Southern Inshore Fisheries and Conservation Authority

Pia Bateman – Chief Executive Officer

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30th April 2024

Dear Member,

MEETING OF THE TECHNICAL ADVISORY COMMITTEE – 9th May 2024

A meeting of the Technical Advisory Committee will be held in the meeting room at Unit 3 on Thursday 9th May 2024 at 14:00 to discuss the business on the under mentioned Agenda. Parking is limited, please consider other forms of transport, or share lifts. The nearby Holes Bay pub/restaurant allows parking if you partake of their refreshments and **ensure you enter your vehicle registration at the bar.** The Premier Inn also allow you to use their parking facilities, **please ensure you register your vehicle at their reception desk.** Poole railway station is approximately a 15-minute walk from the office.

Members of the public can request a guest telephone dial-in code from enquiries@southern-ifca.gov.uk.

Yours sincerely,

Maria Chaplin
Office Manager

AGENDA

1. Welcome

2. Apologies
To receive apologies for absence.

3. Declaration of Interest
All Members are to declare any interests in line with paragraphs (16) and (17) of the Southern IFCA Code of Conduct for Non-Council Members.

4. Minutes – 1st February 2024
To confirm the Minutes of the Technical Advisory Committee meeting held on 1st February 2024 (Marked A).

PROGRESS REPORTS

5. To consider the following:

a) **Chief Executive Officer updates** – To receive an update from the CEO on any matters of relevance.
b) **BTFG Byelaw 2023** – to receive an update from DCO Birchenough
c) **Black Seabream Quantification of Impact Exercise** – to receive a report from DCO Birchenough (Marked B)

ITEMS FOR DECISION

6. Black Seabream: Material Considerations – to consider a report from the CEO (Marked C)

7. Shore Gathering Draft Measures – to consider a report from Senior Policy Specialist Condie and DCO Birchenough (Marked D)

8. Annual review of the Poole Harbour Several Order Management Plan (2024 update) – to consider the report from PO Meredith-Davies (Marked E)

ITEMS FOR INFORMATION

9. Wrasse Fishery Information Report – to receive a report from Senior Policy Specialist Condie (Marked F)

10. Poole Bivalve Survey Report 2023 – to receive a report from IFCO Mullen (Marked G)

11. Solent Bivalve Survey Report 2023 – to receive a report from IFCO Churchouse (Marked H)

12. Fisheries Management Plans Update – to receive a report from PO Wright (Marked I)

13. Marine Licencing Update – to receive a report from IFCO Churchouse (Marked J)

14. Date of Next Meeting

To confirm the date of the next meeting of the Technical Advisory Committee on the 22nd August 2024 at Southern IFCA, Unit 3 Holes Bay Park, Sterte Avenue West, Poole Dorset BH15 2AA.

Note: Item 15 below will involve the consideration of information which is exempt by virtue of Schedule 12A of the Local Government Act 1972 and therefore the public will be excluded during consideration of this item.

15. Poole Harbour Several Order – Request to Amend Business Plan

To consider a confidential report from PO Meredith-Davies (Confidential, Marked K)

MARKED A

SOUTHERN INSHORE FISHERIES & CONSERVATION AUTHORITY
TECHNICAL ADVISORY COMMITTEE – 1st February 2024

Minutes of the Technical Advisory Committee (TAC), held in the meeting room at the Southern IFCA office in Poole at **14:00 on 1st February 2024.**

Present

Dr Antony Jensen	Chairman, MMO Appointee
Mr Richard Stride	Vice Chairman, MMO Appointee
Ms Elisabeth Bussey-Jones	MMO Appointee
Mr Colin Francis	MMO Appointee
Mr Neil Hornby	MMO Appointee
Ms Louise MacCallum	MMO Appointee
Mr Gary Wordsworth	MMO Appointee
Dr Richard Morgan	Natural England
Ms Pia Bateman	Chief Executive Officer (CEO)

Deputy Chief Officer (DCO) Dr Sarah Birchenough, Senior IFCO Ms Emily Condie, IFCO Ms Megan Fullbrook and Office Manager Ms Maria Chaplin were also in attendance.

Mr Stuart Kingston-Turner (Environment Agency), Dr Simon Cripps (MMO Appointee) and Project Officers Mr William Meredith-Davies, Ms Imogen Wright and Ms Chelsea Perrins (PO) attended the meeting virtually.

Apologies

32. Apologies for absence were received from DCO Mr Sam Dell.

Declarations of interest

33. The following pecuniary interested were declared: Mr G Wordsworth (Agenda Item 7 &11). The following non-pecuniary interest were declared: Dr R Morgan (Agenda Item 6 & 7), Mr R Stride (Agenda Item 6) and Ms L MacCallum (Agenda Item 8).

Minutes

34. Members considered the Minutes of the meeting held on the 2nd November 2023, these were confirmed and signed.

PROGRESS REPORTS

35a. Chief Executive Officer Updates

The CEO discussed that following the release of the frontrunner FMPs in December 2023, nationally discussions were now due to take place regarding the implementation of the FMP outcomes. The CEO confirmed that nationally IFCAs are ensuring that they are involved in these conversations, with Tim Smith of the AIFCA representing the collective and from a district perspective, Southern are ensuring that we are in the relevant rooms when it comes to matters of district importance.

The CEO discussed that she would be involved in an FMP Evidence Workshop in February alongside industry representatives and other regulators to begin discussions on evidence gaps. The CEO informed Members, as captured in the pending draft Annual Strategy (for consideration by the Members in March 2024) how Southern are ensuring that our work aligns with the frontrunner outputs and new directions at a district wide level, with application and movement from theory to practice demonstrable at Southern.

The CEO provided an overview of her virtual attendance at the annual Coastal Futures

Conference, describing the underlying theme for this year being 'inclusivity', a model which Southern IFCA champion in the delivery of everyday work and more widely throughout all IFCAs, when considering the IFCA model which seeks to achieve just that. Dr Sarah Coulthard from Nottingham University, who has been working with the AIFCA, delivered a presentation on the challenging participatory decision-making work that IFCAs do. Dr Coulthard did a great job at flying the IFCA flag where she could, but the CEO was disappointed to say that the talk did lead to some less positive conversations regarding IFCAs. The CEO has subsequently spoken with Rob Clark at the AIFCA and the extensive work which Dr Coulthard has achieved will be shared in due course. The AIFCA aims to build on this work, providing a detailed examination of IFCAs and the role IFCAs preform and challenges faced.

The CEO discussed a number of relevant live consultations, to include the recent launch of new measures by the Government to halt and reverse a decline in nature. The CEO described that this comes a year after the publication of the Environment Improvement Plan in January 2023. The main headlines accompanying this announcement were the permanent closure of the North Sea sandeel fishery from April 2024 and further targeted restrictions on bottom trawling. The CEO reminded Members that the MMO last year consulted on proposals to restrict BTFG over reef and rock habitats in offshore MPAs across a further 13 MPA sites. Yesterday it was confirmed that a byelaw will be introduced to bring these proposals into effect.

The CEO described how she was working with national IFCA partners and the AIFCA to consider a joint response to the MMO regarding the preliminary draft management proposals across these 13 MPAs, which is particularly important where the MMO and IFCAs share straddling or adjacent MPAs. Of relevance for Southern is a small section of the Offshore Overfalls MCZ that sits south of Chichester and east of the IOW, a larger (but still relatively small area) sits within the Sussex IFCA jurisdiction.

The CEO described how Southern have been working with colleagues in D&S, Cornwall and the IoS to help frame and support a response from the SW IFCAs to Defra on the introduction of a by-catch only fishery for Pollock by Defra following receipt of ICES advice in mid-2023. The main fisheries for Pollock are west, with less reliance on this fishery in the Southern District when compared with others. This has been quite a complex matter regarding Defra process and procedure and timelines surrounding engagement pre-implementation, as well as management solutions. Industry in general accept that management is required in this fishery and welcome effort control, however, do feel that the bycatch only fishery solution will not be effective and likely have a huge impact on displacement, pressure on other stocks and of course huge socio-economic impacts. The Fisheries Minister Mark Spencer this week confirmed that these fishers will not receive compensation, however, will be encouraged to seek support via the Fisheries and Seafood Scheme to help diversify.

The CEO discussed the closure for crawfish for ICES Area 7 by the MMO. The closure will be in place from 5th Feb to 30 April and has been introduced via a licence variation. From a District perspective, the largest impact is likely further west looking towards our Devon and Cornish colleagues, however, we are aware that crawfish are moving east along the channel, so it maybe in future that this species is more prevalent in the district.

The CEO discussed that the MMO are currently seeking views on proposals to close VIId and the area of Lyme Bay falling in VIIe to king scallop over 10m dredge fishing in summer 2024. The proposed closures are to protect stock during spawning season and limit impact on juvenile settlement. Consultation closes on the 14th Feb.

The CEO provided an update on inshore VMS, in that the rollout programme closed in December 2023. There was an 80% uptake in the under 12 sector. The MMO are asking that all vessels will need to have a type of approved device installed and operating when the new legislation comes into effect, which is anticipated April 2024. The legislation will require all vessels under 12m to have iVMS installed and transmitting data to the MMO when in English waters. The MMO are urging those who have purchased a device to arrange for installation so that they will be complaint when the legislation comes in. The CEO invited those requiring assistance to contact the MMO on a dedicated helpline, details of which can be found on the MMO website.

The CEO finished on an AIFCA initiative, which had been launched in recent months, which are online learning sessions aimed at Members and officers. The CEO provided a summary of the two sessions to date, the first session looked at decision making processes and the role of 'statutory advice' and how IFCA's consider this alongside our legal duties when considering management interventions and the second was chaired by Dr S Cripps and covered Marine Natural Capital. The CEO summarised that both sessions were extremely valuable and that she was pleased to see so many of our Members and staff in attendance.

With regard to the Coastal Futures Conference, Ms L MacCallum agreed with the CEO that fishing was underrepresented at the conference and informed members it was "like the elephant in the room". Despite IFCA and other fisheries representatives being present, none presented. Mr N Hornby advised members that he attended one day this year and agreed that fisheries wasn't well represented.

With regard to Inshore VMS, Mr R Stride informed Members that most fishers he knows have had letters from the MMO, however, it is not in their power to begin installation as the manufacturer has to arrange installation.

35b. BTFG Byelaw 2023

DCO Birchenough advised members that SIFCA made the BTFG Byelaw 2023 at the September Authority meeting with the Byelaw subsequently submitted to the MMO and Defra for consideration in October 2023. The first round of QA from the MMO was received at the end of December and DCO Birchenough outlined that the comments provided by the MMO are currently being reviewed. To date there are no comments which relate to proposed changes to the management itself under the Byelaw.

ITEMS FOR DECISION

36. Black Sea Bream Principles

DCO Birchenough outlined that, at the November TAC meeting, Members were informed that advice was going to be sought from Defra as to the application of the 2024 Government deadline for MPA management to the development of management for Black Sea Bream, which is designated in three of our Dorset Marine Conservation Zones, Purbeck Coast, Poole Rocks and Southbourne Rough. DCO Birchenough outlined that a meeting had been held with herself, the CEO and Defra on this subject. There was a clear indication from Defra that the development of management of Black Sea Bream should be delivered in line with that 2024 deadline.

DCO Birchenough advised members that the discussion with the TAC in November included the potential for pausing this work stream dependent on the outcome of the conversation with Defra, based on the steer received from Defra two Member Working Groups have been held in January 2024 to progress this workstream. DCO Birchenough thanked the Members for their input into the working groups.

DCO Birchenough outlined that the paper presented to the TAC at this meeting outlined General, Evidence and Spatial principles to underpin the development of management for black seabream in the three Dorset MCZs.

DCO Birchenough advised Members that the IFCA duties for management within MCZs are set out in the Marine and Coastal Access Act, where Southern IFCA are required to ensure that the conservation objectives of MCZs are furthered.

DCO Birchenough outlined the General Principle which covers a definition of 'further' in line with the Oxford English Dictionary definition, and the Evidence Principles which outline the four evidence sources used to inform nest locations for black seabream and how any additional evidence sources, post a certain date, would be considered either through the Formal Consultation Phase or in subsequent byelaw reviews as determined under the provisions of any byelaw which is developed.

DCO Birchenough outlined that the four evidence sources had fed into the development of the Spatial Principles and passed to Senior IFCO Condie who provided a more detailed overview of the process which was followed in the development of each of the 6 Spatial Principles, resulting in the development of 'Indicative Habitat Areas'.

Senior IFCO Condie outlined that 'nest data' had been used, in combination with a 'GPS Buffer' of 10m to create 'nest units' and that were three or more nest units existed within 320m of each other these would be grouped to form 'hotpots'. The cumulation of this process is the identification of the 'Indicative Habitat Areas'.

Mr R Stride asked, given those characteristics how significant is the existence of a nest, a position of a nest and then a buffer around that. He commented that on the basis of the principles, the denser the nests are then that becomes an area which is of greater interest, however the hotspot areas seem like a very low density.

DCO Birchenough explained that the identification of nests is based on the current best available evidence of where nests have been mapped. The presence of a nest indicates that the area is suitable nesting habitat and thus grouping nests to form indicative habitat can only be done based on the current best available evidence. It is recognised that the nests won't necessarily be found in exactly the same locations each year but the evidence used is the only evidence currently available to indicate where this suitable habitat may be found.

Mr R Stride queried whether the Conservation Objectives require the nesting areas to be maintained in favourable condition and questioned how a nest would end up in unfavourable condition unless it was fully covered with sediment or had fishing gear towed over it.

Dr A Jensen suggested that during the winter storms, bad weather events can redistribute sediments and would potentially affect the area used, and then the following year, the bream would determine the best nest locations based on conditions. Dr A Jensen advised that he is not aware of any data that suggests bream return to the same nest in subsequent years.

DCO Birchenough advised that there is a need to consider the impact of fishing gear on the eggs which are present on nests in addition to the nest itself, as well as the impact that removing the guarding male fish would have on spawning success.

Dr A Jensen explained that whilst reading the Marine Licensing agenda item, there was a suggestion that there is disposal of dredged material occurring at a site near Swanage. Dr Jensen said he was under the impression that the Swanage dumping site off Old Harry Rocks had been closed down and, if not, whether the MMO were aware of the proximity to the designated areas for black seabream and the potential impact from dredge disposal on nests. DCO Birchenough responded that the IFCA is able to comment on the relationship between licence applications and fishing activity, it is the remit of other bodies such as Natural England, to respond to licence applications in relation to features of designated sites.

Mr N Hornby asked whether there was a proposal to consider temporal management under the principles DCO Birchenough explained that a consideration of any seasonal element to management will come through discussions on what type of management may be required once the General, Evidence and Spatial principles have been considered. Members will need to consider what they feel “furthering” the conservation objectives looks like. This will consider application of spatial areas, consideration of whether any management should be seasonal and what measures may be required for different gear types.

Mr N Hornby suggested that there could be temporal measures without a spatial element. DCO Birchenough explained that this would be moving towards whole site management as opposed to feature-based management. The Southern IFCA’s legal duties are for feature based management within MCZs. The feature is Black Seabream with the conservation objectives relating to the spawning habitat, and the use of this habitat.

Ms L MacCallum asked what percentage of the habitat is suitable and is included in the Indicative Habitat Areas that had been outlined. She stated that, if the black seabream are not fixated on a specific spot, and that each year they can nest in these areas, then temporal measures would make sense because it can’t be predicted year to year where the nests are going to be. DCO Birchenough explained that we can quantify the percentage of ‘nest data’ or ‘nest units’ that are included in Indicative Habitat Areas but not the percentage of overall suitable habitat as the only evidence available to indicate where this is, is the nest data from the identified evidence sources.

Dr S Cripps stated that if the area for management was of sufficient size to allow black seabream to move around from year to year then there wouldn’t be a need for temporal measures. As there is limited data available, would there be a requirement for a large enough area to allow for variation in nest location. He queried how often surveys are carried out to determine where nests are located and whether the areas identified for management would be in place, for example, for the next 10 years or whether they would be re-evaluated year on year because nests move around.

DCO Birchenough advised that Southern IFCA would look to Natural England to provide any updated evidence on nest location resulting from any additional survey work. There is an ongoing tagging project for black seabream, actively tagging bream in the Dorset MCZs, therefore there will be data available from this project over the next couple of years which may help inform future management.

The CEO discussed why the spatial principles have been built from nest data to create Indicative Habitat Areas. The nest data represents where spawning habitat is located and is currently the best available evidence, the development of Indicative Habitat Areas from this data has increased the size of the areas of spawning habitat from 21 to 222 football pitches in size. At subsequent Working Groups Members will be able to consider how to apply these areas in the development of management measures.

Dr Jensen reflected that Members generally appear to be supportive of the principles presented in the paper. He acknowledged the useful discussion on more detailed management measures but reminded Members that, at this meeting, the consideration needs to be on the General, Evidence and Spatial principles.

Mr N Hornby asked whether the available evidence was of sufficient quality to be able to take a spatial decision. He queried whether the Authority can know that it is protecting the right areas.

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Dr Richard Morgan advised some degree of caution is often the case with providing data. Ultimately it will still come back to the suitable habitat, so the nest data that is available is indicative of where this suitable habitat occurs. He referred to the reference in the Conservation Objectives that black seabream should be free of disturbance when they aggregate. He outlined that if there is only a focus on nests, then the aggregation element may not be fully considered. He outlined that the collection of data on suitable habitat requires a large amount of work and that there are sometimes issues with data collection, such as the Cefas survey which was affected by weather conditions. He commented that Matt Doggett has done a lot of work on identifying the location of bream nests and behaviours.

Ms E Bussey-Jones queried whether single, or double nests which do not form part of the Indicative Habitat Areas under the prescribed methodology would then therefore be just as important as they are indicating that suitable habitat is present.

Mr C Francis commented that the concern amongst the angling community is that there's going to be large scale closures to their activities. He commented that black seabream are thriving as a population and spreading, yet management may affect all the angling activity which takes place in these areas.

Mr R Stride reiterated that the criteria for calling a particular set of nests a hotspot was actually quite a low density of nest units based on it being three or more within in 320 meters of each other.

The CEO informed Members that there will be a need for Members to consider what percentage of these Indicative Habitat Areas identified may require management in order to satisfy a furthering of the Conservation Objectives. It will be key to define what 'further' means in this context and how the Authority can demonstrate that it is meeting its legal duties. For the Indicative Habitat Areas that have been discussed, there may or may not be a need to manage all of these areas, rather, depending on the Members consideration 50%, 80% or another percentage for example, may require management in order to achieve 'further'. At this point, a good working model has been developed.

Mr C Francis queried the compliance and enforcement element, stating that if the areas for management are too large the IFCA will be unable to enforce them.

Mr N Hornby asked if the principles are agreed whether management can then only be considered for these areas or whether management could be considered more widely at the next stage. The CEO described the iterative process, in that the principles will remain in draft format but at this stage allow us to maintain momentum in evolving this area of work.

Ms E Bussey-Jones proposed the recommendations which were seconded by Dr A Jensen. Four Members voted in favour of the vote (Dr A Jensen, Ms E Bussey-Jones,, Mr N Hornby and Mr G Wordsworth). The following members abstained, Dr R Morgan, Mr C Francis, Mr R Stride and Ms L MacCallum.

Resolved
37. That Members agree the General, Evidence and Spatial Principles.

38. Poole Harbour Dredge Permit Byelaw HRA 2024-2025

DCO Birchenough outlined that the Poole Harbour Dredge Permit Byelaw HRA relates to the Poole Harbour Dredge Permit Byelaw which regulates the use of dredges within Poole

Harbour. The byelaw has been in place since 2015, and every year there is a requirement to review the HRA, related to the issuing of permits under the byelaw, to make sure that the Southern IFCA continues to meet its legal duties for Poole Harbour as a designated site, and the management provided by the byelaw continues to provide suitable mitigation for that purpose.

DCO Birchenough outlined that 45 permits are issued each year, with the proposal that the same number is issued for the coming season, which starts on the 25th May 2024. DCO Birchenough stated that the HRA has been reviewed, and that there has not been a permit condition review since the previous season, therefore there are no changes in management to consider Data has been updated to include landings from the previous season and outputs from the 2023 stock assessment. Both of those indicate that the stocks continue to be sustainable. It was noted that landings have been up on the previous couple of years and although not as high as for 2020. There is no indication from the stock survey that any impact is being felt on the stock and there have been no changes related to the designation of the Harbour that require consideration. Therefore, the conclusion of the HRA was that the management continues to meet the requirements of the site and the issuing of 45 permits for the coming year will not have an adverse effect on Poole Harbour as a designated site.

DCO Birchenough outlined that two inconsequential amendments had been made to the HRA, based on Formal Advice received from Natural England, which could be accepted if Members agree this is appropriate. The updates were to one of the tables which references draft supplementary advice for conservation objectives, which is now formal advice, and an update to reflect that the water bird assemblage covers all of the relevant species as well as those specifically named. DCO Birchenough outlined that there were no other amendments required following the receipt of Formal Advice from NE and that NE supported the conclusion of the HRA.

Mr R Stride proposed the recommendation which was seconded by Ms E Bussey-Jones. All members were in favour with the exception of Mr G Wordsworth who abstained.

Resolved
39. That, based on the evidence provided in the HRA, Members agree the issuing of 45 permits for the 2024-25 season under the PHDP Byelaw.

40. That Members authorise inconsequential amendments to be made to the HRA as required following any advice received from Natural England.

ITEMS FOR INFORMATION

41. Wrasse Fishery Report 2023

Senior IFCO Condie provided a summary of the data outputs and fishing activity from the 2023 wrasse season. The fishery took place over a 12 week season starting from 1st July. Communication was maintained with the fishers and buyers throughout the season which allowed for a proactive approach to monitoring landings. The fishery concluded with no trigger points, as outlined in the M&CP for the fishery, being reached. Senior IFCO Condie outlined the compliance and enforcement work that had been carried out in relation to the fishery and that the Southern IFCA will continue to monitor the fishery in line with the Wrasse Fishery Guidance, M&CP and the MCRS Byelaw for the 2024 season.

Dr A Jensen queried whether there was any information on how the wrasse are processed once they reach the salmon farms in Scotland and whether there are any reports on the welfare of the fish. It was asked whether more detail could be provided to Members on what happens once the fish have fulfilled their role in relation to salmon farming and whether there are any concerns in this regard.

Recommendation
42. That Senior IFCO Condie explore matters concerning wrasse welfare following capture and report back to the TAC.

Resolved
43. That Members note the update.

44. Fisheries Management Plans

DCO Birchenough presented the report and provided an update on the Authority's work under the FMP Program to support Defra's delivery of the Fisheries Act Objectives. DCO Birchenough outlined work undertaken by Southern IFCA under the FMP program since autumn 2022 outlining that the IFCAs, through the AIFCA, had been invited to provide this information to Defra to support reporting on the provision of Defra funding for this workstream. DCO Birchenough also provided updates on five published frontrunner FMPs under T1 and T2 and progress updates on the development of relevant T3 FMPs, Skates and Rays, Queen Scallop and Cockle. The deadline for submission of T3 FMPs to Defra by Delivery Partners for QA is 9th February 2024.

Resolved
45. That Members note the update.

46. Marine Licensing Update

Senior IFCO Condie provided an update on Marine Licence Applications that the Southern IFCA have received as a consultee, from the MMO. Between November 2023 and January 2024 two MLAs required a response, two MLAs were deemed to not require a response. Detail on the two MLAs requiring a response was provided as part of the report.

Dr A Jensen queried the use of the Swanage Bay disposal site under one of the MLAs listed in the provided table and how the suitability of this site is assessed and how it relates to the presence of fisheries and features of relevant MPAs.

Recommendation
47. That DCO Birchenough seeks further information on the use of the Swanage Bay disposal site from the MMO and report back to the TAC verbally.

Resolved
48. That Members note the update.

49. CONFIDENTIAL Poole Harbour Several Order – Request to Amend Business Plan

In accordance with the consideration of information which is exempt by virtue of Schedule 12A of the Local Government Act 1972 the public were excluded from the meeting (virtually and in person) during consideration of this item.

MARKED A

SOUTHERN INSHORE FISHERIES & CONSERVATION AUTHORITY
TECHNICAL ADVISORY COMMITTEE – 1st February 2024

Following an overview provided by IFCO Fullbrook, regarding a change in methodology for a number of lease beds in Poole Harbour, Members considered the recommendations.

Ms E Bussey-Jones proposed and Mr R Stride seconded, all Members eligible to vote were in favour.

Resolved
47. That Members approve the proposed changes to the Business Plan 2020-25 for Lease Beds 1, 5, 9, 11 and 12.

Date of Next Meeting
50. That the meeting of the TAC will be on the 9th May 2024 at Southern IFCA, Unit 3 Holes Bay Park, Sterte Avenue West, Poole Dorset BH15 2AA.

There being no further business the meeting closed at 16:25

Chairman: **Date:**

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Southern IFCA Inshore Fisheries and Conservation Authority

EXECUTIVE SUMMARY

Marked B

Black Seabream Quantification of Impact Exercise Progress Report

Report by DCO Birchenough

A. Purpose

For Members to receive a report detailing the outcomes of a quantification of impact exercise based on an initial iteration of draft measures for black seabream in three Dorset MCZs.

B. Annex

Outputs from the Quantification of Impact Exercise in relation to an initial iteration of draft measures for the management of black seabream in three Dorset MCZs

1.0 Introduction

- The Quantification of Impact Exercise (The Exercise) considered the potential impacts of an initial iteration of draft measures for black seabream in three Dorset MCZs; Purbeck Coast, Poole Rocks and Southbourne Rough.
- The Exercise sought information on economic impacts, impacts to associated businesses and wider impacts covering social, cultural, heritage and community. In addition, data was collected on fishing activity and any mitigation measures already employed by a particular sector.
- The resulting report is not a full Impact Assessment (a formal document required to support a Byelaw), rather it is a report on outcomes from The Exercise to provide an initial understanding of potential impact.

Considerations

The Exercise was framed around the following considerations:

- That black seabream are designated in three Dorset MCZs; Purbeck Coast, Poole Rocks and Southbourne Rough.
- That within each MCZ, Indicative Habitat Areas (IHAs) have been defined using a prescribed formula, considered and agreed by the Authority at the meeting of the Technical Advisory Committee on 1st February 2024.
- That there are 13 IHAs across the three MCZs; 10 in Purbeck Coast, 2 in Poole Rocks & 1 in Southbourne Rough
- That an initial proposal of draft measures would mean that all fishing, both recreational and commercial, across pots/traps (pelagic and demersal), nets (pelagic and demersal) and lines (pelagic and demersal) would be prohibited within these IHAs - no take zones.
- That the prohibition would be seasonal from 1st April to 31st July each year.

Rationale and evidence to justify the level of analysis

- Due to the nature of the IHAs being smaller areas within the wider MCZ boundary, data available through data sharing channels i.e., Marine Management Organisation (MMO) landings data was deemed to be insufficient in isolation to determine the potential impact to commercial fisheries due to a disparity in spatial scale.
- The data available through data sharing channels on recreational fisheries encompassing both the charter fleet and private recreational sea anglers (RSA) was insufficient to be able to determine impact at an appropriate spatial scale, the only data publicly available being that in published studies on these sectors.
- On this basis Southern IFCA have sought impact information from the following sources:
    - **Targeted engagement with stakeholders** – a Direct Engagement Exercise was completed, speaking with key individuals across the potentially affected gear types/sectors/geographic areas to understand specific impact information related to the IHAs.

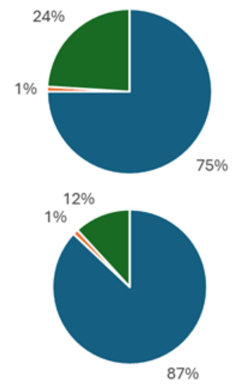
- 23 stakeholders spoken to
  - 6 stakeholders in the charter vessel sector
  - 4 stakeholders in the RSA sector
  - 15 stakeholders in the commercial fishing sector (covering 3 gear types)
- Meetings held in person at the office or local ports (x13) or by telephone (x1)

- **Data available online on charter vessels** – data has been obtained from publicly available online sources in relation to charter vessels operating from key ports in the District. This data consisted of costs for trips, number of trips within the April to July season, number of anglers per trip and any other relevant information.
- **Data obtained from the MMO** – data has been obtained from the MMO under the Environmental Information Regulations 2004 for specific vessels known to operate in IHAs for the period April to July for 2018-2023 providing five years of data *(2020 was not included due to changes in normal patterns of fishing as a result of the Covid-19 Pandemic).*
- **Data obtained from literature** – information sourced from published papers or reports, aiming to provide an initial indication of wider economic contributions of different sectors and participation in recreational fisheries.

2.0 Summary of Key Points

- The following sections of the report detail economic outputs and cumulative assessments from the three data sources specific to the IHAs and relevant vessels:
  - **Section 1.4** – Direct Engagement Exercise
  - **Section 2** – Online data for charter vessels
  - **Section 3** – MMO landings data
- A cumulative assessment was then carried out for these three data sources to look at the total potential economic impact of the proposed draft measures (**Section 4**), this is presented in the table below.
  - Two pie charts show the proportion of total potential economic impact attributed to each sector using Direct Engagement Data for commercial impact (top) and MMO data for commercial impact (bottom – *note this only includes economic impact related to landings, other elements which were covered in the Direct Engagement Data such as gear loss are not represented in the MMO landings data*).

Data Source	Sector	Value	Report Page No.
Engagement Data – Area Specific	Charter vessel	66,750.00	30
	RSA	12,800.00	30
	Commercial	306,980.01	31
Engagement Data – Not Area Specific	Charter vessel	78,760.00	31
	Commercial	7,000.00	31
Online data for charter vessels		834,600.00	32-34
Total		**£1,306,890.01**	
MMO Landings Data		133,396.38	35
Total		**£133,396.38**	



■ Charter Vessel ■ RSA ■ Commercial Fishing

- A summary of wider impacts (non-economic) is presented in **Section 5** of the report as extracted key words/phrases from the Direct Engagement Exercise and the potential cascade effect on other businesses/industries/groups.
- Southern IFCA would like to thank all stakeholders who participated in the Direct Engagement Exercise and provided data to support the development of this report.

3.0 Next Steps

- That Members receive the report.

Marked B – Annex 1

Outputs from the Quantification of Impact Exercise in relation to an initial iteration of draft measures for the management of black seabream in three Dorset MCZs

This document details information resulting from a quantification of impact exercise carried out in relation to an initial iteration of draft measures for black seabream in three Dorset MCZs. This document is not an Impact Assessment, it provides outputs to inform an initial understanding of impact.

The initial iteration of draft measures being explored were discussed by the Authority through a Working Group, based on consideration of General, Evidence and Spatial Principles defined at the February 2024 Technical Advisory Committee Meeting. The initial iteration of measures was:

- All fishing, both recreational and commercial, across pots/traps (pelagic and demersal), nets (pelagic and demersal) and lines (pelagic and demersal) would be prohibited within Indicative Habitat Areas (IHAs).
- That the prohibition would be seasonal from 1st April to 31st July each year.

Data has been sought from a variety of sources including through a Direct Engagement Exercise with the charter vessel, recreational sea angling (RSA) and commercial fishing sectors, publicly available online data on charter vessel operations and Marine Management Organisation (MMO) landings data. There is an additional section which details examples of additional data from literature that can also be interrogated to explore wider impacts.

Contents

Impacts

Information on Impacts is split into sections:

- Impacts from the Direct Engagement Exercise – Impacts by Gear Type
- Impacts from the Direct Engagement Exercise – Impacts by IHA
- Online Data for Charter Vessels
- MMO Landings Data

For potential quantified economic impacts, a summary and cumulative assessment is provided at the end of each section. This data is then compiled under Section 4 into the Cumulative Assessment of Potential Economic Impact from Available Data. Information from the Direct Engagement Exercise has been summarised as far as possible for each sector/gear type and then for each of the IHAs.

Note that in all cases economic value relates to first sale value, direct cost for customers on charter angling trips etc. this should not be taken to reference the final income earned by a particular fisher or business as there will be outgoings as well as income. Examples provided for *economic impacts are based on information received during direct engagement, this is therefore in most cases an estimation rather than a definitive value, however the level of detail provided in order to report these examples is at a level where there can be confidence in the values presented.*

1. Direct Engagement Exercise Data

1.1 Impacts from Direct Engagement - Impacts by Gear Type

For impacts by gear type, the monetised costs have been split down to specific gear types as far as possible. For impacts to businesses and wider impacts (social, cultural, heritage, community) these are often applicable to multiple gear types due to the need for the inshore sector to be able to diversify, therefore these are presented as general points.

Specific data which is not monetised data is provided in Annexes 1 and 2.

Pots/Traps (Commercial)

Fishing Activity – General

- For pot fishing there is a need to be able to access areas which are not affected as much by the tides, tidal patterns introduce natural restrictions in lot of otherwise good fishing ground within the Purbeck Coast MCZ.

Monetised – General Points

- When the weather is more inclement, and when winds are blowing from the S or SW then there is a need to move fishing gear from closer inshore into Area 3, the deeper water in these conditions is safer for pots, without doing this there is a significant risk of losing gear.
- For both potting and netting, restrictions within areas 1-3 will push fishing vessels further east, this will increase the fuel required and thus fuel costs, reducing the profit margin associated with any catch.
- Some fishers build their own pots due to the prohibitive cost of purchasing new pots. The time required to build a new pot is time that is not spent fishing and earning money.
- Bait for pots can be caught by the fisher rather than being purchased to reduce costs, this is often caught in nets within similar areas to bream nests (targeting wrasse and other similar species).

Monetised – Additional Costs

- If bait could not be caught and had to be purchased, this could account for 20-30% of a fisher's income as a minimum
    - Example:
        - 250 pots required £100 per day spend on bait if purchased
        - This is based on a small vessel
        - 2-3 fishing days per week = £300 per week (3 days)
        - 16 weeks April to July = £4,800

Monetised – Gear Loss

- Example:
    - String of 20 pots
    - 3x strings needing to be set in Area 3 = 60 pots
    - Loss of gear = £100 per pot = £600, plus costs of ropes & anchors
    - Time lost in replacing pots when no fishing can take place
- The initial iteration of a seasonal period overlaps with the most productive and settled time of year for pot fishing when it is likely that fishers would be able to have more fishing days and more success from individual fishing trips.

Impacts on Associated Businesses

- 2 pot fishing boats support 3 local businesses in selling locally caught seafood.
- One further boat supports 4 main local businesses who purchase seafood only from that vessel
    - At least half the catch is sold locally
    - It has taken a long time to build these relationships
    - These businesses are high end and only want to serve locally caught catch

Monetised - Impacts on Associated Businesses

- Example: Fishing vessels operating out of Swanage support the use of sheds for storing equipment, conducting maintenance etc. this requires an outlay of £800 per year per shed, up to 8 sheds = £6,400 income for that business.

Wider impacts – Social/Cultural/Heritage/Community

- There are only two vessels which operate out of Kimmeridge, these restrictions may make the operations of these vessels unviable which would lead to the fishing heritage being lost from Kimmeridge.
- For potting and netting, the areas around Purbeck Coast, encompassing Areas 1-7 constitute ancestral fishing grounds, fishers operating in this area can be up to 11th generation.

Nets (Commercial)

Fishing Activity Points - General

- Many fishers operating in these areas are not targeting black seabream, the mesh used is often around 5.5 inches, designed to catch bigger species.

Wider impacts – Social/Cultural/Heritage/Community

- For potting and netting, the areas around Purbeck Coast, encompassing Areas 1-7 constitute ancestral fishing grounds, fishers operating in this area can be up to 11th generation.
- In Lulworth Cove there are only 2 surviving full time fishermen, the introduction of seasonal restrictions for Areas 1-3 in particular would make it likely that the fishing

industry would not be able to be maintained in Lulworth Cove and thus that heritage would be lost.

Lines (Commercial)

Monetised – General Points

- There are 8-10 commercial rod and line vessels operating out of Weymouth, mainly targeting bass, some target bream in smaller numbers.

Lines (Charter Fishing)

Fishing Activity Points - General

- The method of fishing has not changed and the number of trips have not increased to a large degree, however bream catches have increased (see Annex 1).
- With changing weather patterns, the period of April to June has become the best weather window of the year.
- Many of the charter vessels operating out of Poole run inshore trips only as these are favoured by a greater variety of people, are more likely to go ahead in a greater variety of conditions, incur reduced fuel costs and reduced transit time which all results in more time available for fishing. The proximity of good fishing areas to Poole also allows half day and evening trips to be run as well as full day trips.

Monetised – General Points

- Bream trips inshore have the best profit margin, fuel takes approximately 10% of the profit. For bass trips & wreck fishing, fuel takes approximately 25-30%.
- Businesses which sell bait/tackle and book trips on behalf of charter boats will be affected by any loss of charter operators.
- Charter vessels out of Weymouth rely on bream fishing during April to July, this is in part due to the decline in pollack stocks which used to be a target species for Mar-May. Fishing for bream during this period has been important for the last 5-7 years, it is a good fish for charter vessels, the best areas for fishing are sheltered, there is a good guarantee that a customer will catch a fish.
- January and February are quiet months for charter vessels, to fish for black seabream on the areas identified is the basis on which a lot of trips are undertaken and booked out by anglers during the April to July period – which supports the business throughout the quieter months - therefore this is integral to charter businesses being profitable each year.
- Charter angling trips during April to July (which are largely dependent on access to some of the IHAs) are booked up months in advance, dependent on when any regulations were introduced, a business may have trips for those months fully booked which would then have to be cancelled and refunded. Business plans are built in advance based on trips being booked well in advance and similar patterns of activity occurring each year (i.e., trips being booked solid during April to July), anticipated profits and costs are built on this model and allow charter vessels to understand their business inputs and outputs for each year.
- Over the past 10 years, wreck fishing has become less viable, catches have decreased, this type of fishing has become more winter based for charter vessels. Fishing in the

inshore area for bream and other species has become more viable during the summer months.

- Where there are declines in other species such as cod and pollack and restrictions are being introduced (pollack) there is a need to be able to diversify to other species to maintain a charter business.
    - If bream management of closures in IHAs are introduced in addition to current restrictions being faced in relation to pollack, bass restrictions and declines in other species, cumulatively this would make charter businesses unviable.
- Some anglers will do 20-30 angling trips per year with the same charter vessel provider which provides support to the business. This is based on the perception of the area being good for fishing, the ability to catch a variety of species, the experience and expertise of the charter businesses built up over many years, good facilities in local areas and relationships built with business owners and skippers.
- Some charter vessel business owners/operators have run their business for their whole working life, it is often a generational business within the family which is passed down and has taken many years to build up and establish a reputation which results in repeat customers and more interest from new customers.
    - Skills have been developed based on this business therefore there is limited ability to diversify into a different industry and very limited ability to work outside of fishing unless re-training is undertaken (expensive and time consuming) to earn an income similar to that derived from the charter business.
- Weymouth and Poole are home to the largest charter fishing fleets in the country.
- Any increased costs in fuel due to the need to get to other areas further afield if some inshore areas are closed can't be passed onto the customer as increases in the per person cost of a trip will reduce interest and particularly affect repeat custom which is vital to a charter business. Therefore, the charter vessel would have to reduce the profit margin to accommodate increased fuel costs.

Monetised – Losses (across all areas)

- Example: bream fishing across all areas accounts for 1/3 of income, these trips equate to 20-30 trips per month between April and July, 7 fishers per trip, £100 per person
    - £700 per trip
    - £14,000 to £21,000 per month
    - Four months = £56,000 to £84,000
    - 1/3 of income = £18,666.67 to £28,000
    - 6 people are dependent on the income from this business
    - Removal of this 1/3 of income would make business unviable
- Example: one business earns 60% of its income from working with charter businesses to book trips and sell equipment/bait.
    - Business is open 7 days per week during the seasonal period and works with 5-6 charter vessels, 3 of these do all their bookings through this business
        - Bookings are for 8-12 people, £75 per person per day (or private charter of £750 for the vessel), or for half-day trips £40 per person.
        - If all weekends were booked for the seasonal period
            - 17 weekends = 34 days
            - Based on day trips = between £25,500 (based on all being private bookings) to £30,600 (based on all being individual anglers)

- Between £6,375 to £7,650 to booking business
- Between £19,125 to £22,950 for charter vessels (between £6,375 to £7,650 per vessel based on 3 main vessels)

Impacts to associated businesses

- The impact to the charter fleet will be felt up the line to all associated businesses. There is the potential for charter businesses to become unviable as a result of the proposals, and on that basis, business would be lost to businesses including local marinas, tackle shops, accommodations, food & drink businesses, boat builders and boat mechanics.
- The Dorset coast has a well-established good reputation for angling, there is a good variety of species and areas which are available across the year meaning that there are always fishing opportunities. People will travel long distances to fish on this part of the coast. If these areas are prohibited areas during the season there is a risk that this reputation will be affected resulting in less visiting anglers and overall tourism.
- If there are too many restrictions impacting charter fishing on the south coast and anglers don't know if they are going to get enough benefit for the money spent, then it will become more appealing for anglers to go abroad to fish. On this basis all the associated impacts of tourism and the boost to local communities and economies will be lost.
- Charter skippers will purchase bait from local supplies as this is often included in the cost to the customer booking a place. If this is no longer required, it will impact the businesses selling bait and those collecting it.
    - Anglers prefer to purchase their bait from local sources.
- Bait and tackle shops would be affected by any impact on charter vessels and the RSA sector, there are several shops local to the Poole area that are already struggling, concern that these measures would make these businesses unviable (*There are three main tackle shops known in the Poole area, it is not known how many of these relate to this comment but at least 1*).

Wider impacts – Social/Cultural/Heritage/Community

- Charter angling provides an opportunity for different groups of people to get involved in sea angling, see the local coast and appreciate the value and importance of local species and locally caught catch. The different variety of trip types; day trips, half day, evening trips and for different species allows participation from experienced anglers to tourists.
- Charter angling also allows for people who are disabled to go fishing who might not otherwise be able to go to sea in smaller private vessels and for children to go angling to experience the coast, learn about the importance of sustainability and appreciate what is under the sea locally – promoting local seafood.
- Charter angling trips during April to July are booked up months in advance, dependent on when any regulations were introduced, a business may have trips for those months fully booked which would then have to be cancelled and refunded, this may impact people's holidays, booked accommodation etc. and would severely impact repeat custom.
- Some charter vessel business owners/operators have run that business for the whole time that they have been engaged in work, it is a generational business within the family which is passed down and has taken many years to build up and establish a reputation which results in repeat customers and more interest from new customers.

- Charter vessels rely on being able to fish in the summer, in the winter when there are few customers and much less business, operators will be able to see other gear types operating in those areas and catching bream as these activities continue through the winter, however having these areas open during the winter is not helpful for the charter fleet.
- Poole is known as one of the best angling competition venues in England. Any effect on the ability to hold those competitions would affect the perception of Poole and the heritage of the angling communities which have operated out of here for many generations.

Mitigation Measures Already Employed

- Many charter vessels already employ methods to promote good stock management for black seabream, for example an increased minimum size (30cm quoted), a bag limit per angler (5 fish quoted or a number of fish per hour) and other measures (returning all females or returning all egg bearing females or returning mature males all quoted).
  - The attitude of anglers has changed, it is no longer about taking as much as possible in a trip, majority is catch and release, there is a good awareness of the need for conservation hence voluntary measures being used by charter businesses and angling clubs.
  - Charter vessel operators find that male black seabream are only interested in the bait on hooks once they have finished nest guarding. There are periods where very few black seabream will digest bait to the point where they are then caught, during the guarding phase they will attack at hooks/bait but not take it into their mouths. There is then is a period where catches increase as the males have finished nest guarding and are hungry as they don't feed when guarding, then they will take the bait and be caught. Once another spawning round starts catch rates go down again. Catches therefore come in waves throughout the nesting season.
- Some charter vessels recommend the use of circle hooks and sometimes barbless circles, however even when using J hooks, the use of short lines results in the majority of fish being hooked in the mouth. Black seabream tend to take bait quickly resulting in mouth hooking rather than ingesting bait to the point of becoming deep hooked.
- Charter vessels already self-manage the fishery through their own policies for their boats, they also work as a community to monitor generally what measures are being used by each boat and encourage those that don't to adopt these as well as passing best practice onto RSA who use their boats. These measures are likely to result in many charter business becoming unviable, the loss of this industry would lose all the benefits outlined here.

Lines (RSA)

Fishing Activity Points - General

- Between April and July there may be up to 50 RSA vessels operating across Purbeck Coast, Poole Rocks and Southbourne Rough.
  - There may be up to 10 vessels operating over Poole Rocks at any one time.
- Angling clubs run a species competition throughout the year, points are awarded for different species caught.

    - Example from one club: black seabream are worth 5 points each up to the first five fish caught for the year, after this they reduce to being worth 1 point each. This is designed to avoid anglers over targeting one particular species and spreads the effort amongst all species including in the competition over the course of the year.
    - Species competitions are an integral part of angling clubs and the tradition goes back a long way, the more reduction there is in the species that can be caught the less people will want to participate or be part of clubs.
- One RSA vessel recorded black seabream caught as part of RSA competitions, recording catches between April and October for 2023 (Annex 2).
- Anglers will book up charter trips and competitions a year ahead, with the release of new tide books around October, at this point bookings will be made for the following year.
- Fishers out of smaller ports along the Purbeck Coast are very limited in their range to access fishing grounds.

Monetised – General Points

- There are limited areas where visiting RSA can launch boats from, there is often a cost associated with launching and considerations around the travel required to get to a particular coastal location. If fishing opportunities are limited then there will be fewer visiting boats as the cost will outweigh the benefit, this may impact the income received from launching areas (local port or council).
    - PHC Baiter Slipway Poole = £17.30 (between 6am – midnight), £13.80 (between 2.30pm - midnight) per boat
    - Mudeford Quay = £12.50 per boat
    - Swanage = between £5.00 (kayak no trailer storage) to £30.00 (any size boat/jet ski and trailer storage over 4.5m). An annual pass is available for £270.00
    - Weymouth = £13.75 (between 6am – midnight), £11.00 (between 2.30pm - midnight) per boat, yearly permit £178.75, with trailer parking £294.25
    - Kimmeridge = £20.00 per boat
- RSA who are keeping a boat locally need to pay for marina fees/mooring fees – the benefit from undertaking the activity needs to outweigh the cost of keeping the boat.
- RSA who belong to clubs pay membership fees which support the club each year, clubs which are based predominantly around boat angling will only be able to continue with a sufficient level of membership
- Angling clubs have sections – shore, pier, charter and small boat (commonly)
    - The charter section of clubs is comprised of both local, regional and potentially national members who travel to the local area to take part in charter trips. Membership of the club through this section is predicated on anglers being able to take part in charter trips, charter vessels will work with specific clubs and set aside days that are solely for club use. These members tend not to have their own vessel therefore without access to charter vessels they can't go fishing and wouldn't receive any benefit belonging to an angling club.
- The areas in Poole Rocks and Southbourne Rough could possibly be navigated around, however it would depend on the location of individual fishing marks.
- Impacts to the level of RSA activity would impact local tackle shops
    - 3 main shops supplying the local Poole area
    - The cost of bait is increasing, around £24 per lb – loss of this income would have big effect on small businesses that rely on support from local anglers and anglers using charter vessels

Monetised – Angling Clubs

- Example: one local angling club has 200 members operating with 100 boats
  - Initial membership fee £20 = £4,000
  - Individual membership = £45 per year or £50 per year for family membership = £9,000 (based on all members holding individual membership – *it cannot be quantified how many hold individual and how many hold family membership*)
  - Not known how many Members would be affected so not included in impact tables in Section 1.4.
- Example: One local club has 20 Members in the charter section at a cost of £10 per year for year 1 and £15 per year for year 2
  - On the basis of all members being in year 2 = £300 income per year for the club
  - There are approximately 24 trips per year run through the charter section with approximately 8-12 anglers participating per trip, anglers are still required to pay the charter vessel fee, £70
    - Between £560 - £840 per trip for charter operator
      - 24 trips = £13,440 to £20,160 per year for charter operator

Impacts to associated businesses

- The Dorset coast has a well-established good reputation for angling, there is a good variety of species and areas which are available across the year meaning that there are always fishing opportunities. People will travel long distances to fish on this part of the coast. If these areas are prohibited areas during the season there is a risk that this reputation will be affected resulting in less visiting anglers and overall tourism.
- Bait and tackle shops would be affected by any impact on charter and the RSA sector, there are several shops local to the Poole area that are already struggling, concern that these measures would make these businesses unviable (*There are three main tackle shops known in the Poole area, it is not known how many of these relate to this comment but at least 1*).

Wider impacts – Social/Cultural/Heritage/Community

- The Dorset coast has a well-established good reputation for angling, there is a good variety of species and areas which are available across the year meaning that there are always fishing opportunities. People will travel long distances to fish on this part of the coast. If these areas are prohibited areas during the season there is a risk that this reputation will be affected resulting in less visiting anglers and overall tourism.
- There are already many restrictions placed on RSA; bass restrictions, fewer of other species such as plaice, flounder and ray species, less mackerel for both catching and use as bait. Black seabream has become one of the staple fishing species in the summer on this basis and supports activity through local angling clubs and encourages visiting anglers.
  - RSA offers benefits to wellbeing and mental health, increasing restrictions combined with increasing costs and reducing fishing opportunities are affecting the success of RSA in achieving these benefits.
- There has already been a significant decline in the number of local angling clubs in recent years as many did not survive the pandemic. Many other clubs lost members and the

existence of these clubs is dependent on maintaining membership and encouraging new members.

- Poole is known as one of the best angling competition venues in England. Any affect on the ability to hold those competitions would affect the perception of Poole and the heritage of the angling communities which have operated out of here for many generations.

Mitigation Measures Already Employed

- The attitude of anglers has changed, it is no longer about taking as much as possible in a trip, majority is catch and release, there is a great awareness of the need for conservation hence voluntary measures being used by charter businesses and angling clubs.
- Local angling clubs provide a social environment, support for people and encourage sustainable fishing through club specific rules/regulations (i.e., often larger MCRS than regulation measures) and introduce an element of self-policing of local rules and regulations.

General Points – All Gear Types and Sectors

Impact on small and micro businesses

- Fishers using small vessels need to be able to diversify, these vessels are unable to travel large distances therefore need to be able to access local grounds for a variety of different species and gear types. When there are restrictions on one species (i.e., pollack) fishers need to be able to target a different species to maintain the ability to earn a living.
- The change in weather patterns with more inclement weather periods than used to be seen, even in the spring/summer, means that the number of fishing days has declined in recent years – there are already reduced fishing opportunities and restrictions on fishing days before any management is introduced.
    - Where this relates to business operations, this combined with increased restrictions on what can be caught and where has a greater cumulative impact.
    - This also results in inshore areas becoming more important as they are slightly less weather dependent.
    - The defined IHAs, being inshore, are safer for fishers as they provide shelter over longer periods of time.
- Outlays for the industry include insurance, moorings, boat maintenance etc. Insurance and moorings alone can require £5,000 - £6,000 per year outlay – this needs to be offset by catches before a profit can be made.
- In removing fishing from the IHAs, fishers will have to concentrate on other areas to compensate, this will result on fishing pressure which, at the moment, is spread out and limited to 1-2 boats as each fisher has their own patch, becoming more intense over smaller areas with more fishers needing to operate in the same area as each other.
    - This also increases the risk of gear becoming tangled with each other, resulting in potential loss of gear, damage to gear or loss of fishing as when tangled gear does not fish properly and fishers will need to take time to remove and untangle the gear.

Wider impacts – Social/Cultural/Heritage/Community

- Increased restrictions and increasingly limited ability to diversify is having a negative impact on fishers' mental health, being able to go fishing, spend time outdoors and on the sea improves wellbeing, increasing difficulty in doing this, financial concerns and risk of loss of local cultural heritage built up over many generations is affecting this wellbeing and having an adverse effect on mental health.
- At a time when the population of black seabream is larger in this area than it ever has been there are fewer vessels, both commercial fishing and charter, operating.
- Entry requirements for younger fishers are already very hard, it is expensive, and the outcomes need to be worth the initial investment. With less to catch and more regulation there is less incentive to get into the industry – which consists of an increasingly aging demographic.

Scientific Implications – Stocks, Sustainability etc.

- Fishing for black seabream reduces pressure on other stocks where population numbers are not as high, for example turbot and plaice. Reducing fishing for black seabream is likely to result in increased targeting of other species which do not have as robust populations.
- As a mobile species, black seabream will be exploited elsewhere, outside of the designated sites where they are protected. There is a perception that those who can be managed within the MCZs will be at a disadvantage compared to those who can operate outside of MCZs who will still be able to access the same fish.
- Fishers already fishing in areas outside of MCZs targeting bream in the rod and line sector (commercial) are concerned that management within the MCZs will push activity onto those areas increasing what is currently a sustainable level of effort.

Suggested Alternative Measures

- The charter fleet and the RSA sector would generally be supportive of a bag limit and an increase of the MCRS.

1.2 Impacts from Direct Engagement Exercise - Impacts by Indicative Habitat Area

Purbeck Coast MCZ

Area 1

Fishing Activity

- This area is important for sole, skate and ray netting.
- April is the best month for sole netting, once the spider crabs move in during May then the fishery is over.
- In April there can be approximately 6 boats netting for sole within and around Area 1.
- Charter vessels from Weymouth operate in this area, for full time operators weekend trips between April and July will be fully booked – there will also be full bookings during the school holidays (dictated by range opening).
- Whelk and lobster fishing out of Weymouth occurs across Areas 1 & 2 for at least one vessel out of Weymouth.

- Lobster fishing in this area declines from June onwards and more lobsters become berried, so it is not as worthwhile doing as most are put back.
- Lobsters are present in many of the same areas as black seabream, therefore the IHA 1-3, 6-7 are located over the best lobster fishing grounds in the area.
- If the weather is good then net fishing will take place every day – targeting pollack, sole or bass in Areas 1-3.

Monetised - General

- Areas 1-3 can account for 90% of the income for 4 boats.
- This area provides an additional source of income, specifically from sole netting, to that obtained from fishing for other species in the surrounding area.
- For both potting and netting, restrictions within Areas 1-3 will push fishing vessels further east, this will increase the fuel required and thus fuel costs, reducing the profit margin associated with any catch.
- The closure of Areas 1-3 during the seasonal period would result in 2 fishers and their associated businesses needing to find a completely new target species (current target species, sole).
- For both potting and netting, restrictions within Areas 1-3 will push fishing vessels further east to find suitable grounds. The majority of vessels operating in this area are small, 18-20ft, and it can be a 3-hour steam to get from Broadbench (Area 3) to Weymouth. The further east boats have to travel there is more chance of not being able to go due to weather and an increased risk to safety.

Monetised – Losses

Nets

- Example: Fishing for sole can give a profit of £500 per day in this area for a single vessel.
    - Average of 20 available fishing days in a good weather April = £10,000.
- Example: Two vessels undertaking ray fishing across Areas 1 & 3 which can yield 100kg of catch per day, at an average of £1.50 per kg = £200 per day
    - Fishing 2-3 days per week on average (everyday if weather is good) = £600 per week (based on 3 days)
    - 16 weeks in seasonal period = £9,600
    - 2 vessels = £19,200
    - If evenly split between Areas 1 & 3 = £9,600 for Area 1 (for 2 boats)
- Example: Between Area 1 and the southern part of Area 3 there can be a regular catch of 60kg of sole per day, average of £15-20 per kg, fishing for 10 days in April
    - 10 days = 600kg of sole
    - Between £9,000 to £12,000 for April
    - If evenly split between Areas 1 & 3 = £4,500 to £6,000 for Area 1

Total = £25,600 – *based on upper limits where a range of values is presented*

Pots

- Example: Between Areas 1-2 one vessel earns £20,000 per year in the period April to July from lobster fishing.
    - Due to the size of the area, based on a 2/3 of the catch being in Area 1 and 1/3 in Area 2 = £13,333.33 in Area 1.
    - This supports 2 crew and associated families of skipper and crew.
- Example: Between Areas 1-3 one vessel earns £40,000 per year in the period April to July from whelk fishing.
    - Not known how this is split between Areas – based on even split = £13,333.33 in Area 1.
    - This supports 2 crew and associated families of skipper and crew.

Total = £26,666.67

Monetised – Bait Costs

- Example: fishing for skates and rays in Areas 1 & 3 also provides bait for pot fishing which can equate to 3-4 boxes of bait per day at £10 per box value
    - Fishing 2-3 days per week = £120 (4 boxes, 3 days)
    - 16 weeks in seasonal period = £1,920
    - If evenly split between both areas = £960 in Area 3.
    - Inability to collect this bait would result in decline in profits for bait which is sold to other fishers and/or a need to purchase bait rather than catch it requiring an additional outlay of a similar value

Total = £960.00 – *based on upper limits where a range of values is presented*

Total for Area 1 – all gear types = £53,226.66

Area 2

Fishing Activity

- There is netting taking place in this area but due to the size of the area, some vessels could alter practices to work around it.
- Charter vessels from Weymouth operate in this area, for full time operators weekend trips between April and July will be fully booked – there will also be full bookings during the school holidays (dictated by range opening).
- Lobster fishing in this area declines from June onwards and more lobsters become berried, so it is not as worthwhile fishing for lobster at this time as most are put back.
- Lobsters are present in many of the same areas as black seabream, therefore the IHA 1-3, 6-7 are located over the best lobster fishing grounds in the area.
- If the weather is good then net fishing will take place every day – targeting pollack, sole or bass in Areas 1-3.

Monetised – General

- For both potting and netting, restrictions within Areas 1-3 will push fishing vessels further east, this will increase the fuel required and thus fuel costs, reducing the profit margin associated with any catch.
- The closure of Areas 1-3 during the seasonal period would result in 2 fishers and their associated businesses needing to find a completely new target species (current target species, sole).
- For both potting and netting, restrictions within Areas 1-3 will push fishing vessels further east to find suitable grounds. The majority of vessels operating in this area are small, 18-20ft, and it can be a 3-hour steam to get from Broadbench (Area 3) to Weymouth. The further east boats have to travel there is more chance of not being able to go due to weather and an increased risk to safety.

Monetised – Losses

Pots

- Example: Between Areas 1-2 one vessel earns £20,000 per year in the period April to July from lobster fishing (pots).
    - Due to the size of the area, based on a 2/3 of the catch being in Area 1 and 1/3 in Area 2 = £6,666.67 in Area 2.
    - This supports 2 crew and associated families of skipper and crew.
- Example: Between Areas 1-3 one vessel earns £40,000 per year in the period April to July from whelk fishing.
    - Not known how this is split between Areas – based on even split = £13,333.33 in Area 2.
    - This supports 2 crew and associated families of skipper and crew.

Total = £20,000.00

Total for Area 2 – all gear types = £20,000.00

Area 3

Fishing Activity

- This is a primary fishing area for charter vessels from Weymouth, for full time charter operators all weekend trips will be booked between April and July – there will also be full bookings during the school holidays (dictated by range opening).
- Charter boats operating out of Weymouth need options, for example if fishing for bass is difficult or not productive then vessels will switch to bream fishing, primarily within Area 3.
- This Area is sheltered and therefore is available to fish on all tide states.
- This Area is important for charter fishing out of Poole. The Jurassic coast provides a great backdrop which improves the fishing experience. Use of this Area is linked to Area 7, as Area 3 is further away from Poole, if the fishing there is not as good on a particular day then Area 7 will be visited on the return journey, if Area 7 is closed then it is too much of a

distance between Area 3 and the next closest good area to warrant go out there in the first place – the closure of certain areas would affect the usability of others.

- One vessel places all gear in Area 3, equating to 200 pots. If the area were to close this gear would have to be moved into areas that other fishers currently use causing conflict within industry.
- There are three pot vessels which operate in this area.
- Area 3 is a good area for fishers to diversify in, it can be used for commercial rod & line fishing for bass and bream, netting for sole, skates and rays and potting for lobsters, particularly during the summer when the sole netting becomes unviable due to presence of spider crabs.
- This area is popular for bass fishing during May, both Charter Vessels and private RSA will target this species in these areas during this period.
- RSA operating out of Portland will use Area 3 as a preferred area for fishing.
- There can be 6-10 charter vessels in this area on any given day between April and July (dependent on the operation of the ranges).
- The inshore part of this site in particular provides good shelter for pot fishing.
- Lobster fishing in this area declines from June onwards and more lobsters become berried, so it is not as worthwhile doing as most are put back.
- Lobsters are present in many of the same areas as black seabream, therefore the IHA 1-3, 6-7 are located over the best lobster fishing grounds in the area.
- If the weather is good then net fishing will take place every day – targeting pollack, sole or bass in Areas 1-3.

Monetised - General

- When the weather is more inclement, and when winds are blowing from the S or SW then there is a need to move fishing gear from closer inshore into Area 3, the deeper water in these conditions is safer for pots, without doing this there is a significant risk of losing gear.
- From March to the end of July, this Area can be used by charter vessels from the east when the weather is good, however there are already significant limits posed by the Lulworth Ranges which restrict when this activity can take place. Therefore, other areas outside of the ranges need to be accessible so that there are fishing opportunities for charter boat customers on all trips.
- Using this area for charter fishing is important as it provides shelter from the wind when it is blowing from the north/northeast. This makes fishing more comfortable for paying participants and means that fishing can take place all day without the need to move to multiple locations. Making charter fishing trips more comfortable and maximising the time spent fishing as opposed to transiting is important for building up a good reputation and maintaining returning visits from anglers – returning visits/regular custom forms a large majority of income for charter vessels.
- For both potting and netting, restrictions within Areas 1-3 will push fishing vessels further east, this will increase the fuel required and thus fuel costs, reducing the profit margin associated with any catch.
- The closure of Areas 1-3 during the seasonal period would result in 2 fishers and their associated businesses needing to find a completely new target species (current target species, sole).

- For both potting and netting, restrictions within Areas 1-3 will push fishing vessels further east to find suitable grounds. The majority of vessels operating in this area are small, 18-20ft, and it can be a 3-hour steam to get from Broadbench (Area 3) to Weymouth. The further east boats have to travel there is more chance of not being able to go due to weather and an increased safety risk.

Monetised – Losses

Nets

- Example: Area 3 results in approximately £6,000 of income for each of two vessels from catches of black seabream and sole = £12,000 total during the seasonal period.
  - This pays a mortgage and supports a family with three children
  - There is no ability to earn an income from elsewhere, there are no transferable skills, for many fishers this is all they know how to do.
- Example: Two vessels undertaking ray fishing across Areas 1 & 3 which can yield 100kg of catch per day, at an average of £1.50 per kg = £200 per day
  - Fishing 2-3 days per week on average (everyday if weather is good) = £600 per week (based on 3 days)
  - 16 weeks in seasonal period = £9,600
  - 2 vessels = £19,200
  - If evenly split between areas 1 & 3 = £9,600 for Area 3 (for 2 boats)
- Example: One vessel uses sole nets which yield 20-30kg per day in April, sole can average £15-20 per kg = between £450 - £600 per day (based on 30kg)
  - Based on being able to fish an average of 20 days in April = between £9,000 - £12,000
- Example: Between Area 1 and the southern part of Area 3 there can be regular catches of 60kg of sole per day, average of £15-20 per kg, fishing for 10 days in April
  - 10 days = 600kg of sole
  - Between £9,000 to £12,000 for April
  - If evenly split between Areas 1 & 3 = £4,500 to £6,000 for Area 3

Total = £39,600.00 – *based on upper limits where a range of values is presented*

Pots

- Example: One vessel sets approximately 100 pots within Area 3, these can yield 15kg of lobster per day, at a price of £18 per kg = £270 per catch
  - Fishing 2-3 days per week = £810 per week (based on 3 days)
  - 16 weeks in seasonal period = £12,960
- Example: Between Areas 1-3 one vessel earns £40,000 per year in the period April to July from whelk fishing.
  - Not known how this is split between areas – based on even split = £13,333.33 in Area 3.
  - This supports 2 crew and associated families of skipper and crew.

Total = £26,293.33 – *based on upper limits where a range of values is presented*

Commercial Rod and Line

- Example: Commercial rod & line fishing in this area can occur for up to 20 days across May and June (dependent on range firing schedule). Each trip can yield 40-45kg of bass at £12 per kg and 60kg of bream at £8 per kg
    - Per day = £540 for bass (based on 45kg) and £480 for bream = £1,020
    - 20 days = £20,400

Total = £20,400 – *based on upper limits where a range of values is presented*

Monetised – Bait Costs

- Example: fishing for skates and rays in Areas 1 & 3 also provides bait for pot fishing which can equate to 3-4 boxes of bait per day at £10 per box value
    - Fishing 2-3 days per week = £120 (4 boxes, 3 days)
    - 16 weeks in seasonal period = £1,920
    - If evenly split between both areas = £960 in Area 3.
    - Inability to collect this bait would result in decline in profits for bait which is sold to other fishers and/or a need to purchase bait rather than catch it requiring an additional outlay of a similar value

Total = £960.00 – *based on upper limits where a range of values is presented*

Monetised – Gear Loss

- Example: for one vessel, a string of 20 pots costs £2,500 and uses 17 strings, having to move into less sheltered areas risks gear loss
    - £42,500 total value if all gear lost

Total = £42,500

Total for Area 3 (excluding gear loss) = £87,253.33

Total for Area 3 (including gear loss) = £129,753.33

Scientific Implications – Stocks, Sustainability etc.

- Closing this area would require current whelk pot fishing to take place over the same ground rather than fishers having the ability to move around so that ground is given a break. For one fisher the rotation used means that no one piece of ground is fished more than once each year, this aims to give the whelk stocks a rest and ensure sustainability of the stocks.
- Closing Areas 3, 7 & 10 will focus more activity on Poole Rocks and Southbourne Rough.

Area 4

Fishing Activity

- Charter vessels from Weymouth operate in this area, for full time operators weekend trips between April and July will be fully booked – there will also be full bookings during the school holidays (dictated by range opening).
- Pot fishing for lobster takes place in this area.

Monetised – General

- There is netting taking place in this area but due to the size of the area, practices could be changed to work around it.
- This area is small and the distance from the shore means the impact to commercial fishers (not rod and line) is likely to be low.

Monetised – Losses

- No data provided.

Area 5

Fishing Activity

- Charter vessels from Weymouth operate in this area, for full time operators weekend trips between April and July will be fully booked – there will also be full bookings during the school holidays (dictated by range opening).
- Pot fishing for lobster takes place in this area.

Monetised - General

- There is netting taking place in this area but due to the size of the area, practices could be changed to work around it.
- This area is small and the distance from the shore means the impact to commercial fishers (not rod and line) is likely to be low.

Monetised – Losses

- No data provided.

Area 6

Fishing Activity

- Commercial rod and line fishing for bass occurs across this Area.
- This area is used for charter vessel fishing when there are northerly winds, provides an area of shelter.
- Bass fishing in this area would be more affected than bream fishing.
- This area is not used as much by charter vessels from Weymouth.

- For RSA, Areas 6 & 7 are not targeted as much from Poole, however vessels operating from Kimmeridge will use both of these Areas.
- Lobsters are present in many of the same areas as black seabream, therefore the IHA 1-3, 6-7 are located over the best lobster fishing grounds in the area.

Monetised – General

- This area is important not just for targeting black seabream but is an important area for targeting bass. The commercial rod and line fishing out of Weymouth utilises this area significantly for bass fishing, as it is an area which provides shelter and a known source of income. Closure would require vessels to move to other more exposed locations, increasing fuel costs whilst potentially realising less profit thus cutting margins.

Monetised - Losses

Commercial Rod and Line

- Example: Commercial rod and line fishing for one vessel yields 35-40kg of bass per day at £12 per kg with around 20 days fishing taking place across May and June
  - Per day = £480 (based on 40kg)
  - For 20 days = £9,600
  - This can be related to three potential vessels = £28,800

Total = £28,800 - *based on upper limits where a range of values is presented*

Pots

- Example: for one fishing vessel using pots, this is the main pot fishing area April and July, it is a safe area out of the weather and the tide.
  - Between Areas 6 & 7 this equates to ¼ to 1/3 of the business.
  - £1,500 per week overall = £24,000 for 4 months
  - £6,000 to £8,000 from these areas
  - If equal split = £3,000 to £4,000 for Area 6

Total = £4,000 – *based on upper limits where a range of values is presented*

Monetised – Gear Losses

- Example: if pots couldn't be placed in Areas 6 & 7 there is a risk that they would be lost as further out is less sheltered.
  - £100 per pot to replace (plus rope costs and anchors)
  - 20-30 pots per string
  - Example based on 10 strings (no. of strings in an area can vary) = £2,000 - £3,000 to replace per string = £20,000 - £30,000 to replace all across two Areas
  - If equal split = £10,000 to £15,000 for Area 6

Total = £15,000 – *based on upper limits where a range of values is presented*

Total for Area 6 (excluding gear loss) = £32,800.00

Total for Area 6 (including gear loss) = £47,800.00

Wider impacts – Social/Cultural/Heritage/Community

- Pot fishing in this area is related to 5 generations of fishing within the same family (200 years), there is a need to be able to pass this on to the next generation.

The Lulworth Ranges

- The restricted sea area for the Lulworth Ranges covers Areas 1-6 within the Purbeck Coast MCZ
- The range firing pattern varies but generally there is a closure in place during weekdays
- Current pattern (2024 spring)
  - Closed between 09:30 to 17:00, and additionally between 20:00 to 23:59 on Tuesday and Thursday
  - Open on weekends
  - Open for the following periods:
    - Easter (29 Mar to 14 April)
    - Bank Holiday (4 to 6 May)
    - Spring Stand Down (25 May to 2 Jun)
    - Summer Stand Down (26 Jul to 1 Sept)
- Therefore, for 2024, between 1st April and 31st July
  - Accessible all day – 40 days
  - Restricted access – 68 days

Area 7

Fishing Activity

- One charter vessel from Weymouth uses this area routinely.
- Between Area 7 and Area 10 100% of a charter business operates during April to July.
- This area is safe ground for pot fishing, during May to June this is an important lobster area.
- Areas 6 & 7 are not targeted as much from Poole by RSA, however vessels operating from Kimmeridge will use both of these areas.
- Angling will target multiple species in this site, for example shark and ray species, this method uses larger hooks which won't take black seabream.
- Lobsters are present in many of the same areas as black seabream, therefore the IHA 1-3, 6-7 are located over the best lobster fishing grounds in the area.

Monetised – General

- Between Area 7 and Area 10 100% of a charter business operates during April to July. Closing both these areas during this period would close the business. This business provides significant support to the local community and local businesses around the port of operation.
- This area is important for charter fishing out of Poole. The Jurassic coast provides a great backdrop which improves the fishing experience. Use of this Area is linked to Area 3, as Area 3 is further away from Poole, if the fishing there is not as good on a particular day

then Area 7 will be visited on the return journey, if Area 7 is closed then it is too much of a distance between Area 3 and the next closest good area to warrant go out there in the first place – the closure of certain areas would affect the usability of others.

- This is the main pot fishing area for one vessel between April and July, it is a safe area out of the weather and the tide.
  - Between Areas 6 & 7 this equates to ¼ to 1/3 of the business for one fishing vessel.
- The small part of Area 7 which extends to the south means that strings of pots couldn't be set horizontally as the risk would be too high of accidentally going over that part of Area 7 – this therefore makes Area 7 much larger than mapped and more of a full rectangle when it comes to pot fishing.
- Moving out of this area – there is nowhere else to go which would have the same level of fishing, particularly for lobsters.
- This area is important for crab and lobster in the summer – approx. 10% from this area for one vessel's seasonal catch.

Monetised – Losses

Charter Fishing

- Example: Between Area 7 and Area 10 100% of a charter business operates during April to July. Closing both these areas during this period would close the business. The yearly income from 1 out of 3 boats operated = £51,750, the other 2 boats = £15,000
  - Total of £66,750 per year
  - If this was split evenly between two areas = £33,375 for Area 7.

Total = £33,375.00

Pots

- Example: for one fishing vessel using pots, this is the main pot fishing area for April and July, it is a safe area out of the weather and the tide.
  - Between Areas 6 & 7 this equates to ¼ to 1/3 of the business.
  - £1,500 per week overall = £24,000 for 4 months
  - £6,000 to £8,000 from these areas
  - If equal split = £3,000 to £4,000 for Area 7

Total = £4,000 – *based on upper limits where a range of values is presented*

Monetised – Gear Loss

- Example: if pots couldn't be placed in Areas 6 & 7 there is a risk that they would be lost as further out is less sheltered.
  - £100 per pot to replace (plus rope costs and anchors)
  - 20-30 pots per string
  - Example based on 10 strings (no. of strings in an area can vary) = £2,000 - £3,000 to replace per string = £20,000 - £30,000 to replace all across two areas
  - If equal split = £10,000 to £15,000 for Area 7

Total = £15,000 – *based on upper limits where a range of values is presented*

Total for Area 7 (excluding gear loss) = £37,375.00

Total for Area 7 (including gear loss) = £52,375.00

Scientific Implications – Stocks, Sustainability etc.

- Closing Areas 3, 7 & 10 will focus more activity on Poole Rocks and Southbourne Rough.

Wider impacts – Social/Cultural/Heritage/Community

- Pot fishing in this area is related to 5 generations of fishing within the same family (200 years), there is a need to be able to pass this on to the next generation.

Area 8

Fishing Activity

- This is a productive area for lobster fishing.
- RSA vessels operating out of ports from Poole to the east (Christchurch, Solent) would be mainly limited to Areas 8-13 due to weather dependent considerations, transit time & fuel costs.
- This is a popular area for bream fishing for RSA.

Monetised - General

- This area would impact charter businesses as it is important for evening fishing trips, providing shelter and a convenient location which requires less transit time for a shorter trip – these trips help support the main income for charter fishing and open up opportunities to an increased group of people who don't necessarily want to do a whole day's fishing.
  - Better for people to try out angling and for tourists
- Pot fishing within this area for one vessel supports x2 crew, they would have to be kept on as the help is needed but this would affect the profit margin for the skipper, as to retain the crew they would need to be paid the same.
- This is an important lobster area in June and July along with Areas 9 & 10.
  - approx. 10% on income in this regard comes from these three Areas.
- Fishing for lobsters is key in Areas 8 & 10, the key period is from June to July – the initial iteration of measures would affect 30% of the overall income for one fishing vessel.

Monetised – Losses

Pots

- Example: Between Areas 8-10, approx. 25% of earnings, at an average of £2,000 total earnings per week, comes during April to July from one pot fishing vessel
  - 16 weeks (4 months) = £32,000
  - 25% = £8,000
  - If this was split evenly between three areas = £2,666.67 for Area 8.

Total = £2,266.67

Total for Area 8 = £2,266.67

Impacts on Associated Businesses

- Area 8 covers an area which is used for a nationally important kayak fishing competition held annually and run out of Swanage. The competition often sees in excess of 500 participating kayaks and is run within the April to July period. The target species includes black seabream, but it is a species competition so other species are targeted as well. The competition attracts participants from around the country and provides a boost to the local economy in Swanage from accommodation, food & drink etc. It is also an important recognition of the importance of Swanage and the Jurassic coast as a recreational fishing destination, the area has a good reputation and encourages visiting anglers accordingly.

Wider impacts – Social/Cultural/Heritage/Community

- This area (relevant to the whole of Swanage Bay) can be used for vessel anchoring (*a check online does not define any particular anchoring zones but advertises the whole of Swanage Bay other than established mooring areas or an exclusion area around the pier as being suitable for anchoring and a good, sheltered place in which to do so*)
    - It is felt that if fishing activities are to be managed in these areas, but anchoring is able to continue then this will defeat the objective to protect nests and eggs on nests as these could be removed by anchors
    - The no anchor zone in Studland Bay has pushed more boats to Swanage Bay to anchor
- Pot fishing in this area is related to 5 generations of fishing within the same family (200 years), there is a need to be able to pass this on to the next generation.
- This Area is important for RSA, it is a sheltered area close to the home port of Swanage so vessels don't have to travel far, and people can operate safely.
    - If RSA vessels have to travel further to fish, then this increases fuel costs which is likely to result in people taking less trips. This results in less wellbeing and social benefit (i.e., undertaking trips with friends/family) or vessels will venture further offshore which could have significant safety implications.
        - Many of these vessels have small engines and are subject to a greater degree to tide and wind restrictions.

Area 9

Fishing Activity

- RSA vessels operating out of ports from Poole to east (Christchurch, Solent) would be mainly limited to Areas 8-13 due to weather dependent considerations, transit time & fuel costs.

Monetised – General

- This area could be worked around for charter angling.
- This area is used for cuttlefish fishing which has the same time period as the black seabream nesting season. It is a very seasonally restricted fishery and any income from cuttlefish fishery needs to be made during this period.
- This is an important lobster area in June and July along with Areas 8 & 10.
    - approx. 10% on income in this regard comes from these three Areas.

Monetised – Losses

Pots

- Example: Between Areas 8-10, approx. 25% of earnings, at an average of £2,000 total earnings per week, comes during April to July from one pot fishing vessel
    - 16 weeks (4 months) = £32,000
    - 25% = £8,000
    - If this was split evenly between three areas = £2,666.67 for Area 9.
- Example: important cuttlefish fishing area, 4-5 tonnes can be taken between April and May (applicable to two vessels)
    - £3 per kg, 4-5 tonnes = between £12,000 - £15,000
    - For two vessels = £24,000 to £30,000

Total = £32,666.67 – *based on upper limits where a range of values is presented*

Total for Area 9 = £32,666.67

Wider impacts – Social/Cultural/Heritage/Community

- This area (relevant to the whole of Swanage Bay) can be used for vessel anchoring (*a check online does not define any particular anchoring zones but advertises the whole of Swanage Bay other than established mooring areas or an exclusion area around the pier as being suitable for anchoring and a good, sheltered place in which to do so*)
    - It is felt that if fishing activities are to be managed in these areas but anchoring is able to continue then this will defeat the objective to protect nests and eggs on nests as these could be removed by anchors
    - Within this area on a summer weekend there can be up to 50 boats anchored
- Pot fishing in this area is related to 5 generations of fishing within the same family (200 years), there is a need to be able to pass this on to the next generation.

Area 10

Fishing Activity

- This area is used at all times for pot fishing.
- RSA vessels operating out of ports from Poole to the east (Christchurch, Solent) would be mainly limited to Areas 8-13 due to weather dependent considerations, transit time & fuel costs.
- This is a popular area for bream fishing for RSA.

Monetised – General

- Between Area 7 and Area 10 100% of a charter business operates during April to July. Closing both these areas during this period would close the business. This business provides significant support to the local community and local businesses around the port of operation.
- This is an important lobster area in June and July along with Areas 8 & 9.
    - approx. 10% on income in this regard comes from these three Areas.
- This area provides shelter for charter fishing when the wind is stronger (up to 30 knots), this ensures there is an available location for fishing and reduces the risk of having to cancel trips.
- Fishing for lobsters is key in Areas 8 & 10, the key period is from June to July – the initial iteration of measures would affect 30% of the overall income for one fishing vessel.

Monetised – Losses

Charter Fishing

- Example: Between Area 7 and Area 10 100% of a charter business operates during April to July. Closing both these areas during this period would close the business. The yearly income from 1 out of 3 boats operated = £51,750, the other 2 boats = £15,000
    - Total of £66,750 per year
    - If this was even split per area = £33,375 for Area 10

Total = £33,375.00

Pots

- Example: Between Areas 8-10, approx. 25% of earnings, at an average of £2,000 total earnings per week, comes during April to July from one pot fishing vessel
    - 16 weeks (4 months) = £32,000
    - 25% = £8,000
    - If this was split evenly between three areas = £2,666.67 for Area 10

Total = £2,266.67

Total for Area 10 = £35,641.67

Wider impacts – Social/Cultural/Heritage/Community

- Pot fishing in this area is related to 5 generations of fishing within the same family (200 years), there is a need to be able to pass this on to the next generation.

Scientific Implications – Stocks, Sustainability etc.

- Closing Areas 3, 7 & 10 will focus more activity on Poole Rocks and Southbourne Rough.
- Removing the ability to use this area would force more boats into smaller remaining sheltered areas increasing pressure on a smaller area and risking conflict between

different users. It would also result in more vessels targeting the same fish over a smaller area increasing the risk of repeated catch and release and the risk of decreased catches which affects the reputation of the business.

Poole Rocks MCZ

Area 11

Fishing Activity

- Areas 11, 12 and 13 are key areas during the months of April and July for charter fishing. During May there is a 2-4 week period where trips targeting black seabream are more spread out, however during April and July these areas are very important to the local charter fleet for inshore fishing trips.
- Running half day trips limits the areas that can be reached due to need to maximise fishing time and also ensure that fuel expenditure is not exceeding income. For charter vessels out of Poole, Poole Rocks is an idea location for half day trips.
- Pot fishing can occur here for whelks.
- RSA vessels operating out of ports from Poole to the east (Christchurch, Solent) would be mainly limited to Areas 8-13 due to weather dependent considerations, transit time & fuel costs.
- The variety of fish which are attracted to the areas within Poole Rocks makes them important fishing areas.
- These areas will have 6-12 RSA vessels operating during weekends and the summer at any one time (across all Poole Rocks but would cover IHA Areas 11 & 12) – this is a safe fishing area, boats will move to less safe areas as they want to continue fishing but this results in an increased risk to safety.

Monetised - Losses

- Example: The IHA 11 & 12 would impact a key species competition which runs for a day during June. The competition is based on catch and release and the nature of a species competition means that no one species is over-targeted as fishers need variety to gain points.
    - The competition has approx. 20 participating boats, 8 persons per boat at a cost of £320 per 4 people.
        - £12,800 total income earned by competition organisers.
        - Additional monetary value for input to local community from visiting anglers – unable to be quantified for this specific case.
        - If split evenly between two areas = £6,400 for Area 11

Total = £6,400.00

Total for Area 11 = £6,400.00

Area 12

Fishing Activity

- Areas 11, 12 and 13 are key areas during the months of April and July for charter fishing. During May there is a 2-4 week period where trips targeting black seabream are more spread out, however during April and July these areas are very important to the local charter fleet for inshore fishing trips.
- Area 12 covers part of the main area within Poole Rocks which is targeted by charter vessels, this is to target multiple species including black seabream.
- Running half day trips limits the areas that can be reached due to need to maximise fishing time and also ensure that fuel expenditure is not exceeding income. For charter vessels out of Poole, Poole Rocks is an idea location for half day trips.
- RSA vessels operating out of ports from Poole to the east (Christchurch, Solent) would be mainly limited to Areas 8-13 due to weather dependent considerations, transit time & fuel costs.
- The variety of fish which are attracted to the areas within Poole Rocks makes them important fishing areas.

Monetised - Losses

- Example: The IHA 11 & 12 would impact a key species competition which runs for a day during June. The competition is based on catch and release and the nature of a species competition means that no one species is over targeted as fishers need variety to gain points.
    - The competition has approx. 20 participating boats, 8 persons per boat at a cost of £320 per 4 people.
        - £12,800 total income earned by competition organisers.
        - Additional monetary value for input to local community from visiting anglers – unable to be quantified for this specific case.
        - If split evenly between two areas = £6,400 for Area 12

Total = £6,400.00

Total for Area 12 = £6,400.00

Southbourne Rough MCZ

Area 13

Fishing Activity

- Areas 11, 12 and 13 are key areas during the months of April and July for charter fishing. During May there is a 2-4 week period where trips targeting black seabream are more spread out, however during April and July these areas are very important to the local charter fleet for inshore fishing trips.
- Nets are set across Area 13 which can be in place up to mid-April or in some years up to June. This is to target bream and sole.
- Only one fisher operates with nets in this area.

- This site is a preferred netting area when the cuttlefish fishery isn't strong, it is an area which is good for netting in most weathers and is also more free from weed than areas closer inshore.
- RSA vessels operating out of ports from Poole to the east (Christchurch, Solent) would be mainly limited to Areas 8-13 due to weather dependent considerations, transit time & fuel costs.
- This site is primarily used by RSA operating out of Christchurch/Mudeford.
- This area would overlap with a main mark for black seabream for RSAs.
- The variety of fish which are attracted to Southbourne Rough makes the area important for fishing.

Monetised - General

- Avoiding this area within S.R. would require short ends to be put on nets which requires more anchors and then there is more risk that the net will not have the right flexibility to move with the tide and will become tangled on the anchors. This reduces catch levels as the net doesn't then fish properly and incurs time required to de-tangle before the net can be reset.
- This area would not impact the cuttlefish fishery.

Monetised – Losses

- No data provided.

Wider impacts – Social/Cultural/Heritage/Community

- This is a good area for charter fishing and Southbourne Rough overall has a good reputation as a fishing location, this historic use and reputation would be lost with the closure of parts of the site and result in fewer people wanting to take trips.

1.3 General message across all gear types

Information provided from engagement applicable generally to the proposals being discussed:

Given the current population of black seabream, why can't management seek to do a little to aim to maintain those numbers (which seems to be possible with current activities) rather than seeking to do a lot, the response appears to be disproportionate to the risk. Across all gear sectors, if the black seabream population was in decline, then there would be support across the board for management measures, given the current population being seen, it is felt that the good will of industry/individuals to help will be lost which then couldn't be recovered if the population ever reached a point where more stringent management was necessary.

1.4 Cumulative Assessment of Economic Impact from Direct Engagement Exercise Data

The following tables provide outputs and cumulative assessment of economic data provided during through the Direct Engagement Exercise.

Tables 1A-C contain any quantified economic data which was provided specific to an IHA as follows:

- **Table 1A:** data for the charter vessel sector
- **Table 1B:** data for the RSA sector
- **Table 1C:** data for the commercial fishing sector, note this has been further broken down to include or exclude the quantified value of gear loss where this data was available.

Tables 2A-C contain any quantified economic data which was provided that was not specific to an IHA as follows:

- **Table 2A:** data for the charter vessel sector
- **Table 2B:** data for the commercial fishing sector

Note there is no data under this section which relates solely to the RSA sector.

The data presented in these tables provides a direct compilation of data reported **in Sections 1.1 and 1.2 of this document only**, the lack of data for certain sectors does not reflect the impact, the full economic impact should consider all available data sources in combination for each sector. Where data is not given for a specific IHA, this does not mean that there is no impact, it is a reference to the fact that no quantified economic data was provided for that IHA during the Direct Engagement Exercise. Other impacts which are not quantified are presented in Section 1.2 of this document. The number of participants who were spoken to as part of the Direct Engagement Exercise who represented each sector are as follows (*note some individuals represented multiple sectors*):

- **Charter vessel sector** = 6
- **RSA sector** = 4
- **Commercial fishing sector** = 15

Table 1A. Economic Impact from Direct Engagement Exercise – Area Specific – Charter Vessel Sector

Area	Economic Impact (£)
1-6	No data provided
7	33,375.00
8-9	No data provided
10	33,375.00
11-13	No data provided
Total	**66,750.00**

Table 1B. Economic Impact from Direct Engagement Exercise – Area Specific – RSA Sector

Area	Economic Impact (£)
1-10	No data provided
11	6,400.00
12	6,400.00
13	No data provided
Total	**12,800.00**

(*) Note this economic data relates to an RSA fishing competition run over Areas 11 & 12, the value relates to loss of earnings for the competition organisers.

Table 1C. Economic Impact from Direct Engagement Exercise – Area Specific – Commercial Fishing Sector

Area	Economic Impact – loss of earnings (£)	Economic Impact - gear loss (£)	Total Economic Impact (£)
1	53,226.67		53,226.67
2	20,000.00		20,000.00
3	87,253.33	42,500.00	129,753.33
4-5	No data provided		
6	32,800.00	15,000.00	47,800.00
7	4,000.00	15,000.00	19,000.00
8	2,266.67		2,266.67
9	32,666.67		32,666.67
10	2,266.67		
11-13	No data provided		
Total	**234,480.01**	**72,500.00**	**306,980.01**

Table 2A. Economic Impact from Direct Engagement Exercise – Not Area Specific – Charter Vessel Sector

Impact Type	Impact Group	Impact
Loss of earnings	Charter Business	28,000.00
Loss of earnings	Local booking business	7,650.00
Loss of earnings	Charter Businesses using local booking business	22,950.00
Loss of earnings	Charter Business in relation to trips from Charter section of angling club	20,160.00
Total		**78,760.00**

Table 2B. Economic Impact from Direct Engagement Exercise – Not Area Specific – Commercial Fishing Sector

Gear Type	Impact Type	Impact Group	Impact
Pots	Gear Loss	Fisher	600.00
All commercial gear types	Use of gear sheds at Swanage	Local Business	6,400.00
Total			**7,000.00**

Total Economic Impact from Direct Engagement Exercise (IHA specific + non-area specific):

- **Charter vessel sector = £145,510.00**
- **RSA sector = £12,800.00**
- **Commercial fishing sector =**
    - **£241,480.01 (excluding gear loss)**
    - **£313,980.01 (including gear loss)**

2. Online Data for Charter Vessels

To further inform the potential impact on the charter vessel sector, as not all potentially affected vessels were part of the Direct Engagement Exercise, data was sought from additional sources.

Based on data available publicly online for charter vessels, including costs for trips, no. of bookings for the 2024 April to July period, no. of persons allowed per trip, calculations have been made to estimate potential economic impact. Data is presented for three main ports; Christchurch Harbour, Poole Harbour and Weymouth Harbour. It must be noted that certain assumptions have been required as to the relevance to the specific IHA, where this is the case best knowledge has been used based on experience and specific knowledge gained through the Direct Engagement Exercise.

The number of trips identified has been based on available calendars for each vessel for April to July 2024 where trips have either mentioned black seabream directly or referenced inshore fishing which is known to likely encompass fishing in IHAs.

Port:	Christchurch
No. of vessels with available data:	2
Trip Details/Costs:	
Vessel 1	8 spaces 4 hr = £50pp – approx. 20 per month Value = £8,000 8hr = £80pp – approx. 8 per month Value = £5,120 Total = 13,120
Vessel 2	4 spaces 4 hr = £280 8hr = £380 66 trips Total = £25,080
Total Value:	**£ 38,200**

Port:	Poole
No. of vessels:	8
No. of vessels with available data:	1 – full data

	5 – no data on no. of trips, proxy used based on common patterns of trip numbers for other vessels (x2 included specifically in engagement data, not repeated here)
Trip Details/Costs:	
Vessel 1	10 spaces Half day = £40 pp (£400 per boat) 5 trips per month = 20 over four months Value = £8,000 Full day = £75 pp (£650 per boat) 20-24 trips per month = 80-96 over four months Value = £72,000 (based on individual fees and upper trip limit of 96)
5 Vessels	Based on average of £65 pp (provided) and 10 spaces per boat (provided) and an average of 20 relevant trips per month (proxy) = 80 trips over four months Estimated value per vessel = £52,000 5 boats = £260,000
Total Value:	**£ 332,000**

Port:	Weymouth
No. of vessels:	7
No. of vessels with available data:	4 – full data 2 – no availability or price provided; proxy used based on common patterns for other charter vessels 1 – no provide provided; proxy used
Trip Details/Costs:	
Vessel 1	12 spaces Half day = £40 pp Full day = £75 pp (£750 per boat) Approx. 20 full day inshore trips per month = 80 over four months Value = £72,000 (based on individual full day fees)
Vessel 2	9 spaces Full day = £75 pp Booked everyday April – July =112 trips Value = £75,600
Vessel 3	12 spaces Full day = £75 pp Booked everyday April – July =112 trips Value = £100,800
Vessel 4	10 spaces

	Full day = £75 pp 20 trips per month = 80 over four months Value = £60,000
2 Vessels	Based on average of £65 pp (proxy) and 12 spaces per boat (provided data) and an average of 20 relevant trips per month (proxy) = 80 trips over four months Estimated value per vessel = £62,400 2 boats = £124,800
1 Vessel	Based on average of £65pp (proxy) and 10 spaces (provided data) and 12 trips per month (provided data) = 48 trips over four months Estimated value = £31,200
Total Value:	**£ 464,400**

Total Value across three ports = £834,600

3. MMO Landings Data

A data request was submitted to the Marine Management Organisation (MMO) for landings data from specific vessels known to operate in IHAs. Data was requested for the months of April to July for the period 2018-2023 to provide five years of data excluding 2020 due to the potential for differences in landings to normal patterns due to the Covid-19 Pandemic. Data was obtained from the MMO under the Environmental Information Regulations 2004.

The data has been anonymised and summarised below. It should be noted that any specific considerations communicated to Southern IFCA in respect of a specific vessel and associated impacts have been incorporated as far as possible into calculations of potential economic impact. This is an estimation of potential economic impact as landings data is not at the same spatial scale as the IHAs, however based on information gathered during the Direct Engagement Exercise it is determined that this is a best estimate. A range has been provided based on the lowest total value and the highest total value of relevant landings for a given year for the four-month period.

Data was obtained for 13 commercial fishing vessels operating a variety of gear types and targeting a variety of species. The gear types covered pot fishing, net fishing and rod & line fishing. Species included European seabass, black seabream, sole, lobster, brown crab, whelk, skate and ray species, other fish species and other crustacean species.

Vessel No.	Specific Considerations	Potential Economic Impact Range from Landings Data (£)	
		Lower	Upper
1	Potential to impact 1/3 of total catch	6,970.48	9,438.88
2	Potential to impact 90% of total catch	4,297.83	4,297.83
3	Potential to impact 90% of total catch	2,720.48	6,694.56
4	All catch considered	7,568.11	13,065.89
5	Potential to impact catches of black seabream and European seabass	2,205.76	6,454.25
6	Potential to impact catches of sole, ray species, black seabream and pot fished species	3,303.21	8,923.48
7	Potential to impact lobster catches	1,593.55	4,285.40
8	Potential to impact lobster catches	36.38	2,680.21
9	All catch considered	6,696.77	13,772.91
10	All catch considered	305.90	9,716.87
11	Potential to impact pot fished species	15,723.24	19,507.12
12	Potential to impact lobster and whelk catches	10,467.79	29,170.85
13	All catch considered	1,010.50	5,388.13
Total		**62,900.00**	**133,396.38**

4. Cumulative Assessment of Potential Economic Impact from Available Data

The table below combines three data sources and provides a total for the potential economic impact of the initial iteration of draft measures:

- That all fishing, both recreational and commercial, across pots/traps (pelagic and demersal), nets (pelagic and demersal) and lines (pelagic and demersal) is prohibited within 13 IHAs across the Purbeck Coast, Poole Rocks and Southbourne Rough MCZs.
- That the prohibition is seasonal from 1st April to 31st July each year.

The three data sources are:

- Quantified economic data from the Direct Engagement Exercise which is specific to a particular IHA
- Quantified economic data from the Direct Engagement Exercise which is not specific to a particular IHA
- Online data for charter vessels

For the purpose of a full economic assessment the potential economic impact for the commercial fishing sector obtained through the Direct Engagement Exercise includes the value related to potential gear loss.

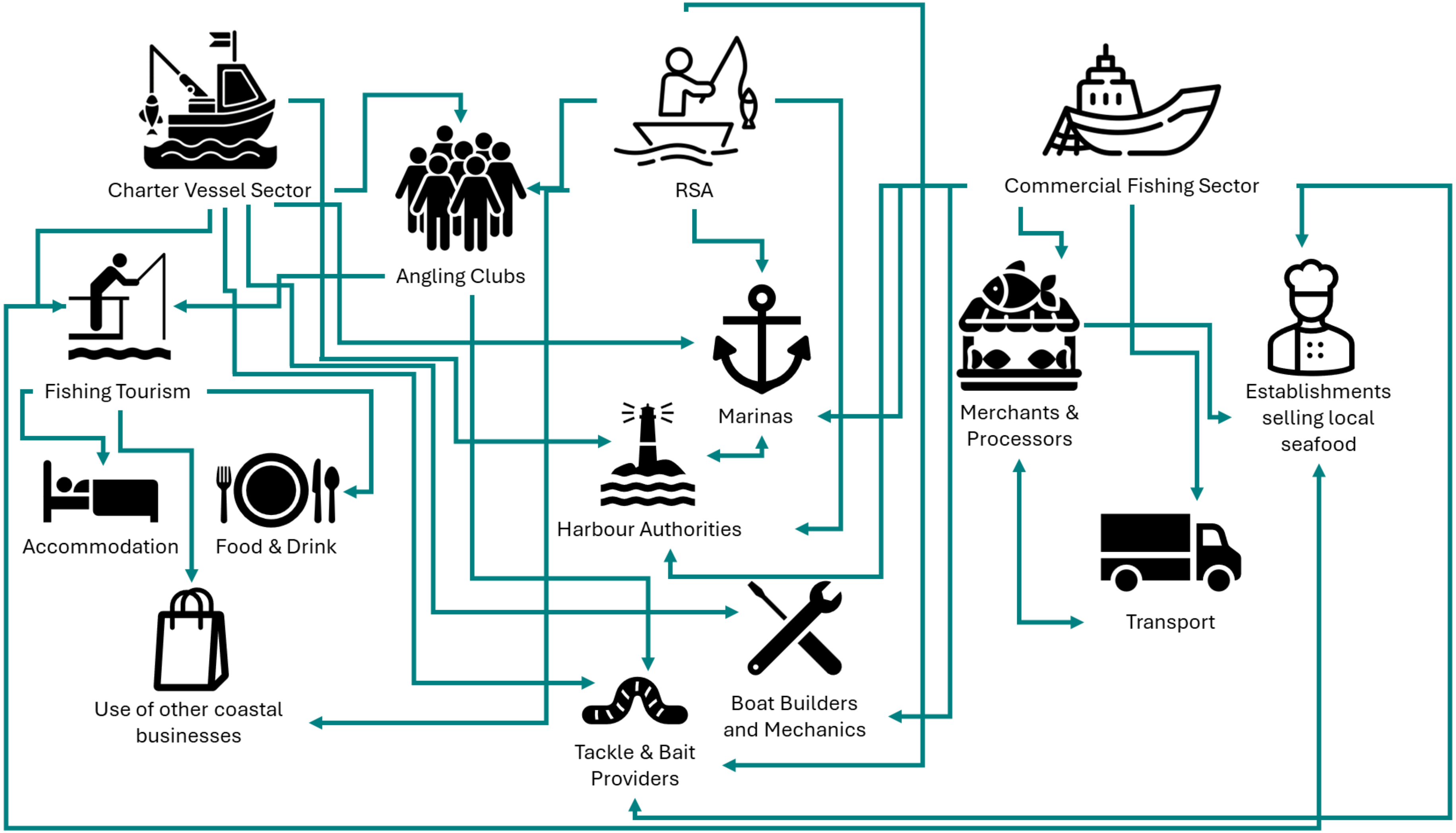
The landings data obtained from MMO for specific vessels is also presented, using the total of the upper range of potential economic impact values as a representation of the potential maximum impact. This data is not included with the above three data sources to provide an overall total as certain vessels for which MMO landings data was obtained were also consulted through the Direct Engagement Exercise therefore to add this data to the engagement data may result in an overestimate with multiple values being applicable to the same vessel.

Data Source	Sector	Value	Page Number
Engagement Data – Area Specific	Charter vessel	66,750.00	30
	RSA	12,800.00	31
	Commercial	306,980.01	31
Engagement Data – Not Area Specific	Charter vessel	78,760.00	31
	Commercial	7,000.00	31
Online data for charter vessels		834,600.00	32-34
Total		**£1,306,890.01**	
MMO Landings Data		133,396.38	35
Total		**£133,396.38**	

5. Wider Impact Considerations

The wider impacts data which was provided through the Direct Engagement Exercise was reviewed and key words/phrases extracted which cover themes of potential impacts, wider considerations and the relationship between the sectors and other businesses/the coastal community. These key words/phrases are presented in the word cloud below. *Note the size of the text does not relate to any weighting applied to a particular word/phrase.*

Consideration has also been given to the potential cascade effect resulting from any direct impacts to the three sectors covered in this report. The diagram below aims to provide an illustrative example of the other industries/businesses/groups which may be impacted as a result of any cascade effect.



6. Additional Data from Literature

The following information is sourced from published papers or reports which relates to the sectors (charter vessel, RSA and commercial fishing) which may be impacted as a result of the initial iteration of draft measures for black seabream. This information aims to provide an initial indication of elements such as wider economic contributions of different sectors to the local economy and participation in RSA. The information presented here is not exhaustive and Information sources such as these examples (and others) can be further interrogated at the appropriate point to feed into a full Impact Assessment for any further iterations of draft measures.

Williams et al (2020)[1]: The economic contribution of sea angling from charter boats: a case study from the south coast of England

- In this study, the economic contribution of charter boat sea angling on coastal communities was assessed for four ports in Dorset on the South Coast of England (Poole, Swanage, Weymouth and Portland).
- Values are provided for Gross Output, Economic Contribution and Gross Value Added (GVA) of the charter boat sector for the ports of Weymouth/Portland and Poole/Swanage.

Port	Gross Output (£)	Economic Contribution (£)	GVA (£)
Weymouth/Portland	1,078,590 (948,181 – 1,208,999)	1,646,557 (1,414,721 – 1,878,394)	510,622 (481,641-539,604)
Poole/Swanage	1,393,333 (1,334,667-1,452,000)	2,000,585 (1,890,179-2,110,990)	786,082 (779,154-793,010)

The paper provides values along with an uncertainty range based on standard errors, given in brackets.

[1] Williams, C., Davies, W., Clark, R. E., Muench, A. and Hyder, K. (2020). The economic contribution of sea angling from charter boats: a case study from the south coast of England. *Marine Policy*, 119, 104066

Williams and Davies (2018)[2]: The value of the small-scale commercial fishing fleet and recreational charter fleet to Weymouth: a tale of two fisheries

- The report looked at the commercial crab and bass fisheries operating out of Weymouth Harbour as well as the Weymouth recreational charter vessel fleet to determine gross output, indirect output and total economic activity.
- Values were given as:

Fishing Fleet	Gross Output (£)	Indirect Output (£)	Total Economic Activity (£)
Bass fishing	947,410	236,509	1,183,920
Crab fishing	279,956	258,288	538,244
Charter vessels	1,305,940	906,381	2,212,321

Williams and Davies (2018)[3]: A tale of three fisheries – the value of the small scale commercial fishing fleet, aquaculture and the recreational charter fleet, to the local economy of Poole

- The report looks to provide an indicator for the wider value created by the charter boat fleet in Poole utilising multiple data sources to complete local economic impact calculations.
- For Poole Harbour, open-book accounts of two charter vessels were used as a basis for estimating gross and indirect output for charter vessels, identifying, at the time of the report, 33 charter vessels operating out of Poole Harbour.
- Values were given as Gross Output, Indirect Output, Total Economic Activity and Total Economic Activity (75% performance) as follows:
    - Gross Output = £3,129,687
    - Indirect Output = £2,600,103
    - Total Economic Activity = £5,729,790
    - Total Economic Activity (75% performance) = £4,297,343

[2] Williams, C. and Davies, W. (2018). The value of the small-scale commercial fishing fleet and recreational charter fleet, to Weymouth: a tale of two fisheries. *New Economics Foundation to the Weymouth and Portland Fishermen's and Licensed Boatman's Association, the Weymouth and Portland Licensed Skippers Association, Southern IFCA and Seafish*, pp. 57

[3] Williams, C. and Davies, W. (2018). A tale of three fisheries: the value of the small scale commercial fishing fleet, aquaculture and the recreational charter boat fleet, to the local economy of Poole. *New Economics Foundation Report for Southern IFCA*, pp. 42

Hyder et al., (2020)[4]: Participation, catches and economic impact of sea anglers resident in the UK in 2016 & 2017

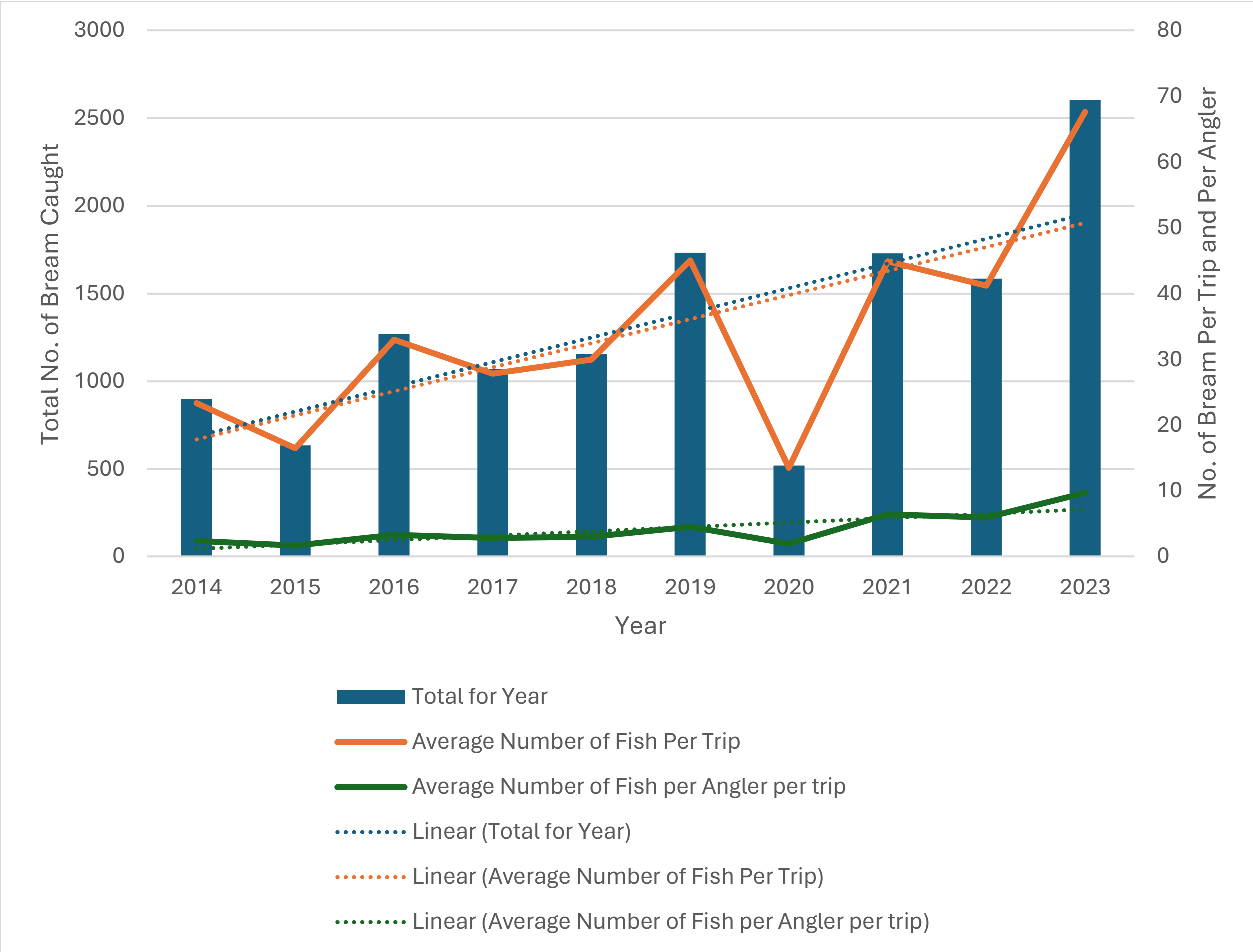
- The report follows on from the Sea Angling 2012 survey in England, adopting a revised monitoring program to estimate numbers of UK sea anglers, how often they fish, what they catch and how much they spend on their sport.
    - On average 823,000 UK residents aged 16 or older went sea angling in the years 2015-2017
        - Participation rate of 1.6%
        - Fished days = 7.0 million
    - Numbers of sea anglers were greatest in England (607,000) with the largest representation in the south west
    - A total of 100 different fish species were caught by sea anglers in the UK in 2016 and 2017 with a release rate of 80%
        - The species composition of the catch was similar in 2016 and 2017, the four most common species were whiting, mackerel, dogfish and bass with bream species accounting for 3% of the total catch (49.7 million in 2016 and 54.5 million in 2017)
    - Participants provided data on expenditure on capital (major) items and a breakdown on spend on the most recent sea angling day trip. This was used to estimate the total economic impact and jobs supported by sea angling in the UK.
        - Total expenditure estimate per adult angler = £1108 in 2016 and £1318 in 2017
        - Total direct expenditure estimates = £696 million in 2016 and £847 million in 2017 (removing imports and taxes and scaling to the UK)
        - Total economic impact =
            - 2016 - £1.58 billion (£326 million GVA), supporting almost 13,600 jobs
            - 2017 - £1.94 billion (£388 million GVA), supporting around 16,300 jobs

[4] Hyder, K., Brown, A., Armstrong, M., Bell, B., Bradley, K., Elena, C., Gibson, I., Hardman, F., Harrison, J., Haves, V., Hook, S., Kroese, I., Mellor, G., MacLeod, E., Meunch, A., Radford, Z. and Townhill, B. (2020). Participation, catches and economic impact of sea anglers resident in the UK in 2016 & 2017. *Cefas, Final Report of the Sea Angling 2016 and 2017 Project*, pp. 39

Annex 1

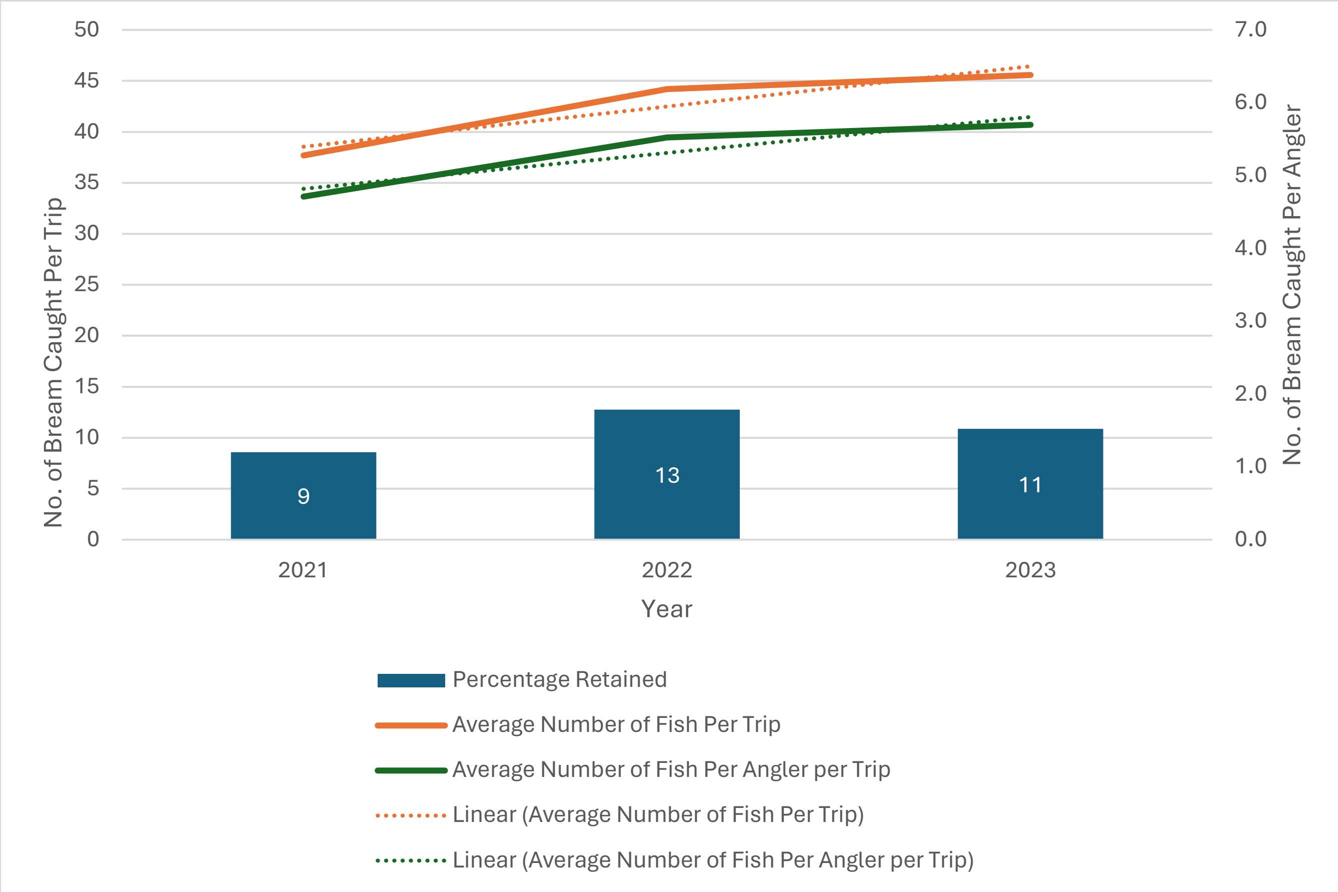
Data provided by two charter angling vessels on catches of black seabream over time related to the number of trips, the number of anglers and, for the second vessel, the percentage of the catch of black seabream which was either retained or released.

Vessel 1



- Between 2014 and 2023 the linear trend in both the total number of black seabream caught per year and the average number of fish caught per trip shows an increase. The average number of bream caught per angler also shows a linear trend increase although less pronounced.
  - Highest number of bream caught per year = 2023 = 2,603
  - Highest average number of fish caught per trip = 2023 = 67.6
  - Highest average number of fish caught per angler per trip = 2023 = 9.7

Vessel 2

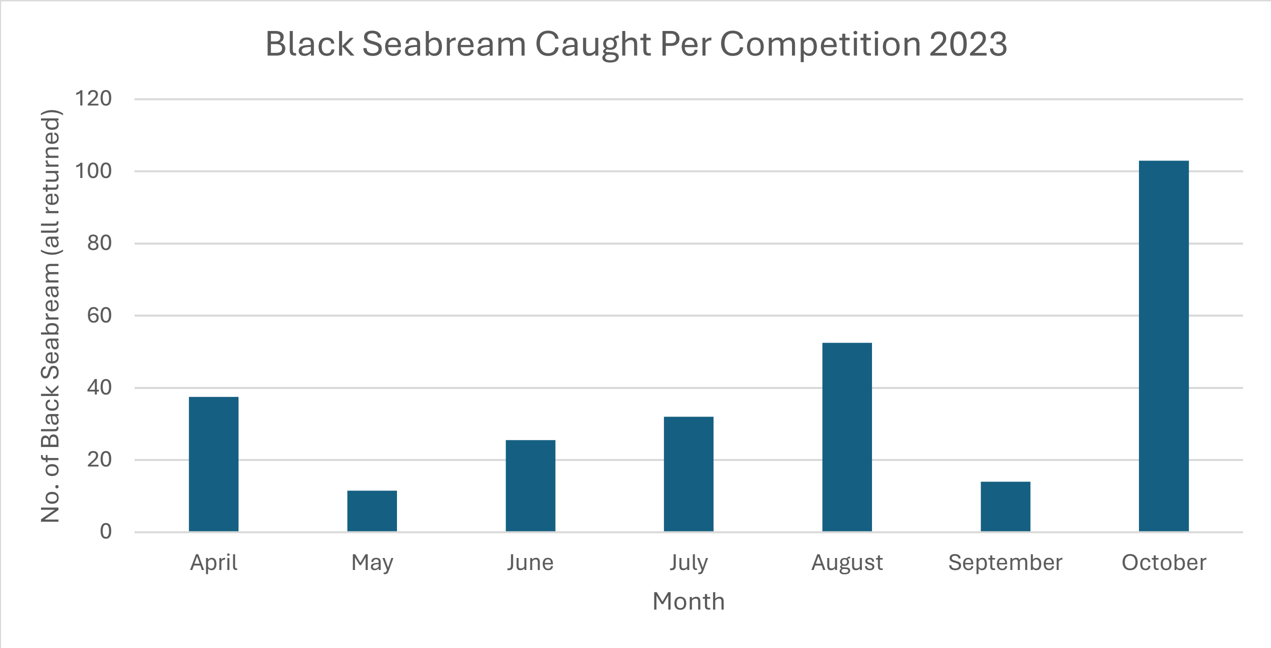


- Between 2021 and 2023 the linear trend in both the average number of fish caught per trip and the average number of fish caught per angler per trip increased.
  - Highest average number of fish caught per trip = 2023 = 45.6
  - Highest average number of fish caught per angler per trip = 2023 = 5.7

Marked B – Annex 1

Annex 2

General data provided during evidence gathering exercise.



- The number of black seabream caught per competition through 2023 by one RSA vessel.
    - Highest in October 2023 = 103
    - Lowest in May 2023 = 23
- Competitions runs across Poole Bay and Purbeck Coast
- All fish were returned

Southern IFCA Inshore Fisheries and Conservation Authority

EXECUTIVE SUMMARY

Marked C

Black Sea bream: Material Considerations
Decision Paper

Report by the CEO

A. Purpose

To provide an update following a Members Working Group held on the 24th April 2024 which focused on Decision Making Processes and Material Considerations in the context of black sea bream. Additionally, to maintain transparency with stakeholder on the matters which will be considered by the Authority when developing management for black sea bream.

B. Recommendations

1) That draft management measures for black sea bream in Dorset's MCZs will be developed with consideration of social, economic and environmental impact, in addition to all other Material Considerations.
2) That a Management Matrix be developed to support the Authority when considering Material Considerations vs. draft management options, in order to inform an appropriate decision making process.

C. Annex:

Annex 1: Material Considerations, Bean *et al*, 2022.

1.0 Background

- At the TAC meeting in November 2023, Members were informed that advice would be sought from Defra on the application of the 2024 Government deadline for MPA management for black sea bream (BSB) as a designated species in three Dorset Marine Conservation Zones (MCZs) [Purbeck Coast, Poole Rocks, & Southbourne Rough].
- Defra provided a clear indication that the development of management for BSB is to be delivered in line with the 2024 MPA deadline.
- Two Member Working Groups were held in January 2024 to discuss guiding principles to underpin the development of BSB management. These principles related to general, evidence and spatial elements.
- At the February TAC Members agreed the General, Evidence and Spatial Principles ('The Principles') to facilitate progression of this area of work.

2.0 Progress Since February TAC

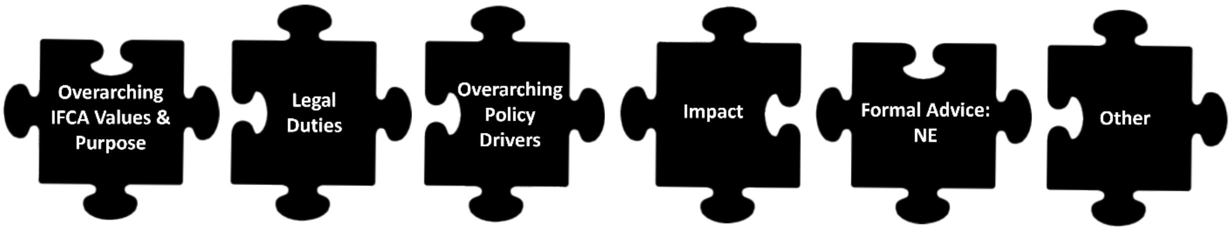
- At a Working Group in February, Members proposed the first iteration of draft management measures based upon The Principles, which satisfied the BSB Conservation Objectives in the context of s.154 duties under the Marine and Coastal Access Act 2009 (MaCAA).
- Subsequently:
  - A targeted **quantification of impact exercise** was undertaken to quantify the potential impact of the first iteration of draft measures, with focused informal industry engagement to provide an initial understanding of impact.

  - An identification of all relevant **Material Considerations** (matters that should be taken into account when making a decision) has been undertaken, as informed by the basic principle of Administrative Law (Annex 1).

  - A **Member WG** was held on the 24th April to discuss the Decision Making Process and Material Considerations in the context of BSB.

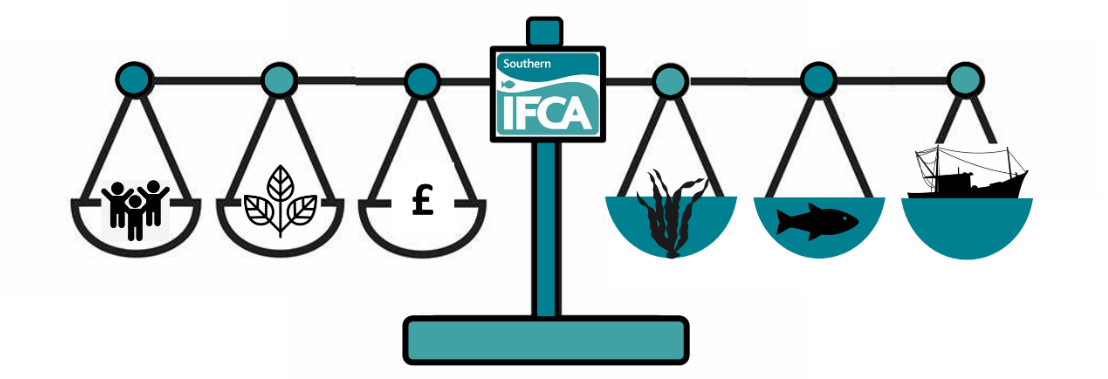
3.0 Summary of Material Considerations Working Group:

- The Working Group explored the following six Material Consideration categories in brief and their role in the wider decision-making process:



- The Working Group referenced a paper by Bean *et al*, 2022 which discusses that legal duties, for example specified under s.154 of the MaCAA *'…are rarely intended to be exhaustive and that other material considerations not expressed must be taken into account…'* when determining management outcomes.
- The Bean *et al,* 2022 paper forms the foundation for exploration of all Material Considerations relevant to BSB which include, for example, considerations of proportionality (management to be proportionate to the risk being addressed), impact (social, economic and environmental), the precautionary principle and Formal Advice from Natural England.
- Collectively, in considering all Material Considerations in combination, Southern IFCA will be doing so in accordance with the overarching IFCA values and purpose:

> ***" IFCAs will lead, champion and manage a sustainable marine environment & inshore fisheries, by successfully securing the right balance between social, environmental & economic benefits to ensure healthy seas, sustainable fisheries & a viable industry "***



4.0 Next Steps

- A Management Matrix be developed which provides a breakdown of the six Material Consideration categories into c.29 headers and c.50 sub-headers for Members consideration.
- That Members consider appropriate weighting to all relevant Material Considerations at a subsequent Working Group in order to inform a robust decision making process and a proportionate approach to management. Outcomes of this Working Group will be considered at the August TAC.

Specialist Advice to IFCAs and IFCA Decision-Making

This note provides guidance to IFCAs as to the treatment within their decision-making processes of specialist advice provided to IFCAs by statutory bodies.

1. Specialist Advice in Decision-Making

It is a basic principle of Administrative Law that, during the course of its decision-making, a decision-maker must take into account all material considerations. Some material considerations may be expressly stated in legislation, for example, express considerations for IFCAs are listed in s.153(2)(a)-(d) Marine & Coastal Access Act 2009. However, such listings are rarely intended to be exhaustive and other material considerations not expressed must be taken into account. One of the material considerations that an IFCA must take into account will be any advice received from other statutory advisory and/or regulatory bodies, such as Natural England, the Environment Agency, or Historic England.

It is important to remember when considering specialist advice that an IFCA is a regulatory environmental decision-maker and must reach its own decision, rather than simply follow unquestioningly the advice of other regulators or advisors.[1] Consequently, an IFCA must reach its own determinations, taking into account all material considerations. However, in reaching its decisions an IFCA will need to attach differing weight to differing material considerations. In other words, while all material considerations must be taken into account, not all material considerations carry the same weight.

In reviewing the legality of decisions made by statutory environmental regulators the Courts will give "*real weight*" to the evidence of a specialist statutory agency "*in the absence of a clear refutation*".[2] More recently, the Court of Appeal has stated that an "*enhanced margin of appreciation*" (extra weight) is carried by the view of "*… an environmental regulator making a specialist judgment, applying very sophisticated specialised scientific and environmental knowledge and expertise* …".[3] These cases concerned the weight attached to different material considerations by a statutory environmental regulator itself in its own decision-making, rather than being about the weight to be attached to advice given by it to another regulator. However, there is little doubt that a court would follow the same principle when reviewing the weight attached by a decision-maker, such as an IFCA, to advice received from a statutory advisory body.

The Environment Agency, Natural England and Historic England are statutory bodies that, applying specialised knowledge and expertise, may provide advice to IFCAs. In the normal course of events an IFCA, albeit reaching its own decision, would therefore be expected to attach such an '*enhanced margin of appreciation*' (extra weight) to such advice. However, there may be circumstances where the confidence of an IFCA in the accuracy of such advice may be in doubt or where, notwithstanding the extra weight attached to such advice, the IFCA feels that the advice is outweighed by other material considerations. In such circumstances it is important to remember that it is for an IFCA to reach its own decision and not simply follow the received advice without question.

If an IFCA is faced with such a situation it would be advisable to:

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[1] S*tringer v. Minister of Housing & Local Government* [1970] 1 WLR 1281.

[2] *Levy v. The Environment Agency* [2002] EWHC 1663 (Admin) per Silber J. at 78 – 80; see to same effect *R. (on the application of Edwards) v. The Environment Agency* [2005] EWHC 657 (Admin) per Lindsay J. para 92

[3] *R (on application of Mott) v. Environment Agency* [2016] EWCA Civ 564 per Bearson L.J. at 73.

1. Minute the decision-making process in some detail.
2. Record what considerations are being taken into account, with an indication of the weight being attached to them.
3. Record what factors are causing the IFCA to either question the accuracy or potency of the advice.

The object is to provide as accurate an understanding of the decision-making process that has been undertaken as possible. The greater the departure from the specialist advice received the more prudent it becomes that a fuller record of the decision-making is minuted.

2. <u>The Precautionary Principle and Specialist Advice</u>

Another consideration that will be material, especially when diverging from specialist advice, will be the Precautionary Principle. The Precautionary Principle exists in both domestic English and Welsh law[4] and as a general principle of EU law.[5] More recently a precautionary objective appears as one of the eight objectives of the Fisheries Act 2020,[6] with the explanation that a precautionary approach to fisheries management "means an approach in which the absence of sufficient scientific information is not used to justify postponing or failing to take management measures to conserve target species, associated or dependent species, non-target species or their environment."[7]

Consideration of the Precautionary Principle does not mean that specialist advice must be invariably followed. Instead, when IFCAs are deciding how to discharge their statutory duties to manage fisheries in a sustainable way and balance socio-economic benefits with protecting the marine environment,[8] the Precautionary Principle means that where there is a lack of full scientific certainty or, more likely, gaps in the available evidence, then the IFCA cannot use this to avoid making a decision. Thus, where there are, in the view of an IFCA, uncertainties underlying the formulation of specialist advice, the Precautionary Principle means that an IFCA must make a decision accordingly.[9] This requirement is confirmed in the Explanatory Notes to the Marine & Coastal Access Act 2009 where it states:

"*IFC authorities will be able to apply precautionary measures… in order to fulfil their main duty. Precautionary measures in this context means that the absence of adequate scientific information should not be used as a reason for postponing or failing to take management measures to conserve target species, associated or dependant species and non-target species and their environment.*" [10]

Although an IFCA cannot avoid making decisions where evidence is lacking or incomplete there is nevertheless a good degree of flexibility allowed in the decision-making. As explained by the Joint Nature Conservation Committee:

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[4] Garcia SM (1994) 'The Precautionary Principle: its Implications in Capture Fisheries Management' *Ocean and Coastal Management* 22, 99-125; see also Environment Act 2021 section 17 and Department for Environment, Food and Rural Affairs, *Policy Statement on Environmental Principles* (May 2022), available at https://www.gov.uk/government/publications/environmental-principles-policy-statement/draft-environmental-principles-policy-statement (Accessed 5 August 2022)
[5] Other general principles include the principle of proportionality, the principle of legal certainty and the principle of legitimate expectations.
[6] Fisheries Act 2020 section 1(1)(b)
[7] Fisheries Act 2020 section 1(10)
[8] Marine & Coastal Access Act 2009 section 153
[9] See further European Parliament, *Precautionary Principle: Definitions, application and governance* (2015) https://www.europarl.europa.eu/thinktank/en/document/EPRS_IDA(2015)573876 (Accessed 5 August 2022) and DEFRA op cit. n4
[10] Marine and Coastal Access Act 2009 Explanatory Notes, para.435 Marine and Coastal Access Act 2009 - Explanatory Notes (legislation.gov.uk) (Accessed 31 July 2022)

“Precaution is not an all-or-nothing commodity: different approaches can be precautionary to different degrees… In principle, a 'precautionary approach' to a fishery is any approach which reduces the likelihood of stock collapse or significant impact on natural heritage or the supporting environment. Selecting the appropriate mechanism, and choosing the 'degree' of precaution to be used, is a matter for … judgement by decision-makers. Precautionary approaches can reflect the full panoply of mechanisms (e.g. regulations, incentives, spatial planning of fishing activity, etc), up to and including prohibition ('strict precaution'). Often, however, precaution can be exercised through the proper application of a feedback loop between activity and impact which modifies the intensity of a process over time ('adaptive precaution'). Adaptive precaution is the preferred option where:

- *the activity is one which can be undertaken at different levels of intensity;*
- *it is technically feasible to establish a feedback monitoring regime; and*
- *institutional frameworks are sufficiently robust to guarantee that monitoring and feedback controls future mortality.”*[11]

The European Commission’s Communication on the Precautionary Principle[12] notes that where action is deemed necessary, measures based on the precautionary principle should be proportionate to, or should not be disproportionate to, ‘the chosen level of protection’. Therefore, it is clearly important to know what ‘the chosen level of protection’ is. This can be determined by a reasoned judgement, taking into consideration relevant advice and evidence (and the levels of certainty therein), on the level of harm or deterioration that may be caused by an activity or action, or the lack of regulation thereof.

By utilising current systems such as catch reporting and monitoring, together with evidentiary reviews, an IFCA can apply an adaptive precautionary approach which is flexible, responds to increased evidence gathering and ensures that a proportionate balance between risk and public benefit is maintained. This may be an iterative exercise carried out by an IFCA (as well as other bodies) in order to improve decision-making with respect to environmental impacts or risk.

August 2022

Dr. Emma Bean
Devon & Severn IFCA

Rob Clark
Chief Officer, Association of IFCAs

Jason Lowther
Associate Professor in Law
School of Society and Culture,
University of Plymouth

Prof. Michael Williams
Devon & Severn IFCA

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[11] Joint Nature Conservation Committee in Devon and Severn IFCA, *Decision Making and the Precautionary Principle* (2017) https://www.devonandsevernifca.gov.uk/Resource-library/A-Role-function-and-management-of-the-Authority/Decision-Making-the-Precautionary-Principle/Decision-Making-the-Precautionary-Principle (Accessed 31 July 2022)

[12] COM(2000) 1, Brussels, 2 February 2000

EXECUTIVE SUMMARY

Marked D

Draft Measures for Management of Shore Gathering in MCZs, SACs and SPAs in the Southern IFCA District
Decision Paper

Report by IFCO Condie & DCO Birchenough

A. Purpose

- For Members to consider draft measures for the management of shore gathering activities in the Southern IFCA District occurring in MCZs, SACs and SPAs, underpinned by management principles.

B. Recommendation

- That Members agree the Management Principles for shore gathering activities occurring in MCZs, SACs and SPAs in the Southern IFCA District.
- That Members agree the draft measures for shore gathering activities in the above mentioned sites based on the Management Principles.
- That Members delegate officers to make any inconsequential amendments to the draft measures on the basis of any Formal Advice received by Natural England.

C. Annexes

1. Mapping package for draft measures
2. Draft Seaweed Harvesting Code of Conduct
3. Summary of Conservation Assessment Outputs for Shore Gathering Review
4. Site Specific Evidence Document for the Southern IFCA Shore Gathering Review
5. Literature Review for the Southern IFCA Shore Gathering Review

1.0 Introduction

- Members considered a review of shore gathering management through a Working Group meeting in October 2022 and the subsequent TAC meeting in November 2022. The outcomes of these meetings were further informed in 2023 by the publication of The Environmental Improvement Plan 2023 which introduced a requirement on IFCAs to ensure that all management measures are in place for all MPAs by 2024 to meet Government targets. On this basis, the Shore Gathering Review was re-defined to focus on **feature based management interventions for MPAs: sites designated under the National Site Network (SACs, SPAs and MCZs).**
- Members then further considered the development of the Shore Gathering Review at a Working Group meeting in February 2023. At this Working Group Members considered a set of draft Management Principles and discussed that Officers proceed with developing draft measures on the basis of these Principles.
- **The Management Principles** have been reviewed following the Working Group Meeting and expanded upon to provide transparency and clarity in the approach taken to develop draft measures.

2.0 Key Considerations

- Draft measures for the management of Shore Gathering activities in MCZs, SACs and SPAs relate to the following legal duties:
  - Under the **Marine & Coastal Access Act (MaCAA)** Southern IFCA are required to ‘ensure that the conservation objectives of MCZs are furthered’.
  - Under the **Conservation of Habitats and Species Regulations 2017** (as amended by Conservation Regulations 2019), as a competent authority, Southern IFCA must exercise its functions so as to secure compliance with the requirements of the Habitats Directive and the Wild Birds Directive.

3.0 Management Principles

The following Management Principles have been developed for the Shore Gathering Review to underpin the development of draft measures. The Management Principles build on draft Principles discussed by Members.

1. The best available evidence used to inform feature-based protection for features designated under relevant MCZs, SACs and SPAs is:
   a. The Natural England (NE) designated features layer provided to Southern IFCA in 2023
   b. The National Seagrass Layer obtained from the Defra Government Website
   c. NE (quality assured) commissioned Hampshire and Isle of Wight Wildlife Trust (HIWWT) seagrass data provided to Southern IFCA in 2024

2. Any additional data received after <u>9th May 2024</u> will be considered during the period of formal consultation and then (subject to byelaw ratification), in subsequent byelaw reviews, as determined by the provisions of the byelaw.

3. For relevant features a GPS buffer of 10m will be incorporated.

4. Prohibition areas will be defined as follows:
   a. For designated seagrass features within MCZs that occur up to the 5m chart datum contour.
   b. For seagrass designated as a feature or as a supporting habitat, within or adjacent to SACs and SPAs that occur up to the 5m chart datum contour.

5. Existing Southern IFCA Management measures for relevant activities in the Poole Harbour SPA will be combined to create a single management approach.

6. With the exception of seagrass, the extent and distribution of feature-based management in the Solent Maritime SAC and district wide SPAs will be developed using Poole Harbour as a model.

7. In the application of the Poole Harbour model to the Solent Maritime SAC and district wide SPAs, the following approach will be taken:
   a. Bird Sensitive Areas (BSA) will be used as the basis for spatial management.
   b. In the absence of BSAs being defined by Natural England in the Solent Maritime SAC and district wide SPAs (excluding Poole Harbour), BSAs will be defined as follows:
      i. For the Solent Maritime SAC and Solent SPAs, BSAs will be initially defined using areas proposed for management as good examples of estuarine habitat under the Bottom Towed Fishing Gear Byelaw 2023 and adapted to be relevant to shore gathering activity.
      ii. For the Solent Maritime SAC, Solent SPAs and The Chesil and The Fleet SPA, consideration will be given to aligning BSAs with directions relating to access and shore gathering activities given by other bodies, for example harbour authorities and conservation bodies.
   c. The requirements for seasonal management within BSAs will be considered on the basis of best available evidence.

8. A code of practice will be developed for the gathering of seaweed by hand.

4.0 Draft Measures

<u>Definitions:</u> The following definitions have been drafted in relation to the activities exploiting sea fisheries resources which will be covered by the Draft Measures.

i. No person shall remove, fish for or take sea fisheries resources by hand or with the use of hand held implements or equipment where the removal, fishing for or taking is for the purpose of harvesting sea fisheries resources.
ii. No person shall have with them any hand held implements or equipment that is intended to be used for the purpose of harvesting sea fisheries resources.
iii. No person shall use or deploy any form of artificial habitat, structure or shelter to aid the collection of shore crab.
iv. Paragraphs (i) to (iii) do not apply to the fishing for or taking of sea fisheries resources using a

vessel provided that no part of the vessel's hull is in contact with the seabed

v. The definition of hand held implements or equipment has the following exceptions:
   a. Hook and line in conjunction with a fishing rod
   b. Handlines
   c. Spear gun
   d. A net other than a push net

Spatial Management:

- Underpinned by Management Principles 1-7 in Section 3, draft spatial measures have been developed (Annex 1).
- Spatial measures consist of:
  - Year-round prohibition areas for **seagrass** as defined in Management Principle 4
  - **Poole Harbour (excluding seagrass)**
    - Seasonal prohibited areas based on the spatial footprint of the existing Poole Harbour Shellfish Hand Gathering Byelaw, with the prohibition applying between 1st November and 31st March each year.
  - **The Fleet (excluding seagrass)**
    - A year-round spatial prohibition area is defined for habitats under the relevant SAC and SPA in line with access requirements already in place under the local nature reserve.
  - **Chichester Harbour, Langstone Harbour and Portsmouth Harbour (excluding seagrass)**
    - Seasonal prohibited areas between 1st November and 31st March each year
  - **Southampton Water and the Solent (excluding seagrass)**
    - Seasonal prohibited areas between 1st March and 31st August each year

Seaweed Code of Conduct:

- Underpinned by Management Principle 8 in Section 3, a code of conduct has been drafted for the gathering of seaweed by hand (Annex 2).
- The provisions of the CoC have been developed in line with other seaweed harvesting CoCs currently in place around the UK, primarily utilising a code developed by Natural England in conjunction with partners including other IFC Authorities.

5.0 Conservation Assessment Package

- Assessments have been carried out according to due process for relevant MCZs, SACs and SPAs in the Southern IFCA District.
- A summary of this process and associated outcomes are provided as Annex 3 to this report, supported by the Site Specific Evidence Document (Annex 4) and the Literature Review (Annex 5).
- The conclusion of the relevant assessments is that the proposed draft measures will allow the Southern IFCA to meet its duties under relevant legislation for MCZs, SACs and SPAs.

6.0 Potential Impact of Draft Measures

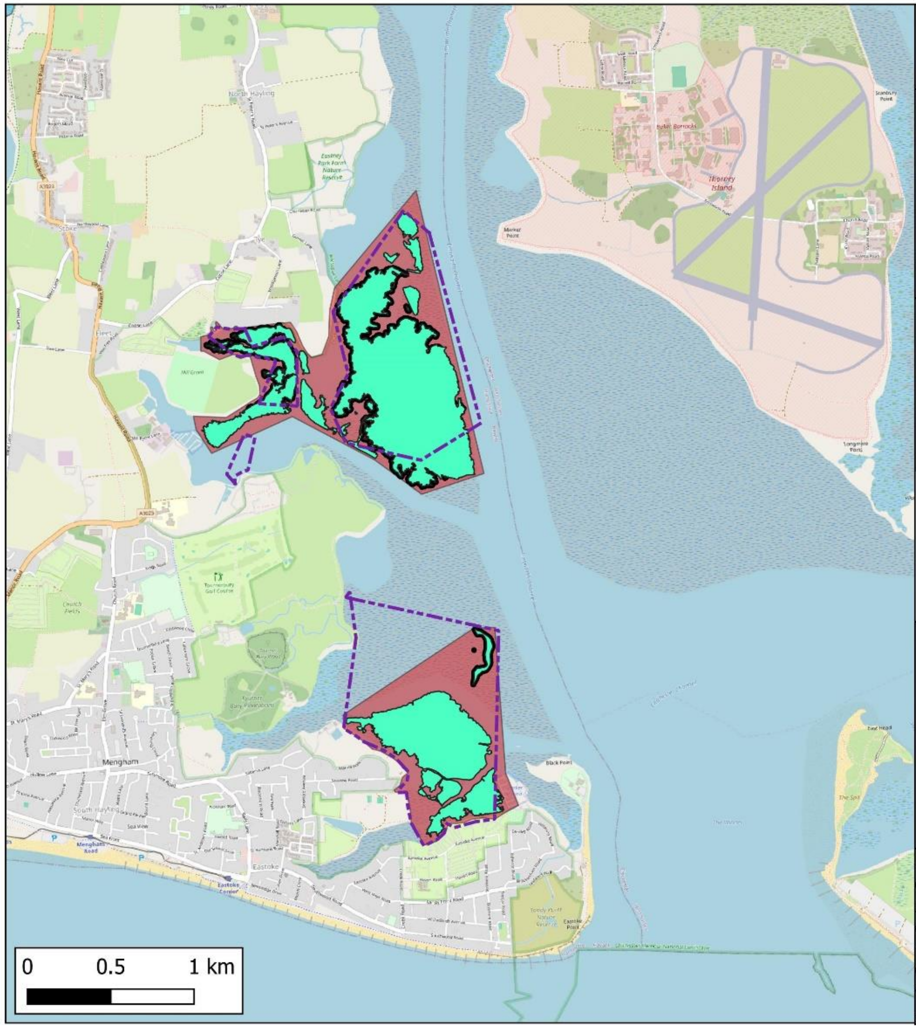
- Officers have undertaken a targeted engagement exercise with relevant stakeholders to consider potential impacts of proposed draft measures.
- This included both commercial and recreational sectors, bait diggers and shellfish gatherers in Dorset and Hampshire.
- The outcome of the exercise was that the potential impact of proposed draft measures will be low to none. The group who would be most impacted are commercial bait diggers, this impact is primarily economic. The extension of the Holes Bay winter closure from the current Bait MoA and introduction of a summer closure in the River Medina will displace up to 3 commercial diggers in each location.

7.0 Next Steps

- If Members resolve the recommendations, Officers will progress to Stage 3 of the Byelaw Making Process (Draft Byelaw) and draft any required supporting documentation for the Byelaw Package including a Conservation Assessment Package which will be provided to NE for Formal Advice.
- The Byelaw Package will be provided to the August Technical Advisory Committee meeting to consider whether to recommend that the Authority make the relevant byelaw for the management of shore gathering activities in MCZs, SACs and SPAs in the Southern IFCA District.

Marked D – Annex 1

Southern IFCA Shore Gathering Review – Mapping Package for Draft Measures

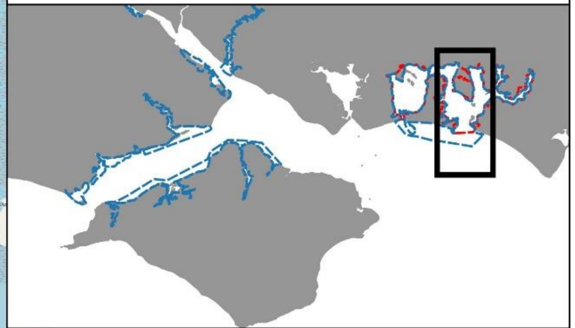


Chichester Harbour

Overlapping MPAs: Chichester and Langstone Harbours SPA
Solent Maritime SAC

Data Layers Included: NE database
National Seagrass Layer (Current Extent)
NE commissioned HIWWT data

Closure Type: Permanent seagrass closure



- Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds
- Seagrass
- 10 m GPS Buffer
- Permanent Closure
- Solent Maritime SAC
- Chichester and Langstone Harbours SPA

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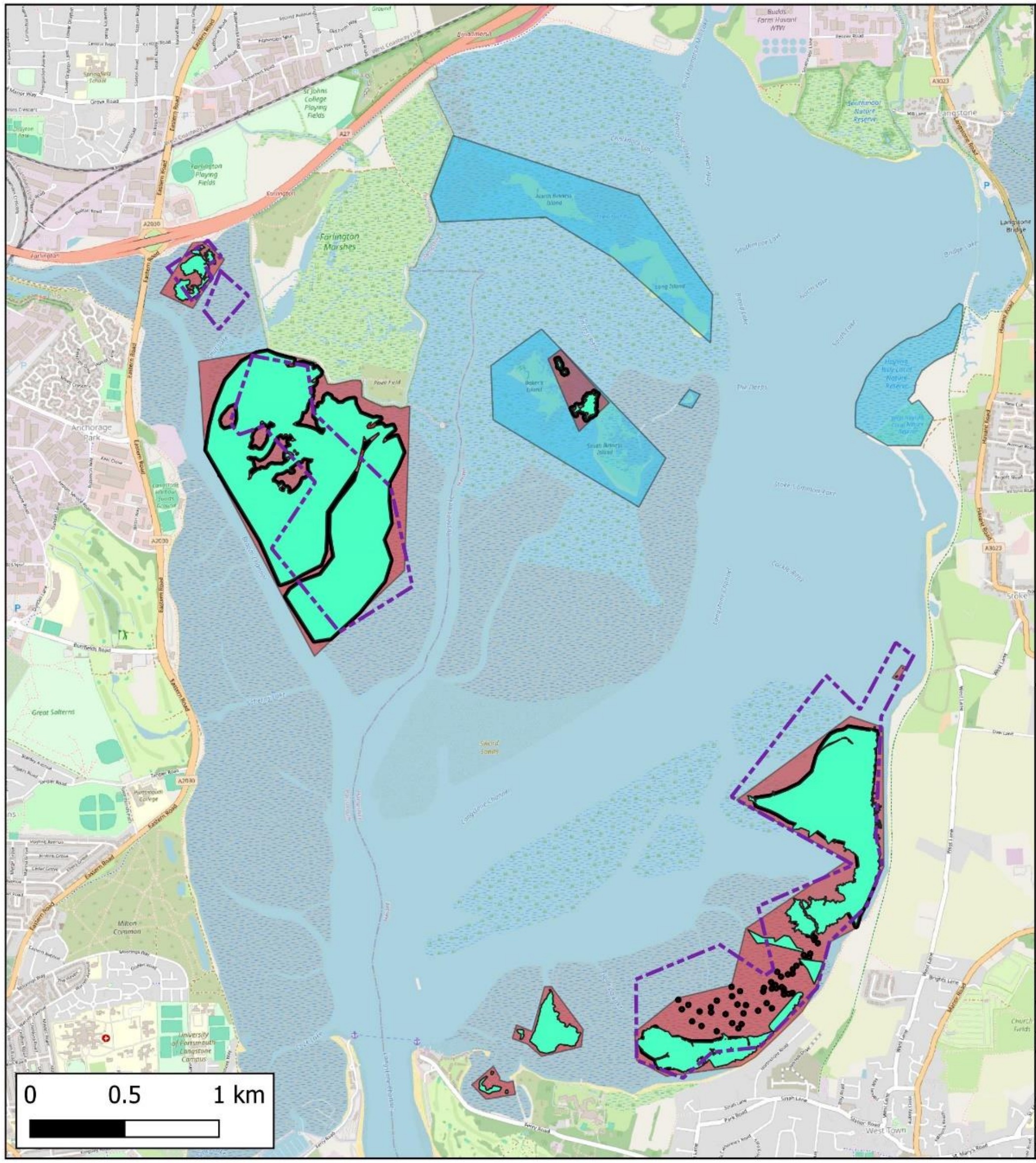
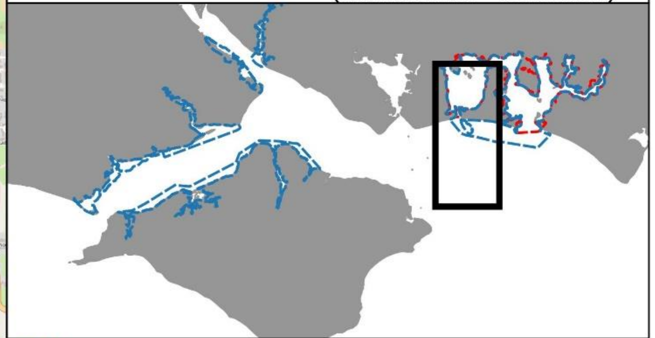


Langstone Harbour

Overlapping MPAs:	Chichester and Langstone Harbours SPA
	Solent Maritime SAC
Data Layers Included:	NE database
	National Seagrass Layer (Current Extent)
	NE commissioned HIWWT data
Closure Type:	Permanent seagrass closure
	Seasonal bird closure (1st November - 31st March)



- Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds
- Seagrass
- 10 m GPS Buffer
- Permanent Closure
- Seasonal Closure (1st November - 31st March)
- Solent Maritime SAC
- Chichester and Langstone Harbours SPA

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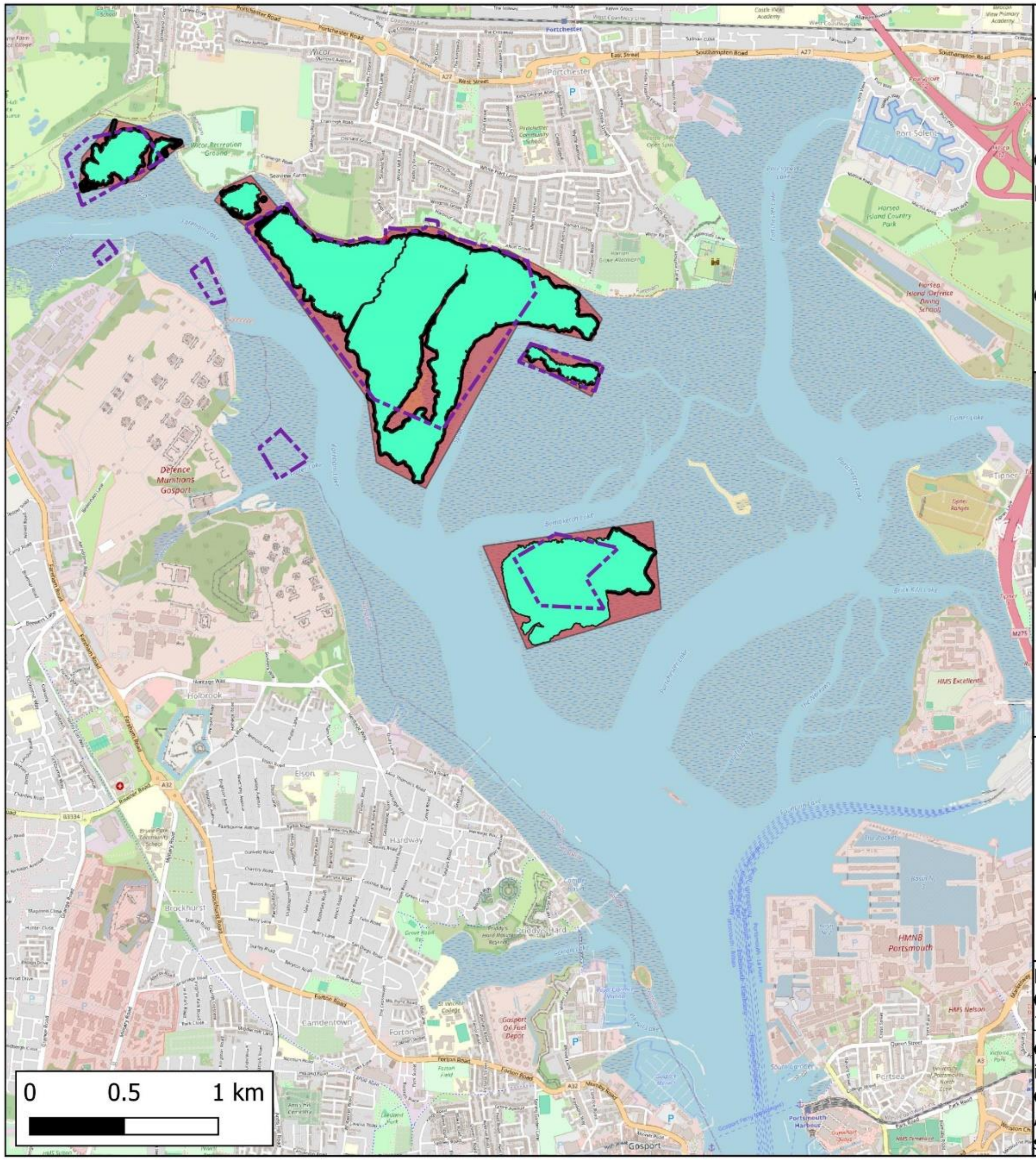

Portsmouth Harbour

Overlapping MPAs: Portsmouth Harbour SPA
Data Layers Included: NE database
National Seagrass Layer (Current Extent)
NE commissioned HIWWT data
Closure Type: Permanent seagrass closure

Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds
Seagrass
10 m GPS Buffer
Permanent Closure
Portsmouth Harbour SPA

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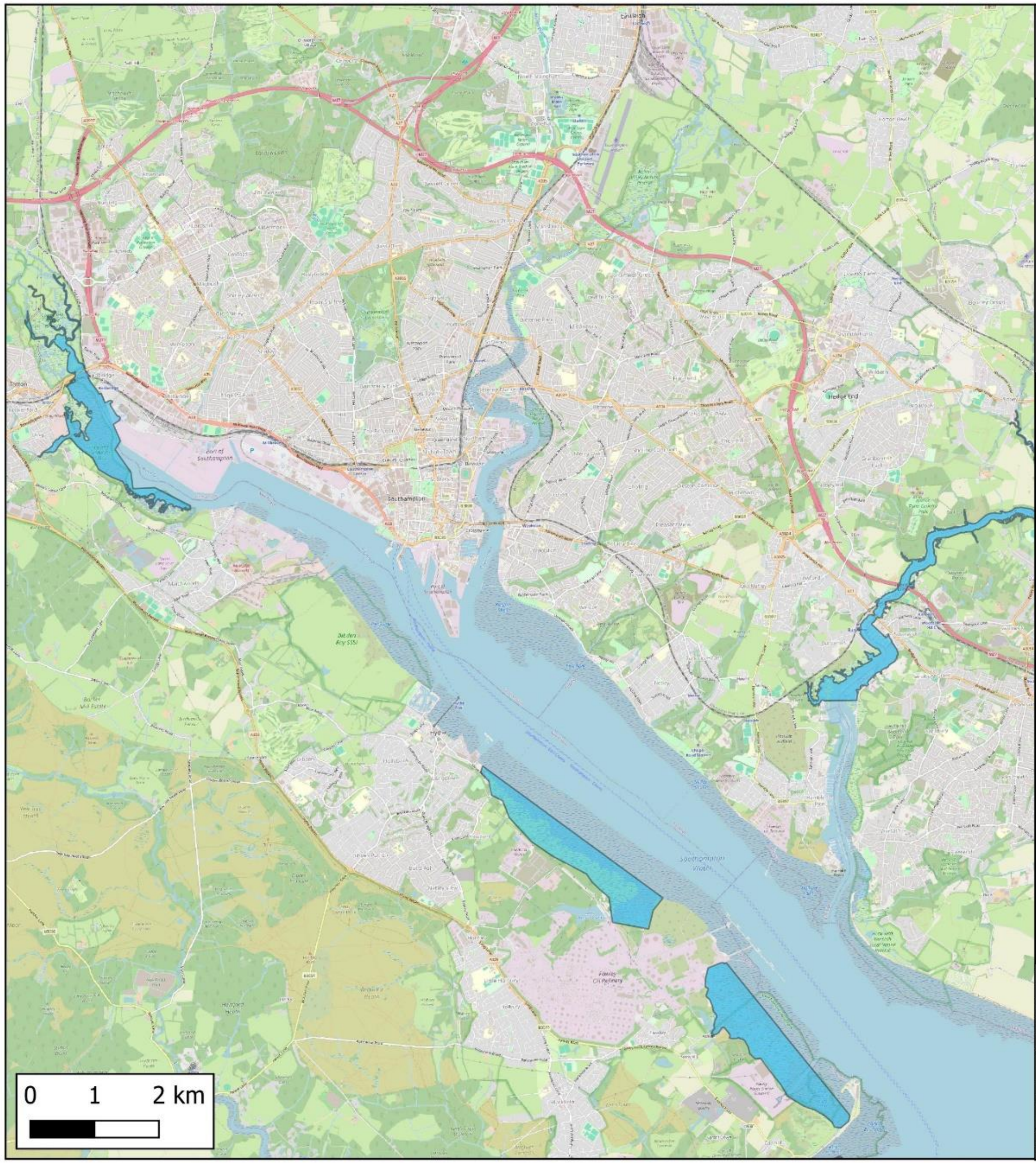
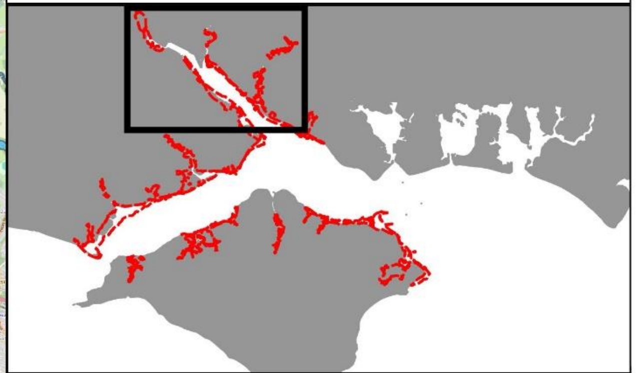


Southampton Water

Overlapping MPAs: Solent and Southampton Water SPA

Closure Type: Seasonal bird closure



Seasonal Closure (1st March - 31st August)

Southampton Water SPA

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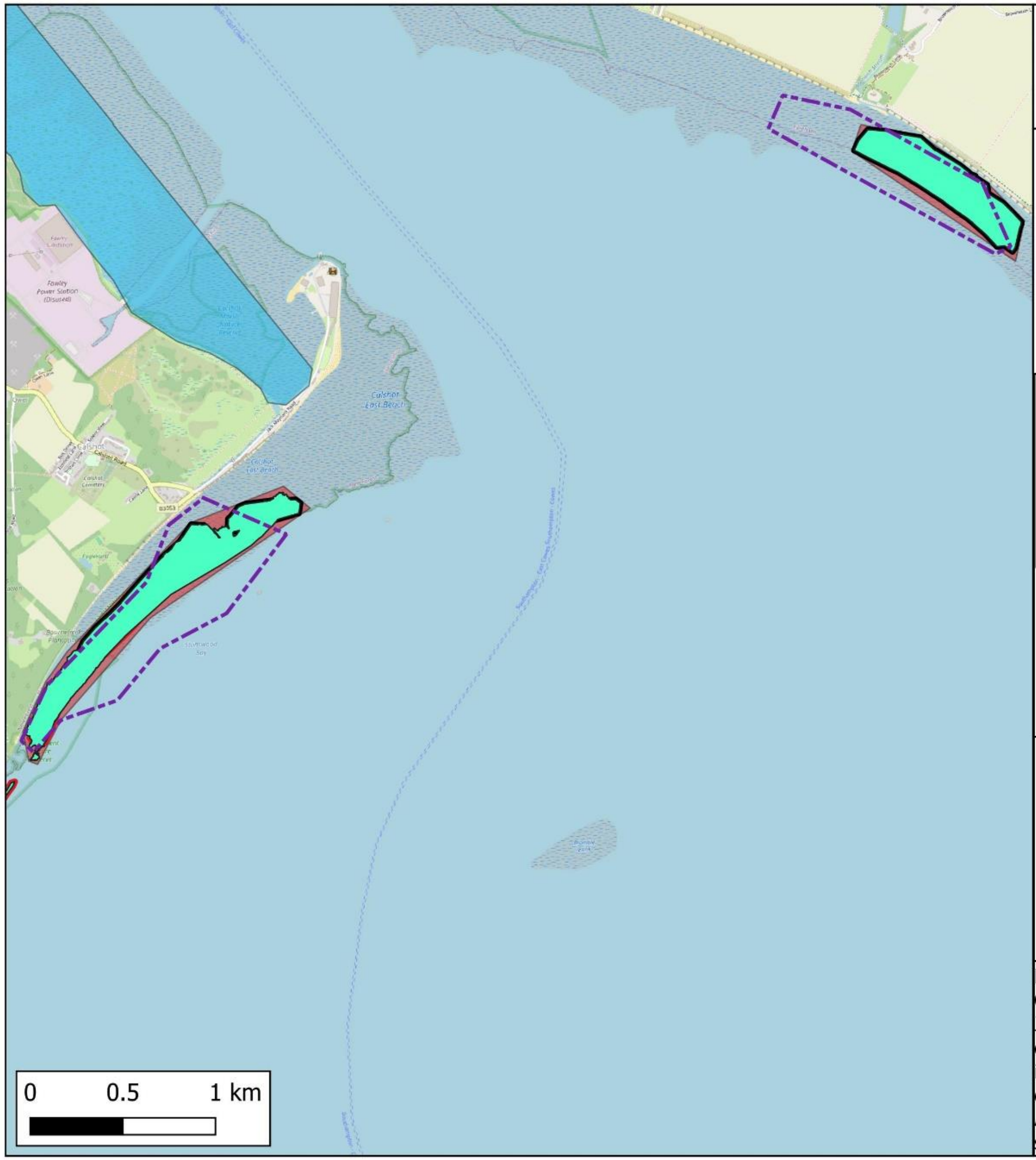

Southampton Water Entrance

Overlapping MPAs: Solent and Southampton Water SPA
Data Layers Included: NE database
National Seagrass Layer (Current Extent)
NE commissioned HIWWT data
Closure Type: Permanent seagrass closure

Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds
Seagrass
10 m GPS Buffer
Permanent Closure
Solent and Southampton Water SPA

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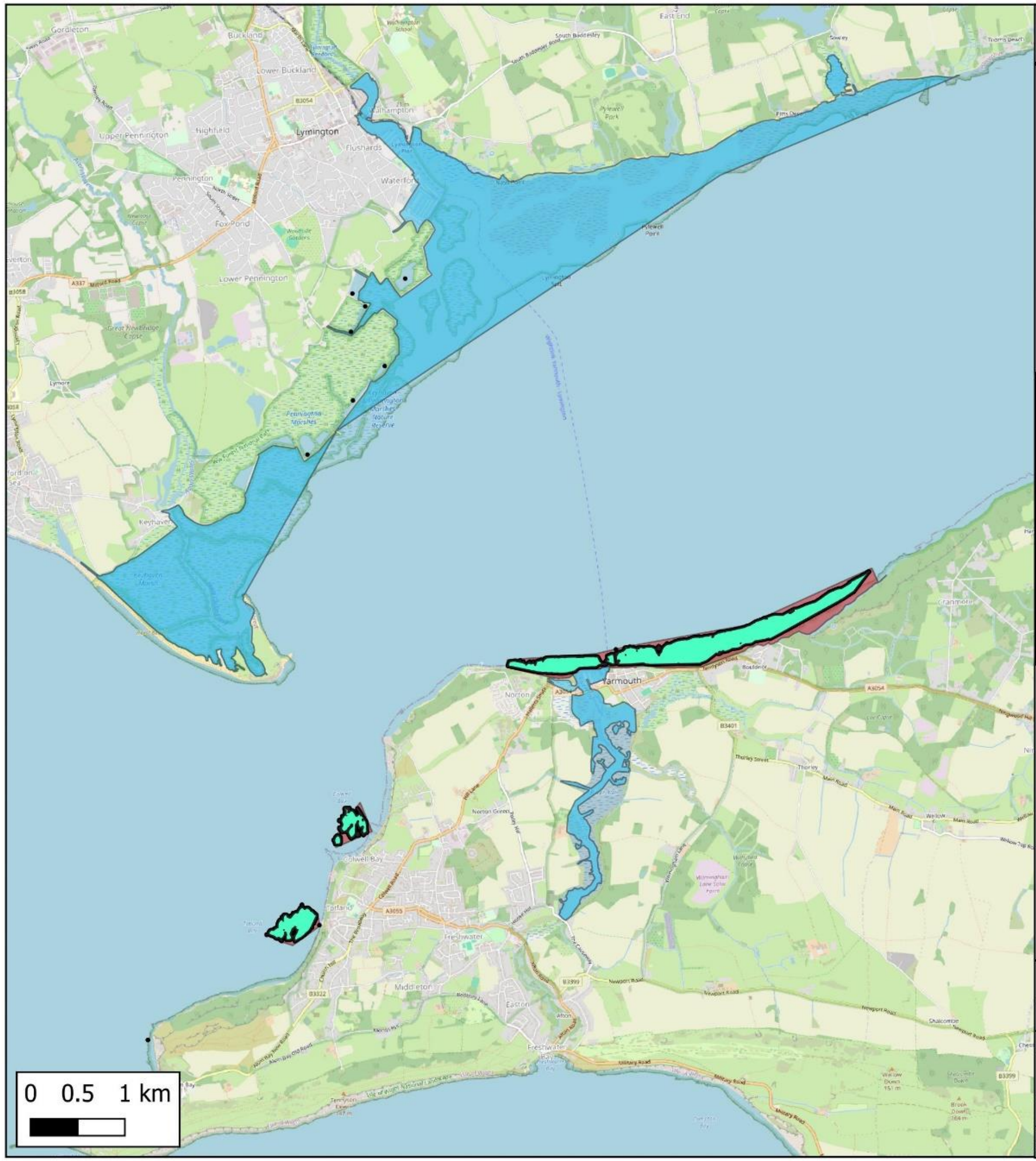
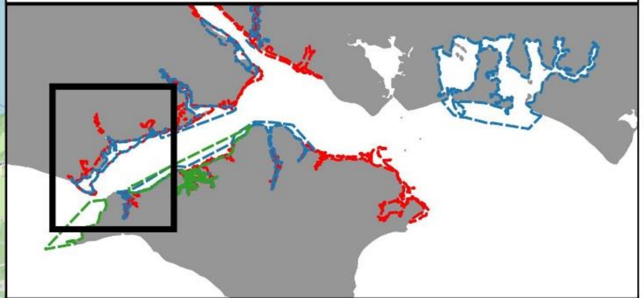
Marked D – Annex 1



Western Solent

Overlapping MPAs:	Solent and Southampton Water SPA
	Yarmouth to Cowes MCZ
	The Needles MCZ
	Solent Maritime SAC
Data Layers Included:	NE database
	National Seagrass Layer (Current Extent)
Closure Type:	Permanent seagrass closure
	Seasonal bird closure (1st March - 31st August)



- Seagrass
- 10 m GPS Buffer
- Permanent Closure
- Seasonal Closure (1st March - 31st August)
- Solent and Southampton Water SPA
- The Needles MCZ
- Yarmouth to Cowes MCZ
- Solent Maritime SAC

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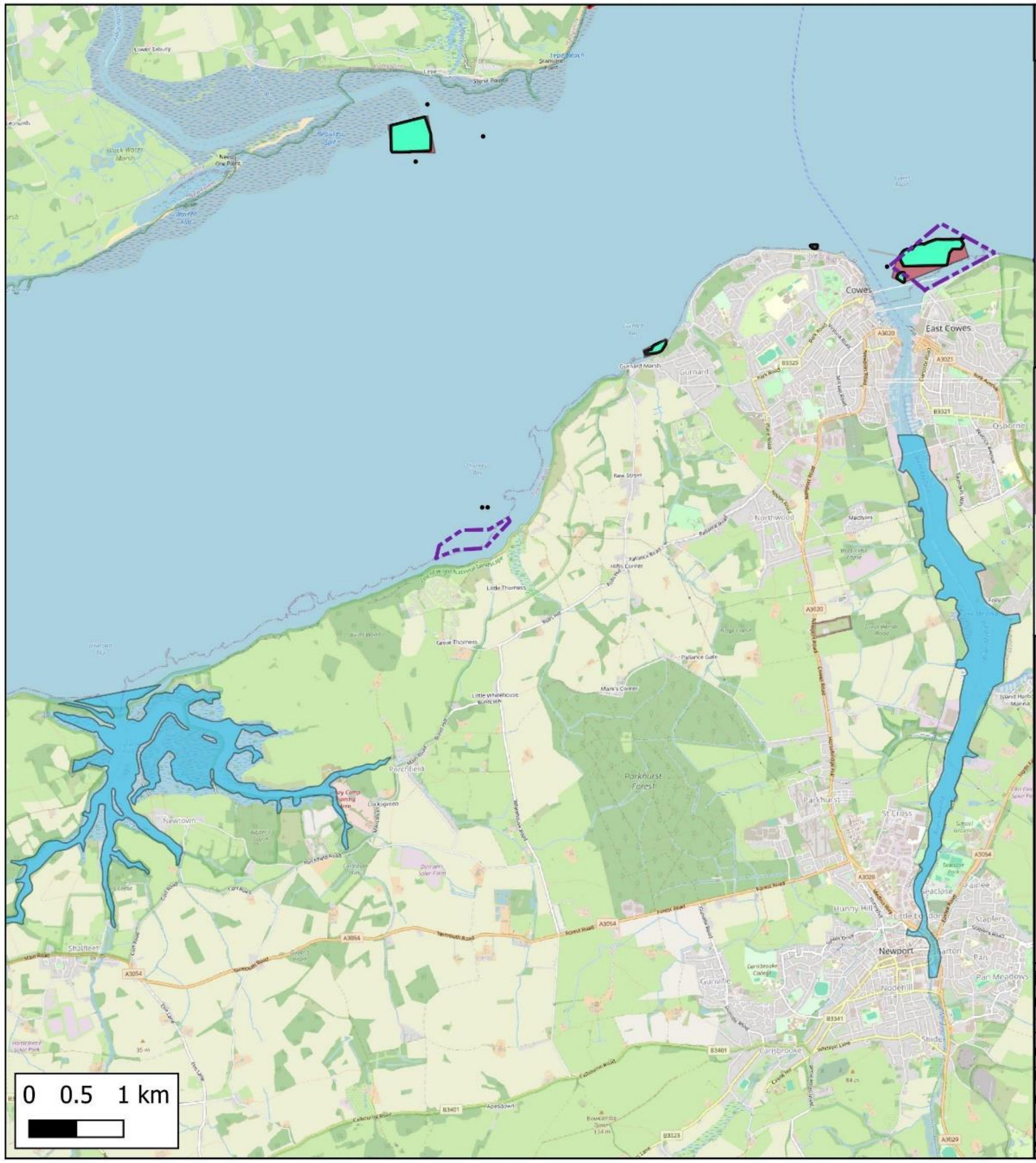
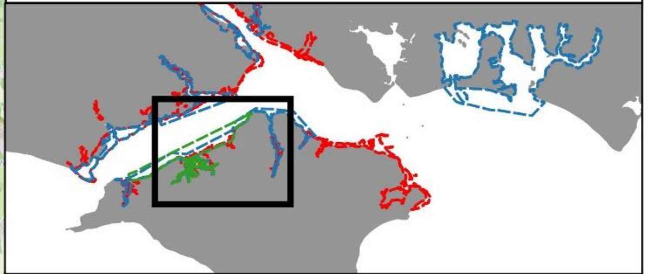


Western Solent

Overlapping MPAs:	Solent and Southampton Water SPA
	Yarmouth to Cowes MCZ
	Solent Maritime SAC
Data Layers Included:	NE database
	National Seagrass Layer (Current Extent)
	NE commisioned HIWWT data
Closure Type:	Permanent seagrass closure
	Seasonal bird closure
	(1st March - 31st August)



- Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds
- Seagrass
- 10 m GPS Buffer
- Permanent Closure
- Seasonal Closure (1st March - 31st August)
- Solent and Southampton Water SPA
- Yarmouth to Cowes MCZ
- Solent Maritime SAC

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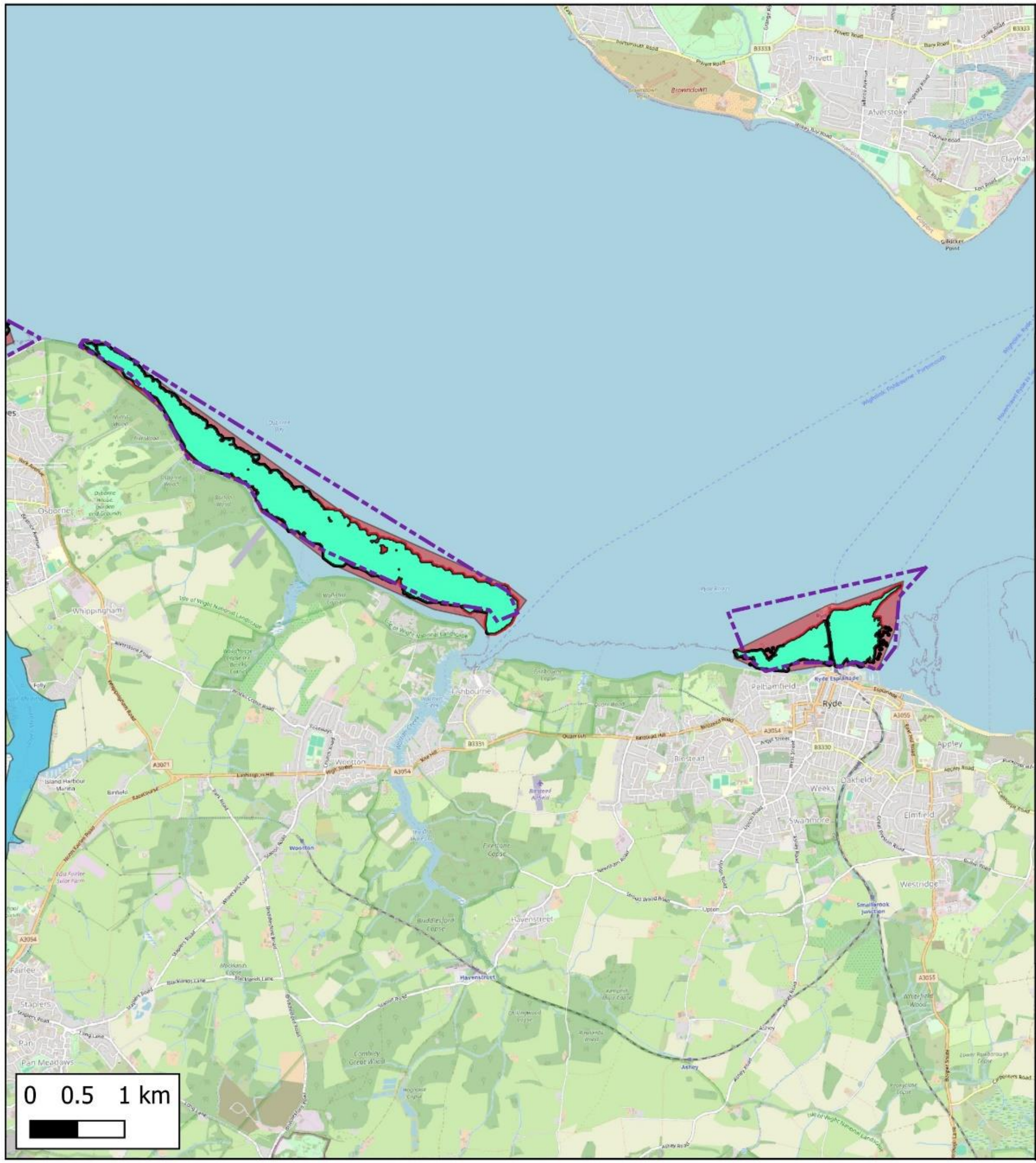
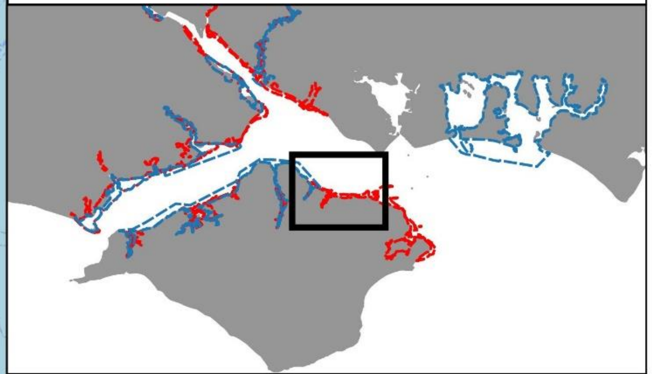


Eastern Solent

Overlapping MPAs:	Solent and Southampton Water SPA
	Solent Maritime SAC
Data Layers Included:	NE database
	National Seagrass Layer (Current Extent)
	NE commisioned HIWWT data
Closure Type:	Permanent seagrass closure



- Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds
- Seagrass
- 10 m GPS Buffer
- Permanent Closure
- Solent and Southampton Water SPA
- Solent Maritime SAC

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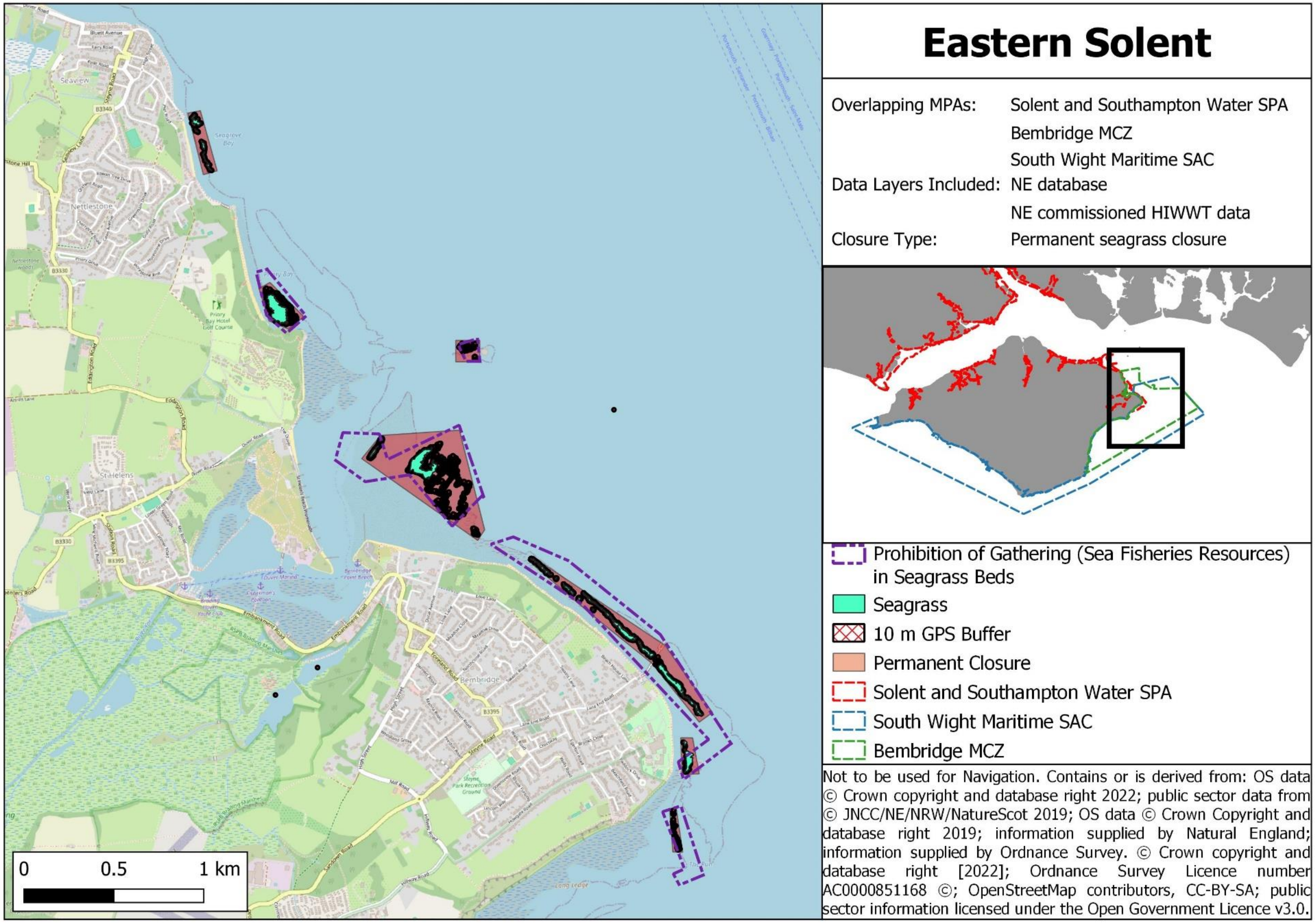
Eastern Solent
Overlapping MPAs: Solent and Southampton Water SPA
Bembridge MCZ
South Wight Maritime SAC
Data Layers Included: NE database
NE commissioned HIWWT data
Closure Type: Permanent seagrass closure
Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds
Seagrass
10 m GPS Buffer
Permanent Closure
Solent and Southampton Water SPA
South Wight Maritime SAC
Bembridge MCZ
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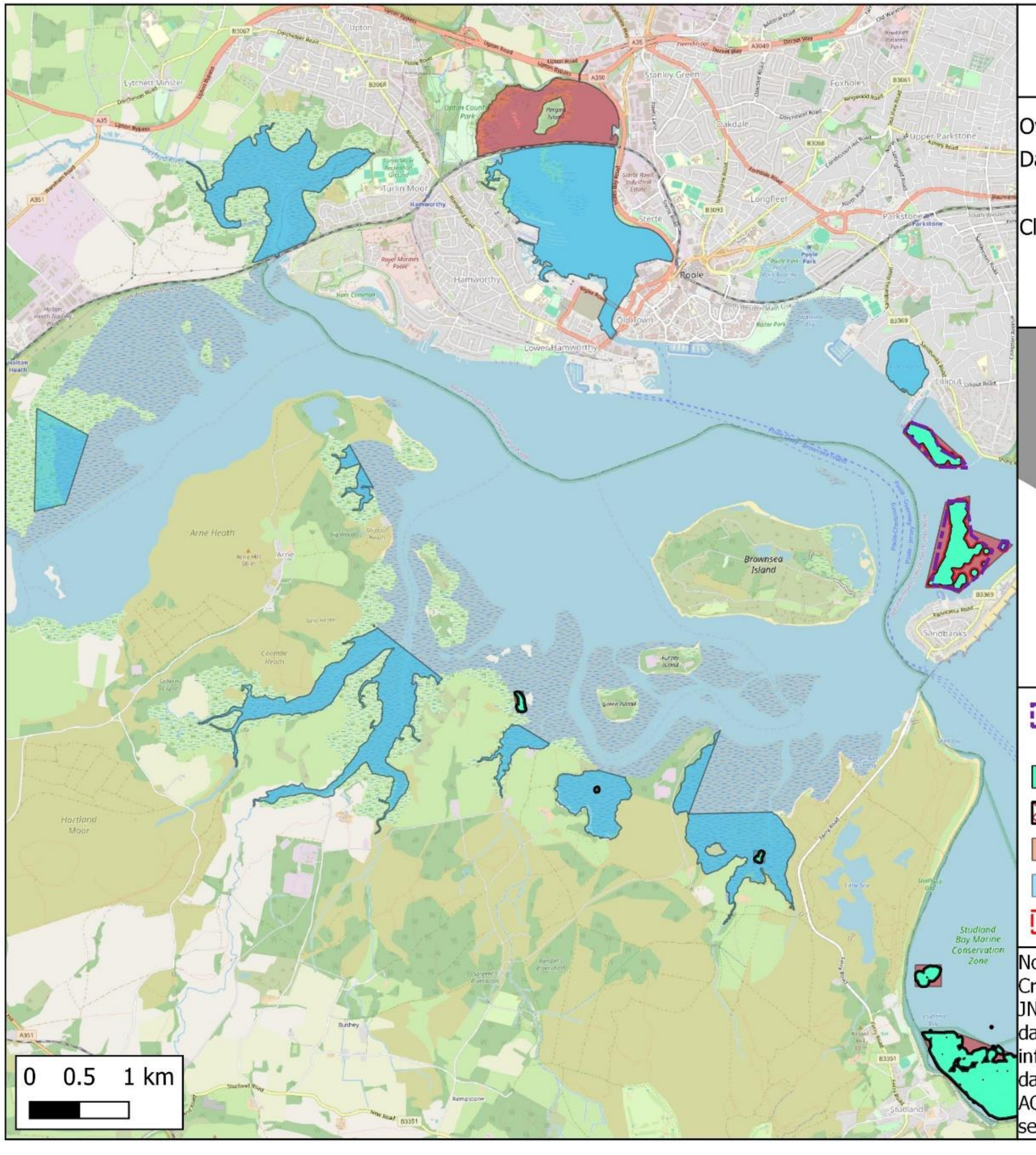
0
0.5
1 km
Seaview
Nettlestone
St Helens
Bembridge



Poole Harbour

Overlapping MPAs: Poole Harbour SPA
Data Layers Included: NE database
National Seagrass Layer (Current Extent)
Closure Type: Permanent seagrass closure
Seasonal bird closure
(1st November - 31st March)

- Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds
- Seagrass
- 10 m GPS Buffer
- Permanent Closure
- Seasonal Closure (1st November - 31st March)
- Poole Harbour SPA

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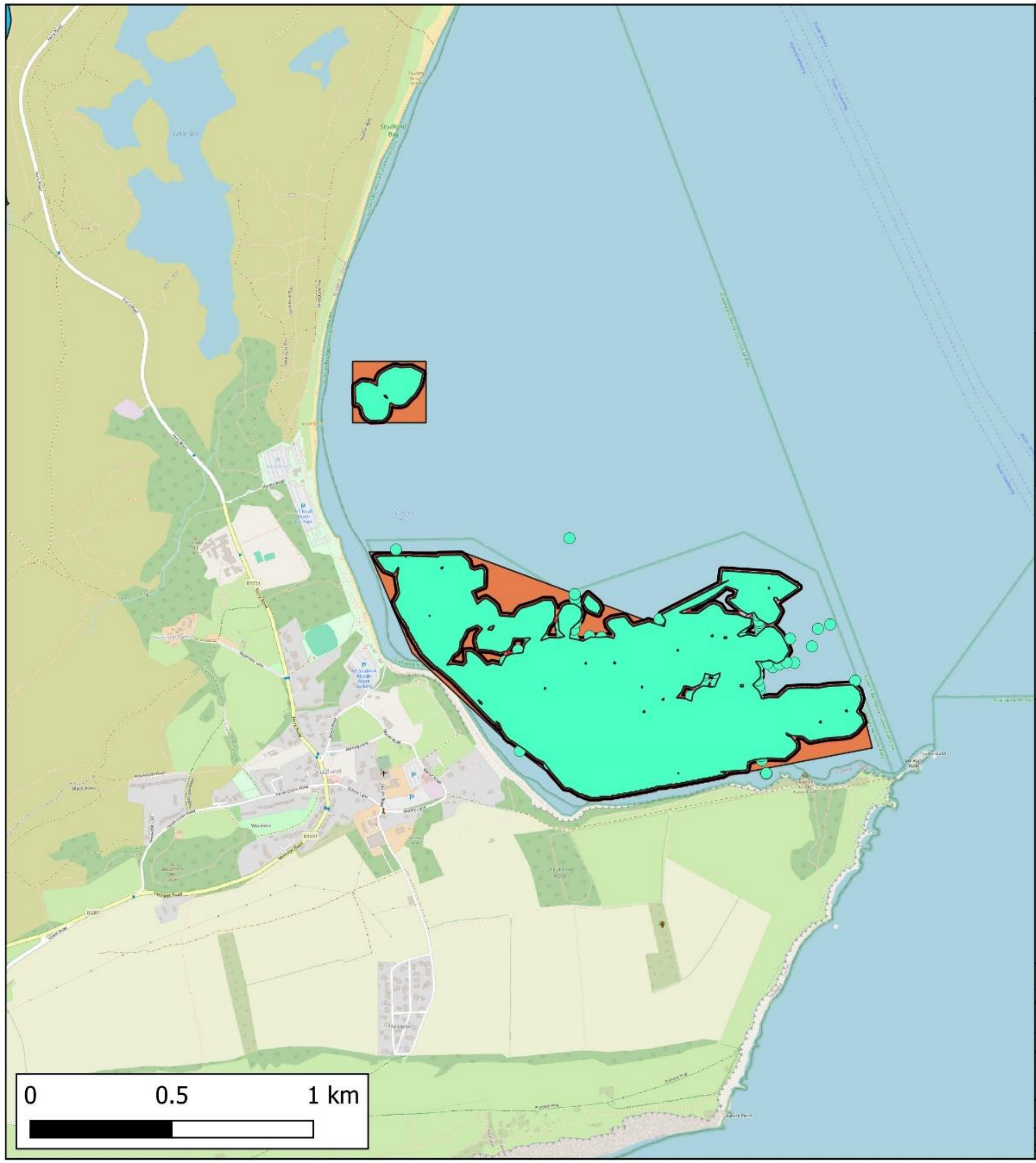
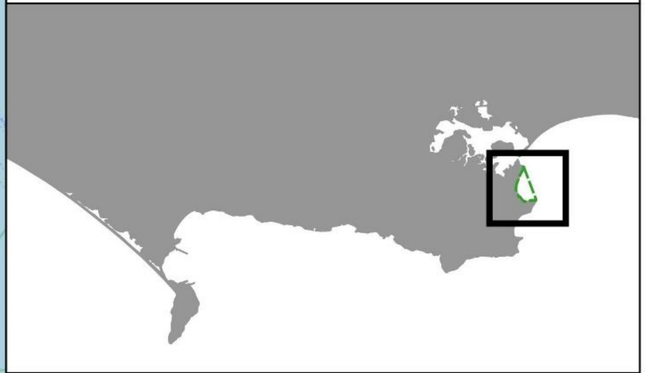


Studland Bay

Overlapping MPAs:	Studland Bay MCZ
Data Layers Included:	NE database National Seagrass Layer (Current Extent)
Closure Type:	Permanent seagrass closure



- Seagrass
- 10 m GPS Buffer
- Permanent Closure
- Studland Bay MCZ

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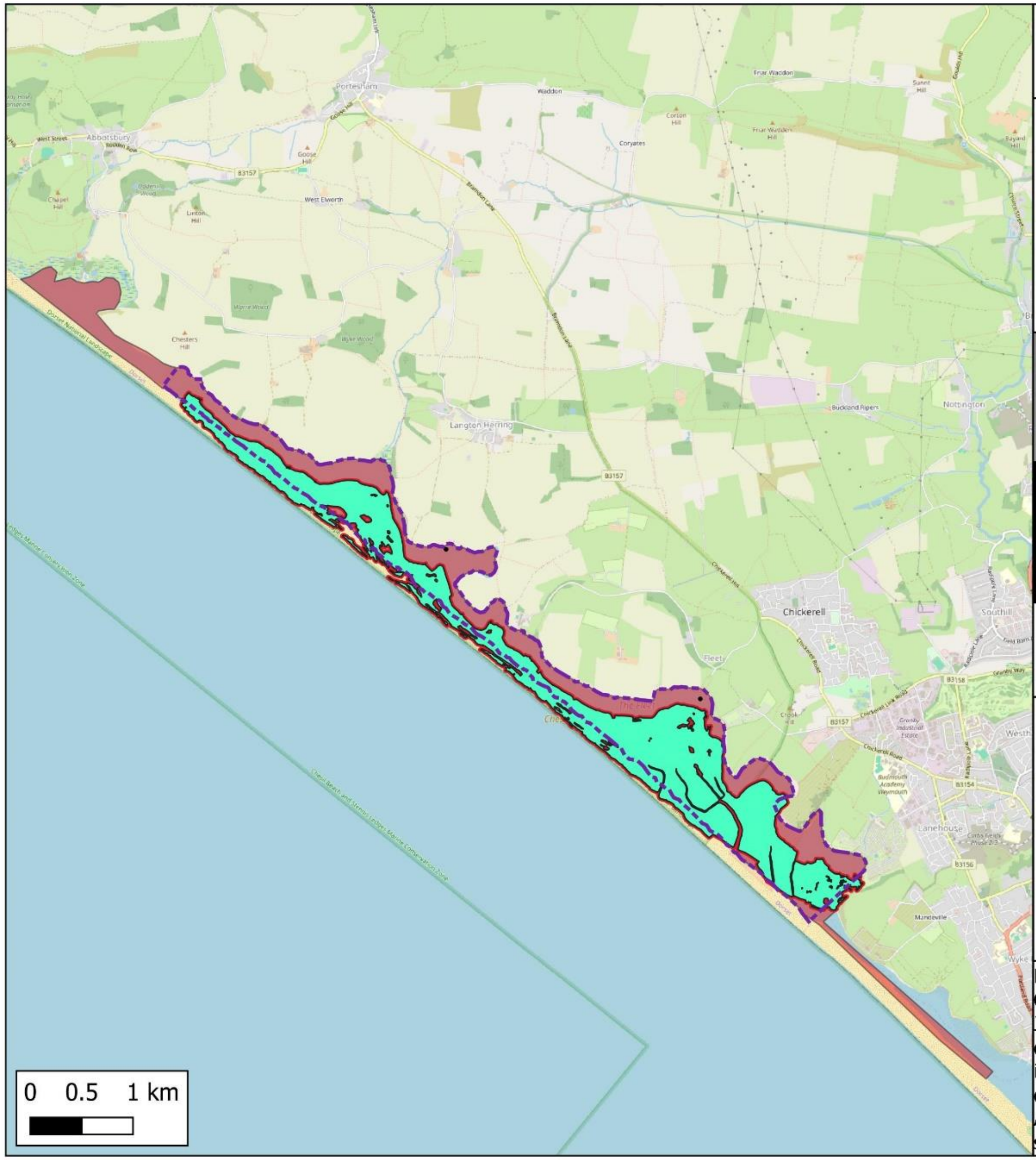
The Fleet



Overlapping MPAs:	Chesil and The Fleet SAC
	Chesil Beach and The Fleet SPA
Data Layers Included:	NE database
	National Seagrass Layer (Current Extent)
Closure Type:	Permanent seagrass closure

Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds
Seagrass
10 m GPS Buffer
Permanent Closure
Chesil Beach and The Fleet SPA
Chesil and the Fleet SAC

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Seaweed Harvesting Code of Conduct

This Seaweed Harvesting Code of Conduct applies to Marine Conservation Zones (MCZs), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) in the Southern IFCA District. The CoC has been adapted from the Natural England CoC for seaweed harvesting (which was developed in conjunction with the Crown Estate, Cornwall and Devon & Severn IFCAs, the National Trust and Cornwall Wildlife Trust) to include reference to relevant features of the District's National Site Network Sites.

1. Ensure you obtain any relevant permissions before undertaking gathering activity, for example Natural England consent or landowner permission.
2. Harvest seaweed only by hand – mechanical methods should not be used.
3. Do not use vehicles on the foreshore.
4. Avoid disturbing sea birds by keeping an appropriate distance away.
5. Avoid or minimise trampling on non-target organisms and avoid taking 'bycatch' such as stalked jellyfish, Peacocks Tail and Seahorses.
6. Collect less than one third of an individual plant to allow for regrowth.
7. Cut fronds (leaves) well above the point of growth (e.g. the meristem for kelps) and always leave the holdfast attached.
8. Harvest sparsely, taking only a small percentage of standing stock.*
9. Rotate harvesting areas to allow ample time for recovery. Harvested areas should be left for up to several years, depending on the species, before harvesting again.*
10. Harvest seaweeds during the active growth season to allow for quicker recovery.*
11. Harvest seaweeds after reproduction has occurred if possible and ensure a substantial proportion of mature plants remain.*
12. Take extra care when harvesting invasive non-native seaweeds to ensure that seaweeds or spores are not transferred to other areas. Follow 'Check, Clean, Dry' biosecurity principles, checking, cleaning and drying all equipment and clothing when moving between sites to ensure that invasive species, pests and diseases are not spread to new areas. ** (https://secure.fera.defra.gov.uk/nonnativespecies/checkcleandry/#)
13. Do not collect drift seaweed from the entire length of strandlines – harvest sparsely as this constitutes an important habitat.
14. Keep records of volumes of each species of seaweed harvested, along with date and location.
15. Limit harvesting in erosion prone coastal areas (i.e. dunes) where kelp forests dissipate wave energy.
16. Please be aware that foreshores can be hazardous. Do not put yourself at risk of injury by collecting seaweed in adverse conditions and be aware of tides.

*Consult Natural England for further information/ advice

** For information on how to identify non-native seaweeds, please see the GBNNSS website: www.nonnativespecies.org.

Summary of Conservation Assessment Outputs for Shore Gathering Review

1. Overview

Scope of Shore Gathering Review:

Feature-based management interventions for MPAs: sites designated under the National Site Network (Special Areas of Conservation [SACs], Special Protection Areas [SPAs] and Marine Conservation Zones [MCZs])

Relevant Activities:

Within the scope of the Shore Gathering Review, the following activities have been identified as occurring or having the potential to occur within the Southern IFCA District, these are grouped under two headers based on the Advice on Operations categories listed by Natural England in the Designated Sites information packages[1].

Shore-Based Activities

- Bait digging/collection
- Shellfish gathering
- Crab tiling/collection
- Shrimp push-netting
- Mechanical harvesting (by hand)

Seaweed Harvesting

- The harvesting of seaweed by hand from the shore

Detail on the methods involved for each of these activities is provided in Annex 1 to this document.

Relevant National Site Network Sites:

The National Site Network sites which occur within the Southern IFCA District have been considered in relation to the known occurrence of shore-based activities and/or seaweed harvesting or the potential for those activities to occur over suitable habitats. The following sites were identified as requiring consideration through the appropriate assessment process:

MCZs

- Chesil Beach and Stennis Ledges
- Purbeck Coast
- Studland Bay
- The Needles
- Yarmouth to Cowes
- Bembridge

[1] Natural England Designated Sites Database

SPAs

- Chesil Beach and the Fleet
- Poole Harbour
- Solent and Southampton Water
- Portsmouth Harbour
- Chichester and Langstone Harbour

SACs

- Lyme Bay and Torbay
- Chesil and the Fleet
- Studland to Portland
- Solent Maritime
- South Wight Maritime

The following sites were not included in the review due to their being entirely subtidal in nature and thus there is no potential for overlap with shore-based activities or the gathering of seaweed by hand from the shore:

- South of Portland MCZ
- Poole Rocks MCZ
- Southbourne Rough MCZ

For all the relevant sites, information on the designated features of that site are provided in the **Southern IFCA Shore Gathering Site Specific Evidence Document.**

2. Southern IFCA Legal Duties

The Shore Gathering Review and the associated development of draft measures must ensure that Southern IFCA are able to meet legal duties under the following legislation:

The Marine and Coastal Access Act 2009 (MaCAA)

Duties under Section 154 of MaCAA

(1) The authority for an IFC district must seek to ensure that the conservation objectives of any MCZ in the district are furthered
(2) Nothing in section 153(2) is to affect the performance of the duty imposed by this section

Section 125 of MaCAA also requires that public bodies (which includes IFCAs) exercise its functions in a manner to best further (or, if not possible, least hinder) the conservation objectives for MCZs.

The Conservation of Habitats and Species Regulations 2017, as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

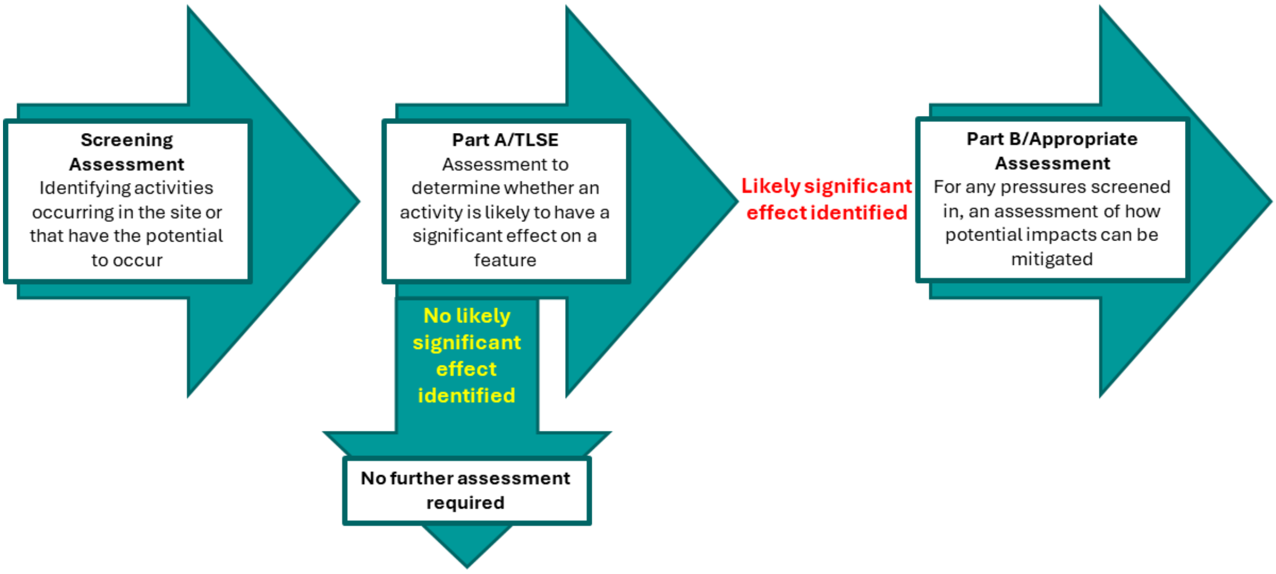
The Conservation of Habitats and Species Regulations 2017, as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, ('2019

Regs') transposes the land and marine aspects of the Habitats Directive and the Wild Birds Directive into domestic law and outlines how the National Site Network will be managed and reflect any changes required by EU Exit.

As a competent authority, Southern IFCA must exercise its functions…so as to secure compliance with the requirements of the Habitats Directive and the Wild Birds Directive.

A determination of whether management measures are appropriate to meet the legal duties for relevant sites is made through the completion of an MCZ Assessment (for MCZs) or a Habitats Regulations Assessment (HRA, for SACs and SPAs). The plan or project must be assessed in view of the site's conservation objectives.

Both types of assessment follow a stepwise process:



3. Outcomes of Part A/TLSE Assessments

Part A Assessments

Part A Assessments were carried out for MCZs listed in Section 1 for both shore-based activities and seaweed harvesting. The following pressures were identified as having a potential likely significant effect:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Habitat structure changes – removal of substratum (extraction)
- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
- Removal of non-target species
- Removal of target species
- Underwater noise changes
- Visual disturbance

The following features were identified as potentially being impacted by one or more of the above identified pressures *(note not all features are designated in all MCZs)*:

Shore-Based Activities	Seaweed Harvesting
Intertidal coarse sediment	Rock habitats (various energy levels, intertidal, infralittoral, circalittoral)
Long snouted seahorse (*Hippocampus guttulatus*)	Peacock's tail (*Padina pavocina*)
Seagrass beds	Stalked jellyfish (*Haliclystus* spp)
Short snouted seahorse (*Hippocampus hippocampus*)	Long snouted seahorse (*Hippocampus guttulatus*)
	Estuarine rocky habitats
	Littoral chalk communities

TLSE Assessments

TLSE Assessments were carried out for SACs and SPAs listed in Section 1 for shore-based activities and seaweed harvesting.

The following pressures were identified as having a potential likely significant effect for SACs:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Habitat structure changes – removal of substratum (extraction)
- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
- Removal of non-target species
- Removal of target species

The following features were identified as potentially being impacted by one or more of the above identified pressures *(note not all features are designated in all MCZs)*:

Shore-Based Activities	Seaweed Harvesting
Saltmarsh habitats	Reefs
Estuaries	Estuaries
Mudflats and sandflats not covered by seawater at low tide	Circalittoral rock
Sandbanks which are slightly covered by sea water all the time	Infralittoral rock
	Intertidal rock

The following pressures were identified as having a potential likely significant effect for SPAs:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Habitat structure changes – removal of substratum (extraction)
- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion
- Removal of non-target species
- Removal of target species
- Above water noise
- Visual disturbance

The following features were identified as potentially being impacted by one or more of the above identified pressures *(note not all features are designated in all MCZs)*:

Shore-Based Activities	Seaweed Harvesting
Designated bird species	Designated bird species
Supporting Habitats	***Supporting Habitats***
Saltmarsh	Intertidal rock
Intertidal seagrass beds	Infralittoral rock
Intertidal mixed sediments	Circalittoral rock
Intertidal mud	
Intertidal sand and muddy sand	
Subtidal seagrass beds	

4. Outcomes of Part B/Appropriate Assessment

In carrying out the required Part B/Appropriate Assessments for the identified pressure/feature interactions, the following evidence was used. The table indicates where this evidence can be found in supporting documentation for the Shore Gathering Review. Site specific evidence for feature location and extent is used in line with Management Principle 1 for the Shore Gathering Review.

1. *The best available evidence used to inform feature-based protection for features designated under relevant MCZs, SACs and SPAs is:*
    a. *The Natural England (NE) designated features layer provided to Southern IFCA in 2023*
    b. *The National Seagrass Layer obtained from the Defra Government Website*
    c. *NE (quality assured) commissioned Hampshire and Isle of Wight Wildlife Trust (HIWWT) seagrass data provided to Southern IFCA in 2024*

Evidence Type	Relevant Document
Site Specific	
Feature location and extent	**Site Specific Evidence Package**
Existing shore gathering management	
Records of shore gathering activities	
Records of catches of target species from shore gathering activities	
Records of offences related to shore gathering activities	
For SPAs, evidence on seasonality and prey preferences of designated bird species	**Seasonality Table provided as Annex 2 to this document**
General	
Evidence from peer-reviewed literature on activities and potential impacts	**Literature Review**
Methods for relevant shore gathering activities	**Annex 1 to this document**
Existing management which applies across the Southern IFCA District	**Site Specific Evidence Package**
Existing management for shore gathering activities from other authorities	

Consideration was also given to the relative sensitivities of different habitats to different pressures, fishing activities and access to the intertidal areas. This work has been carried out over several years through a number of studies looking to map sensitivities for designated habitats (Tillin *et al.,* 2010; Hall *et al.,* 2008; Tyler-Walters & Arnold, 2008). These sensitivity analyses identify that the sensitivity of a particular habitat is reduced for more dynamic habitats, with lower levels of activity and the frequency of activity occurring over the same area. For all habitats analysed, seagrass beds showed the highest sensitivity with the sensitivity analysis by Tillin *et al.* (2010) showing a high sensitivity particularly to abrasion impacts with a high confidence in the analysis outcome.

Definitions and Management Principles

In consideration of the identified potential pressure/feature interactions in conjunction with the evidence sources listed, definitions for shore gathering activity and a set of Management Principles were developed to underpin management development for shore gathering within National Site Network Sites.

The definitions drafted in relation to activities exploiting sea fisheries resources are:

i. *No person shall remove, fish for or take sea fisheries resources by hand or with the use of hand held implements or equipment where the removal, fishing for or taking is for the purpose of harvesting sea fisheries resources.*
ii. *No person shall have with them any hand held implements or equipment that is intended to be used for the purpose of harvesting sea fisheries resources.*
iii. *No person shall use or deploy any form of artificial habitat, structure or shelter to aid the collection of shore crab.*
iv. *Paragraphs (i) to (iii) do not apply to the fishing for or taking of sea fisheries resources using a vessel provided that no part of the vessel's hull is in contact with the seabed*
v. *The definition of hand held implements or equipment has the following exceptions:*
    a. *Hook and line in conjunction with a fishing rod*
    b. *Handlines*
    c. *Spear gun*
    d. *A net other than a push net*

These definitions ensure that all relevant activities are covered in relation to management areas defined under the Management Principles for regulatory measures. Through the Part B/Appropriate Assessment process, it was identified that the potential impacts are applicable to all types of shore gathering activity and therefore in order to ensure that identified protections for designated features are appropriately mitigating those impacts, there is a need to manage all relevant activities in the same way.

The below table lists Management Principles 3-8 and how these relate to ensuring that the IFCA is meeting its legal duties in relation to the relevant protected sites.

Management Principle	
(3) For relevant features a GPS buffer of 10m will be incorporated	The use of a GPS buffer ensures that potential impacts from accidental trampling are reduced and increases protection for relevant features from accidental incursions. The size of the buffer is relevant to the use of hand-held GPS units and the nature of the activity being undertaken, i.e. hand-held equipment operated by a single operative.
(4) Prohibition areas will be defined as follows: a. For designated seagrass features within MCZs that occur up to the 5m chart datum contour.	Seagrass is identified as the habitat with the highest sensitivity to shore gathering activities with significant impacts possible from low levels of activity. This impact is applicable year-round. Prohibition areas for identified designated seagrass features within MCZs and within or adjacent to

b. For seagrass designated as a feature or as a supporting habitat, within or adjacent to SACs and SPAs that occur up to the 5m chart datum contour.	SACs and SPAs up to the 5m chart datum contour provides protection to this feature year-round and ensures that activities such as push netting which have the potential to occur subtidally are managed within a distance from the shore which is proportionate in relation to where the activity can take place. The identification of seagrass as both a designated feature (MCZs and SACs) and a supporting habitat (SPAs) necessitates prohibited areas for all National Site Network Sites where this habitat is designated. This protection also addresses potential impacts to designated species which may be associated with seagrass beds; peacocks tail, stalked jellyfish species and seahorse species.
(5) Existing Southern IFCA Management measures for relevant activities in the Poole Harbour SPA will be combined to create a single management approach.	Combining seasonal (1st November to 31st March) prohibition areas for shellfish harvesting which are based on the advice received from NE on Bird Sensitive Areas (BSA) within Poole Harbour with areas currently managed under a Memorandum of Agreement for Bait Digging will provide protection to both the designated features and supporting habitats of the Poole Harbour SPA from all shore gathering activities. The measures will address non-compliance which is currently observed in relation to the MoA for bait digging and align seasonal closures through a regulatory mechanism. This provides additional protection against bait collection activity and, in line with the definition, recognises that the impacts from identified pressures are the same for all shore gathering activities and therefore appropriate protections require management of all relevant activities in the same way. Consistency in management from previous measures will aid understanding from stakeholders which will encourage greater levels of compliance. In addition, considering the relatively low levels of activity (maximum 35 occurrences of one activity spread over a single month) utilising the identified BSAs as areas of importance for designated features is a proportionate approach to management which allows the achievement of relevant conservation objectives.
(6) With the exception of seagrass, the extent and distribution of feature-based management in the Solent Maritime SAC and district wide SPAs will be developed using Poole Harbour as a model. (7) In the application of the Poole Harbour model to the Solent Maritime SAC and district wide SPAs, the following approach will be taken: a. Bird Sensitive Areas (BSA) will be used as the basis for spatial management.	Due to the absence of advice on keys BSAs and the identification of low levels of shore gathering activity in the Solent SPAs and the Solent Maritime SAC, a proportionate approach to meeting the relevant conservation objective is necessary. The Poole Harbour model utilises BSAs as an identification of key areas for designated features and supporting habitats within the site and management on this basis has been in place since 2015. NE have supported the management as appropriate to meeting the legal duties of Southern IFCA in relation to the site.

	The application of this approach to the Solent SPAs and Solent Maritime SAC will allow key areas for designated features to be protected; encompassing bird features, supporting habitats and designated estuarine and sediment habitats under the Solent Maritime SAC.
b. In the absence of BSAs being defined by Natural England in the Solent Maritime SAC and district wide SPAs (excluding Poole Harbour), BSAs will be defined as follows: i. For the Solent Maritime SAC and Solent SPAs, BSAs will be initially defined using areas proposed for management as good examples of estuarine habitat under the Bottom Towed Fishing Gear Byelaw 2023 and adapted to be relevant to shore gathering activity. ii. For the Solent Maritime SAC, Solent SPAs and The Chesil and The Fleet SPA, consideration will be given to aligning BSAs with directions relating to access and shore gathering activities given by other bodies, for example harbour authorities and conservation bodies.	Consideration of existing measures and alignment with areas already identified for protection provides a robust method of defining areas which are most likely to be key to designated features/supporting habitats in the absence of advice on where BSAs occur in SPAs other than Poole Harbour. This approach ensures the appropriate protections can be provided to address the pressure/feature interactions identified for designated bird features, supporting habitats and estuarine and sediment habitats under the Solent Maritime SAC; whilst also ensuring consistency with management of other fishing activities in the District and recognising the different level of effort and impact resulting from different types of fishing activity. Utilising areas afforded protection from other gear types increases the overall level of cumulative protection. Where existing measures are in place under other bodies/authorities, alignment provides the ability to increase the overall cumulative protection afforded to a particular feature, build on existing evidence as to which areas are key for designated features and supports consistency for stakeholders with the aim of increasing compliance through improved understanding and stakeholder buy in. Whilst the Solent Maritime SAC does not have bird species as a designated feature, the designated estuarine and sediment features align with supporting habitats for the overlapping SPAs. Protecting these habitats through the identification of BSAs for the SPAs addresses the impacts to the features of this site in a proportionate way to the activity being managed.
c. The requirements for seasonal management within BSAs will be considered on the basis of best available evidence.	Based on the availability of evidence for designated bird features in the Solent SPAs and a consideration of proportionality reflecting the low levels of activity. The draft measures have set seasonal management of BSAs as follows: **Chichester Harbour, Langstone Harbour and Portsmouth Harbour:** 1st November to 31st March • This covers the following percentage of the seasonal period where >50% of designated bird species are present: o Portsmouth Harbour – 100% o Langstone Harbour – 63% o Chichester Harbour *(only relevant to part within Southern IFCA District)* – 63% **Solent and Southampton Water SPA:** 1st March to 31st August

	• This covers 100% of the seasonal period where >50% of designated bird species are present. The use of >50% of designated bird species being present for 63% of the seasonal period aligns with the seasonal management applied in Poole Harbour (1st November to 31st March). Given the proximity of Portsmouth Harbour SPA to Chichester and Langstone Harbours SPA and the fact that a winter seasonal closure is required, an accepted level of precaution is applied to Portsmouth Harbour. Prohibition to all shore gathering activities within the BSA during these periods will mitigate impacts of disturbance, above water noise and impacts to supporting habitats during the period when they are most important to designated species. For the Solent Maritime SAC, year-round protection to identified key areas of designated habitat is provided for bottom towed fishing gear (BTFG). Protections afforded for shore gathering overlap with Solent SPAs and are thus subject to the above seasonal restrictions, however given the low levels of activity for relevant shore gathering operations and the nature/degree of impact compared to other fishing methods the impacts are deemed to not cause an adverse impact to the features of the SAC.
(8) A code of practice will be developed for the gathering of seaweed by hand.	Consideration of the levels of activity which are currently seen in the Southern IFCA District for seaweed harvesting do not currently indicate that a regulatory approach to management is required. The identified pressures in relation to rocky habitats and associated species (including designated species for MCZs of peacocks tail, stalked jellyfish species and seahorse species) can be addressed through a code of practice, the provisions of which have been developed to include mitigation for trampling, abrasion, awareness of associated species and good practice to address impacts to the target species. The code of practice has been developed in line with other codes of practice, including those developed by NE in conjunction with other IFCAs. This ensures a consistency in approach and ease of understanding for stakeholders which will help increase voluntary compliance.

Draft Management Measures

Based on the Management Principles the draft measures for shore gathering activity in the Southern IFCA District can be summarised as follows:

- Year-round prohibition areas for **seagrass** as defined in Management Principle 4
- **Poole Harbour (excluding seagrass)**
  - Seasonal prohibited areas based on the spatial footprint of the existing Poole Harbour Shellfish Hand Gathering Byelaw, with the prohibition applying between 1st November and 31st March each year.
- **The Fleet (excluding seagrass)**
  - A year-round spatial prohibition area is defined for habitats under the relevant SAC and SPA in line with access requirements already in place under the local nature reserve.
- **Chichester Harbour, Langstone Harbour and Portsmouth Harbour (excluding seagrass)**
  - Seasonal prohibited areas between 1st November and 31st March each year
- **Southampton Water and the Solent (excluding seagrass)**
  - Seasonal prohibited areas between 1st March and 31st August each year

<u>Seaweed Code of Conduct:</u>

- The provisions of the CoC have been developed in line with other seaweed harvesting CoCs currently in place around the UK, primarily utilising a code developed by Natural England in conjunction with partners including other IFC Authorities.

Note: the draft measures for shore gathering by Southern IFCA do not remove or supersede existing measures relevant to shore gathering activities which are enforced/monitored by other relevant bodies/regulatory authorities. Stakeholders undertaking shore gathering activities will need to ensure that they are abiding by all relevant regulations and/or voluntary measures and will need to seek guidance from the appropriate body for any regulations which are under the remit of that body.

Examples include:

- Statutory Nature Conservation Order – Fareham Creek, Portsmouth Harbour
- Landowner permission to harvest bait commercially
- SSSI consent from Natural England
- Harbour authority regulations for digging around moorings, jetties etc.
- National and regional codes of best practice for bait digging

Southern IFCA will consider, should the draft measures be approved, where revocations to existing byelaws will be required (either whole or in part). However, measures such as Minimum Conservation Reference Size will continue to be enforced under the relevant legislation, applicable to recreational and commercial shore gathering activities. The combination of management created by the proposed draft measures and maintained existing measures strengthens the level of protection afforded to designated sites.

Conclusion

Based on the information presented in this document which is a summary of that used to undertake relevant assessments for designated sites in the Southern IFCA District, it is concluded that the draft measures for shore gathering activities will allow Southern IFCA to meet its duties under the relevant conservation legislations for MCZs, SACs and SPAs.

In-Combination Assessment

As part of the assessment process, Southern IFCA are required to consider the in-combination effect of draft measures with other fishing activities and also other non-fishing plans/projects in relevant areas.

For fishing activities, the appropriate conservation assessments have been completed for the management of activities identified as having a potential impact on National Site Networks within the District. These include:

- Bottom towed fishing gear
    - This encompasses specific assessments relevant to management of dredge fishing in Poole Harbour and the Solent
- Net fishing

These assessments concluded, with appropriate management in place, that there will be no adverse effect or no impact to the furthering of conservation objectives.

For other activities, there are no potential in combination effects identified for the relevant pressure/feature interactions:

- Pot/trap fishing
- Rod and line angling

Considering non-fishing plans or projects, the Southern IFCA is a consultee in the marine licencing process administered by the MMO. Southern IFCA reviews relevant applications for works taking place in the marine environment and through this process identifies whether there is likely to be an overlap with fishing activity. From the marine licence applications reviewed from March 2023 to date, there is no identified in combination effect.

Integrity Test

On the basis that the draft management for shore gathering in the Southern IFCA district is deemed to allow the Southern IFCA to fulfil its duties in relation to relevant conservation legislations for MCZs, SACs and SPAs and the absence of any identified in-combination effect, it is concluded that the draft measures will mitigate against any adverse effect to designated features within or adjacent to SACs and SPAs and allow the furthering of conservation objectives for features within MCZs.

Annex 1 – Method Summaries

Bait Digging/Collection

Bait digging is carried out in the intertidal zone on mud and sand sediment habitats. The shore is usually accessed by foot, or in less usual cases via a vessel to the intertidal zone. The target species are marine worms (including Arenicola marina, Hediste diversicolor, Alitta virens).

These species are most often collected using a fork or spade, which is placed in the sediment and used to lift and turn over a pile of sediment. Garden forks and spades which can easily be purchased are typically used. The worms are then removed by hand from the sediment pile. The practice of returning the dug sediment to the hole created (back filling) is encouraged. Marine worms are collected for both commercial and recreational purposes.

Bait Digging ©Maggz (Licence). Ragworm (top), lugworm (bottom)

Shellfish Gathering

Shellfish gathering is carried out in the intertidal zone on soft to coarse sediment types. The intertidal zone is accessed by foot and shellfish are collected by hand. The activity is carried out for commercial and recreational purposes the extent of which varies dependent upon the time of year. Recreational activity most often occurs in good weather over the summer months, whilst commercial activity can occur in most weathers and more often during periods when other shellfish fisheries are closed.

Manila clam and common cockle

Clams can be found by identifying their syphon holes in the sediment, and then simply picking the animal out of the sand by the hand or using a small handheld instrument such as a knife to extract the clam.

Cockles are often also be collected when gathering clams by hand. Separately, cockles may be targeted on sandier sediments using either small hand rakes or, garden sized rakes. These typically have a sediment penetration depth of approximately 10cm.

Pacific oysters

Pacific oysters, a non-native invasive species to the coasts of the Southern IFC District, are found on the sediment surface (typically coarse sediment), or attached to manmade structures such as sea walls and pontoons. Native oysters are usually found sub-tidally and therefore are not likely to be collected by hand. Pacific oysters are simply picked up by hand without the need for any tools.

Razor clams

Razor clams are found in sandy sediments at or below the low tide line. They are located by finding the figure eight siphon hole on the sediment surface. Salt (typically fine table salt) is poured over the siphon hole and after a few seconds or minutes, the razor clam pushes up through the salt to clear the hole. The razor clam is then removed by hand.

Shellfish hand gatherers in Poole Harbour and mixed clams and cockles

Using salt to bring up razor clams to the sediment surface. ©Sean Salmon (Licence)

Crab Tiling/Collection

Crab collection for use as angling bait is carried out on the shore on foot. Rocks and boulders are overturned to find crabs. Crabs are retained if they are 'soft', having recently moulted their exoskeleton. The most common species targeted is *Carcinus maenas* due to its abundance, but *Necor puber* and *Cancer pagarus* may also be taken if found.

Crab tilling refers to a more targeted process where people place artificial structures, such as tiles, bricks, mats or tyres on the seabed between the high and low water mark. This is more likely to occur in areas where natural structures are not present, for example, mud flats, sand flats, or coarse sediment types. The structures are left in place, with persons periodically returning at low water to turn over the objects or look within them and collect crabs which have recently moulted by hand.

Shrimp Push Netting

Shrimp (prawn) push netting is a recreational activity in which a person pushes a small hand-held net along the seabed in shallow water. The net mouth is approximately 1m x 0.5m in width and height, with a straight bar at the bottom. The net skims the surface of the sediment collecting the shrimp (Palaemon spp.) in the back of the net. This activity can only occur on large spring tides for approximately an hour at low water. Shrimp are usually found near rocks or algae covered areas. Push netting has been stated to occur primarily between July to mid-September.

A hand-made shrimp push-net from the Isle of Wight, with one meter ruler at its base.

Push netting for shrimp © North Western IFCA

Mechanical Harvesting

Mechanical collection refers to the use of machines or basic mechanics to gather or extract shore-based resources, such as animals or plants, from their natural environment. This method is often used to increase efficiency and productivity compared to manual collection which typically use simple tools (e.g., a rake, spade, etc.). The most common type of mechanical harvesting is through bait pumps.

Bait Pump

A specialised pump that collects sand or mud from the exposed shoreline at low tide and filters it to collect target species such as lugworm (*Arenicola defodiens*). Bait pumping originated in the 1800s with British fishermen using a hand-operated mechanism to extract bait from the sand. This evolved into the first mechanical pump in the early 1900s.

Seaweed Harvesting

Seaweeds are typically gathered by accessing rocky shores as the tide falls. Parts of the seaweed plant are cut off using scissors. Typically, the holdfast of the plant is left attached to the rock, and only a small number of the plant fronds are cut with scissors. Loose seaweed may also be taken from the drift line along sandy or less rocky shores.

All seaweeds in the UK are described as edible, however some have become more popular due to taste and texture including, *Fucus vesiculosus, Chondrus crispus, Palmaria palmata, Himanthalia elongate, Ulva* species and kelp species. Seaweeds may also be collected for a specific purpose including for use in animal feed, cosmetics and pharmaceuticals.

Seaweed gathering using scissors. Source: https://jerseywalkadventures.co.uk/

Annex 2 – Seasonality Table for Designated Bird Species

Seasonality data on designated bird species for the Southern IFCA District Special Protection Areas (SPAs) as provided by Natural England through their Designated Sites database. Green months indicate where >50% of the designated species are present within each area.

SPA	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Chesil Beach and the Fleet												
Chichester and Langstone Harbours												
Poole Harbour												
Portsmouth Harbour												
Solent and Southampton Water												

Southern Inshore Fisheries and Conservation Authority

Site Specific Evidence Packages

Supporting Document as part of the Shore Gathering Review

Contents

This document provides site specific evidence for Marine Conservation Zones (MCZs), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) in the Southern IFCA District relevant to the Shore Gathering Review.

Note that information provided on shore gathering activity within each site is based on Southern IFCA sightings data. This data is collected during Southern IFCA patrols and therefore is not a true representation of overall effort for a particular activity as observations will only have been made when a patrol is operating in the relevant area, however the nature of Southern IFCA patrols and the cumulative analysis of data from multiple years allows for an indicative picture of activity occurring within the relevant sites.

1. MPAs in the Scope of the Shore Gathering Review

Table 1 displays the National Site Network Sites relevant to the Shore Gathering Review. Site specific evidence for each of these sites is provided in section 2.

Table 1 MPAs within the Southern IFCA District included in the Shore Gathering Review.

MCZs	SPAs	SACs
Bembridge	Chesil Beach and the Fleet	Chesil and the Fleet
Chesil Beach and Stennis Ledges	Chichester and Langstone Harbour	Lyme Bay and Torbay
Purbeck Coast	Poole Harbour	Solent Maritime
Studland Bay	Portsmouth Harbour	South Wight Maritime
The Needles	Solent and Southampton Water	Studland to Portland
Yarmouth to Cowes		

National Site Network Sites which are not included in the Shore Gathering Review are those which are entirely subtidal and therefore are not able to be subject to shore gathering activities.

2. Marine Conservation Zones (MCZs)

2.1 Chesil Beach and Stennis Ledges MCZ

2.1.1 Designated Features of the MCZ

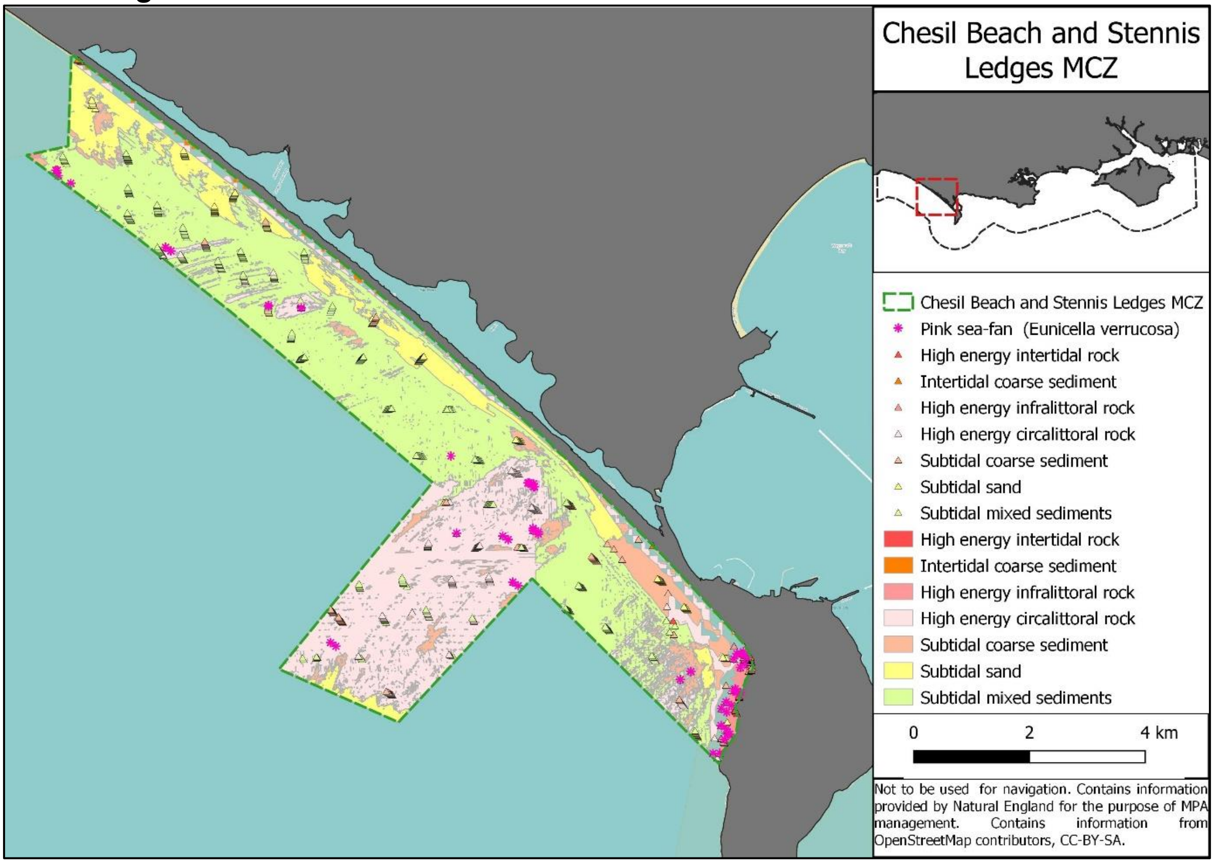


Figure 1 The location and extent of the supporting habitats of the Chesil Beach and Stennis Ledges MCZ (boundary shown by the dashed green line).

The Chesil Beach to Stennis Ledges MCZ covers an area of 37 km^2 running along the coastline of Chesil Beach. The area covers a variety of rocky and sediment habitats and includes the Pink Sea-fan as a designated feature[1]. The designated features of the MCZ are given in Table 2.

Table 2 Designated features of the Chesil Beach and Stennis Ledges MCZ.

Designated Features	High energy circalittoral rock
	High energy infralittoral rock
	High energy intertidal rock
	Intertidal coarse sediment
	Native oyster (*Ostrea edulis*)
	Pink sea-fan (*Eunicella verrucosa*)
	Subtidal coarse sediment
	Subtidal mixed sediments
	Subtidal sand

[1] https://designatedsites.naturalengland.org.uk/

2.1.2 Shore Gathering activity in the MCZ – Southern IFCA Sightings Data

As of October 2023, there has been evidence available on the location of shore gathering activities occurring in the Chesil Beach and Stennis Ledges MCZ.

2.1.3 Recorded catches within the MCZ

As of October 2023, there has been evidence available on the catch composition of shore gathering activities occurring in Chesil Beach and Stennis Ledges MCZ.

2.1.4 Recorded Offences within the MCZ

As of October 2023, there has been no recorded offences linked to shore gathering activities occurring in Chesil Beach and Stennis Ledges MCZ.

2.2 <u>Purbeck Coast MCZ</u>

2.2.1Designated Features of the MCZ

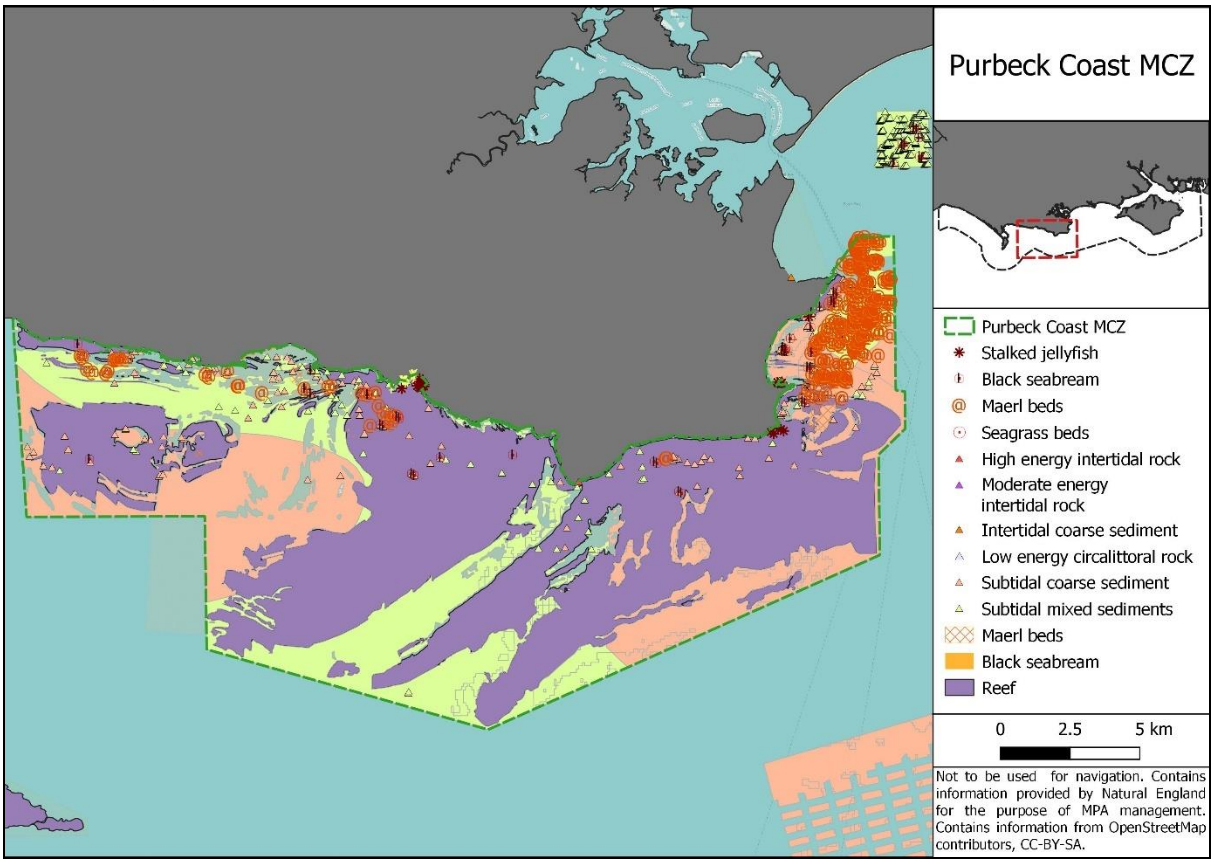


Figure 2 The location and extent of the supporting habitats of the Purbeck Coast MCZ (boundary shown by the dashed green line).

The Purbeck Coast MCZ covers an area of 282 km^2. The MCZ covers the area of coastline from Ringstead Bay in the West to north of Swanage Bay in the East[2]. The Purbeck Coast MCZ is designated for a range of intertidal and subtidal habitats and species as displayed in 2 and 3.

[2] https://designatedsites.naturalengland.org.uk/

Table 3 Designated features of the Purbeck Coast MCZ

Designated Features	Black Seabream (*Spondylisoma cantharus*)
	High Energy Intertidal Rock
	Intertidal Coarse Sediment
	Maerl Beds
	Moderate Energy Intertidal rock
	Peacock’s tail (*Padina Pavocina*)
	Stalked Jellyfish (*Haliclystus spp*)
	Subtidal Coarse Sediment
	Subtidal Mixed Sediments

2.2.2 Shore Gathering activity in the MCZ – Southern IFCA Sightings Data

As of October 2023, there has been evidence available on the location of shore gathering activities occurring in the Purbeck Coast MCZ.

2.2.3 Recorded catches within the MCZ

As of October 2023, there has been evidence available on the catch composition of shore gathering activities occurring in the Purbeck Coast MCZ.

2.2.4 Recorded Offences within the MCZ

As of October 2023, there has been no recorded offences linked to shore gathering activities occurring in Purbeck Coast MCZ.

2.3 Studland Bay MCZ

2.3.1 Designated Features of the MCZ

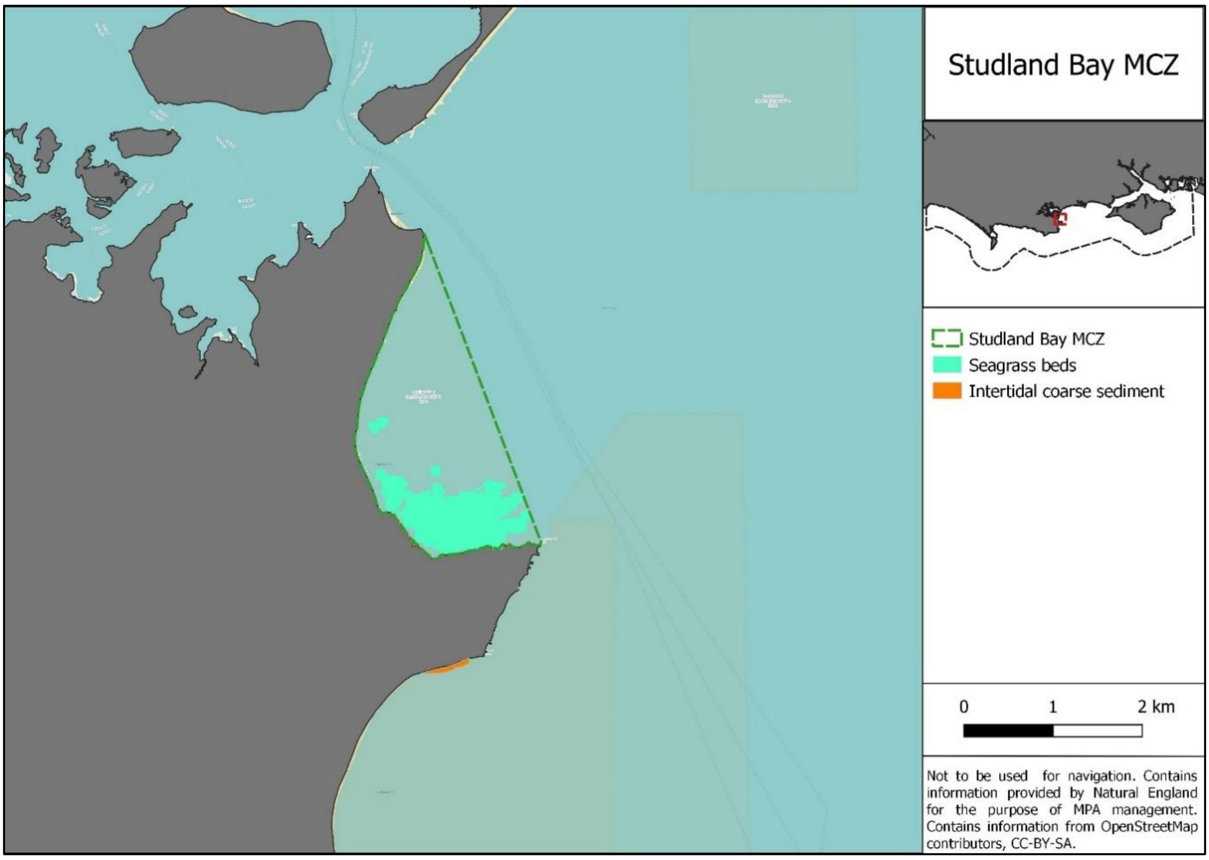


Figure 3 The location and extent of the supporting habitats of the Studland Bay MCZ (boundary shown by the dashed green line).

The Studland Bay MCZ is approximately 4 km^2 and relatively sheltered from prevailing south westerly winds by Ballard Down[3]. The designated features of the Studland Bay MCZ are displayed in Figure 3 and Table 4.

Table 4 Designated features of the Studland Bay MCZ

Designated Features	Intertidal coarse sediment
	Long snouted seahorse (*Hippocampus guttulatus*)
	Seagrass beds
	Subtidal sand

2.3.2 Shore Gathering activity in the MCZ – Southern IFCA Sightings Data

As of October 2023, there has been evidence available on the location of shore gathering activities occurring in the Studland Bay MCZ.

2.3.3 Recorded catches within the MCZ

As of October 2023, there has been evidence available on the catch composition of shore gathering activities occurring in the Studland Bay MCZ.

[3] https://designatedsites.naturalengland.org.uk/

2.3.4 Recorded Offences within the MCZ

As of October 2023, there has been no recorded offences linked to shore gathering activities occurring in Studland Bay MCZ.

2.4 The Needles MCZ

2.4.1 Designated Features of the MCZ

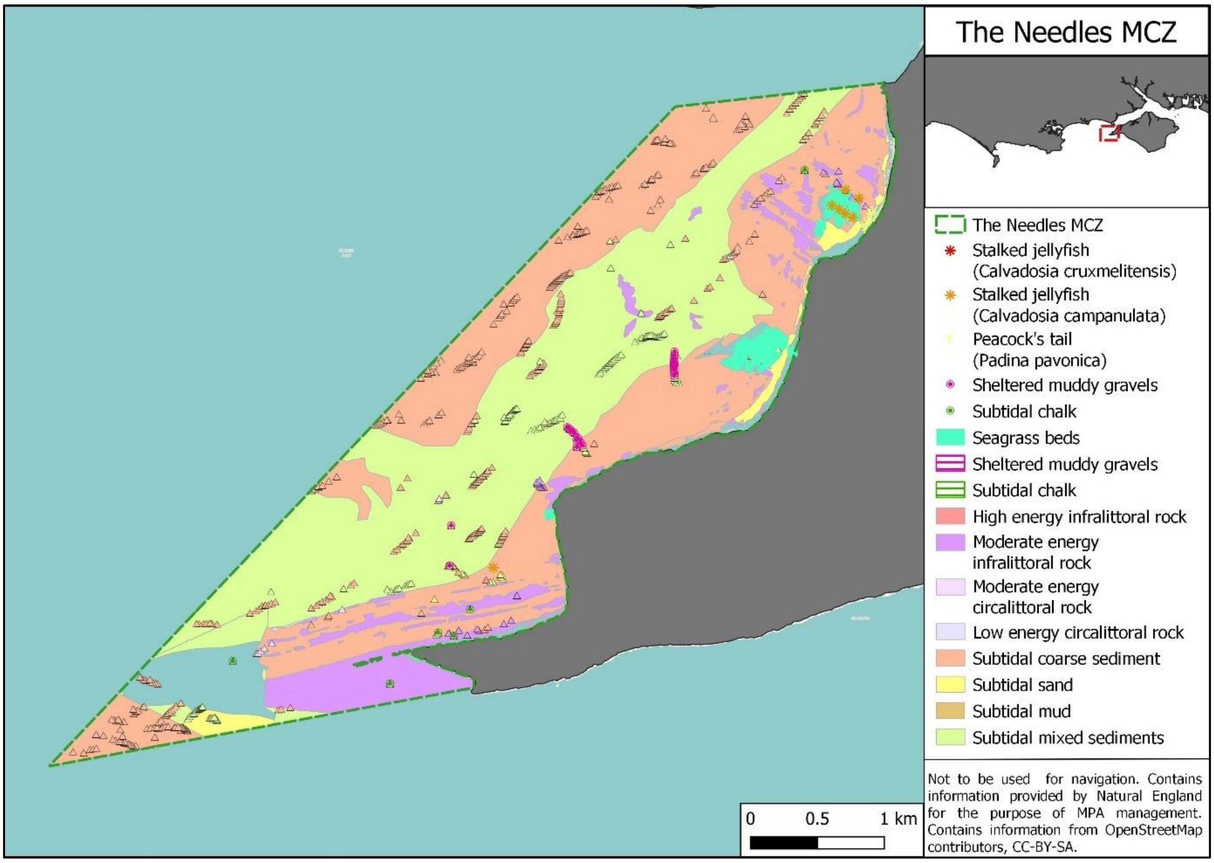


Figure 4 The location and extent of the supporting habitats of The Needles MCZ (boundary shown by the dashed green line).

The Needles MCZ is located on the west coast of the Isle of Wight and covers an area of 11 km^2. The MCZ covers the coastline from Fort Albert down to the Needles Geological feature along the mean high-water mark and extends up to 3 km from the shoreline. The designated features of the MCZ are displayed in Figure 4 and Table 5.

Table 5 Designated features of The Needles MCZ

Designated Features	High Energy Infralittoral Rock
	Moderate Energy Circalittoral Rock
	Moderate Energy Infralittoral Rock
	Native Oyster (Ostrea Edulis)
	Peacock's tail (*Padina Pavocina*)
	Seagrass Beds
	Sheltered Muddy Gravels
	Stalked Jellyfish (*Calvadosia campanulata*)
	Subtidal Chalk
	Subtidal Coarse Sediments

	Subtidal Mixed Sediments
	Subtidal Mud
	Subtidal Sand

2.4.2 Shore Gathering activity in the MCZ – Southern IFCA Sightings Data

As of October 2023, there has been evidence available on the location of shore gathering activities occurring in The Needles MCZ.

2.4.3 Recorded catches within the MCZ

As of October 2023, there has been evidence available on the catch composition of shore gathering activities occurring in The Needles MCZ.

2.4.4 Recorded Offences within the MCZ

As of October 2023, there has been no recorded offences linked to shore gathering activities occurring in The Needles MCZ.

2.5 Yarmouth to Cowes MCZ

2.5.1 Designated Features of the MCZ

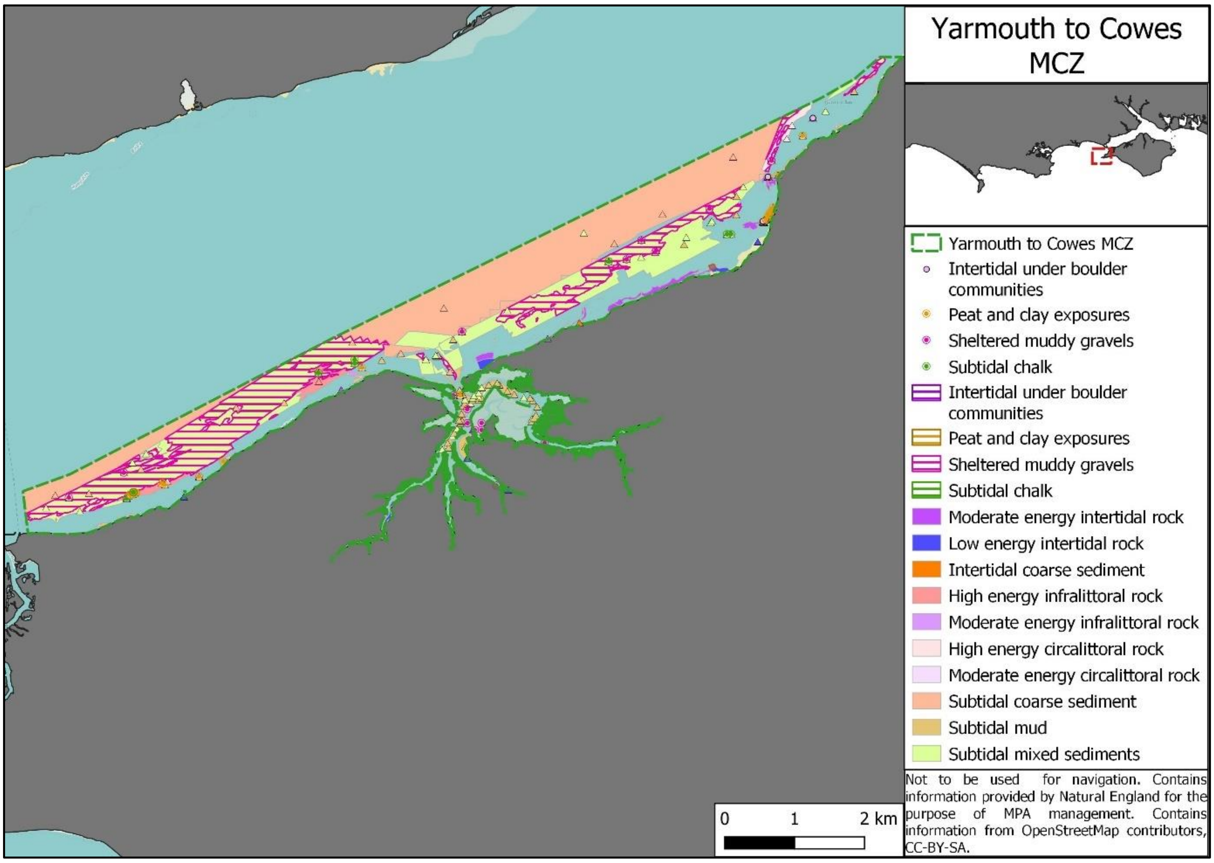


Figure 5 The location and extent of the supporting habitats of the Yarmouth to Cowes MCZ (boundary shown by the dashed green line).

The Yarmouth to Cowes MCZ covers 16 km^2 and stretches from Gurnard in the east, a village west of Cowes, to Yarmouth pier in the West and extends to the edge of the Western Solent deep water channel. The designated features of the Yarmouth to Cowes MCZ are displayed in Figure 5 and Table 6.

Table 6 The designated features of the Yarmouth to Cowes MCZ.

Designated Features	Bouldnor Cliff geological feature
	Estuarine rocky habitats
	High Energy Circalittoral Rock
	High Energy Infralittoral Rock
	Intertidal coarse sediment
	Intertidal under boulder communities
	Littoral chalk communities
	Low energy intertidal rock
	Moderate Energy Circalittoral Rock
	Moderate Energy Infralittoral Rock
	Moderate energy intertidal rock
	Native Oyster (*Ostrea Edulis*)
	Peat and Clay Exposures
	Sheltered Muddy Gravels
	Subtidal Chalk
	Subtidal Coarse Sediments
	Subtidal Mixed Sediments
	Subtidal Mud

2.5.2 Existing Shore Gathering Management Specific to the MCZ

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds. No person shall dig for or take sea fisheries resources from any prohibited area. Area 25 is within the Yarmouth to Cowes MCZ.

2.5.3 Shore Gathering activity in the MCZ – Southern IFCA Sightings Data

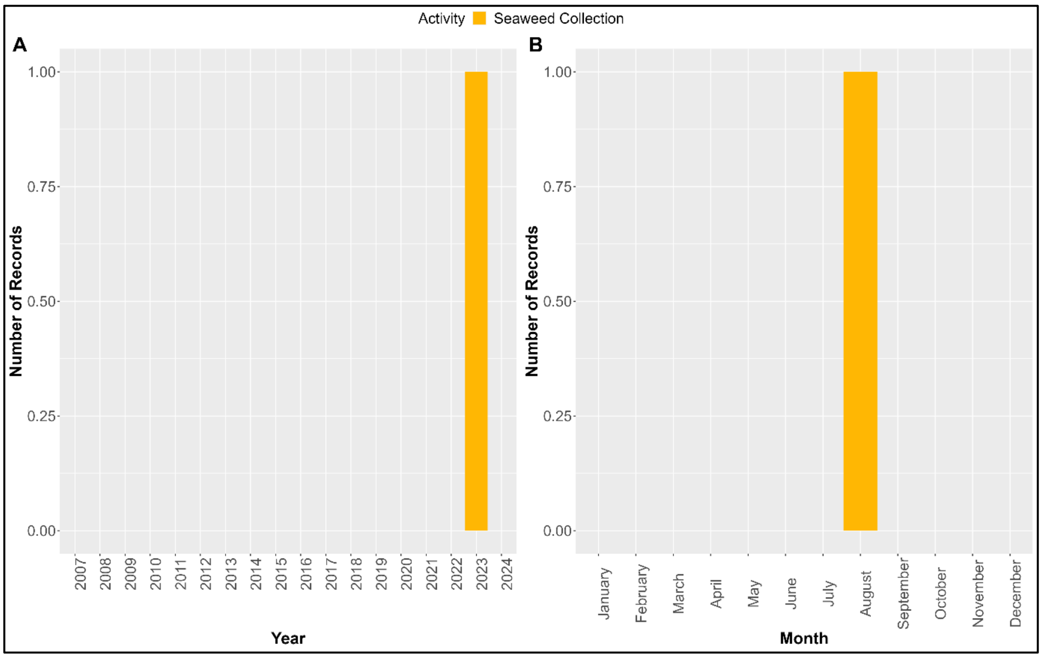


Figure 6 Records of shoregathering activity occuring in the Yarmouth to Cowes MCZ.

Figure 6 displays the only recorded occurrence of shore gathering activity in the Yarmouth to Cowes MCZ and Figure 7 the spatial distribution. The activity recorded was seaweed gathering and was observed in January 2023.

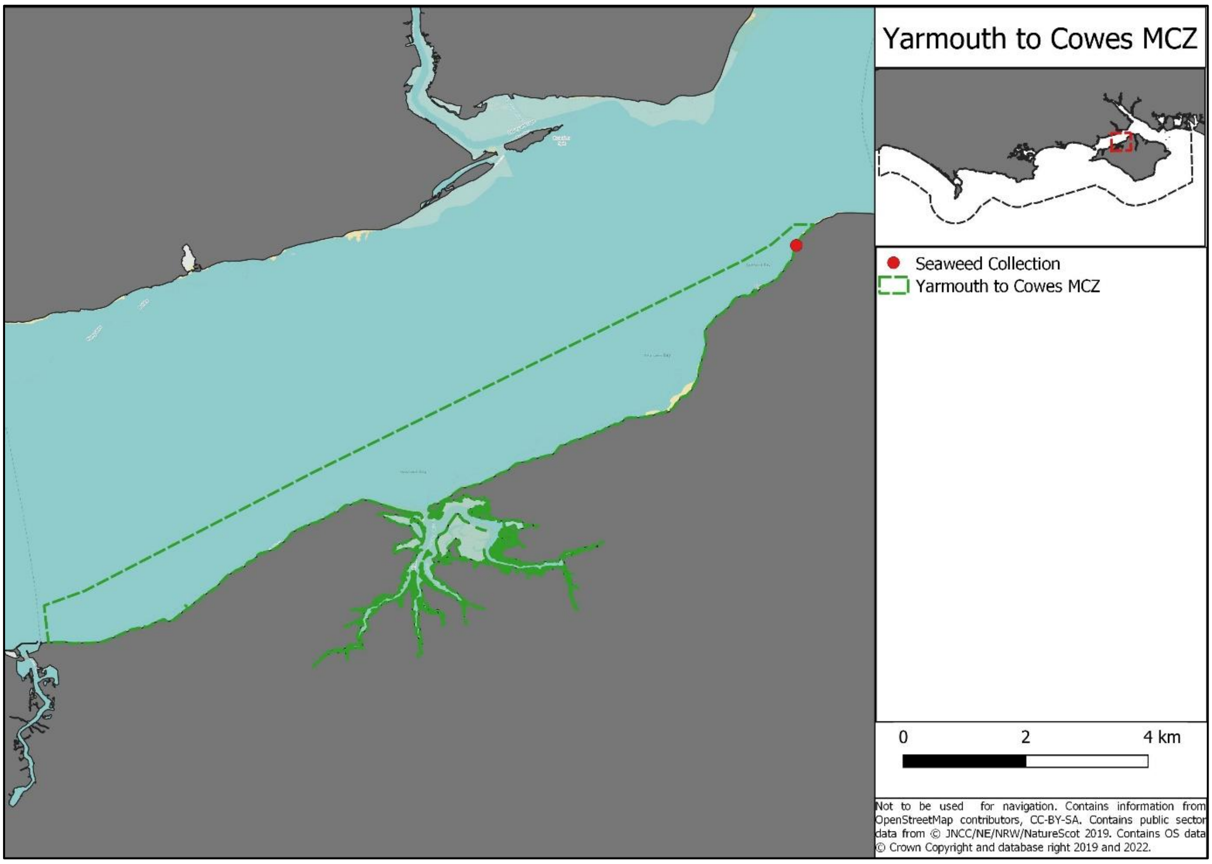


Figure 7 Spatial distribution of all shore gathering activity observed by Southern IFCA in the Yarmouth to Cowes MCZ (boundary shown by the dashed green line).

2.5.4 Recorded catches within the MCZ

As of October 2023, there has been evidence available on the catch composition of shore gathering activities occurring in the Yarmouth to Cowes MCZ.

2.5.5 Recorded Offences within the MCZ

As of October 2023, there has been no recorded offences linked to shore gathering activities occurring in the Yarmouth to Cowes MCZ.

2.6 Bembridge MCZ

2.6.1 Designated Features of the MCZ

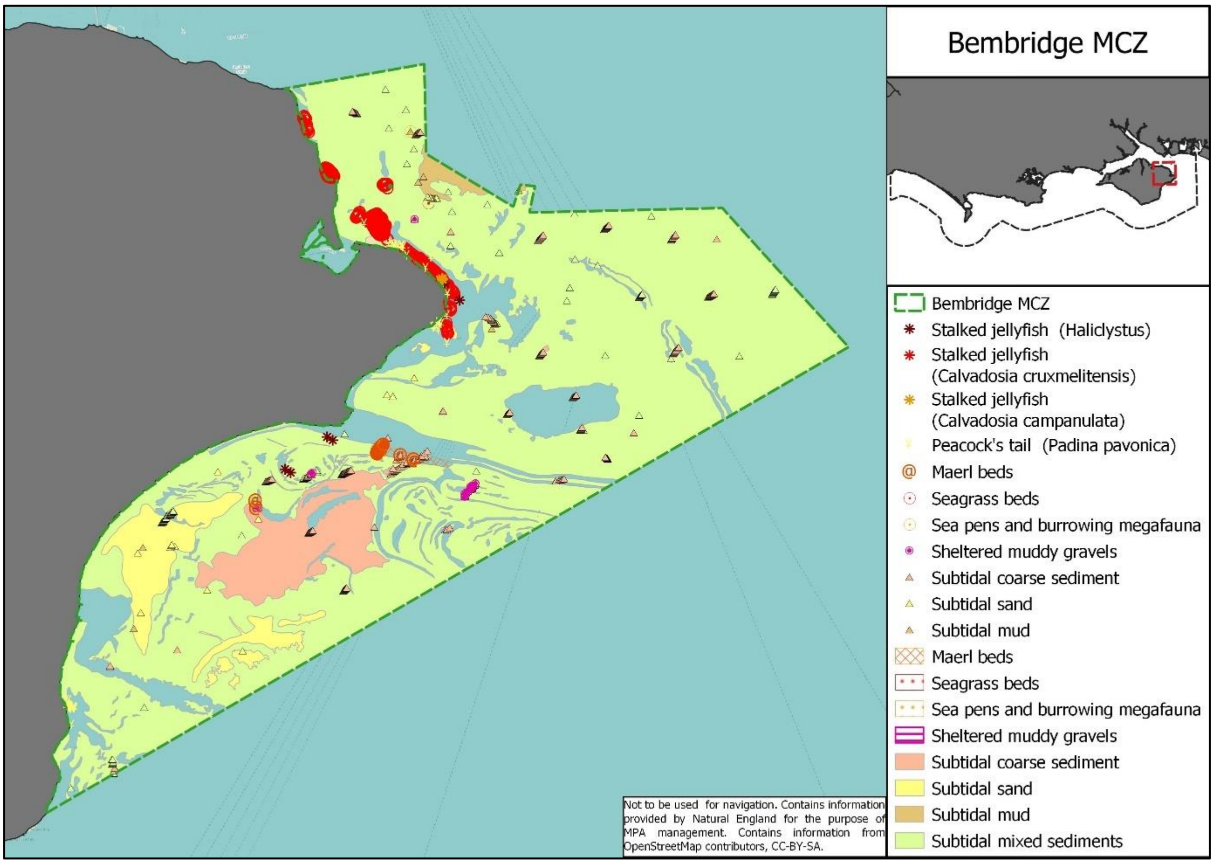


Figure 8 The location and extent of the supporting habitats of the Bembridge MCZ (boundary shown by the dashed green line).

The Bembridge MCZ covers an area of 75 km^2 and stretches southwards from Nettlestone Point in the North to Ventnor in the South and stretch to the edge of the deep-water channel in the Eastern Solent. The designated features are displayed in Figure 8 and Table 7.

Table 7 The designated features of Bembridge MCZ

Designated Features	Maerl Beds
	Native Oyster (*Ostrea Edulis*)
	Peacock's tail (*Padina Pavocina*)
	Seagrass beds
	Sea-pen and burrowing megafauna communities
	Sheltered Muddy Gravels
	Short Snouted Seahorse (*Hippocampus hippocampus*)
	Stalked Jellyfish (*Calvadosia campanulata*)
	Stalked Jellyfish (*Haliclystus spp*)
	Subtidal Coarse Sediments
	Subtidal Mixed Sediments
	Subtidal Mud
	Subtidal Sand

2.6.2 Existing Shore Gathering Management Specific to the MCZ

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds. No person shall dig for or take sea fisheries resources from any prohibited area nor be in the prohibited areas with an rake, spade, fork or similar tool. Areas 17-21 are within the Bembridge MCZ.

2.6.3 Shore Gathering activity in the MCZ

As of October 2023, there has been evidence available on the location of shore gathering activities occurring in the Bembridge MCZ.

2.6.4 Recorded catches within the MCZ

As of October 2023, there has been evidence available on the catch composition of shore gathering activities occurring in the Bembridge MCZ.

2.6.5 Recorded Offences within the MCZ

As of October 2023, there has been no recorded offences linked to shore gathering activities occurring in the Bembridge MCZ.

3. Special Protection Areas (SPAs)

3.1 Chesil Beach and the Fleet SPA

3.1.1 Designated Features of the SPA

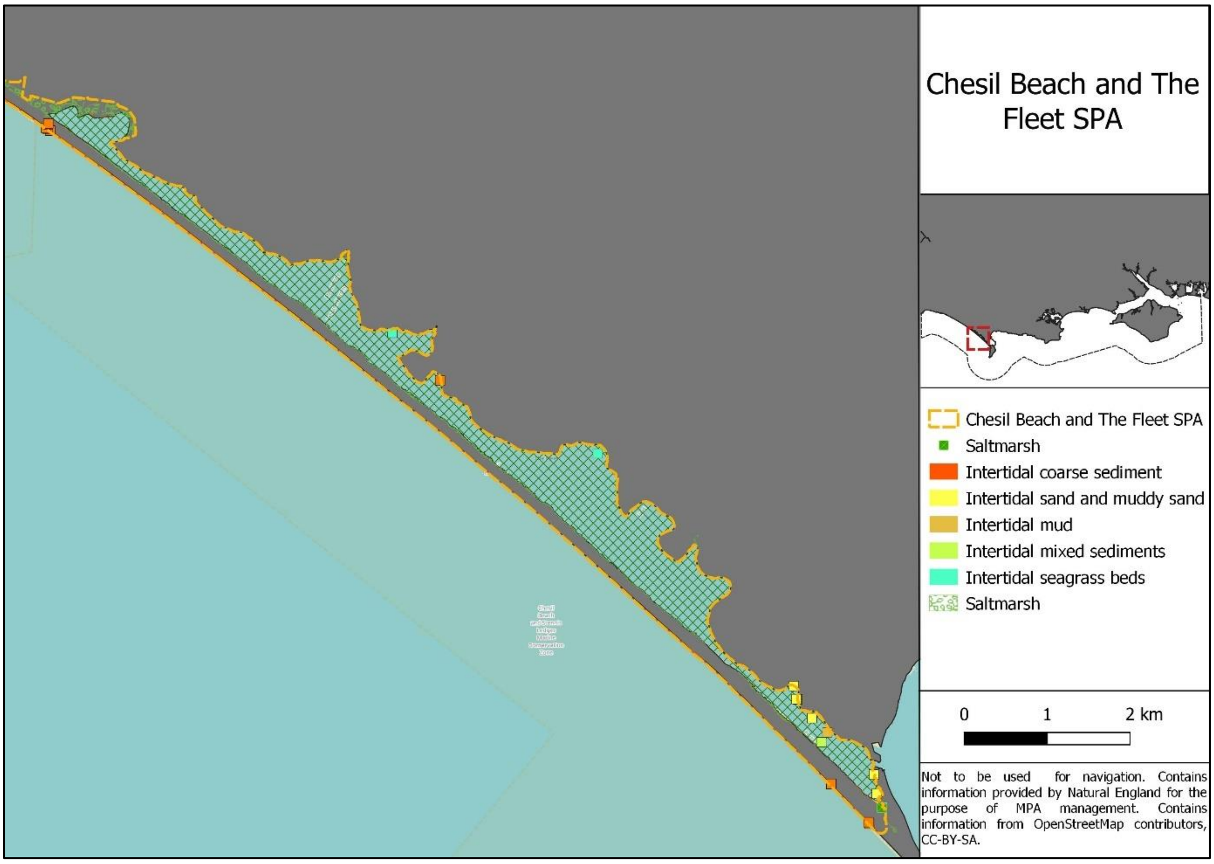


Figure 9 The location and extent of the supporting habitats of the Chesil Beach and The Fleet SPA (boundary shown by the dashed yellow line).

The Chesil Beach and the Fleet SPA covers an area of 7 km^2. The Fleet supports the largest diversity of species and habitat of any coastal lagoon in the UK [4] and aside from the entrance at the southeastern end, The Fleet is largely sheltered from waves and tidal processes[5]. The qualifying features and their supporting habitats are displayed in Figure 9 and Table 8.

Table 8 Qualifying features and their supporting habitats in the Chesil Beach and The Fleet SPA.

Qualifying Features	Little Tern (*Sternula albifrons*), Breeding
	Wigeon (*Mareca Penelope*), Non-breeding
Supporting Habitats	Coastal Lagoons
	Intertidal Coarse Sediment
	Intertidal Mixed Sediment
	Intertidal Sand and Muddy Sand
	Intertidal Seagrass beds
	Intertidal Mud
	Water Column

[4] Bamber, R. N. 1997. Assessment of saline lagoons within Special Areas of Conservation (SACs). Peterborough: English Nature.
[5] https://designatedsites.naturalengland.org.uk/

3.1.2 Existing Shore Gathering Management Specific to the SPA

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds. No person shall dig for or take sea fisheries resources from any prohibited area nor be in the prohibited areas with an rake, spade, fork or similar tool. Areas 29 are within the Chesil Beach and the Fleet SPA.

3.1.3 Shore Gathering activity in the SPA

As of October 2023, there has been evidence available on the location of shore gathering activities occurring in the Chesil Beach and The Fleet SPA.

3.1.4 Recorded catches within the SPA

As of October 2023, there has been evidence available on the catch composition of shore gathering activities occurring in the Chesil Beach and The Fleet SPA.

3.1.5 Recorded Offences within the SPA

As of October 2023, there has been no recorded offences linked to shore gathering activities occurring in the Chesil Beach and The Fleet SPA.

3.2 Poole Harbour SPA

3.2.1 Designated Features of the SPA

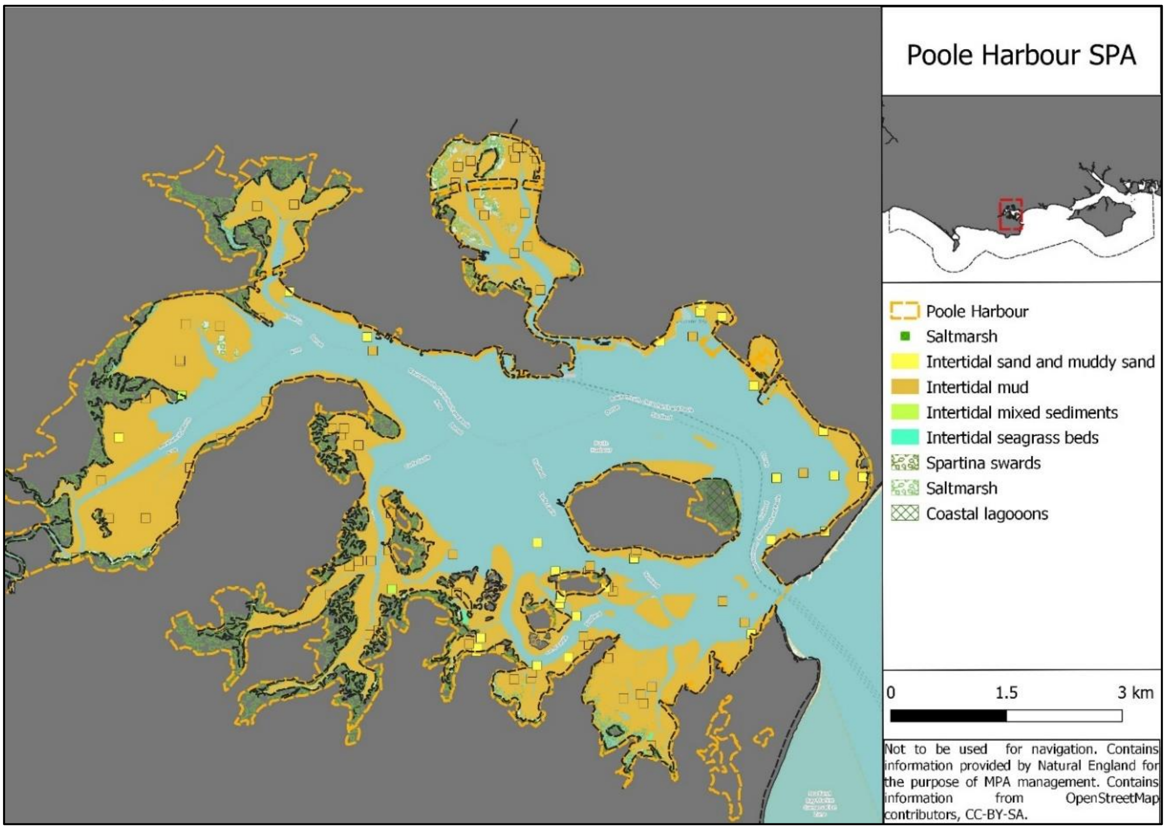


Figure 10 The location and extent of the supporting habitats of the Poole Harbour SPA (boundary shown by the dashed yellow line).

Poole Harbour SPA comprises of large tidal mudflats, saltmarsh, and seagrass beds. The SPA covers an area of 42 km^2 and is an important feeding habitat for migratory birds[6]. The qualifying features and their supporting habitats are displayed in Figure 10 and Table 9.

Table 93 Qualifying features and their supporting habitats in the Poole Harbour SPA.

Qualifying Features	Avocet (*Recurvirostra avosetta*), Non-breeding
	Black-tailed godwit (*Limosa limosa islandica*), Non-breeding
	Common tern (*Sterna hirundo*), Breeding
	Little egret (*Egretta garzetta*), Non-breeding
	Mediterranean gull (*Ichthyaetus melanocephalus*), Breeding
	Sandwich tern (*Thalasseus sandvicensis*), Breeding
	Shelduck (*Tadorna tadorna*), Non-breeding
	Spoonbill (*Platalea leucorodia*), Non-breeding
	Waterbird assemblage, Non-breeding
Supporting Habitats	Coastal lagoon
	coastal reedbed
	freshwater and coastal grazing marsh
	Mediterranean and thermo- Atlantic Halophilous scrubs
	Salicornia and other annuals colonising mud and sand
	Atlantic salt meadows
	Spartina swards

[6] https://designatedsites.naturalengland.org.uk/

	Intertidal seagrass beds
	Intertidal mixed sediments
	Intertidal mud
	Intertidal sand and muddy sand
	Water column

3.2.2 Existing Shore Gathering Management Specific to the SPA

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds. No person shall dig for or take sea fisheries resources from any prohibited area nor be in the prohibited areas with an rake, spade, fork or similar tool. Areas 26-28 are within the Poole Harbour SPA.

Poole Harbour is subject to the Poole Harbour Shellfish Hand Gathering Byelaw. From the 1st of November to 31st March, both days inclusive, a person must not take from a fishery, shellfish of any kind by hand gathering or with the use of a hand tool, in the defined areas within Poole Harbour.

The Poole Harbour Bait Digging Memorandum of Agreement was produced in partnership with industry, other authorities, NGOs and other bodies. The agreement sets out a range of voluntary permanent and seasonal spatial closures, in addition to provisions on backfilling holes, avoiding taking green spawning worms, keeping to access paths, avoiding digging around moorings, slipways and sea walls, being aware of the use of torch lights to disturb roosting birds and keeping to all local byelaws and regulations.

3.2.3 Shore Gathering activity in the SPA

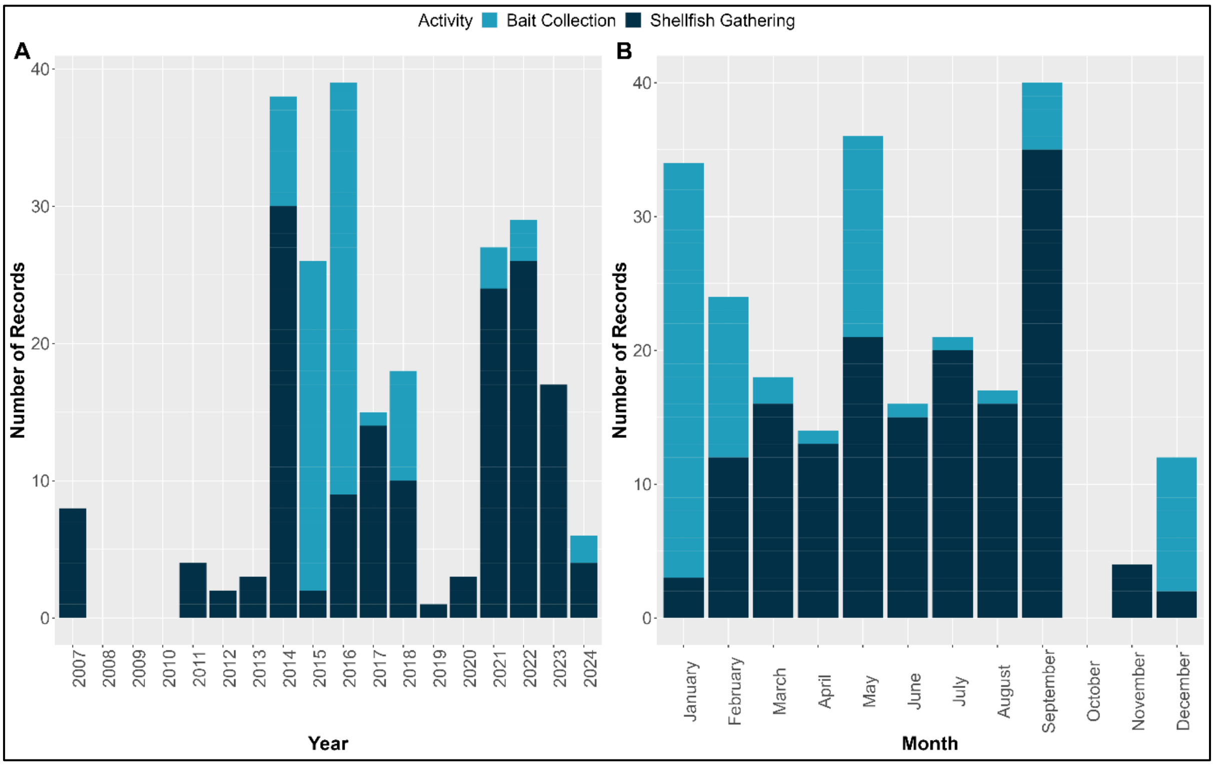


Figure 11 Records of shoregathering activity occuring in the Poole Harbour SPA.

Records of shore gathering activity in the Poole Harbour SPA date back to 2007 and are comprised of bait collection and shellfish gathering and are displayed in Figure 11A. Bait digging activity appears to peak in 2015 and 2016 with 24 and 30 records respectively.

However, this should be viewed with the understand that the data is based on Southern IFCA sightings data. Bait digging appears to mostly occur from December to January (Figure 11B) however this should also be considered in line with the data source.

Shellfish gathering peaked in 2014 with 30 records. Similar but lower levels were observed in 2021 and 2022 with 24 and 26 records respectively. Monthly records remain relatively consistent from February to August with a with between 12 and 20 records. Shellfish gathering peaks in September with a total of 35 records.

Spatial distribution is displayed in Figure 12. High density areas of shellfish gathering include Whitley Lake, Arne Bay, and Rockley Spit (East to West). High density areas of Bait collection include Blue Lagoon and Holes Bay (East to West). Note that some records will represent activity prior to the introduction of existing management measures.

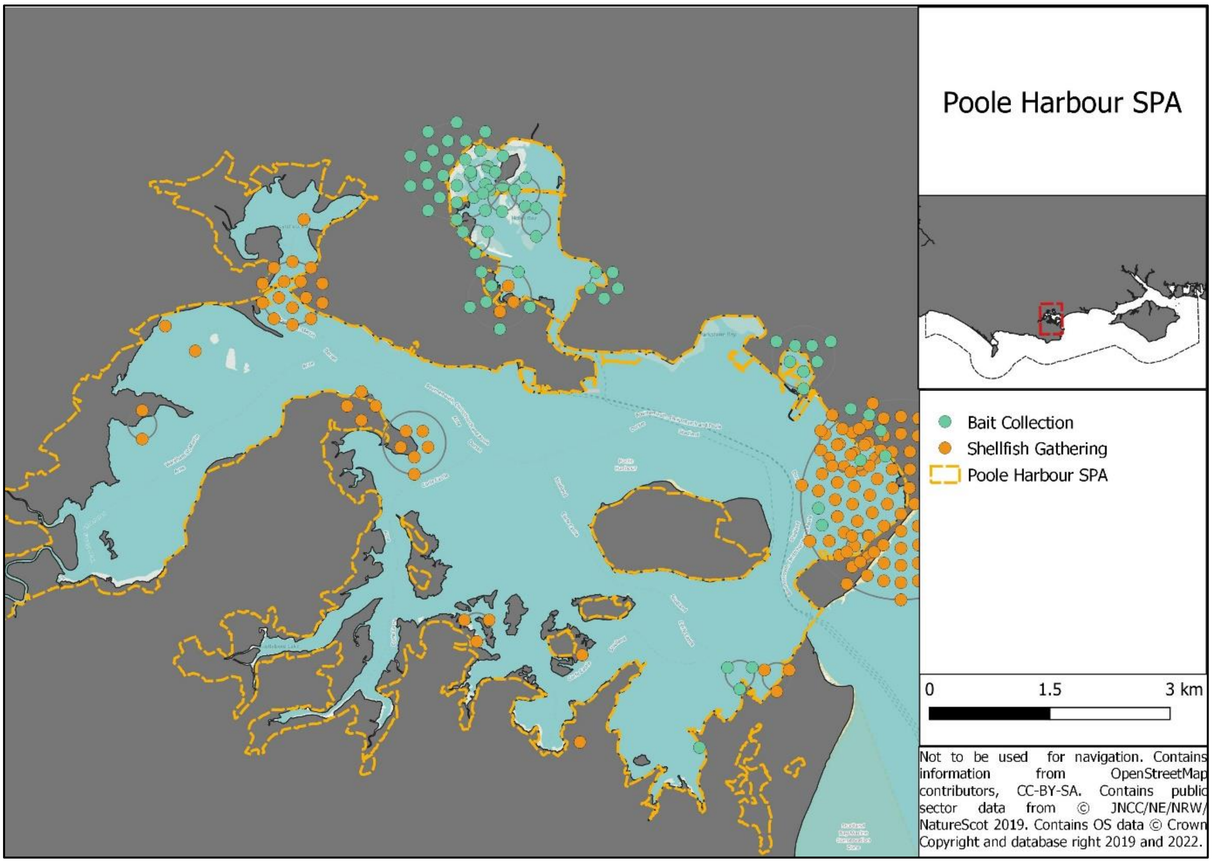


Figure 12 Spatial distribution of all shore gathering activity observed by Southern IFCA in the Poole Harbour SPA (boundary shown by the dashed yellow line) as of October 2023.

3.2.4 Recorded catches within the SPA

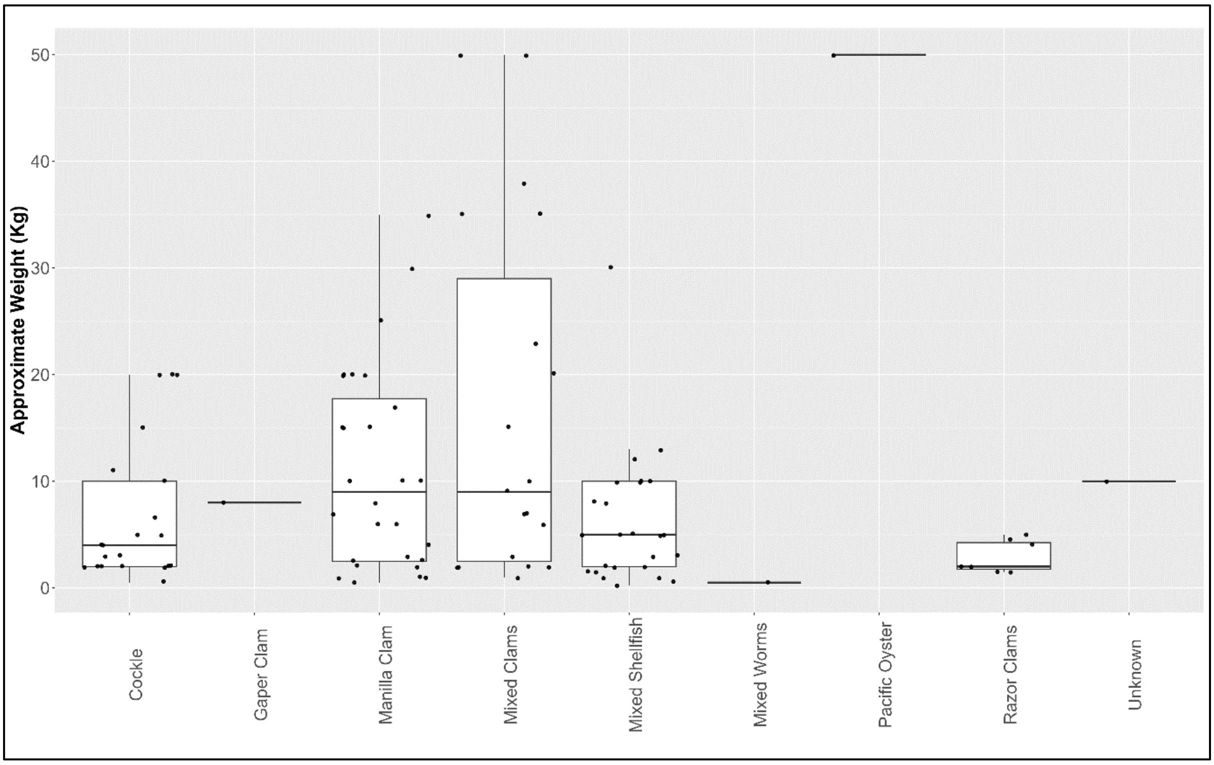


Figure 132 Approximate weight of catch associated with shore gathering activity in the Poole Harbour SPA.

Figure 13 displays the range of weights recorded on Southern IFCA search records of species caught through shore gathering activity (shellfish) in Poole Harbour SPA since 2007. Table 10 displays the mean weight for each species.

Table 10 The mean weight of recorded catches associated with shore gathering activity in the Poole Harbour SPA.

Species	Mean Weight (kg)
Cockle	6.71
Gaper Clam	8.00
Manila Clam	11.01
Mixed Clams	16.68
Mixed Shellfish	6.14
Mixed Worms	0.50
Pacific Oyster	50.00
Razor Clams	2.93
Unknown	10.00

3.2.5 Recorded Offences within the SPA

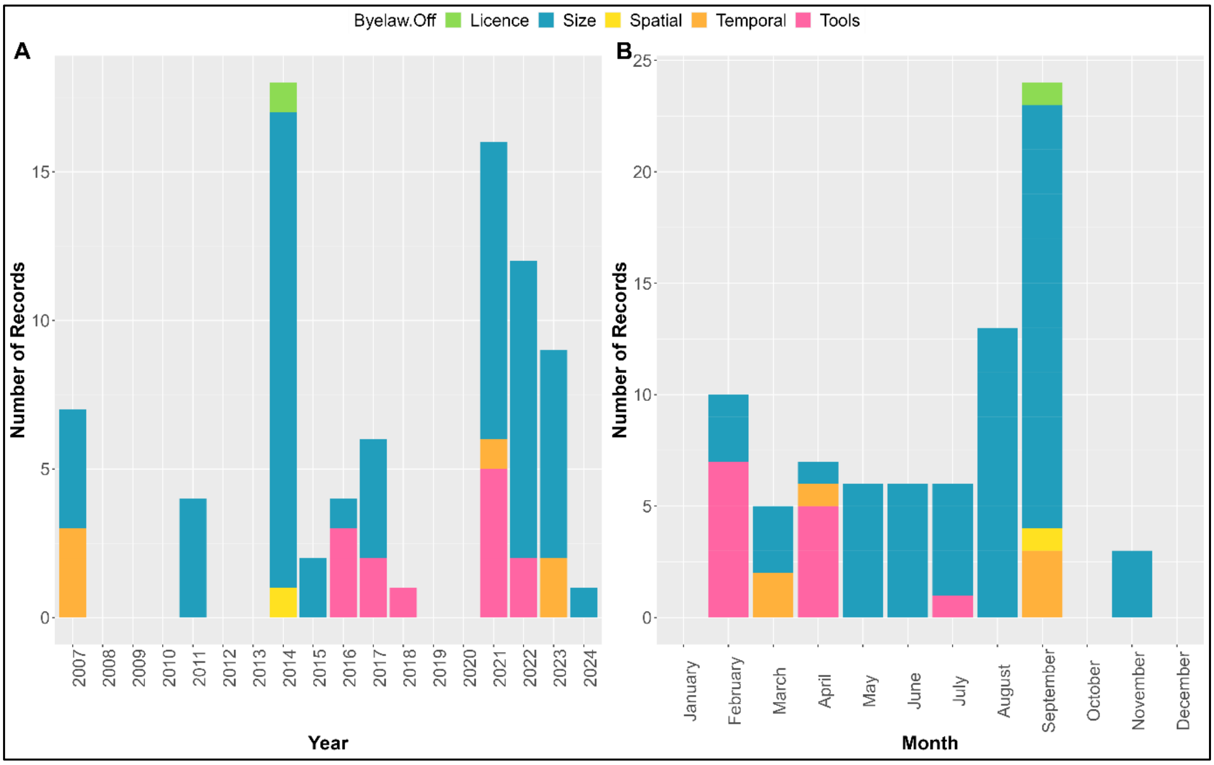


Figure 143 Recorded offences and the theme of infringment in the Poole Harbour SPA.

Figures 14 A and B display the yearly and monthly trends in offences related to shore gathering activity within the Poole Harbour SPA since 2007. Offences peaked in 2014 with 18 records. Similar to the levels of activity discussed in section 3.2.2, offences peak at the end of the summer. In this case it is likely due to targeted patrol work occurring in September 2014.

Infringements relating to undersized species occur most frequently, followed by the use of tools. A summary of current shore gathering related management can be found in sections 3.2.5 and 6.

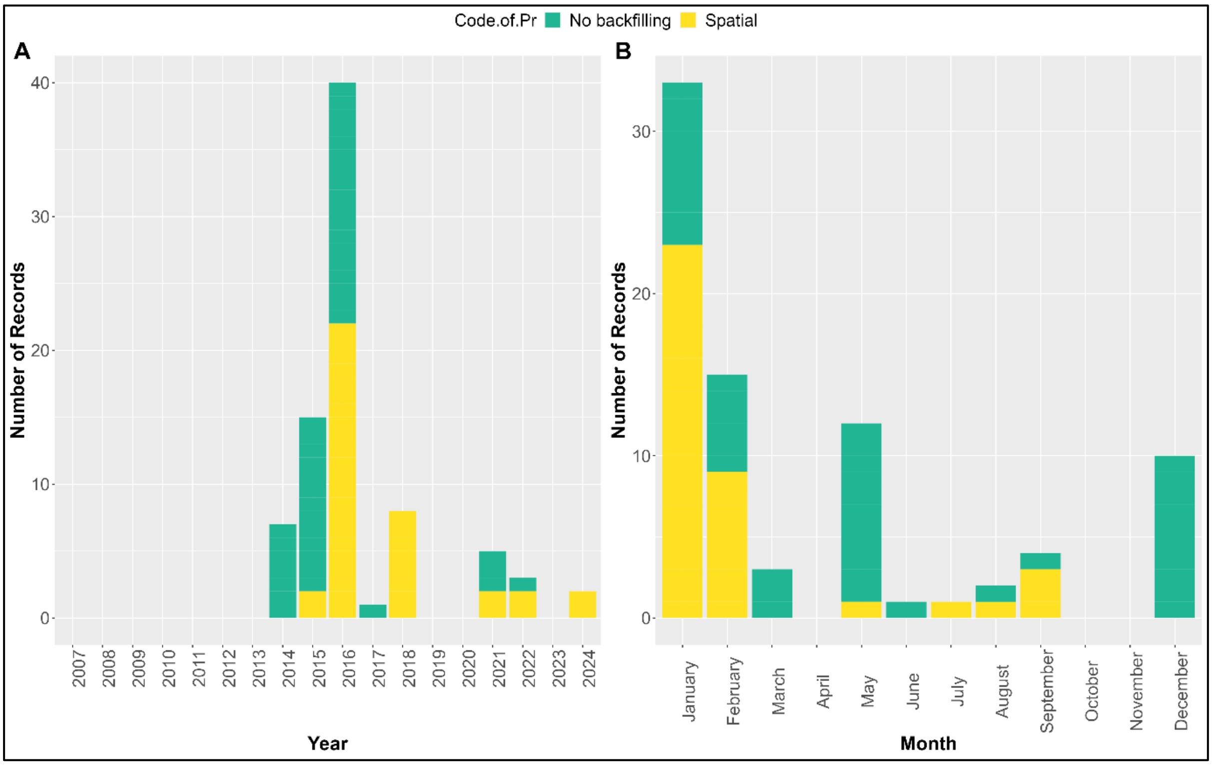


Figure 15 Poole Harbour Bait MoA infringements by theme

There are 81 recorded infringements of the Pool Harbour MoA recorded in IFCA search and intelligence records. The majority of recorded infringements relate to digging in permanent or seasonal spatial closures.

3.3 Solent and Southampton Water SPA

3.3.1 Designated Features of the SPA

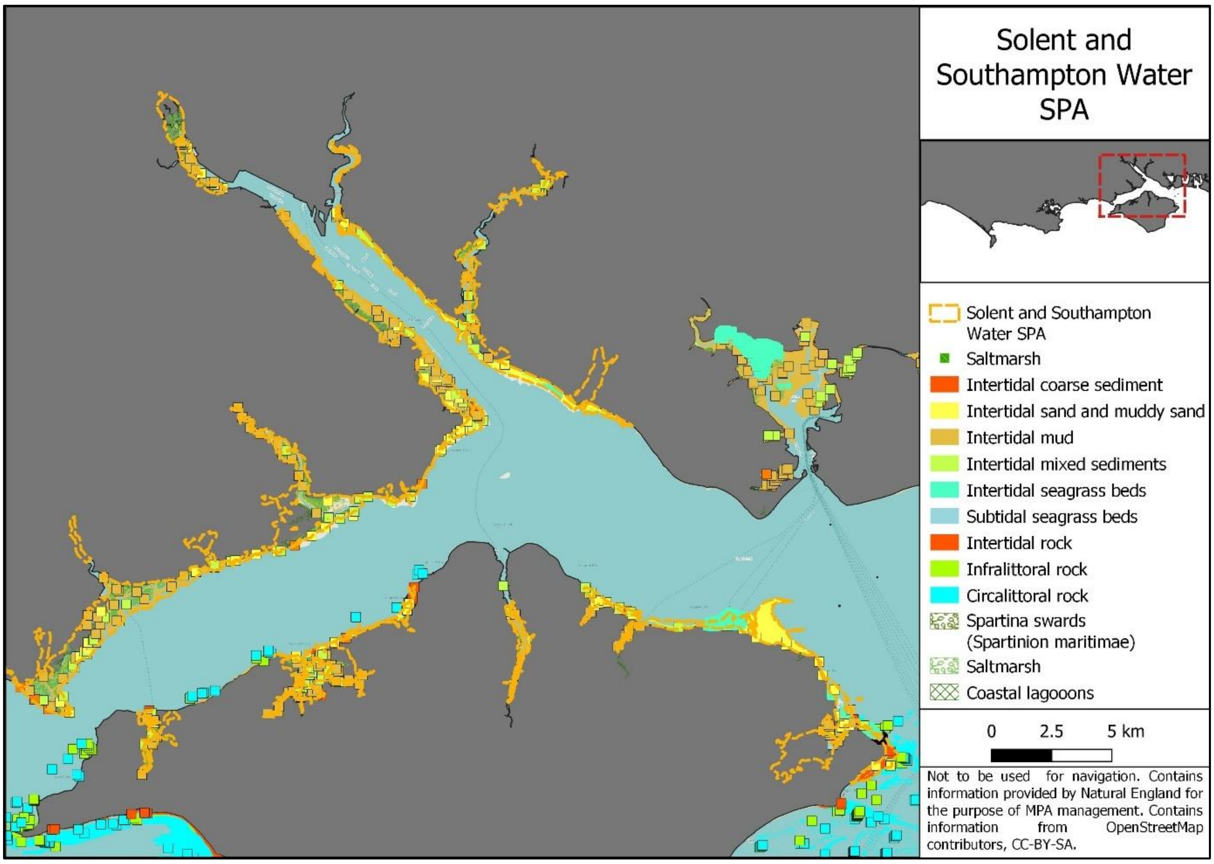


Figure 164 The location and extent of the supporting habitats of the Solent and Southampton Water SPA (boundary shown by the dashed yellow line).

The Solent and Southampton Water SPA reaches from Hurst Spit in the West to Hill Head in the East, covering sections of the Hampshire coastline and the north coast of the Isle of Wight. The SPA covers 54 km^2 of estuarine habitats that support a range of invertebrates and migratory birds[7]. The qualifying features and their supporting habitats are displayed in Figure 16 and Table 11.

Table 11 Qualifying features and their supporting habitats in the Solent and Southampton Water SPA

Qualifying Features	Black-tailed godwit (*Limosa limosa islandica*), Non-breeding
	Common tern (*Sterna hirundo*), Breeding
	Dark-bellied brent goose (*Branta bernicla bernicla*), Non-breeding
	Little tern (*Sternula albifrons*), Breeding
	Mediterranean gull (*Ichthyaetus melanocephalus*), Breeding
	Ringed plover (*Charadrius hiaticula*), Non-breeding
	Roseate tern (*Sterna dougallii*), Breeding
	Sandwich tern (*Thalasseus sandvicensis*), Breeding
	Teal (*Anas crecca*), Non-breeding
	Waterbird assemblage, Non-breeding
Supporting Habitats	Coastal Lagoon
	Coastal Reedbed

[7] https://designatedsites.naturalengland.org.uk/

	Freshwater And Coastal Grazing Marsh
	Salicornia And Other Annuals Colonising Mud And Sand
	Atlantic Salt Meadows
	Spartina Swards
	Intertidal Seagrass Beds
	Intertidal Rock
	Intertidal Coarse Sediment
	Intertidal Mixed Sediments
	Intertidal Mud
	Intertidal Sand And Muddy Sand
	Infralittoral Rock
	Subtidal Seagrass Beds
	Circalittoral Rock
	Water Column

3.3.2 Existing Shore Gathering Management Specific to the SPA

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds. No person shall dig for or take sea fisheries resources from any prohibited area nor be in the prohibited areas with an rake, spade, fork or similar tool. Areas 15-23 and area 25 overlap with the Solent and Southampton Water SPA.

3.3.3 Shore Gathering activity in the SPA

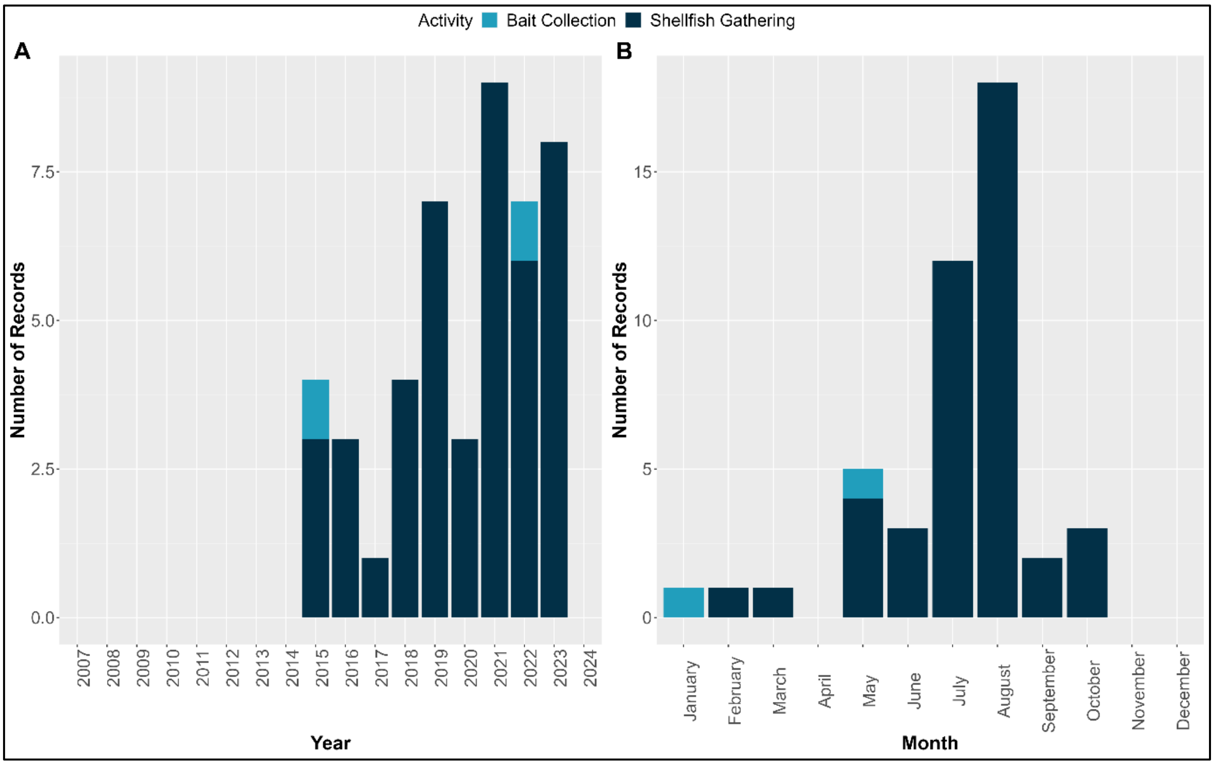


Figure 17 Records of shoregathering activity occuring in the Solent and Southampton Water SPA.

Figure 17 displays records of shore gathering activity occurring in the Solent and Southampton Water SPA. Shellfish gathering is the most commonly occurring activity in the Solent and Southampton Water SPA. With Peaks occurring in 2021 and in the months of July and August.

Figure 18 displays the spatial distribution of all shore gathering activity observed by Southern IFCA in the Solent and Southampton Water SPA. The area of highest levels of activity is Hill Head.

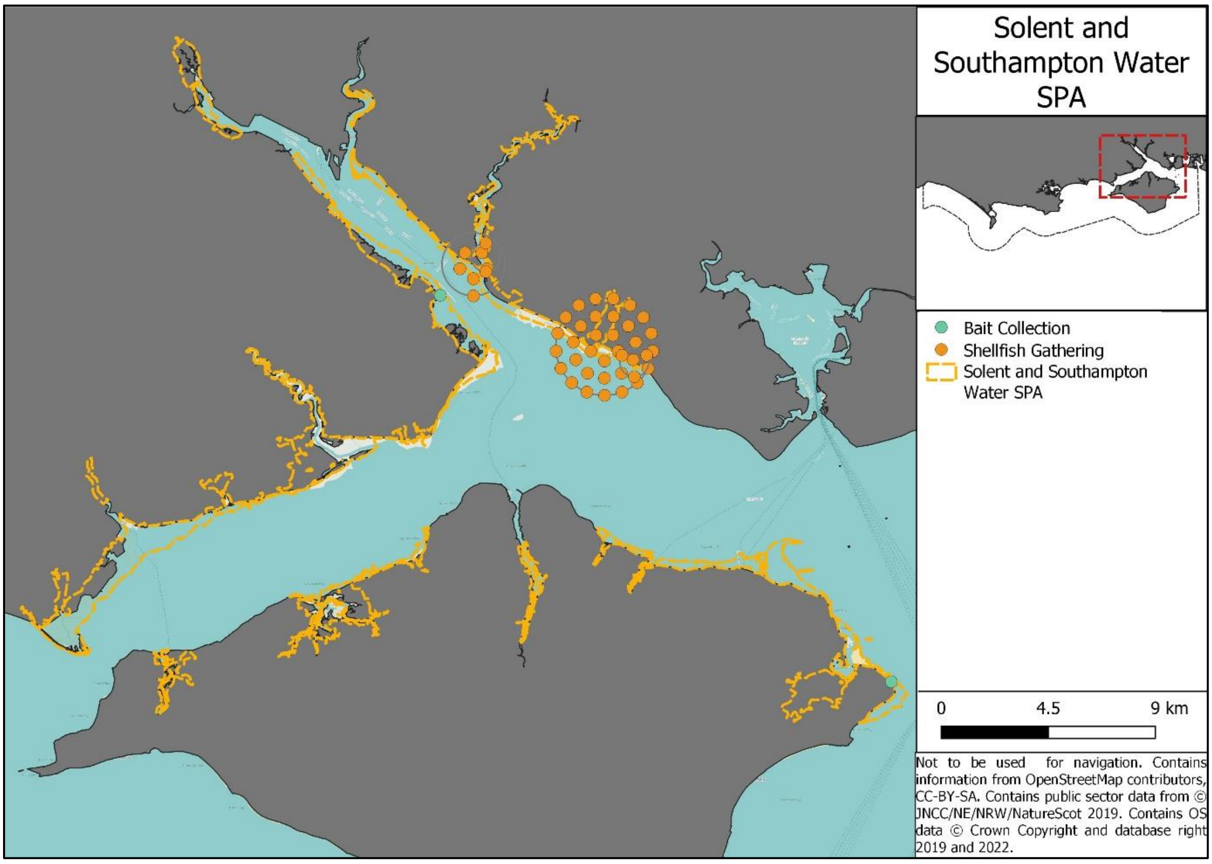


Figure 18 Spatial distribution of all shore gathering activity observed by Southern IFCA in the Solent and Southampton Water SPA (boundary shown by the dashed yellow line) as of October 2023.

3.3.4 Recorded catches within the SPA

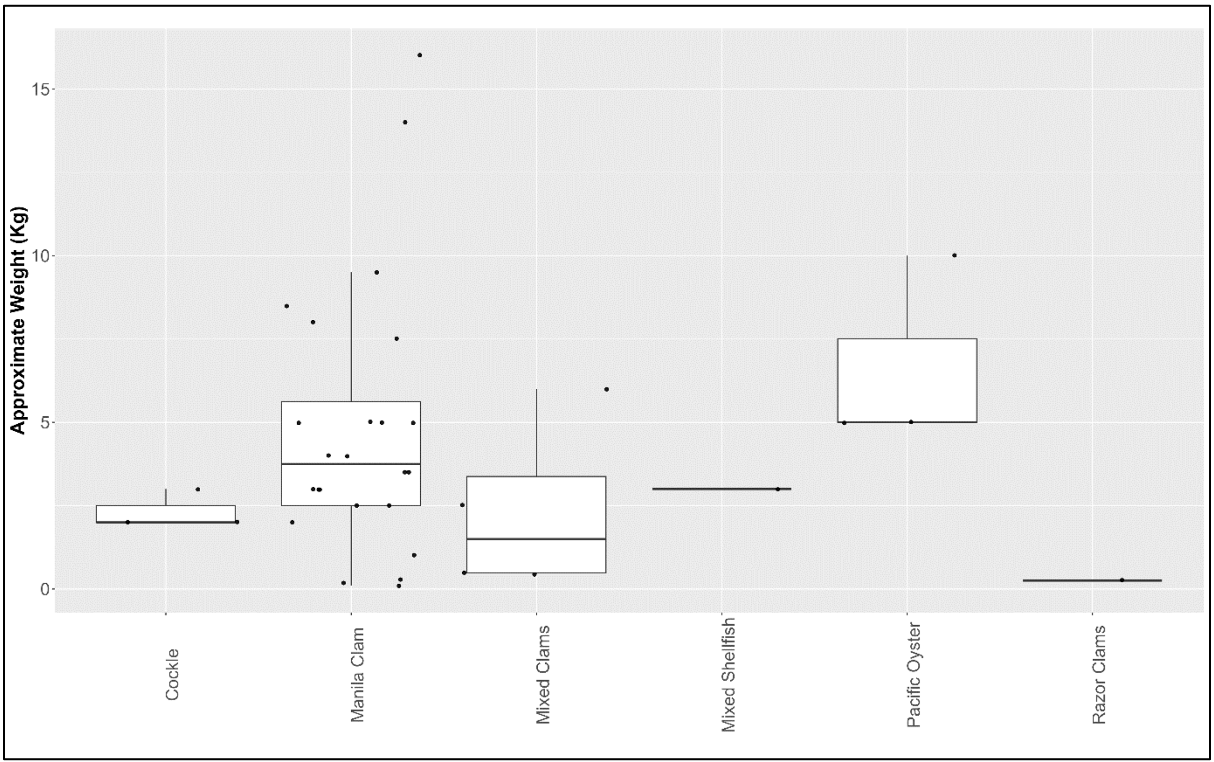


Figure 19 Approximate weight of catch associated with shore gathering activity in the Solent and Southampton Water SPA.

Figure 19 displays the range of weights recorded on Southern IFCA search records carried out in the Solent and Southampton Water SPA since 2015. Table 12 displays the mean weight for each species.

Table 12 The mean weight of recorded catches associated with shore gathering activity in the Solent and Southampton Water SPA.

Species	**Mean Weight (kg)**
Cockle	2.33
Manila Clam	4.83
Mixed Clams	2.36
Mixed Shellfish	3.00
Pacific Oyster	6.67
Razor Clams	0.25

3.3.5 Recorded Offences within the SPA

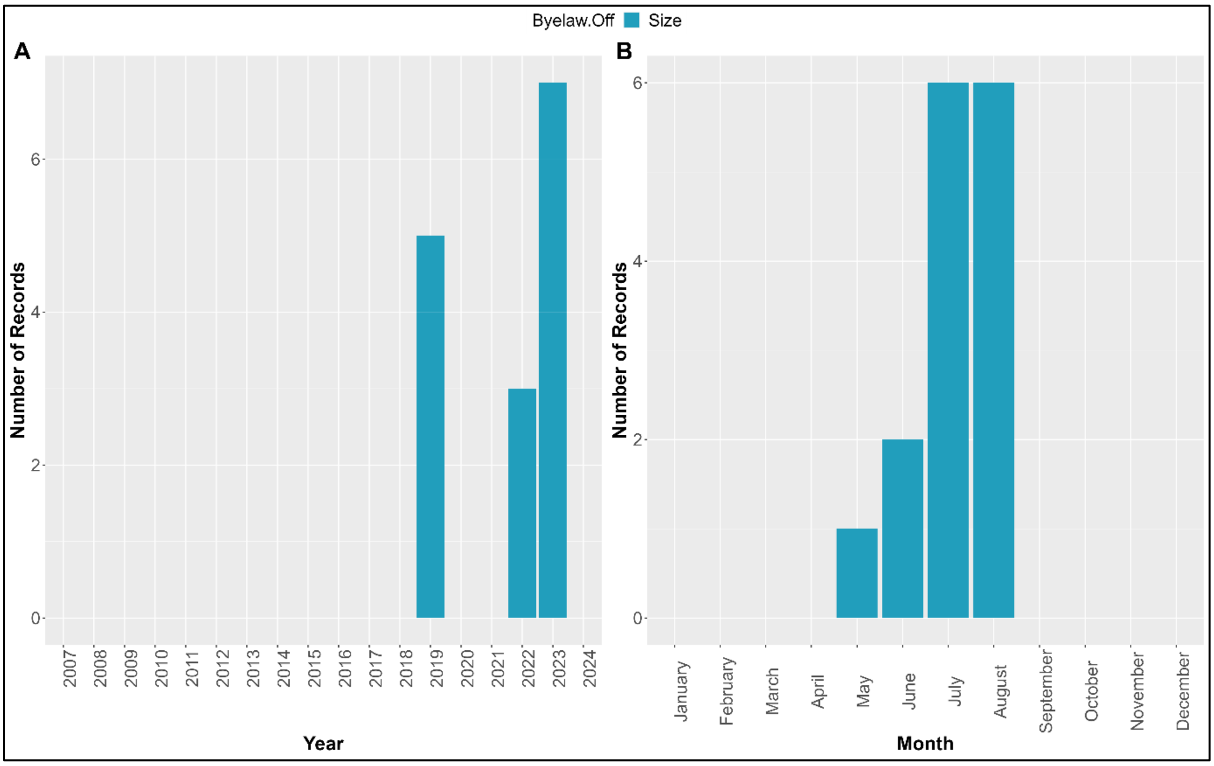


Figure 205 Recorded offences and the theme of infringment in the Solent and Southampton Water SPA.

Figure 20 displays recorded offences related to shore gathering activity within the Solent and Southampton Water SPA. All records of offences relating to shore gathering activities in the Solent and Southampton Water SPA have been in relation to Minimum Conservation Reference Size. With the peak number of offences occurring in 2023.

3.4 Portsmouth Harbour SPA

3.4.1 Designated Features of the SPA

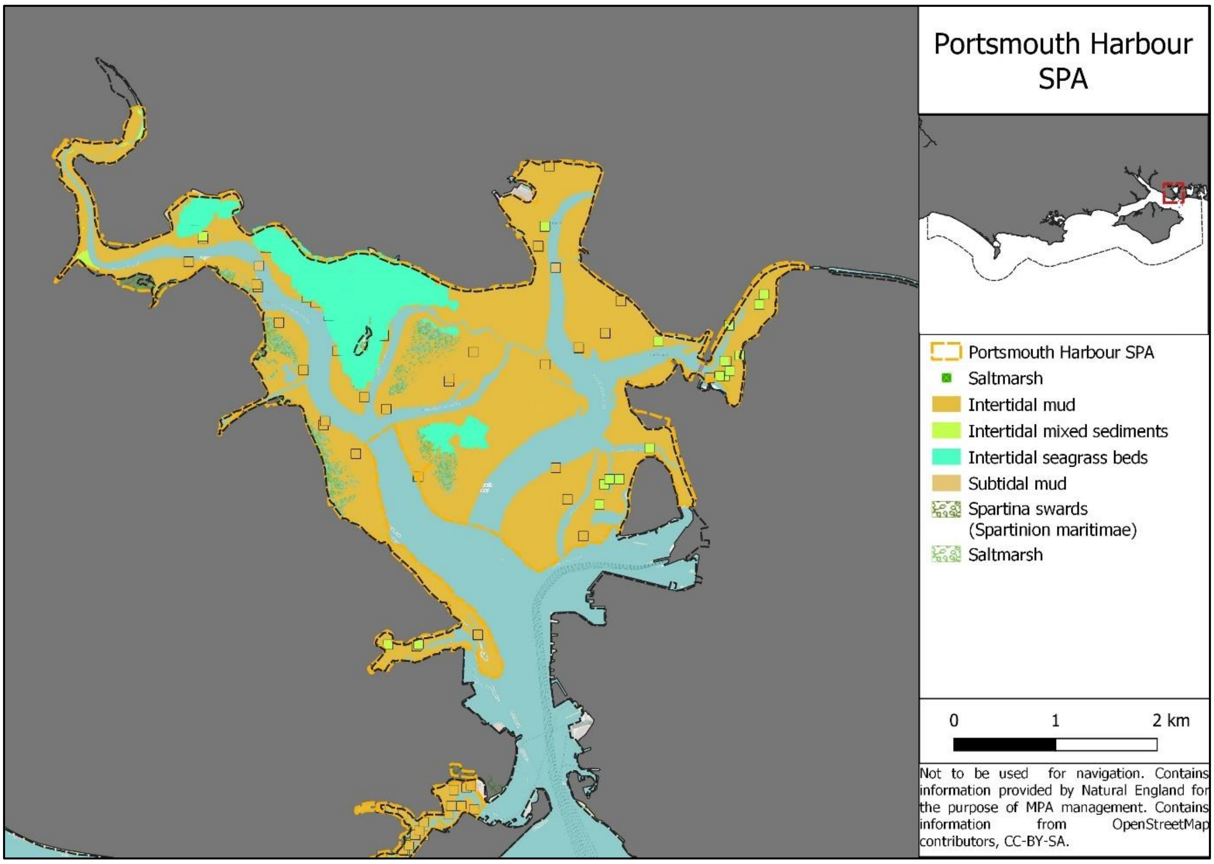


Figure 6 The location and extent of the supporting habitats of the Portsmouth Harbour SPA (boundary shown by the dashed yellow line).

Portsmouth Harbour is important habitat for large numbers of nationally and internationally important bird species. The SPA covers 13 km^2 and the qualifying features and their supporting habitats are displayed in Figure 21 and Table 13[8].

Table 13 The qualifying features and supporting habitats of the Portsmouth Harbour SPA.

Qualifying Features	Black-tailed godwit (*Limosa limosa islandica*), Non-breeding
	Dark-bellied brent goose (*Branta bernicla bernicla*), Non-breeding
	Dunlin (*Calidris alpina alpina*), Non-breeding
	Red-breasted merganser (*Mergus serrator*), Non-breeding
Supporting Habitats	Coastal Lagoon
	Freshwater And Coastal Grazing Marsh
	Salicornia And Other Annuals Colonising Mud And Sand
	Atlantic Salt Meadows
	Spartina Swards
	Intertidal Seagrass Beds
	Intertidal Mixed Sediments
	Intertidal Mud
	Subtidal Mud
	Water Column

[8] https://designatedsites.naturalengland.org.uk/

3.4.2 Existing Shore Gathering Management Specific to the SPA

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds. No person shall dig for or take sea fisheries resources from any prohibited area nor be in the prohibited areas with an rake, spade, fork or similar tool. Areas 8-14 are within the Portsmouth Harbour SPA.

3.4.3 Shore Gathering activity in the SPA

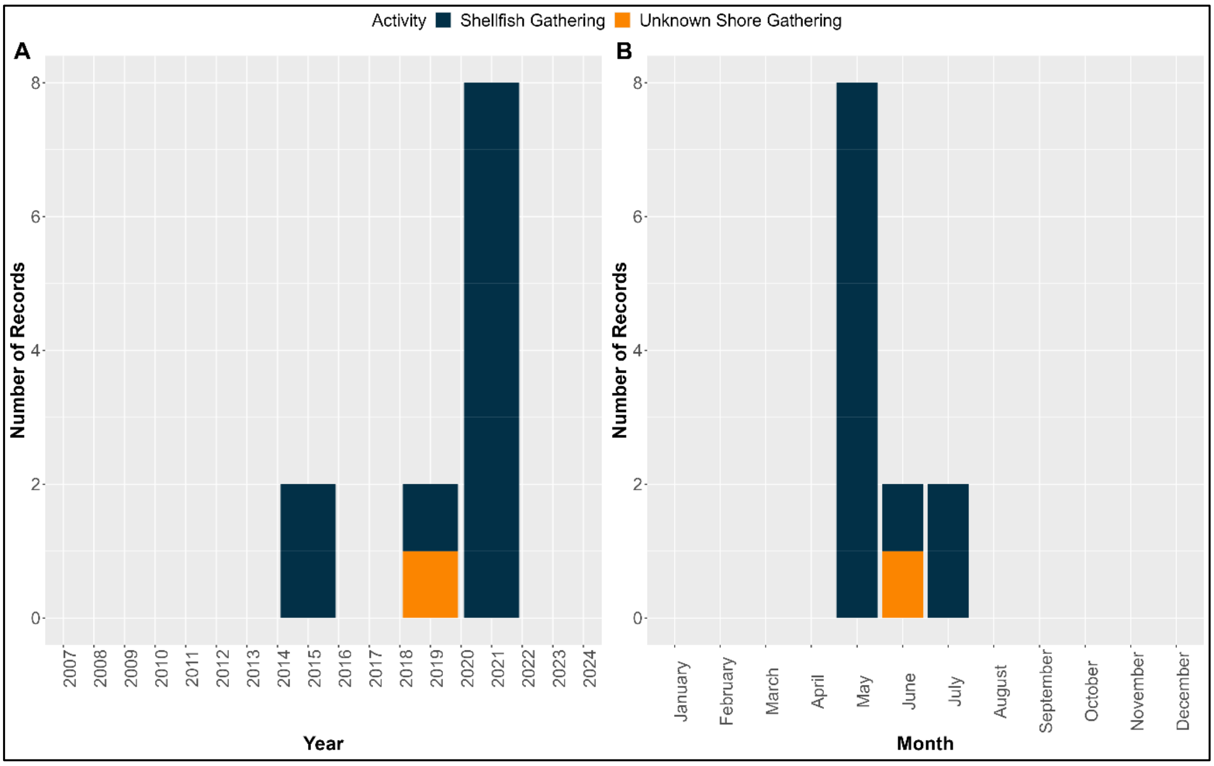


Figure 22 Records of shoregathering activity occuring in the Portsmouth Harbour SPA.

Figure 22 displays annual and monthly trends in shore gathering activity within the Portsmouth Harbour SPA. The majority of shore gathering records indicate shellfish gathering is the most common shore gathering activity occurring in the Portsmouth Harbour SPA.

Figure 23 displays the spatial distribution of all shore gathering activity observed by Southern IFCA in the Portsmouth Harbour SPA as of October 2023. The area with the highest density of activity is to the west of Portchester Castle.

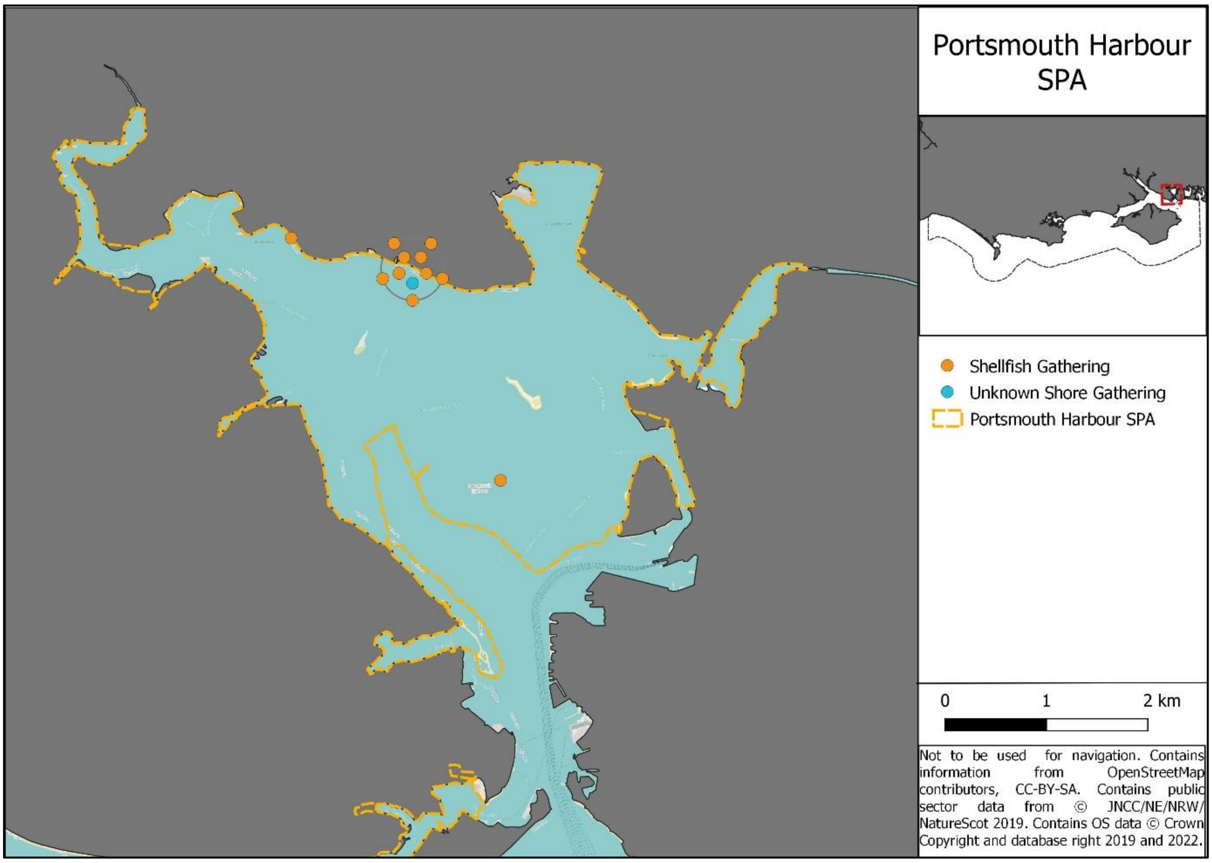


Figure 23 Spatial distribution of all shore gathering activity observed by Southern IFCA in the Portsmouth Harbour SPA (boundary shown by the dashed yellow line) as of October 2023.

3.4.4 Recorded catches within the SPA

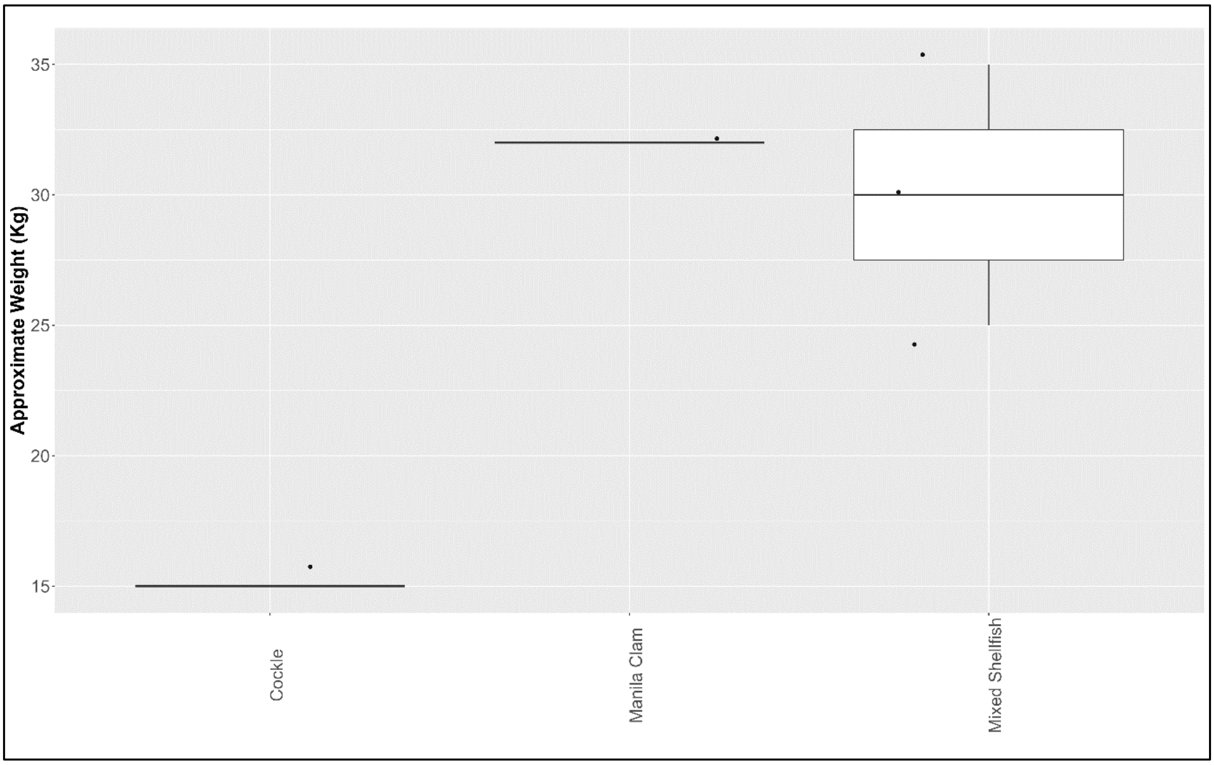


Figure 247 Approximate weight of catch associated with shore gathering activity in the Portsmouth Harbour SPA.

There are limited records on weights of catch from shore gathering activities however the limited records indicate generally higher means than other MPAs. The range of weights and mean weights are displayed in Figure 24 and Table 14 respectively.

Table 14 The mean weight of recorded catches associated with shore gathering activity in the Portsmouth Harbour SPA.

Species	Mean Weight (kg)
Cockle	15.00
Manila Clam	32.00
Mixed Shellfish	30.00

3.4.5 Recorded Offences within the SPA

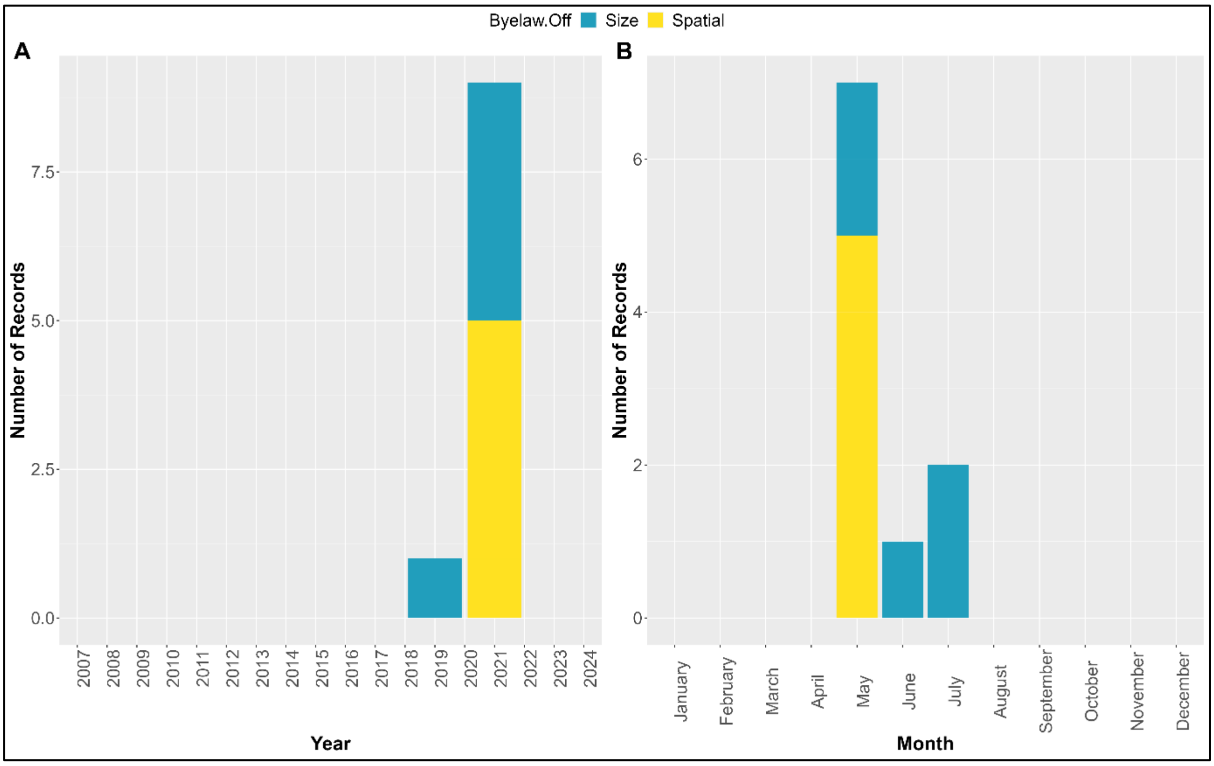


Figure 25 Recorded offences and the theme of infringment in the Portsmouth Harbour SPA.

Figure 25 displays all recorded offences related to shore gathering activity within the Portsmouth Harbour SPA. A peak record of offences occurred in 2021, 5 spatial and 4 MCRS offences. Regulations relating to shore gathering activity in the Portsmouth Harbour SPA are discussed in section 3.4.2 and 6.

3.5 Chichester and Langstone Harbour SPA

3.5.1 Designated Features of the SPA

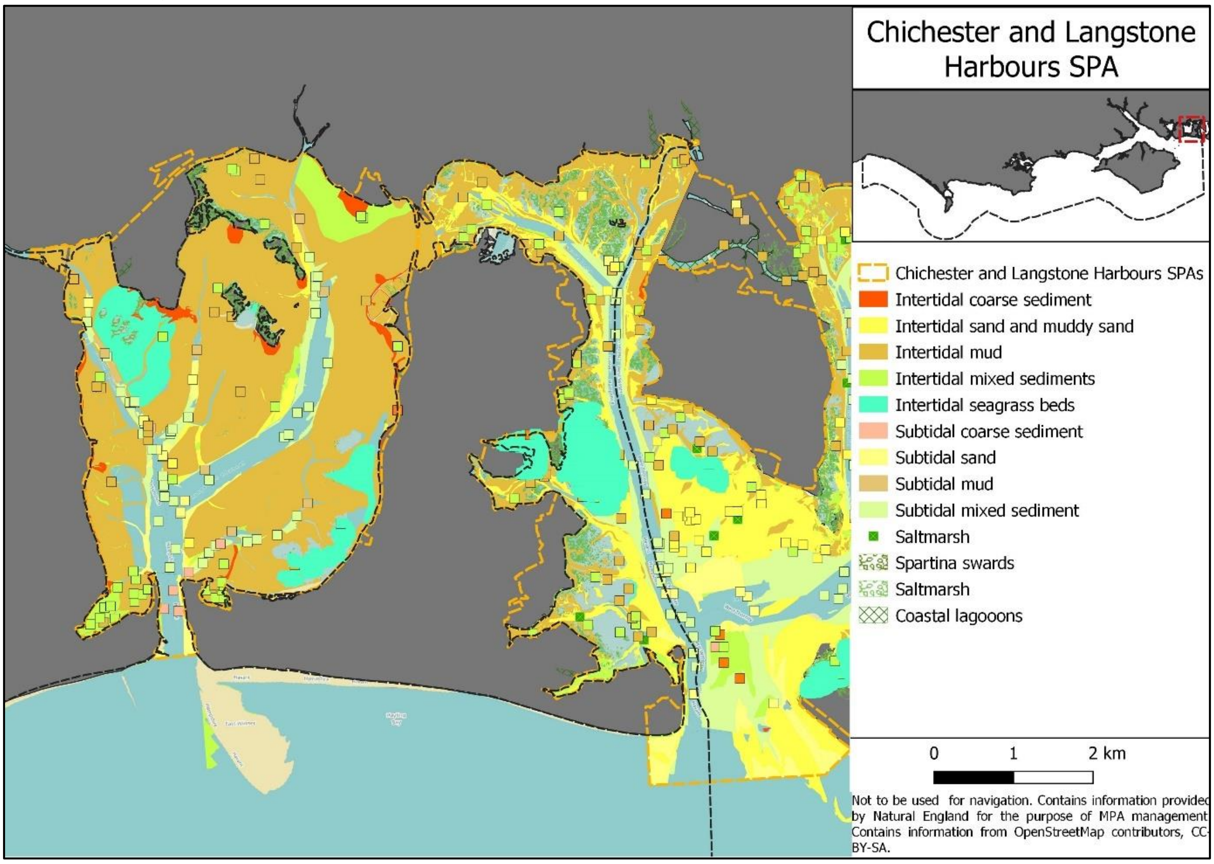


Figure 26 The location and extent of the supporting habitats of the Chichester and Langstone Harbour SPA (boundary shown by the dashed yellow line).

Chichester and Langstone Harbour covers two estuary basins with large mudflats and sandflats. The habitats support large numbers of overwintering birds with the SPA covering an area of 58 km^2. The qualifying features and supporting habitats are displayed in Figure 26 and Table 15.

Table 15 Qualifying habitats and their supporting habitats within Chichester and Langstone SPA.

Qualifying Features	Bar-tailed godwit (*Limosa lapponica*), Non-breeding
	Common tern (*Sterna hirundo*), Breeding
	Curlew (*Numenius arquata*), Non-breeding
	Dark-bellied brent goose (*Branta bernicla bernicla*), Non-breeding
	Dunlin (*Calidris alpina alpina*), Non-breeding
	Grey plover (*Pluvialis squatarola*), Non-breeding
	Little tern (*Sternula albifrons*), Breeding
	Pintail (*Anas acuta*), Non-breeding
	Red-breasted merganser (*Mergus serrator*), Non-breeding
	Redshank (*Tringa totanus*), Non-breeding
	Ringed plover (*Charadrius hiaticula*), Non-breeding
	Sanderling (*Calidris alba*), Non-breeding
	Sandwich tern (*Thalasseus* sandvicensis), Breeding
	Shelduck (*Tadorna tadorna*), Non-breeding
	Shoveler (*Spatula clypeata*), Non-breeding

	Teal (*Anas crecca*), Non-breeding
	Turnstone (*Arenaria interpres*), Non-breeding
	Waterbird assemblage, Non-breeding
	Wigeon (*Mareca penelope*), Non-breeding
	Shoveler (*Spatula clypeata*), Non-breeding
Supporting Habitats	Coastal Lagoon
	Coastal Reedbed
	Freshwater and Coastal Grazing Marsh
	Salicornia and Other Annuals Colonising Mud and Sand
	Atlantic Salt Meadows
	Spartina Swards
	Intertidal Seagrass Beds
	Intertidal Rock
	Intertidal Coarse Sediment
	Intertidal Mixed Sediments
	Intertidal Mud
	Intertidal Sand and Muddy Sand
	Subtidal Coarse Sediment
	Subtidal Mixed Sediment
	Subtidal Mud
	Subtidal Sand
	Water Column

3.5.2 Existing Shore Gathering Management Specific to the SPA

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds No person shall dig for or take sea fisheries resources from any prohibited area nor be in the prohibited areas with an rake, spade, fork or similar tool. Areas 1-7 are within the Chichester and Langstone Harbours SPA.

3.5.3 Shore Gathering activity in the SPA

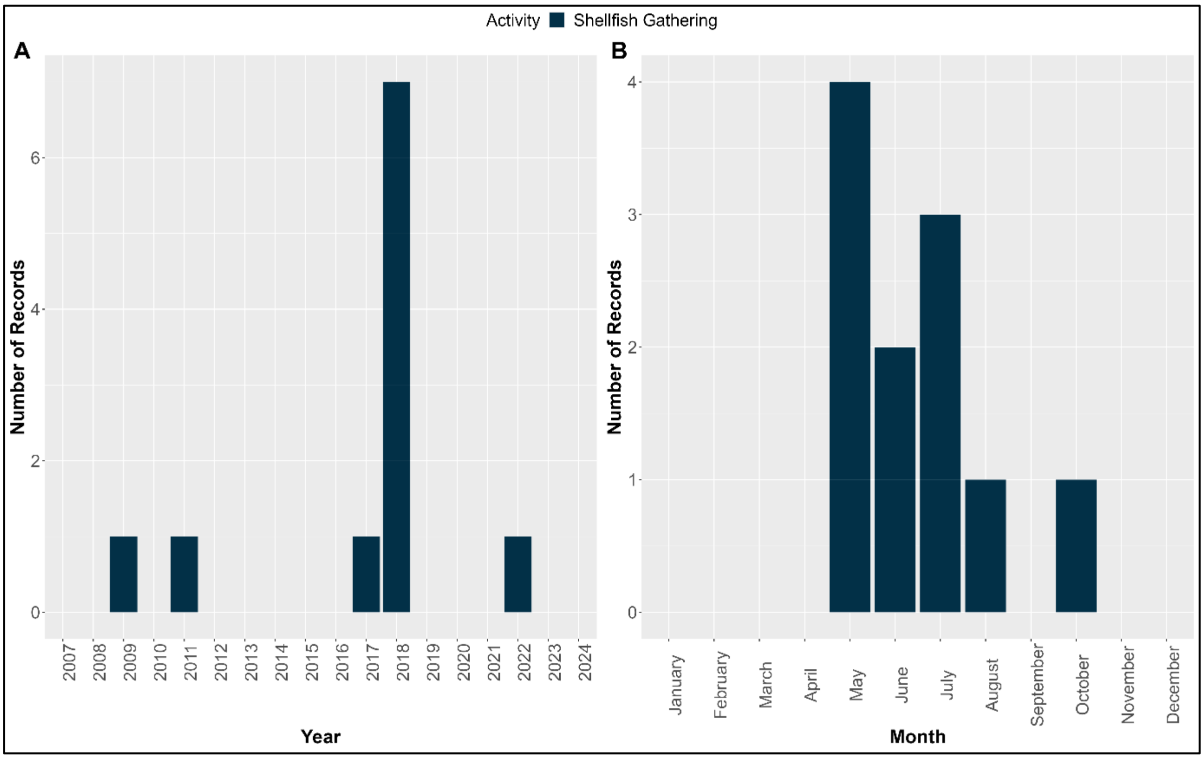


Figure 27 Records of shoregathering activity occuring in the Chichester and Langstone Harbour SPA.

Figure 27 displays all records of shore gathering activity occurring within the Chichester and Langstone Harbour SPA. Activity in the Chichester and Langstone Harbours SPA is limited to shellfish gathering with a peak in 2018 of 6 records.

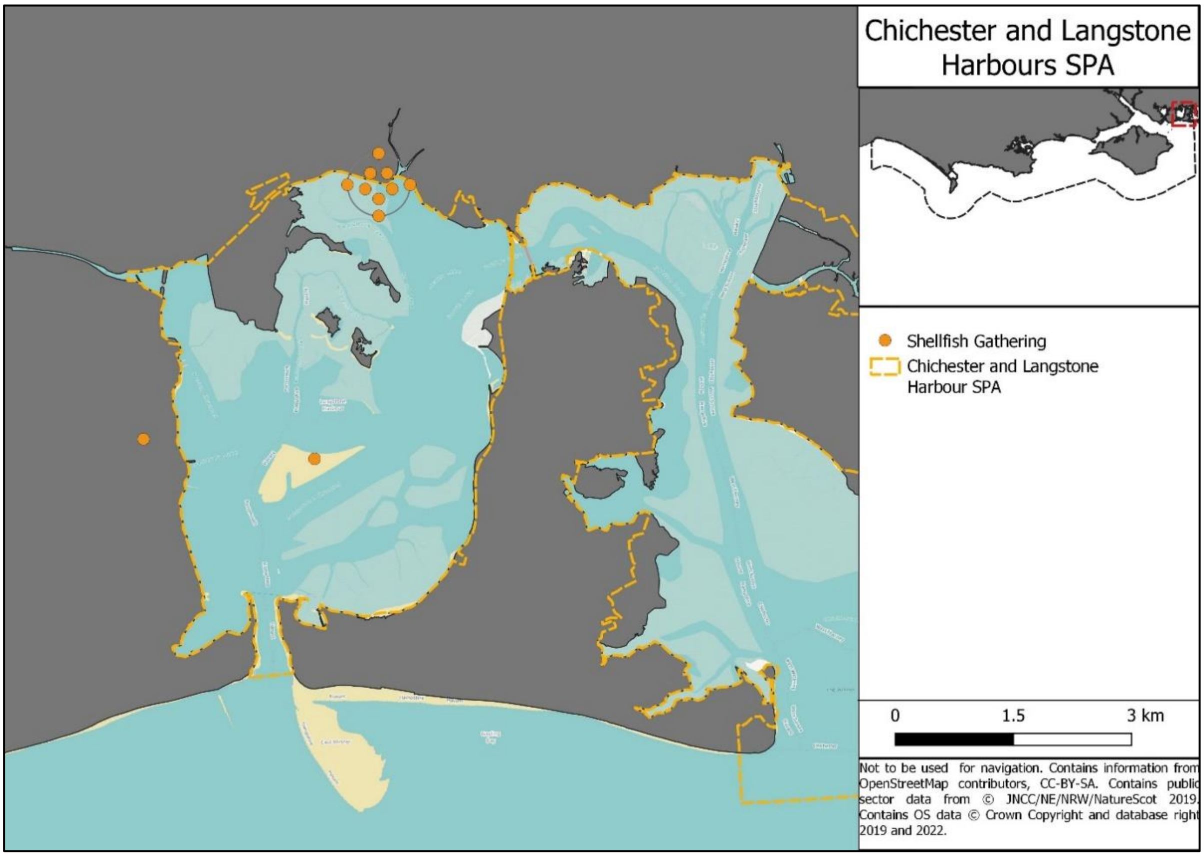


Figure 28 Spatial distribution of all shore gathering activity observed by Southern IFCA in the Chichester and Langstone Harbour SPA (boundary shown by the dashed yellow line) as of October 2023.

Figure 28 displays the Spatial distribution of all shore gathering activity observed by Southern IFCA in the Chichester and Langstone Harbours SPA. The area with the highest density of activity is between Chaldock Lake and Broadmarsh Coastal Park.

3.5.4 Recorded catches within the SPA

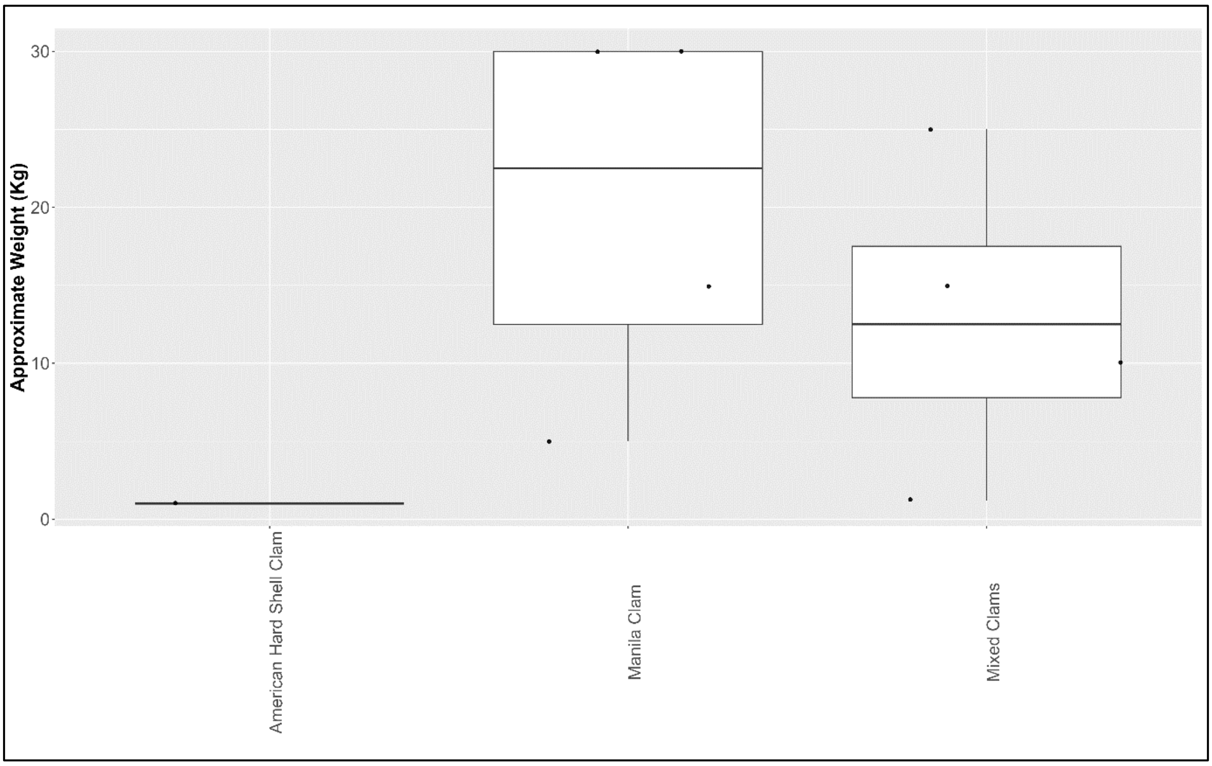


Figure 298 Approximate weight of catch associated with shore gathering activity in the Chichester and Langstone Harbour SPA.

Figure 29 and Table 16 display a summary of recorded catch weights from shore gathering activity within the Chichester and Langstone Harbour SPA.

Table 16 The mean weight of recorded catches associated with shore gathering activity in the Chichester and Langstone Harbour SPA.

Species	Mean Weight (kg)
American Hard-Shell Clam	1.00
Manila Clam	20.00
Mixed Clams	12.80

3.5.5 Recorded Offences within the SPA

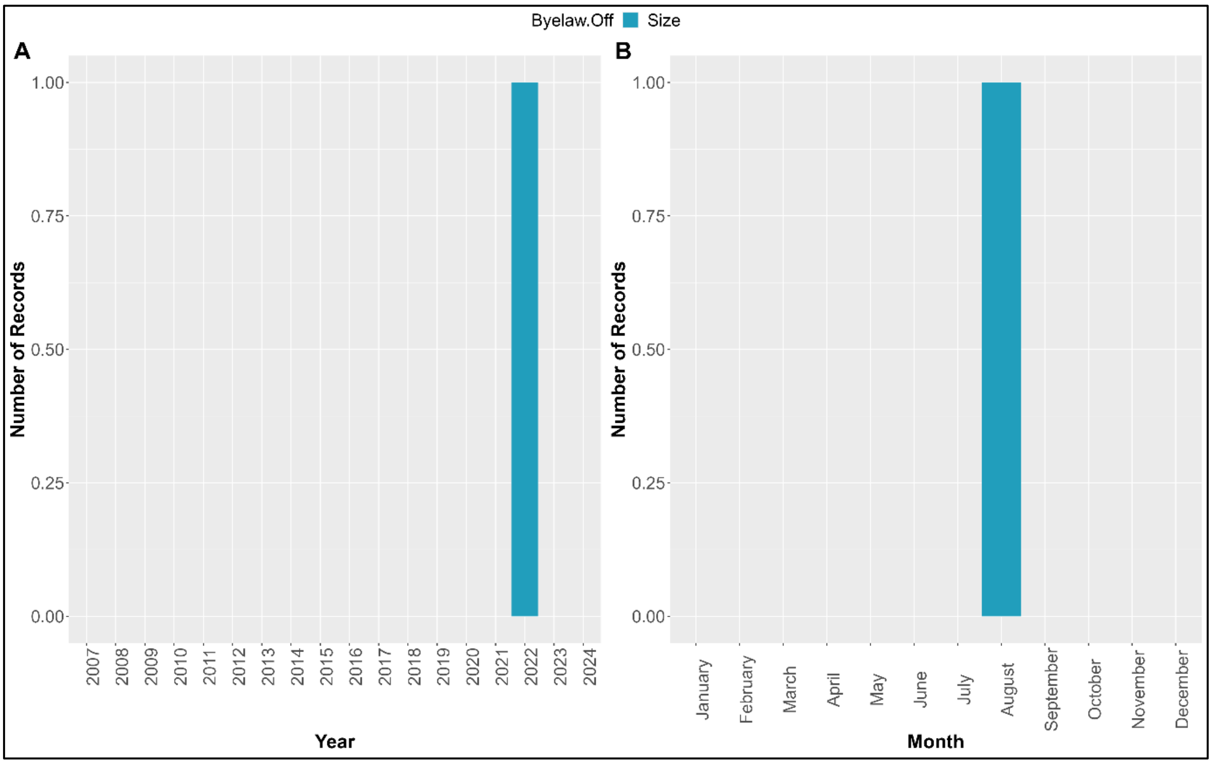


Figure 30 Recorded offences and the theme of infringment in the Chichester and Langstone Harbour SPA.

There has been only one recorded offence associated with shore gathering activity in the Chichester and Langstone Harbour SPA. The offence is displayed in Figure 30 and relates to a MCRS infringement.

4. Special Areas of Conservation (SAC)

4.1 Lyme Bay and Torbay SAC

4.1.1 Qualifying Features of the SAC

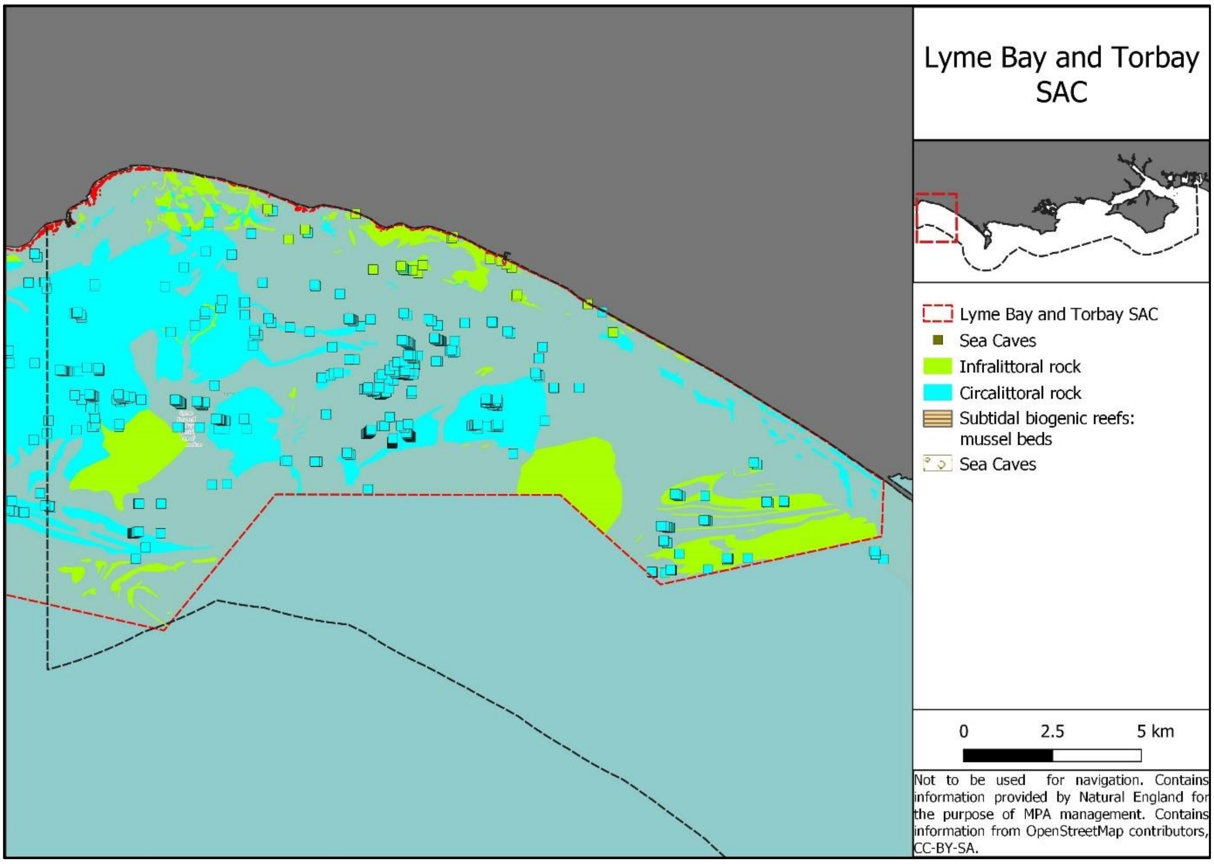


Figure 31 The location and extent of the supporting habitats of the Lyme Bay and Torbay SAC (boundary shown by the dashed red line).

The Lyme Bay and Torbay SAC cover an area of 31 km^2; the SAC overlays the Devon & Severn and Southern IFCA boundary. The area within the Southern IFCA district encloses the Lyme Bay Reefs[9]. The qualifying features of the SAC are displayed in Figure and Table .

Table 17 Qualifying Features of the Lyme Bay and Torbay SAC.

Qualifying Features	Reefs
	Submerged or Partially submerged sea caves

4.1.2 Shore Gathering activity in the SAC

As of October 2023, there has been evidence available on the location of shore gathering activities occurring in the Lyme Bay and Torbay SAC.

[9] https://designatedsites.naturalengland.org.uk/

4.1.3 Recorded catches within the SAC

As of October 2023, there has been evidence available on the catch composition of shore gathering activities occurring in the Lyme Bay and Torbay SAC.

4.1.4 Recorded Offences within the SAC

As of October 2023, there has been no recorded offences linked to shore gathering activities occurring in Lyme Bay and Torbay SAC.

4.2 Chesil and the Fleet SAC

4.2.1 Qualifying Features of the SAC

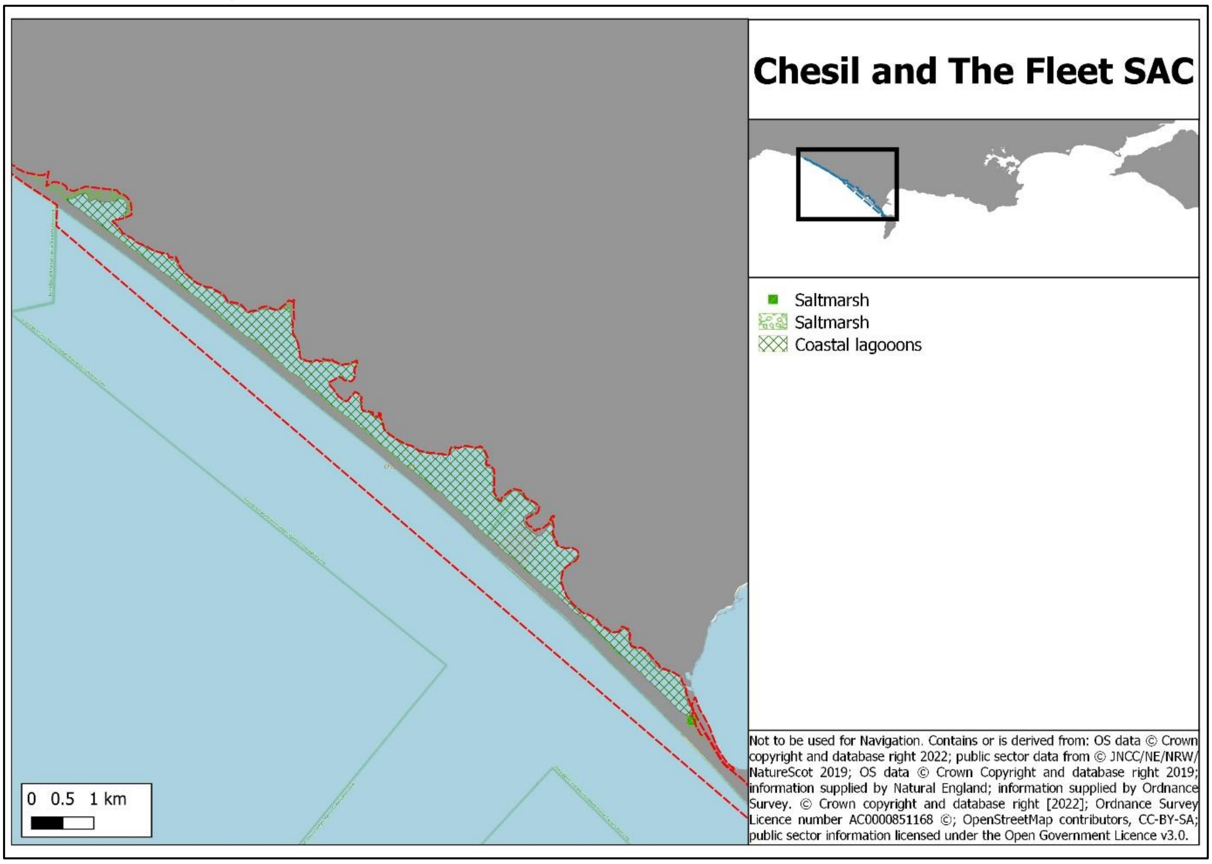


Figure 32 The location and extent of the supporting habitats of the Chesil and The Fleet SAC (boundary shown by the dashed red line).

The Chesil and the Fleet SAC covers an area of 16 km^2. The Fleet supports the largest diversity of species and habitat of any coastal lagoon in the UK [10] and aside from the entrance at the southeastern end, The Fleet is largely sheltered from waves and tidal processes[11]. The qualifying features and their supporting habitats are displayed in Figure 32 and Table 18.

[10] Bamber, R. N. 1997. Assessment of saline lagoons within Special Areas of Conservation (SACs). Peterborough: English Nature.
[11] https://designatedsites.naturalengland.org.uk/

Table 18 The qualifying features of Chesil and the Fleet SAC.

Qualifying Features	Annual vegetation of drift lines
	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
	Coastal lagoons
	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)
	Perennial vegetation of stony banks

4.2.2 Existing Shore Gathering Management Specific to the SAC

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds. No person shall dig for or take sea fisheries resources from any prohibited area nor be in the prohibited areas with an rake, spade, fork or similar tool. Areas 29 are within the Chesil and the Fleet SAC.

4.2.3 Shore Gathering activity in the SAC

As of October 2023, there has been evidence available on the location of shore gathering activities occurring in the Chesil and The Fleet SAC.

4.2.4 Recorded catches within the SAC

As of October 2023, there has been evidence available on the level of catch associated with shore gathering activities occurring in the Chesil and The Fleet SAC.

4.2.5 Recorded Offences within the SAC

As of October 2023, there have been no recorded offences related to shore gathering activities in the Chesil and The Fleet SAC.

4.3 Studland to Portland SAC

4.3.1 Qualifying Features of the SAC

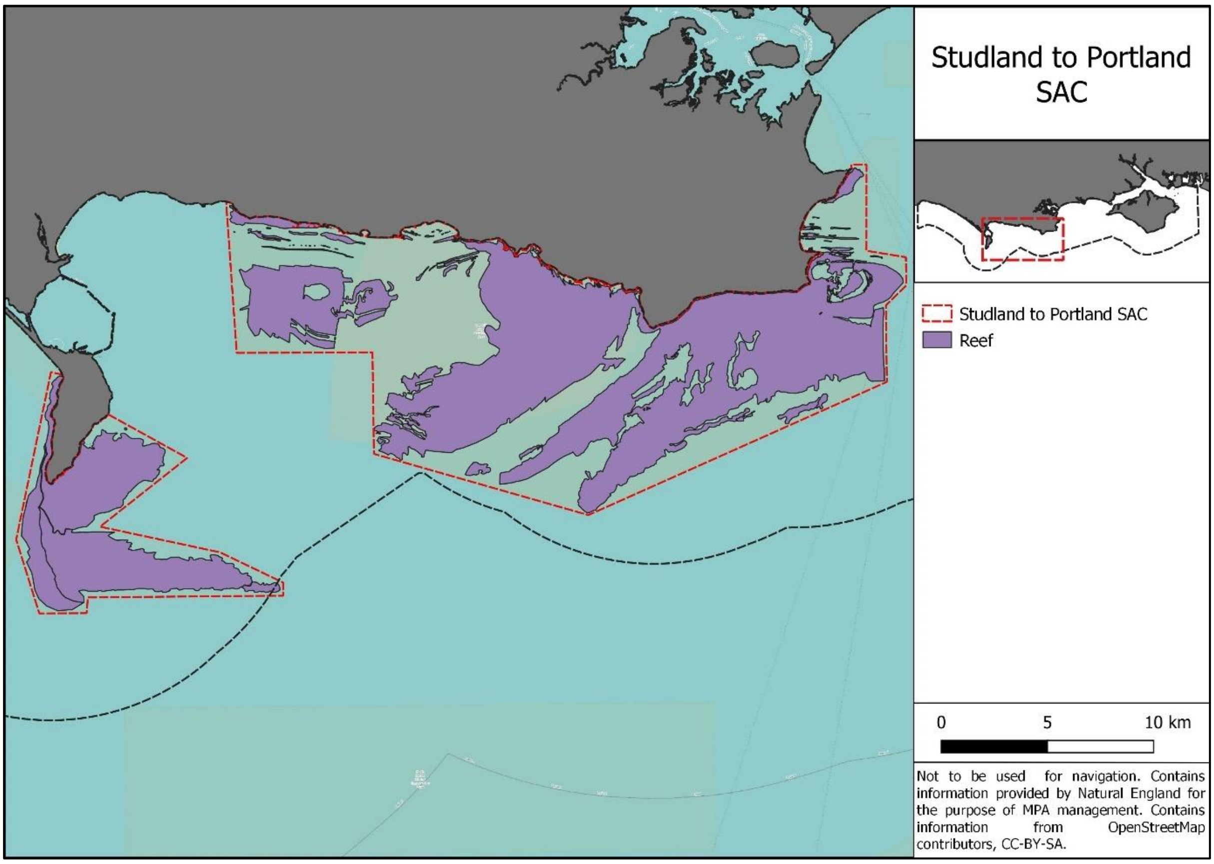


Figure 33 The location and extent of the supporting habitats of the Studland to Portland SAC (boundary shown by the dashed red line).

The Studland to Portland SAC has covers the area from Studland Bay to Ringstead Bay as well as the area covering the Portland Reefs[12]. The total area covered by the SAC is 332 km^2 and the qualifying features are displayed in Figure 33 and Table 19.

Table 19 Qualifying features of the Studland to Portland SAC.

Qualifying Features	Reefs

4.3.2 Shore Gathering activity in the SAC

As of October 2023, there has been evidence available on the location of shore gathering activities occurring in the Lyme Bay and Torbay SAC.

4.3.3 Recorded catches within the SAC

As of October 2023, there has been evidence available on the catch composition of shore gathering activities occurring in the Studland to Portland SAC.

4.3.4 Recorded Offences within the SAC

As of October 2023, there has been no recorded offences linked to shore gathering activities occurring in Studland to Portland SAC.

[12] https://designatedsites.naturalengland.org.uk/

4.4 Solent Maritime SAC

4.4.1 Qualifying Features of the SAC

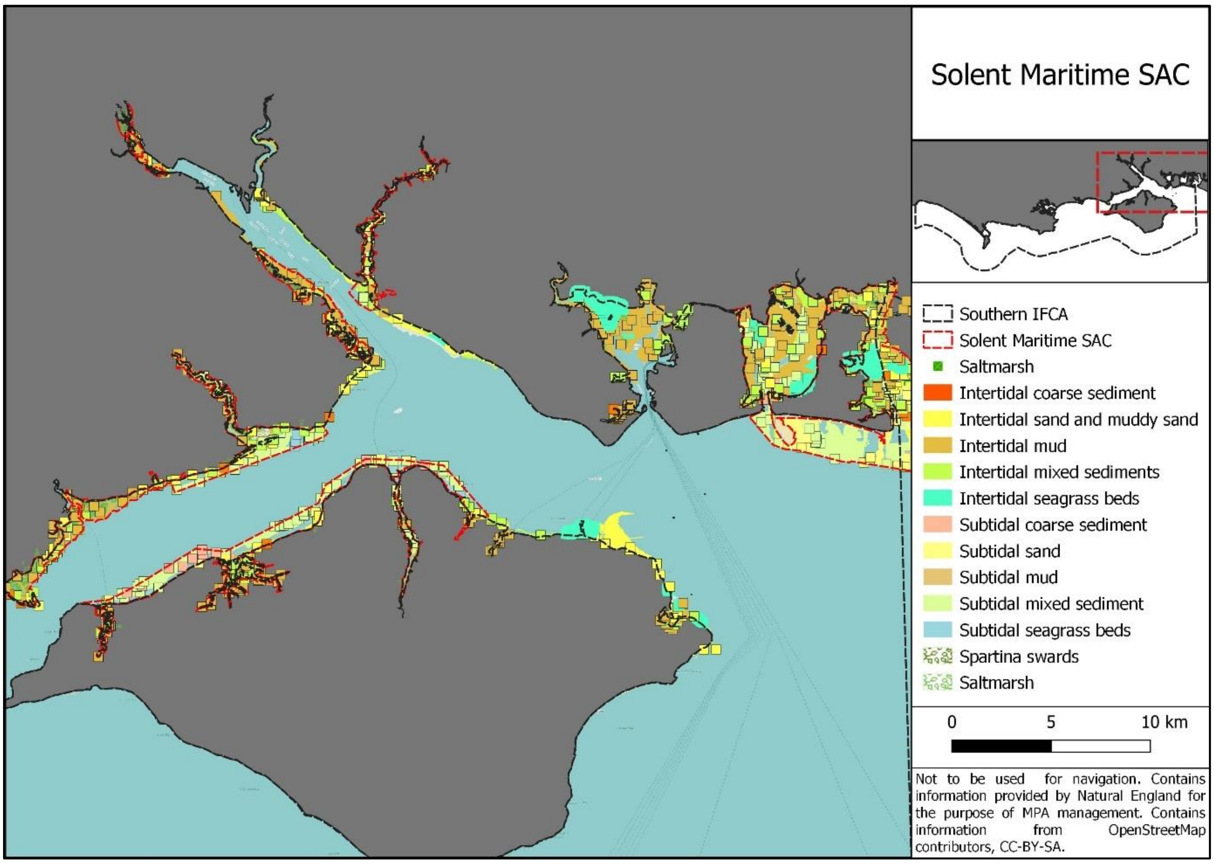


Figure 34 The location and extent of the supporting habitats of the Solent Maritime SAC (boundary shown by the dashed red line).

The Solent Maritime SAC covers a large range of estuarine and marine habitats and an area of 113 km^2 [13]. The qualifying features are displayed in Figure 34 and Table 20.

Table 20 Qualifying features of the Solent Maritime SAC.

Qualifying Features	Annual Vegetation Of Drift Lines
	Atlantic Salt Meadows (*Glauco-Puccinellietalia maritimae*)
	Coastal Lagoons
	Desmoulin's Whorl Snail (*Vertigo moulinsiana*)
	Estuaries
	Mudflats And Sandflats Not Covered By Seawater At Low Tide
	Perennial Vegetation Of Stony Banks
	Salicornia And Other Annuals Colonising Mud And Sand
	Sandbanks Which Are Slightly Covered By Sea Water All The Time
	Shifting Dunes Along The Shoreline With *Ammophila arenaria* ("White Dunes")

[13] https://designatedsites.naturalengland.org.uk/

	Spartina Swards (*Spartinion maritimae*)

4.4.2 Existing Shore Gathering Management Specific to the SAC

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds. No person shall dig for or take sea fisheries resources from any prohibited area nor be in the prohibited areas with an rake, spade, fork or similar tool. Areas 23-25 are within or overlap the Solent Maritime SAC.

4.4.3 Shore Gathering activity in the SAC

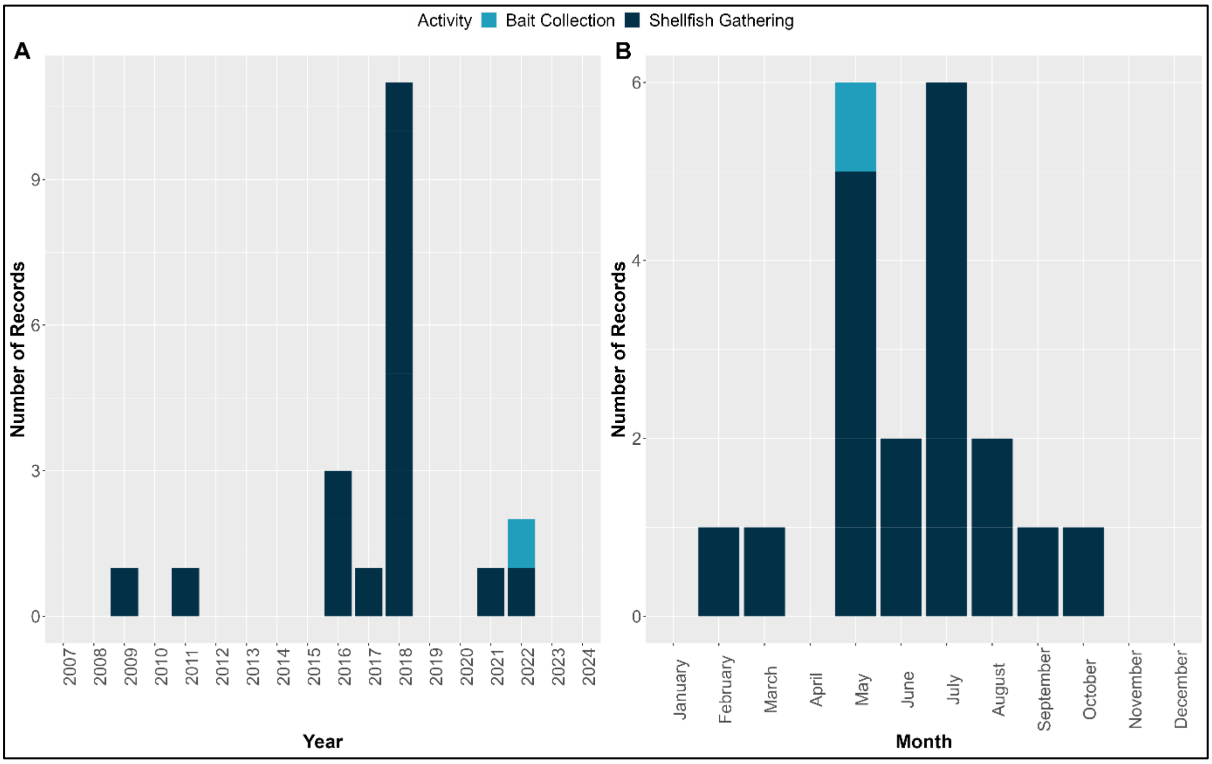


Figure 35 Records of shoregathering activity occuring in the Solent Maritime SAC.

Figure 35 displayed the annual and monthly trends in shore gathering activity. The most popular activity is shellfish gathering with peak in 2018 and the month of July.

Figure 36 displays the spatial distribution of all shore gathering activity observed by Southern IFCA in the Solent Maritime SAC as of October 2023. The SAC overlaps with the Solent and Southampton Water SPA as well as the Chichester and Langstone Harbours SPA, therefore the areas with highest density of activity are the same; Hill Head and between Chaldock Lake and Broadmarsh Coastal Park.

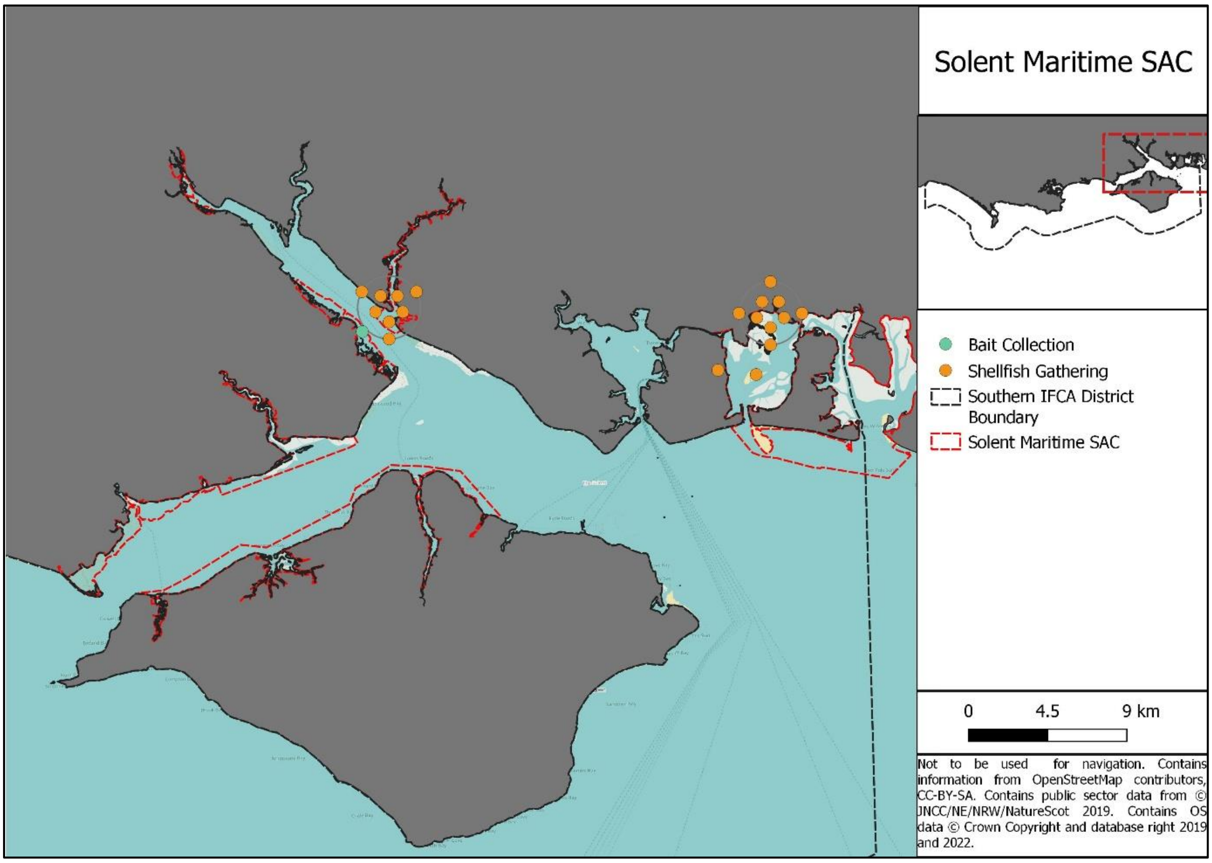


Figure 36 Spatial distribution of all shore gathering activity observed by Southern IFCA in the Solent Maritime SAC (boundary shown by the dashed red line) as of October 2023.

4.4.4 Recorded catches within the SAC

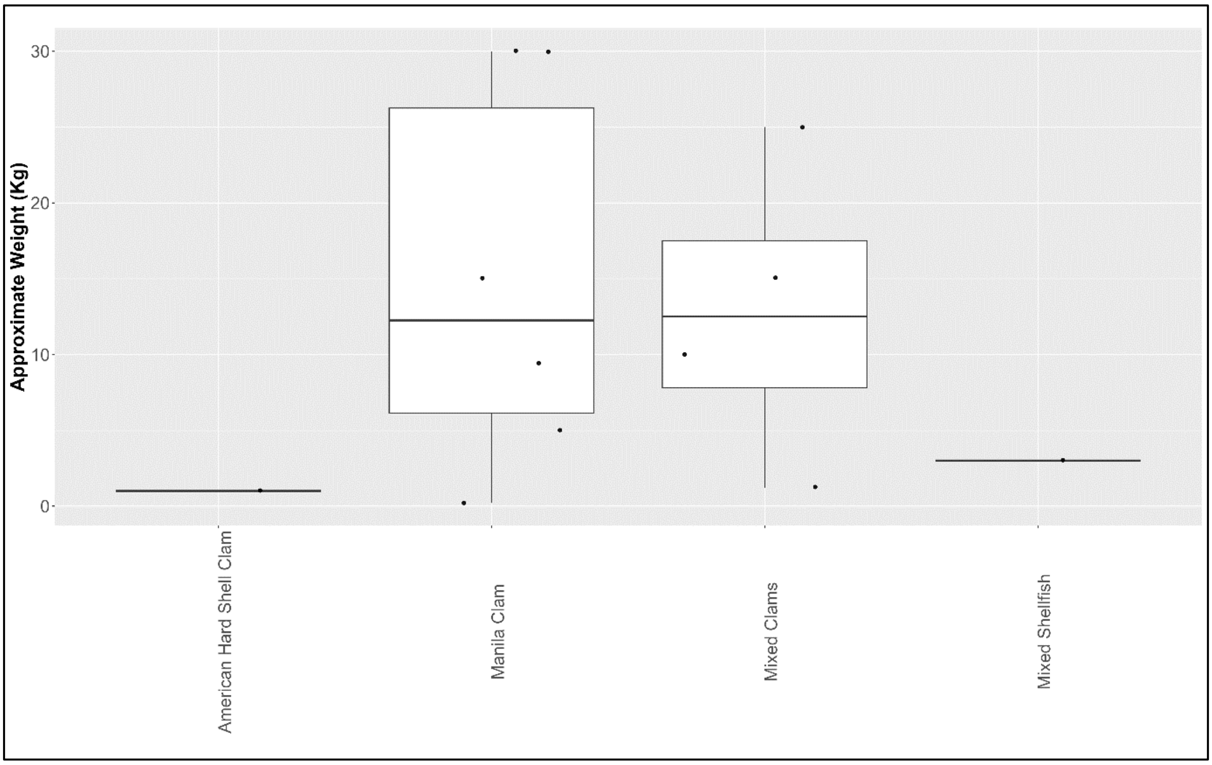


Figure 37 Approximate weight of catch associated with shore gathering activity in the Solent Maritime SAC.

Figure 37 and Table 21 display a summary of catch weights recorded in the Solent Maritime SAC.

Table 21 The mean weight of recorded catches associated with shore gathering activity in the Solent Maritime SAC.

Species	Mean Weight (kg)
American Hard-Shell Clam	1.00
Manila Clam	14.95
Mixed Clams	12.80
Mixed Shellfish	3.00

4.4.5 Recorded Offences within the SAC

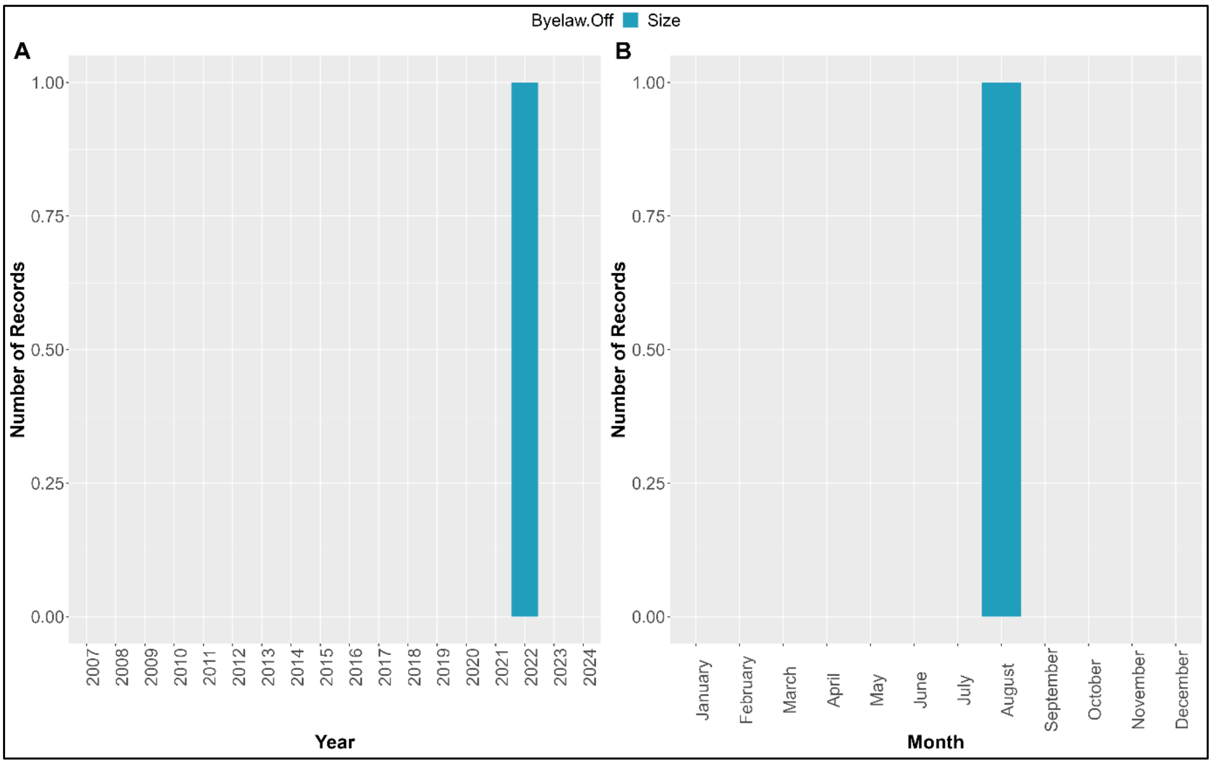


Figure 38 Recorded offences and the theme of infringment in the Solent Maritime SAC.

There has been one recorded offence in the Solent Maritime SAC (Figure 38). This occurred in August 2022 and was a MCRS related infringement related to shore gathering activity.

4.5 South Wight Maritime SAC

4.5.1 Qualifying Features of the SAC

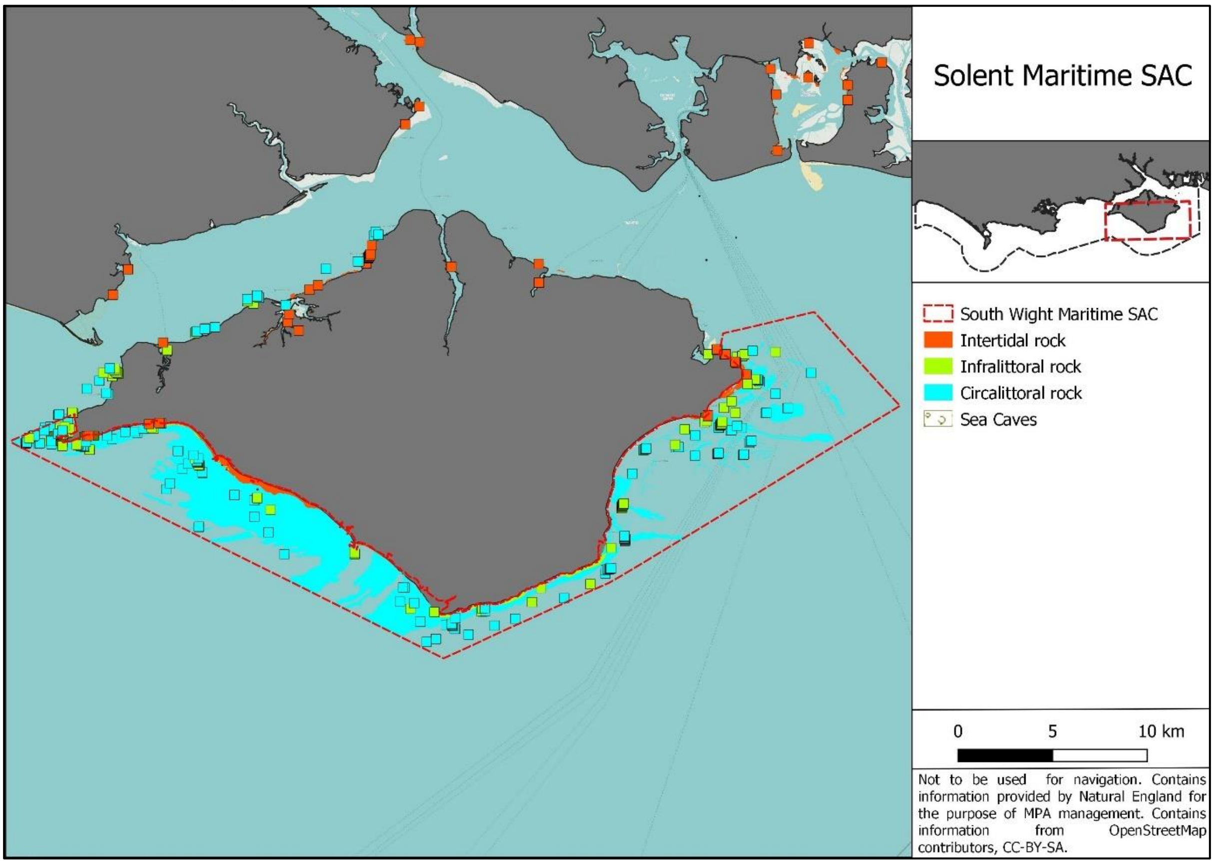


Figure 39 The location and extent of the supporting habitats of the South Wight Maritime SAC (boundary shown by the dashed red line).

The South Wight Maritime SAC covers an area of 199 km^2, running the full length of the south coast of the Isle of Wight from The Needles to Bembridge. The area covers extensive reef and sea cave systems[14]. The qualifying features of the SAC are displayed in Figure 39 and Table 22.

Table 22 Qualifying features of the South Wight Maritime SAC

Qualifying Features	Submerged or partially submerged sea caves
	Vegetated sea cliffs of the Atlantic and Baltic coasts
	Circalittoral Rock
	Infralittoral Rock
	Intertidal Rock
	Subtidal Stony Reef

4.5.2 Existing Shore Gathering Management Specific to the SAC

The Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw defines a schedule of 29 prohibited areas within the district to protect seagrass beds. No person shall

[14] https://designatedsites.naturalengland.org.uk/

dig for or take sea fisheries resources from any prohibited area. Areas 17-19 are within or overlap the South Wight Maritime SAC.

4.5.3 Shore Gathering activity in the SAC

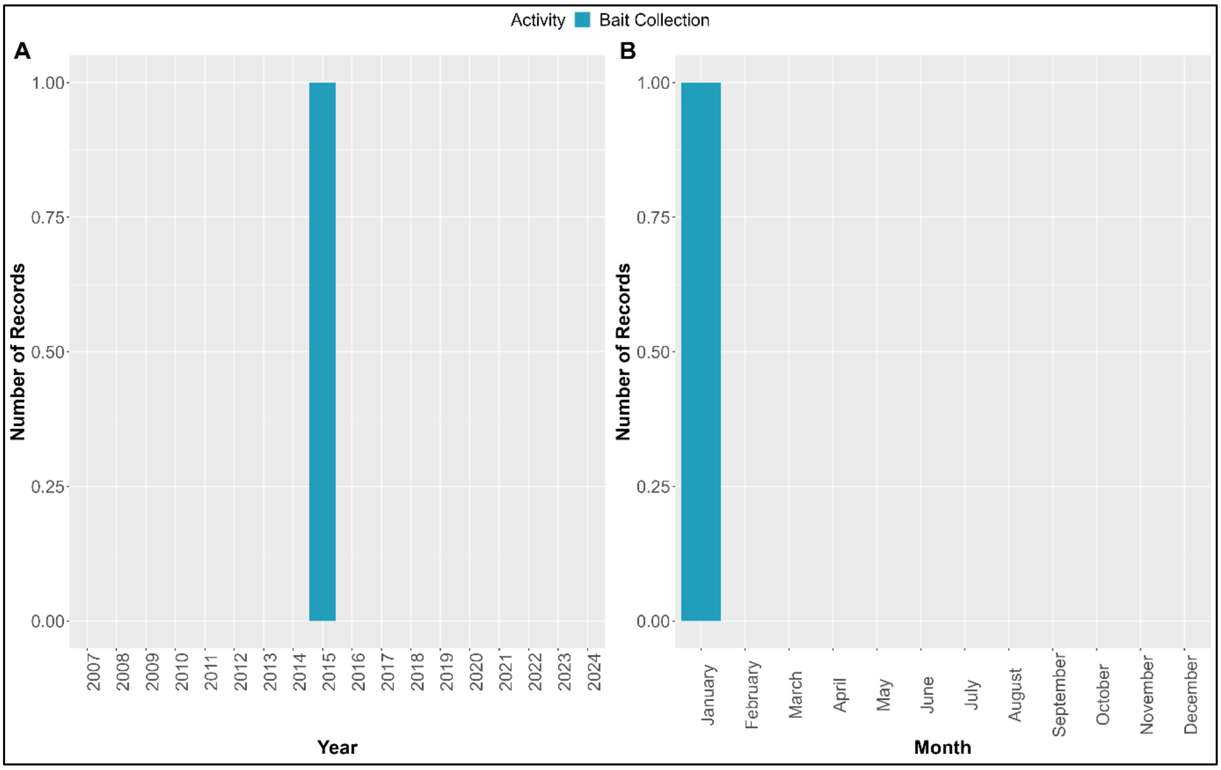


Figure 40 Records of shoregathering activity occuring in the South Wight Maritime SAC.

Figure 40 displays the only recorded occurrence of shore gathering activity in the South Wight Maritime SAC. This was bait digging and occurred in January 2015. Figure 41 displays the location of this activity.

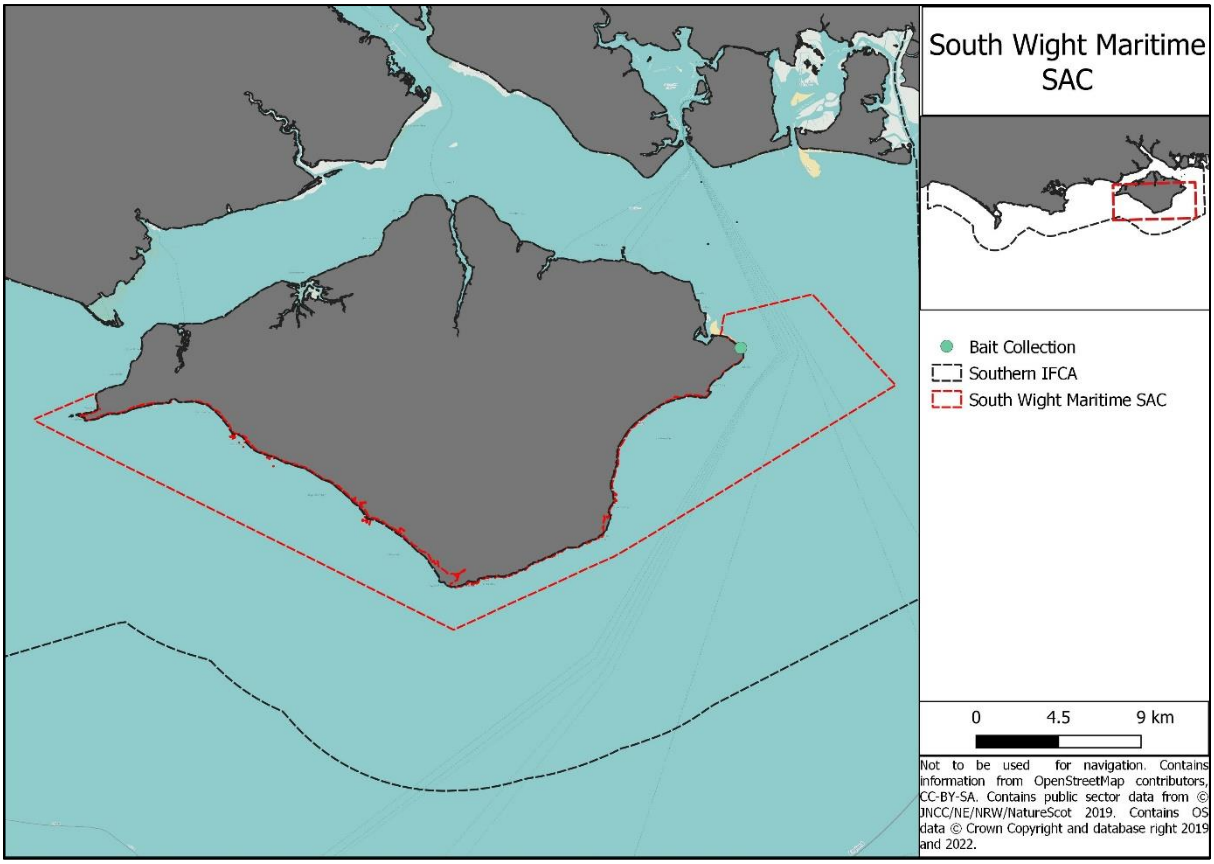


Figure 41 Spatial distribution of all shore gathering activity observed by Southern IFCA in the South Wight Maritime SAC (boundary shown by the dashed red line) as of October 2023.

4.5.4 Recorded catches within the SAC

As of October 2023, there has been evidence available on the level of catch associated with shore gathering activities occurring in the South Wight Maritime SAC.

4.5.5 Recorded Offences within the SAC

As of October 2023, there have been no recorded offences related to shore gathering activities in the South Wight Maritime SAC.

5. Combined MPA Summary of Activity, Catch and Offences

5.1 Shore Gathering activity in all relevant MPAs

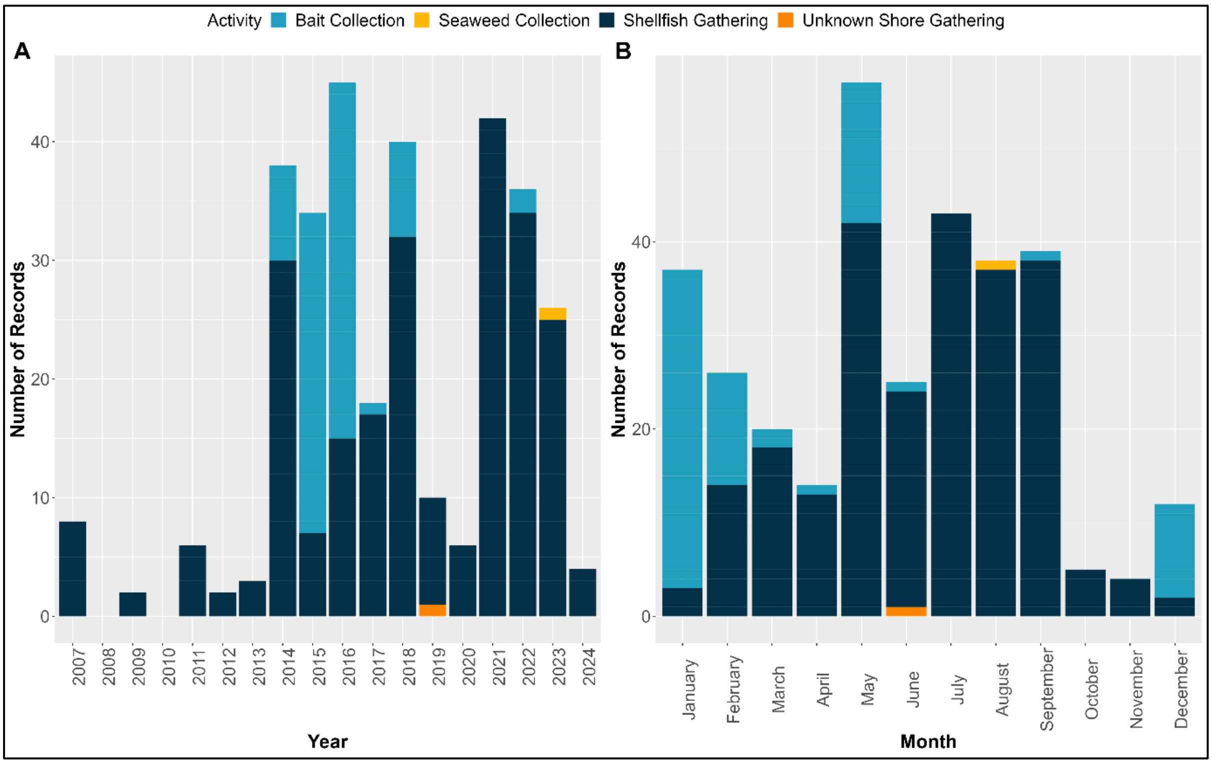


Figure 42 Information on shore gathering activity across the district.

Figure contains information on all shore gathering activity occurring within National Site Network Sites across the Southern IFCA District. Shore Gathering activity appears to peak in 2016 and 2021, with shellfish gathering being the most popular activity, followed by bait digging. Shore gathering activity most commonly occurs in the summer months from May to September.

5.2 Recorded catches in all relevant MPAs

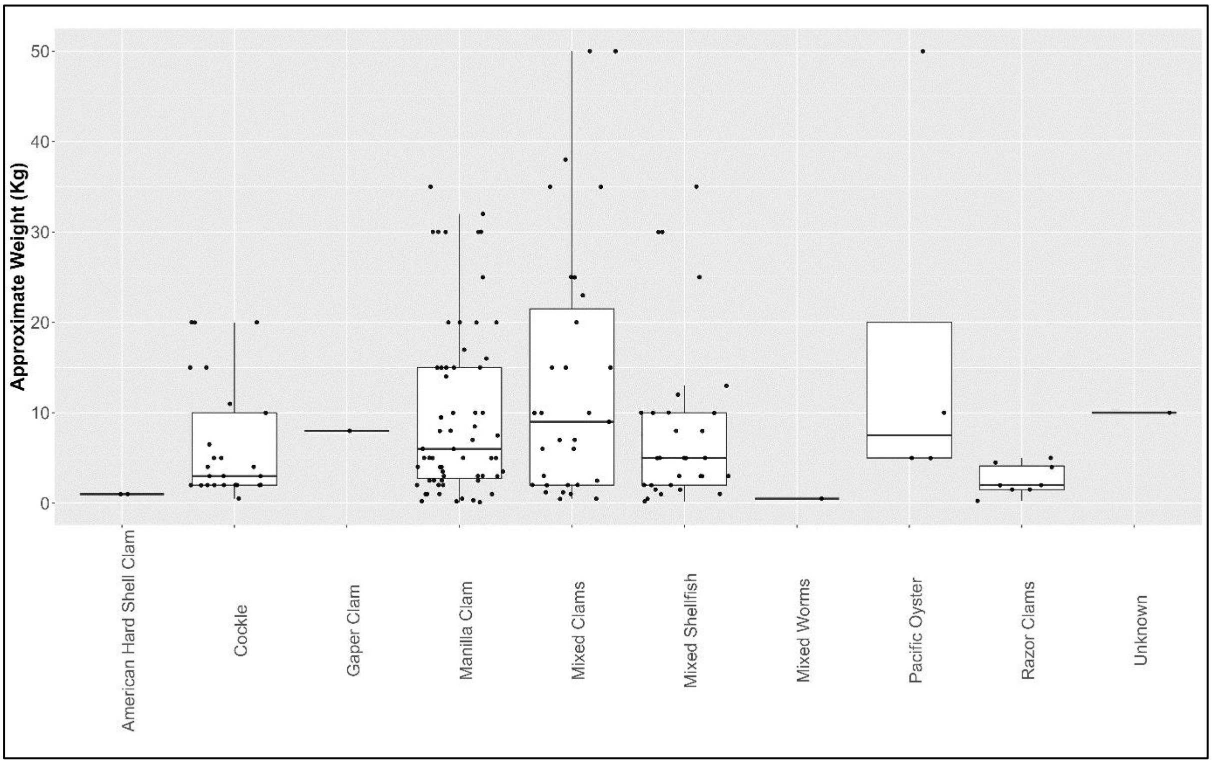


Figure 43 Approximate weight of catch associated with shore gathering activity across all MPAs in the district.

Figure 43 and Table 23 display a summary of catch weights recorded across all MPAs in the district.

Table 23 The mean weight of recorded catches associated with shore gathering activity in the Solent Maritime SAC.

Species	Mean Weight (kg)
American Hard-Shell Clam	1.00
Cockle	6.52
Gaper Clam	8.00
Manilla Clam	9.94
Mixed Clams	13.83
Mixed Shellfish	8.32
Mixed Worms	0.50
Pacific Oyster	17.50
Razor Clams	2.59
Unknown	10.00

5.3 Recorded Offences in all MPAs

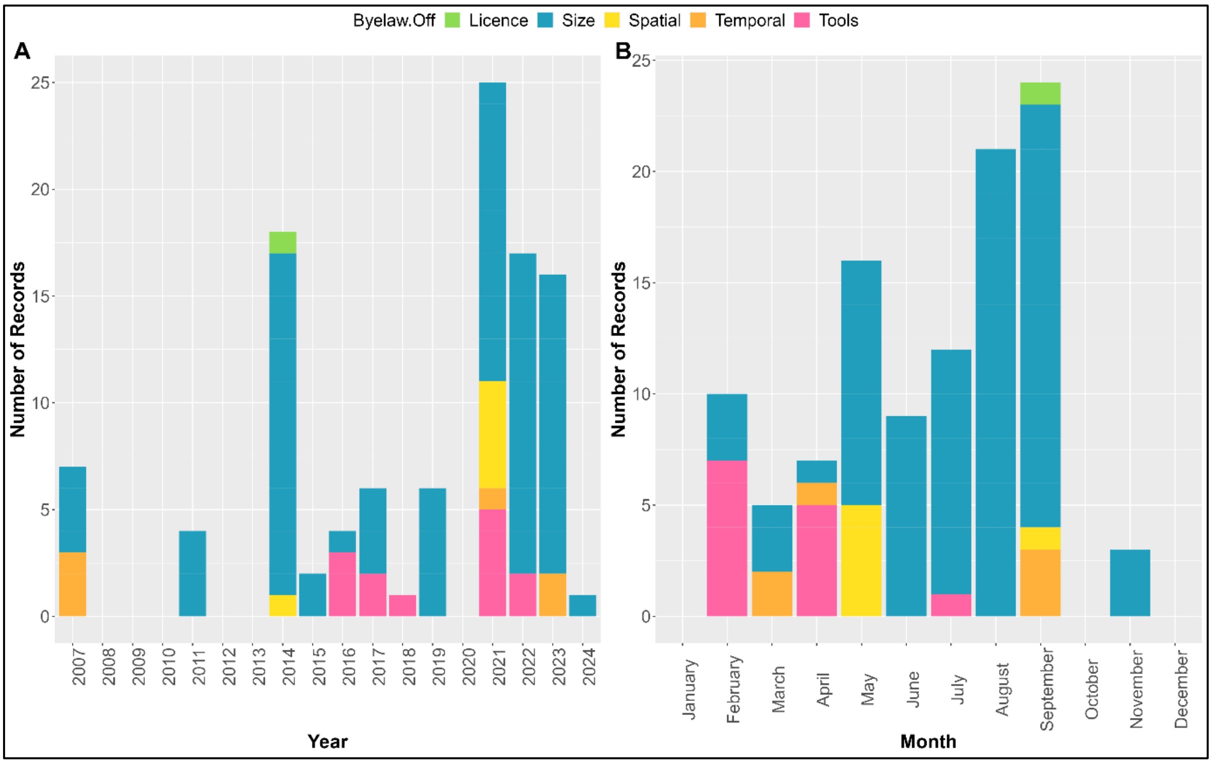


Figure 44 Recorded offences and the theme of infringment across all MPAs in the district.

Figure 44 displays a summary of shore gathering related offences within the district. The most common offences relate to MCRS. Peaks in offences occurred in 2021 increase through the summer months from July to September.

6. District Wide Management Relating to Shore Gathering

Byelaw	Description
Minimum Conservation Reference Size Byelaw	*A person must not take, retain on board, tranship, land, transport, store, sell, display or offer for sale from a fishery within the District, any fish or shellfish species specified in the schedules which measure less than the minimum conservation reference size specified in the schedule. Any such fish or shellfish must be returned to the sea immediately.*
Periwinkles Byelaw	*No person shall take from a fishery any periwinkles between the 15th May and 15th September inclusive. No person shall take periwinkles except by hand picking.*
Oysters Close Season Byelaw	*No person shall take oysters from a fishery from 1st March to 31st October in any year, both days inclusive. Oyster cultivation exceptions apply. This applies to Native Oysters only.*
Temporary Closure of Shellfish Beds Byelaw	*Where any shellfish bed is depleted and requires closure to recover, the Committee may establish a temporary shellfish bed closure, wherein no person may take shellfish from the defined shellfish bed*
Fishing for Cockles	*A person must not take from a fishery a cockle between 1st February and 30th April inclusive. A person must not*

	remove a cockle from a fishery, unless complying with the gear restrictions and minimum size requirements.
Fishing for Oysters, Mussels, and Clams Byelaw	*Oysters, Mussels, and Clams may only be fished for by handpicking or dredging.*
Scallop Fishing Byelaw 2019	*No person may fish for or take any scallop from a fishery before 0700 and after 1900 local time. This does not apply in The Solent, where a person must not fish for or take any scallop from any fishery on any day before 0600 local time or after 1800 local time.*
Oysters	*No person shall remove an oyster (other than Portuguese or Pacific Oysters) that will pass through a circular ring of 70mm diameter or any cultch for young Oysters to grow on.*
Mussels	*No person shall remove from a fishery a mussel measuring less than 50mm in length. Mussel cultivation exceptions apply with permission from Southern IFCA.*
Redeposit of Shellfish	*Any person who takes shellfish from a fishery within the Southern IFCA district where the removal or possession of it is prohibited, should return the shellfish to the fishery, as near as possible to the place it was taken.*

Southern Inshore Fisheries and Conservation Authority

Shore Gathering
Literature Review

Supporting Document as part of the Shore Gathering Review

Contents

Section A: Introduction to the Literature Review

This Literature Review is a supporting document for the development of management for shore gathering activities in the Southern IFCA district.

This document uses best available evidence, namely peer reviewed papers and reports, to ensure that sound scientific evidence is used to inform assessments of relevant activities. The Literature Review is provided in two sections, general impacts which relate to multiple activities and potential impacts which relate to a specific shore gathering activity. Under the sections for specific activities, an overview is also provided of how that activity is carried out. The document also highlights where specific studies have been carried out and whether these have been conducted in the UK or outside the UK.

Summary boxes have been provided at the end of each section to give an overview of the section content and key points.

This Literature Review is to be read in conjunction with the Southern IFCA Shore Gathering Review Conservation Assessment Package and Site Specific Evidence Package.

Section B: Literature Review

1. Potential Impacts from Shore Gathering Activities - General

1.1 Overview

- The gathering of fish and shellfish species has been carried out commercially and recreationally along the Dorset, Hampshire and Isle of Wight coasts for centuries.
- Harvesting consists of the removal of target species at low tide, either in selective collection such as hand gathering or collective harvesting using rakes or mechanical power.
- Frequently gathered species within the Southern IFCA District include the Manila Clam (*Ruditapes philippinarum),* the common cockle (*Cerastoderma edule),* Pacific oysters (*Magallana gigas)* and the bait worm species King ragworm (*Alitta virens*) and lugworm (*Arenicola marina*).
- Shore gathering activities which occur or have the potential to occur in the district are; bait digging/gathering, shellfish gathering, crab tiling, push netting, seaweed collection and mechanical harvesting (commonly for bait species but also potentially for shellfish species).

1.2 Removal of Target Species

- The removal of target species in shore gathering techniques reduces the target species population in the area. Species recoverability is determined by a number of characteristics including magnitude of pressure, species fecundity, environmental conditions, human interaction and life cycle (Hutchings, 2000; Kaiser *et al.,* 2006; Lotze, 2011).

- Similarly, removal of species can disrupt ecosystem balance and impact community structure. As a result, other species display fluctuations, dominant species may alter and habitat structure may change (Turner *et al.,* 1999; Rice, 2000; Kaiser *et al.,* 2000; Dernie *et al.,* 2003; Rossi *et al.,* 2007).
- Harvesting structurally significant species, such as kelps, causes habitat structural changes which may alter light availability throughout the water column and affect potential nursing and breeding sites. (Connolly, 1994; Auster and Langton, 1999; Turner *et al.,* 1999).
- Removal of target species has the potential to affect prey availability for predatory species, such as birds. This affects higher trophic levels via non-targeted removal (Tasker *et al.,* 2000; Sieben *et al.,* 2011; Montevecchi, 2023) and through the disruption of predator-prey interactions which may impact community compositions. For example, the removal of small bivalves and crustaceans can reduce foraging opportunities for shore birds and fish (Navedo *et al.,* 2008).
- Changes in prey availability can cause shifts in the location of populations of predator species. For example, bird species may move to areas where harvesting of prey species does not take place which could then lead to increased bird densities in these areas (Sutherland & Goss-Custard 1991; Goss-Custard and Verboven, 1993).
- A meta-analysis of studies on hand gathering techniques (and other fishing methods) found that data from the first 10 days following a disturbance showed a significant reduction in the abundance of annelids, however it was also noted that annelid worms and crustaceans appear to recover more quickly in comparison to molluscs (Clarke *et al.,* 2017). This was postulated to be related to sediment preferences and the relatively sedentary nature of molluscs compared to annelids and crustaceans where there is the potential for recolonisation of an area through adult migration as well as larval dispersal (Clarke *et al.,* 2017). It was noted that the localised nature of hand gathering activities would create an impact over a much smaller scale than other fishing activities but that the initial impact may be observed deeper within the sediment as hand worked equipment will often penetrate deeper than dredges (Clarke *et al.,* 2017).

Summary

- Direct removal of target species has the potential to lead to population declines of those species, in which recoverability is based on a number of conditions including magnitude of pressure, species fecundity, life cycle, human interactions and environmental conditions.
- Removal of target species may disrupt ecosystem balance and lead to impacts to other species populations, habitat changes and impact community structure. For example, predatory prey interactions may change, resulting in a change in behaviour of the predator species.
- Removal of structural species as seaweeds can alter habitat structure, which may impact the distribution of light throughout the water column and affect potential nursery and breeding sites.
- Impacts are species specific both in terms of the target species itself and the impact on any predatory species. Recovery is also species specific and is likely related to habitat type and methods of recolonisation by each species.

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1.3 Removal of non-target species

- Certain methods of shore-gathering have the potential to remove or disrupt non-target species, which play roles in intertidal food webs and ecosystem biodiversity (Nunes *et al*., 2011).
- Harvesting can cause sediment disturbance, resulting in the removal, damage, or mortality of epifauna and infauna in the surrounding sediment (Dernie *et al.,* 2003; Rossi *et al.,* 2007). This also applies to the exposure and excavating of individuals that are found below the surface of the substratum (Clarke *et al.,* 2017).
- Some species may not be returned to the sediment following harvesting. For example, small species such as those in the larval phase may be attached to species such as kelps (McAllen, 1999).
- The timescale of recovery for benthic communities is largely dependent on sediment type, associated fauna and the rate of natural disturbance (Roberts *et al.,* 2010).
- In locations where natural disturbance levels are high, the associated fauna is characterised by species adapted to withstand and recover from disturbance (Collie *et al.,* 2000; Roberts *et al.,* 2010).
- Non-target species found in more stable habitats, which are often distinguished by high diversity and epifauna, are likely to take a greater time to recover (Roberts *et al.,* 2010).
- Many studies have found that meiofauna exhibit a different response to disturbance than macrofauna. Some meiofauna show very little, or short-term effects of disturbance, whilst others can utilise increases in resources and benefit from disturbance (Wynberg & Branch 1994; Sherman *et al*., 1980; Wynberg & Branch, 1997; Johnson *et al*., 2007). Turbellarians significantly increased after digging and remained above control levels for 35 days (Wynberg & Branch, 1994). However, copepods and polychaetes were significantly reduced immediately after digging, and whilst numbers did bounce back approximately 10 days after the disturbance, they did not return to control levels for more than 70 days (Wynberg & Branch, 1994).
- Population recovery rates are known to be species specific (Roberts *et al*., 2010). Long-lived bivalves will undoubtedly take longer to recovery from disturbance than other species (Roberts *et al*., 2010). Megafaunal species such as molluscs and shrimp over 10 mm in size, especially sessile species, are more vulnerable to impacts of fishing gear than macrofaunal species as a result of their slower growth and therefore are likely to have long recovery periods (Roberts *et al*., 2010). Short-lived and small benthic organisms on the other hand have rapid generation times, high fecundities and therefore excellent recolonization capacities (Coen, 1995).
- Meiofauna has been found to recover quickly, within just one tidal cycle, after mud had been turned over (Sherman *et al*., 1980). Some groups, such as foraminifera, even benefited from the disturbance and increased in number after digging (Sherman *et al*., 1980). Wynberg & Branch (1994) also found that meiofauna react positively to disturbance after initial declines, but they then return to control levels. On the other hand, Johnson *et al*., (2007) found that meiofauna reacted negatively to trampling on an English Mudflat. Similarly, though the recovery period for this group of species was short, between 36 and 144 hours (Johnson *et al*., 2007). Hand raking for clams led to a significantly lower nematode assemblage 12h after disturbance, however the meiofaunal community had once again recovered within 48 hours (Mistri *et al*., 2009).
- For example, the use of mechanical dredging or rakes have the potential to impact non-target with the potential for a significant removal. Despite returning non-target species, the risk of mortality is increased. It is noted that some studies on this have shown high recoverability rates of non-target species (Hall and Harding, 1997).

- Gastropods, such as *Peringia* (formally *Hydrobia*) *ulvae*, have been found to be positively affected by the presence of disturbance including digging (Carvalho *et al*., 2013; Watson *et al*., 2007).
- Effects are difficult to quantify, marine ecosystems are complicated and subject to large natural fluctuations caused by changes in parameters including temperature and tidal/current action (Gislason *et al.*, 2002). This is in addition to other human caused impacts, for example, changes in nutrient levels. This combination of effects makes the impact from a particular fishing activity on marine species communities hard to isolate (Gislason *et al.*, 2002).

There are specific species which are designated species within the MPAs covered by the Shore Gathering Review which may be impacted as non-target species. Where general evidence on these species is available it is reported in Sections 1.3.1 and 1.3.2 below, specific evidence relating to certain pressures is presented in relevant sections.

1.3.1 Seahorse Species

- No direct evidence is available on the impact of shore gathering activities on seahorse populations.
- Seahorses spend the majority of their time attached to the substrata for example, seaweed, rock and artificial surfaces (Lorrie *et al.,* 1999; Curtis and Vincent, 2005). Seahorses are also associated with eelgrass and seagrass beds which may be impacted by shore gathering activities (see Section 1.4.1). The species is therefore most likely to be impacted through impacts to associated habitats.
- Seahorse species can be affected by physical degradation and destruction of their habitats resulting in population decline in the most extreme circumstances (Vincent *et al.,* 2011).
- Abrasion and disturbance to the surface of the substratum could result in the direct removal of seahorses attached to substrata or a decrease in populations as a result of the removal of habitat (Foster and Vincent, 2004).
- Similarly, individuals are sensitive to crushing such as during trampling in access to harvesting sites (Nash *et al.,* 2021).
- Short generation times, rapid growth rate and early maturity suggest recovery may be rapid (Harasti, 2016; Woodall, 2017), however, this is contradicted by their limited mobility, small home range and limited dispersal. It is suggested that complete removal of individuals from a population would result in poor recovery rates, otherwise it is thought that resistance and recovery to disturbance events may be high.

1.3.2 Stalked Jellyfish

- No direct evidence is available on the effect of shore gathering activities on stalked jellyfish species.
- The species is found attached to algae in pools/the low water line on rocky shores and therefore, could be exposed to abrasion pressure used in harvesting techniques and during access to sites.
- Removal of target species such as seaweeds could lead to reduction in the abundance of individual stalked jellyfish and available substrate reducing stalked jellyfish populations (Tyler-Walters and Head, 2017).
- Stauromedusae are soft bodied and therefore unlikely to be able to withstand direct crushing/ abrasive pressure used in shore gathering activities themselves of trampling via access to sites (Miranda, *et al.,* 2012; 2016).

- Stauromedusae are likely to be lost if their supporting habitat the algae is lost due to abrasion or physical change (Corbin, 1979; Miranda *et al.,* 2010).
- It is difficult to determine recoverability, although the short life span and potential for asexual reproduction suggests rapid recovery. However, if over 75% population is lost, recovery is limited (Tyler-Walters and Head, 2017).

1.3.3 Peacocks tail (*Padina pavonica*)

- No direct evidence is available on the effect of shore gathering to *P. pavonica*.
- The species occurs on the rock surface and therefore, would be exposed to any present abrasion pressure.
- Disturbance of the seabed and trampling in access to sites may deplete population of peacock's tail and in harvested areas and may lead to smothering of individuals.
- If abrasion of *P. pavonica* were to occur damage to individuals' fronds is likely, but holdfasts should remain. The species has a high recovery potential from regrowth of fronds from rhizoids/holdfasts and also, through its high reproductive potential with both sexual and asexual reproduction possible, so long as some rhizoids/fronds remain (Schiel and Taylor, 1999). Recolonisation can also occur from propagules (Schiel and Taylor, 1999).
- It is suggested that in areas of unfavourable conditions, asexual reproduction may maintain populations (Price *et al.,* 1979).
- Dislodges and drifting fronds with spores may support dispersal and colonization of shores that are isolated from other populations although recovery through this method could be slow (Herbert *et al.,* 2016).
- The species is therefore considered to have a low sensitivity to the abrasion pressure.

Summary

- Non-target species have the potential to be disrupted or removed through shore gathering activities, which in turn can impact food webs and ecosystem biodiversity.
- Where levels of natural disturbance are higher, associated fauna is often characterised by species adapted to a certain level of disturbance.
- Timescales for recovery are largely dependent on sediment type, associated fauna and the rate of natural disturbance.
- Recovery rates are also species specific, mollusc species often take longer to recover than annelid worms and crustacean species.
- Effects are difficult to quantify as effects from a specific activity are difficult to isolate from any impacts caused by variation in environmental variables and additional anthropogenic impacts such as water quality.
- Seahorse species do not have any direct evidence of impacts related to shore gathering activity. Impacts are likely to result from impacts to their associated habitats such as seagrass and seaweeds. The species is also vulnerable to crushing from trampling or direct removal from abrasion. It is postulated that direct removal of a significant proportion of the population would be required to cause a large negative effect.
- Stalked jellyfish species do not have any direct evidence of impacts related to shore gathering activity. Impacts are likely to relate to impacts to their associated habitats such as seaweeds. The species' are soft bodied and unlikely to withstand abrasion or trampling.
- Peacocks tail does not have any direct evidence of impacts related to shore gathering activity. The species would be exposed to any potential abrasion pressures in associated rocky habitats. Impacts are likely to be the fronds whilst the holdfast should remain. This increases the potential for recovery.

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1.4 Sediment Impacts

This section covers general impacts relating to the pressures:

- Abrasion/disturbance of the substrate on the surface of the seabed
- Penetration and/or disturbance of the substratum below the surface of the seabed including abrasion
- Habitat structure changes – removal of substratum (extraction)

- Abrasion and disturbance are generally related to the direct and physical effects of handwork activity including digging and trampling. Such impacts include the creation of basins and mounds, burial and removal of the substratum, sediment disturbance, changes in vertical distribution of sediment layers and changes in the properties of the sediment (McLusky *et al*., 1983; Watson *et al*., 2017).
- Waves and tides can wash away finer sediment and associated organic content that has been dissociated through turning over of sediment (Watson *et al.,* 2017). The effects of this can lead to increased turbidity, pollutants within the water column and potential eutrophication (Watson *et al.,* 2017).
- The upturning of large sections of substrate to access buried invertebrates below the surface can result in layering disruptions and changes in chemical concentrations in the sediment surface layer (Fowler, 1999).
- The physical marks associated with activity may persist over a number of weeks. Where tide and wave action is low or there is limited water exchange within an estuary, the time taken for depressions to be filled following activity increases, potentially resulting in slower rates of sediment recovery than in higher energy sites (Birchenough, 2013).
- Impacts resulting from anthropogenic activity are most evident where the level of disturbance causes differences to sediment structure that are elevated above natural background changes caused by biotic and abiotic factors including changes caused by the benthic community through burrow formation and deposition of faecal material (Probert, 1984).
- A meta-analysis of global studies on hand gathering (and other gear type) impacts found that the magnitude of the response of fauna to fishing varied with the degree of abrasion to the surface of the substratum and changes to habitat (including sediment type) (Clarke *et al*., 2017).
- Studies on bait pumping for shrimp and bait digging showed an increase in finer sediment accumulation where depressions caused by the activity persist after the activity has taken place (McLusky *et al.,* 1983; Wynberg and Branch, 1994; Contessa and Bird, 2004).

1.4.1 Effects on Seagrass Beds

- Shore gathering activities have the potential to remove, uproot and bury seagrass shoots and rhizomes (Barañano *et al.,* 2018).
- Seagrass is highly sensitive to burial at just 2-16cm depth (Cabaço & Santos, 2007). Burial results in the reduction of leaf and rhizome carbon and starch content, the occurrence of dead shoot and reductions in leaf and sheath lengths (Cabaço & Santos, 2007).
- Impacts are noted to be variable with activity. The sedimentary carbon stock of *Zostera marina* beds was noted to be reduced by 50% in areas subject to clam harvesting, reflecting levels found in unvegetated areas (Barañano *et al.,* 2018), however low intensity digging activity in *Zostera noltii* beds was noted not to cause any changes in sediment variables or photosynthetic efficiency (Branco *et al.,* 2018).
- Seagrass species can respond in a number of ways to hand work activity. In response to disturbance seagrass beds often increase their reproductive effort (Cabaço & Santos, 2012).
- Mechanical disturbances such as clam harvesting have resulted in a nine and four-fold increase in plant reproductive effort (Cabaço & Santos, 2012; Alexandre *et al*., 2005; Suonan *et al*., 2017).
- Reproductive effort is a measure of parameters such as; the number of flowering shoots, the number of spathes per flowering shoot and flowering period (Alexandre *et al*., 2005; Suonan *et al*., 2017; Park *et al*., 2011). However, the response of reproductive effort is species specific, with a strong positive correlation apparent between rhizome diameter and increased reproductive effort (Cabaço & Santos, 2012). The correlation indicates that species with a higher storage capacity (*Z. marina*) have a higher capacity of investing in sexual reproduction (Cabaço & Santos, 2012). Those with lower storage capacity such as *Z. noltii* may not be able to recover through reproduction (Cabaço & Santos, 2012).
- On the other hand, research has found that seedlings do not contribute to the recovery of Z. marina and therefore increased reproductive effort may not be an effective recovery strategy (Qin *et al*., 2016). When shoots and rhizomes were removed/buried by clam harvesting in China, seedlings were observed almost as soon as the disturbance had ceased. However, seedlings in both a disturbed and control areas did not survive the following winter, unlike the perennial beds in the control site (Qin *et al*., 2016).
- Recovery time varies considerably between species and location. Boese *et al*., (2009) stimulated disturbance to a Z. marina bed by removing the shoots. Disturbed areas recovered through the growth of rhizomes from perennial seagrass beds. Recovery of an area disturbed within a well-established seagrass bed took 24 months, however in a disturbed area located in the transition zone of seagrass beds (where the bed ends and bare sediment begins) seagrass took 32 months to recover (Boese *et al*., 2009). The estimated rhizome growth rate was 0.5m per year. Meanwhile Zoster noltii has been found to take approximately five years to recover in Wales, although there is strong variability in seagrass beds from year to year (Bertelli *et al*., 2018).
- Zostera japonica in Korea can recover from clam harvesting vehicles within 5 months of the immediate elimination of shoots (Park *et al*., 2011). Post recovery the bed had higher above and below ground biomass and rhizome internode length than the control (Park *et al*., 2011).
- Where seagrass declines the habitat can be recolonised by other species. However, research has shown that *A. marina* may colonize a declining seagrass bed and the presence of the annelid prevented the recovery of the *Z. marina*. Sediment reworking by the worm led to rapid burial of eelgrass seeds below critical depth where they could not develop (Valdemarsen *et al*., 2011).

1.4.2 Trampling

- In some harvesting methods, abrasion is not caused by the direct impact of the activity itself, but, by the indirect impact of the access required to access resources. The damage occurs when human footsteps interact with the communities residing in the intertidal area, known as trampling.
- Trampling leads to direct and indirect effects. Direct impacts include the immediate damage, crushing or removal of algae and invertebrates, and indirect impacts include changes in community assemblages, due to loss of habitat and changes to environmental variables.
- While the intensity of the trampling has been found to be the key factor in governing the level of impact caused it is also correlated to the recovery time (Araujo *et al*., 2009; Milazo *et al*., 2002; Povey & Keough, 1991). Typically, the relationship between trampling intensity and recovery is negative, with more intensely trampled areas requiring longer time frames to recover (Povey & Keough 1991; Araujo *et al*., 2009; Rita 2011).
- After one year following impact Araujo *et al*. (2009) found the communities of medium and high intensity trampled areas remained significantly different to controls and low trampled sites. Rita (2011) studied recovery over a longer term of five years and found that 36 months following trampling, *A. nodosum* (algae) had recovered in low intensity areas only. 54 months following disturbance *A. nodosum* had recovered in medium intensity sites but had not achieved full recovery in high intensity sites (Rita, 2011).

1.4.2.1 Reefs

- Trampling abrasion during access to sites may lead to crushing/ dislodging or damage to ecologically significant species within reef habitats (Tyler-Walters and Arnold, 2008; Plicanti *et al.,* 2016).
- The extent of damage is dependent on the species and exposure. For example, species with hard exteriors such as mussels or barnacles, may be less impacted than softer bodies individuals within the reef habitats (Tyler-Walters and Arnold, 2008; Plicanti *et al.,* 2016).
- Studies suggest disrupted areas do not recover in highly exposed areas, due to wave action. This therefore suggests, the ability for reef to recovery following trampling is dependent on exposure to wave action and tides (Tyler-Walters and Arnold, 2008; Plicanti *et al.,* 2016).
- Differences in impact vary, studies have found large declines in *Mytilus californianus* after trampling in mussel beds, with up to 54% loss in experimental plots after 1 day of trampling (Brosnan and Crumrine, 1994). However, Smith and Murray (2005) found only 15% of loss as a direct result of trampling, during experimental exposure to mussel bed reefs.

1.4.2.2 Mud and Sand Flats

- Trampling intensity has been shown to be a crucial factor on the level of impact caused to sandy beach macrofauna on the Eastern Cape coast (Moffett *et al*., 1998).
- In soft intertidal mud, clear footprints have been found to remain four days after trampling and disturbance still visible 21 days later (Rossi *et al*., 2007), however, it was concluded this does not affect abiotic characteristics of the sediments.
- Johnson *et al.,* (2007) found no significant differences between the grain size, total organic content and penetrability following six trampling events on an intertidal mudflat habitat in Southwest England.

- Rossi *et al*. (2007) also found no different in inorganic nitrogen content in the top centimetre of surface water, however higher trampling intensities have been found to impact chlorophyl levels (Wynberg and Branch 1997).
- Research on the effects of trampling on sediment habitats has mostly focused on the impacts to the communities living below the surface of the sediment, with general decreases in tube-dwelling, sub-surface deposit feeders and deep burrowing species (Wynberg and Branch, 1994).
- In one specific study from SW England, twelve hours following trampling, nematode abundance and species number significantly declined but were seen to recover within 36 hours (Johnson *et al*., 2007).
- It is understood that meiofauna bury themselves deeper into the sediment in response to trampling and therefore the community can recover quickly once the impact has ceased (Johnson *et al*., 2007).
- Mobile species, such as annelids have shown no changes from trampling, although adult bivalve species, *Cerastoderma edule* and *Macoma balthica*, significantly declined in abundance trampled sites (Rossi *et al*., 2007).
- In contradiction, trampling enhanced the recruitment rate of juvenile *M. balthica* and did not impact juvenile *C. edule* (Rossi *et al*., 2007).
- On sandy beaches, often visited by tourists rather than shellfish collectors, trampling in the supralittoral zone has been shown to lead to mortality and declines in sand hopper (*Talitrus saltator*) density (Ugolini *et al.,* 2007).
- Between the high tide and swash zone clear negative impacts of trampling on sand communities have been demonstrated during the summer season in southern Spain (Reyes-martinez *et al.,* 2015). Over time, trampling changes the density and taxonomic structure of the macrofauna compared to a protected site. The sand shrimp *Bathyporeia pelagica* was severely affected in the most trampled area reducing to zero individuals per m^2 (Reyes-martinez *et al*., 2015). Crustaceans can decrease by more than 60% in trampled areas, meanwhile polychaetes increase by more than 60%. In a protected area, microbenthic density increased compared to a significant decrease in disturbed areas (Reyes-martinez *et al*., 2015).
- A study of number of animals in enclosures found that at low trampling intensities few of the macrofauna were damaged, but the level of damage was substantial (mean 70% and 63%) for *Gastrosaccus psammodytes and D. serra respectively,* under intense trampling (Moffett *et al*., 1998).

1.4.2.3 Saltmarsh

- Low level trampling was not found to affect the redox discontinuity layer, organic matter content, silt-clay content and soil pH of saltmarsh in the UK in winter or summer (Chandrasekara and Frid, 1996). Trampled areas versus untrampled areas showed no difference in winter and summer.
- Chandrasekara and Frid (1996) concluded that the saltmarsh vegetation cushions the impact of trampling and therefore prevents impacts to the sediment infauna.
- In Wales, a study of long-term (48 years) trampling on saltmarsh found that it did not affect the physical characteristics of the sediments, water content or bulk density (Headley and Sale, 1999).
- However, the penetration resistance (sediment compaction) increased significantly in trampled areas. As with short-term disturbance, long-term trampling reduced the abundance and vegetation height by 14cm on average, of *Halimione portulacoides* and four other species, resulting in higher bare ground cover (Headley and Sale, 1999). This

led to increased abundances of typically lower growing halophyte species in the midmarsh zone, which were significantly more present in trampled areas including; *Armeria maritima, Aster tripolium, Glaux maritima, Salicornia europeaea, Spergularia marginata* and *Suaeda maritima*. Overall, trampling anthropogenically increased the species diversity of the saltmarsh communities and led to new plant communities (Headley and Sale, 1999).

- Natural saltmarshes in Denmark were found to be relatively resistant to trampling, showing limited changes in species abundance and diversity (Andersen, 1995).
- However, other habitat types, such as uncut grassland, artificial dunes and dunes, had clear negative impacts of trampling. Andersen (1995) concluded that saltmarsh is resistant to a low trampling level of approximately five visitors per day.
- Intensity of trampling studies on Californian saltmarsh (*Salicornia virginica)* found all trampling led to decrease in intensity and frequency of saltmarsh height and flower production in a six-month period. However, heavy trampling led to 90% cover of bare ground (Woolfolk, 1999).
- In one area lightly trampled plots did not initially show signs of damage, but six months later *S. virginica* canopy declined by around ten percent whilst controls did not, showing a delayed response to trampling. Overall, trampling can decrease saltmarsh abundance, change community structure and promote invasion of introduced species all contributing to the loss of marsh habitat (Woolfolk, 1999).
- Trampling and other disturbances have also been found to affect the reproductive potential of saltmarsh *(Plantago maritima)* in Poland (Lazarus *et al., 2020*). Although intensive grazing had the largest impact on saltmarsh, intensive human trampling had a similar effect, decreasing fruit seed abundance and size.
- Recovery studies in California reported that heights did not reach height of controls within two and a half years after trampling (Woolfolk, 1999). Significant differences between insects and arachnid communities were still present between trampled and controls (Woolfolk, 1999).
- Martone, & Wasson (2008) found that after nine months of recovery trampled plots still had significantly lower percent cover of native plants. For tidally flushed sites, by 12 months native plants had recovered, however, for tidally restricted sites, recovery of native plants took between 12 and 22 months and was still lower (not significantly) at the end of the 22-month study period (Martone, & Wasson, 2008).

1.4.2.4 Seagrass Beds

- Access to seagrass beds for shore gathering activities results in trampling of the substratum. The higher the activity level the worse the effects of the trampling might be (Eckrich & Holmquist, 2000).
- Intensive trampling from tourist visitors over *Zostera marina* beds, resulted in a significant reduction of seagrass cover (Travaille *et al*., 2015).
- Seagrass (*Thalassia testudinum*) biomass was noted to directly relate to trampling intensity and duration (Eckrich & Holmquist, 2000; Major *et al*., 2004). As well as trampling intensity, the substrate type plays an important role in the severity of trampling impacts to seagrass beds; with softer substrates more vulnerable to significant biomass reductions (Eckrich & Holmquist, 2000).
- Different types of foot wear can also lead significant effect levels (Major *et al*., 2004).

Summary

- Abrasion impacts may include the creation of basins and mounds, burial and removal of the substratum, sediment disturbance, changes in vertical distribution of sediment layers and changes in the properties of the sediment.
- Impacts resulting from anthropogenic activity are most evident where the level of disturbance causes differences to sediment structure that are elevated above natural background changes caused by biotic and abiotic factors including changes caused by the benthic community through burrow formation and deposition of faecal material.
- A meta-analysis of global studies on hand gathering (and other gear type) impacts found that the magnitude of the response of fauna to fishing varied with the degree of abrasion to the surface of the substratum and changes to habitat (including sediment type).
- Shore gathering activities have the potential to remove, uproot and bury seagrass shoots and rhizomes.
- Impacts to seagrass are noted to be variable with activity and different species can respond in different ways. This includes increasing reproductive effort, potential related to the storage capacity of the particular species. However, seedlings have been noted not to survive to produce a full adult plant in some cases, offsetting the increased reproductive effort.
- In some harvesting methods, abrasion is not caused by the direct impact of the activity itself, but, by the indirect impact of the access required to access resources.
- Trampling leads to direct and indirect effects. Direct impacts include the immediate damage, crushing or removal of algae and invertebrates, and indirect impacts include changes in community assemblages, due to loss of habitat and changes to environmental variables.
- Typically, the relationship between trampling intensity and recovery is negative, with more intensely trampled areas requiring longer time frames to recover.
- Reefs, mud & sand flats, saltmarsh and seagrass beds may all be subject to impacts from trampling. Different habitats will be subject to different levels of impact and recovery times.

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1.5 Protected bird species: visual disturbance

- Anthropogenic disturbance can affect an animal's behaviour and rate of survival (Liley, *et al*, 2012a; 2012b).
- In this context, disturbance is defined as any human activity that has the potential to affect the behaviour of an animal. The disturbance may be audible or visual and where possible, these disturbances are distinguished.

1.5.1 Levels of Disturbance and Immediate Response

- Immediate results of disturbance range from birds becoming alert to taking major flights (>50m) to alternative suitable habitats (Liley *et al.,* 2010; Liley *et al.,* 2012a).
- Water-based and mechanically fuelled human activity are likely to cause higher levels of disturbance in bird populations whereas slower moving activities such as bird watching and hand picking of clams do not usually cause birds to flush or take flight (Burger, 1981).
- Furthermore, activities in the intertidal area are more likely to cause a disturbance event than activities occurring further up the shore due to the closer proximity to feeding intertidal birds (Riddington *et al.,* 1996; Liley *et al.,* 2010; Liley and Fearnley, 2012).
- The local level of disturbance intensity varies with ease of access to the location, habitat, and activity type (Goss-Custard and Verboven, 1993; Liley and Fearnley, 2012).
- The level of response to a disturbance is species-specific for shorebirds with individuals spending up to a third of their time displaying disturbance-related behaviours (Blumstein *et al.,* 2003; Schlacher *et al.,* 2013).
- Studies suggest the likelihood of a bird to respond to an anthropogenic disturbance can be indicated by the body size and quantity of food consumed by a species, with larger species becoming alert at extended distances (Blumstein *et al.,* 2005; Palacios *et al., 2*022).
- An earlier response time is necessary for larger species due to a lack of agility, in comparison to smaller species, making predator avoidance more difficult (Witter *et al.,* 1994).
- Other factors influencing the level of disturbance include flock size, distance to the disturbance and noise levels (Rees *et al.,* 2005; Wright *et al.,* 2010).
- Scan rates increase with the speed at which a visual disturbance is occurring, and the likelihood of an energetically expensive behavioural response increases with noise level (Fitzpatrick and Bouchez, 1998; Wright, *et al.,* 2010).

- Birds are reported to display both decreased nest attentiveness and increased vigilance when exposed to higher levels of disturbance (Riddington, *et al.,* 1996; Baudains and Lloyd, 2007).
- Research within Poole Harbour suggests that sites with a higher levels of access lead to a lower level of bird response due to the type of activity. Sites in Baiter Park and Holes Bay showed the highest levels of access however, the activities were mostly limited to slower and quieter activities, such as walking and cycling. Areas with more frequent disturbance events were concentrated on the Studland side of Poole Harbour (Arne, Pilots Point, Bramble Bush Bay) and were predominantly the result of unpredictable and loud activities, such as unleashed dogs and water sports (Liley and Fearnley, 2012).
- Other models suggest the complete removal of human disturbance could increase bird (in this case, Ringed Plovers) populations by up to 85% (Liley and Sutherland, 2007) and to 100% survival in the Solent (Stillman *et al.,* 2012).
- In a study in South Africa, birds displayed a greater tolerance to the distance humans could approach the nest before taking flight and returned faster after frequent disturbance (Baudains and Lloyd, 2007).

- Literature on the effects of disturbance on feeding behaviours found contrasting positive, negative and no affect results with increased disturbance (Riddington, *et al.,* 1996; Fitzpatrick and Bouchez, 1998; Navedo and Masero, 2008; Verhulst, *et al.,* 2001).
- Although, Fitzpatrick and Bouchez (1998) describe a decrease in the amount of food redistributed to chicks as disturbance increased.
- Other changes in feeding behaviour include an increased concentration of wading shore birds feeding around crab tiles and geese altering feeding patterns to feed for an extra hour at night to balance their daily energy expenditure (Rees, *et al.,* 2005; Sheehan, 2007).

1.5.2 Longer Term Response

- The majority of the literature reviewed described habituation and redistribution/loss of habitat as a long-term impact of anthropogenic disturbance of bird populations. Habituation is defined as the alteration of an instinctual behaviour of birds as a result of frequent anthropogenic disturbance.
- Redistribution and a temporary loss of habitat as a result of disturbance occurs at a range of temporal and spatial scales and varies with species depending on the level of disturbance (Burger, 1981).
- There is evidence to suggest birds opt not to use areas of suitable habitat that experience disturbance; this evidence discusses roads, shipping, offshore wind farms and organized scaring (Gill, 1996; Klassen *et al.,* 2005).
- Oystercatchers have been reported to alter their feeding schedule within a tidal cycle to avoid coinciding with humans in the mussel beds of the Exe Estuary (Goss-Custard and Verboven, 1993).
- Similar results have been displayed with Redshank, Curlew and Oystercatchers, altering their arrival and departure from sites in Belfast Lough, depending on the levels of recreational activity (Fitzpatrick and Bouchez, 1998).
- Studies in Glasgow found whooper swans displayed a short-term decrease in sensitivity to disturbance when daily disturbance levels were high (Rees *et al.,* 2005). There was no evidence to suggest these short-term habituations remain on a longer time scale.

- Literature suggests an increase in anthropogenic disturbance causes a reduction in egg incubation time and parental care, leading to a decrease in reproductive success (Verhulst *et al.,* 2001; Baudains and Lloyd, 2007).
- However, it has been stated that there is no guarantee behavioural responses (as a result of disturbance) are related to changes in reproduction or mortality and, species should be assessed on an individual basis (Stillman, *et al* 2007).

1.5.3 Shore gathering and disturbance

- There is little research focused on areas within the Southern IFC District (five out of 62 papers reviewed). A significant amount of the research relies on models and is species specific.
- Of the 22 pieces of literature reviewed that discussed an interaction between birds and intertidal fisheries only six discussed disturbances by shore gatherers, the remainder discussed the implications of removing a food source.
- Two out of the six discussed the disturbance or change of behaviour caused by the structures used in the fishery (crab tiles and oyster culture trestle tables) (Higherloh *et al.,* 2001; Sheehan, 2007).
- Of the remaining four articles, only one discussed hand gathering of clams as a potential disturbance causing activity and the remaining three referred to bait digging.
- No information was found regarding birds being disturbed by seaweed gathering or shrimp push netting.
- As these activities also occur in the intertidal zone and are carried out at a relatively slow pace when compared to jogging or water sports, we can assume the potential for bird disturbance is likely similar to bait digging and hand gathering of clams.
- Shellfish hand gatherers are reported unlikely to cause a disturbance to birds as a result of the slow-moving behaviour of the activity (Burger, 1981).

Studies from the Southern IFCA District

- A report focusing on Poole Harbour described an observed 1558 potential disturbance events by bait diggers over an 11-day period. Only seven percent of these observations resulted in a disturbance. The disturbances ranged from birds walking or swimming away to taking a major flight (Liley *et al.,* 2012).
- In the Solent, during more than 70% of bait digging, crab tilling and shellfish gathering events, no bird disturbance was caused, although of most events where disturbance did occur led to major flights by birds (Liley *et al.,* 2010*).* Data collected did not suggest that sites with higher access levels (e.g. more people) do not experience significantly higher disturbance events which could indicate that some level of habituation occurs within bird population (Liley *et al.,* 2010).
- Bird disturbance in general declined with distance, where events occur 100m or more away from birds rarely led to disturbance (Liley *et al.,* 2010).
- Developing on this work, Stillman *et al.* (2012b) used a model to understand the likely impact of disturbance to bird survivability in the Solent. Due to the assumed relative infrequence of bait digging activity (1.2% of visits), removal of the activity from the model did not lead to higher survivability of birds, although the model did not factor in the effect on bird prey availability.

Studies from the wider UK

- In contrast, other evidence discusses a negative correlation between the number of bait diggers and wader and gull abundance, and the reduction in the extent of uses of a refuge area by waterfowl species in the Northeast of England. These results are suggested to be due to the larger body mass of waders and an increased vulnerability to predators. The decreased abundance of gulls was not expected as they are thought to be a more tolerant species, however, this is likely due to a lower level of access and hence decrease habituations of the gulls in the study area (Townshend and O'Connor, 1993; Watson *et al.,* 2017).

Summary

- Anthropogenic disturbance causes a range of species-specific responses to bird species, which scale from increased vigilance and scan rates to longer term redistribution of a species.
- Disturbance can result in changes to the fitness of bird species and has the potential to cause changes in population size through increased mortality.
- The information relating directly to intertidal fisheries and shore gathering activities is minimal; however, due to the slow moving and quiet nature of shore gathering, the majority of interactions are not likely to result in disturbance, unless the activity begins to occur in areas with previously very low levels of access and decreased levels of habituation as a result.

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1.6 Protected bird species: food availability

1.6.1 Removal of target species

- Shellfisheries can provide a potential source of conflict by competing with the same food resources as certain bird species (Atkinson *et al*., 2003).
- The removal of food resources by shellfish fishing therefore has the potential to have detrimental effects on the amount of food available per bird and subsequently increases the chance of a threshold being reached where mortality from starvation begins to increase (West *et al*., 2005; Navedo *et al*., 2008).
- The removal of shellfish from productive beds, along with associated disturbance, can drive birds from preferred feeding grounds to areas of poorer quality. This can lead to an increase in bird densities and a subsequent intensification of interference and exploitation competition for food, which can reduce intake rate and probability of starvation, particularly in winter (Goss-Custard & Verboven, 1993; Clark, 1993; Goss-Custard *et al*., 1996).

- It is important to understand to what degree bird species can switch to other food resources, if their target species (that may also be the target species of the fishery) is reduced (Schmechel, 2001).
- It was reported by Zwarts *et al*. (1996a) that along the north-west European coast there are limited possibilities of alternative prey items for certain bird species, especially in winter due to changes in availability.
- Using individual behaviour-based models, it has been shown that shellfish stocks should not fall below 2.5 to 8 times the biomass that shorebird populations require to survive (Stillman *et al*. 2003; Goss-Custard *et al*. 2004; Stillman *et al*. 2010).
- Stillman *et al*. (2001) used a behaviour-based model to investigate the effects of present-day management regimes of the Exe estuary mussel fishery and Burry Inlet cockle fishery on the survival and numbers of overwintering oystercatchers. Results of the study concluded that at present intensities (for cockle hand raking: 50 persons, max 100kg per day) the fisheries do not cause oystercatcher mortality to be higher than it would be in absence of the activity (Stillman *et al*., 2001).
- Hand raking cockles had negligible effect on how much time oyster catchers spent feeding because it only removed cockles >22mm (Stillman *et al*., 2001). Increased fishing effort up to 500 persons hand raking cockles did not affect the mortality rate, mean mass of birds, or bird time spent in fields, whereas increased dredging did. The difference was caused by the significantly higher rate of depletion of the stocks seen in dredge fisheries (Stillman *et al*., 2001).
- However, for mussel hand raking, the effects on oystercatchers were greater than dredging because the activity removed mussel beds and caused disturbance and so these impacts combined (Stillman *et al*., 2001).
- In a study by Ferns *et al*. (2000), bird feed activity increased shortly after cockle harvesting (mechanical), particularly in areas of muddy sand rather than in areas of clean sand. However, following the increase in feeding activity, the level of bird activity declined for more than 80 days (curlew and gulls) and for more than 50 days (oystercatcher) following harvesting when compared to control areas. It was noted that the initial net benefit of harvesting was matched by decreased feeding opportunities in the winter (Ferns *et al.,* 2000).

1.6.2 Size of prey species

- The exact role of the fishery and its effect on bird population, because of direct competition, will largely depend on the distinct size fractions of the stock that may be exploited by fishers and birds (Schmechel, 2001).
- Whilst there may be an overlap in the size of cockles taken by both fishers and birds, most bird predation is of a smaller size class than fishers take (Norris *et al*., 1998).
- If sizes overlap, there can be a genuine conflict of interest between the birds and the fishery, therefore larger minimum sizes are more favourable to birds (Lambeck *et al*., 1996).
- Bowgen *et al*., (2015) used an individual-based model to investigate how invertebrate species regime shifts would affect wading bird populations across Poole Harbour. Shifts were considered in terms of size class changes and complete removal, which represent similar effects of intertidal fishing activity. Curlew, black-tailed godwit and redshank numbers were most reduced when the abundance of the largest marine worms was removed (Bowgen *et al*., 2015). The strongest effect was on curlew, with modelled numbers reduced to zero percent if worm sizes above 75mm were removed, whilst for godwits, removal of worms above 60mm had the same effect. Curlew and black-tailed

godwits were not able to compensate with other marine invertebrates and could switch only to earthworms (Bowgen *et al*., 2015). Contrastingly, for a reduction in bivalve size classes an effect was seen when only the very smallest bivalve size classes remained at <19mm and <15mm respectively for oystercatchers and curlew and black-tailed godwits (Bowgen *et al*., 2015).

- Overall, the curlew was found to be most sensitive to regime shifts due to its large size, and specific feeding strategy, whilst generalists such as oyster catchers are likely to survive during invertebrate species shifts. However, because birds adapt to changes by switching to alternative prey species, size classes and feeding areas, it was concluded that changes in invertebrate size and species distribution do not affect the number of birds the Harbour can support (Bowgen *et al*., 2015).
- Caldow *et al*. (in Jensen *et al.* 2005) demonstrated that the non-native Manila clam, forms a prey item of the oystercatcher population in Poole Harbour. The size of individuals targeted by oystercatcher's range in length from 16 to 50mm. Between late summer and the following spring, a significant increase in the proportion of the population (up to 40 to 50%) consumes this target species. Using an individual's-based simulation model, the study predicts the presence of Manila clams, at low densities of 5 clams per m^2 (mean density when the study was undertaken), has reduced over-winter mortality rates of oystercatchers by 3.5% in Poole Harbour (Caldow *et al.,* 2005). The impacts in this study were related to the dredge fishery rather than shore gathering activity.
- Oystercatchers have shown a preference for older cockles, 20 to 40 mm, and will not take cockles less than 10 mm when these larger size classes are available (Hulscher, 1982; Zwarts *et al*., 1996a). However, oystercatchers do not necessarily choose the largest cockles as they are difficult to handle, with studies reporting that larger cockles were refused more often than small ones (Zwarts *et al*. 1996a). Oystercatchers are known to refuse small prey due to low profitability and the size of cockles left after fishing may therefore have an impact on feeding rate of the oystercatcher (Zwarts *et al*. 1996b; Wheeler *et al*., 2014).

Summary

- The removal of food resources during shore gathering such as shellfish collection has the potential to impact the amount of food available per bird inhabiting a particular area.
- The removal of target species may lead to changes in feeding behaviours, modification in feeding grounds to areas of poorer quality, increased density of feeding birds in areas with resources and increased competition for food.
- Increased impacts increase the chances of a threshold being reached where mortality from starvation begins to increase. Although this is dependent on the extent of removal, alongside the likelihood of species switching to other food sources in the even that their target food species is removed.
- Studies have shown that certain levels of activity, for example 50 cockle gatherers at a maximum of 100kg cockle harvested per day did not cause mortality of specific species to be higher than it would be in the absence of that activity.
- The extent of impact from fishing is also related to the size of prey species taken by fishers in comparison to the size taken by bird species. If there is an overlap between the required size ranges the impact is likely to be greater.

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2. Potential Impacts from Shore Gathering – Activity Specific

This section covers evidence relating to specific shore gathering activities, the evidence in this regard is less comprehensive than general impacts. The majority of the potential impacts from shore gathering activity apply generally and are not specific to a particular gear type, these more widely applicable impacts are covered through the review of evidence in Section 1.

2.1 Bait digging

- Bait digging plays a significant role in the cultural and economic sectors of coastal communities. The blow worm (*Arenicola defodiens*) is one of the five most expensive marine species on the global fisheries market (retail price per kg), according to a recent assessment of the polychaete bait industry, which revealed that 121,000 t are collected annually, valued at £5.9 billion (Watson *et al.,* 2017a).

2.1.1 Ecological impacts

2.1.1.1 Removal of target species

- *A. virens* (King ragworm) is often one of the most dominant macroinvertebrates within estuarine sediment communities providing an important prey species for many species of bird, fish and crustacean as well as being a key predator and scavenger Removal may therefore impact benthic communities (Giangrande *et al*., 2005; Watson *et al*., 2007).
- Individuals of *A. virens* subject to bait digging activity showed a significantly lower average mean weight than those in areas not subject to activity (Watson *et al.,* 2007).
- There is the potential for continued disturbance to alter the proportion of sexually mature individuals within a population with bait dragging selectively removing those individuals of a marketable size which are commonly those that are also sexually mature. Previous studies support this, with areas routinely used for bait digging showing that while the overall population numbers are greater, the number of reproductively mature individuals is lower than in areas where the activity does not occur (Watson *et al*., 2007). However, this may result in a shift in population dynamics rather than an overall detrimental impact.
- Studies have shown that other commercially exploited species exhibit a shift toward earlier onset of sexual maturity at a smaller size (Jennings *et al*., 2001). A. virens is known to be able to become sexually mature between 1 and 8 years old (Last and Olive, 1999) with the exact age (and therefore size) affected by environmental conditions (Breton *et al*., 2003), it could be therefore that A. virens are also able to shift toward achieving sexual maturity at a smaller size to compensate for the removal of larger individuals, thus reducing the impact on the overall population.
- Another potential impact is the loss of segments from damage caused during the bait dragging process. Damaged individuals are often immediately returned to the fishery as they have low market value; however the survival rate of these individuals is thought to be high provided that they are able to re-burrow quickly to avoid predation (Fowler, 1999). The ability of an individual to regenerate lost caudal segments is dependent on a number of factors including the position in the body at which the damage occurred (Golding, 1967; Olive, 1974), however the proportion of individuals returned damaged is thought to be low and the associated levels of predation not above what is seen naturally.
- Preferential removal of larger lugworms has resulted in changes in lugworm population structure, such as smaller individual sizes (Shahid, 1982) and increased mortality in the Solent (Beukema, 1995; Volkenborn and Reise, 2007).
- Decreases in lugworm can have significant impacts on the environment as they play a vital role in sediment stability and bioturbation (the reworking of soils and sediments by animals or plants through burrowing, ingesting and defecation). Bioturbation is believed to be a main driver of biodiversity (Tinlin-Mackenzie *et al.,* 2022).

2.1.1.2 Removal of non-target species

- Where impacts of bait digging have been observed, the recovery rates of infauna communities can range from several months up to five years for most vulnerable species (van den Heiligenberg, 1987; Beukema, 1995; Blake, 1979; Cryer *et al*., 1987; Fowler, 1999; Klunder *et al*., 2021, Cravalho *et al.,* 2013).

- Digging for the lugworm *Arenicola marina* has been shown to deplete the population of the cockle *Cerastoderma edule* on the North Norfolk Coast as the turning over of the sediment resulted in the cockles being re-buried too deep to survive (Jackson and James, 1979; McLusky *et al*., 1983).
- A study on bait digging in Fareham Creek, UK found that changes in sediment from the activity did not result in significant changes to the macrofaunal community although there was a significant increase in the variability of dispersion of species (Watson *et al.,* 2017). However, significant changes were seen in a neighbouring estuary site (Dell Quay) where it was noted that digging occurred for the majority of the time in areas which had already been dug (Watson *et al.,* 2017). It was postulated that the cumulative impacts of repeated digging prevent the recovery of small macrofauna species (Watson *et al.,* 2017). The overall conclusion of the study was that digging alters the macrofaunal community and associated sediment characteristics across large spatial scales but that the strength and type of response is site specific (Watson *et al.,* 2017).
- A study in an MPA in Northumberland, UK found that there was a significant negative impact on wider sediment communities from lugworm digging in the short-term with reductions in total infaunal abundance, taxonomic richness and alterations in community structure (Tinlin-Mackenzie *et al.,* 2022). Recovery was noted to occur within a few months suggesting that sites have the potential for substantial recovery if disturbance is ceased (Tinlin-Mackenzie *et al.,* 2022).
- Effects on macrofauna are also species specific. 11 days after digging in Norfolk, mortality had occurred in 85% of cockles (*Cerastoderma edule*) (Jackson & James 1979). The effect was observed to be greater on juvenile cockles, and laboratory experiments suggested that burial of cockles beneath the depth at which they can regain their near surface positions, leads to mortality (Jackson & James, 1979).
- Macrofaunal biomass has been noted to be significantly reduced after digging (Wynberg & Branch, 1994) although it is not always the case in all studies (Wynberg & Branch, 1997).
- Digging to 10 and 20 cm depth, where sediment was removed from an area, led to immediate declines in total abundance and species richness (Dernie *et al*., 2003).
- A study from two south Iberian Atlantic coastal systems found that the effects of bait digging were site specific and related to biological and sediment composition of the area prior to digging taking place (Carvalho *et al.,* 2013). Macrobenthic assemblages in areas with less mud, initially presenting the greatest infaunal diversity and eveness values, showed minor effects from digging with recovery within 7 days (Carvalho *et al.,* 2013). Areas with the greatest mud content and assemblages dominated by only a few species were the most affected and recovery occurred over a longer timescale (Carvalho *et al.,* 2013). The abundance of sedentary polychaetes was noted to decline whilst gastropod species increased. Differences in response to the disturbance by benthic assemblages were notes to vary when subjected to the same intensity, frequency and nature of disturbance both between and within different coastal ecosystems (Carvalho *et al.,* 2013). On this basis it was concluded that generalisations of activity impacts on non-target species are not possible (Carvalho *et al.,* 2013).

2.1.1.3 Sediment Impacts

- Studies on bait digging indicate that the organic content of the sediment changed following digging as organic matter was trapped in the holes dug and that the resulting lower concentration of organic matter in the immediate area surrounding the hole resulted in the inhibition of colonisation by sedentary species (Grant, 1981).

- A study in Portsmouth Harbour and Chichester Harbour in the UK found that significant differences between dug and undug sediment were limited to changes in organic content (Watson *et al.,* 2017). It was stated that, as organic matter, binds many contaminants, and sediment disturbance leads to desorption of pollutants that an increase in bioavailability of certain contaminants is a likely impact from bait collection (Watson *et al.,* 2017).
- At a low energy site in the Solent, experimental 1m^2 digging scares were observed on foot for 83 ± 30 days after the activity had taken place (Watson *et al.,* 2017).
- A number of studies have identified significant changes of sediment as a result of digging with the activity causing an increased coarsening of grains (McLusky *et al.,* 1983; Edwards *et al.,* 1992; Watson *et al.,* 2017). However, there are also studies where no significant changes in relation to grain size have been seen (Sherman and Coull, 1980; Dernie *et al.,* 2003).

2.1.1.4 Impacts to bird species

- A study on bird disturbance from digging activity in the Solent, UK, found a significant negative correlation in Chichester Harbour between the number of waders and the number of bait collectors (Watson *et al.,* 2017). A significant negative correlation with gulls was also noted (Watson *et al.,* 2017). Both species were noted to move away from areas when bait diggers were presented. There was however, no significant relationship at the site in Portsmouth Harbour, postulated to be due to the area being a highly disturbed site where birds may be habituated to the presence of collectors (Watson *et al.,* 2017).
- There are contrasting results in specific studies of bait digging on bird species foraging behaviours. It has been found that curlew demonstrated no impacts to foraging in areas which had been bait dug (Liley *et al.,* 2012) but semilpated sandpipers showed a reduction of 68.5% in foraging efficiency from bait harvesting, postulated to be related to reduced prey availability and interference with prey cues due to disturbed sediments (Shepherd and Boates, 1999).
- A study in Spain found that digging by hand impacted the bird prey species *Hydrobia ulvae* in terms of density and biomass when the top 5cm of the sediment were compared between dug and undug areas (Masero *et al.,* 2008). It was determined that this part of the sediment was most likely to be used by shorebirds, therefore the documented decrease could have potential impacts to the bird species utilising it as a prey source (Masero *et al.,* 2008).

Summary

- Removal of target species for bait digging may impact benthic communities as target species are often dominant within the sediment community and provide prey species for many species of birds, fish and crustacean.
- Potential impacts to target species include individuals' weight and the proportion of sexually mature individuals in a population.
- Impacts to non-target species are noted to be varied, along with recovery rates. Differences in impact have been seen over relatively small spatial scales, with the suggestion that cumulative impacts of regular activity may exacerbate effects.
- Impacts from abrasion directly attributed to bait digging activity are primarily related to organic content of the sediment which may lead to other effects such as increased bioavailability of pollutants. There is also a suggestion that sediment becomes more dominated by coarser grains as a result of digging but this is not seen in all studies.
- Bait digging has the potential to cause disturbance to bird species and impacts to foraging. However, these impacts are seen to be site specific and potentially related to species being more habituated to disturbance.

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2.2 Shrimp Push Netting

2.2.1 Overview

- Push net gear is usually operated on intertidal mud and muddy sand substrates during low tide. Due to the tidal conditions in the UK, fishers can usually operate for one to two hours (Temple, 2015).

2.2.2 Ecological impact

- The ecological impact of shrimp push netting is thought to be relatively small, where impacts do occur, these are related to trampling and removal of target species. Push netting in the UK is generally operated at low frequencies within temporal and spatial limitations (weather conditions, sea state, tide, substrate type and topography).
- Some push nets in the North of the UK have a wooden bar along the bottom that enables the net to bounce along the substrate without digging into it (Haines, 2016).
- Other forms of push net have skis fitted on the end of the frame in contact with the seabed to prevent it from getting stuck on finer substrates (Fisheries and Aquaculture Department (FAO), 2023).

2.2.2.1 Removal of target species

- Nurul Amin *et al*. (2008) describes in a Malaysian estuarine study that the average push net fisher catches 3.54 kg/hour of *Acetes* shrimp. However, the total catch will vary depending on the strength of the operator, their experience, and season.
- Regardless of whether this gear is operated commercially or recreationally, the operation of this gear is known to cause little stress to caught prawn individuals when hand operated (Broadhurst *et al*., 2004).
- In a study in Australia, it was found that the low concentration of Lactate released from stress during and after catch had a minimal effect on the condition and survival rate of the target species. The relatively small size of the gear and the area it can cover in one operation has a limited impact on the population of shrimp in terms of removal of caught individuals (Temple, 2015).

2.2.2.2 Removal of non-target species

- Push nets have a fine mesh for catching prawns and shrimp, because of this fine mesh there is also the potential for catches of juvenile prawns and other small species (Hinz, 1989).
- The ratio of bycatch to targeted species caught depends on the catch capability of the fisher operating the push net (Nurual Amin *et al*, 2008). This includes the strength of the operator, their experience operating this gear for the species they're targeting, and the season this gear is being operated in (Nurul Amin *et al*., 2008).
- Even though push netting is a small-scale fishing operation compared to other gears, continued catch of juvenile fish species could result in stock declines and trophic shifts (Jones *et al*., 2009).
- Various studies conflict over the selectivity of push nets, with some quoting at least 90 % selectivity for shrimp and prawns (Jeyabaskaran, *et al*., 2018; Suebpala *et al*., 2017) and others a minimum of 70 % non-selectivity (Davies *et al*., 2009; Macer, 1967).

- In a study in Wales, it was found that 70 % of the total catch from push net activity consisted of juvenile fish, including Plaice and Dab, and some decapod species (Macer, 1967). Dependent on the frequency the gear is operated, continued catch of juvenile fish could have an impact on their recruitment to adult stocks (Macer, 1967).

2.2.2.3 Sediment Impacts

- Contact with the substrate from this gear is low compared to some other gear due to its small footprint, however due to this type of gear requiring manpower, there is a risk of trampling from the fisher during operation (Rossi *et al*., 2007).
- The impact of this gear both directly and indirectly from trampling from fishers when in operation or to gain access to the operation site can disrupt sediment on the surface of the seabed, damage fragile features, and bury or crush epibenthic species (Rossi, *et al*., 2007).
- Hand operated push nets are designed to be light weight so that they can glide across substrate without penetrating the seabed or damaging fragile features including seagrass and Mearl beds.
- A study in India found there was evidence of burrowing fauna being caught as well as fragments of seagrass and other seaweed (Rajan *et al*., 2017).
- A study in Thailand also found that the activity had the potential to dislodge or remove sessile species (Janekarn & Chullasorn, 1997). Extending this impact, it is postulated that the gear could cause damage to habitats such as seagrass by cutting or uprooting plants.

2.2.2.4 Impacts to bird species

- North Western IFCA assessments of push netting activities (Haines, 2016; Temple, 2015) determined that the operation of this gear within SPAs has no significant impact on nesting or feeding birds. The small scale and non-motorised operation of this activity is unlikely to exceed ambient noise levels and is limited spatially and temporally in terms of operation (tide restriction).
- A study in Thailand (Galbraith *et al*., 1999) found that fishers operating hand-held push nets were generally ignored by resident bird populations. However, when there was a large group of push net fishers, or if fishers were present at the site for an extended period of time, then there was a temporary decline in bird foraging activity (Galbraith *et al*., 1999). There was also an impact on breeding birds when there was a large gathering of people, excessive noise being produced, or fishers getting too close to the nesting sites (Galbraith *et al*., 1999).

Summary

- Push netting usually occurs on intertidal mud and muddy sand substrates during low tide for 1-2 hours at a time.
- The ecological impact is thought to be small, related primarily to trampling and removal of the target species.
- Mitigative measures are often already applied to push nets to reduce impact on the seabed.
- Impacts to target species have been found to be minimal with stress responses observed during and following catch to have a minimal affect on condition and survival rate.
- There is the potential for bycatch of juvenile prawns or other small species, the degree to which bycatch is observed is primarily based on fisher behaviour when operating the gear. Gear selectivity is documented at between 30%-90%.
- Two studies have shown that sessile species can be impacted by push netting, with one study documenting seagrass being removed by the activity.
- Bird disturbance from push netting is documented to be not significant, the number of operators and fishers getting too close to nesting sites were exacerbating factors where any impact was noted to occur.

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2.3 Crab tilling and collection

- Crab tiling is the collection of shore crab (*Carcinarus maenas*) for the purpose of being used as angling bait. The crab tiling fishery operates within estuarine mudflats at a commercial scale and the process involves laying crab tiles, also referred to as crab shelters (hard man-made structures such as roof tiles, half round guttering and vehicle tyres) on the shore. Shore crabs are harvested from underneath the tiles periodically at low tide (Sheehan *et al*, 2010).
- There are areas where crab tilers only remove crabs over 40mm carapace width, avoid berried females and only harvest crabs which are in the stage of pre-ecdysis (moulting) (Sheehan *et al*., 2008).
- Over 1 million shore crabs are removed from south-west UK shores annually to be sold as bait (Sheehan *et al*., 2008). The mild climate in the south of the UK allows crabs to moult all year round, providing a year-round fishery. In other parts of the UK, crabs may only moult in summer months, leading to a seasonal fishery (Russel *et al.* 1999).
- The location at which crab tilers can place crab shelters is limited due to the requirements of landowner's permission. This is because, crab-tiling does not follow the standard right to lay fishing gear as it does not "entrap" species.

2.3.1 Ecological Impact

2.3.1.1 Removal of target species

- *C. maenas* reach maturity within two years at a size of 25-30mm (Neal & Pizzolla 2008). Therefore, crab tilling does not target juvenile individuals and all crabs removed are likely to have had the opportunity to reproduce.
- Sheehan *et al.* (2008) found that when compared to non-tilled estuaries, tilled estuaries support a significantly greater abundance of crabs (63% more), particularly juvenile individuals 20 to 39mm. This was believed to be due to the provision of additional habitat.

- However, the same study found more reproductively active crabs and crabs greater than 60cm in non-tiled estuaries (Sheehan *et al.,* 2008). Similarly, removal of species may lead to reduction of local populations.
- The impact of greater crab abundance in tiled estuaries is unknown. Devon and Severn IFCA (2019) highlighted that estuaries are important nursery areas for many fishes, such as plaice (*Pleuronectes platessa),* bass (*Dicentrarchus labrax)* and turbot (*Scophthalmus maximus). C. maenas* is an important food source for several predatory fish, and therefore an increase in crab abundance may lead to increased abundance of adult predatory fish species (Devon and Severn IFCA, 2019). However, *C. maenas* is also a predator in intertidal systems and predates upon juvenile fishes, and therefore greater abundance of the species may have negative consequences on fish populations (Devon & Severn IFCA, 2019).

2.3.1.2 Impacts to non-target species

- Abundance of aquatic fauna has been noted to be lower around crab tiles compared to non-tiled areas. It is postulated that the congregation of *C. maenas* around crab tiles increases the level of predation on non-target species as tiled areas showed an abundance of the target species over other aquatic fauna (Sheehan, 2007).
- A study in the UK found that the abundance of mobile fauna including benthic gobies, mysids, crabs and pelagic fishes was greater in control sites that in tiled sites during the month of July (Sheehan *et al*., 2010a). This was also observed in March but results were not significant, equally there was a greater diversity of taxa in control sites observed but this was also not significant (Sheehan *et al*., 2010a). Crabs were observed to occupy the tiles during submersion and had a tendency to be aggressive to other species in defending the tile (Sheehan *et al*., 2010a).
- A similar study in the same area of the UK found that mean infaunal abundance declined with increasing mean penetrability of the sediment (Sheehan *et al*., 2008). Control and ‘tile only’ sites showed similar abundance scores to each other whilst ‘trampling only’ sites were least stable and showed the lowest infaunal abundance (Sheehan *et al*., 2008).

2.3.1.3 Sediment Impacts

- Sheehan *et al*. (2010b) studied several sediment parameters in relation to the effects of crab tiling and associated trampling. Impacts to the sediment were though to be mostly related to trampling with the extent of changes to the sediment related to relatively small changes in sediment composition (Sheehan *et al*., 2010b).
- The same study observed no effect of crab-tiling on organic content or grain size, it was determined that existing differences from among-estuary variation masked any impacts from the activity in isolation (Sheehan *et al*, 2010b).
- The effects of year and difference between sites were stronger than effects of disturbances from treatments. Sheehan *et al*. (2010b) concluded that crab tiling modifies sediment stability and measures of infaunal diversity, with muddy habitats more susceptible to disturbance than those which are sandy.

2.3.1.4 Disturbance to bird species

- The estuaries in which the shore crab is harvested act as key feeding habitats for wading birds, some of which prey on *C. maenas.*

- The presence of crab tiles were found to have no impact on bird abundances in Devon estuaries, however curlew and redshank were seen using the crab tiles as a resources for food and spending a significant amount of time around crab tiles (Sheehan, 2007).
- Observations of foraging birds in tiled and non-tiled sites were used to test a model that the fishery modified diversity, distribution and behaviour of shorebirds (Sheehan *et al*., 2012). No evidence was found for a relationship between shorebird species richness, abundance or assemblage composition and the presence of tiles (Sheehan *et al*., 2012).
- It is suggested that crab-tiles could influence the distribution of potential prey species and as such aggregate shorebirds, relieving predation pressure in other areas (Sheehan *et al*., 2012). Bird species such as curlew and redshank were also observed next to crab-tiles without engaging in feeding behaviour suggesting that the tiles may also provide a shelter for shorebirds against negative effects of wind on thermoregulation (Sheehan *et al*., 2012).

Summary

- Some mitigation measures are already employed by crab-tilers including targeting crabs over 40mm carapace width, avoiding berried females and only harvesting crabs which are in the stage of pre-ecdysis.
- Estuaries subject to crab-tiling are found to support a significantly greater abundance of crabs, particularly juveniles, believed to be due to additional habitat provision. However, more reproductively active crabs were found in non-tiled estuaries.
- The impact of greater crab numbers in estuaries is mixed, providing both a food source to predatory adult fish but also a predator species for juvenile fish.
- Abundance of other aquatic fauna has been noted to be lower around crab tiles, potentially due to aggressive defending of the tiles by the crabs. In other studies changes in abundance of non-target species has been found to be seasonal.
- The effects of trampling are noted to be the most prevalent abrasion impact, compounding effects of faunal change. Muddy habitats were more susceptible to disturbance than sandy habitats.
- No impacts to organic content or grain size of sediments in crab-tiled areas have been noted.
- The presence of crab-tiles is noted not to have an impact on bird species, certain species have even been noted to use crab tiles for feeding and shelter.

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2.4 Shellfish collection

- Shellfish gathering involves the removal of bivalve species such as cockles, native oysters and periwinkles from the surface of the substrate using methods such as digging, raking or hand picking (McLusky *et al*., 1983; Travaille *et al.,* 2015; Watson *et al.,* 2017).

2.4.1 Ecological Impacts

2.4.1.1 Removal of target species

- A study in the Western English Channel considered the impact of clam raking in different habitat types and concluded that high energy environments transfer clams and macrofauna, minimising the effect of rake harvesting (Beck *et al.,* 2015). Results showed that experimental clam raking of *R. philippinarum and R. decussatus* significantly decreased the number of clams on gravelly compared to sandy habitats (Beck *et al.,* 2015).
- Research conducted in the Strangford Lough SAC (Northern Ireland) found that previous disturbance to sediment where cockles were returned (i.e. collection via hand rake) had no influence on burial rate of cockles, however larger cockles had a slower burial speed (McLaughlin *et al.,*2007).
- Research by Leitao and Gaspar (2011) in the south of Portugal concluded that neither hand knife nor dredge methods used to collect cockles affected the subsequent burrowing rate of the target species. Regarding the burrowing rate of two groups of cockles, 83% burrowed within 15 minutes and only 10% remained on the surface after an hour (Leitao and Gaspar, 2011).
- However, Crespo *et al.* (2010) found large-scale collection of the common cockle (*Cerastoderma edule*) in Portugal may cause considerable changes in population structure over an 18-month period (Crespo *et al.,* 2010). Population abundance and biomass reduced by 80% and 94%, respectively, with implications for population dynamics and secondary production. The abundance of cockles above 15.25mm decreased significantly, whereas the density of cockles over 20.25mm did not recover within a year (Crespo *et al.,* 2010).
- The same study found that large-scale harvesting caused seasonal variations in recruitment dates, from May to year-round, however production values remained low during the 12-month research. Overall, overharvesting resulted in the disappearance of adult cockles and subsequent lower production values (Crespo *et al*., 2010).
- Investigations into management of cockle harvesting outside of Europe concluded that management of highly variable and unknown species in not possible due to the unpredictable nature of recreational harvest and shellfish population dynamics (Beck *et al.,* 2015).
- Precautionary minimum size limits were deemed the best management solutions, with bag limits and closed areas playing a less vital role where there is an absence of intensive monitoring and management (Hartill *et al.,* 2005).
- Crawford *et al*., (2010) demonstrated that small scale no take zones led to significant increased densities of cockles (*Anadara spp.*), both inside and out of the protected areas.
- In Washington USA, Griffiths *et al.* (2006) studied the effects of clam (*Venerupis philippinarum* and *Protothaca staminea*) digging on several open beaches compared to marine reserve beaches. Clam abundance was greater on reserve beaches compared to non-reserve beaches (Griffiths *et al.,* 2006).
- Similarly, Gray (2016) compared the impact of clam harvesting on two commercially hand-fished beaches compared to two un-fished beaches in Australia, before and during harvesting of 4,300 and 17,800kg of clams. No effect of clam harvesting was found

however, populations of clams were highly variable across the four sites. Under local management measures, fishers were limited to a 40kg catch per day, so it was considered that this level of harvesting may not be impacting the populations of clams in the area, or that the natural spatial variation observed between beaches and sites is greater than that which is caused by fishing at its current level (Gray, 2016).

2.4.1.2 Removal of non-target species

- The method by which this is achieved e.g., digging, raking or hand picking can also lead to the removal of non-target species through indirect mortality, damage and disturbance (Dernie *et al.,* 2003; Rossi *et al.,* 2007).
- Kaiser *et al.* (2001) examined the effects of hand raking of a small and large area without removing the target species on non-target species and undersized cockles (*Cerastoderma edule*). Initially, raking led to three times more damaged undersized cockles in the experimental plot. Unexpectedly, there was significantly lower mean abundance of individual organisms in the control plot, which demonstrated there were differences in community structure between the experimental and control plots irrespective of treatment. Fourteen days following raking there was a decrease in abundance relative to immediately after raking. After 56 days the small-raked areas had recovered, however for the large-raked areas, whilst the abundance of individuals had increased, it had not fully recovered 447 days following analysis (Kaiser *et al.,* 2001).
- Leitao and Gaspar (2007) compared the impact of *C. edule* collection using a knife versus a hand dredge. Macrofaunal mortality was low in both methods (mean: harvesting knife 1.64% and dredge 0.98%), but unexpectedly harvesting using the hand knife led to a higher (although not significant) mortality of macrofauna. As predicted, the harvesting dredge led to a five-fold increase in both the area fished and catch collected. When the target species were removed from the analysis, no significant difference between the communities exposed to the different fishing methods was observed, indicating both methods had remarkably similar overall impacts to the community, other than the target species (Leitao and Gaspar, 2007).
- Experimental clam raking (*R. philippinarum and R.* decussatus) in the Western English Channel uncovered no significant change in sediment characteristics or macrofauna on sandy, gravelly or mixed gravelly rocky habitats studied (Beck *et al.,* 2015).
- A study on the removal of razor clams by salting in southern Portugal found that there were no effects on the associated benthic community and that similar patterns of fluctuations in abundance were observed in control and experimental areas, attributed to natural variability (Constantino *et al*., 2009).
- Investigation into Manila clam (*Ruditpaes philippinarum)* collection in Italy found hand raking led to significantly lower meiofaunal abundance, particularly Harpacticoids (Mistri *et al.,* 2004).
- Other research has considered the differences between beaches which are fished and those which are protected in some way from the activities. In Washington USA, Griffiths *et al.* (2006) studied the effects of clam (*Venerupis philippinarum* and *Protothaca staminea*) digging on several open beaches compared to marine reserve beaches. Species richness and total polychaete family richness were greater on reserve beaches compared to non-reserve beaches. Non-reserve sites had greater abundances of the un-harvested clam species, limpets and *Nereis* polychaetes.
- Experimental digging led to significantly reduced species richness within the ‘holes’, compared with the dug-out ‘fill’ and controls. There was no significant effect of placing

cages over experimentally dug plots showing that on this beach predation was not a key factor affecting the community following digging (Griffiths *et al*., 2006).

2.4.1.3 Sediment Impacts

- A study on razor clam harvesting using salt in southern Portugal found that there was no significant impact on the sediment (Constantino *et al*., 2009). The main observed effect was an increase in salinity, however this decreased rapidly with the flood tide and returned to pre-activity levels within a few hours (Constantino *et al*., 2009).
- A study on recreational clam harvesting by raking and digging in the USA found that raking did not impact any of the measured parameters, however clam digging resulted in reduced seagrass coverage and reductions in above-ground and below-ground biomass associated with the seagrass bed 1 month after the last of three-monthly treatments (Boese, 2002). Differences were noted to persist up to 10 months after treatment although were not significant. It was noted that full impacts could only be explore through multi-year studies and that differences in sediment characteristics and clam abundance would affect the level of impact (Boese, 2002).
- A study in Washington in the USA found that digging for clams altered the dug area, affecting grain size, organic matter and oxygen content (Griffiths *et al.,* 2006).

Summary

- Impacts to target species from shellfish gathering have been noted to be dependent on sediment type, season and the method of harvesting use.
- For some species, like common cockle, impacts relating to population abundance and biomass have been observed with implications for population dynamics and secondary production.
- Management measures including MCRS and small closed areas have been shown to minimize target species impacts. Low levels of harvesting have also been demonstrated to have a low level of impact.
- Decreased in abundance of non-target species have been noted following shellfish harvesting although this is also dependent on sediment characteristics and method of harvesting with mixed results from studies.
- Changes to species richness have been observed where holes remain from activity compared to holes filled in and control areas.
- Impacts to sediment are not widely studied specifically for shellfish harvesting where sediment effects are separated out from infaunal community effects. Studies which have looked specifically at sediment have found mixed results, some no effect and another showing affects to grain size, organic matter and organic content.
- Impacts to seagrass beds have been noted from clam digging with impacts (not significant) persisting up to 10 months post-treatment.

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2.5 Seaweed collection

- Seaweed harvesting targets a variety of brown, red and green seaweeds in the intertidal zone, by hand collection.
- Biological characteristics of key targeted species are summarised in Table 1.
- The process involves selective cutting from monospecific strands of seaweed such as rockweed and kelps or alternatively collection of the storm-cast fronds, which result in mixed species harvest (Mac Monagail *et al*., 2017).
- Seaweed harvesting has a large economic value and is harvested for commercial and recreational uses such as food, cosmetics, pharmaceuticals, or creation of materials.
- Key seaweed species targeted within the commercial industry include Sea spaghetti (*Himanthalia elongate),* dulse (*Palmaria palmata)*, carrageen (*Chondrus crispus),* sea lettuce (*Ulva spp.),* red algae (*Porphyra spp.),* serrated wrack (*Fucus serratus) and* bladder wrack *(Fucus vesiculosus).* Other kelps include oarweed (*Laminaria digitata)* and sugar kelp (*Saccharina latissimi)* (Wilding *et al.,* 2021).

2.5.1 Ecological Impacts

2.5.1.1 Removal of Target Species

- Seaweeds are a key source of primary production and dissolved inorganic matter, therefore playing a key role as a food source both when dead and alive (Kelly, 2005).
- For each species, the holdfast, stipe and fronds provide substratum for other flora and fauna to attach (Kelly, 2005).
- Studies have shown that seaweeds mediate environmental conditions of the substrate, therefore, if harvested, have the capability to cause cascade affects to the surrounding ecology (Pocklington, 2017). These effects on the community have been seen to last for decades (Ingolfsson and Hawkings, 2008).
- The three-dimensional structure created by seaweed functions as habitats to mobile invertebrates such as fish, birds and seals, and also act as important nesting and breeding grounds (Mineur *et al.,* 2015). Harvesting eliminates the structure to attach eggs to or build nests within and is certain to impact communities living within the surrounding area harvested (Kelly, 2005).
- Removal of *Ascophyllum* led to significantly more *Fucus and Ulva spp.* and an increase in *Cirratulus* biomass (Boaden and Dring, 1980; Jenkins *et al.,* 2004).
- Removal of 100% and 75% of seaweed fronds led to understorey substratum temperatures three degrees Celsius higher than if only 0-50% of fronds were removed, due to a double in light intensity reaching these levels (Pocklington, 2017).
- Jenkins *et al*., (1999) found that removal of *Ascophyllum* in the Isle of Man directly resulted in the bleaching and death of turf species. This led to an increase in the area grazed by limpets, a subsequent increase in limpet recruitment and increased bare substratum (Jenkins *et al*., 1999). Eighteen months following removal, *Fucus* species had become dominant, partly restoring the understorey algal turf and interactions between limpets (Jenkins *et al*., 1999). Five years later, the algal turf had not fully recovered, showing long-term effects on the communities (Jenkins *et al*., 1999).
- In Nova Scotia, no effect of *Ascophyllum* removal was found on the use of the intertidal by small fishes (Black and Miller, 1991), although Rangeley (1994) critiqued this research, due to sampling biases and experimental design.
- In contradiction, in the sublittoral, removal of *Laminaria hyperborea* led to decrease in abundance of gadid fish by 92%. Furthermore, cormorants were reported completing

significantly more dives in harvested areas, thereby expending more energy to find the same number of resources (Loentsen *et al*., 2010).

- The increase in light penetrating the substratum following canopy forming algae removal in Australia, led to the bleaching of encrusting coralline algae, with their photosynthetic activity reducing to half that observed under canopies (Irving *et al*., 2004).
- Expansion in space as a result of the removal of *Laminairia* led to the increase in blade and stripe length of annual species such as *Saccorhiza polyschides* in Britanny (Engelen *et al.,* 2011).

2.5.1.2 Removal of non-target species

- Bycatch is seen primarily for trawling or dredging of seaweed, however hand-raking can remove a certain amount of epiphytes and slow-moving animals if they are attached to fronds or if a holdfast has its own species community (Lotze *et al*., 2019).
- Examples of species particularly at risk are Peacocks tail, bearded red seaweed and stalked jellyfish species due to their small size thus being overlooked by harvesters (Wilding *et al*., 2021).
- Species which are attached securely to seaweeds may have to be removed by hand, there is the potential that, if done in situ, these species may relocate and survive but few epifauna and epiphytes will be able to reattach (Wilding *et al*., 2021). Processing away from the shore will remove the bycatch from the ecosystem (Wilding *et al*., 2021).
- In Atlantic Canada harbour, monospecific strands of Irish moss have been noted to host up to 36 animal and 19 major algal species which are vulnerable to removal as bycatch (Lotze *et al*, 2019).
- A study in South Africa noted that harvesting should be restricted to the distal portion of fronds as this would result in only a 50% reduction of epiphytes (Anderson *et al*., 2006).

2.5.1.3 Sediment Impacts

- Removal of seaweeds may affect fluid dynamics of the water column and lead to changes in sediment. Coarser sediment prevalence has been reported for harvested areas of the UK, following *Ascophyllum* collection (Boaden and Dring, 1980).
- Similarly, mortality of turf species as a result of *Ascophyllum* removal in the Isle of Man led loss of entrapped silt (Jenkins *et al.,* 1999).
- In contrast, a study conducted in the Unites States of America found removal of *Ascophyllum* in both experimentally and harvested sites had no impact to sediment type (Phillippi *et al.,* 2014).

- Brown seaweed species are noted to be particularly intolerant and sensitive to trampling impacts (Wilding *et al*., 2021). Understorey algae may suffer indirectly due to increased desiccation, however robust algal turf species, opportunists and gastropod grazers may increase in abundance as an indirect effect of trampling (Wilding *et al*., 2021).

Summary

- Studies have shown that seaweeds mediate environmental conditions of the substrate, therefore, if harvested, have the capability to cause cascade affects to the surrounding ecology. The three-dimensional structure created by seaweed functions as habitats to mobile invertebrates such as fish, birds and seals, and also act as important nesting and breeding grounds.
- Impacts from seaweed removal range from changes in light intensity, composition of understorey communities, interactions between species and changes in species composition.
- Peacocks tail, bearded red seaweed and stalked jellyfish species are noted to be vulnerable as bycatch from seaweed harvesting.
- If bycatch species are removed in situ they may be able to reattach and survive but this will be species specific.
- Mixed impacts to sediments have been reported with a prevalence of coarser grains post-harvesting noted in one study and no effect on sediment type in another.
- Brown seaweed species are noted to be particularly vulnerable to trampling. Impacts of trampling to associated species is noted to be species specific.

Table 1. The life history characteristics of common edible seaweeds found on United Kingdom rocky shores.

Common name	Species	Zone	Lifespan (Years)	Maximum length (cm)	Max. Growth Rate cm/day *	Size at maturity (cm)	Age at maturity (years)	Reproduction	References
Gut weed	*Ulva intestinalis*	All	<1	30	0.25	Unk	Unk	Spores (sexual/ asexual) >10m dispersal (BIOTIC)	Budd & Pizzola (2008)
Sea lettuce	*Ulva lactuca*	All & free growing	Unk	30	Unk	Unk	Unk		Pizzolla (2008)
Channelled wrack	*Pelvetia caniculata*	High intertidal	4	15	0.01	4	1-2	Gametes (sexual)	White (2008a)
Spiral wrack	*Fucus spiralis*	High intertidal	4	40	0.04	3	2	Hermaphrodite (Gametes)	White (2008b)
Bladder wrack	*Fucus vesiculosus*	Mid intertidal	5	150	0.07	15-20	Unk	Gonochoristic (Gametes)	White (2008c)
Knotted wrack	*Ascophyllum nodosum*	Mid intertidal	10-20	200	0.04	Unk	5	Gonochoristic (Gametes)	Hill & White (2008)
Carrageen	*Chondrus crispus*	Mid intertidal to 24m	2-3	22	0.03	12	2	Spores (sexual/ asexual)	Rayment & Pizzola (2008)
Toothed wrack	*Fucus serratus*	Low intertidal	5	60	0.2	Unk	Unk	Gonochoristic (Gametes) (>10km)	Jackson (2008)
Thongweed	*Himenthalia elongata*	Low intertidal	2-3	200	0.16	0.15	2	Gonochoristic	White (2008d)
Oarweed	*Laminaria digitata*	Low intertidal to 20m	6-10	200	1.3	Unk	~1.5	Gonochoristic (Gametes)	Hill (2008)
Tangle weed	*Laminaria hyperborea*	Low intertidal to 30m	11-20	100	0.94	Unk	2-6	Spores (sexual/ asexual)	Tyler-Walters, 2007
Sugar Kelp	*Saccharina latissima*	Sublittoral fringe to 30m	2-4	400	1.1	100-200	~1.5	Spores (sexual/ asexual) (>100m)	White (2007)

* Max. growth rate has been converted to cm per day.

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2.6 Mechanical collection

- Mechanical collection refers to the use of machines or basic mechanics to gather or extract shore-based resources, such as animals or plants, from their natural environment.
- This method is often used to increase efficiency and productivity compared to manual collection which typically use simple tools (e.g., a rake, spade, etc.).
- This review primarily focuses on the utilisation of 'bait pumps' and tractor dredges; the only mechanical devices where evidence was available.

2.6.1.1 Bait Pumping

- A specialised pump that collects sand or mud from the exposed shoreline at low tide and filters it to collect target species such as lugworm (*Arenicola defodiens*). Cubbera *et al.* (2018) highlighted that prior bait digging studies had failed to catch lugworm (*A. Defodiens*) because the species burrows deep beneath the surface dirt. As a result, using mechanical bait pumps allows for more effective and efficient collecting below the surface of the seabed at a reduced effort for gatherers.
- Bait pumping originated in the 1800s with British fishermen using a hand-operated mechanism to extract bait from the sand. This evolved into the first mechanical pump in the early 1900s.

2.6.1.2 Mechanical dredging

- Mechanical dredging involves the use of a tractor to pull trailer mounted dredges across low tide sandy bottom shores, in order to harvest target species. Various designs of dredge are used and blades varying between 70 and 100cm wide, which penetrate between 20 to 40cm into the sediment (Hall and harding., 1997; Cotter *et.a.,* 2000; Klunder *et.al.,* 2021).
- Dredged sediment is mixed with water and sieved to harvest the larger/targeted organisms; the smaller organisms are discarded in and around the gullies (van den Heiligen-berg 1987, Beukema 1995, Leopold & Bos 2009).

2.6.2 Ecological Impacts

2.6.2.1 Removal of target species

- Bait pumps are more effective than bait digging for removal target species of lugworm with little effort.
- Fowler (199) reported that there was no evidential support to suggest the use of bait pumps depletes populations.
- Fowler (1999) also demonstrated the limited impact the act of bait pumping had on the sediment, highlighting that bait pumping causes far less disruption than traditional bait digging. However, this has been contradicted by more recent studies (Contessa and Bird, 2004).
- A study of Bury Inlet, South Wales, found that the removal of cockles using tractor dredges resulted in significant decline in spawning populations and juvenile cockles, 30-33% and 9-19% reduction in abundance respectively (Cotter *et al.,* 1997).
- A 3-month study by Contessa and Bird (2004) highlighted the negative influence on shrimp abundance while bait pumping for ghost shrimp. These results displayed a decline in abundance, porosity of sediment, organic carbon content and redox potential of intertidal sediment. Ghost shrimp feeding and burrowing activity influence sediment properties that the species inhabit, meaning its biochemical nature can only be restored when shrimp are repopulated. Deeper investigation found that the act of intense bait pumping prevented favourable conditions for shrimp to reinhabit, such as sediment porosity and redox, which in turn created a negative feedback loop (Contessa and Bird, 2004).
- In contradiction, Wynberg and Branch (2002) found full recovery in sand prawn (*Cakkuabass kruassi)* populations 32 weeks after bait pumping. This was following a decline in populations 6 weeks after collection, which mirrored the results of Contessa and Bird (2004).
- A study by Hall and Harding (1997) concluded that the effects of tractor dredges have no significant effect on target species structure, after showing recovery to the same faunal structure of an undisturbed community within 56 days. Hall and Harding (1997) determined the immigration of adults into disturbed areas resulted in the recovery of the target species.
- Studies have shown that the presence target species such as lugworm and ghost shrimp, are essential for long term sustainability of communities (Contessa and Bird, 2006; Volkenborn & Reise 2006, Volkenborn *et al*. 2007).

2.6.2.2 Removal of non-target species

- Although, mechanical dredging can lead to high mortality of discarded organisms, the decaying organisms are considered to increase sediment oxidation and nutrient availability in these fished areas, which in turn, increased abundance of opportunistic species, such as those targeted in shore gathering (Klunder *et.al.,* 2021).

- Species with a longer life cycle recover at slower rates following dredging, while the abundance of opportunistic feeders, such as polychaete worms, increase in quick succession following collection (Klunder *et.al.* 2021).
- Arntz & Rumohr (1982) showed this pattern of community succession within the first 2 years after recolonisation, which is then normalised by the third year.
- Reports have shown ‘rapid’ recovery rates and low overall effects to non-target benthic fauna (Hall and Harding, 1997).
- However, this was contradicted a later study in 2000 by Ferns *et.al.* which highlighted that the effect of tractor dredging on non-target species was widely detrimental, resulting in 31% to 83% loss of the population of polychaetes (Ferns *et.al.* 2000). The populations of non-targeted invertebrates took several months to recover, which consequently has the ability to reduce bird feeding activity (Ferns *et.al.* 2000).
- Wynberg and Branch (2002) highlighted that indirect impacts associated with the physical disturbance in bait pumping were more harmful that the removal of target species itself. As a result of the activity, macrofaunal numbers declined in most gathered areas and showed clear distinct community compositions to other areas.
- When dredging for lugworms in the Dutch Wadden Sea, Volken-born & Reise (2006) demonstrated a positive effect on the biomass of several benthic species shortly after their removal.
- A study in the Netherlands reported no differences in benthic organisms between dredged areas and reference areas (Drenthe, 2013), however this was contradicted by Beukema (1995), stating biomass in dredged areas only recovered after several years.

2.6.2.3 Sediment Impacts

- A study in southern Australia found that bait pumping for shrimp showed initial destruction of target species burrows and compaction of sediment from both the pumping and trampling of the mudflat (Contessa and Bird, 2004). This reduced porosity and created reducing conditions to depths of 20cm (Contessa and Bird, 2004). The proportion of smaller grain sizes also increased in surface sediments and organic carbon content decreased (Contessa and Bird, 2004).
- A study in South Africa of the removal of sand and mud prawns including using a pump found that areas where sandprawns were harvested showed finer grained sediments (Wynberg and Branch, 1994). There were no obvious differences in sorting coefficient but the organic fraction was lower in experimental areas 18 days post-activity, a trend which had reversed by the end of the first month where the organic content was then higher than in control areas up to 4 months (Wynberg and Branch, 1994).
- The same study noted that in experimental areas for sandprawns the sediment surface was depressed about 10cm below the surrounding area and penetrability declined following activity as well as the accumulation of a black layer approximately 4cm from the surface (Wynberg and Branch, 1994).
- The same effects were not fully observed for mudprawn harvesting suggesting sediment characteristics influence the degree of impact (Wynberg and Branch, 1994).

Summary

- Evidence on mechanical harvesting is limited, primarily relating to two activities; bait pumping and tractor dredging
- Impacts to target species are mixed; for tractor dredging a significant decline in common cockle as a target species was noted in South Wales, however impacts from bait pumping are more variable with some studies suggesting impacts are much lower than traditional digging while others show significant effects resulting from the creation of unfavourable conditions for recolonisation.
- Impacts to non-target species are similarly mixed with some studies suggesting rapid recovery following activity whilst others found significant declines in polychaete species following tractor dredging.
- Sediment impacts are noted to include compaction from both the activity and associated trampling, reduced porosity, increases in fine grain sediments and changes to organic content.
- The nature of the sediment prior to activity was noted to potentially influence the degree of impact.

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EXECUTIVE SUMMARY

Marked E

Annual Review of the Poole Harbour Several Order 2015 Management Plan: 2020 Revision (2024 Update)

Decision Paper

Report by PO W. Meredith-Davies.

A. Purpose

Under Section (4) of The Poole Harbour Fishery Order 2015, the Authority are required to undertake an annual review of the Poole Harbour Several Order Management Plan.

B. Recommendation(s)

1. That Members approve 2024 updates to the Poole Harbour Several Order 2015 Management Plan: 2020 Revision.

2. That Members approve the document for publication on the Southern IFCA website.

3. Supporting Documentation for Further Information

- Poole Harbour Several Order 2015 Management Plan: 2020 Revision (2024 Review).

1.0 Introduction

- The objective of the Poole Harbour Several Order Management Plan ('Management Plan') is to demonstrate how Southern Inshore Fisheries and Conservation Authority (IFCA) manage aquaculture activity within a defined area of Poole Harbour under The Poole Harbour Fishery Order 2015 ('The Order').

- Under Section (3) of the Order, the Authority must manage the aquaculture in Poole Harbour in line with the Management Plan.

- Under Section (4) of The Order, the Authority is required to undertake an annual review of the Management Plan and publish an updated version of the Management Plan on the Southern IFCA website.

2.0 Summary of Key Points

- If, during a review any significant changes are made to the Management Plan, then the Authority must notify, in writing any interested parties. The Authority must, prior to publication of the updated Management Plan, take account of any representations it receives in writing from any interested party on the proposed changes.

- The management of aquaculture within Poole Harbour must have specific regard to Southern IFCAs responsibilities, as defined in sections (153), (154) and (166) of the Marine and Coastal Access Act (MaCAA) 2009.

- In addition, Southern IFCA is a Relevant Authority in the management of sites which are within the National Site Network, designated under the Habitats Directive and/or Birds Directive, and has a statutory responsibility to ensure that fishing activity does not damage, disturb or have an adverse effect on the wildlife or habitats for which a site has been designated. This includes the governance of the conservation interests of the Poole Harbour Special Protection Area (SPA).

- Under sections (28G) and (28I) of the Wildlife and Countryside Act, 1981, IFCAs are required to consider any Site of Special Scientific Interest (SSSI) with marine components giving protection to species and habitats of national importance when carrying out its duties. This includes the governance of the conservation interests of the Poole Harbour SSSI. The Management Plan also has regard to the Poole Harbour Wetland of International Importance under the Ramsar Convention.

3.0 Key Considerations

- For the 2024 review, the following inconsequential amendments have been made to the Management Plan:

  1. Amendments to grammar and sentence structure where required.
  2. Update to text in the table for 'Management Plan 2: Aquaculture and the Poole Harbour SSSI' to reflect the phasing of the BTFG review as agreed by the Authority, and the consideration of SSSI components under Phase II.

- The 2024 review provides inconsequential updates or clarification of information in relation to the existing management of Lease Beds under The Order. As such, the 2024 review has not introduced any significant changes to the Management Plan.

4.0 Next Steps

- Should the Authority agree to the Recommendations then the Poole Harbour Several Order 2015 Management Plan: 2020 Revision (2024 Review) will be published on the Southern IFCA website ahead of 1st July 2024.

Marked E – Annex 1

Southern Inshore Fisheries and Conservation Authority

Poole Harbour Several Order 2015 Management Plan: 2020 Revision

(2023 Review)

Document Control

Title	**Southern IFCA Poole Harbour Several Order 2015 Management Plan**
Approver	Secretary of State
Owner	Southern IFCA

Revision History: Tranche 1 2015-2020

Base Document	Author	Reason
As above	Sarah Birchenough	Developed in line with requirements under Poole Harbour Fishery Order 2015. Management Plan directs governance of the Tranche 1 lease allocations (July 2015-June 2020).

Annual Review	Author	Details	Approver
2016	Neil Richardson	No significant changes	Rob Clark
2017	Neil Richardson	No significant changes	Rob Clark
2018	Neil Richardson	No significant changes	Rob Clark
2019	Pia Bateman	Addition of 2018 Natural England (NE) Site Management Statement	Rob Clark

Revision History: Tranche 2 2020-2025

Base Document	Author	Reason	Approver	Published
Southern IFCA Poole Harbour Several Order 2015 Management Plan (2020 Revision)	Pia Bateman	Revised edition to consider significant changes to the management of lease beds as detailed in Section 1.1 of this document. The Management Plan directs governance of the Tranche 2 lease allocations for the period July 2020-June 2025.	(1) Southern IFCA Authority, May 2020. (2) Secretary of State sign off	30th June 2020

Annual Review	Author	Reason	Approver	Published
2021	Pia Bateman	• Addition of Management Plan 3 (Section 7) following receipt of formal advice from NE in December 2020 on newly allocated lease beds 7, 8 and 12. • Additions to Management Plan 5 (Section 7) following an update in advice from NE regarding the farming of Pacific oysters. • Additions to Section 5.3 re: Lease Condition Requirements following a change in ownership & methodology on Lease Bed 3.	Southern IFCA Authority, May 2021	May 2021
2022	Sarah Birchenough	• Update in Section 1 and Section 2.2.2 (with the removal of Section 2.2.3) to reflect legislative changes following the UK's exit from the EU. • Addition of text to Management Plan 5 (Section 7) to reflect the 2022 update from Defra regarding the farming of Pacific oysters.	Southern IFCA Authority, May 2022	May 2022

2023	Sarah Birchenough	• Update in Section 3.2.1 regarding Pacific oyster monitoring data with other refs to this work updated accordingly in Management Plan 5 (Section 7) • Addition of text to Management Plan 5 (Section 7) to reflect updates from Defra regarding the farming of Pacific oysters	Southern IFCA Authority, May 2023	May 2023
2024	William Meredith Davies & Sarah Birchenough	• Updates to grammar and sentence structure throughout • Update to text in the table for 'Management Plan 2: Aquaculture and the Poole Harbour SSSI' to reflect the phasing of the BTFG review as agreed by the Authority, and the consideration of SSSI components under Phase II.	*TBC*	*TBC*

CONTENTS

1.0 Summary

The objective of this Management Plan is to demonstrate how Southern Inshore Fisheries and Conservation Authority (IFCA) manage aquaculture activity within a defined area of Poole Harbour under The Poole Harbour Fishery Order 2015 ('The Order'). In accordance with Section (1) of the Sea Fisheries (Shellfish) Act 1967, The Order confers on Southern IFCA the right of several fishery for the cultivation of shellfish of any kind for a period of twenty years from the 1st July 2015.

Under Section (3) of The Order, the Authority must manage the aquaculture in Poole Harbour in line with the Management Plan entitled Poole Harbour Several Order 2015 Management Plan ('Management Plan').

Under Section (4) of The Order, the Authority is required to undertake an annual review of the Management Plan. If, during this review any changes are made to the Management Plan, then the Authority must notify, in writing[1] any interested parties[2] of any proposed changes to the Management Plan. The Authority must, prior to publication of the updated Management Plan, take account of any representations it receives in writing from any interested party on the proposed changes.

The management of aquaculture within Poole Harbour must have specific regard to Southern IFCA's responsibilities, as defined in sections (153), (154) and (166) of the Marine and Coastal Access Act (MaCAA) 2009.

In addition, Southern IFCA is a Relevant Authority in the management of sites within the National Site Network, designated under the Habitats Directive and/or Birds Directive, and has a statutory responsibility to ensure that fishing activity does not damage, disturb or have an adverse effect on the wildlife or habitats for which a National Site Network Site has been designated. This includes the governance of the conservation interests of the Poole Harbour Special Protection Area (SPA).

Under sections (28G) and (28I) of the Wildlife and Countryside Act, 1981, IFCAs are required to have consideration of any Site of Special Scientific Interest (SSSI) with marine components giving protection to species and habitats of national importance when carrying out its duties. This includes the governance of the conservation interests of the Poole Harbour SSSI. The Management Plan also has regard to the Poole Harbour Wetland of International Importance under the Ramsar Convention.

1.1. Significant Changes in the Management Plan 2020

The original Poole Harbour Several Order 2015 Management Plan[3] was produced following full and extensive consultation with all interested parties, relevant bodies and stakeholders.

The 2020 edition of the Management Plan ('Management Plan 2020') underwent a full update in order to incorporate some of the main drivers for Tranche 2 of lease bed allocation as follows:

[1] At least four weeks prior to 1st July

[2] Paragraph 4 (4) of The Order defines 'interested parties' as the Secretary of State; Natural England; any person likely to be affected by the Management Plan or changes to it; or any person whom the Authority consider may be the owner, lessee or occupier of the fishery area.

[3] Available from Southern IFCA

- The expiration of the first tranche (T1) of lease bed allocation on the 30th June 2020;
- A reallocation of lease bed grounds (where relevant) under the second tranche (T2) of lease bed allocation, in order to reflect the changes in conservation designations in Poole Harbour, specifically with regard to the expansion of the Poole Harbour SSSI in 2018 and the extension of the Poole Harbour SPA in 2017;
- A review and update of the conditions under the terms of lease allocation in line with advice received from NE regarding the farming of Pacific oysters in Poole Harbour.
- A review and update of the conditions under the terms of lease allocation in line with advice received from the Poole Harbour Commissioners (PHC) with regard to the leasing of grounds within a designated area for personal watercraft.

In Section 7.0 of this document there are five Management Plans which document the actions that have been taken by Southern IFCA since 2015 in response to either the advice received from NE concerning the management of aquaculture in Poole Harbour ensuring compatibility with marine nature conservation designations, as well as species-specific measures and mitigations (Management Plans 1-6).

Management Plan 5 comprises a risk assessment undertaken in collaboration with PHC, which assesses the interaction between aquaculture activity and water users operating in an area designated for Personal watercraft.

The Management Plans are:

Management Plan 1: Aquaculture and the Poole Harbour SPA Designation.

Management Plan 2: Aquaculture and the Poole Harbour SSSI Designation.

Management Plan 3: Aquaculture & the Poole Harbour SPA & SSSI Designation (2020 update)

Management Plan 4: Aquaculture and the Poole Harbour RAMSAR site.

Management Plan 5: Aquaculture and species interaction**.**

Management Plan 6: Aquaculture and water user interaction.

2.0 Background

2.1 Poole Harbour

Poole Harbour is an estuary enclosed by a bar at the mouth with fresh water entering through several small rivers, the largest of which is the River Frome. The Harbour is the largest natural harbour in Europe and the second-largest natural harbour in the world. The Harbour covers an area of 38 km^2 and contains five islands, the largest of which is Brownsea Island.

The Harbour contains a variety of different habitat types leading to a wide variety of benthic communities and a highly productive environment with the growth of seaweeds and saltmarsh providing a sustainable food source for suspension feeding species, deposit feeding species and grazing communities[4].

Poole Harbour is subject to a large degree of anthropogenic activity both from fishing and other Harbour processes such as maintenance dredging and recreational activities. Fishing activity occurs throughout the Harbour in the form of aquaculture and an established wild shellfishery for clams and cockles, as well as a net fishery, commercial and recreational angling and collection of bait worms by both dragging and digging.

Poole Harbours' unique and varied marine habitat is recognised through its marine nature conservation designations, of both European and National importance. The Harbour provides an excellent case study demonstrating how both commercial (wild and farmed) and recreational fishing can coexist and thrive in these designated areas.

2.2 IFCAs duties in the management of aquaculture

2.2.1 The Marine and Coastal Access Act, 2009

IFCAs' main duties and responsibilities are defined in sections (153) and (154) of the Marine and Coastal Access Act (MaCAA) 2009 being:

> <u>(153) Management of inshore fisheries</u>
>
> (1) The authority for an IFC district must manage the exploitation of sea fisheries resources in that district.
>
> (2) In performing its duty under subsection (1), the authority for an IFC district must—
>
> > (a) seek to ensure that the exploitation of sea fisheries resources is carried out in a sustainable way,
> >
> > (b) seek to balance the social and economic benefits of exploiting the sea fisheries resources of the district with the need to protect the marine environment from, or promote its recovery from, the effects of such exploitation,
> >
> > (c) take any other steps which in the authority's opinion are necessary or expedient for the purpose of making a contribution to the achievement of sustainable development, and

[4] Humphreys, J. and May, V. (eds.) 2005, *Proceedings in Marine Science 7: The Ecology of Poole Harbour*, Elsevier, Amsterdam

(d) seek to balance the different needs of persons engaged in the exploitation of sea fisheries resources in the district.

(154) Protection of marine conservation zones

(1) The authority for an IFC district must seek to ensure that the conservation objectives of any MCZ in the district are furthered.

By definition in subparagraph (10) of Section (153), "sea fisheries resources*"* means any animals or plants…that habitually live in the sea, including those that are cultivated in the sea. By definition in sub paragraph (12) of Section (153), any reference to the "exploitation" of sea fisheries resources is a reference to any activity relating to the exploitation of such resources, whether carried out for commercial purposes or otherwise, including…introducing such resources to the sea or cultivating such resources.

Under Section (154) of MaCAA if a fishery within the IFCA District (to include a private or several fishery) is, will, or has the potential to damage an MPA, then it is the IFCA's statutory responsibility to ensure that that site is managed so as to ensure compliance with the relevant legislation. In order to deliver these duties, IFCAs can introduce management measures, specifically the ability to make byelaws (under Section 156) to manage or restrict the several or private fishery rights. Importantly this can be done without the consent of the person enjoying those rights if the right is being exercised in relation to a protected site (Section 158).

In addition, IFCAs can apply for the right of a Several Order under the Sea Fisheries (Shellfish) Act 1967 for the establishment, improvement and the maintenance and regulation of a fishery for shellfish. The Poole Harbour Fishery Order 2015 is an example of this.

2.2.2 National Legislation

Southern IFCA is a Relevant Authority in the management of sites within the National Site Network designated under the Habitats Directive[5] and the Wild Birds Directive[6]. Prior to 2021, these sites were referred to as European Marine Sites and, although the original designations sit under the two pieces of European legislation outlined above, the land and marine aspects of the Habitats Directive and the Wild Birds Directive have been transposed into domestic law by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019[7], which outlines how the National Site Network will be managed and reflects any changes required by EU Exit. The National Site Network sites are in place to protect and support rare and threatened species and rare natural habitat types. Southern IFCA has a statutory responsibility to ensure that fishing activity does not damage, disturb or have an adverse effect on the wildlife and habitats for which these sites are legally protected. Any management introduced should contribute to furthering the conservation objectives of the site, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Directives. This includes the governance of

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[5] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31992L0043:EN:HTML

[6] Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds. http://eur-lex.europa.eu/LexUriServ/site/en/consleg/1979/L/01979L0409-20070101-en.pdf

[7] https://www.legislation.gov.uk/uksi/2019/579/contents/made

the conservation interests of the Poole Harbour SPA when considering any aquaculture practices, current or future.

Section 28G of the Wildlife and Countryside Act (WCA) 1981 (as amended) defines 'section 28G authorities', including Southern IFCA and NE, who have a duty to take reasonable steps, consistent with the proper exercise of their functions, to ensure compatibility of activity with the conservation and enhancement of SSSI and to further the conservation and enhancement of the flora, fauna or geological or physical features by reason of which the site is of special scientific interest. Southern IFCA therefore must consider the conservation and enhancement of the Poole Harbour SSSI when managing aquaculture within Poole Harbour, to include any proposals for leased grounds under 'The Order'.

2.3 Marine Conservation Designations within Poole Harbour

2.3.1 Poole Harbour Special Protection Area

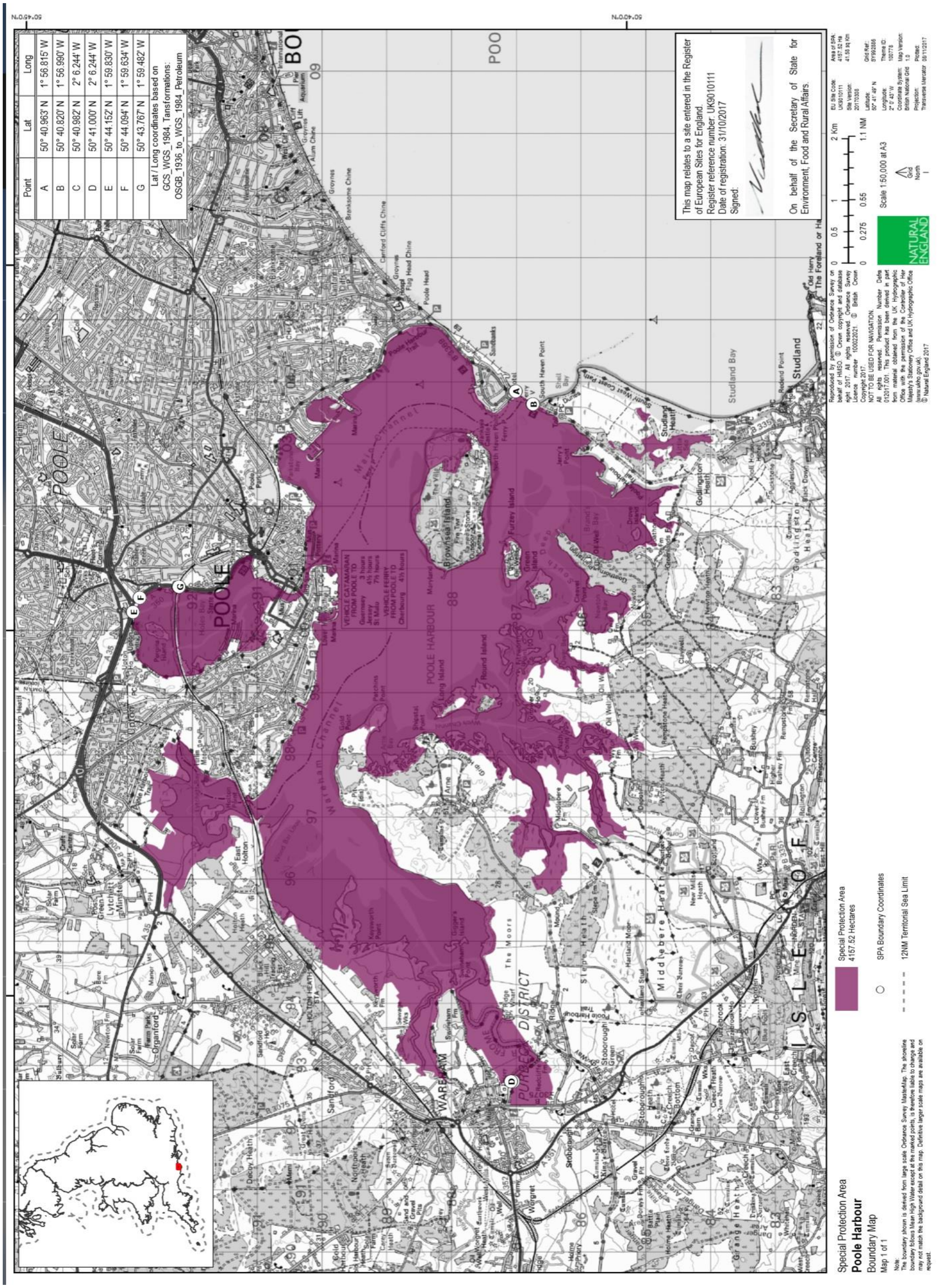
The Poole Harbour SPA qualifies under Article 4.1 of the EU Birds Directive by regularly supporting more than 1% of the Great Britain populations of five Annex 1 species. It also qualifies under Article 4.2 of the EU Birds Directive in that it regularly supports more than 1% of the biogeographic population of two regularly occurring migratory species not listed in Annex 1 and is used regularly by over 20,000 waterfowl (as defined by the Ramsar Convention) or 20,000 seabirds in any season. The species and associated habitats, which qualify Poole Harbour as a SPA, are provided in Tables 1 and 2. Map 1 shows the extent of the Poole Harbour SPA.

The conservation objectives for Poole Harbour SPA are, subject to natural change, to maintain or restore: (1) The extent and distribution of the habitats of the qualifying features; (2) The structure and function of the habitats of the qualifying features; (3) The supporting processes on which the habitats of the qualifying features rely; (4) The populations of the qualifying features; (5) The distribution of the qualifying features within the site.

Table 1: Qualifying features for Poole Harbour SPA
Common Shelduck (non-breeding) *Tadorna tadorna*
Pied Avocet (non-breeding) *Recurvirostra avosetta*
Black-tailed Godwit (non-breeding) *Limosa limosa islandica*
Mediterranean Gull (breeding) *Larus melanocephalus*
Common Tern (breeding) *Sterna hirundo*
Waterbird assemblage
Little Egret (non-breeding) *Egretta garzetta*[8]
Eurasian Spoonbill (non-breeding) *Platalea leucorodia*
Sandwich Terns (breeding) *Thalasseus sandvicensis*[9]

Table 2: Associated habitats for qualifying features	
Coastal lagoons	Mediterranean & thermo-Atlantic halophilous scrubs
Freshwater and coastal grazing marsh	Atlantic salt meadows (saltmarsh)
Spartina swards (saltmarsh)	Intertidal seagrass beds
Intertidal mixed sediments	Intertidal muds
Intertidal sand & muddy sand	Water column

[8] *as identified in the 2001 UK SPA Review*
[9] *these species have been recorded as occurring in internationally important numbers in Poole Harbour and Southern IFCA are advised that as a matter of best practice these additional qualifying features should be given material consideration when assessing impacts of aquaculture on the site*



Map 1: Poole Harbour SPA

2.3.2 Poole Harbour Site of Special Scientific Importance

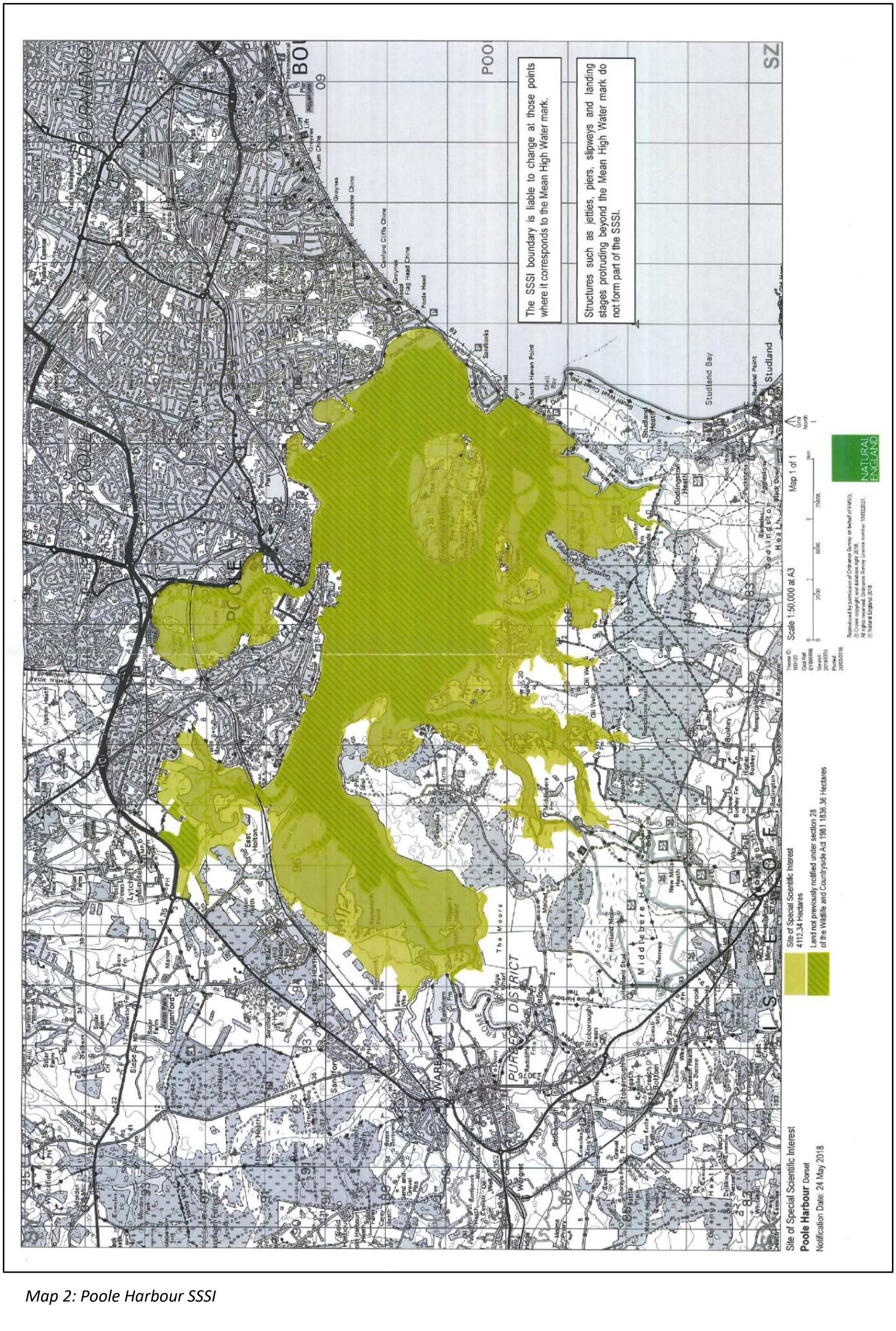
In 1990 Poole Harbour was notified as a SSSI. The qualifying features are listed in Table 3.

Table 3: Qualifying features for Poole Harbour SSSI
Estuarine habitats including marshes, mudflats and subtidal communities
Fringing terrestrial habitats including heathlands and grasslands
Species supported by the above-named habitats including breeding & wintering birds, lichens, rare invertebrates and the red squirrel *Sciurus vulgaris*

On the 24th May 2018 NE notified additional land, considered to be of special interest as part of the Poole Harbour SSSI. The extension encompassed four areas of additional land, the largest of which being subtidal estuarine open water below the Mean Low Water (MLW), which extends to the Harbour mouth in the east and west to where the estuary meets the rivers Piddle and Frome (Map 2). The other three areas of additional land include saltmarsh, wetland and supporting habitats around the fringes of Lytchett Bay and Holes Bay. All four areas have been included in the designation as they support estuarine habitats and/or wintering wildfowl and waders for which the site is designated. The area below MLW is also seen to support other features for which the site is designated including foraging habitats for breeding seabirds and subtidal benthic habitats (such as peacock worm (*Sabella pavonina)* and the eelgrass (*Zostera marina)*. The area is also included for coastal and marine geomorphological processes, as these are seen to be essential for the maintenance of estuarine habitats such as saltmarshes and intertidal mudflats.

In some locations within Poole Harbour, the estuarial and intertidal areas support the following important subtidal benthic habitats:

- **High-density beds of the Peacock worm *Sabella pavonina*** - Widespread within certain mid-stream areas of subtidal channels - These beds are of conservation interest as a habitat for other species. This species is not rare, but Poole Harbour is the best-known location for high-density bed formation.
- **The sponge *Suberites massa* -** This species has been recorded in a number of areas associated with artificial structures, for example in the Blackwater channel in Holes Bay and has been recorded as common in a restricted area in South Deep on the north-west side of Goathorn Point, associated with the American slipper limpet (*Crepidula fornicata)* shells.
- **Intertidal sediments -** These areas are a key estuarine habitat, which comprises a range of biotopes including areas of *Zostera marina*. No nationally scarce species or biotopes have been found within the intertidal sediments; however, the importance comes from the abundance and biomass of annelid worms and bivalve molluscs, which are key prey species for waterfowl.
- **Bird species -** Large areas of intertidal mudflats lie below MLW provide an additional area of food resource for over-wintering waders and breeding water birds on certain tides. Areas of estuarial water below MLW are essential for fish-eating species to feed and rest and key roosting sites are found in saltmarsh areas across the Harbour. Common and Sandwich terns are part of the notified breeding bird interest of the SSSI and are known to forage within the open water of the Harbour and outside the Harbour entrance.



Map 2: Poole Harbour SSSI

3.0 The Poole Harbour Fishery Order 2015

In accordance with Section (1) of the Sea Fisheries (Shellfish) Act 1967, Southern IFCA manage aquaculture activity within a defined area of Poole Harbour under The Poole Harbour Fishery Order 2015 ('The Order'). The Order confers on Southern IFCA the right of several fishery for the cultivation of shellfish of any kind for a period of twenty years from the 1st July 2015. Leases are issued under The Order for a period of five years.

The Order covers an area of 837.8 hectares and allows for the cultivation of aquaculture species, namely 'shellfish' as defined in the MaCAA 2009 as "crustaceans and molluscs of any kind". The main species harvested on the lease beds are Pacific oysters and mussels however, in the past, native oysters, clam species and common cockle have also been farmed and cultivated in Poole Harbour. This definition provided in MaCAA allows Southern IFCA to retain flexibility for shellfish species that could potentially be the subject of future aquaculture activity within the Harbour.

3.1 Ensuring compatibility between aquaculture and MPA designations

The Southern IFCA aims to promote and manage aquaculture in Poole Harbour under The Order with well-structured and appropriate governance that enables Southern IFCA to meet marine nature conservation duties, develop the future potential for aquaculture practice, and seek to better balance the interests of stakeholders.

3.1.1 Poole Harbour SPA

In order to achieve compliance with statutory duties under the Habitats Directive (as detailed in Section 2.2.2 of this document), Southern IFCA produce a Habitats Regulation Assessment[10] (HRA), which is an assessment of the potential impacts of the proposed aquaculture activities and any mitigating measures proposed by Southern IFCA in order to demonstrate compatibility with the Poole Harbour SPA. The HRA is developed in consultation with NE who provide formal advice to Southern IFCA prior to NE ratifying the HRA.

Management Plan 1 & 3 (Section 7.0 of this document) provide a summary of advice received from NE with regard to the Poole Harbour SPA since 2015. A summary response to this advice is provided by Southern IFCA and a description of management measures Southern IFCA have adopted to mitigate interactions between aquaculture operations and the Poole Harbour SPA.

The most recent HRA accompanying the Tranche 2 Lease Bed Reallocation Programme can be found on the Southern IFCA website. This HRA has been updated (April 2021), following receipt of NE's formal advice received December 2020, specific to aquaculture activities taking place on newly designated lease beds and includes 'Evidence Packages' which are specific in demonstrating how the newly allocated lease beds under Tranche 2 are compatible with the conservation objectives of the SPA.

[10] Document available from Southern IFCA

3.1.2 Poole Harbour SSSI

In the absence of a formal assessment process for SSSIs at the time The Order was introduced; in order to demonstrate compliance with statutory duties under the WCA (1981) (as detailed in Section 2.2.2 of this document), consideration of the potential interaction between aquaculture activity and the designated features of the Poole Harbour SSSI were recorded in the HRA. For the purposes of issuing Tranche 2 leases, SSSI assessments will continue to be considered under the HRA. Management Plan 2 & 3 in Section 7.0 of this document provides a summary of the advice received from NE since 2015.

To coincide with the extension of the SSSI in 2018, a joint Site Management Statement (SMS)[11] for Poole Harbour was formalised in 2018. The SMS is a public statement, which was prepared, jointly by Southern IFCA and NE in order to outline the management position in relation to fishing activity (to include aquaculture) operating within the Poole Harbour SSSI expansion. Management Plan 2 in Section 7.0 of this document provides a summary of the advice received since 2018 and the management measures taken by Southern IFCA in response.

3.1.3 Poole Harbour RAMSAR Site

Management Plan 4 in Section 7.0 of this document provides a summary of advice received from NE with regard to the Poole Harbour RAMSAR site since 2015 and a summary response to this advice provided by Southern IFCA.

3.2 Management of species subject to aquaculture activity

3.2.1 Pacific Oysters

Pacific oysters (*Magallana gigas*) have been farmed in Poole Harbour prior to the site being designated as a SSSI in 1990. Within the grounds leased by Southern IFCA there are a number of beds on which *M. gigas* are currently farmed, in a process in which the species is grown from spat at a facility before being laid directly on the seabed once individuals have reached a certain size.

The Pacific oyster is defined as an invasive non-native species and is categorised as a 'medium risk' under the Water Framework Directive by the UK Technical Advisory Group and a 'moderate risk' by the GB Non-Native Species Secretariat.

Management Plan 5 in Section 7.0 of this document provides a summary of advice received from NE in 2017 and 2020 with regard to the farming of *M. gigas* within Poole Harbour.

A Pacific Oyster survey by the University of Southampton was undertaken during 2021, with sampling extending into early 2022. This survey work has been referenced in previous versions of this Management Plan. Based on an understanding of resource requirements, the methodology required to collect appropriate data and an ability to robustly review the data to help inform any reviews of the Management Plan, it has been determined that the data from this survey along with a consideration of any requirements for further monitoring work on this species will be reviewed as part of the wider process of developing the lease program for the period 2025-2030, with this work due to commence in the autumn of 2023.

[11] Document available from Southern IFCA

3.4 Ensuring compatibility between aquaculture and other water users

Working in partnership with Poole Harbour Commissioners (PHC), a risk assessment has been undertaken in order to manage and mitigate the interactions between aquaculture practice and other water users operating within an area of Poole Harbour designated as an area for personal watercraft. Management Plan 6 in section 7.0 of this document provides details on the management measures Southern IFCA will be taking forward in order to mitigate interactions.

3.3 Ensuring compatibility between aquaculture and biosecurity

Southern IFCA has produced a Biosecurity Plan covering the full extent of The Order. The document outlines the types of activities occurring in Poole Harbour and the potential risks associated with these activities, as well as inspection and mitigation procedures for the movement, laying and removal of sea fisheries resources in the proposed area. This is a standalone document[12].

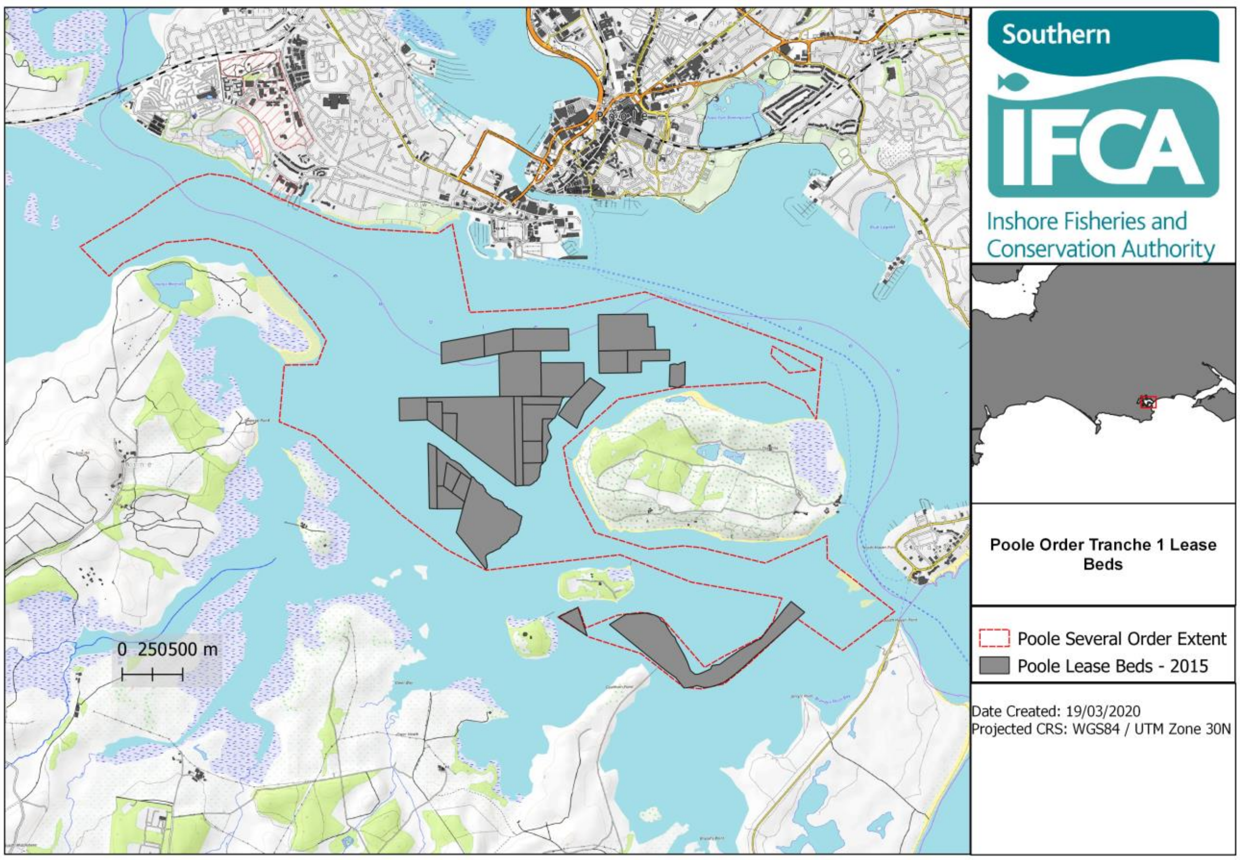
The IFCA work with the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) to conduct inspections of lease beds allocated under The Order. The process by which inspections will be carried out and the requirements on the rights holder for the inspection are set out in the conditions of the lease issued by Southern IFCA.

[12] Document available from Southern IFCA

4.0 Management under Tranche 1: 2015-2020

In 2015, under The Order, the first tranche (T1) of lease beds were allocated to nine companies or individuals for a period of five years, under the Terms of the Lease of Right of Several Fishery of Shellfish Laying in Poole Harbour. Under these Terms the T1 leases terminate on the 30th June 2020.

The footprint of the T1 beds (Map 3) replicated the lease bed allocations under the former Poole Fishery Order 1985 (which expired in 2015). Under T1, 31 lease beds were sub-leased from Southern IFCA with the consent of the Commissioners of Crown Lands under the provisions of the Southern IFCA lease from the Crown. Annex 2 provides a map of the 31 T1 bed allocations.



Map 3: Tranche 1 Lease Beds (2015-2020)

5.0 Management under Tranche 2: 2020-2025

5.1 T2 Lease Application Process

The second tranche (T2) of lease bed allocation will begin on the 1st July 2020 and expire on the 30th June 2025.

5.1.1 Expressions of Interest

In December 2019 Expressions of interest (EOI) were invited from T1 leaseholders; the basis of which was to enable Southern IFCA to determine whether T1 leaseholders intended to apply for lease grounds under T2 of lease bed allocation. In addition, the EOI sought to provide confirmation that any T1 leaseholders wishing to apply for a T2 lease had a full understanding of the following:

1. Of the terms under which a T2 application would be considered;
    a) Which may include the need for closure and reallocation of an existing T1 lease bed if subtidal benthic habitats are present (Lease Bed Reallocation Plan);
    b) That the boundaries of the T2 beds will be defined using WGS84 coordinates and as a result, the existing T1 boundaries may be subject to change;
    c) That the annual fee based upon price per hectare may be subject to change;
    d) The requirement for T1 holders to provide a Business Plan 2020-2025 and an ‘End of T1 Lease’ Report;
    e) There may be a monetary fee required at the point of application.
    f) That consideration of lease allocation under T2 will be subject to applicants meeting specific and comprehensive criteria;
    g) That each application will be considered on its own merits with Southern IFCA reserving the right to consider the proposals contained within the application in accordance with their statutory responsibilities.
2. The timelines for application.

5.1.2 Application Criteria

Consideration of the allocation of lease beds under T2 is subject to the production of the documentation outlined in this section at the time of application. Southern IFCA invited applications between the 7th February and the 3rd April 2020.

5.1.2.1 A Business Plan 2020-2025

A comprehensive Business Plan must be provided at the point of application. Reference to the following must be included in the Business Plan:

i. **Executive summary** providing an overview of your proposed business and plans.
ii. **Methodology** to include:
    a. The target species to be grown and harvested;
    b. Details of supplier of seeds for laying;
    c. Details of buyers/target market of the harvested product;
    d. Specification of vessel(s) and platforms to be used; and
    e. Details of equipment used in both laying of seeds and harvesting of seeds (please note that the proposed activity must not place any structure on the seabed).
iii. **Company and management summary**
    a. Details of the leaseholder and any other personnel involved in aquaculture operations.
iv. **Financial forecast**

a. Funding and demonstrable sources of funding.
b. The projected quantities of each species to be broken down into annual forecasts for years 2020 to 2025:
   i. kg/year seeding forecast;
   ii. kg/year harvesting forecast; and
   iii. Identification of any variables, which may compromise the achievement of annual forecasts.

v. Details of how the proposed business operations are compatible and consistent with the following **conservation considerations**:
a. Applicants will need to demonstrate compatibility with the Southern IFCA HRA, in that there will be no significant impact on the Poole Harbour Special Protection Area (SPA) as a result of proposed business operations; and
b. Compatibility with the special interest of the Poole Harbour SSSI.

vi. **Safety**
a. A Safety Plan to demonstrate that appropriate safety measures are in place for the proposed activity; and
b. To provide evidence of permissions granted by Poole Harbour Commissioners (PHC) for the use of a commercial vessel within Poole Harbour, under the Registration of Small Commercial Craft[13], registration via https://phc.co.uk/webforms/register/.

vii. A **Biosecurity Plan** to detail the processes by which the lease bed operator will ensure that their activities are consistent with best practices and legal requirements.

5.1.2.2 End of Tranche 1 Lease Report

A comprehensive End of T1 Lease Report must also be provided at the point of application, with reference to the following to be included:

i. **Summary of business operations** under the T1 lease.

ii. Demonstration of how leaseholders **met their 2015-2020 Business Plan**
a. Where projected seeding and harvesting forecasts weren't met, to provide detail on:
   - How and why projected forecasts (seeding and harvesting) weren't realised;
   - Any lessons learnt.
b. Future mitigation considerations for proposed business operations under T2.

5.2 T2 Lease Bed Allocation

Consideration of lease allocation under T2 is subject to applicants meeting the criteria detailed in this Management Plan. Following submission of relevant documentation, all applications will be subject to an assessment undertaken by the Southern IFCA. This process will be carried out with each application being considered on its own merits and Southern IFCA reserves the right to consider the proposals contained within the required documentation in accordance with their statutory responsibilities. These duties are detailed under Sections (153), (154) and (166) of the Marine and Coastal Access Act (2009), which includes any provision made by or under The Poole Harbour Fishery Order 2015 under Section 1 of The Sea Fisheries (Shellfish) Act 1967, conferring

[13] '*…For the purpose of promoting or securing conditions conducive to the… safety of navigation…persons and property in the harbour, PHC seek to ensure that all commercial craft operating within Poole Harbour are properly maintained, equipped and manned and used only for the purposes for which they are capable…*' Extract taken from the General Direction – Registration of Small Commercial Craft.

the right of regulating a fishery, as well as with specific regard to its duties as the competent and relevant authority for the governance of the conservation interests of the Poole Harbour SPA and the Poole Harbour SSSI, the former under Section 9(3) of the Conservation of Habitats and Species Regulations 2017 and the latter under Sections (28G) and (28I) of the Wildlife and Countryside Act 1981. More details on statutory duties can be found in Section 2.2 of this Document.

The Authority reserves the right to consider the proposals contained within documents and plans submitted by applicants in terms of the risk to the conservation interests of the site and any mitigation proposed to avoid deterioration of notable communities, such as peacock worm (*Sabella pavonina*). Where mitigation is proposed to avoid active use of ground to ensure that such communities are maintained, Southern IFCA will consider the transfer of the lease in question within the extent of The Order and in so doing, recognises the risk to the Authority of not attaining its duties under Section (153) of MaCAA 2009 by causing unnecessary and unsustainable damage to the marine environment.

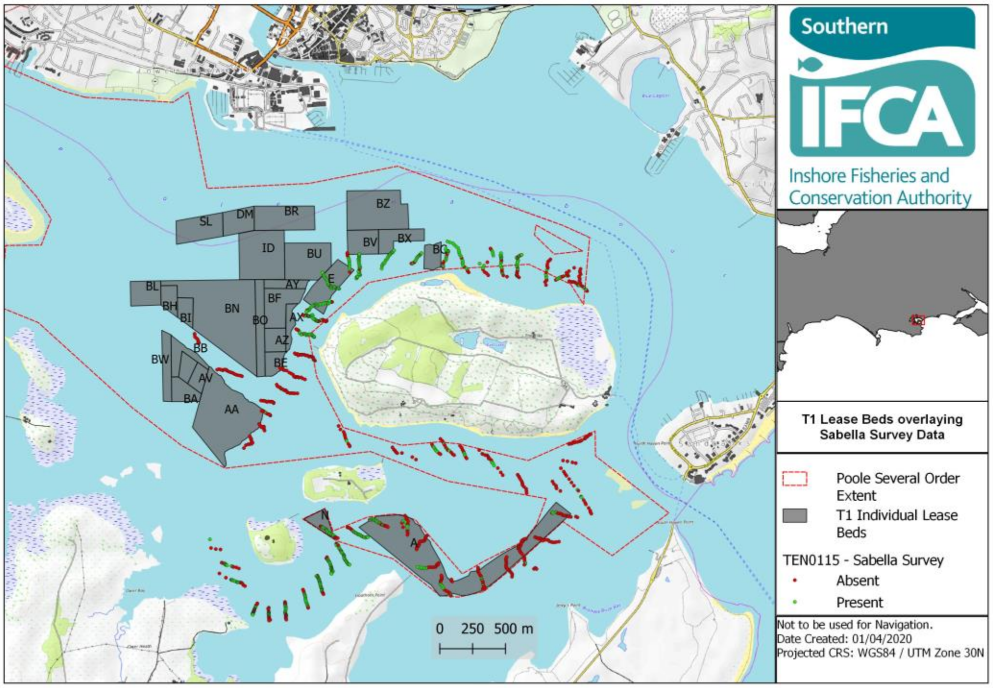
5.2.1 Tranche 2 Lease Bed Reallocation Plan

Following the Poole Harbour SSSI extension in 2018; below MLW, encompassing subtidal estuarial waters and lower shore intertidal mudflats, which support subtidal benthic habitats such as *S. pavonina* and intertidal sediments; advice from NE was that no aquaculture is to be allowed to operate in areas of *S. pavonina* beds and in areas of associated sponge communities including *Suberites massa*. In addition, where lease beds overlay areas of intertidal sediments the impact of aquaculture must be considered to ensure that there is no adverse effect on the integrity of the site.

In direct response to the advice received by NE, as documented in Section 7.1 of the Site Management Statement, under the T2 Lease Bed Reallocation Programme Southern IFCA will close three of the T1 lease beds highlighted by NE to be affected by *S. pavonina.* The total area of these closures equates to 32.4 hectares. The footprint of these areas will receive permanent protection from bottom-towed fishing through separate management.

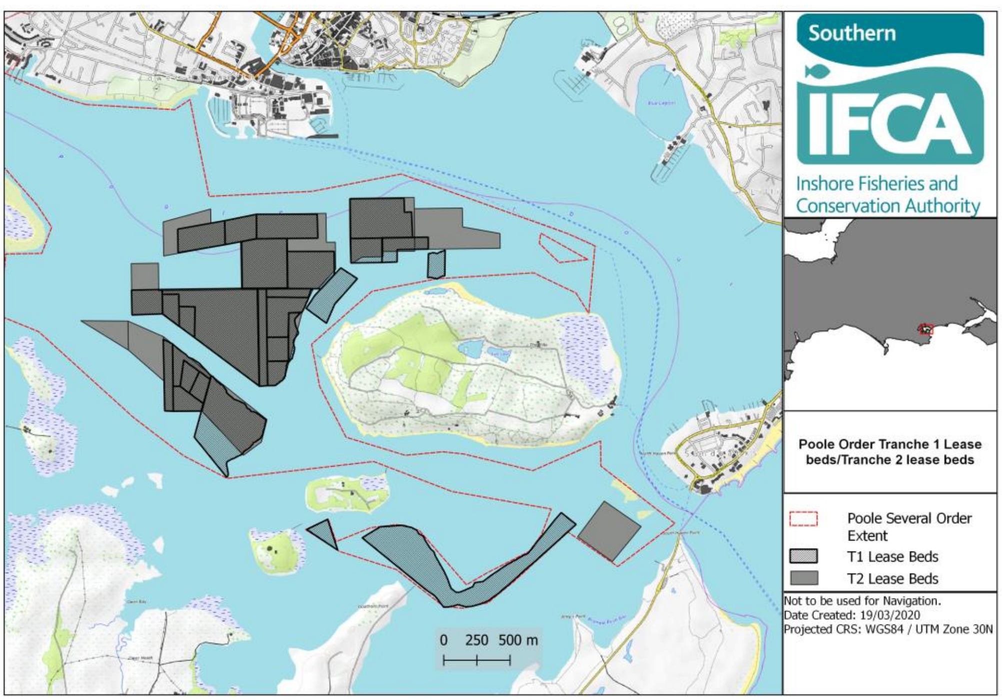
In addition, following Southern IFCAs undertaking of a *Sabella* survey (Map 4) in the vicinity of the Poole Harbour T1 lease beds:

- One other T1 lease bed requires full closure and reallocation (to coincide with the second tranche of lease bed allocation), due to the presence of *S. pavonina*. The total area equates to 9.8 Hectares. The footprint of these areas will receive permanent protection from bottom-towed fishing through separate management;
- Two T1 lease beds require part closure and reallocation (to coincide with the second tranche of lease bed allocation), due to the presence of *S. pavonina.* The total area equates to 1.77 Hectares;
- One T1 lease bed requires part closure and reallocation due to its location on intertidal sediments. The total area equates to 7.09 Hectares.

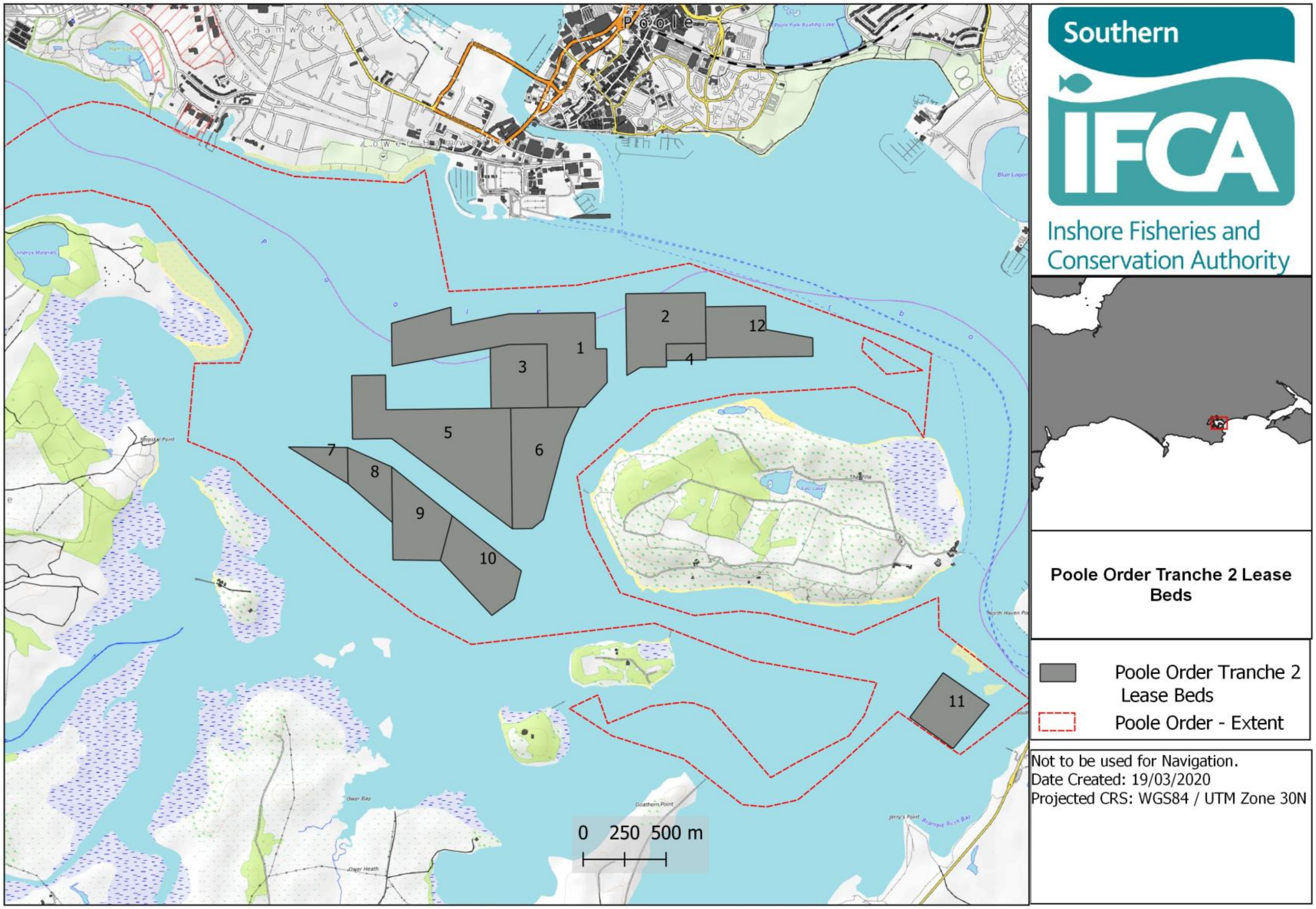


Map 4: Presence and absence of Sabella pavonina in Poole Harbour (specific to the vicinity of T1 lease beds)

Map 5 overlays the T2 Lease beds with the T1 lease beds, in order to demonstrate where T1 lease beds have been closed and reallocation has occurred as a result of the presence of *Sabella pavonina*. Map 6 shows the proposed footprint of the T2 lease beds. More detailed charts and coordinates for each of the proposed beds are contained within the Annex 3 of this document.



Map 5: The footprint of Tranche 1 (2015-2020) vs. Tranche 2 (2020-2025) lease beds



Map 6: Tranche 2 Lease beds (2020-2025) More detailed charts and coordinates for each bed are available in Annex 3

5.3 Conditions on Lease Holders under Tranche 2

Each leaseholder is managed under the terms of a 'Lease of the Right of Several Fishery of Shellfish Laying'. The lease agreement documents the provisions and management measures that the Lessee must observe. These may be general conditions, or specific to individual lease beds and may include, but are not limited to:

a) The requirement for leaseholders to use and manage the lease beds in accordance with the provisions submitted in the lease holders Business Plan (as submitted at the time of application);
b) Restrictions on the removal of shellfish, to include compliance with minimum conservation reference sizes and the identification of persons permitted to remove shellfish;
c) Compliance with species-specific measures, such as measures specific to the farming of Pacific oysters;
d) Compliance with vessel length requirements;
e) The requirement for leaseholders to specify in writing any proposed changes in methodologies within a specified time frame to enable Southern IFCA to ensure compatibility of methodologies with the conservation objectives and biosecurity objectives of the site;
f) Compliance with temporal or spatial measures, in order to reduce water user interactions in Poole Harbour;
g) Compliance with temporal or spatial measures, in order to mitigate against interactions between conservation objectives of the SPA and the specific methodologies employed by leaseholders;
h) The requirement for leaseholders to mark and maintain the limits of lease bed boundaries;
i) Compliance with any issues detailed in the HRA within a given timeframe;
j) The requirement for leaseholders to facilitate inspections;
k) Requirement for all relevant leaseholder(s) who relay shellfish from the wild fishery in Poole Harbour to provide documentation in line with conditions specified in the lease;
l) The requirement for all relevant leaseholders who relay shellfish from the wild fishery to notify Southern IFCA, in line with the conditions of the lease, prior to undertaking any activity.

Leaseholders will be required to comply with all conditions outlined in the lease issued by the Authority. These conditions may be specific to a particular area of lease ground. Any leaseholder that contravenes any conditions may, at the discretion of the Authority, have the lease revoked and any lays shall return to the possession of the Authority.

5.3.1 Dispensations

The Authority, in its sole discretion, may consider issuing a dispensation, following an application made in writing to The Authority, from the leaseholder. Leaseholders may apply for dispensations for the following purposes:

a) The replacement of a Main Vessel;
b) The use (to be time-limited and activity specific) of an Ancillary Vessel;
c) The replacement of an Ancillary Vessel;
d) The removal of shellfish less than that specified in the lease.

5.3.2 Compliance with Conditions

Under Section (166) of the Marine and Coastal Access Act 2009, an Inshore Fisheries and Conservation Officer (IFCO) has the powers to enforce any provision made by or under Section 1 of the Sea Fisheries (Shellfish) Act 1967 conferring the right of regulating a fishery and whilst enforcing The Order, has common enforcement powers. Any person operating under The Order is subject to the provisions under section 292 of MaCAA (2009).

Southern IFCA Officers may monitor the area covered under The Order at any time and formal inspections of areas leased will be conducted as appropriate with additional inspections forming part of routine compliance patrols of the Harbour.

7.0 Management Plans

<table>
<tr><th colspan="4">Management Plan 1: Aquaculture and the Poole Harbour SPA Designation</th></tr>
<tr><td rowspan="3">Disturbance caused by human activity</td><td colspan="3">Frequency, duration and/or intensity of disturbance affecting foraging and roosting overwintering waterbird assemblage, avocet, black-tailed godwit, shelduck and little egret should not reach a level which significantly affects the feature.</td></tr>
<tr><td>NE Advice (2015)</td><td>Southern IFCA Response (2015)</td><td>Management Measures</td></tr>
<tr><td>“…it cannot be dismissed that boat movements used for aquaculture together with other disturbance factors would not cause a significant disturbance to the features of the SPA when taking place in proximity to key feeding and roosting habitats. Aquaculture activity could cause noise and visual disturbance (either alone or in combination with other plans and projects) to the features listed above when taking place at key times of the year for the overwintering birds and in proximity to important feeding and roosting sites…”.</td><td>The extent of The Order excludes areas designated as ‘Bird Sensitive Areas’ in the Poole Harbour Aquatic Management Plan[14] to avoid disturbance to bird species during key sensitive periods. The majority of these areas are also closed to shellfish dredging and hand raking through the Southern IFCA byelaw ‘Prohibition on using or carrying a shellfish dredge, scoop or handrake in certain areas of Poole Harbour’* ensuring that disturbance in these areas is further minimised. Existing aquaculture activity in the Harbour also does not take place within these defined areas.

*The Byelaw applicable in 2015 has since been replaced by The Poole Harbour Dredge Permit Byelaw and the Poole Harbour Hand Gathering Byelaw</td><td><u>Relevance to the extent of The Order (2015):</u>
No action required

<u>Relevance to T1 lease beds (2015-2020):</u>
No action required

<u>Relevance to T2 lease beds (2020-2025):</u>
See Management Plan 3</td></tr>
<tr><td rowspan="3">Extent and distribution of supporting non-breeding habitat</td><td colspan="3">The extent and distribution of suitable habitat which supports overwintering waterbird assemblage, avocet, black tailed godwit, shelduck and little egret for all stages of the non-breeding period (moulting, roosting, loafing and feeding) is maintained.</td></tr>
<tr><td>NE Advice (2015)</td><td>Southern IFCA Response (2015)</td><td>Management Measures</td></tr>
<tr><td>“…eelgrass beds within the intertidal sediment communities in Poole Harbour are known to support fish eating species such as red breasted mergansers as well as providing a food source for dark bellied Brent geese. Physical damage could occur from laying of shellfish and structures support aquaculture on intertidal sediment communities including eelgrass beds. In addition, shallow inshore waters provide important feeding and roosting habitats, some aquaculture practices could potentially have an impact on the extent of this habitat e.g. where floating structures are causing a loss in the extent of the habitat...”</td><td>The extent of The Order excludes the eelgrass beds in the Harbour. These beds are protected from bottom towed fishing gear and hand gathering under the Southern IFCA byelaws ‘Bottom Towed Fishing Gear Byelaw*’ and ‘Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw’ respectively. Aquaculture activity currently taking place in Poole Harbour does not occur over this feature.

* The Bottom Towed Fishing Gear Byelaw has since been replaced by The Bottom Towed Fishing Gear Byelaw 2016</td><td><u>Relevance to the extent of The Order (2015):</u>
No action required

<u>Relevance to T1 lease beds (2015-2020):</u>
No action required

<u>Relevance to T2 lease beds (2020-2025):</u>
See Management Plan 3</td></tr>
<tr><td rowspan="3">Extent and distribution of supporting</td><td colspan="3">The extent, distribution and availability of breeding habitat which supports common tern, sandwich tern and Mediterranean gull for all stages of their breeding cycle (courtship, nesting and feeding) is maintained.</td></tr>
<tr><td>NE Advice (2015)</td><td>Southern IFCA Response (2015)</td><td>Management Measures</td></tr>
<tr><td>“…shallow inshore waters provide key feeding habitat for breeding common and sandwich terns and Mediterranean gull. Some aquaculture</td><td>Shallow inshore waters will be included within the extent of The Order however areas where species are seen to preferentially feed will be assessed against the positioning of individual lays</td><td><u>Relevance to the extent of The Order (2015):</u>
No action required.</td></tr>
</table>

[14] http://www.pooleharbouraqmp.co.uk/viewplan.html

<table>
<tr><td>breeding habitat</td><td>practices could potentially have an impact on the extent of this habitat e.g. where floating structures area causing a loss in the extent of the habitat...”</td><td>and proposed activity within those lays. Lays which are to be included in the Tranche 1 allocation do not currently use floating structures and this will be considered against the business plans proposed through this tranche.</td><td><u>Relevance to T1 lease beds (2015-2020):</u> Methodologies in Business Plans screened and assessed to ensure floating structures are not an intended practice.

<u>Relevance to T2 lease beds (2020-2025):</u> Methodologies in Business Plans screened and assessed to ensure floating structures are not an intended practice.</td></tr>
<tr><td rowspan="3">Breeding population (productivity and survival)</td><td colspan="3">Overall breeding productivity and adult survival is at a level which is consistent with maintaining the structure and abundance of the population of Mediterranean gulls at or above its current or target level, whichever is the higher at all stages of its breeding cycle (courtship, nesting and feeding) is maintained.</td></tr>
<tr><td>NE Advice (2015)</td><td>Southern IFCA Response (2015)</td><td>Management Measures</td></tr>
<tr><td>“…disturbance of Mediterranean gull nesting sites from boat movements for aquaculture taking place in proximity to Seagull Island could cause a decline in the annual productivity or breeding success of the population and this may adversely affect the overall size and age-structure of the breeding population and its long-term viability…”.</td><td>The extent of The Order excludes the area of Seagull Island and Brownsea Lagoon. The extent into the Wareham Channel is deemed to be of a distance great enough not to cause disturbance to the Mediterranean gull by remaining in the area of the channel and avoiding areas designated as intertidal sediment. Lays proposed under tranche 1 allocation are not within proximity to Seagull Island or Brownsea Lagoon.</td><td><u>Relevance to the extent of The Order (2015):</u>
No action required

<u>Relevance to T1 lease beds (2015-2020):</u>
No action required

<u>Relevance to T2 lease beds (2020-2025):</u>
No action required</td></tr>
<tr><td rowspan="3">Food availability (function and supporting processes)</td><td colspan="3">Maintain the overall prey availability of key prey species of preferred prey sizes which supports overwintering water bird assemblage, avocet, black-tailed godwit, shelduck and little egret and breeding common tern, sandwich tern and Mediterranean gull.</td></tr>
<tr><td>NE Advice (2015)</td><td>Southern IFCA Response (2015)</td><td>Management Measures</td></tr>
<tr><td>“…sediment disturbance as a result of aquaculture (and in combination with other fishing activities) can potentially impact o bird prey availability, prey size and the bird’s ability to forage over intertidal sediment communities and shallow inshore waters. This can be through removal (mortality) or target and non-target species and impacts on non-target prey availability through changes in habitat structure of the intertidal sediment communities. In addition, aquaculture practices could also potentially affect the water quality which in turn could impact on the prey availability…”.</td><td>The extent of The Order excludes the supporting habitats designated for the SPA; areas of intertidal sediment above mean low water (other than that already used for aquaculture), reed bed and saltmarsh are not contained within the extent. Lays under the Tranche 1 allocation have been in place for a period of 30 years and therefore under The Order will have a minimal impact on prey availability and habitat structure as the seabed within these lays is already well defined and developed for aquaculture. Currently under the Tranche 1 lays there are no structures placed on the seabed, which may affect prey availability access, the majority of these areas are also not exposed at low tide making them unsuitable for foraging. Currently there are no structures placed on the seabed for aquaculture, should this be proposed in the future, the IFCA will require a lease from the Crown Estate to cover the ground where structures would be placed, consideration will also be made to the impact on the available sediment on the placing of these structures.</td><td><u>Relevance to the extent of The Order (2015):</u>
No action required

<u>Relevance to T1 lease beds (2015-2020):</u> Methodologies in Business Plans to be screened and assessed to ensure structures are not placed on the seabed.

<u>Relevance to T2 lease beds (2020-2025):</u>

• Methodologies in Business Plans screened and assessed to ensure structure placed on the seabed are not an intended practice.

• See Management Plan 3</td></tr>
</table>

Management Plan 2: Aquaculture and the Poole Harbour SSSI

<table>
<tr><th>NE Advice (2015)</th><th>Southern IFCA Response (2015)</th><th>Management Measures</th></tr>
<tr>
<td>In addition to the overwintering birds the SSSI is designated for nesting birds using the fringing reed bed and saltmarsh habitats of Poole Harbour and several marine invertebrate species. Natural England advise that aquaculture has the potential to damage the breeding bird assemblage feature through disturbance in proximity to their nesting and feeding sites. Additional notable communities, including Sabella, have been identified in some channels in the Harbour. Natural England advise that proposals for aquaculture could potentially damage these communities.</td>
<td>The extent of The Order excludes reed bed, saltmarsh and key areas of intertidal sediment. The extent also excludes areas defined as 'Bird Sensitive Areas', which are also closed to shellfish dredging and hand raking, removing disturbance impacts and providing an area for nesting and feeding sites. Any proposals for aquaculture activity will be considered in relation to any notable communities' present in designated areas.

In addition to the above considerations, Southern IFCA are advised that bird count data analysed by Natural England in 2012 indicates declines in numbers of overwintering birds in sectors of the Harbour. The areas of Lychett Bay and Brands Bay were highlighted; these areas are excluded from the extent of The Order.

Mid-stream areas of the subtidal channels of Poole Harbour have high-density beds of the polychaete Sabella species. These are particularly widespread in the South Deep area and are of particular conservation interest as a habitat for other species (Dyrynda 1991). The species itself is not rare but Poole Harbour is the best-known example of where the species form high-density beds with a substantial associated fauna. As such they exhibit a high species richness and diversity, with the tubes colonised by seaweeds, sponges (including the rare Suberites massa), bryozoans and ascidians while crabs and fish are associated with these Sabella beds. (Dyrynda 1991; Baldock, 2016). Sabella pavonia is not a feature if the SSSI, however it supports the features and habitats of the designation and should be maintained in favourable condition, therefore any damage to Sabella beds constitutes damage to the feature and should be maintained.</td>
<td rowspan="3"><u>Relevance to the extent of The Order (2015):</u>
No action required

<u>Relevance to T1 lease beds (2015-2020):</u>
Voluntary non-farming of the following lease beds: A, E, N (39.8 Hectares) to account for the presence of Sabella. Provision written into Business Plan

<u>Relevance to T2 lease beds (2020-2025):</u>
(1) Specific objectives for ongoing and future aquaculture management were outlined in the Site Management Statement. It is these management objectives that are being taken forward in the Lease Bed Reallocation Programme 2020 and will coincide with the second Tranche (T2) of lease bed allocation under The Order, as well as the introduction of new lease conditions.

<u>(i) Full closure of:</u>
• T1 beds A, E, N: due to presence of Sabella pavonina (equating to 39.8 hectares) in South Deep and Wych Channel.
• T1 bed BC: due to presence of Sabella pavonina (equating to 2.4 hectares) within Wych Channel.

The footprint of these areas (A, E, N, BC) will be considered for management as part of the Bottom Towed Fishing Gear Review: Phase II, which is currently underway. The scope of Phase II of the review and the process for the phasing of the BTFG review is outlined in the Management Intentions Document for the BTFG Byelaw 2023, available on the Southern IFCA website[15].

<u>(ii) Part closure of:</u>
• T1 bed BV: due to the presence of Sabella pavonina (equating to 0.85 hectares) within Wych Channel
• T1 bed BX: due to the presence of Sabella pavonina (equating to 0.92 hectares) within Wych Channel
• T1 bed AA: (equating to 7.09 hectares) due to location in relation to intertidal sediments, which under the SSSI are key estuarine habitats, which comprise a range of biotopes including areas of Zostera marina. In addition, intertidal mudflats provide important areas for wintering waders and breeding rare birds in certain tides.</td>
</tr>
<tr><th colspan="2">NE and Southern IFCA Site Management Statement (2018)</th></tr>
<tr><td colspan="2">Within Poole Harbour there are a number of areas where Sabella pavonina has been located. Advice received from Natural England was that aquaculture practice could potentially damage the Sabella pavonina beds. With the SSSI extension below mean low water and a clearer understanding of the location of Sabella pavonina beds and associated important sponge communities including Suberites massa, the advice from Natural England is that no aquaculture is to be allowed to operate in these areas. In addition, where lease beds overlay areas of intertidal sediments the impact of aquaculture must be considered to ensure that there is no adverse effect on the integrity of the site. This advice is clarified in a Site Management Statement[16], which is a public statement prepared jointly by Southern IFCA and Natural England in order to outline the management position in relation to fishing activity (to include aquaculture) operating within the Poole Harbour SSSI expansion, as notified on the 24th May 2018.

The Joint Management Statement was agreed at the Meeting of the Full Authority in December 2018.</td></tr>
</table>

[15] BTFG Byelaw 2023 - Management Intentions Document

[16] Document available from Southern IFCA

	(2) See Management Plan 3

Management Plan 3: Aquaculture and the Poole Harbour SPA and SSSI Designations 2020 update

NE Advice on interactions between overwintering birds and Lease Beds 7, 8 and 12 (December 2020)

"*…the key period of the year for most overwintering bird features in Poole Harbour SPA is between September and March. Based on this…there is a clear overlap in terms of the presence of protected bird features and the planned 'cleaning' and 'harvesting' operations. Due to the location of these lease beds (7, 8, 12)) these activities could be impacting potentially important SPA supporting habitat if bird features are using these areas. We appreciate that these lease beds are below the mapped mean low water mark but parts are above chart datum and could be exposed at certain times over the winter. There is evidence that although rarely exposed, these lower shore habitats can provide an extremely dense and therefore valuable source of prey items for wildfowl and waders…'*

NE advice specific to Lease Beds specified	Southern IFCA Response (2020)	Management Measures
Lease Bed 12: ***<u>Feeding and Prey Availability:</u>*** *'…based on the anecdotal evidence provided by local ornithologists, NE understands that few of the protected features use this area and the key species are red-breasted merganser and goldeneye. Given the preferred prey for both bird species (fish and various invertebrates including M.edulis respectively), NE…concludes that the prey availability and the ability of bird features to prey on species using the area around lease bed 12 will not be impacted by planned operations…'* ***<u>Night-time rafting:</u>*** *'…Natural England recognises that vessel-based activity such as dredging will take place at high water, during day light hours (and any night-time activity will only take place April to May) and since the nearest area of exposed supporting habitat is likely to be some distance away (ca. 500m), pressures related to disturbance of birds using the intertidal supporting habitat such as 'visual disturbance' and 'above water noise' are not likely to be relevant. In addition, any rafting species such as red-breasted merganser and goldeneye that could aggregate to roost on the water will not be disturbed due to operations only taking place in daylight hours.* ***<u>Conclusion</u>****: '…Natural England recognises that while there will be impacts associated with lease bed operations, it can be confidently concluded that, given the proposed methods of aquaculture being employed, the species being farmed and the mitigation implemented, these impacts are not significant and will not adversely affect integrity of the SPA. Natural England therefore agrees with SIFCA's conclusion…'*	The most recent HRA 2020 (updated February 2021, following the receipt of NE's formal advice in December 2020) can be found on the Southern IFCA website This updated version of the HRA includes 'Evidence Packages' demonstrating how the newly allocated lease beds under Tranche 2 are compatible with the conservation objectives of the SPA.	**<u>Relevance to T2 lease beds (2020-2025):</u>** **Seasonal and Temporal Restriction: Lease Bed 12** Prohibition of aquaculture activity outside of the hours 20:00 to 08:00 daily, during the calendar months April, May, June, July, August and September.
<u>Lease Bed 7&8:</u> ***<u>Feeding and Prey Availability:</u>*** ***'…****As above (re: bed 12) and using the same rationale Natural England agrees with SIFCA's conclusion that prey availability and the ability of bird features that use the area (specifically red-breasted merganser and goldeneye) to prey on species using the area around lease bed 7 and 8 will not be impacted by planned aquaculture operations…'* **<u>Night-time rafting:</u>** *'…since all activities are proposed to take place between 08:00-16:00 NE concludes that aquaculture operations will not present a risk to any bords using the area for rafting at night as there will be no interaction, and therefore no disturbance.* **<u>Abrasion:</u>** *'…While not specifically supporting habitat for SPA features, Natural England supports the SIFCAs proposed measure to require leaseholders to carry out any lease bed 'cleaning' operations (i.e. one off dredging to flatten the*		**<u>Relevance to T2 lease beds (2020-2025):</u>** **Seasonal and Temporal Restriction: Lease Beds 7&8** Prohibition of 'bed cleaning' during the calendar months September, October, November, December, January, February and March.

seabed and remove undesirable material of permanently submerged seabed), after winter after the over-wintering birds have largely left the site. NE advises that ideally this should take place after March in order to avoid the over-wintering period as set out in the seasonality table in Natural England's conservation advice for the site. As demonstrated as part of this Appropriate Assessment, although the time spent 'cleaning' these beds over these months is considered to be small, and resulting pressures unlikely to impact prey availability, by avoiding this period goldeneye can use the lease beds for feeding without any disturbance at all. This will further reduce any residual impacts on the waterbird assemblage feature...' ***Conclusion****: '…Natural England recognises that while there will be impacts associated with lease bed operations, it can be confidently concluded that, given the permanently submerged nature of the lease beds, proposed methods of aquaculture being employed, and the mitigation implemented, these impacts are not significant and will not adversely affect the integrity of the SPA. Natural England therefore agrees with SIFCA's conclusion…'*		

Management Plan 4: Aquaculture and the Poole Harbour RAMSAR Site

NE Advice (2015)	Southern IFCA Response (2015)	Management Measures
In addition to overwintering waders and wildfowl the Ramsar site is designated for eelgrass beds. Natural England advised that physical damage could occur to this habitat if shellfish or structures supporting aquaculture were laid over the eelgrass beds.	Eelgrass beds are excluded from The Order extent and will not be subject to aquaculture activity. In addition, these areas are protected from bottom towed fishing gear and hand gathering under the Southern IFCA byelaws 'Bottom Towed Fishing Gear Byelaw'* and 'Prohibition of Gathering (Sea Fisheries Resources) in Seagrass Beds Byelaw' respectively. Aquaculture activity currently taking place in Poole Harbour does not occur over this feature. ** The Bottom Towed Fishing Gear Byelaw has since been replaced by The Bottom Towed Fishing Gear Byelaw 2016*	Relevance to the extent of The Order (2015): No action required Relevance to T1 lease beds (2015-2020): No action required **Relevance to T2 lease beds (2020-2025):** No action required

Management Plan 5: Aquaculture and species interactions		
NE Advice (2017)	**Southern IFCA Response (2017-18)**	**Management Measures**
'…Due to the proximity of the Poole Harbour lease beds to the SSSI, SPA and Ramsar site, we believe that there is a risk that wild oyster settlement could adversely affect the features and supporting habitats of these sites. It is Natural England's view that in most cases, the risk of wild settlement can be minimised by using triploid oysters…on this basis we would support revised management measures to prohibit the laying of diploid oysters under the terms of the Poole Harbour Several Order. The advice provided above is consistent with Natural England's general guidance on Pacific oyster aquaculture within or adjacent to designated sites. However, in the absence of formal policy guidance, there may be circumstances where an applicant specifically requests the use of diploid oysters. In such cases, we would review the request on a site-specific basis with regard to local environmental conditions and seek assurance that any potential impacts of wild settlement are adequately mitigated. *In addition, Natural England have further clarified that their current view for Poole Harbour is that, as there has been no evidence of Pacific Oysters spreading over the intertidal mudflats in Poole Harbour as a result of current cultivation, Pacific Oysters may be laid on leased beds providing the oysters are of triploid stock or are subject to another method of sterilization including but not limited to the laying of quadriploid stock. Provided that appropriate amendments are incorporated into the Management Plan Natural England do not object to the farming of Pacific Oysters within Poole Harbour…'*	In order to ensure that the stock of Pacific oysters laid onto leased ground in Poole Harbour is of triploid stock or subject to another method of sterilization, an amendment will need to be made to the Poole Harbour Fishery Order 2015 Management Plan to stipulate a provision relating to the specific farming of Pacific oysters. This amendment to the Management Plan will also state that applications to farm Pacific Oysters using a type of stock different to that stipulated will be considered on a case-by-case basis with the proposed method being subject to an Appropriate Assessment.	Relevance to the extent of The Order (2015): No action required Relevance to T1 lease beds (2015-2020): Specific objectives for ongoing and future aquaculture management were outlined in the Site Management Statement in 2018 – leaseholders were made aware of the need to use triploid stock, or stock subject to another method of sterilisation on lease grounds. **Relevance to T2 lease beds (2020-2025):** Management Plan and lease conditions updated to reflect advice received from NE. New conditions relating to Pacific oysters to be introduced in the T2 leases, being: 1. The stock of Pacific oysters laid onto lease ground in Poole Harbour must be of triploid stock or subject to another method of sterilisation; 2. Applications to farm Pacific oysters using a type of stock different to that stipulated in (1) will be considered on a case-by-case basis, with the proposed methodology subject to an Appropriate Assessment. For reference: it is anticipated, following the formulation of a Pacific Oyster Review Group in the Department for Environment, Food and Rural Affairs (DEFRA), that a National Policy on the use of Pacific oysters in aquaculture may be introduced in the future. Where appropriate, both the Management Plan and Lease Conditions may be subject to amendments in line with the introduction of future National Policy. **Update 2022:** At a meeting of the Shellfish Association of Great Britain Mollusc Committee in March 2022, a representative from Defra provided an update that it had been determined that a National Policy on Pacific Oysters was not required. It had been decided that each Pacific Oyster aquaculture enterprise (farm) would require an individual HRA based on site-specific considerations. An HRA is already completed in line with the issuing of leases for The Order, it is therefore expected that any future amendments to the Management Plan and Lease Conditions which may be required will be determined on the basis of the drafting of the HRA every five years. **Update 2023:** In September 2022 a new national position on Pacific oysters was published by Defra. This position includes the following points:

		• Pacific oysters are currently considered to be established in England south of latitude 52°N and therefore, with current technology, cannot be prevented from establishing in, or be successfully or economically eradicated from this area; • Defra does not support the expansion of the Pacific oyster farming industry north of latitude 52°N; • Authorisations for farms south of 52°N within 5km of an MPA will continue to be granted only after the regulator has considered the outcome of site-based environmental impact assessments. These must take into account the impact of the Pacific oyster on the current condition of local MPAs if there is a likely adverse impact, Defra supports regulators to introduce mitigating authorisation conditions such as using triploidy or monitoring; • Cefas are working to carry out all outstanding environmental assessments for existing Pacific oyster farms near MPAs. Pacific oysters are currently covered under the HRA for the issuing of leases for 2020-2025 (updated February 2021, following the receipt of NE's formal advice in December 2020) with a specific annexed Evidence Package on the management of this species.
NE Advice (December 2020)	**Southern IFCA Response (December 2020)**	**Management Measures**
'…(1) NE advise the need to establish and demonstrate that the current levels of Pacific oyster production are not causing an impact. To that end and in order to conclude no adverse effect on site integrity beyond reasonable scientific doubt, NE advises that 2 further aspects (in addition to the lease conditions introduced) are considered: *(a) That current levels of effort i.e. the amount of stock laid should be capped until it can be demonstrated that there is no risk to the Poole Harbour SPA and RAMSAR site;* *(b) that robust annual monitoring and reviews will be implemented to demonstrate that no feral populations have or will become established – the annual monitoring to be of particular relevance in light of expected CEFAs Pacific oyster analysis due in 2021…'*	Southern IFCA provided evidence of Mills (2016) as the most relevant source of data that demonstrates the status of Pacific oysters in the SPA. This PhD study presents an assessment of Pacific oyster presence and distribution in Poole Harbour based on data from 2013 and provides a comparison with other sites such as Southampton Water. The study reflects the apparent lack of feral populations of Pacific oysters in Poole harbour and suggests possible reasons for this.	**<u>Relevance to T2 lease beds (2020-2025):</u>** a) Current effort (amount of stock laid) has been capped in line with current (2020) and/or historic levels on beds farming Pacific oysters. Details of which can be found in the HRA. b) Annual monitoring and outcomes to be published in this Management Plan annually. The first monitoring to take place in April 2021 and continue annually for the duration of the leases in order to establish a baseline and provide a robust assessment of change over time. NE will be involved in discussions around methodology and outcomes (resulting analyses). The report for the 2021-22 survey is due to be provided in spring 2022. **Update 2023:** A survey of Pacific oysters was undertaken during 2021 into early 2022 by the University of Southampton. This survey work has been referenced in previous versions of this Management Plan. Based on an understanding of resource requirements, the methodology required to collect appropriate data and an ability to robustly review the data to help inform any reviews of the Management Plan. It has been determined that the data from this survey along with a consideration of any requirements for further monitoring work on this species will be reviewed as part of the wider process of developing the lease program for the period 2025-2030, with this work due to commence in the autumn of 2023. c) A National Policy on the use of Pacific oysters in aquaculture is anticipated to be introduced in 2021. As such, and where appropriate,

		both the Management Plan and Lease Conditions may be subject to amendments in line with the introduction of future National Policy. **Update 2022:** as per the section above, Defra will not be producing a National Policy for Pacific oysters at this time. **Update 2023:** as per above, Defra produced a national policy for the farming of Pacific oysters in September 2022.

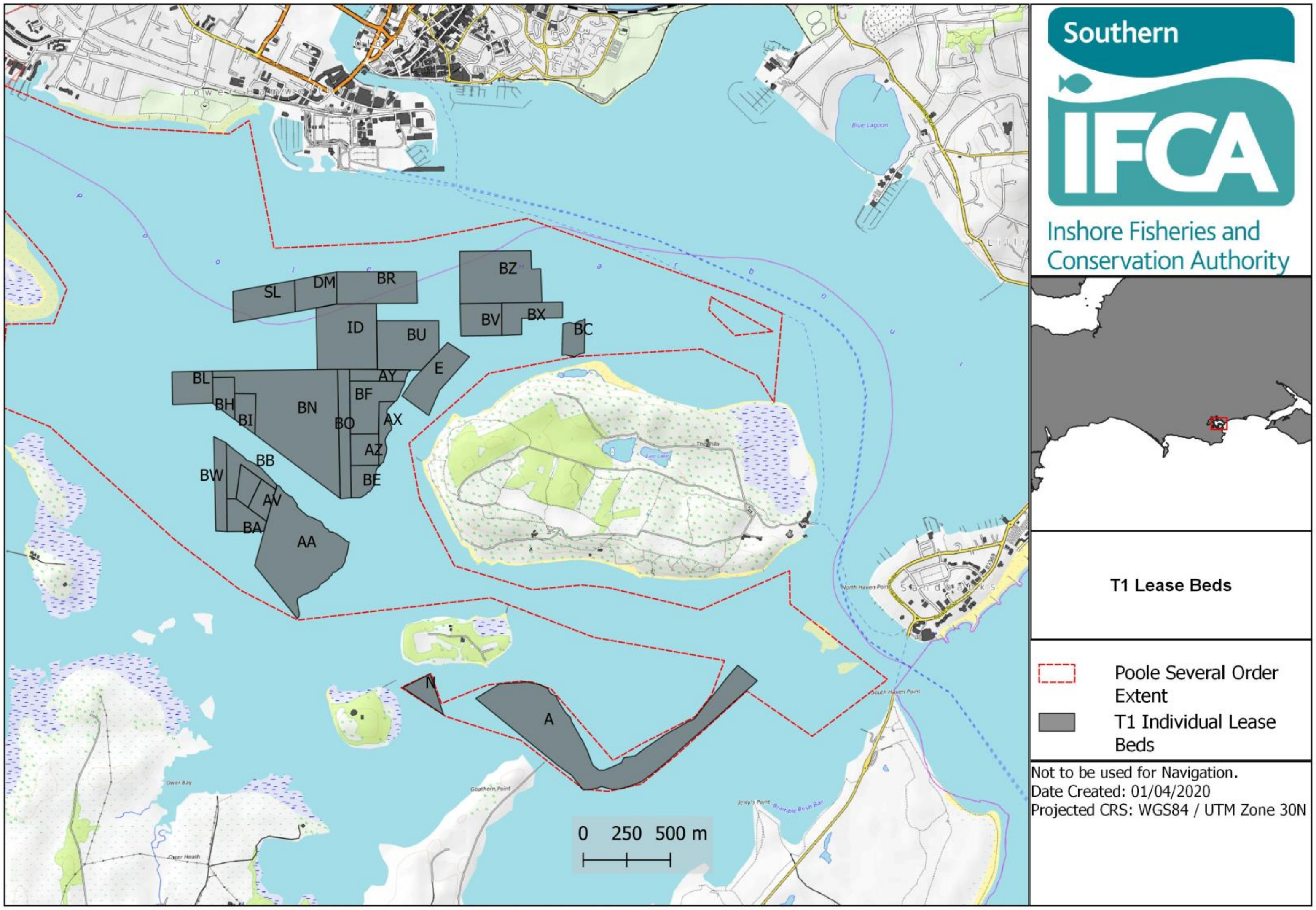
Management Plan 6: Aquaculture and water user interactions

Management Measures		
Relevance to the extent of The Order (2015): Full assessments of interactions with other water users (navigation, wild fisheries and shellfish beds, personal watercraft interactions e.g. jet ski designated areas), small craft moorings, Port of Poole operations) undertaken during the consultation phase for The Order.	**Relevance to T1 lease beds (2015-2020):** As per relevance to extent of The Order (2015).	**Relevance to T2 lease beds (2020-2025):** Risk assessment (below) undertaken to quantify the interaction of aquaculture operations (vessel on site) on Lease Bed 12 with personal watercraft users. Outcomes: specific lease conditions to be introduced as per Risk Assessment controls.

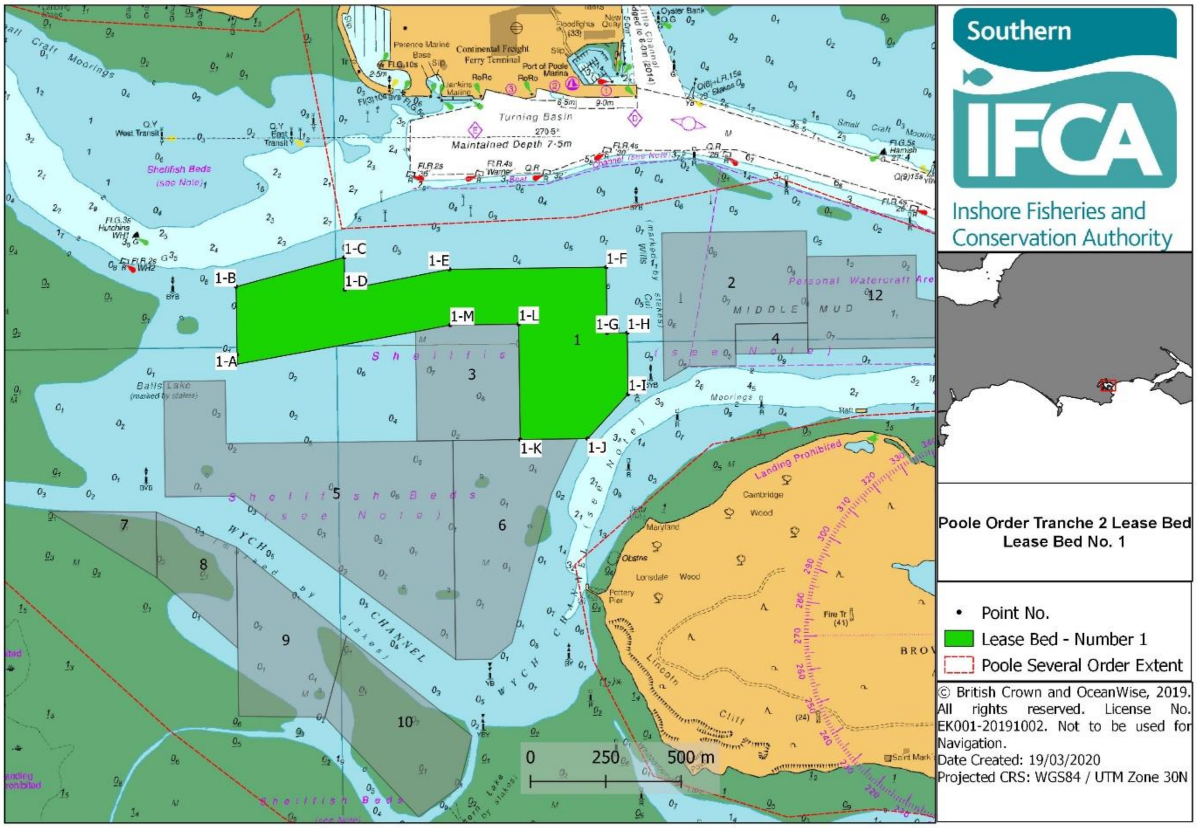
Annex 1: Risk Assessment for aquaculture vessel operations and personal watercraft interactions		**Risk Assessment undertaken:** 11th April 2022 **Review:** Annually	**Assessor:** Southern IFCA (in collaboration with PHC)
Activity/Process	**Number of persons at risk:**		
Interaction between aquaculture vessel operations (cleaning bed, seeding and harvesting) on Lease Bed 12 with the Personal Watercraft Area north of Brownsea Island	**Number**	**Lease holder and operatives**	**Personal watercraft users**
	1		
	2-5	■	
	6-10		
	10+		■

Hazards involved with activity/process		Without control measures			With control measures		
		Likelihood X	Severity =	Rating	Likelihood X	Severity =	Rating
A	Collision between vessel used for aquaculture and personal watercraft users	4	4	16	1	4	4
B	Collision between personal watercraft users and buoys used to demarcate the boundary of the lease bed	4	4	16	1	4	4
Basic safety measures/controls/mitigation							
1	**Prohibition of aquaculture activities outside of the hours: 08:00 and 20:00 during the months April to September,** with the intention to reduce the interaction between water users and vessels used for the purposes of aquaculture. Assumption that the peak number of water users will be operational during daylight hours and during the spring and summer months.						
2	Requirement for leaseholder to have **functional AIS onboard vessel and active during hours of operations**. This will negate the need for physical marking of the lease bed area (buoys), and thus remove the potential for interaction between personal watercraft and buoys.						

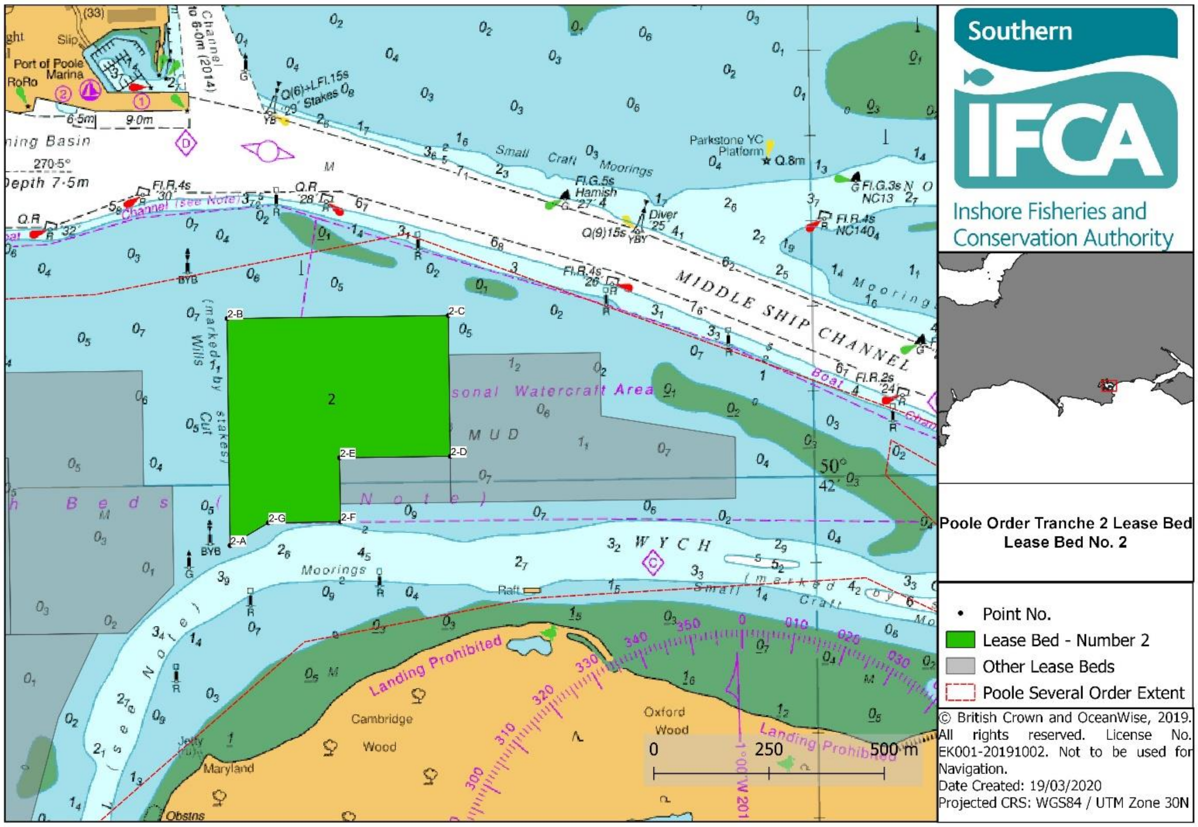
Annex 2: Tranche 1 lease bed locations



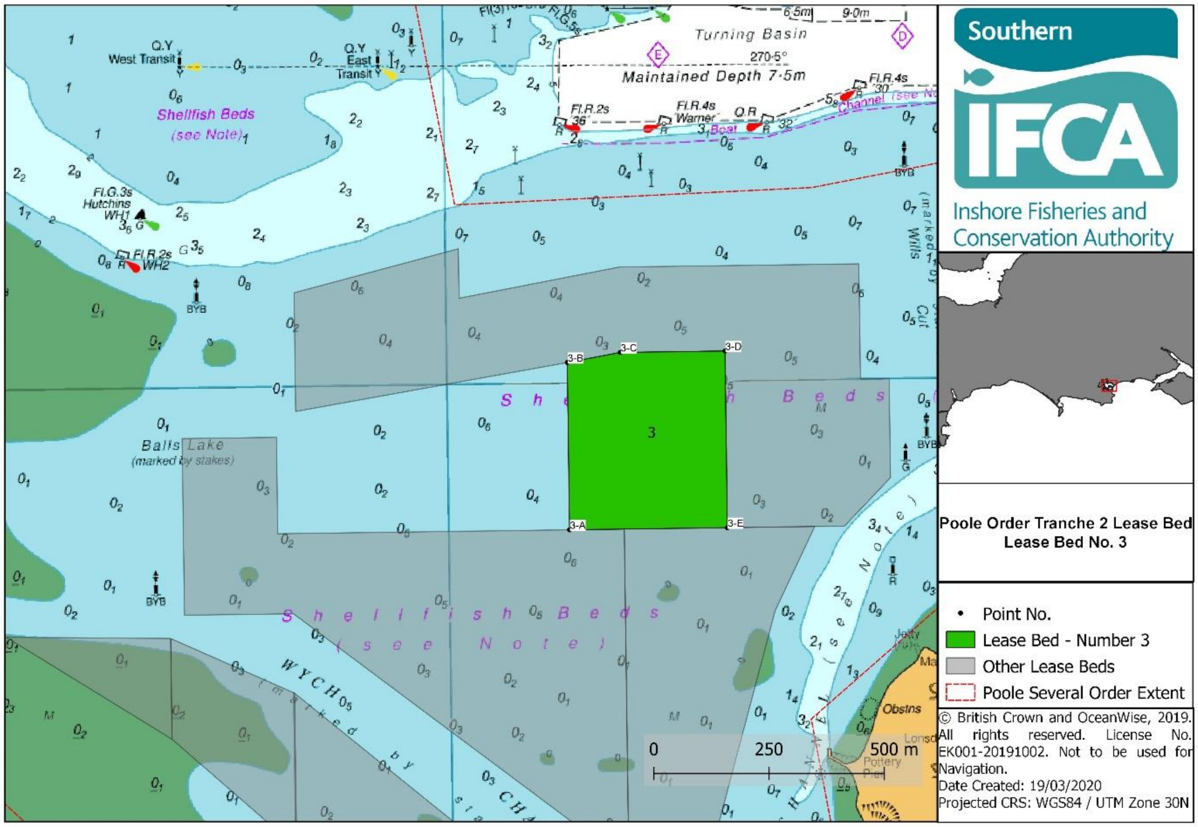
Annex 3: Tranche 2 lease bed charts and coordinates



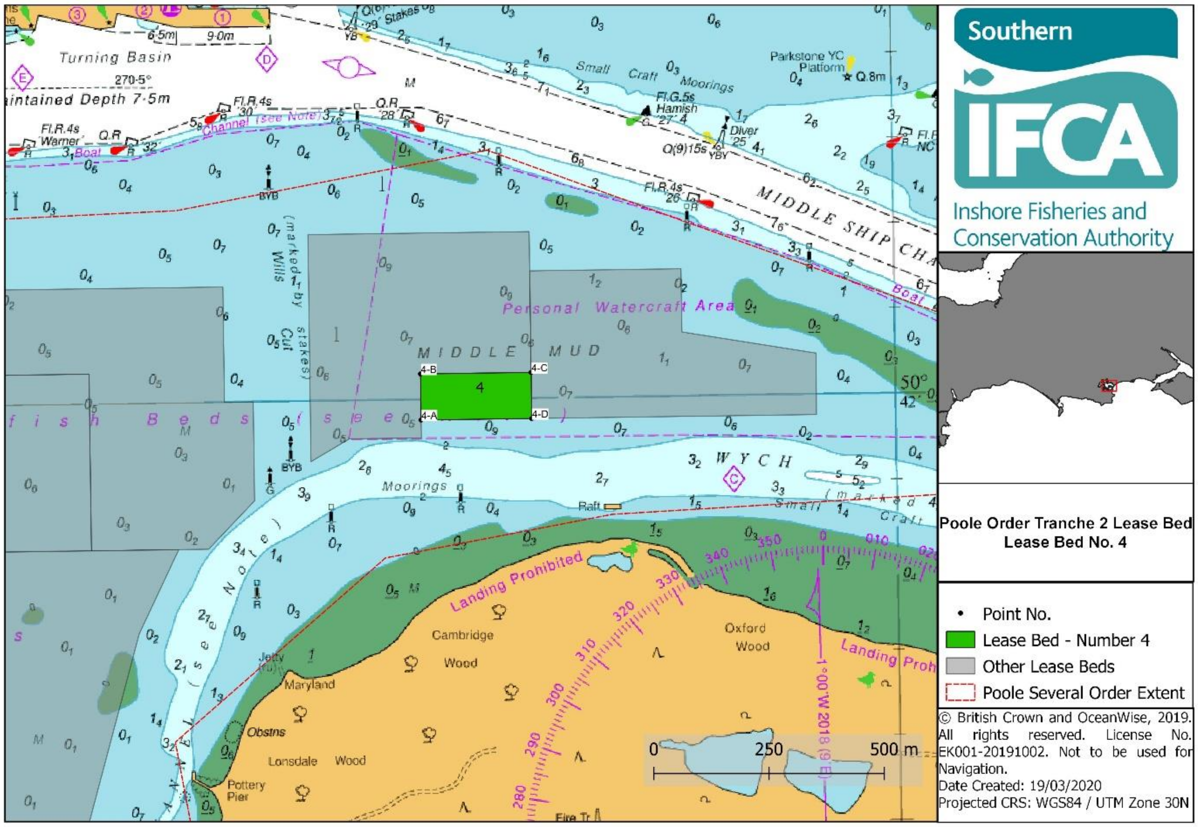
Lease Bed 1– external coordinates		
Point No.	Longitude	Latitude
1-A	002° 00.282' W	50° 41.970' N
1-B	002° 00.282' W	50° 42.109' N
1-C	001° 59.976' W	50° 42.158' N
1-D	001° 59.976' W	50° 42.100' N
1-E	001° 59.680' W	50° 42.134' N
1-F	001° 59.238' W	50° 42.134' N
1-G	001° 59.238' W	50° 42.016' N
1-H	001° 59.181' W	50° 42.016' N
1-I	001° 59.181' W	50° 41.906' N
1-J	001° 59.297' W	50° 41.827' N
1-K	001° 59.487' W	50° 41.827' N
1-L	001° 59.487' W	50° 42.034' N
1-M	001° 59.680' W	50° 42.034' N



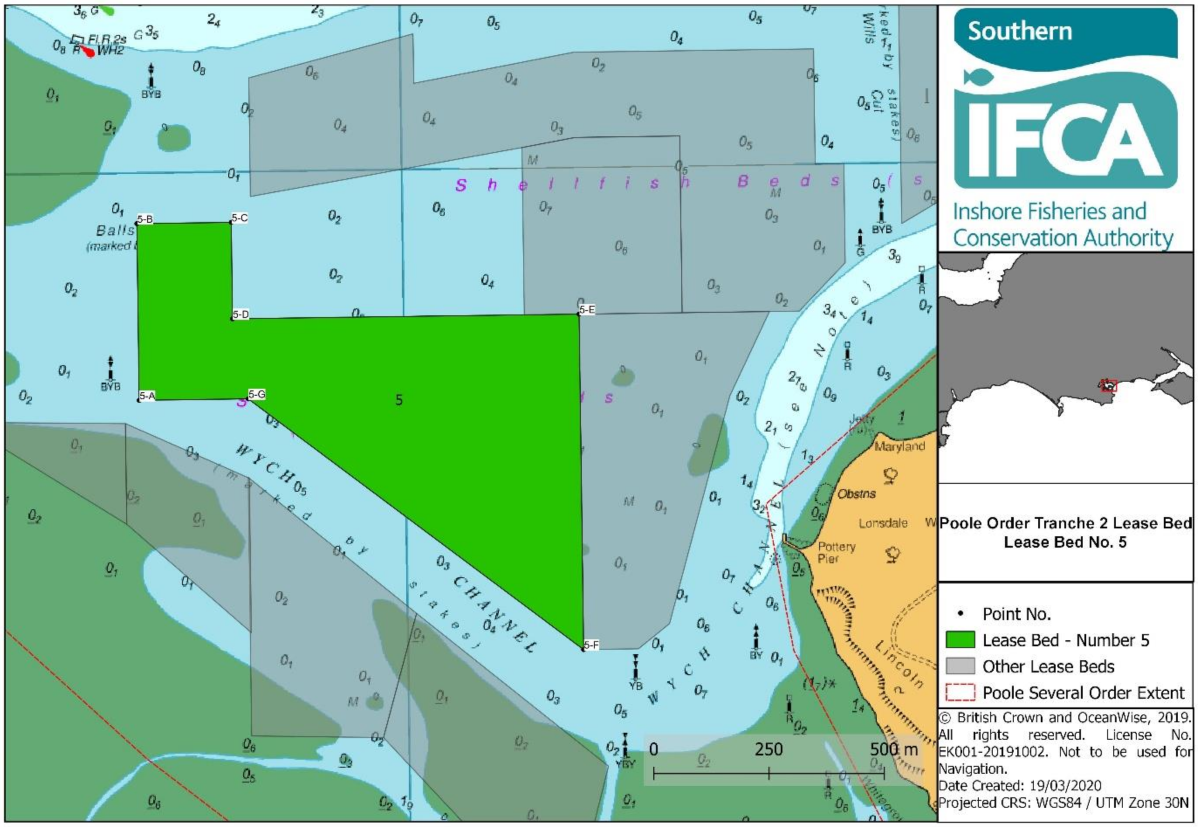
Lease Bed 2– external coordinates		
Point No.	Longitude	Latitude
2-A	001° 59.080' W	50° 41.928' N
2-B	001° 59.080' W	50° 42.194' N
2-C	001° 58.672' W	50° 42.194' N
2-D	001° 58.672' W	50° 42.029' N
2-E	001° 58.876' W	50° 42.029' N
2-F	001° 58.876' W	50° 41.954' N
2-G	001° 59.009' W	50° 41.954' N



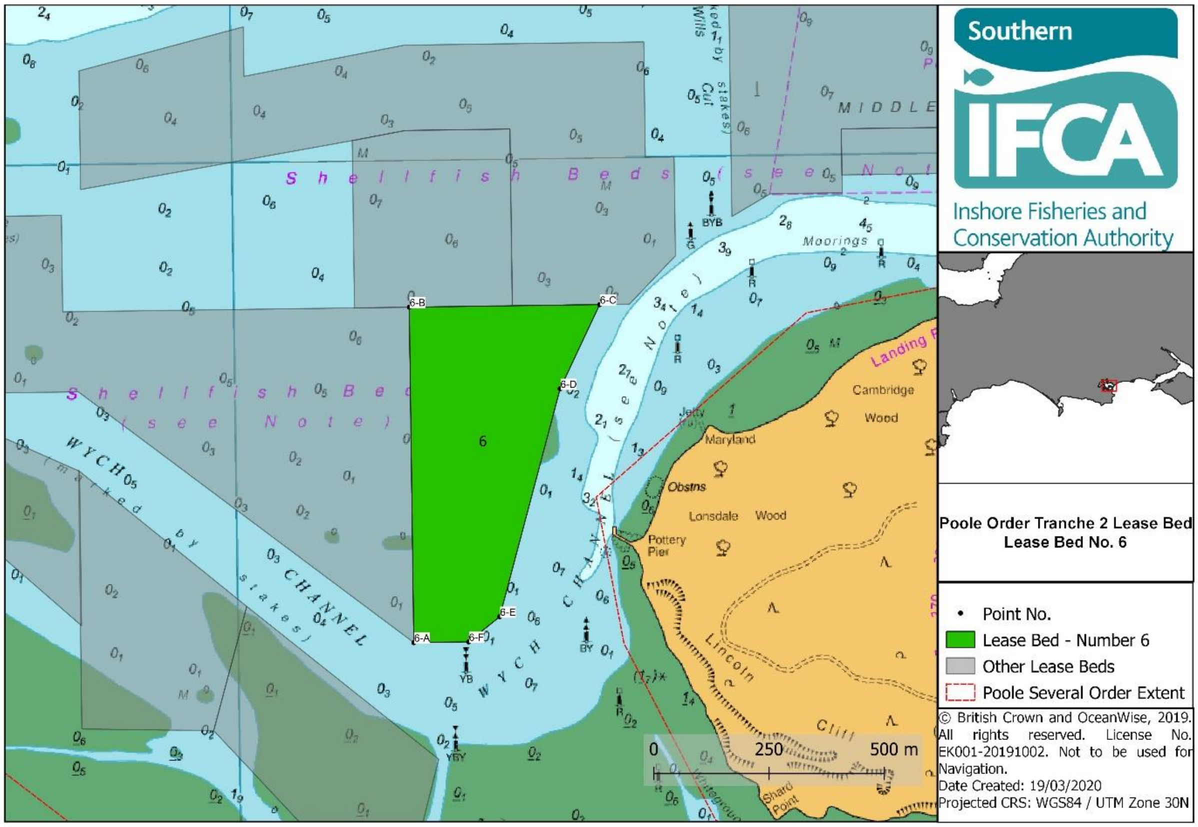
Lease Bed 3 – external coordinates		
Point No.	Longitude	Latitude
3-A	001° 59.778' W	50° 41.827' N
3-B	001° 59.778' W	50° 42.023' N
3-C	001° 59.680' W	50° 42.034' N
3-D	001° 59.487' W	50° 42.034' N
3-E	001° 59.487' W	50° 41.827' N



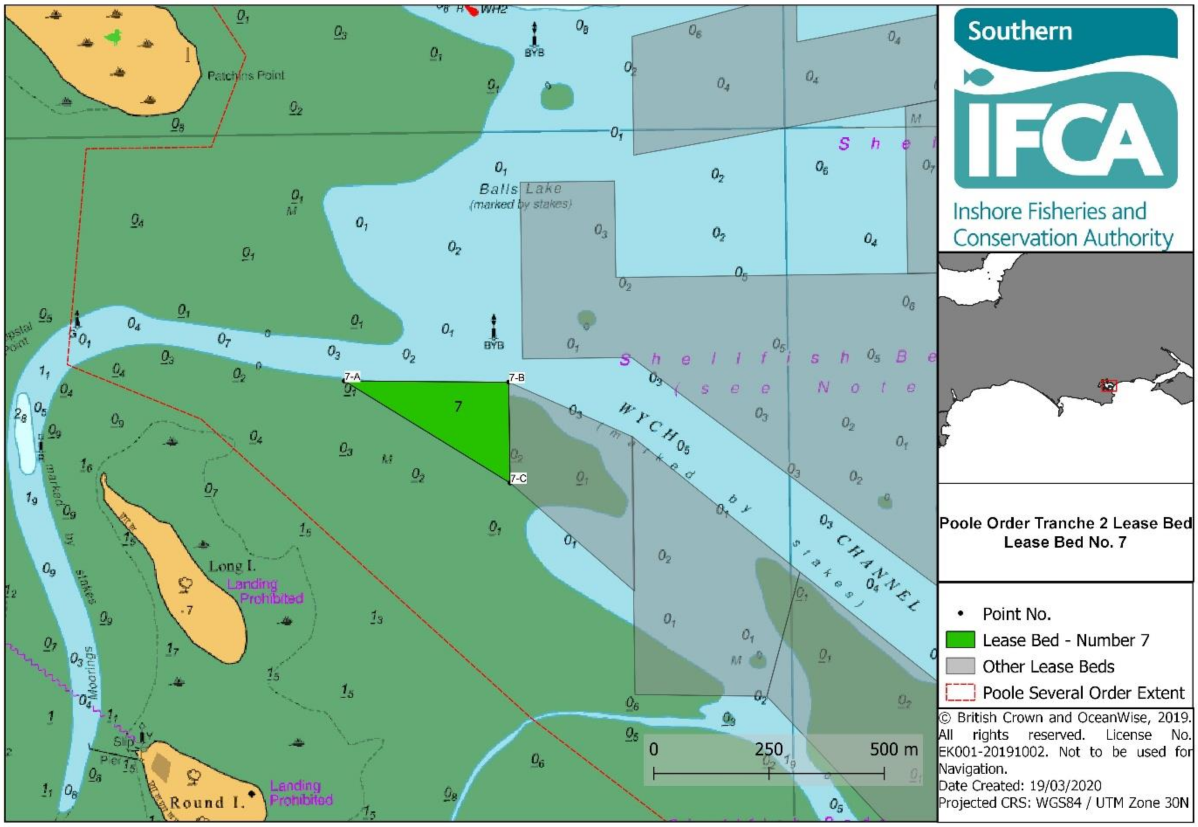
Lease Bed 4 – external coordinates		
Point No.	Longitude	Latitude
4-A	001° 58.876' W	50° 41.975' N
4-B	001° 58.876' W	50° 42.029' N
4-C	001° 58.672' W	50° 42.029' N
4-D	001° 58.672' W	50° 41.975' N



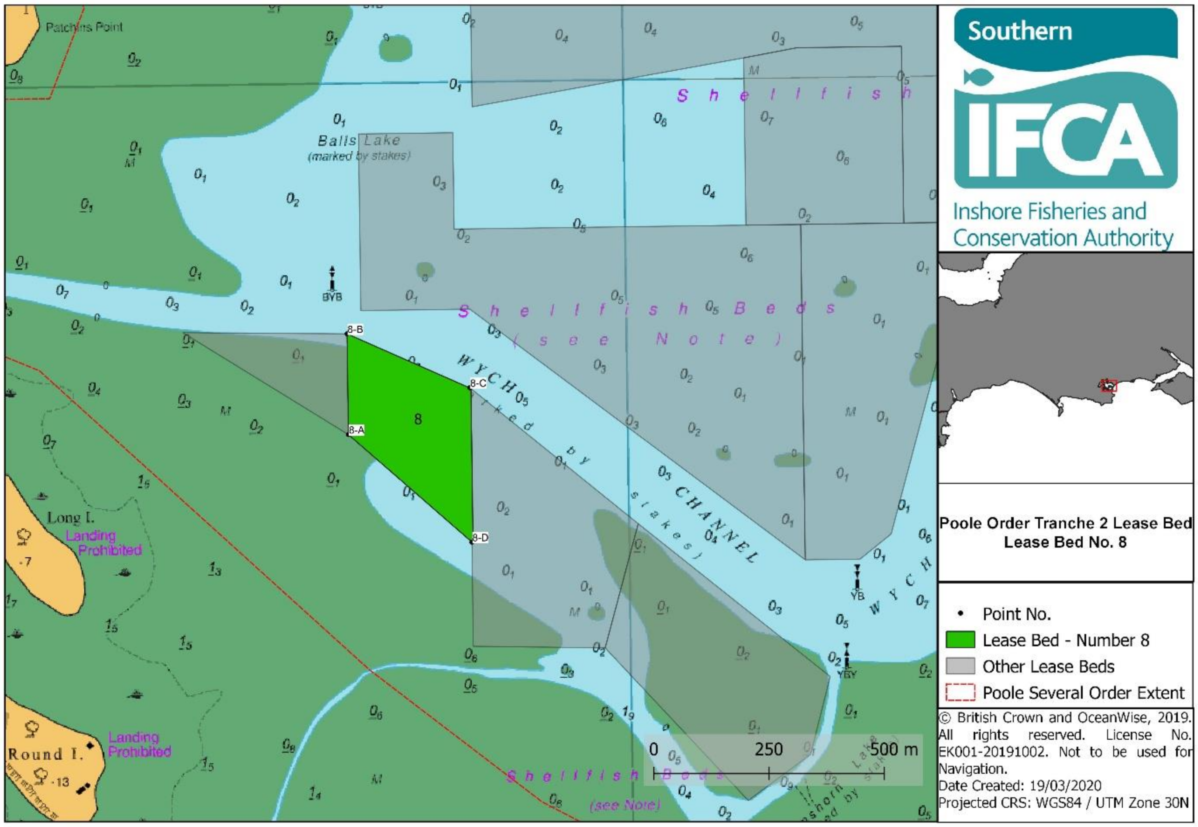
Lease Bed 5 – external coordinates		
Point No.	Longitude	Latitude
5-A	002° 00.490' W	50° 41.733' N
5-B	002° 00.490' W	50° 41.940' N
5-C	002° 00.316' W	50° 41.940' N
5-D	002° 00.316' W	50° 41.827' N
5-E	001° 59.677' W	50° 41.827' N
5-F	001° 59.677' W	50° 41.434' N
5-G	002° 00.289' W	50° 41.733' N



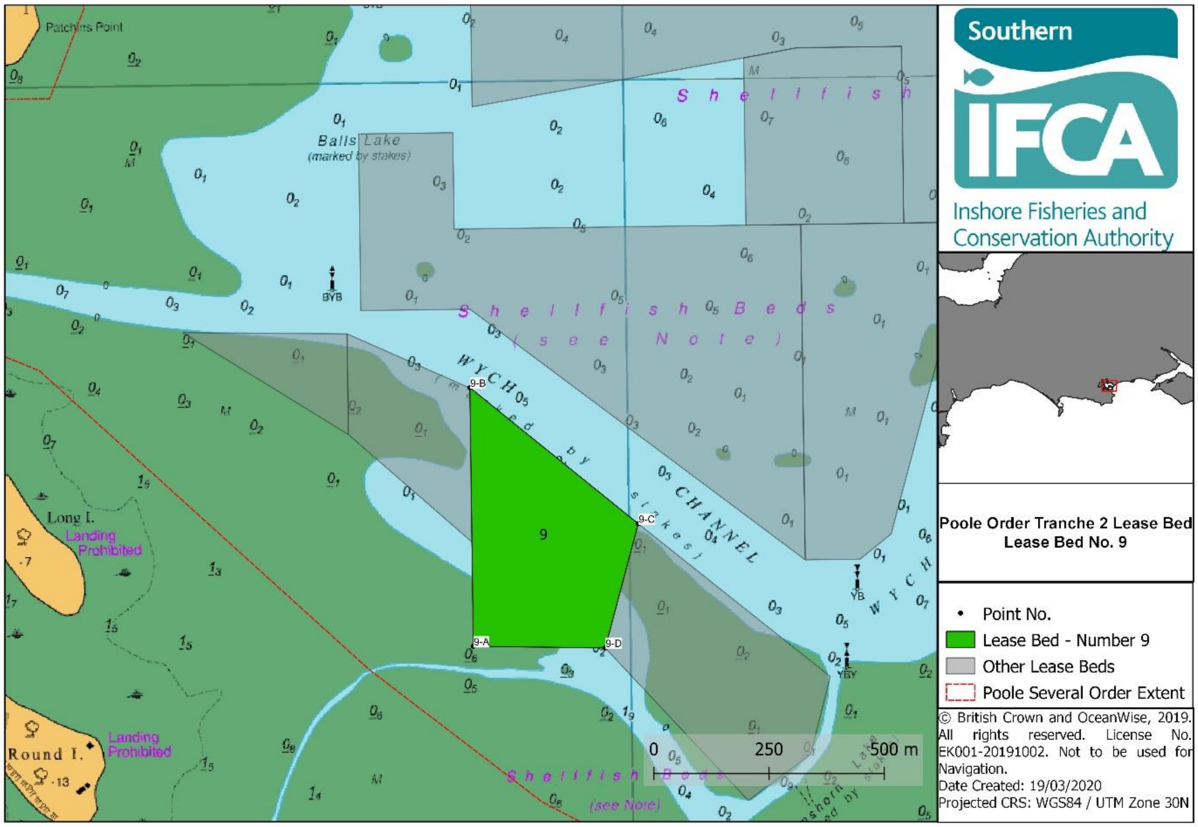
Lease Bed 6 – external coordinates		
Point No.	Longitude	Latitude
6-A	1° 59.677' W	50° 41.434' N
6-B	1° 59.677' W	50° 41.827' N
6-C	1° 59.326' W	50° 41.827' N
6-D	1° 59.401' W	50° 41.729' N
6-E	1° 59.518' W	50° 41.463' N
6-F	1° 59.576' W	50° 41.434' N



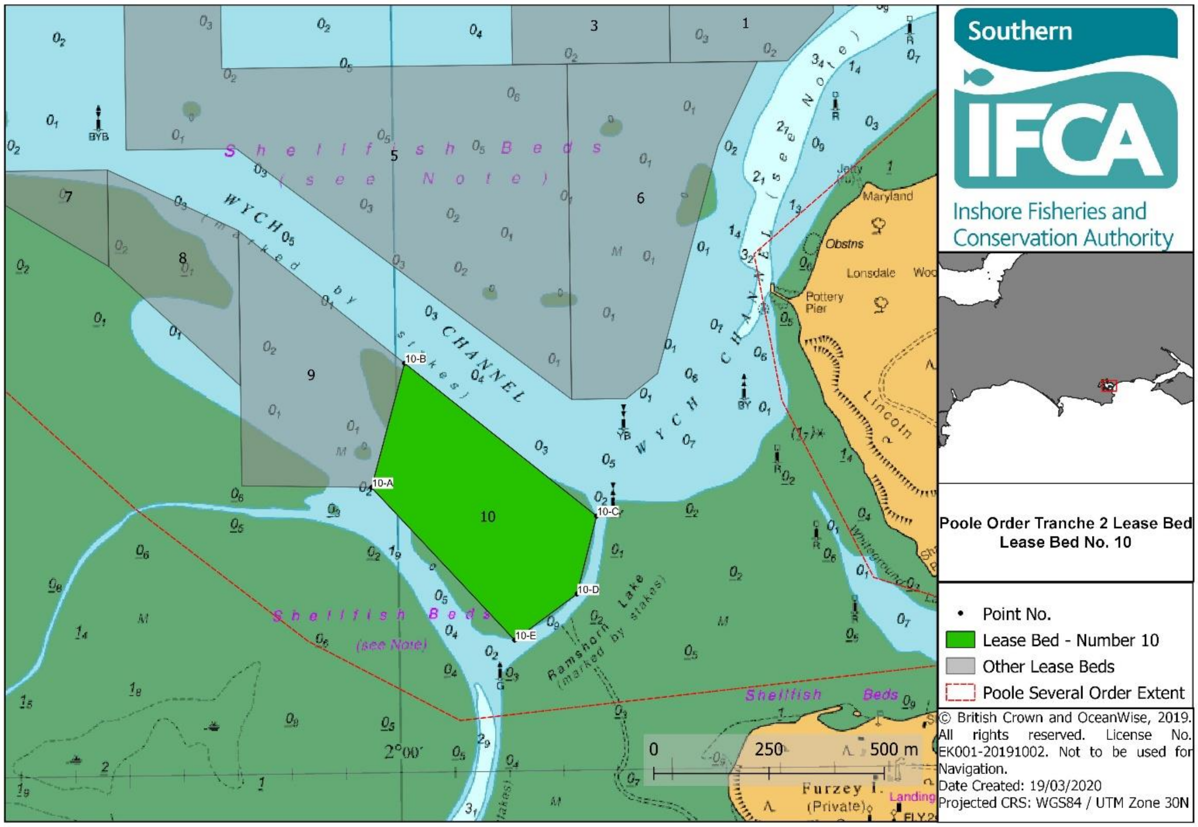
Lease Bed 7 – external coordinates		
Point No.	Longitude	Latitude
7-A	002° 00.819' W	50° 41.710' N
7-B	002° 00.516' W	50° 41.706' N
7-C	002° 00.516' W	50° 41.588' N



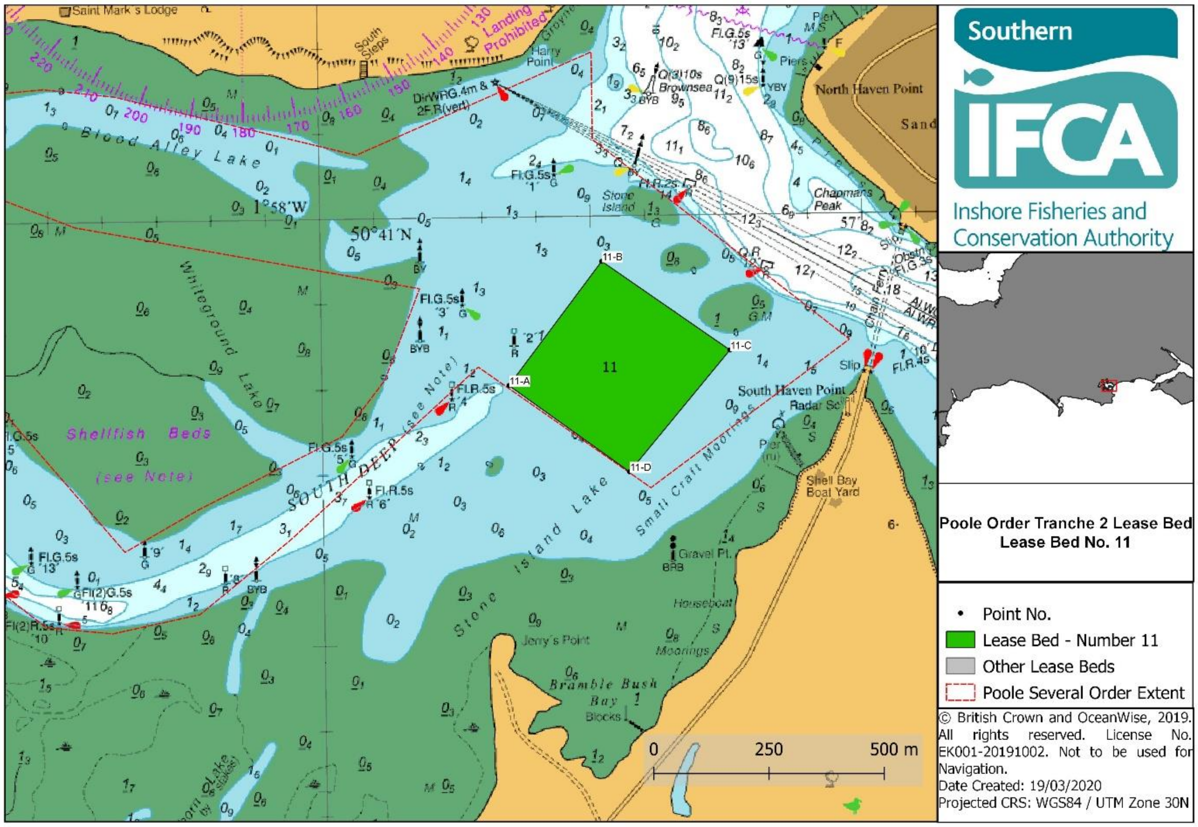
Lease Bed 8 – external coordinates		
Point No.	Longitude	Latitude
8-A	002° 00.516' W	50° 41.588' N
8-B	002° 00.516' W	50° 41.706' N
8-C	002° 00.291' W	50° 41.641' N
8-D	002° 00.291' W	50° 41.460' N



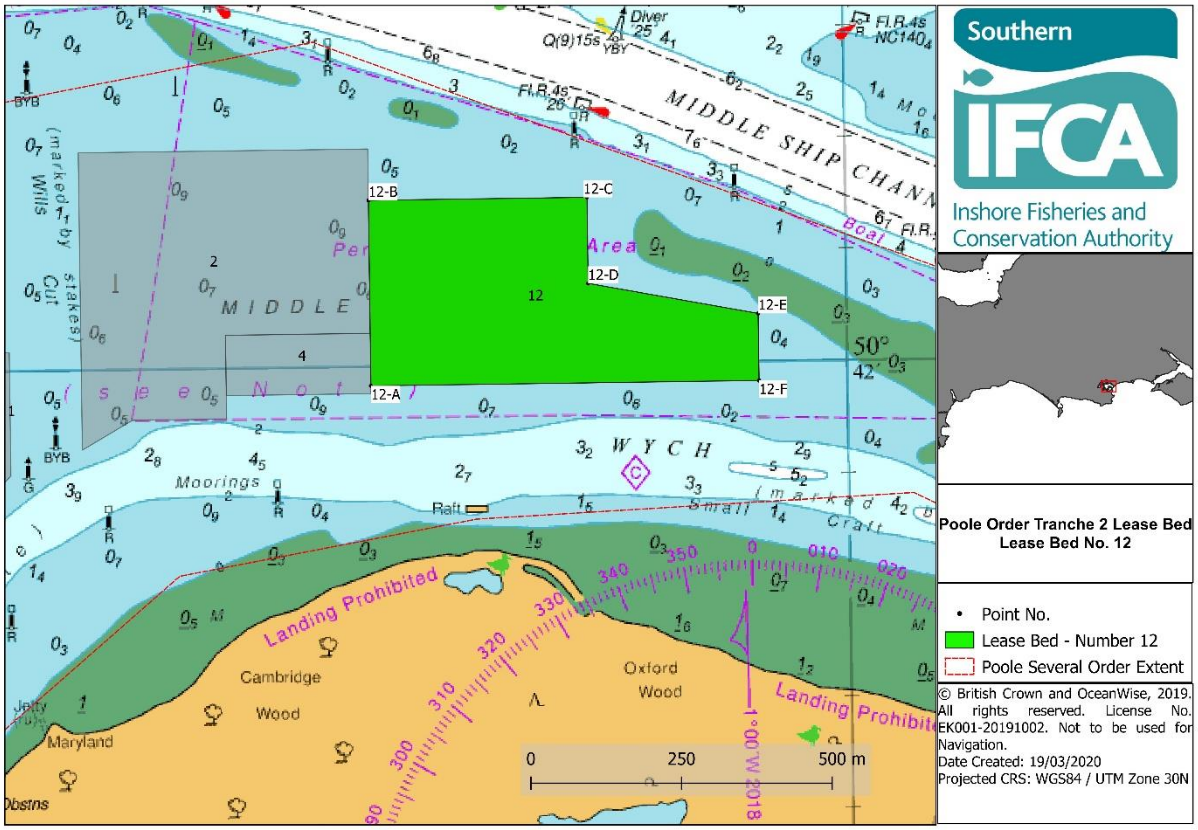
Lease Bed 9 – external coordinates		
Point No.	Longitude	Latitude
9-A	002° 00.291' W	50° 41.338' N
9-B	002° 00.291' W	50° 41.641' N
9-C	001° 59.984' W	50° 41.479' N
9-D	002° 00.048' W	50° 41.334' N



Lease Bed 10 – external coordinates		
Point No.	Longitude	Latitude
10-A	002° 00.048' W	50° 41.334' N
10-B	001° 59.984' W	50° 41.479' N
10-C	001° 59.634' W	50° 41.297' N
10-D	001° 59.672' W	50° 41.206' N
10-E	001° 59.788' W	50° 41.153' N



Lease Bed 11 – external coordinates		
Point No.	Longitude	Latitude
11-A	001° 57.655' W	50° 40.802' N
11-B	001° 57.481' W	50° 40.946' N
11-C	001° 57.247' W	50° 40.840' N
11-D	001° 57.435' W	50° 40.699' N



Lease Bed 12 – external coordinates		
Point No.	Longitude	Latitude
12-A	001° 58.672' W	50° 41.982' N
12-B	001° 58.672' W	50° 42.148' N
12-C	001° 58.363' W	50° 42.148' N
12-D	001° 58.363' W	50° 42.071' N
12-E	001° 58.125' W	50° 42.042' N
12-F	001° 58.125' W	50° 41.982' N

EXECUTIVE SUMMARY

Marked F

Southern IFCA Live Wrasse Fishery – Information Report on points raised by IFCA Members
Paper for Information

Report by IFCO Condie

A. Purpose

- To provide members with information relating to the Southern IFCA live wrasse fishery, in response to requests for further information on specific topics raised at the February 2023 TAC meeting:
  - Alignment of management with Southern IFCA legal duties
  - Wrasse welfare as cleaner fish
  - Potential ecosystem wide effects

1.0 Introduction

- The Dorset wrasse fishery supplies live wrasse to UK Salmon farms for use as natural sea lice control. In the Southern IFC District, wrasses, including Ballan, Corkwing, Goldsinny, Rockcook and Baillon, are removed from the Weymouth and Portland area, in and around the Studland to Portland Special Area of Conservation (SAC) (majority of activity occurs outside the SAC).
- In accordance with requirements under the Conservation of Habitats and Species Regulations, the fishery has been assessed through a Habitats Regulations Assessments (HRA) in order to ensure the activity occurring within the SAC does not lead to an adverse effect on site integrity.
- The fishery is managed through regulated Minimum Conservation Reference Size (MCRS) and voluntary 'Wrasse Fishery Guidance' and is monitored in line with a Monitoring and Control Plan (MCP).
- At the TAC meeting in February 2023, Members queried whether more detail could be provided on how wrasse are processed, aspects of welfare and the outcome for fish once they have fulfilled their role as cleaner fish.
- This report provides available information on these topics along with an overview of relevant legal duties and potential ecosystem related effects of the fishery, in line with the current understanding as reported in the Studland to Portland SAC HRA (2023).
- This report is designed to provide an update following the request made at the February TAC meeting. The live wrasse fishery will continue to operate under the MCP for the 2024 season in line with the outcomes of the Wrasse Fishery Report 2023 (reviewed by Members at the TAC in Feb 2023).

2.0 Summary of Key Points

- Wrasse are not a designated feature of any MCZ in UK waters, nor are they listed in the Habitats Directive or Conservation of Habitats and Species Regulations
- Southern IFCAs duties regarding wrasse relate only to MaCAA Section 153, Paragraph 1 & 2
- The Wrasse Complex Fishery Management Plan (FMP) development process commenced in early 2024. The body developing the plan is the MMO with the original expected completion to be in 2025.
- Government Legislation alongside other standards and processes are in place to manage the welfare of wrasse. However, there is no legal requirement for salmon farms to report the numbers used or discarded.
- Information on the treatment of wrasse tends to be available only from bodies with a strong interest in animal welfare.
- Information suggests the majority of salmon farms do not use wrasse for longer than

one salmon production cycle for biosecurity reasons. Recommendations are that wrasse are humanely slaughtered at the end of the production cycle rather than being released due to the risk of hybridization and spread of disease.

- The salmon farm linked to the Dorset live wrasse fishery is a member of the RSPCA Assured Scheme. The scheme requires the company to adhere to the '*RSPCA Welfare Standards for Farmed Atlantic Salmon 2021'* and the included section on '*Cleaner Fish'*. Updated standards are expected in May 2024.
- There is minimal published information on the ecological niche filled by wrasse and Southern IFCA are awaiting the results of a PhD from the University of Exeter to be published and shared. The current available information is incorporated into the current Studland to Portland SAC for the fishery which was agreed by the Authority (Feb 2023) and subject to Formal Advice from NE who agreed with the conclusions reached.

3.0 Next Steps

- That Members note the report.
- The live wrasse fishery in the Southern IFCA District will be monitored for the 2024 season in line with the MCP.
- Southern IFCA will engage with the development process of the Wrasse Complex FMP with expected delivery in 2025.
- The identification of the requirement for any future review of management for the live wrasse fishery will consider elements including but not limited to the current Annual Plan for Southern IFCA and the Research & Policy Team and the commitments contained within for the relevant year, any available evidence and whether this indicates that a review of measures may be required, outcomes from the development of the Wrasse Complex FMP.

Information provided to Southern IFCA Technical Advisory Committee Members in response to requests for further information on specific topics related to the Southern IFCA live wrasse fishery.

1. Introduction

The Dorset wrasse fishery supplies live wrasse to UK Salmon farms for use as natural sea lice control. In the Southern IFC District, wrasses, including Ballan, Corkwing, Goldsinny, Rockcook and Baillon, are removed from the Weymouth and Portland area, in and around the Studland to Portland Special Area of Conservation (SAC). The majority of the fishery occurs outside of the SAC. In accordance with requirements under the Conservation of Habitats and Species Regulations, the fishery has been assessed through a Habitats Regulations Assessment (HRA) to ensure the activity which does occur within the SAC does not lead to an adverse effect on site integrity. The fishery is managed through regulated Minimum Conservation Reference Size (MCRS) and voluntary 'Wrasse Fishery Guidance' and is monitored in line with a Monitoring and Control Plan (MCP).

The following report is separated into four sections to provide an overview on the legal duties of Southern IFCA (Section 2), current legislation and standards on the welfare of Wrasse when used as cleaner fish (Section 3), and the current understanding of the potential ecosystem wide effects of the fishery (Section 4).

2. How does the Management of the Dorset Fishery align with our legal duties?

Wrasse are not a designated feature of any Marine Conservation Zone (MCZ) in UK waters, nor are they listed in Schedules 2-5 of the Conservation of Habitats and Species Regulations 2017 or Annex I or II of the Habitats Directive as requiring protection in Special Areas of Conservation (SACs). Southern IFCA's current duties in relation to wrasse are as follows:

Marine and Coastal Access Act 2009 (Section 153, Paragraph 1 & 2):

1) The authority for an IFC district must manage the exploitation of sea fisheries resources in that district.
2) In performing its duty under subsection (1), the authority for an IFC district must
   a) seek to ensure that the exploitation of sea fisheries resources is carried out in a sustainable way,
   b) seek to balance the social and economic benefits of exploiting the sea fisheries resources of the district with the need to protect the marine environment from, or promote its recovery from, the effects of such exploitation,
   c) take any other steps which in the authority's opinion are necessary or expedient for the purpose of making a contribution to the achievement of sustainable development, and
   d) seek to balance the different needs of persons engaged in the exploitation of sea fisheries resources in the district.

The Fisheries Act (2020) lays out the requirement for the development of fisheries management plans (FMP) to support sustainable fisheries. The Wrasse Complex FMP development process was originally expected to run from 2023-2025 and has commenced in early 2024. The leading authority on the Wrasse Complex FMP is the Marine Management Organisation.

The Act also sets out the Fisheries Objectives which collectively define sustainable fishing. Table 1 highlights the objectives relevant to the Dorset Wrasse Fishery.

Table 1 How does SIFCAs management of the Dorset Wrasse fishery align with the Fisheries Act (2020)

Objective	Definition	How is this currently Aligned to SIFCA Management
Sustainability	(a) fish and aquaculture activities are— (i) environmentally sustainable in the long term, and (ii) managed so as to achieve economic, social and employment benefits and contribute to the availability of food supplies, and (b) the fishing capacity of fleets is such that fleets are economically viable but do not overexploit marine stocks.	The Southern IFCA wrasse fishery is subject to a monitoring and control plan (M&CP); this sets out a range of monitoring variables relating to effort and landings. If trigger threshold of the variables is exceeded a review of the likely significant effect of the fishery on the SAC is carried out. If deemed to have an LSE, an appropriate assessment is carried out to complete a HRA. If deemed to have an adverse effect to the site integrity of the Studland to Portland SAC a review of management is to be carried out.
Precautionary	(a) the precautionary approach to fisheries management is applied, and (b) exploitation of marine stocks restores and maintains populations of harvested species above biomass levels capable of producing Maximum Sustainable Yield (MSY)	There are both regulatory and voluntary measures applied to the wrasse fishery. A defined action plan through the M&CP ensures that there is a robust system for the delivery of voluntary measures, deemed to be appropriate at present based on the supporting evidence for this species/fishery. Catch levels are monitored throughout the season and fishers instructed to stop below the trigger level for number of wrasse removed, being precautionary to ensure this trigger is not reached. There is no stock assessment of wrasse species. No MSY can be determined.
Ecosystem	(a) fish and aquaculture activities are managed using an ecosystem-based approach so as to ensure that any negative impacts on marine ecosystems are minimised and, where possible, reversed, and (b) incidental catches of sensitive species are minimised and, where possible, eliminated	There is currently no published research on the ecological niche populated by wrasse. Current knowledge on wrasse ecology is described in section 4 of this paper. Wrasse are the target species and kept alive, fishers return unwanted and undersized species to sea on pot retrieval.
Scientific Evidence	(a) scientific data relevant to the management of fish and aquaculture activities is collected, (b) where appropriate, the fisheries policy authorities work together on the collection of, and share, such scientific data, and (c) the management of fish and aquaculture activities is based on the best available scientific advice.	Fishers submit voluntary catch returns listing the location and number of each species caught. Buyers voluntarily submit landings data on a weekly basis. This data directly informs the M&CP.

Bycatch	(a) the catching of fish that are below minimum conservation reference size and other unwanted bycatch, is avoided or reduced, (b) catches are recorded and accounted for, and (c) bycatch that is fish is landed, but only where this is appropriate and (in particular) does not create an incentive to catch fish that are below minimum conservation reference size.	The wrasse fishery is subject to the Minimum Conservation Reference Size Byelaw, alongside the Wrasse Fishery Guidance which lists voluntary maximum sizes. The buyer / fish farm also implement a minimum size of 14cm due to the slot size of the salmon cages. This is larger than the legislative minimum size for 4 of the 5 wrasse species caught.
Equal Access	The access of UK fishing boats to any area within British fishery limits is not affected by— (a) the location of the fishing boat's home port, or (b) any other connection of the fishing boat, or any of its owners, to any place in the United Kingdom.	Fishers engaged in the wrasse fishery are not restricted by the location of their home port or connection to a location within the UK.
National Benefit	Fishing activities of UK fishing boats bring social or economic benefits to the UK or any part of the UK.	The Dorset wrasse fishery employs 10 vessels, 1 buyer and the associated transport operatives. The fish are delivered to at least one fish farm in Scotland. The company owning the fish farm owns multiple others. It is unknown if the wrasse are delivered to multiple farms. Wrasse are also an important recreational species around the UK.
Climate Change	(a) the adverse effect of fish and aquaculture activities on climate change is minimised, and (b) fish and aquaculture activities adapt to climate change.	N/A

3. Wrasse Welfare as Cleaner Fish

The initial catch of wrasse from the Dorset Fishery is the beginning of a long journey for the wrasse. The following section provides a brief overview of the process, legislation, standards and guidance on the treatment and husbandry of wrasse as cleaner fish. It should be noted that due to lack of other information, the following section mainly comprises of information provided by organisations with a strong interest in animal welfare.

3.1 Treatment pre-transport – as observed by SIFCA officers

During inspections and observations of fishers at the point of landing, officers have observed positive treatment of the landed wrasse. Fishers have packed out fish holding cages with artificial seaweed to provide refuge and protection from abrasion on the cage. Fishers' transport smaller buckets of wrasse from the cages to the transport lorry and are mindful not to overcrowd the buckets or allow the fish to remain in direct sunlight or warm temperatures for extended periods.

Fish that are observed to be damaged or above the required size of the salmon farms are returned to the sea. When parasitic copepods are observed attached to the wrasse, these are removed and if not possible due to a strong attachment risking damaging the fish further, the fish is returned to the sea.

Fishers and buyers have been clear to SIFCA officers that it is in their best interests to handle the fish in a way that offers protection and minimises suffering, this extended to the length of time the fish are in the holding cages prior to landing. In 2023 fish were landed weekly with one of the reasons being to limit the damage that could occur in the holding cages. In previous years, landings occurred on a two-weekly cycle, but buyers and fishers deemed this to be too long a time period in the cages.

3.2 Transport and Legislation

During Transport, wrasse are safeguarded by both the Welfare of Animals (Transport)(England) Regulations 2006 and the Welfare of Animals (Transport)(Scotland) Regulations 2006 which makes it an offence to transport animals in a way which is likely to cause, injury or unnecessary suffering. The animals are also protected under The Aquatic Animal Health (England and Wales) Regulations 2009 and The Aquatic Animal Health (Scotland) Regulations 2006 which make it an offence to fail to keep a record of the number of animals that die during transport.

At Southern IFCA we receive landings data which included a record of fish landed and fish receive at the fish farm in good condition and alive. It is not specified to Southern IFCA what the happens to those fish that are deemed alive but in a condition that prevents them being used by the salmon farms. It is also unclear as to what deems poor condition, however based on quayside discussion with stakeholders, it can be assumed poor condition encompasses, damaged fins, scales or tails and the presence of parasitic copepods.

3.3 Arrival at fish farm

A large proportion of Scottish Salmon Farms are certified by the RSPCA Assured scheme, including the company that is served by the one buyer in the Southern IFCA district. The scheme has detailed welfare standards regarding the transport, treatment and slaughter of cleaner fish. This includes a visual screening and welfare risk assessment for disease and injury (RSPCA, 2021). Updated standards are expected to come into effect in May 2024 (RSPCA, 2024).

3.4 Salmon Cages

The Animal Health and Welfare (Scotland) Act 2006 places a duty of care on those responsible for the cleaner fish, to safeguard them from unnecessary suffering. This means that cleaner fish should be provided with an adequate diet, the opportunity to express normal behaviour, and protection from disease, pain and suffering. Furthermore, the Animal Welfare (Sentience) Act 2022 recognises vertebrate (i.e., animals with a backbone inside their body) and some invertebrate (i.e., cephalopod molluscs and decapod crustacean) animals as sentient beings for the first time in UK law. This includes all fish. Under this new Act, the unique needs of animals – including 'cleaner fish'- will have to be taken into account.

The RSPCA welfare standards for Farmed Atlantic Salmon 2021, requires cleaner fish to be released into an enclosure with hides/kelp. This is to reduce stress and minimise interactions with aggressive salmon. The salmon are also required to have been fed prior to the release of cleaner fish to minimise predation (Dready, et al., 1995).

There is no legal requirement for farms to publish mortality rates – unless significant and unexpected. However, cleaner fish mortalities are reportedly very high (12-100% (OneKind, 2018)) with few fish surviving a full salmon cycle (European Union Reference Laboratory for Fish Diseases, 2016). Reports on wrasse specific mortality are also very high with "considerable loss of wrasses in the salmon net pens due to predation, handling, escapes and disease" with mortality reaching 75% after 35 days (Skiftexvik, et al., 2014) (Geitung, et al., 2020).

Studies have shown that ~30% of lumpfish (also used as a cleaner fish in salmon farms) could be subject to starvation within a few weeks of being released (Breck, 2015). Supplementary food is required to prevent cleaner fish biting the salmon (Skiftesvik, et al., 2013) (OneKind, 2018). Also, cohabitation with Salmon may increase the risk of mortality of cleaner fish by disease. The most frequent outbreak of disease in cleaner fish in salmon farms is *Aeromonas salmonicid*; which causes swellings that can develop into lesions (Brooker, et al., 2018). Finally, mass escape is also attributed as a cause of mortality for cleaner fish (Geitung, et al., 2020). Table 1 displays a range of cleaner fish mortality rates as documented by the Fish Health Inspectorate.

Table 2 Cleaner fish mortalities as documented by the Fish Health Inspectorate. Table copied from (OneKind, 2018).

SPECIES	WHEN?	WHERE?	WHAT?
Lumpsuckers	July 2017	Seaforth	6,566 (16 %) mortality
Wrasse	July 2017	Seaforth	4,498 (12 %) mortality
Lumpsuckers	2017	Cole Deep	24,000 lumpsuckers stocked on site in Sept 2016, and now (2017) very few are left.
Lumpsuckers	April 2017	Shuna SW	High mortalities of lumpsuckers, up to 400 fish a day. Fish were treated with antibiotic for bacterial infection. No lumpsuckers left on site.
Lumpsuckers	July/August 2017	Stead of Aithness	Site stocked with lumpsuckers but these have died. This occurred shortly after the 15,000 lumpsuckers were inputted.
Cleaner fish (species not specified)	2017	Loch Alsh (Sron)	Approximately 40 % of all cleaner fish lost since input. AGD has been detected.
Lumpsuckers	Summer 2017	Raineach	Had stocked the site with lumpfish in Autumn 2015 and summer 2016, but have lost most fish.
Wrasse	December 2012	Vidlin North	Recent mortality in last weeks- 100/site/week attributed to post-treatment losses.
Wrasse	December 2012	Lismore West	Loss of 10 % of wrasse stocks since delivery in August 2012.

3.5 End of Production

With no legislation in place to necessitate reporting of high cleaner fish mortality and evidence gaps related to the numbers of cleaner fish being used in each cage or farm, it is difficult to build a full understanding of the end of the lifecycle for cleaner fish. The following passages have been taken from reports referencing the end of production cycle outcomes for cleaner fish. However, it should be noted by the reader, no peer reviewed published reports, or information directly from salmon farms has been found during the writing of this information paper. The majority of articles are written and published by parties with a strong interest in animal welfare, extracts from these are provided in the following two quotes and Figures 1 & 2.

"*Re-use of cleaner fish within the same farm following salmon being sent to slaughtering is practiced to some extent, except when the salmon have experienced serious infectious disease outbreaks. Re-use at other farms is recommended against. There may, however, be exceptions for re-use on sites within the same management area provided the MA undergoes a synchronized fallow (including cleaner fish) after the last site is harvested This local re-use can have strong benefits in that sites approaching harvest cannot use chemical controls on lice and pose lower risk because of the limited time for emergence. It must, however, be treated with care and not undertaken if cleaner fish are to be reused in the next production cycle. Intentional release of all live fish, including cleaner fish species, from aquaculture facilities is prohibited. It seems apparent that these regulations are not consistently followed nor enforced in at least one of the salmon producing European countries. Internal risk assessment in each individual case is however encouraged in the guidelines. Surviving cleaner fish not destined for re-use should be appropriately euthanized and destroyed according to applicable legislations.*" (European Union Reference Laboratory for Fish Diseases, 2016)

"*Finally, the wrasse and lumpfish that survived are killed at the end of the salmon production cycle for biosecurity reasons. They are usually slaughtered by an overdose of anaesthetic for the smaller fish and lumpfish, or a percussive blow for bigger wrasse.*" (Conservation Animal Welfare Foundation, 2022)

Slaughter: wild and hatchery reared wrasse and lumpfish

CF 5.0 Producers must be able to demonstrate that the methods used to kill cleanerfish are humane.

> **This is usually a percussive blow for bigger wrasse or an overdose of anaesthetic for smaller fish or lumpfish.**

Figure 1 Extract from the RSPCA welfare standards for Farmed Atlantic Salmon 2021 on the slaughter of wild wrasse used as cleaner fish

Slaughter: wild and hatchery reared wrasse and lumpfish

CF 6.1 **REVISED** All cleanerfish must be killed humanely.

CF 6.2 **NEW** The following methods are permitted for the killing of cleanerfish:

a) being put into an anaesthetic overdose under veterinary prescription

b) a percussive blow or electrical stun-to-kill for wrasse over 50g only.

CF 6.3 **NEW** The following killing methods of cleanerfish are considered to be inhumane and must not be used:

a) bleeding (exsanguination) or decapitation without prior stunning

b) asphyxia

c) evisceration

d) live chilling

e) ice slurry or bath

f) carbon dioxide narcosis.

ⓘ **NEW The RSPCA strongly encourages further work into establishing alternative, humane methods of killing cleanerfish to eliminate any potential negative impacts.**

CF 6.4 **NEW** Cleanerfish must only be culled by trained and competent personnel.

Figure 2 Extract from the RSPCA welfare standards for Farmed Atlantic Salmon 2024 on the slaughter of wild wrasse used as cleaner fish. Expected to come into effect in May 2024.

4. Potential Ecosystem Wide Effects of the Wrasse Fishery – Extracts from the Studland to Portland SAC HRA

Rocky reefs and their associated algal cover form at least one, if not the only habitat, of all above mentioned five wrasse species (Costello, 1991) Although there are differences in the level of exposure and depths favoured by each species (Costello, 1991); (Skiftesvik, et al., 2015). Along the Norwegian coast, wrasse make up the most numerous fish within shallow water communities (Halvorsen, 2016), although their importance in such a complex coastal ecosystem is unclear (Skiftexvik, et al., 2014).

In order to identify possible wider ecosystem effects of their removal it is important to establish their role and position within the food web. Wrasse are considered to belong to a functional group known as ‘coastal mesopredatory fish’ (Bergström, et al., 2016). Coastal mesopredatory fish are defined as mid-trophic level demersal and benthic species with a diet consisting predominantly of invertebrates (Bergström, et al., 2016). Mesopredatory fish serve as a food source for higher trophic levels (i.e. piscovorous fish) and perform a regulating function on lower trophic levels ((Sieben, et al., 2011) (Baden, et al., 2012) (Östman, et al., 2016) (Bergström, et al., 2016). Thus, their abundance is highly likely to have important effects on other parts of the ecosystem web due to their central role within it (Bergström, et al., 2016). Southern IFCA are waiting for the outcomes of a PhD from the University of Exeter, focused on this area to be published and shared.

Wrasse graze on animal growth found on seaweeds and rocks and are important predators of hardshelled animals, such as crustaceans and molluscs, leading to a diverse diet and making all species carnivorous (Costello, 1991) (Sayer, et al., 1995); (Sayer, et al., 1996a) (Deady &

Fives, 1995). Dietary studies have revealed that decapods, predominantly *Cancer pagurus* and *Carcinus maenas*, represent a key food category for ballan wrasse (Dipper, et al., 1977) whilst one of the main food categories for corkwing wrasse is gastropods molluscs; Gibbula umbilicalis and Helcion pellucidum in particular (Sayer, et al., 1996a). The diet of rock cooks have been found to be dominated by bivalve molluscs and amphipods (Sayer, et al., 1996a) and dominant food items for goldsinny, as well as larger corkwing, including mussels and barnacles (Deady & Fives, 1995) (Sayer, et al., 1995). The removal of wrasse, in their role as grazers and predators of epifaunal species, can lead to top-down effects (Bergström, et al., 2016). Top-down effects include a loss of grazing control, whereby wrasse feed upon epifaunal species which in turn graze on algal species (Bergström, et al., 2016). A loss of grazing control, caused by the removal of wrasse species, can therefore lead to an increase in epifaunal growth and subsequent increases in the grazing of algal species.

In coastal areas of temperate regions, an important example of the loss of grazing control is the overgrazing of algal assemblages (particularly kelp forests) by sea urchins, whose populations have increased as a result of fisheries-related decline in predatory fish (Figueiredo, et al., 2005). This concern has recently been cited by (Coghlan, 2017) over the removal of wrasse for cleaner fish in salmon farms. (Figueiredo, et al., 2005) assessed the importance of sea urchins in the diets of ballan wrasses in the Azores and found that echinoderms, particularly echinoids, were the second most important prey group and accounted for 41.5% (by weight) of all identified food items and the importance of this prey group increased with fish size. Prior to this study, the importance of echinoderms in the diet of ballan wrasse had not been recorded. The study concluded that ballan wrasse are likely to provide a very significant contribution to the control of sea urchin populations within the Azores and that a reduction in the mean size of fish (often a consequence of fishing) may lead to a significant decline in sea urchin predation and subsequent sea urchin proliferation and overgrazing. Another study, on the diet of corkwing wrasse on the west coast of Scotland, reported sea urchin spines in over 5% of individuals examined; much less than the reported for ballan wrasse in the Azores (Sayer, et al., 1996a).

A number of studies have examined the relationship between wrasse predation on epifaunal invertebrate grazers of brown macro algae found in rocky areas in New Zealand. Using mesocosm experiments, (Pérez-Matus & Shima, 2010) investigated the interaction of two wrasse species, *Notolabrus celidotus* and *N. fucicola* and found both species had a positive indirect effect on the giant kelp, *Macrocystis pyrifera*, through the consumption and behavioural change of amphipods, respectively. Overall, the presence of the *N. celidotus* and *N. fucicola* led to a 5-fold and 2-fold decrease, respectively, in the number of grazing marks (Pérez-Matus & Shima, 2010). (Newcombe & Taylor, 2010)) conducted similar mesocosm experiments using *N. celidotus* and three species of brown macroalgae; *Ecklonia radiata, Carpophyllum flexuosum* and *C. maschalocarpum*. The study reported a reduction (to 7-20% of predator-free densities) in epifaunal grazing on algae species as a result of predation. When epifaunal densities were reduced (artificially or by fish predation), algal biomass was greater (due to less damage) but more heavily fouled. When predatory fish were not present, macroalgae sustained increased damage and biomass was reduced to 21-74% of epifauna-free algal biomass. In the study a trophic cascade was apparent, as the addition of predator led to a reversal in the decline of primary producer biomass caused by herbivores (Newcombe & Taylor, 2010)). The results of the study were not found to be consistent with field surveys of varying fish densities. The above studies demonstrate the potential importance of top-down control of epibenthic grazers and how the removal of wrasse might lead to potential trophic cascades. The applicability of these studies and their results however must be considered with caution, particularly with respect to study conducted by (Figueiredo, et al., 2005). This is due to the likely differences in epifaunal assemblages found in the Azores and found on the south coast of the UK, and thus the importance of echinoderms as a component of the species diet is likely to be less considerable. Wrasse also serve as a prey species for gadoids, sea birds and mammals (seals and otters) (Steven, 1933) (Nedreaas, et al., 2008) (Helfman, et al., 2009) (Smale, et al., 2013). At low abundances of piscivores, the distribution of coastal meopredatory fish and piscivores is tightly coupled (Bergström, et al., 2016). A reduction in wrasse is therefore likely to lead to subsequent reduction and/or and change in the distribution of species which feed on them. (Halvorsen, 2016) reported goldsinny growth rates to be negatively related to population and the abundance of coastal cod. This demonstrates that the potential implications of wrasse removal are likely to be complex.

This information, extracted from the current Studland to Portland SAC HRA for the live wrasse fishery, represents the current understanding of ecosystem effects which may be related to the fishery. The current HRA (dated 2023) has been agreed by the Authority (February 2023) and subject to Formal Advice from Natural England who agreed with the conclusions reached.

EXECUTIVE SUMMARY

Marked G

Poole Harbour Bivalve Survey Report 2023
Paper For Information

Report by IFCO Mullen

A. Purpose

To provide members with the survey report from the Poole Harbour Bivalve Survey 2023.

B. Annex

1. The Southern IFCA Poole Harbour Bivalve Survey Report 2023

1.0 Introduction

- The Poole Harbour Bivalve Survey is carried out annually in the spring, prior to the opening of the dredge fishery under the Poole Harbour Dredge Permit byelaw. The survey collects data on the size (length) and catch per unit effort (CPUE) for the two most commonly harvested species, the Manila clam (*Ruditapes philippinarum*) and the common cockle (*Cerastoderma edule*).
- The aim is to repeat the methodology each year to build a time series of data which can be used, in combination with other data sources such as catch data from the fishery, to assess the sustainability of the Manila clam and common cockle fisheries in Poole Harbour and inform any reviews of management measures.
- The Poole Harbour Clam & Cockle Fishery is certified under the Marine Stewardship Council (MSC), the certification having been in place since 2018 and recently renewed for another five-year period in 2023. Part of the requirements under the Principles of this certification is to demonstrate robust stocks and sustainable fishing practices. The data collected during this survey contributes to evidencing this for the Clam & Cockle Fishery.

2.0 Summary of Key Points

- The attached report (Annex 1) provides an overview of the dataset collected in the 2023 survey. The survey was carried out over the period of the 18th-20th March 2023.
- The report analyses length frequency data, Catch Per Unit Effort (CPUE) data and catch data of Manila clam and common cockle (as landings data provided by permit holders), as the two main commercially harvested species, between survey sites, corresponding catch reporting zones and years (2021-2023).
- Analysis indicates that stocks of both species remain stable based on all parameters (CPUE, length frequency and catch rate) therefore at this time the combined data sources indicate that management is appropriate for maintaining a sustainable stock of target species in the Poole Harbour dredge permit fishery.

Catch Per Unit Effort & Catch Data Results

- High output CPUE values compliment favourable fishing grounds for each species and similarly reflects the environmental stimuli driving habitation for both species. High CPUE of Manila clam are seen in muddy and fine-grounded sedimental areas of Arne, Inner Keysworth and Holton Mere, whereas high CPUE of cockles are found in sandy and coarse sediments displayed in sites such as Round Island, Seagull Island and Keysworth.

- Where statistical differences were observed between zones for Manila clam, this is likely related to the prevalence of preferred habitat type.
- Consistent landings data and no significant difference in CPUE suggest Manila clam stocks have been stable within the last 3 years.
- Holes Bay displayed increased CPUE compared to other catch zones, this suggests that the permanent closure of this area to dredge fishing is affording some benefit to stock levels.
- Although the quantity of landings of cockle has decreased slightly since 2020, statistical analysis showed no significant difference in landings catch data or CPUE data for the survey over the 3 years. This suggests that the fishing levels and stocks have remained stable.
- The quantities of cockle landed each season are consistently lower than Manila clam landings. This is due to market preferences and economic value of each species where Manila clam is the favoured species. Peak landings of Manila clam and common cockle were in July of 2022, which is consistent with previous year trends showing highest harvesting in mid-summer months before a steady decline in landings to the end of the season.

<u>Length data results</u>

- All sites showed the average width of Manila clam above the MCRS of 35mm, with exception to Sites 19 and 19(2) at Holton Mere. These two sites fall within catch Zone 10, which is one of the preferred fishing ground for clam dredging. Smaller sizes within Site 19 and Site 19(2) may be as a result of a slight increase in fishing pressure to Manila clams within zone 10 during the 2022 season. Similarly, the period between the fishing season and the survey taking place is likely to be subject to temperatures below that for optimal growth. Therefore, by the opening of the fishery on 25th May, sizes are expected to increase.
- Average length data also shows all sites, with the exception of site 19(2), above the MCRS for common cockle. There is less fishing effort in this area for cockle so it is likely that environmental variables may be causing the pattern seen here for the below MCRS average size.
- The sampling method and the manner in which these species grow are likely to influence the differences in patterns in average size between the Manila clam (more varied) and common cockle compared to their respective landing sizes seen this study. While the majority of the cockle population were above the MCRS for the species, the Manila clam sample populations was more varied in size, this may be due to growth allometry of this species which is more varied than that of the common cockle.

<u>Conclusions</u>

- The 2023 Poole Harbour Bivalve Survey has provided data which enables an assessment to be made of the stocks of the main commercially harvested species, Manila clam and common cockle, and for data to be compared to previous survey years.
- The results indicate that the harvestable populations of both species remain stable with CPUE showing either no significant differences between years or, for common cockle, an increase in CPUE in the last two survey years. Catch levels and length frequency also remain stable for both species.

3.0 Next Steps

- That Members note the report.
- The report will be published on the Authority's website.
- The 2024 survey was undertaken in April 2024, the data from this survey will be added to the survey timeseries dataset and analysed, incorporating catch data from the 2023 season as the most recently available data on catch levels.

Marked G – Annex 1

Southern IFCA Poole Harbour Bivalve Survey-2023

This report has been produced by Southern Inshore Fisheries and Conservation Authority.
Reported by IFCO Celie Mullen

A copy of the report is available on our website at www.southern-ifca.gov.uk or from Southern IFCA Office at:

Unit 3, Holes Bay Park, Sterte Road West, Poole, Dorset, BH152AA

Tel: 01202721773, email: enquiries@southern-ifca.gov.uk

Table of Contents

1. Introduction

This report provides details of the 2023 Poole Harbour Bivalve Survey, which is conducted annually for the purpose of monitoring commercially viable shellfish beds within Poole Harbour, UK. The survey began in 2015 and outputs are used as baseline against which to monitor trends in stock levels and potential changes in the population of commercial bivalve species, to support Southern IFCA's management decisions and aid in the evaluation of the sustainability of the Poole Harbour Dredge Fishery.

The survey evaluates length frequency data and Catch per Unit Effort (CPUE) data from 27 commercially fished shellfish beds within Poole Harbour (see Section 1.5) from 11 catch zones. The survey focuses on the primarily commercially harvested species, the common cockle (*Cerastoderma edule)* and Manila clam (*Ruditapes philippinarum)* (length frequency and CPUE), with length frequency information only collected for other bivalve species.

1.1 The fishery

Shellfish dredging in Poole Harbour originated using hand-ranking techniques to gather cockles. This was followed by the introduction of Manila clams in the 1980s, with the intention of establishing commercial aquaculture. The fishery transferred to the use of mechanical dredging as infrastructure advanced, which lead to the development of the pump-scoop dredge, which is currently seen in the modern-day fishery (*Figure 1)*. The Manila clam and common cockle are the primary species harvested however, American Hard-Shelled clams (*Mercenaria mercenaria*) and the native clam (*Ruditapes decussatus*) are also harvested in smaller quantities.

Figure 1. An example of the pump-scoop dredge which is used within the modern-day Poole Harbour Dredge Fishery to fish for clam and cockle species.

The Poole Harbour clam and cockle fishery was awarded dual certification under the Marine Stewardship Council's Sustainability Standard and the Seafish Responsible Fishing Scheme in 2018. The fishery runs from 25th May to 23rd December annually.

1.2 Pump-Scoop Dredge

The pump-scoop dredge was engineered to minimise ecological damage while maximising efficiency. Water jets are pressured towards the back of the dredge basket, directing sediment movement through the mechanical dredge basket. Dredge type and construction are restricted under the permit conditions of the Poole Harbour Dredge Permit Byelaw. The horsepower of the dredge may not exceed 15 and the basket size may not exceed 460mm in width by 460mm in depth by 300mm high (excluding poles or attachments). Dredge bars must have no less than 18mm between them and cross pieces used to strengthen the dredge basked must have a minimum spare of 40mm between them. Dredges must have a mandatory riddle (secondary sorting system) bar spacing of 18mm for sorting shellfish to ensure harvested stock is above the MCRS. Figure 2 shows an example pump-scoop-dredge.

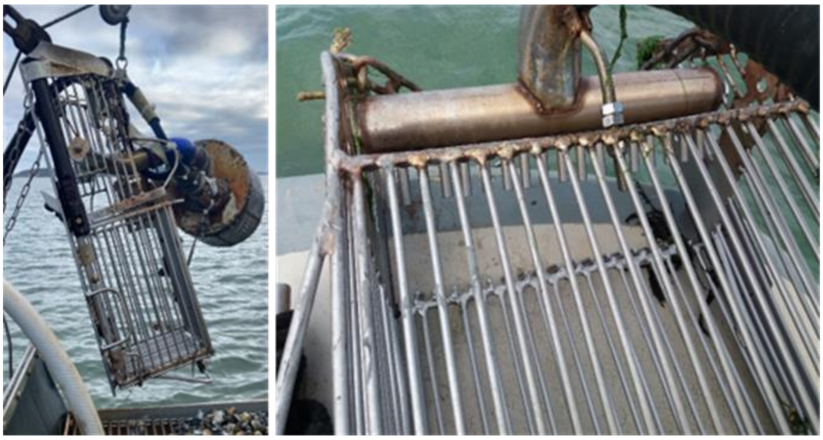


Figure 2. An example of the pump-scoop dredge used within the Poole Harbour Dredge fishery.

1.3 Manila clam *(Ruditapes philippinarum)*

The Manila clam (*Figure 3*) was introduced to Poole Harbour in 1988 for the purpose of aquaculture and became a self-sustaining population (Jensen *et al.*, 2004; Jensen *et al.,* 2005; Humphreys *et al.,* 2007). Manila clams inhabit muddy and fine sediments in the intertidal zone and shallows (Jensen *et al.,* 2005). They dwell in the top 40mm of the substratum, but can bury as deep as 100mm, and filter phytoplankton and sedimentary organic matter from the water (Lee, 1966; Dang *et al.,* 2009).

Figure 3. A diagram of the Manila clam. The widest point (width) was used to obtain length data within the Poole Bivalve Survey 2023.

Poole Harbour provides a relatively sheltered, nutrient rich, shallow water habitat with extensive intertidal mud flats, and temperatures up to 27°C in the summer. This provides optimum reproductive conditions for the species (Toba and Miyama, 1995; Jensen *et al.,* 2004; Jensen *et al.,* 2005; Chung *et al.,* 2005; Humphreys *et al.,* 2007).

In Poole Harbour the Manila clam spawning season occurs from July to September (Grisley, 2003; Jensen *et al.,* 2005; Tumnoi, 2012). Water temperature between 8°C and 27°C provides suitable conditions for larval development (Chung *et al.,* 2005; Drummond *et al.* 2006; Moura *et al.,* 2018). Below this threshold Manila clams are thought to be sexually inactive. In Poole Harbour Manila clam are capable of spawning more than once throughout the summer depending on environmental conditions with peak activity in September (Humphreys *et al.,* 2007; Jensen *et al.,* 2004;). In Poole Harbour juveniles grow up to 20 mm in their first 24 months (Jensen *et al.,* 2004). The rate of growth then reduces once individuals have reached sexual maturity.

1.4 Common cockle *(Cerastoderma edule)*

The common cockle (*Figure 4*) is commonly found to inhabit sandy bays and estuaries throughout the Southern IFCA District. Individuals burrow up to 50mm below the surface of sandy and fine gravel seabed from middle to lower intertidal zones. Cockles grow to up to 38mm for males, 20mm for females and are known for their distinct shell with 22-28 ribs. In the UK, spawning occurs between March and August (Seed and Brown, 1977; Newell & Bayne 1980), gametogenesis is initiated in the previous winter months (October to March).

Growth rate decreases with increasing tidal height, due to lack of immersion time and limited food availability and opportunity (Richardson *et al.,* 1980; Jensen, 1993; Montaudouin & Bachelet, 1996; Montaudouin, 1996). Similarly, in winter months, metabolic rate is slowed due to decreasing temperatures and cockles' inability to acclimatise. Cockles are filter feeders and individuals have the capability to filter half a litre of water per hour. The cockle fishery within Poole Harbour has commercial importance and populations densities of up to 10,000 per square metre have been recorded.

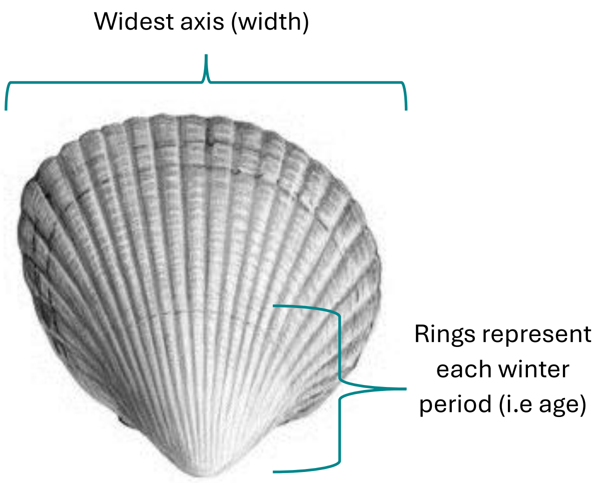


Figure 4. A diagram of the common cockle. Dark rings represent the number of wintering months which is used to decipher age. The widest axis (length) is highlighted, which was used to obtain length frequency data within the Poole Bivalve Survey 2023.

1.5 Southern IFCA Management

The fishery is managed under the Poole Harbour Dredge Permit Byelaw 2015[1] The byelaw manages the direct use of the pump-scoop dredge through a permit system, with up to 45 permits issued each year, where the permit is required to use the pump-scoop dredge equipment within Poole Harbour. The byelaw regulates a number of elements of the fishing operation including:

- Gear types, construction and restrictions
- Spatial and temporal restrictions
- Catch restrictions
- Reporting

As part of catch reporting requirements, fishers must submit a monthly catch return indicating, for each day fished, the hours fished, the quantities of species caught and the buyer(s). Fishers must also indicate which of 11 catch zones the catch has come from to allow for catch data to be related to the annual stock survey.

The fishery is located within the boundaries of the Poole Harbour Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and Ramsar Site, the Southern IFCA undertakes a Habitats Regulations Assessment to ensure that in permitting this fishery, Southern IFCA are operating in line with their legal duties under relevant legislations and there is no adverse effect on the SPA, SSSI or Ramsar Site from the fishery[2].

2 Methodology

The survey took place between 18th – 20th March 2023 and used local fishing vessel, FV Marnie George. A pump-scoop dredge was used in line with normal fishing practice and management measures (see Section 1.5).

The pump-scoop dredge is inherently size selective as fishers want to reduce the amount of post-capture measuring required to ensure compliance with MCRS. It is recognised therefore that the survey methodology will not fully sample the population below MCRS, although every effort is made to capture all shellfish from the dredge before it passes through the riddle. However, the sampling is carried out the same way each year therefore whilst the samples are not fully representative of the below MCRS part of the population there is the ability to make comparisons between years for under MCRS CPUE and length frequency due to the consistency in methodology. Please note, Site 2 was not sampled due to tidal constraints, therefore, for the 2023 survey, 26 shellfish beds were sampled.

The following methodology was followed:

1. Three dredge tows were conducted within a radius of 20m from a predetermined central point of each site. This central point is consistent across all survey years (*Table 1*).
2. After 2 minutes the dredge was brought inboard and bivalves were retained and labelled to the corresponding site and dredge tow (e.g. Site 1 Dredge 1).

[1] Poole-Harbourr-Dredge-Permit-Byelaw.pdf
[2] Poole Harbour HRA 2023-2024 season

3. Each species was identified, and the first 50 individuals were measured at their widest axis to the nearest millimetre (please refer to Figure 3 and Figure 4, which illustrates the measurement parameters).
4. Manila clams and common cockles were separated into above and below their relative Minimum Conservation Reference Size (MCRS) (35mm and 23.8mm respectively) and weighed.
5. Following measurement, all samples were returned to shellfish production areas within the same classification.

Table 1 identifies the sites surveyed within the Poole Harbour Dredge survey 2023 and their corresponding shellfish catch zones and reference points.

Site Number	Site Name	Zone	Latitude		Longitude	
1	Middle Ground	1	50	42.147	1	57.205
2	Whitley Lake	2	50	41.875	1	56.337
3	Aunt Betty	1	50	41.959	1	57.813
4	Blood Alley	3	50	40.900	1	58.023
5	Jerry's Point	3	50	40.498	1	57.717
6	Brands Bay South	4	50	40.040	1	58.569
7	Brands Bay West	4	50	40.362	1	58.837
8	Furzey Island	8	50	41.110	1	59.384
10	Newtons Bay	5	50	40.286	1	59.671
11	Ower Bay	6	50	40.617	2	00.282
11(2)	Wards	8	50	40.943	2	00.272
12	Round Island	8	50	41.027	2	01.053
13	Wych and Middlebere Lake	7	50	40.804	2	01.653
14	Long Island	8	50	41.457	2	00.803
15	Arne	9	50	41.914	2	01.425
15(2)	Inner Arne	9	50	42.006	2	01.621
16	Patchins Point	1	50	42.224	2	01.180
17	Giggers	11	50	41.575	2	03.996
18	Keysworth	11	50	42.175	2	03.894
18(2)	Inner Keysworth	11	50	42.215	2	04.181
19	Holton Mere	10	50	42.499	2	03.488
19(2)	Inner Holton Mere	10	50	42.629	2	03.965
20	Seagull	10	50	42.660	2	02.964
21	Rockley Spit	10	50	42.931	2	02.501
22	Hamworthy	1	50	42.494	2	00.437
23	Upton Lake	HB	50	43.546	2	00.267
24	Creekmore Lake	HB	50	43.610	1	59.738

3 Results

Results focus on the predominant commercial species within the harbour, Manila clam and common cockle. Other species found during the survey and harvested at a smaller scale include American Hard-Shelled clam *(Mercenaria mercenaria*), the Native *clam (Ruditapes decussatus*), the native oyster (Ostrea edulis), the Pacific oyster *(Magallana gigas*), the spiny cockle (*Acanthocardia aculeata)* and the blue mussel (*Mytilus edulis).*

Length frequency data was analysed in reference to site, whereas Catch Per Unit Effort Data was applied to the 11 shellfish catch reporting zones under the Poole Harbour Dredge Permit Byelaw (Figure 5). Length frequency data and Catch Per Unit Effort Data (CPUE) were examined using Excel and R Studio. CPUE was determined using the weight data while factoring the size of the dredge and length of tows. Units of CPUE are kilograms per metre of dredge per hour (kg/m/hr).

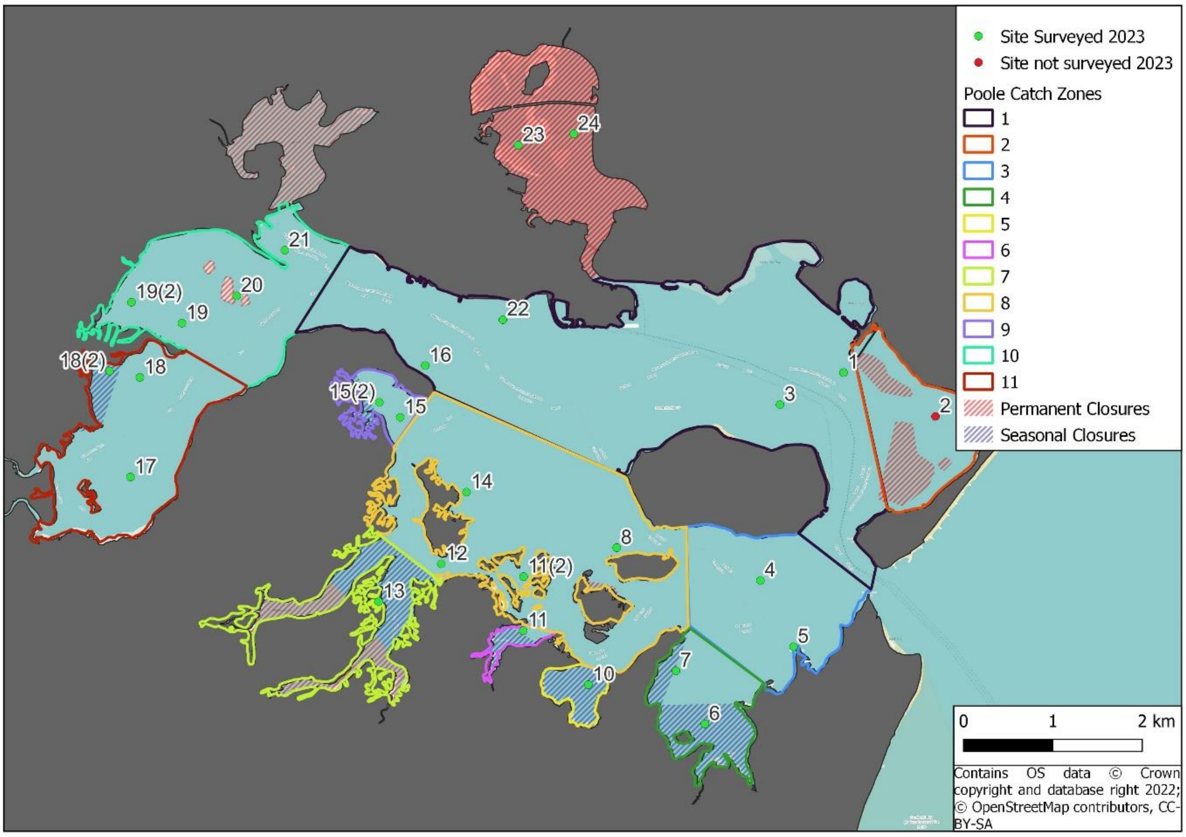


Figure 5. A visual representation of the sites within the Poole Harbour Bivalve Survey 2023. Sites are located with 11 shellfish catch zones. Sites are categorised as green (surveyed) or red (not surveyed). Seasonal and permanent closures included within the fishery byelaw have also been included.

3.1 Length Frequency Data

The average length (mm) of Manila clam and common cockle across three dredges per site are shown in (*Figure 6 A and B).*

3.1.1 Manila Clam

- The average length of Manila clam varied from 49mm at Site 4 (n=7) to 33mm at Site 19(2) (n=150).
- All sites had an average width above the MCRS length, except Sites 19 and 19(2), both averaging just below the MCRS at 34.9mm and 33.1mm respectively.

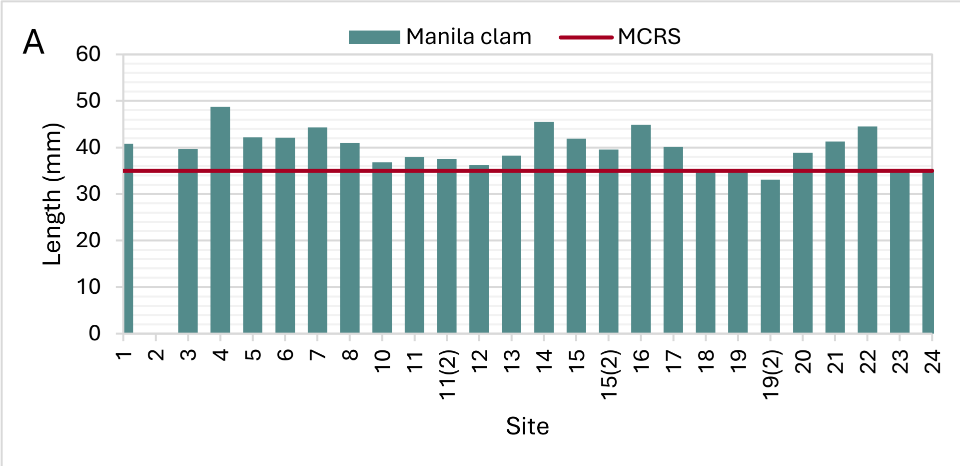


Fig 6A The average length of Manila clam (A) in each of the surveyed sites in the Poole Harbour Dredge Bivalve Survey 2023. The corresponding minimum conservation references size (MCRS) is represented as a red line to provide comparison (35mm).

3.1.2 Common cockle

- The average length of cockle varied from 38mm at Site 4 (n=96) to 22mm at Site 19(2) (n=94).
- All sites had an average width above the MCRS length, except site 19(2).

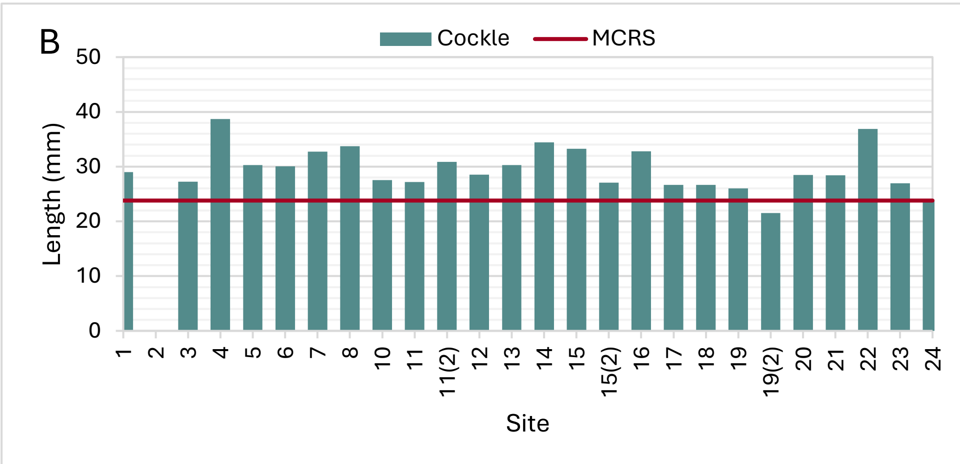


Figure 6B. The average length of common cockle in each of the surveyed sites in the Poole Harbour Dredge Bivalve Survey 2023. The corresponding minimum conservation references size (MCRS) is represented as a red line to provide comparison (23.8mm).

3.2 Catch Per Unit Effort (CPUE)

CPUE above and below the MCRS for Manila clam and common cockle are shown in Figure 7A and B respectively. Data has been analysed for 2023 and also in comparison to data from the previous two surveys, 2022 and 2021. Statistical analyses were performed using a non-parametric Kruskal-Wallis test with subsequent Dunn's test.

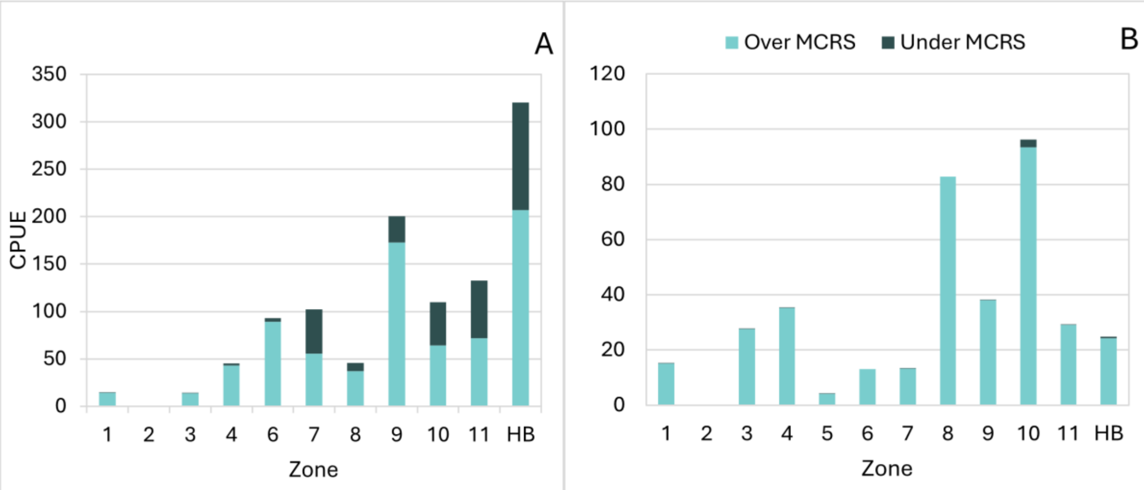


Fig 7 A and B. The Catch Per Unit Effort for Manila clam (A) and common cockle (B) per site surveyed within the Poole Harbour Survey 2023. Bars represented total CPUE which is also divided into above and below MCRS CPUE (light and dark blue representatively). Note that Site 2 was not surveyed.

3.2.1 Manila Clam

- For the 2023 survey, Holes Bay and zones 9 and 5 showed the highest average CPUE (above and below MCRS combined). The values were 207.02, 200.45 and 159.50 kg/m/hr, respectively.
- These sites also showed the highest above MCRS CPUE values at 207.02,172.79 and 107.42 km/m/hr respectively.
- All zones had a greater CPUE above MCRS than below MCRS. Holes Bay showed the greatest CPUE below MCRS at 113.27 kg/m/hr.
- Statistical comparison of the 2023 dataset showed a significant difference in the total CPUE between zones ($p<0.05$). Post-hoc testing revealed that total CPUE in zone 1 was significantly lower than zone 10, zone 11 and Holes Bay ($p<0.05$). There was also a significant difference between zone 3 and zone 10. There were no significant differences between the CPUE above or below MCRS between zones ($p>0.05$).
- Statistical comparisons between the last three survey years for each zone (2021-2023) showed no significant difference between the total CPUE of each zone compared between the 3 years ($p>0.05$) *(Figure 8)*.
- CPUE above and below MCRS also showed no significant difference between years ($p>0.05$). This suggests that over the last 3 surveys, the Manila clam CPUE has remained stable.

3.2.2 Common cockle

- For the 2023 survey, zones 10, 8 and 9 showed the highest average CPUE (above and below MCRS combined). The values were 95.05, 78.87 and 38.24 kg/m/hr respectively.
- These sites also showed the highest above MCRS CPUE values at 93.38, 82.73 and 37.98 kg/m/hr dredge per hour respectively. Zone 10 also showed the highest average under MCRS CPUE of 2.84 kg/m/hr dredge per hour.
- Statistical comparison between zones showed no significant differences in the total CPUE for the 2023 dataset. There was also no significant difference between zones in CPUE of under MCRS or above MCRS ($p>0.05$).
- Statistical comparisons between the last three survey years for each zone (2021-2023) showed significant results only for zones 8 and 10.
- Analysis of average total CPUE of common cockle in Zone 10 showed no significant differences between the 2022 and 2023 datasets ($p>0.05$), however, both had a significant increase in CPUE from the 2021 dataset ($p<0.05$).
- The average CPUE for above MCRS in zone 10 showed significant difference between years. Post-hoc testing showed the CPUE was significantly higher in 2022 and 2023 surveys compared to 2021 (both p values were under the 0.05 significance level). However, comparison between 2022 and 2023 showed no significant difference in CPUE of cockles above MCRS.
- Zone 10 showed significant a difference in average CPUE of cockles under MCRS, between years, however there was not enough variation between data for the years compared to variation within each year therefore the difference could not be detected in post-hoc testing.
- Average CPUE under MCRS in zone 8 showed significant difference between years ($p<0.05$), however post-hoc testing was unable to determine any differences as above.
- For these comparisons in Zone 10, visually the data shows a higher total CPUE and CPUE above MCRS in 2023 compared to 2022 and 2021 and the below MCRS is higher in 2022 and 2023 than in 2021.

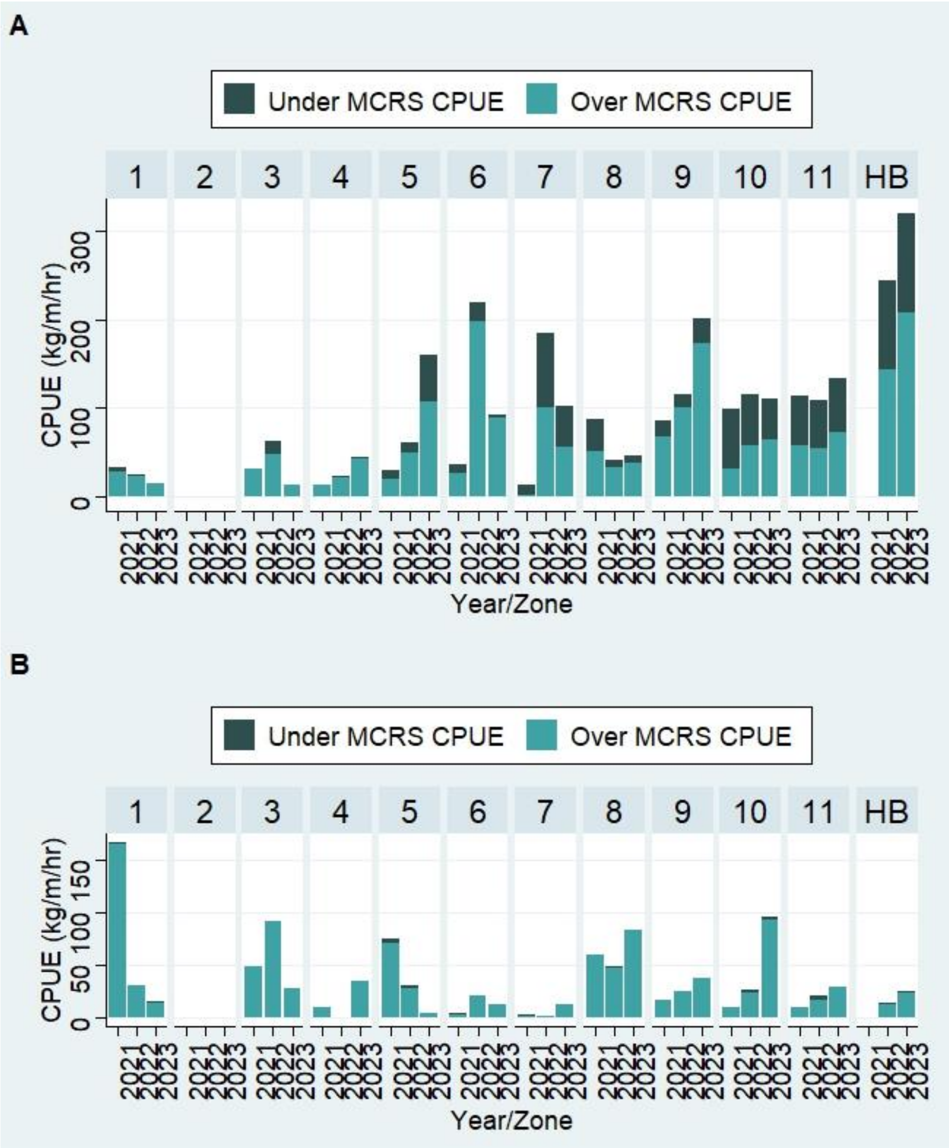


Figure 8. Catch per Unit Effort expressed as kg of shellfish per metre of dredge per hour for Manila clam (A) and common cockle (B). Dark blue bars represent CPUE under the MCRS for Manila clam and common cockle (35mm and 23.8mm respectively), and light blue bars represent the CPUE above the MCRS. Data has been grouped into the classified shellfish bed zones 1-11 and Holes Bay (HB) and shows the most recent three years of the survey (2021-2023).

4 Catch Data

Quantities of Manila clam and common cockle caught each month by the fishery for the 2020, 2021 and 2022 fishing seasons are shown in Figure 9 A and B, respectively. The fishing season runs from 25th May to 23rd December each year.

4.1 Manila clam

- The total landings over the season increased from 354.36 tonnes in 2020 to 492.02 tonnes in 2021, however this declined in 2022 to 337.32 tonnes. Statistical analysis showed no significant difference in the total landings of Manila clam between 2020-2022 ($p>0.05$).

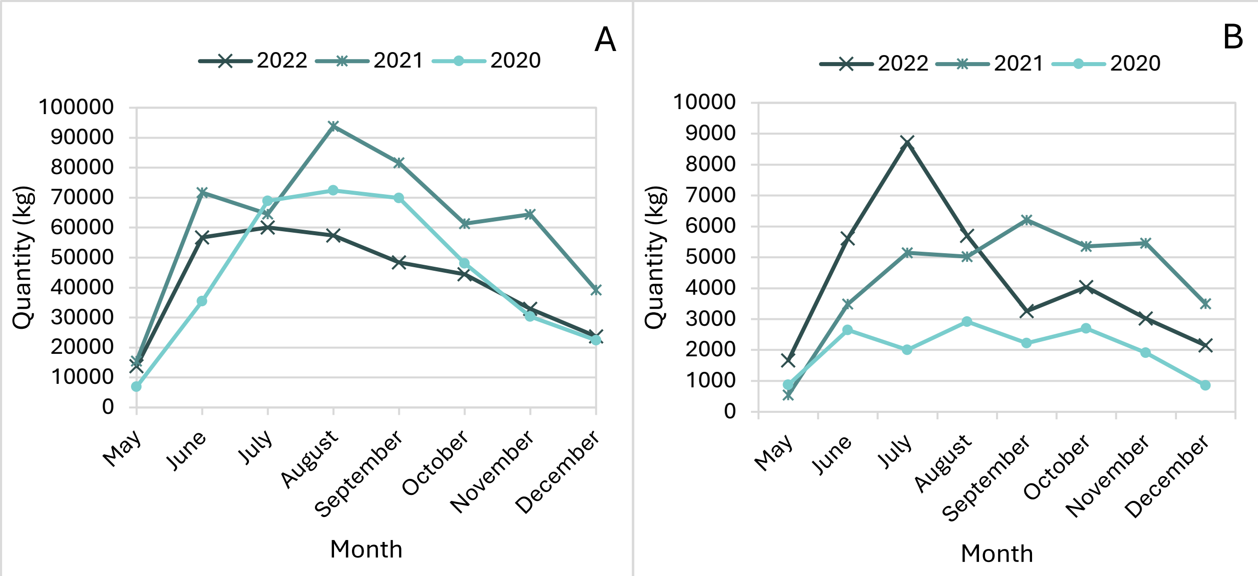


Figure 9 A and B. The monthly total catch (kg) of Manila clam submitted in catch returns from permits of the Poole Harbour Dredge Fishery for the 2022, 2021 and 2020 seasons.

- The peak landed catch for the 2022 season was at 6,055kg in July (Figure 9A). This follow trends from previous years which show peak landings during mid-summer months before steadily declining towards the end of the season in December.

4.2 Common cockle

- Statistical analysis showed a significant difference in landings between years ($p<0.05$) but post-hoc testing was not able to identify the changes.
- Analysis of raw landings data showed an increase in total catch from 16.12 tonne in 2020 to 34.16 tonne in 2022 (Figure 9B). There was a large increase in landings between 2020 and 2021 with catches stabilising during 2022 for the second half of the season but showing a large peak in landings for July of 2022, at 8,725kg.
- The monthly average quantity of cockles landed increased from 2016.13kg in 2020 to 4270.19kg in 2022. However, statistical analysis showed there was no significant difference in the monthly average landed between 2020-2022 ($p>0.05$).
- Trends follow previous years which show a peak in landings during mid-summer months before steady declining into the final seasons in December.

4.3 Comparison of catch data classified by zones

Since 2019, fishers have been required to report which fishing zones have been fished each day (figure 10 A and B). This provides zonal application to catch data.

4.3.1 Manila clam

- Zones 8, 10 and 11 have been consistently favourable for fishing between the last three years.

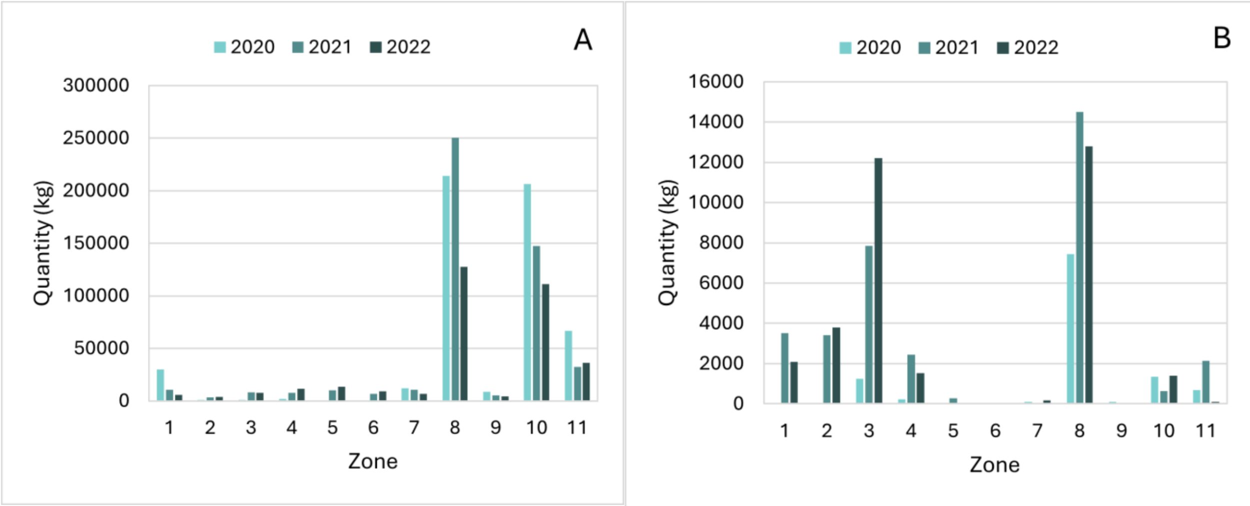


Figure 10 A and B. Landings of Manila clam (A) and common cockle (B) between 2020-2022. Information was gathered by submitted catch returned form the Poole Harbour Dredge Fishery. Zonal distribution of catch has been categorised.

- Quantities have slightly declined in zones 8 and 10 since 2021, but statistical analysis showed no significant difference between zonal catch data for Manila clams between 2020-2022 ($p>0.05$).

4.3.2 Common cockle

- Increasing catch data has been recorded in Blood Alley (zone 3) since 2020. zones 3 and 8 have been consistently favourable fishing grounds between 2020-2022.
- Statistical analysis showed no significant in zonal catch data for the common cockle between years ($p>0.05$).

5 Discussion

CPUE & Catch Data

- Quantifying CPUE from survey results and quantifying landings data provided by fishers allows the results to be analysed against level of fishing. This applied to the 11 catch zones, introduced since 2019, allows identification of any zonal changes which could be used to inform management.
- High output CPUE values compliment favourable fishing grounds for each species and similarly reflects the environmental stimuli driving habitation for both species. High CPUE of Manila clam are seen in muddy and fine-grounded sedimental areas of Arne, Inner Keysworth and Holton Mere, whereas high CPUE of cockles are found in sandy and coarse sediments displayed in sites such as Round Island, Seagull Island and Keysworth.
- Consistent landings data and no significant difference in CPUE suggest Manila clam stocks have been stable within the last 3 years.
- The statistical differences observed in total CPUE between zones with Zones 1 and 3 showing lower total CPUE than a selection of other zones is likely related to habitat type. Both Zones 1 & 3 are comprised of sandier, coarser sediments compared to the zones which showed a significantly higher total CPUE (10, 11 and Holes Bay) which are

comprised of muddier sediments, aligned with the preferred habitat type for Manila clam.

- Sites 23 and 24 in Holes Bay display high CPUE for Maila clams. The combination of a permanent fishing closure within Holes Bay since 2015, alongside preferred conditions for Manila clam growth, may result in a high reproduction rate with little to no removal.
- Zone 10 displayed an increase in CPUE of common cockle between 2021 and 2023 however stocks have stabilised since 2022.
- Although the quantity of landings of cockle has decreased slightly since 2020, statistical analysis showed no significant difference in landings catch data or CPUE data for the survey over the 3 years. This suggests that the fishing levels and stocks have remained stable.
- The quantities of cockle landed each season are consistently lower than Manila clam landings. This is due to market preferences and economic value of each species where Manila clam is the favoured species.

Length Frequency

- All sites showed the average width of Manila clam above the MCRS of 35mm, with exception to Sites 19 and 19(2) at Holton Mere. These two sites fall within catch Zone 10, which is one of the preferred fishing ground for clam dredging. Smaller sizes within Site 19 and Site 19(2) may be as a result of a slight increase in fishing pressure to Manila clams within zone 10 during the 2022 season. Similarly, the period between the fishing season and the survey taking place is likely to be subject to temperatures below that for optimal growth. Therefore, by the opening of the fishery on 25th May, sizes are expected to increase.
- Average length data also shows all sites, with the exception of site 19(2), above the MCRS for common cockle. There is less fishing effort in this area for cockle so it is likely that environmental variables may be causing the pattern seen here for the below MCRS average size.
- Similarly, the sampling method and the manner in which these species grow are likely to influence the differences in patterns in average size between the Manila clam and common cockle compared to their respective landing sizes seen this study. While the majority of the cockle population were above the MCRS for the species, the Manila clam sample populations was more varied in size.
- Previous zonal observations have showed that Manila clam grow differently depending on the region it inhabits within the Harbour; some individuals are seen to grow along the widest axis and remain thin, whereas other subpopulations grow in depth but remain narrow in length. Therefore, thicker Manila clams will be retained by the dredge regardless of if the length is above or below the MCRS. In contradiction, cockles are seen to grow more equally throughout their structure, meaning less undersized individuals are unintentionally caught in the dredge. This, alongside potential impacts from the differences in fishing pressures between species may therefore affect the species' relative size distributions. Therefore, a higher proportion of undersize Manila clams can be seen in the CPUE outputs.
- Sites in Holes Bay show a lower average size compared to other sites and a greater proportion of individuals under MCRS, despite the higher CPUE levels. This could

similarly be explained by variations in growth allometry seen in Manila clams across Poole Harbour resulting in a greater retention of Manila clam below MCRS. It could also be related to environmental variables, the testing for these is outside the scope of this study.

6 Conclusion

- The 2023 Poole Harbour Bivalve Survey has provided data which enables an assessment to be made of the stocks of the main commercially harvested species, Manila clam and common cockle, and for data to be compared to previous survey years.
- The results indicate that the harvestable populations of both species remain stable with CPUE showing either no significant differences between years or, for common cockle, an increase in CPUE in the last two survey years.
- Catch levels also remain consistent with no significant differences between years and no specific effects of catch levels can be discerned in the survey results.
- Length frequency also remains stable with the majority of sites showing an average size at or above the species MCRS. The exceptions to this are likely explained in the majority by environmental variables and growth allometry, although there may be an influence of fishing activity in the areas with the highest effort during the season.
- The populations of Manila clam and common cockle in Poole Harbour appear to be robust to the current level of fishing pressure with harvesting remaining sustainable in respect to stock levels.
- The survey will continue to be undertaken annually to extend the timeseries dataset which will facilitate being able to work towards identifying potential empirical reference points for stocks of Manila clam and common cockle, to further develop the work on this fishery in terms of monitoring stock levels and fishing effort to ensure sustainable practice.

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EXECUTIVE SUMMARY

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Solent Bivalve Survey 2023 Report
Paper For Information

Report by IFCO Churchouse

A. Purpose

To provide members with a report on the outcomes of the Solent Bivalve Survey carried out in 2023.

B. Annex

1. The Southern IFCA Solent Bivalve Survey Report 2023

1.0 Introduction

- The Southern IFCA Solent Bivalve Survey is carried out twice a year to assess the distribution and abundance of bivalve species in three of the Bivalve Management Areas (BMAs) defined under the Solent Dredge Permit Byelaw (SDPB).
- The SDPB issues permits for the dredging for shellfish within the Solent area, which is split into 6 Bivalve Management Areas (BMAs). The fishing season runs from 1st November to 31st March each year, with the areas of Southampton Water, Portsmouth Harbour and Langstone Harbour closing to dredge fishing from the 1st March each year. Using a dredge to fish for bivalves other than the native oyster is permitted through the issuing of Category A permits each year.
- The areas of Southampton Water (BMA 4), Portsmouth Harbour (BMA 5) and Langstone Harbour (BMA 6) are surveyed in the autumn (pre-fishing season) and the spring (post-fishing season) each year, with a particular focus on monitoring the stocks of two commercially important bivalve species; the Manila clam (*Ruditapes philippinarum*) and the common cockle (*Cerastoderma edule*).
- The data from the survey is used, in conjunction with previous years, to create a timeseries dataset which can be used to monitor trends in stock levels and help to inform management under the SDPB.
- This paper provides Members with the report for the Solent Bivalve Survey for 2023, analysing the data collected for both the spring and autumn surveys and comparisons between available survey years.

2.0 Summary of Key Points

- In 2023, surveys were undertaken in April and September, collecting weight and length data on populations of Manila clam and Common Cockle at:
    - 10 survey sites in Southampton Water
    - 7 survey sites in Portsmouth Harbour
    - 6 survey sites in Langstone Harbour
- For analysis data is combined from all survey sites within each BMA, this allows Southern IFCA to monitor populations at the level of the BMA to align with how areas are defined under the SDPB and allow the potential for future management at the level of a BMA if this was deemed to be required.
- In analyses run between the pre-fishing season survey (Autumn 2022) and the post-fishing season survey (Spring 2023), CPUE for Manila clam and Common cockle at/above and below MCRS was found to have no significant difference for all Bivalve

Management Areas except for the Common cockle population at/above MCRS within Portsmouth Harbour, where CPUE increased.
- In analyses run between the post-fishing season survey (Spring 2023) and the pre-fishing season survey (Autumn 2023), CPUE at/above MCRS for the Manila clam in Southampton Water was found to increase and CPUE below MCRS for common cockle in Portsmouth Harbour was seen to decrease, there were no other significant differences.
- For analysis run on Spring surveys, CPUE results from the 2023 survey were found to be significantly lower for the Manila clam population at/above MCRS in Southampton Water than in 2020, and the Common cockle population below MCRS in Southampton Water and in Portsmouth Harbour than in 2022 and 2020.
- For the analysis run on Autumn surveys, CPUE results from the 2023 survey were found to be significantly lower for the Manila clam population at/above MCRS in Southampton Water in comparison to 2019, and for the Common cockle population below MCRS in Portsmouth Harbour in comparison to 2021.
- In analysis run between the pre-fishing season survey (Autumn 2022) and the post-fishing season (Spring 2023), average length was found to significantly increase during the fishing season for the Manila clam and Common cockle population in Portsmouth Harbour, and to significantly decrease during the fishing season for the Common cockle population in Langstone Harbour.
- For all analyses run on CPUE and average length where significant results were found, no general trends were observed.
- Within the Solent Bivalve timeseries, all surveys to date have had average lengths below the MCRS for Manila clam populations in Southampton Water, and only 2018 and 2023 surveys have had average lengths above MCRS for Manila clam populations in Portsmouth Harbour. All surveys within the timeseries have had average lengths above MCRS for Manila clam populations within Langstone Harbour, and have had average Common cockle lengths above MCRS within all three Bivalve Management Areas.

3.0 Next Steps

- The Spring survey for 2024 was carried out in March, the Autumn survey for 2024 will be carried out in September. Data from 2024 (January, March and September) will be analysed following the completion of the Autumn survey, built into the survey timeseries dataset and reviewed against previous survey years.
- That Members note the report.

Southern IFCA Survey Report

Solent Bivalve Survey 2023

1 Introduction

The Solent Bivalve Survey runs twice a year to assess the distribution and abundance of bivalve species in three Bivalve Management Areas (BMA) defined under the Solent Dredge Permit Byelaw, namely Area 4 (Southampton Water), Area 5 (Portsmouth Harbour), and Area 6 (Langstone Harbour). The spring survey provides information on the stock following the closure of the fishing season and the autumn survey on the stock prior to the opening of the fishing season in November.

The survey focuses on the two main bivalve species harvested commercially in these Management Areas, the Manila clam (*Ruditapes philippinarum*) and the Common Cockle (*Cerastoderma edule*). The results from the survey provide data which can be used as a baseline against which to monitor trends in stock levels of commercial bivalve species in the Solent, which will feed into the future development of management for the Solent Dredge Permit Fishery.

2 Methodology

In 2023, the Spring survey took place from the 3rd April to the 5th April and the Autumn survey over three days between the 14th and 18th of September, using three local fishing vessels familiar with the BMA being sampled by that vessel. On each vessel, the same box clam dredge was deployed, of the same class used in normal fishing practice (Figure 1).

Each management area has defined survey sites which represent areas of different fishing intensity and habitat type. The areas surveyed also span a range of classifications for shellfish beds as defined by the Food Standards Agency. The survey sites for each management area are shown in Figure 2.

Figure 1. Photo of the box clam dredge used in the survey.

Shellfish samples were obtained using the following methodology:

- Three dredge tows, timed at two minutes, were conducted within each survey site within the wider BMA.
- After two minutes the dredge was brought inboard and any bivalves within it were retained.
- The presence/abundance of different sediment types and other habitat identifiers including weed and slipper limpet (*Crepidula fornicata*) were recorded and abundance scored on a scale of 1 - 5.

- Each bivalve was identified to species level and the first 50 individuals of each species were measured along the widest axis (length) to the nearest millimetre.
- Manila clams and Common cockles were separated into at/above and below their Minimum Conservation Reference Size (MCRS), 35mm and 23.8mm respectively, and then weighed.
- All samples were returned to shellfish production areas with the same classification as that from which they had been taken after measuring.

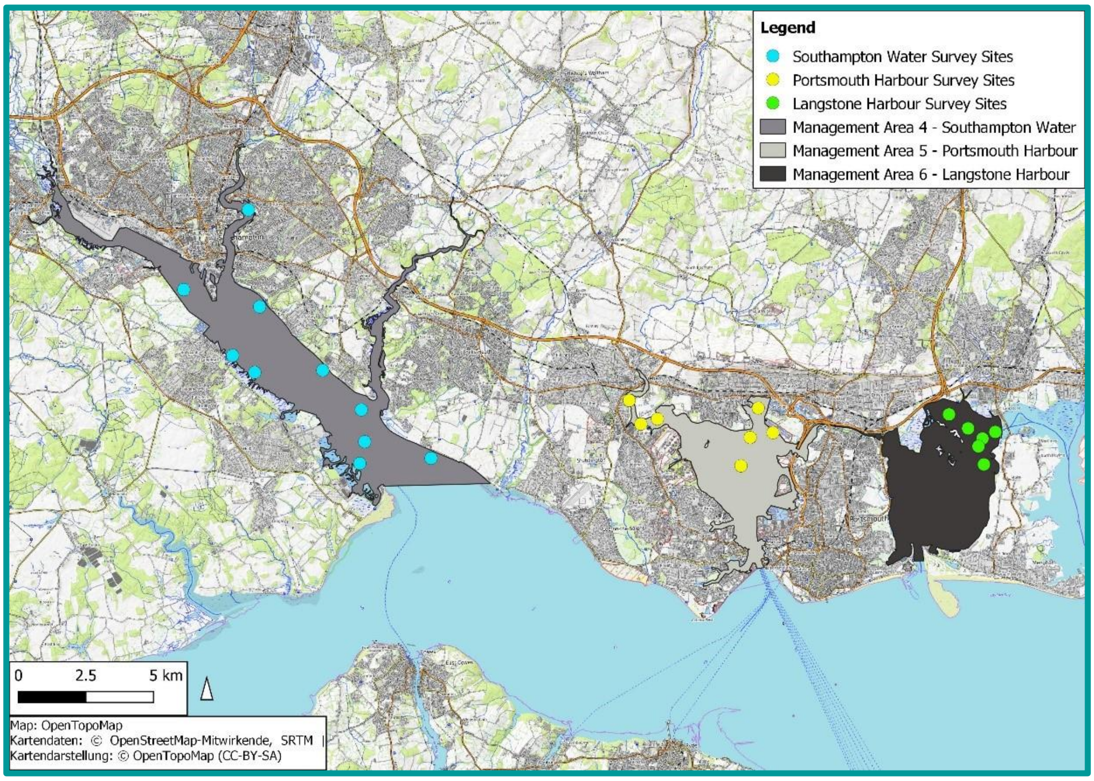

Figure 2: Map showing each of the three management areas surveyed and the location of survey sites within each area.

3 Results

The results of the survey focus on the two main commercial species, the Manila clam and the Common cockle.

Other species found during the survey in smaller quantities included the American Hard-Shelled clam (*Mercenaria mercenaria*), the native oyster (*Ostrea edulis*), the Pacific oyster (*Magallana gigas*), and the spiny cockle (*Acanthocardia aculeata*).

3.1 Catch Per Unit Effort

Data on the abundance and distribution of Manila clam and Common cockle is presented as Catch Per Unit Effort (CPUE), defined as kg of shellfish per metre of dredge per hour, for each BMA. CPUE is provided for both species at/above Minimum Conservation Reference Size (MCRS) and below MCRS. The use of CPUE consistently between survey years and pre/post fishing seasons allows for statistical comparisons to identify if there are any significant changes to the stock of the two focus species.

It should be noted that, given that the sampling method is size selective, data for stock below MCRS will not be representative of the full portion of the stock of each species in these size classes, however consistency in survey methodology between years allows for comparisons.

3.1.1 Comparison between pre and post the fishing season

CPUE data from Autumn 2022, as a representation of pre-fishing conditions, has been compared to CPUE data from Spring 2023, as a representation of post-fishing season conditions, for each management area considering CPUE at/above MCRS and below MCRS.

Manila clam

- For Southampton Water, a Dunn's post-hoc analysis found no statistically significant difference in CPUE at/above MCRS or below MCRS between the Autumn 2022 survey and the Spring 2023 survey.
- For Portsmouth Harbour, a Dunn's post-hoc analysis found no statistically significant difference in CPUE at/above MCRS or below MCRS between the Autumn 2022 survey and the Spring 2023 survey.
- For Langstone Harbour, a Dunn's post-hoc analysis found no statistically significant difference in CPUE at/above MCRS or below MCRS between the Autumn 2022 survey and the Spring 2023 survey.

Common Cockle

- For Southampton Water, a Dunn's post-hoc analysis found no statistically significant difference in CPUE at/above MCRS or below MCRS between the Autumn 2022 survey and the Spring 2023 survey.
- For Portsmouth Harbour, a Dunn's post-hoc analysis found no statistically significant difference in CPUE at/above MCRS between the Autumn 2022 survey and the Spring 2023 survey. A Dunn's post-hoc analysis found that the CPUE below MCRS was statistically significantly higher in Spring 2023 than Autumn 2022 ($p < 0.05$) (Figure 3).
- For Langstone Harbour, a Dunn's post-hoc analysis found no statistically significant difference in CPUE at/above MCRS or below MCRS between the Autumn 2022 survey and the Spring 2023 survey.

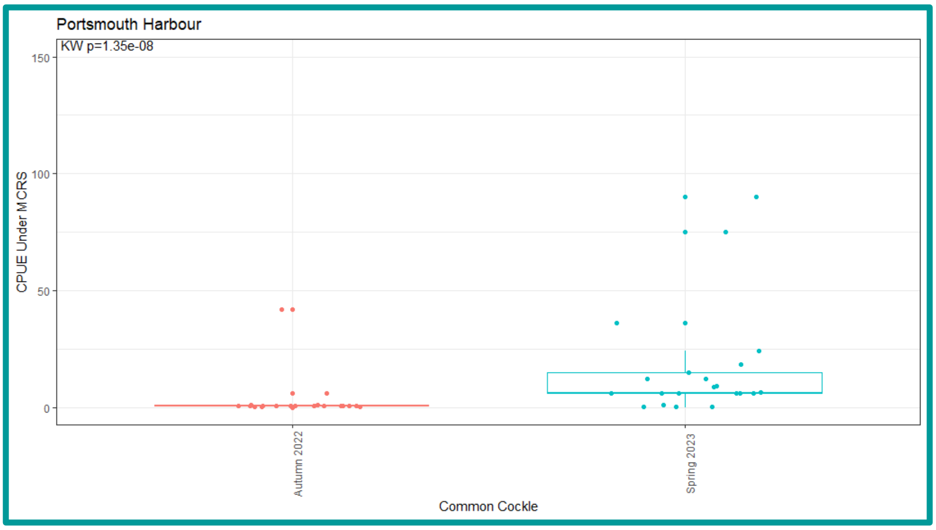

Figure 3: CPUE of Common Cockle below MCRS for Portsmouth Harbour between the Autumn 2022 and Spring 2023 surveys, which were found to statistically significantly different (p<0.05).

3.1.2 Comparison between surveys run in 2023

A comparison between the Spring 2023 and Autumn 2023 surveys was carried out to analyse changes to population levels during the fishery closed season.

Manila clam

- A Dunn's post-hoc analysis found no statistically significant differences in CPUE at/above or below MCRS between the surveys run in 2023 for any of the BMAs.

Common Cockle

- For Southampton Water, a Dunn's post hoc analysis found that CPUE at/above MCRS was statistically significantly higher in Autumn 2023 in comparison to Spring 2023 ($p < 0.05$) (Figure 4). No statistically significant differences were found between 2023 surveys for CPUE below MCRS.
- For Portsmouth Harbour, no statistically significant differences were found between 2023 surveys for CPUE at/above MCRS. A Dunn's post-hoc analysis found that CPUE below MCRS was statistically significantly lower for Autumn 2023 in comparison to Spring 2023 ($p < 0.01$) (Figure 5).
- For Langstone Harbour, a Dunn's post-hoc analysis found no statistically significant difference between 2023 surveys in CPUE at/above MCRS or below MCRS.

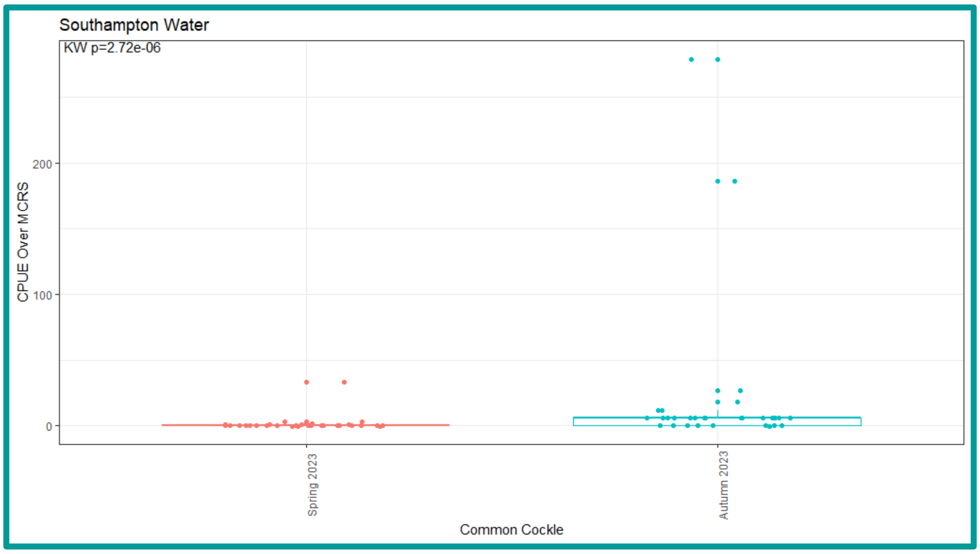

Figure 4: CPUE of Common Cockle at/above MCRS for Southampton Water between the Spring 2023 and Autumn 2023 surveys, which were found to be statistically significantly different ($p<0.05$).

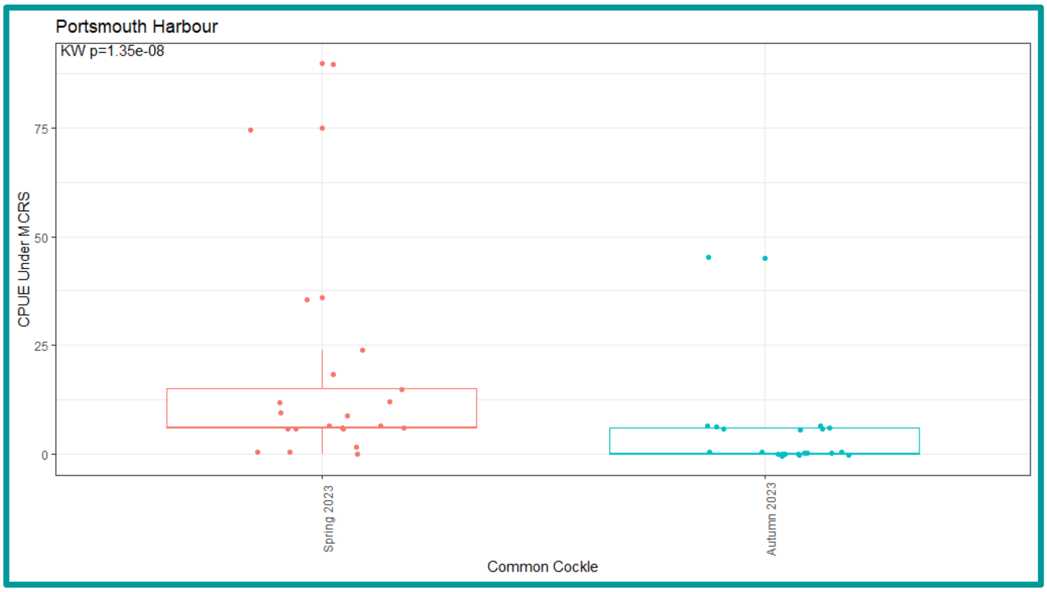

Figure 5: CPUE of Common Cockle below MCRS for Portsmouth Harbour between the Spring 2023 and Autumn 2023 surveys, which were found to statistically significantly different (p<0.01).

3.1.3 Comparison between survey years for spring (post-fishing season) surveys

- CPUE data for surveys carried out in the spring, representing post-fishing season conditions, has been compared between survey years.
- For Manila Clam CPUE data is available for 2018 – 2020 and 2022 – 2023, however data from Spring 2018 has been removed due to there being no weight data available, weight data was only obtained from autumn 2018 onwards through development of the survey methodology. For Common cockle CPUE data is available for 2020, 2022, and 2023 (weight data for Common cockle was not collected prior to 2020). Please note there is no survey data available for spring 2021 due to the Covid-19 pandemic.

Manila clam

- For Southampton Water, no statistically significant differences were found between spring surveys for CPUE at/above MCRS. A Dunn's post-hoc analysis between data from Spring surveys in 2019, 2020, 2022, and 2023 found that CPUE under MCRS was statistically significantly higher in Spring 2020 in comparison to Spring 2023 (p < 0.01) (Figure 6).
- For Portsmouth Harbour, a Dunn's post-hoc analysis found no statistically significant difference between years in CPUE at/above MCRS or below MCRS.
- For Langstone Harbour, a Dunn's post-hoc analysis found no statistically significant difference between years in CPUE at/above MCRS or below MCRS.

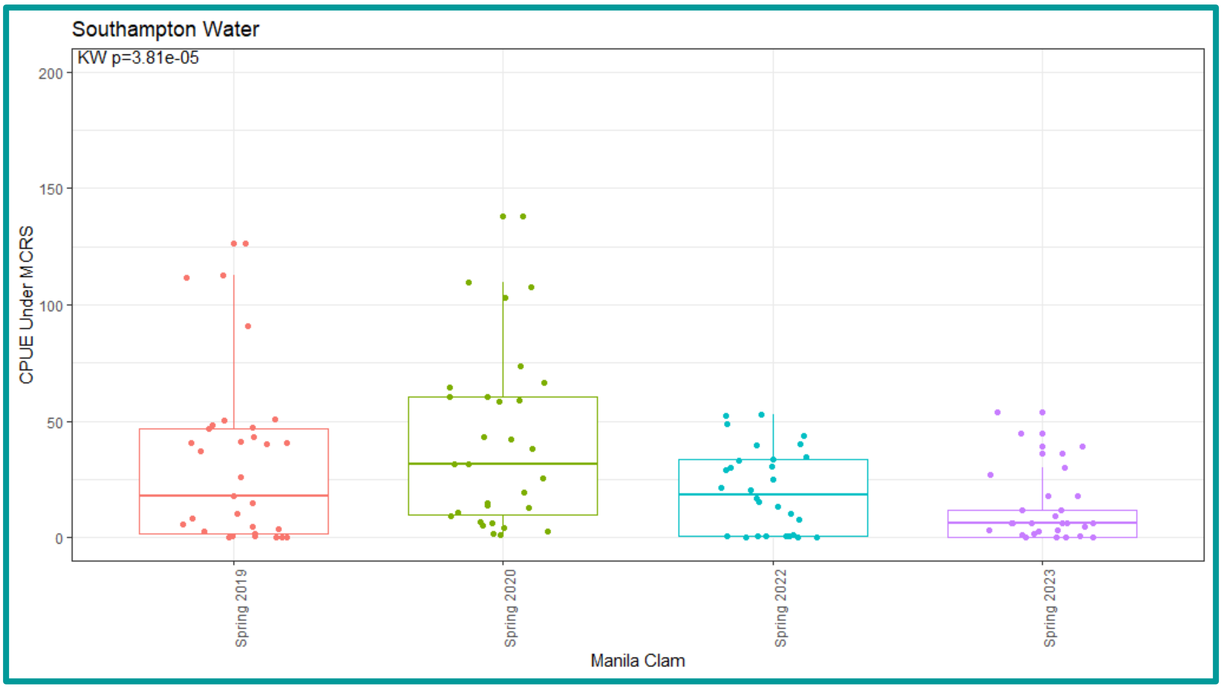

Figure 6: CPUE of Manila Clams below MCRS from Southampton Water for available spring surveys from 2019 to 2023, where a significant decrease ($p < 0.01$) was found between 2020 and 2023.

Common Cockle

- For Southampton Water, a Dunn's post-hoc analysis between data from Spring surveys in 2020, 2022, and 2023 found that CPUE at/above MCRS was statistically significantly higher in Spring 2020 ($p < 0.01$) and in Spring 2022 ($p < 0.01$) in comparison to Spring 2023 (Figure 7). No statistically significant difference was found between years in CPUE below MCRS.
- For Portsmouth Harbour, a Dunn's post-hoc analysis found that CPUE at/above MCRS was statistically significantly higher in Spring 2020 ($p < 0.05$) and in Spring 2022 ($p < 0.01$) in comparison to Spring 2023 (Figure 8). No statistically significant difference was found between years in CPUE below MCRS.
- For Langstone Harbour, a Dunn's post-hoc analysis found no statistically significant difference between years in CPUE at/above MCRS or below MCRS.

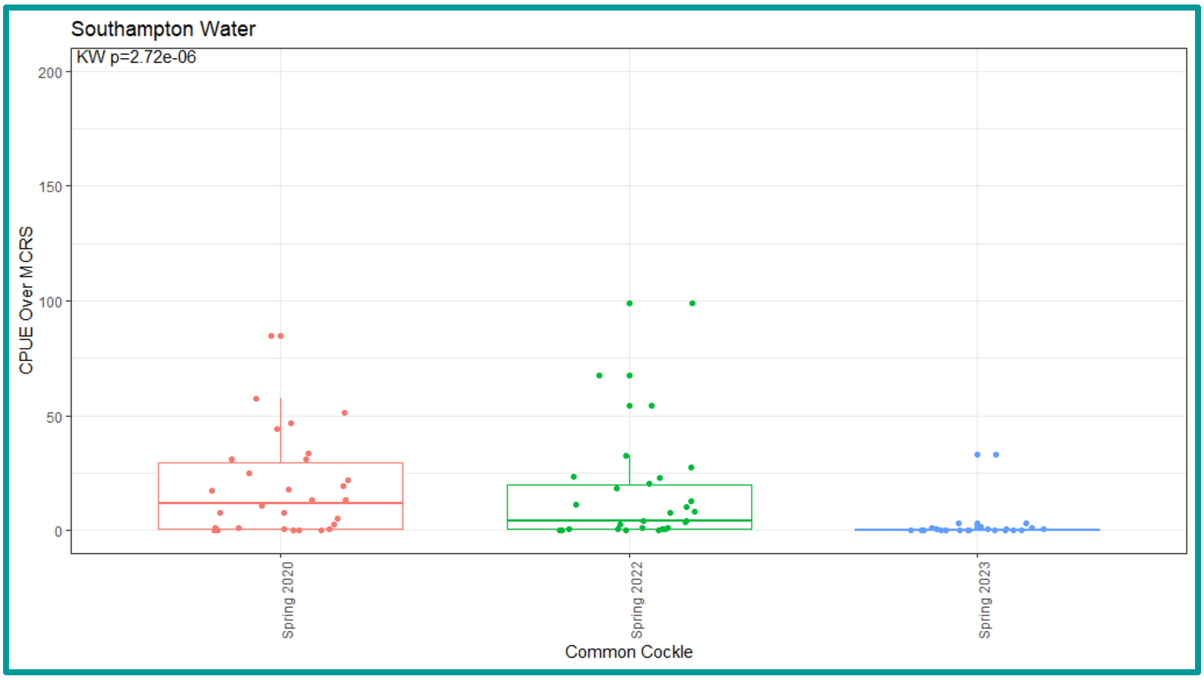

Figure 7: CPUE of Common Cockle at/above MCRS from Southampton Water for spring surveys, where statistically significant decreases ($p < 0.01$) were found from 2020 and 2022 to 2023.

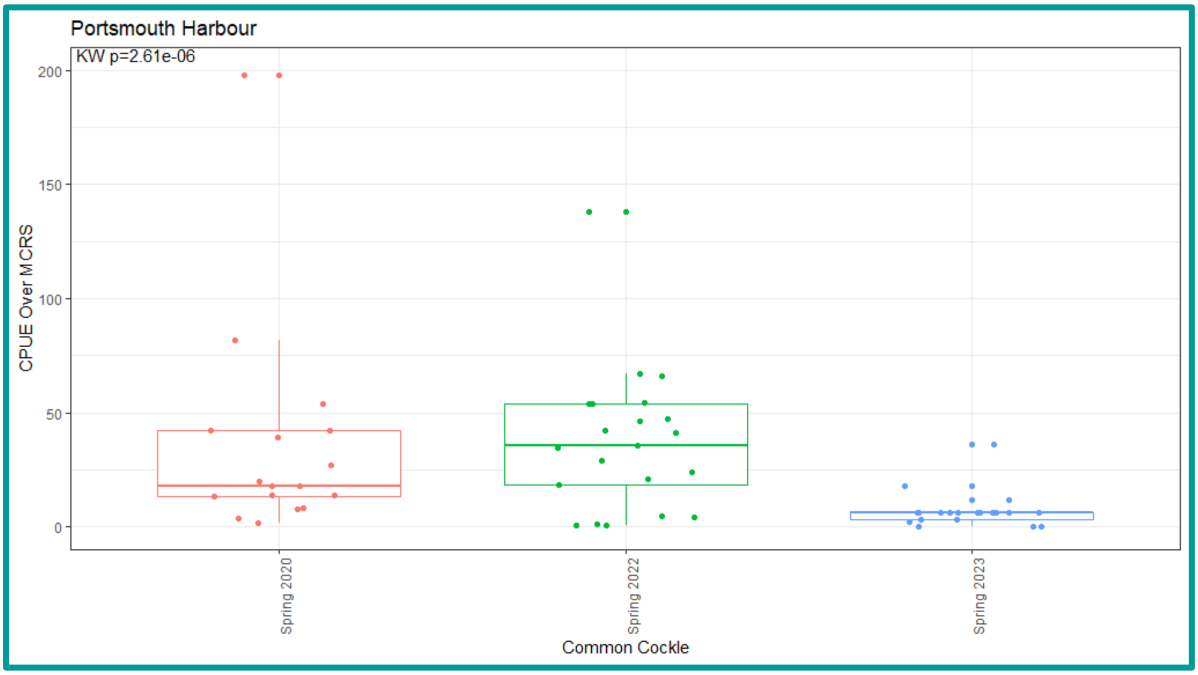

Figure 8: CPUE of Common Cockle at/above MCRS from Portsmouth Harbour for spring surveys, where statistically significant decreases ($p < 0.01$) were found from 2020 and 2022 to 2023.

3.1.4 Comparison between survey years for autumn (pre-fishing season) surveys

- CPUE for surveys carried out in the autumn, representing pre-fishing season conditions, has also been compared between survey years.
- For Manila clams, CPUE data is available for 2018, 2019, 2021, 2022 and 2023. For Common cockles, CPUE data is available for 2021, 2022, and 2023 (weight data was not

collected prior to 2020). No data was collected in autumn 2020 due to the Covid-19 pandemic.

Manila Clam

- For Southampton Water, no statistically significant differences were found between autumn surveys for CPUE at/above MCRS. A Dunn's post-hoc analysis between data from Autumn surveys in 2018, 2019, 2021, 2022, and 2023 found that CPUE below MCRS was statistically significantly higher in Autumn 2019 in comparison to Autumn 2021 ($p < 0.01$) and Autumn 2023 ($p < 0.05$) (Figure 9).
- For Portsmouth Harbour, a Dunn's post-hoc analysis found no statistically significant difference between years in CPUE at/above MCRS or below MCRS.
- For Langstone Harbour, a Dunn's post-hoc analysis found no statistically significant difference between years in CPUE at/above MCRS or below MCRS.

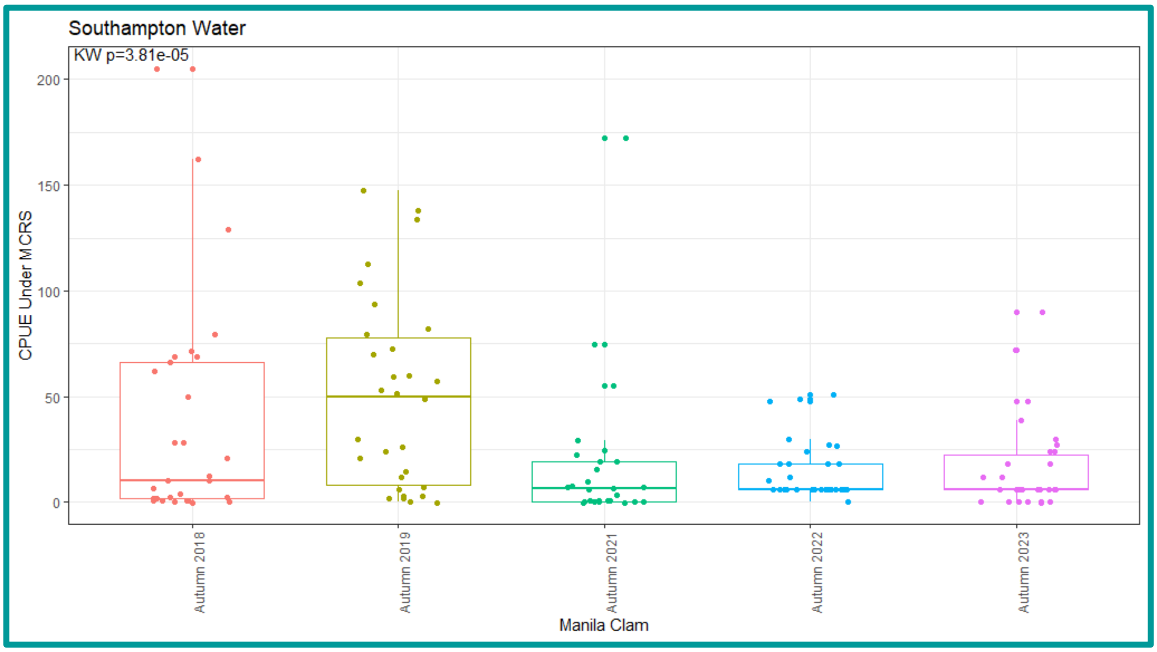

Figure 9: CPUE of Manila Clams below MCRS from Southampton Water for autumn surveys, where statistically significant decreases were found from 2019 to 2021 ($p < 0.01$) and 2023 ($p < 0.05$).

Common Cockle

- For Southampton Water, no significant differences were found between spring surveys for CPUE at/above MCRS. A Dunn's post-hoc analysis between data from Autumn surveys in 2021, 2022, and 2023 found that CPUE below MCRS was statistically significantly higher in Autumn 2021 in comparison to Autumn 2022 ($p < 0.05$) (Figure 10).
- For Portsmouth Harbour, analysis between data from Autumn surveys in 2021, 2022, and 2023 found that CPUE at/above MCRS was statistically significantly higher in Autumn 2021 in comparison to Autumn 2023 ($p < 0.05$) (Figure 11). A Dunn's post-hoc analysis found no statistically significant difference between years in CPUE below MCRS.
- For Langstone Harbour, a Dunn's post-hoc analysis found no statistically significant difference between years in CPUE at/above MCRS or below MCRS.

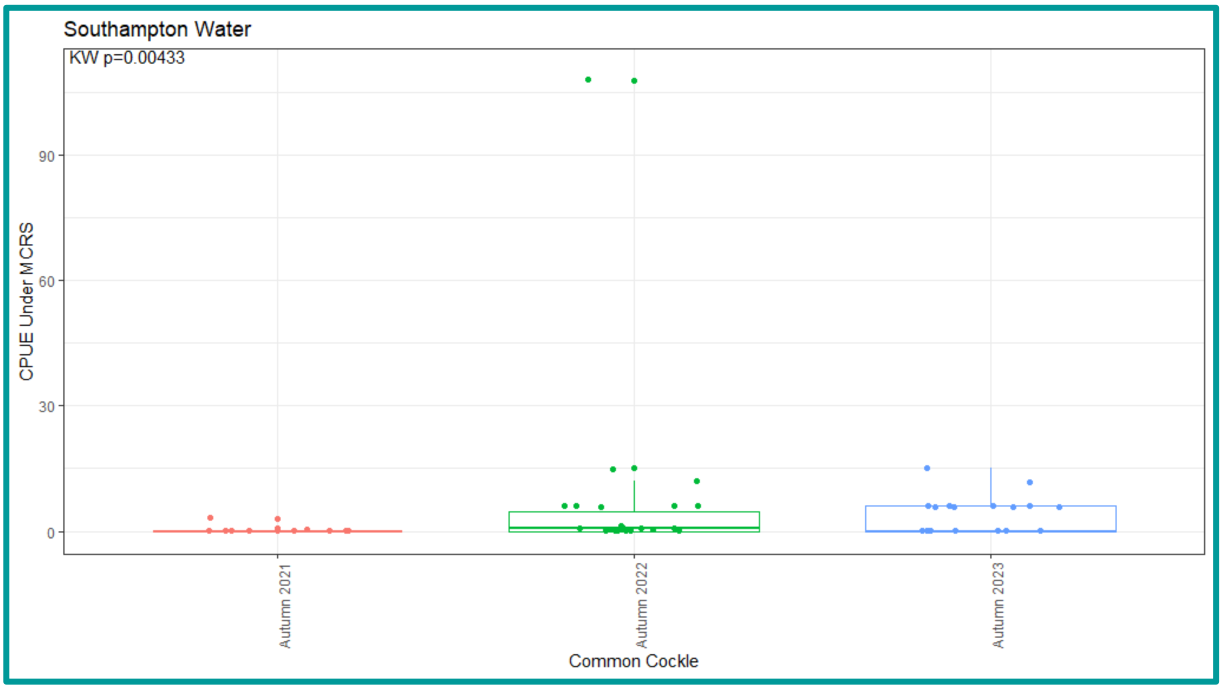

Figure 10: CPUE for Common Cockle below MCRS in Southampton Water for autumn surveys, where a significant decrease ($p < 0.05$) was found from 2021 to 2022.

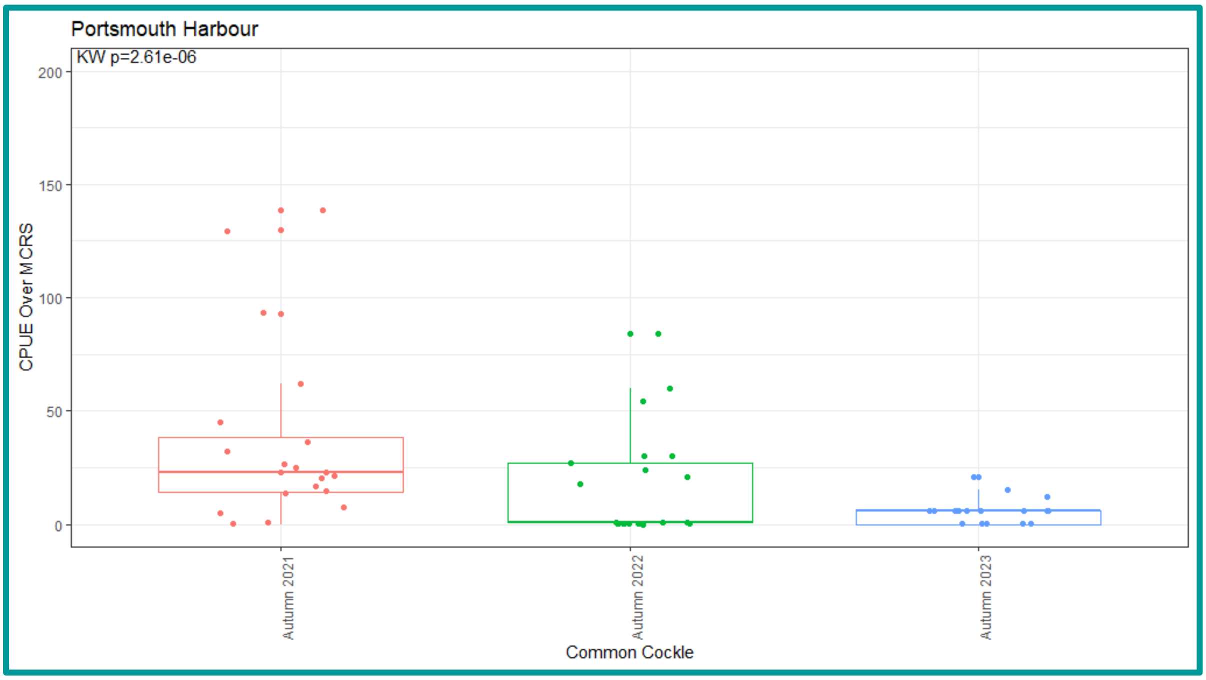

Figure 11: CPUE for Common Cockle at/above MCRS in Portsmouth Water for autumn surveys, where a significant decrease ($p < 0.05$) was found from 2021 to 2023.

3.2 Average Length

An analysis on the length trends within the data collected in 2023 and the data within the survey timeseries was undertaken. Given the lack of general trend observed within the results of this analysis, presented here is the occurrence of average length above or below MCRS within each BMA. The full comparative results for analysis of length data between pre- and post- fishing season, surveys undertaken in 2023, surveys undertaken post-fishing season (Spring), and surveys undertaken pre-fishing season (Autumn) are available within Annex 1.

3.2.1 Surveys undertaken pre and post fishing season (2022 to 2023)

Manila Clam

- For Southampton Water, both the Autumn 2022 survey and the Spring 2023 survey had average lengths below MCRS (35mm), at 33.11mm and 33.82mm respectively.
- For Portsmouth Harbour, the Autumn 2022 survey had an average length below MCRS at 33.29mm while the Spring 2023 survey had an average length above MCRS at 36.36mm.
- For Langstone Harbour, both the Autumn 2022 survey and the Spring 2023 survey had average lengths above MCRS, at 38.74mm and 37.04mm respectively.

Common Cockle

- For Southampton Water, both the Autumn 2022 and the Spring 2023 surveys had average lengths above MCRS (23.8mm), at 26.84mm and 26.77mm respectively.
- For Portsmouth Harbour, both the Autumn 2022 and the Spring 2023 surveys had average lengths above MCRS, at 25.47mm and 27.5mm respectively.
- For Langstone Harbour, both the Autumn 2022 and the Spring 2023 surveys had average lengths above MCRS, at 29.42mm and 26.96mm respectively.

3.2.2 Surveys run in 2023

Manila Clam

- For Southampton Water, both the Spring 2023 and the Autumn 2023 survey had average lengths below MCRS (35mm), 33.82mm and 32.76mm respectively.
- For Portsmouth Harbour, both the Spring 2023 and the Autumn 2023 surveys had average lengths above MCRS, at 36.36mm and 35.84mm respectively.
- For Langstone Harbour, both the Spring 2023 and the Autumn 2023 survey had average lengths above MCRS, at 37.04mm and 37.7mm respectively.

Common Cockle

- For Southampton Water, both the Spring 2023 and the Autumn 2023 surveys had average lengths above MCRS (23.8mm), at 26.77mm and 26.5mm respectively.
- For Portsmouth Harbour, both the Spring 2023 and the Autumn 2023 surveys had average lengths above MCRS, at 27.5mm and 29.13mm respectively.
- For Langstone Harbour, both the Spring 2023 and the Autumn 2023 surveys had average lengths above MCRS, at 26.96mm and 26.55mm respectively.

4 Discussion of Results

4.1 CPUE

Between the Autumn 2022 and Spring 2023 surveys the only significant result was a statistically significant increase in CPUE for Common cockle at/above the Minimum Conservation Reference Size (MCRS) in Portsmouth Harbour (Figure 3). For all other comparisons no significant difference was found, suggesting that the current fishing pressure is not having a significant effect on the populations of the three sampled Bivalve Management Areas (BMAs). Effort within the Solent bivalve fishery did decrease during the 22/23 fishing season in comparison to the 21/22 season (Figure 12), however a lack of consistent trends across all populations sampled prevent clear conclusions from being drawn, and indicate results could instead be a factor of population changes during the year and influence of environmental variables.

Comparison of survey results during the closed season, between Spring 2023 and Autumn 2023 are mixed, however there is only one incidence of the CPUE increasing (Southampton Water, Manila clam at/above MCRS) with the other significant results being a decline (Portsmouth Harbour, common cockle, below MCRS) and the majority showing no significant difference. This should be considered along with there being consistent results between different survey years for the same survey period and that there are no indications to date of a significant effect of the fishery on stock levels or a significant decline in catch levels either reported by fishers or seen through the catch data. However, this should be monitored through the closed period for 2024 to determine if a similar pattern is seen for a second year.

From analyses run on surveys undertaken in the Spring of available years, as representations of post-fishing season conditions, statistically significant decreases in CPUE were found for the Manila clam population at/above MCRS within Southampton Water in 2023 in comparison to 2020 (Figure 4), and the populations of Common Cockle below MCRS within Southampton Water and Portsmouth Harbour in 2023 in comparison to both 2020 and 2022 (Figure 5 & 6). Assigning potential causes to these trends is not attempted as the significant declines in CPUE are not consistent year-on -year. As the analyses comparing the Autumn 2022 and Spring 2023 results suggest that current fishing pressure is not having a significant influence on the population, there are likely to be other factors influencing the data patterns seen between Spring surveys. For all other comparisons no significant difference was found.

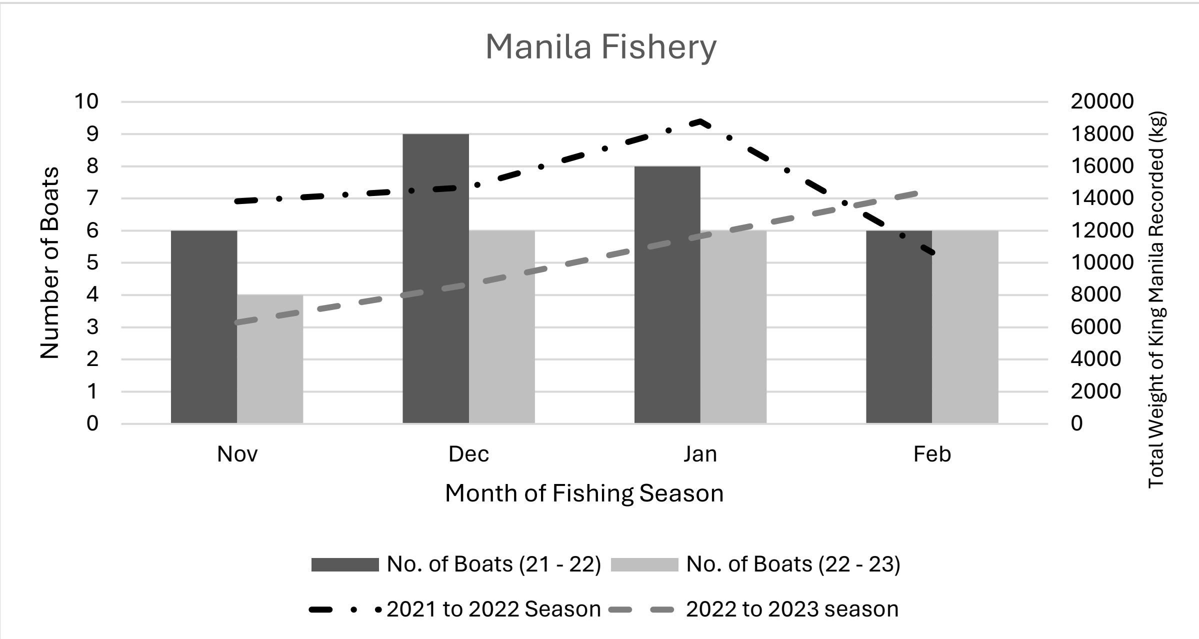

Figure 12: Solent Bivalve catch data 21/22 season compared to 22/23 season.

From analyses run on surveys undertaken in the Autumn of available years, as representations of pre-fishing season conditions, statistically significant decreases in CPUE were found for the population of Manila clam below MCRS in Southampton Water for 2021 and 2023 in comparison to 2019 (Figure 9), the Common cockle population below MCRS in Southampton Water from 2022 to 2021 (Figure 10), and the Common cockle population at/above MCRS in Portsmouth Harbour in 2023 in comparison to 2021 (Figure 11). These results reveal fluctuating patterns within the populations, but no general trend.

Following the close of the 2023/24 season in March 2024, only three years of catch data is available for the Solent Bivalve fishery, which was first collected in November 2021 when the Solent Dredge Permit Byelaw came into effect. As such there is not sufficient years of catch data to establish patterns or to relate catch data to patterns seen in the CPUE results. The lack of consistent trends within the BMA populations and the lack of significant results between Autumn 2022 and Spring 2023 survey results suggests that catch levels are not having a negative influence on the stock and that there are other factors which may be influencing changes/fluctuations in the stock levels between years.

4. 2 Average Length

Between the Autumn 2022 and Spring 2023 surveys, analyses found significant increases in average length for the Manila clam and Common cockle populations within Portsmouth Harbour (Figure 10 & 11). A significant decrease in average length during the fishing season was found within the Common cockle population in Langstone Harbour (Figure 12).

From analyses run on surveys undertaken in the Spring of available years, as representations of post-fishing season conditions, statistically significant results suggest the following trends:

- An increase in average length for the Manila clam population with Southampton Water from 2020 to 2023 (Figure 13);
- For the Manila clam population in Portsmouth Harbour, a decrease in average length from 2018 to 2020, then an increase from 2020 to 2023, with a higher average length in 2023 than in 2018 (Figure 14);
- A decrease in average length for the Manila clam population in Langstone Harbour from 2018 to 2023, with one period of increase between 2020 and 2022 (Figure 15);
- An increase in average length for the Common cockle population in Southampton Water up to 2022 (Figure 16);
- A general pattern of increase in average length for the Common cockle population in Portsmouth Harbour from 2018 to 2023, with year-on-year variation between 2018 and 2020 (Figure 17);
- A decrease in average length for the Comon cockle population in Langstone Harbour between 2019 and 2023 (Figure 18).

As the general pattern presented by these results is not consistent it is difficult to attribute any specific causes to them, and likely there are a number of influencing factors that caused the trends.

From analyses run on surveys undertaken in the Autumn of available years, as representations of pre-fishing season conditions, statistically significant results suggest the following trends:

- For the Manila clam and Common cockle populations within Southampton Water, an increase in average length from 2018 to 2021, then a decrease to 2023 (Figure 19 &22);

- A general pattern of increase in average length for the Common cockle population in Portsmouth Harbour, with inter-year variations centred on the 2022 survey (Figure 23);
- For the Common cockle population in Langstone Harbour, an increase in average length from 2018 to 2022 (Figure 24);
- Analysis of the Manila clam populations within Portsmouth and Langstone Harbours show levels of inter-year variation in average length too high to present a clear trend (Figure 20 & 21).

As the general pattern presented by these results is not consistent it is difficult to attribute any specific causes to them, and likely there are a number of influencing factors that caused the trends.

When looking at the occurrence of the bivalve species' average lengths during each survey between the three Bivalve Management Areas, clear picture appears. Throughout the survey timeseries, the average length of each survey has remained above the MCRS of 23.8mm for Common cockle within the three Bivalve Management Areas surveyed. This is also the case for Manila clam within Langstone Harbour. However, Manila clam within Southampton Water have consistently had a survey average length below that of MCRS (35mm), while Manila clam within Portsmouth Harbour have only had a survey average length above MCRS in 2018 and 2023. These trends will continue to be monitored during future surveys.

Summary

- In 2023, surveys were undertaken in April and September, collecting weight and length data on populations of Manila clam and Common Cockle with three Bivalve Management Areas, Southampton Water, Portsmouth Harbour, and Langstone Harbour.
- In analyses run between the pre-fishing season survey (Autumn 2022) and the post-fishing season survey (Spring 2023), CPUE for Manila clam and Common cockle at/above and below MCRS was found to have no significant difference for all Bivalve Management Areas except for the Common cockle population at/above MCRS within Portsmouth Harbour, where CPUE increased.
- In analyses run between the post-fishing season survey (Spring 2023) and the pre-fishing season survey (Autumn 2023), CPUE at/above MCRS for the Manila clam in Southampton Water was found to increase and CPUE below MCRS for common cockle in Portsmouth Harbour was seen to decrease, there were no other significant differences.
- For analysis run on Spring surveys, CPUE results from the 2023 survey were found to be significantly lower for the Manila clam population at/above MCRS in Southampton Water than in 2020, and the Common cockle population below MCRS in Southampton Water and in Portsmouth Harbour than in 2022 and 2020.
- For the analysis run on Autumn surveys, CPUE results from the 2023 survey were found to be significantly lower for the Manila clam population at/above MCRS in Southampton Water in comparison to 2019, and for the Common cockle population below MCRS in Portsmouth Harbour in comparison to 2021.
- In analysis run between the pre-fishing season survey (Autumn 2022) and the post-fishing season (Spring 2023), average length was found to significantly increase during the fishing season for the Manila clam and Common cockle population in Portsmouth Harbour, and to significantly decrease during the fishing season for the Common cockle population in Langstone Harbour.

- For all analyses run on CPUE and average length where significant results were found, no general trends were observed.
- Within the Solent Bivalve timeseries, all surveys to date have had average lengths below the MCRS for Manila clam populations in Southampton Water, and only 2018 and 2023 surveys have had average lengths above MCRS for Manila clam populations in Portsmouth Harbour. All surveys within the timeseries have had average lengths above MCRS for Manila clam populations within Langstone Harbour, and have had average Common cockle lengths above MCRS within all three Bivalve Management Areas.

Annex 1

Average Length Analysis

Comparison between pre and post fishing season

The average length of each species was compared between the Autumn 2022 survey as a representation of conditions pre-fishing season and the Spring 2023 survey as a representation of condition post-fishing season.

Manila Clam

- For Southampton Water, a Dunn's post-hoc analysis found no statistically significant difference between average length for the surveys in Autumn 2022 (33.1mm) and Spring 2023 (33.8mm).
- For Portsmouth Harbour, a Dunn's post-hoc analysis found a statistically significant increase in average length between the Autumn 2022 (33.3mm) and Spring 2023 (36.4mm) surveys ($p < 0.01$) (Figure 10).
- For Langstone Harbour, a Dunn's post-hoc analysis found no statistically significant difference between average length for the surveys in Autumn 2022 (38.7mm) and Spring 2023 (37mm).
- For Southampton Water, both surveys had average lengths below MCRS. For Portsmouth Harbour, the autumn 2022 survey had an average length below MCRS while the spring survey 2023 had an average length above MCRS. For Langstone Harbour, both surveys had average lengths above MCRS.

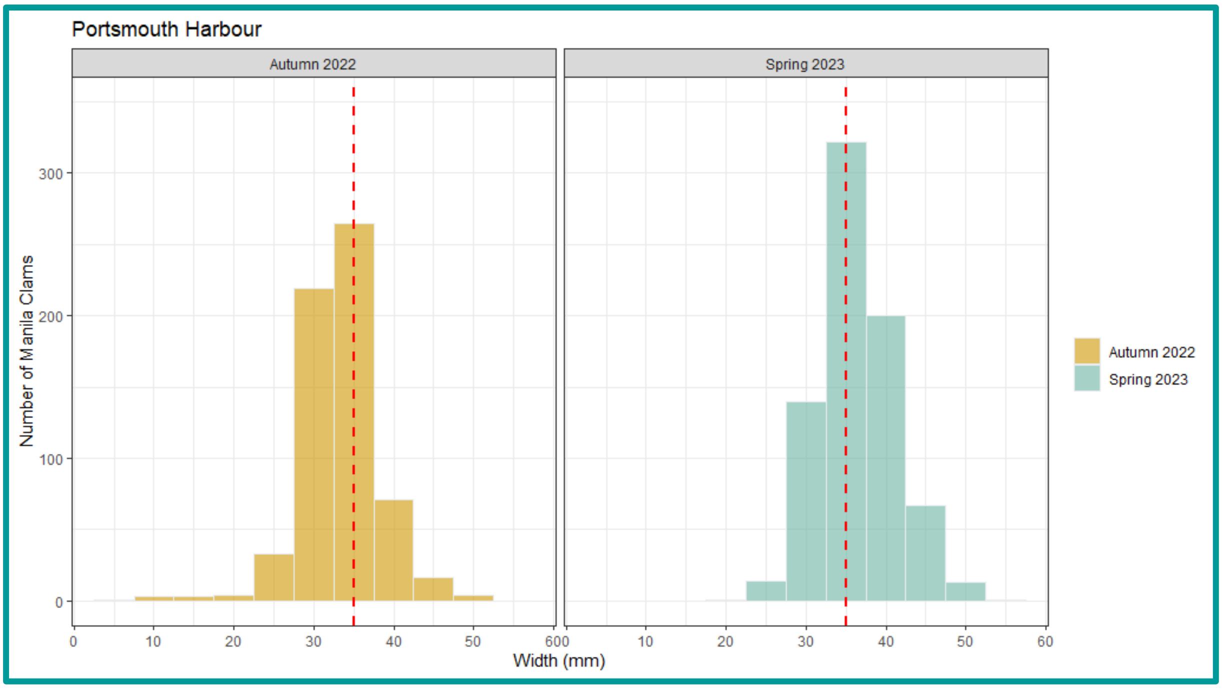

Figure 13: Comparison of average length of Manila Clam between the Autumn 2022 and Spring 2023 surveys for Portsmouth Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (35mm).

Common Cockle

- For Southampton Water, a Dunn's post-hoc analysis found no statistically significant difference between average length for the surveys in Autumn 2022 (26.8mm) and Spring 2023 (26.8mm).
- For Portsmouth Harbour, a Dunn's post-hoc analysis found a statistically significant increase in average length between the Autumn 2022 (25.5mm) and Spring 2023 (27.5mm) surveys ($p < 0.01$) (Figure 11).
- For Langstone Harbour, a Dunn's post-hoc analysis found a statistically significant decrease in average length between the Autumn 2022 (29.4mm) and Spring 2023 (27mm) surveys ($p < 0.01$) (Figure 12).
- For all cases the average length was above the MCRS of 23.8mm.

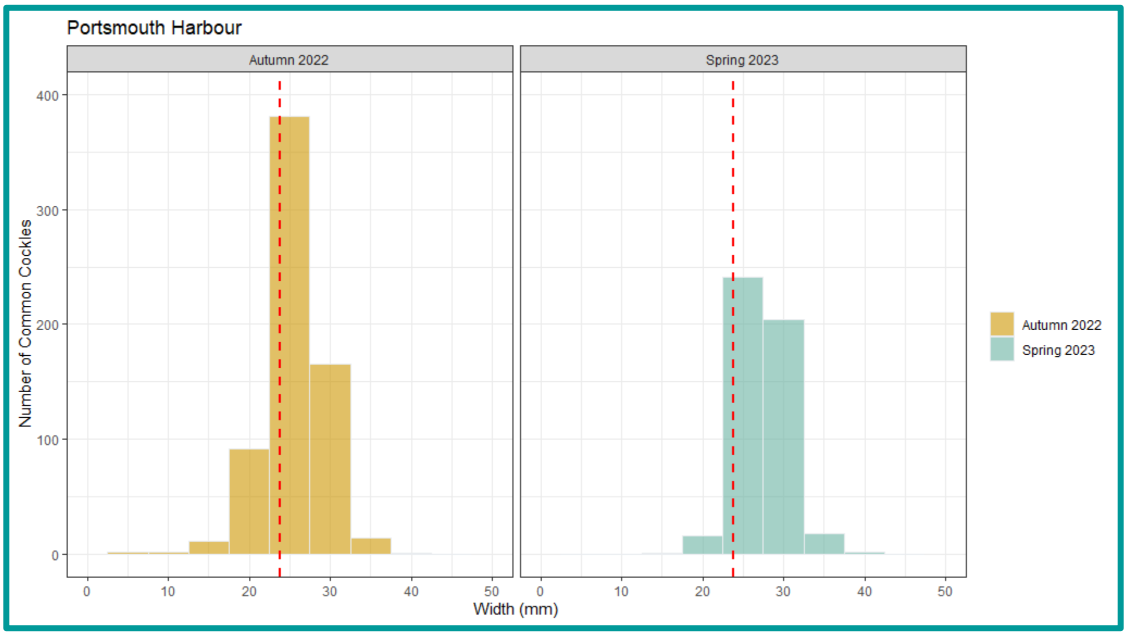

Figure 14: Comparison of average length of Common Cockles between the Autumn 2022 and Spring 2023 surveys for Portsmouth Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (23.8mm).

3.2.2 Comparison between surveys run in 2023

A comparison between the Spring 2023 and Autumn 2023 surveys was carried out to analyse changes to population traits during the fishery closed season.
Dunn's post-hoc analyses for Manila Clam and Common Cockle found no statistically significant differences in CPUE at/above or below MCRS between the surveys run in 2023 for any of the BMAs.

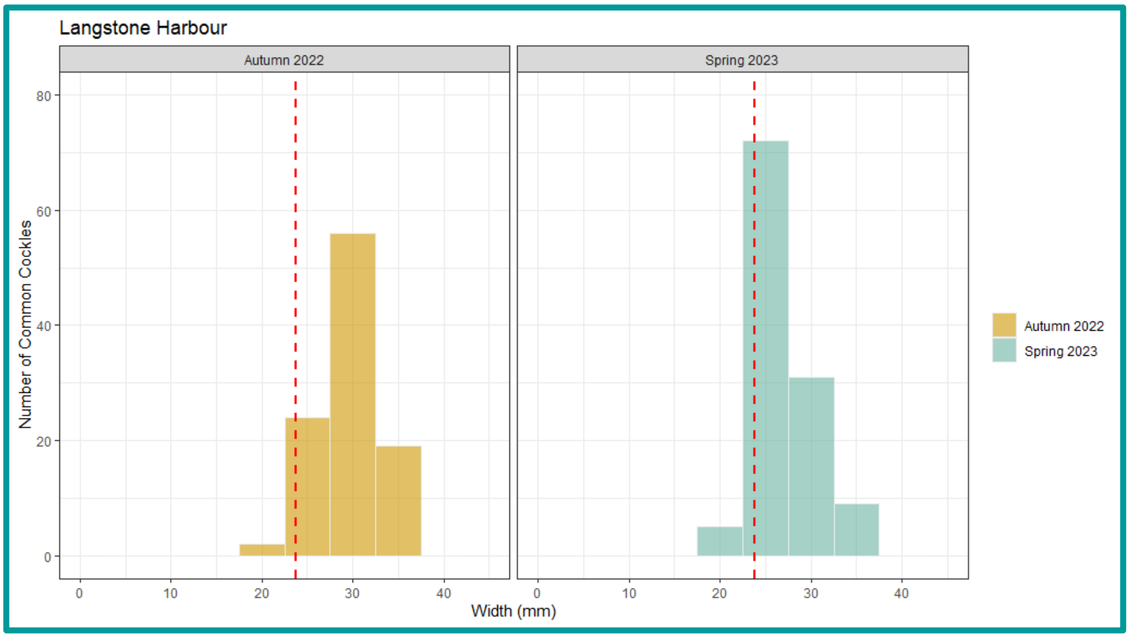

Figure 15: Comparison of average length of Common Cockles between the Autumn 2022 and Spring 2023 surveys for Langstone Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (23.8mm).

3.2.3 Comparison between survey years for spring (post-fishing season) surveys

The average length of each species in each Management Area was analysed for each spring survey from 2018 to 2023 (there is no data for 2021 due to the Covid-19 pandemic).

Manila Clam

- For Southampton Water, a Dunn's post-hoc analysis found statistically significant increases in average length between the surveys in (Figure 16):
    - Spring 2020 (33.9mm) in comparison to Spring 2018 (33.2mm) and Spring 2019 (32.7mm) ($p < 0.01$);
    - Spring 2022 (34.3mm) in comparison to Spring 2018 (33.2mm), Spring 2019 (32.7mm), and Spring 2020 (33.9mm) ($p < 0.01$);
    - Spring 2023 (33.8mm) in comparison to Spring 2018 (33.2mm), Spring 2019 (32.7mm), and Spring 2020 (33.9mm) ($p < 0.01$).

- For Portsmouth Harbour, a Dunn's post-hoc analysis found statistically significant decreases in average length between the surveys in (Figure 17):
    - Spring 2019 (34.7mm) in comparison to Spring 2018 (35.9mm) ($p < 0.05$);
    - Spring 2020 (33.4mm) in comparison to Spring 2018 (35.9mm) and Spring 2019 (34.7mm) ($p < 0.01$);
- And statistically significant increases in average length between the surveys in (Figure 17):
    - Spring 2022 (34.9mm) in comparison to Spring 2020 (33.4mm) ($p < 0.01$);
    - Spring 2023 (36.4mm) in comparison to Spring 2019 (34.7mm), Spring 2020 (33.4mm), and Spring 2022 (34.9mm) ($p < 0.01$).

- For Langstone Harbour, a Dunn's post-hoc analysis found statistically significant decreases in average length between the surveys in (Figure 18):

  - Spring 2019 (38.5mm) in comparison to Spring 2018 (40.7mm) ($p < 0.05$);
  - Spring 2020 (37.8mm) in comparison to Spring 2018 (40.7mm) ($p < 0.01$);
  - Spring 2023 (37mm) in comparison to Spring 2018(40.7mm) and Spring 2022 (39.4mm) ($p < 0.01$);
- And statistically significant increase in average length between the surveys in (Figure 18):
  - Spring 2022 (39.4mm) in comparison to Spring 2020 (37.8mm) ($p < 0.01$).

For Southampton Water, all surveys had average lengths below MCRS. For Portsmouth Harbour, the 2019, 2020, and 2022 surveys had average lengths below MCRS while the 2018 and 2023 surveys had an average length above MCRS. For Langstone Harbour, all surveys had average lengths above MCRS.

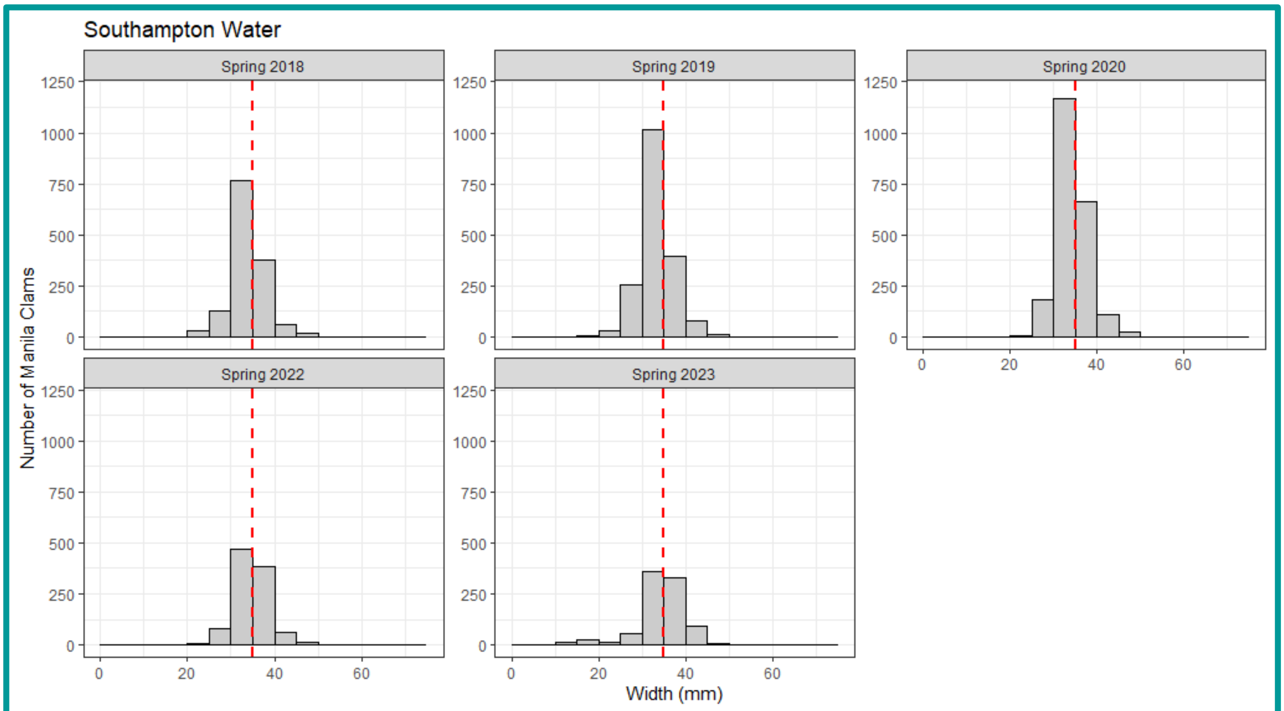

Figure 16: Comparison of average length of Manila Clam between the (available) Spring surveys in Southampton Water. The red reference line is provided to show the Minimum Conservation Reference Size (35mm).

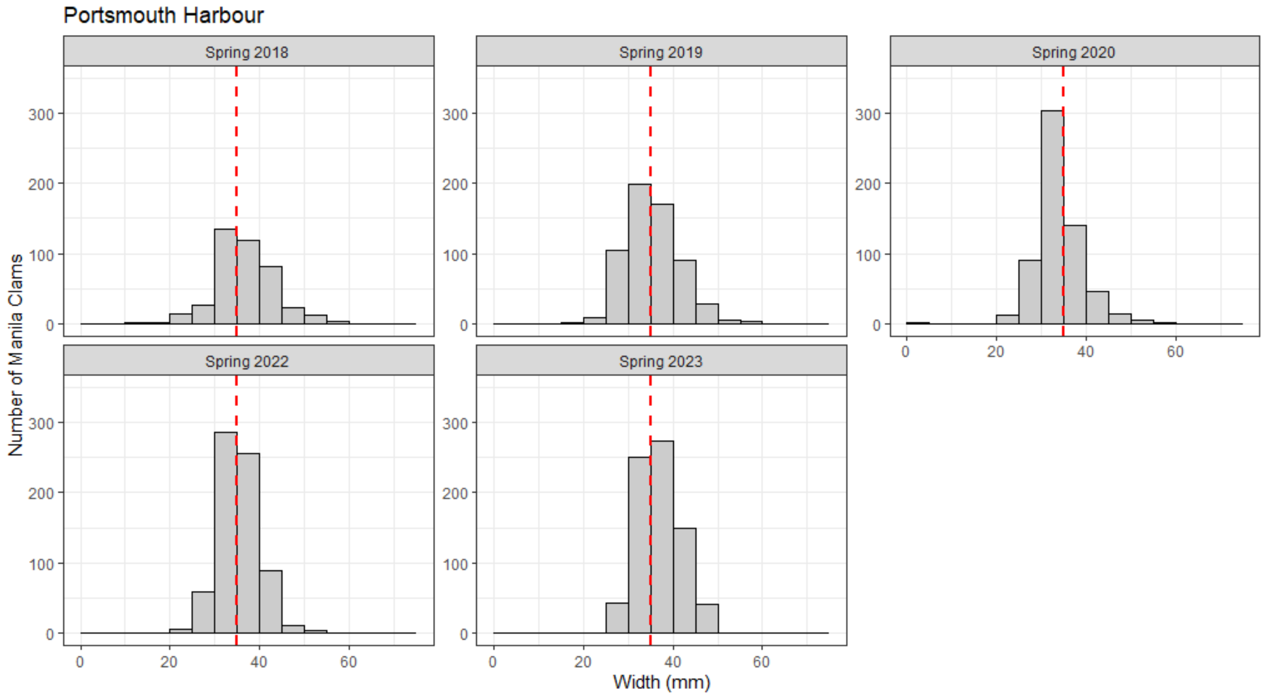

Figure 17: Comparison of average length of Manila Clam between the (available) Spring surveys in Portsmouth Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (35mm).

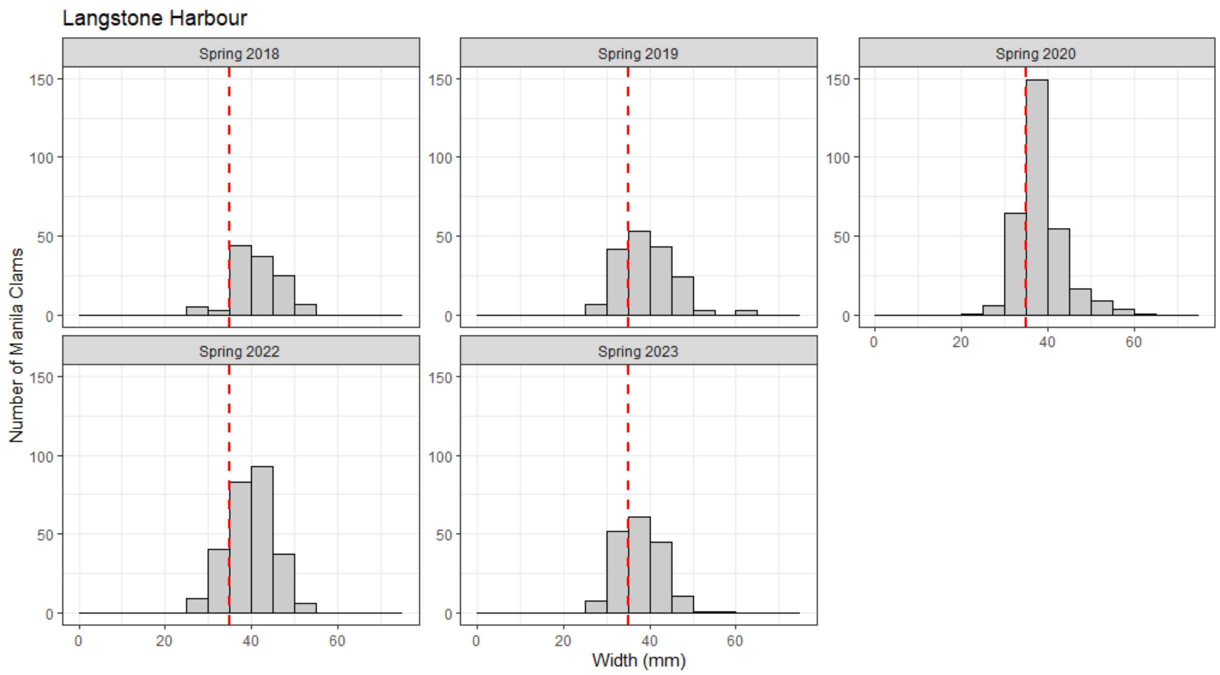

Figure 18: Comparison of average length of Manila Clam between the (available) Spring surveys in Langstone Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (35mm).

Common Cockle

- For Southampton Water, a Dunn's post-hoc analysis found statistically significant increases in average length between the surveys in (Figure 19):
    - Spring 2020 (27.2mm) in comparison to Spring 2018 (26.5mm) ($p < 0.01$);
    - Spring 2022 (27.1mm) in comparison to Spring 2018 (26.5mm) and Spring 2019 (26.8mm) ($p < 0.01$).
- For Portsmouth Harbour, a Dunn's post-hoc analysis found statistically significant increases in average length between the surveys in (Figure 20):
    - Spring 2019 (27.3mm) in comparison to Spring 2018 (26.3mm) ($p < 0.01$);
    - Spring 2022 (27mm) in comparison to Spring 2018 (26.3mm) and Spring 2020 (25.7mm) ($p < 0.01$);
    - Spring 2023 (27.5mm) in comparison to Spring 2018 (26.3mm) and Spring 2020 (25.7mm) ($p < 0.01$).
- And statistically significant decreases in average length between the surveys in (Figure 20):
    - Spring 2020 (25.7mm) in comparison to Spring 2018 (26.3mm) ($p < 0.05$) and Spring 2019 (27.3mm) ($p < 0.01$).
- For Langstone Harbour, a Dunn's post-hoc analysis found statistically significant decreases in average length between the surveys in (Figure 21):
    - Spring 2020 (27mm) in comparison to Spring 2018 (28mm) and Spring 2019 (28.4mm) ($p < 0.01$);
    - Spring 2022 (27.3mm) in comparison to Spring 2018 (28mm) and Spring 2019 (28.4mm) ($p < 0.01$);
    - Spring 2023 (27mm)) in comparison to Spring 2018 (28mm) and Spring 2019 (28.4mm ($p < 0.01$).

For all cases the average length was above the MCRS of 23.8mm.

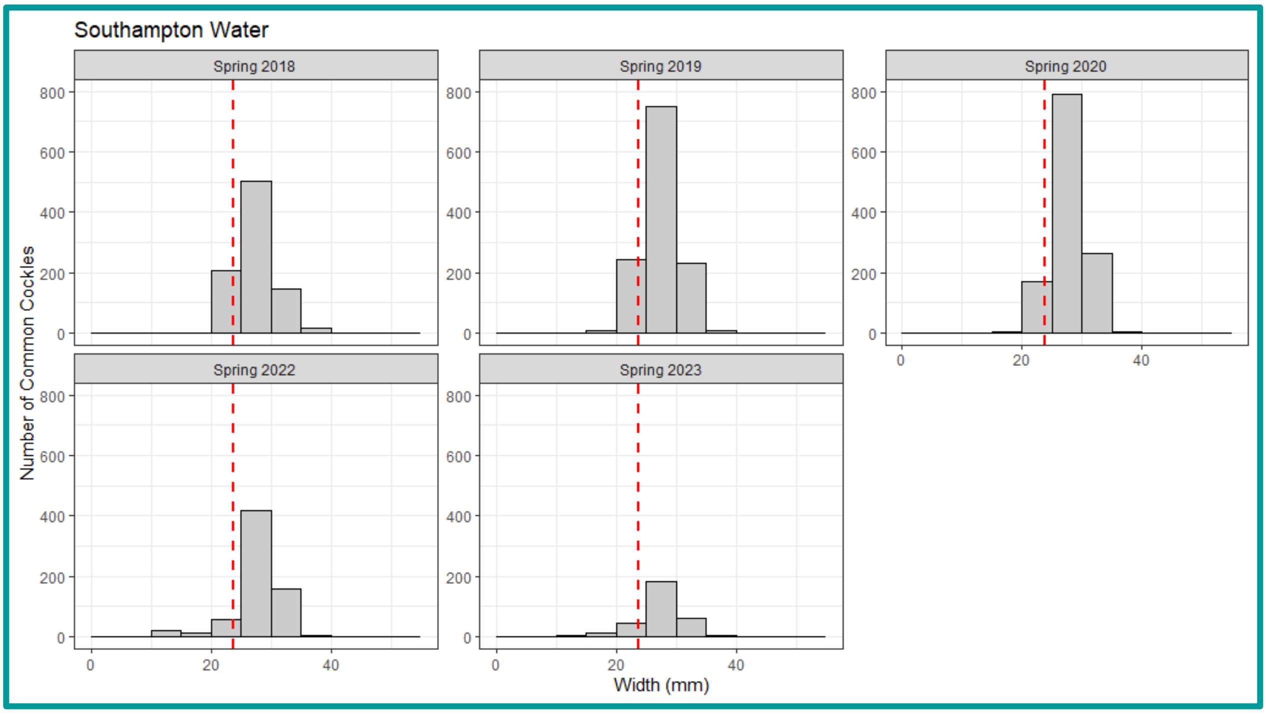

Figure 19: Comparison of average length of Common Cockle between the (available) Spring surveys in Southampton Water. The red reference line is provided to show the Minimum Conservation Reference Size (23.8mm).

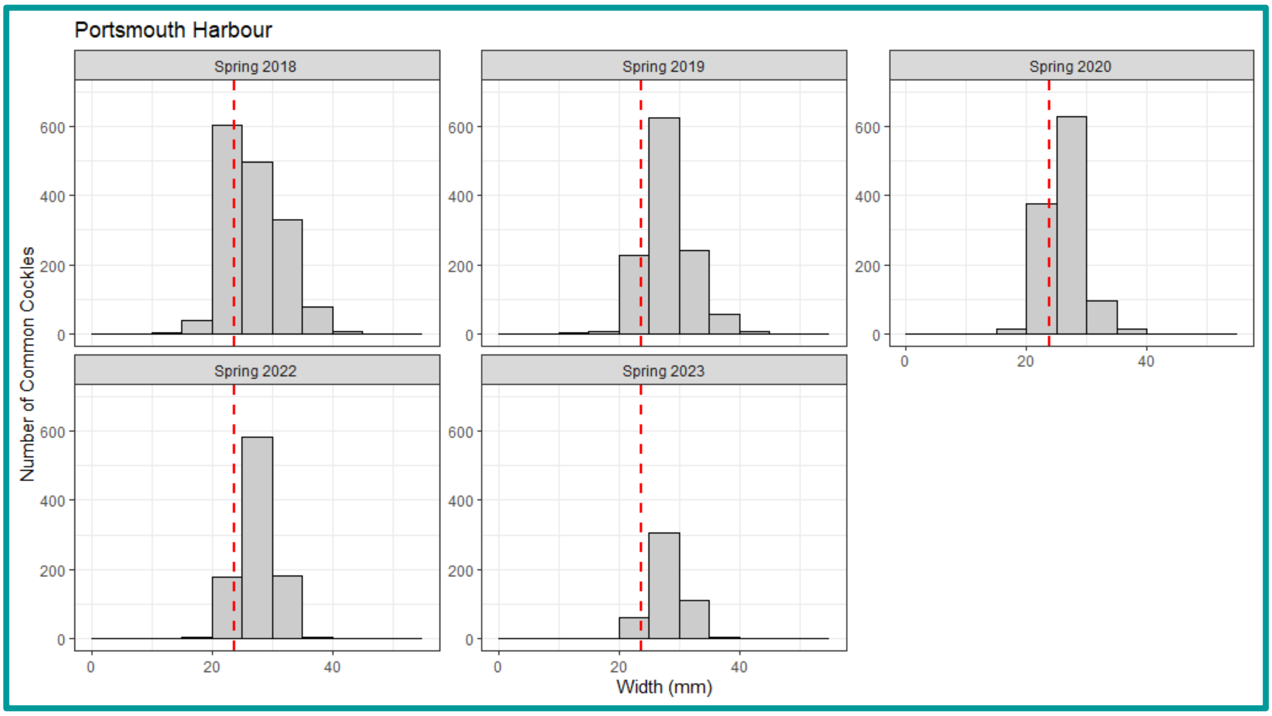

Figure 20: Comparison of average length of Common Cockle between the (available) Spring surveys in Portsmouth Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (23.8mm).

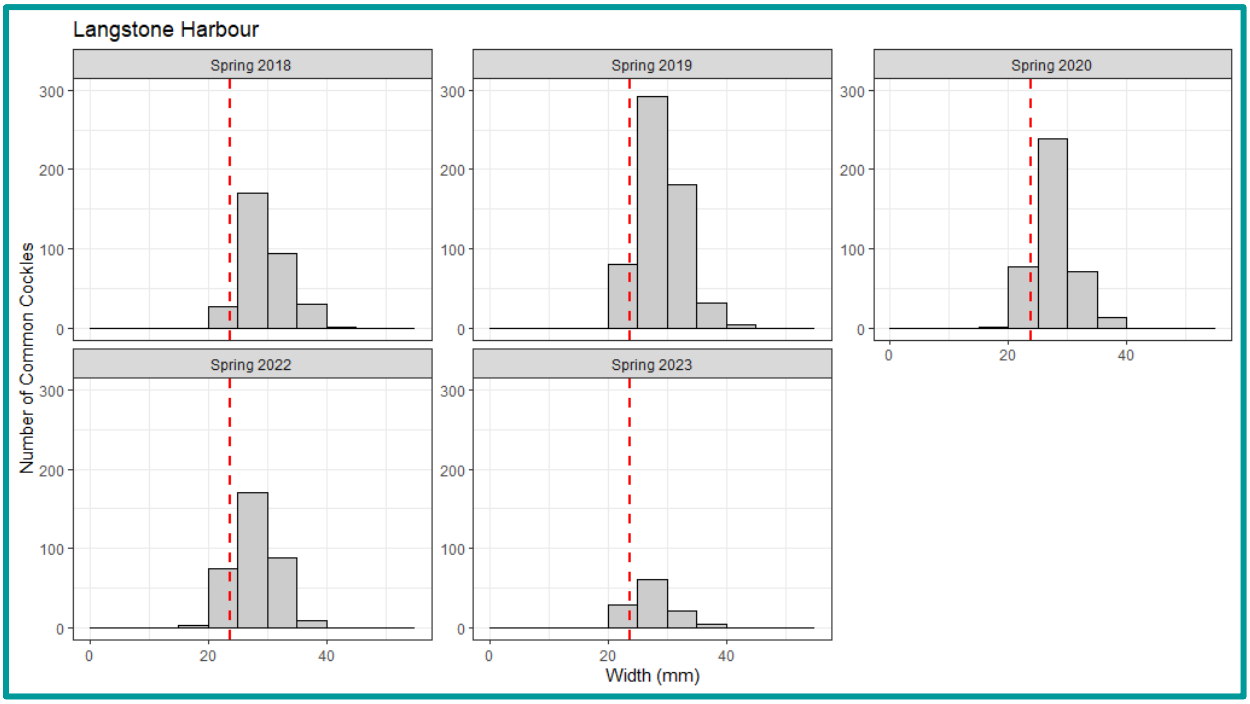

Figure 21: Comparison of average length of Common Cockle between the (available) Spring surveys in Langstone Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (23.8mm).

3.2.3 Comparison between survey years for autumn (post fishing season) surveys

The average length of each species in each Management Area was analysed for each autumn survey from 2018 to 2023 (there is no data for 2020 due to the Covid-19 pandemic).

Manila Clam

- For Southampton Water, a Dunn's post-hoc analysis found statistically significant increases in average length between the surveys in (Figure 22):
  - Autumn 2021 (34.6mm) in comparison to Autumn 2019 (32.5mm) and Autumn 2018 (31.9mm) ($p < 0.01$);
  - Autumn 2022 (33.1mm) in comparison to Autumn 2019 (32.5mm), and Autumn 2018 (31.9mm) ($p < 0.01$);
  - Autumn 2023 (32.8mm) in comparison to Autumn 2019 (32.5mm) ($p < 0.05$) and Autumn 2018 (31.9mm) ($p < 0.01$);
- And statistically significant decreases in average length between the surveys in (Figure 22):
  - Autumn 2022 (33.1mm) and Autumn 2023 (32.8mm) in comparison to Autumn 2021 (34.6mm) ($p < 0.01$).
- For Portsmouth Harbour, a Dunn's post-hoc analysis found statistically significant decreases in average length between the surveys in (Figure 23):
  - Autumn 2019 (33.4mm) in comparison to Autumn 2018 (35.7mm) ($p < 0.01$);
  - Autumn 2022 (33.3mm) in comparison to Autunm 2021 (34.8mm) and Autumn 2018 (35.7mm) ($p < 0.01$);
- And significant increases in average length between the surveys in (Figure 23):
  - Autumn 2021 (34.8mm) in comparison to Autumn 2019 (33.4mm) ($p < 0.01$);

    - Autumn 2023 (35.8mm) in comparison to Autumn 2022 (33.3mm) and Autumn 2019 (33.4mm) ($p < 0.01$).
- For Langstone Harbour, a Dunn's post-hoc analysis found a statistically significant decrease in average length between the surveys in (Figure 24):
    - Autumn 2021 (36.3mm) in comparison to Autumn 2018 (39.4mm) ($p < 0.01$).
- And statistically significant increases in average length between the surveys in (Figure 24):
    - Autumn 2021 (36.3mm) in comparison to Autumn 2019 (39.3mm) ($p < 0.01$);
    - Autumn 2022 (38.7mm) in comparison to Autumn 2021 (36.3mm) ($p < 0.01$).

For Southampton Water, all surveys had average lengths below MCRS. For Portsmouth Harbour, the 2019, 2021, and 2022 surveys had average lengths below MCRS while the 2018 and 2023 surveys had an average length above MCRS. For Langstone Harbour, all surveys had average lengths above MCRS.

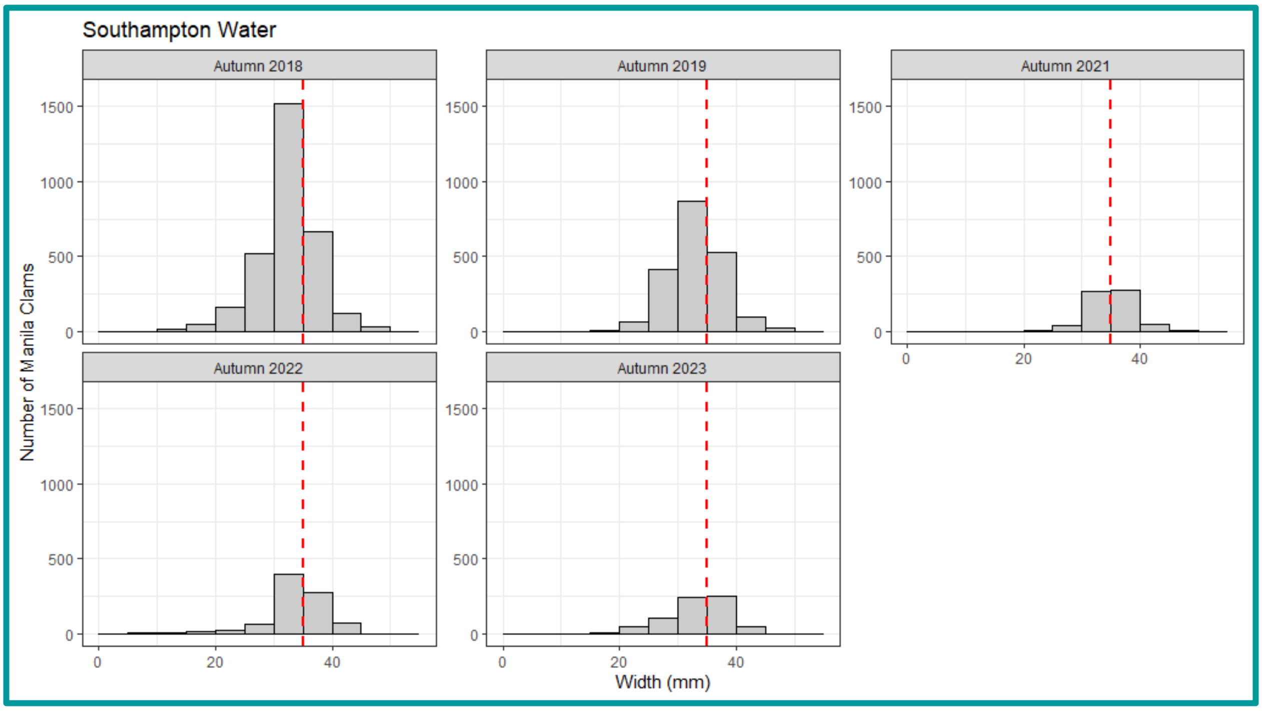

Figure 22: Comparison of average length of Manila Clam between the (available) Autumn surveys in Southampton Water. The red reference line is provided to show the Minimum Conservation Reference Size (35mm).

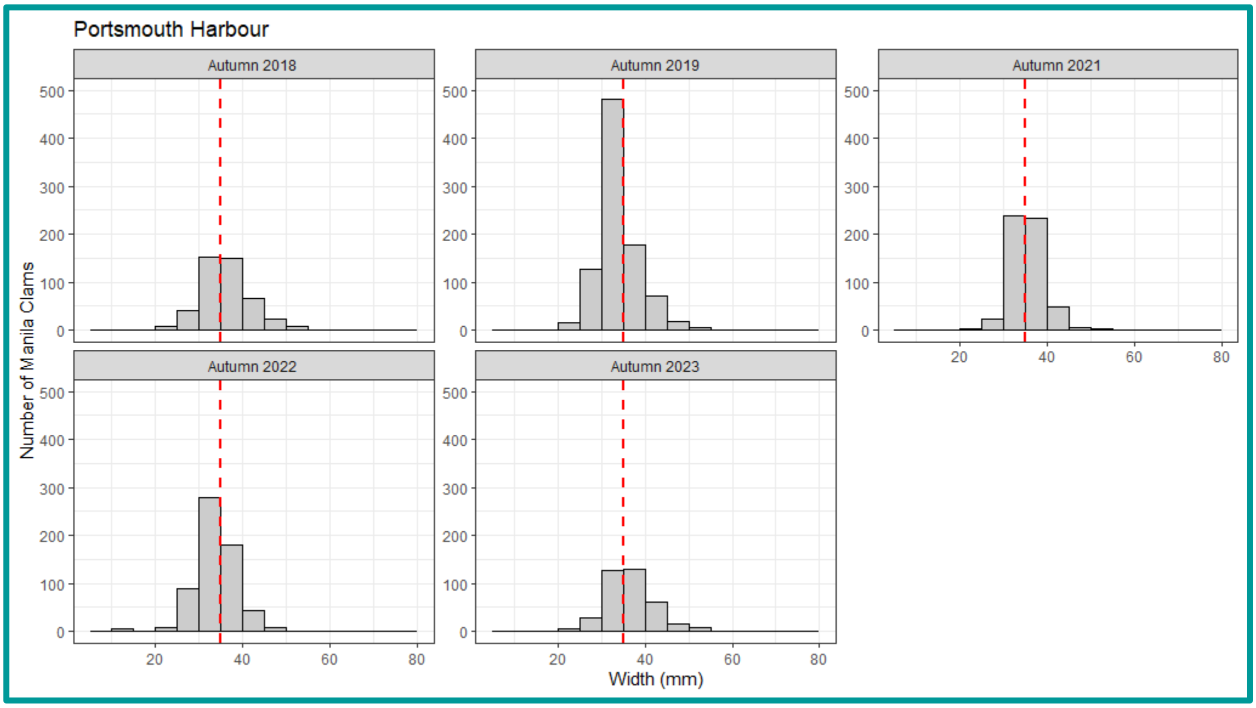

Figure 23: Comparison of average length of Manila Clam between the (available) Autumn surveys in Portsmouth Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (35mm).

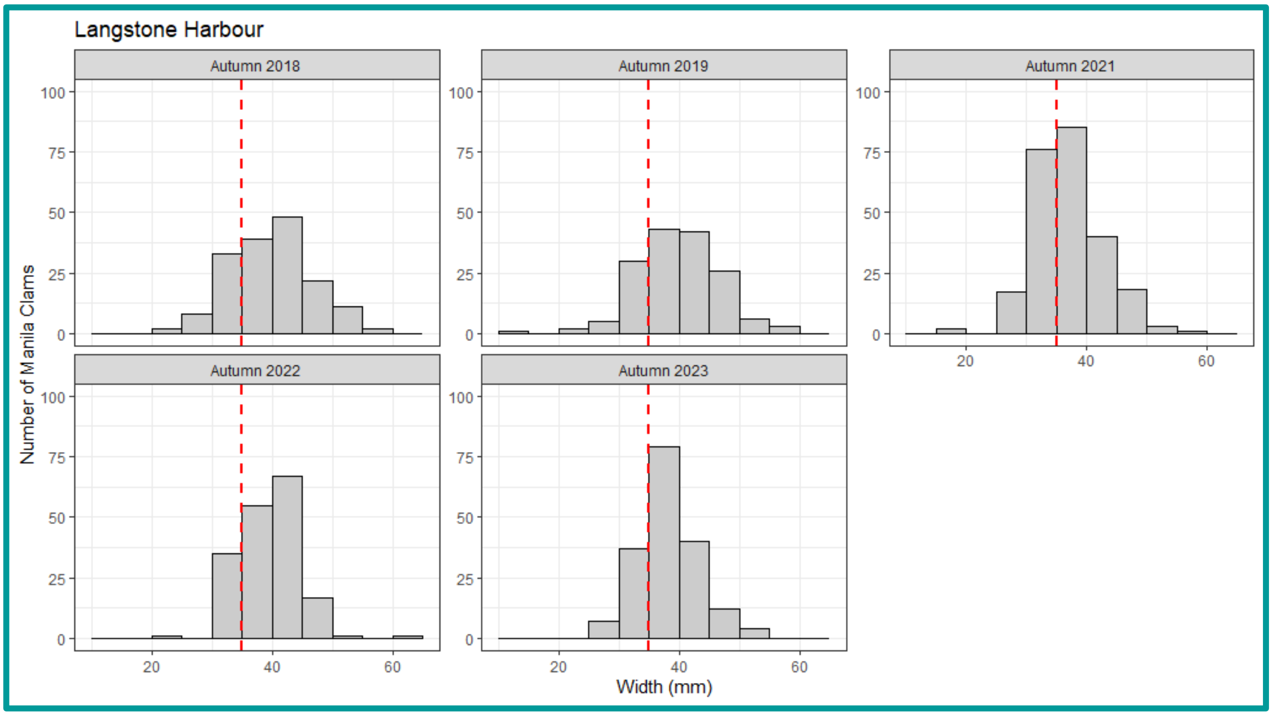

Figure 24: Comparison of average length of Manila Clam between the (available) Autumn surveys in Langstone Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (35mm).

Common Cockle

- For Southampton Water, a Dunn's post-hoc analysis found statistically significant increases in average length between the surveys in (Figure 25):
    - Autumn 2021 (29.1mm) in comparison to Autumn 2018 (26.5mm) and Autumn 2019 (26.4mm) ($p < 0.01$);
    - Autumn 2022 (26.8mm) in comparison to Autumn 2018 (26.5mm) ($p < 0.01$);
- And statistically significant decreases in average length between the surveys in (Figure 25):
    - Autumn 2022 (26.8mm) in comparison to Autumn 2021 (29.1mm) ($p < 0.01$);
    - Autumn 2023 (26.5mm) in comparison to Autumn 2021 (29.1mm) ($p < 0.01$).
- For Portsmouth Harbour, a Dunn's post-hoc analysis found statistically significant decrease in average length between the surveys in (Figure 26):
    - Autumn 2019 (26.8mm) in comparison to Autumn 2018 (27.6mm) ($p < 0.01$);
    - Autumn 2022 (25.5mm) in comparison to Autumn 2018 (27.6mm), Autumn 2019 (26.8mm), and Autumn 2021(28.1mm) ($p < 0.01$).
- And statistically significant increases in average length between the surveys in (Figure 26):
    - Autumn 2021(28.1mm) in comparison to Autumn 2018 (27.6mm) and Autumn 2019 (26.8mm) ($p < 0.01$)
    - Autumn 2023 (29.1mm) in comparison to Autumn 2018 (27.6mm), Autumn 2019 (26.8mm), and Autumn 2022 (25.5mm) ($p < 0.01$).
- For Langstone Harbour, a Dunn's post-hoc analysis found statistically significant decreases in average length between the surveys in (Figure 27):
    - Autumn 2019 (27.1mm) in comparison to Autumn 2018 (28.3mm) ($p < 0.05$);
    - Autumn 2023 (26.6mm) in comparison to Autumn 2018 (28.3mm) ($p < 0.05$) and Autumn 2022 (29.4mm) ($p < 0.01$).
- And statistically significant increases in average length between the surveys in (Figure 27):
    - Autumn 2022 (29.4mm) in comparison to Autumn 2019 (27.1mm) ($p < 0.01$) and Autumn 2021 (28mm) ($p < 0.05$).

For all cases the average length was above the MCRS of 23.8mm.

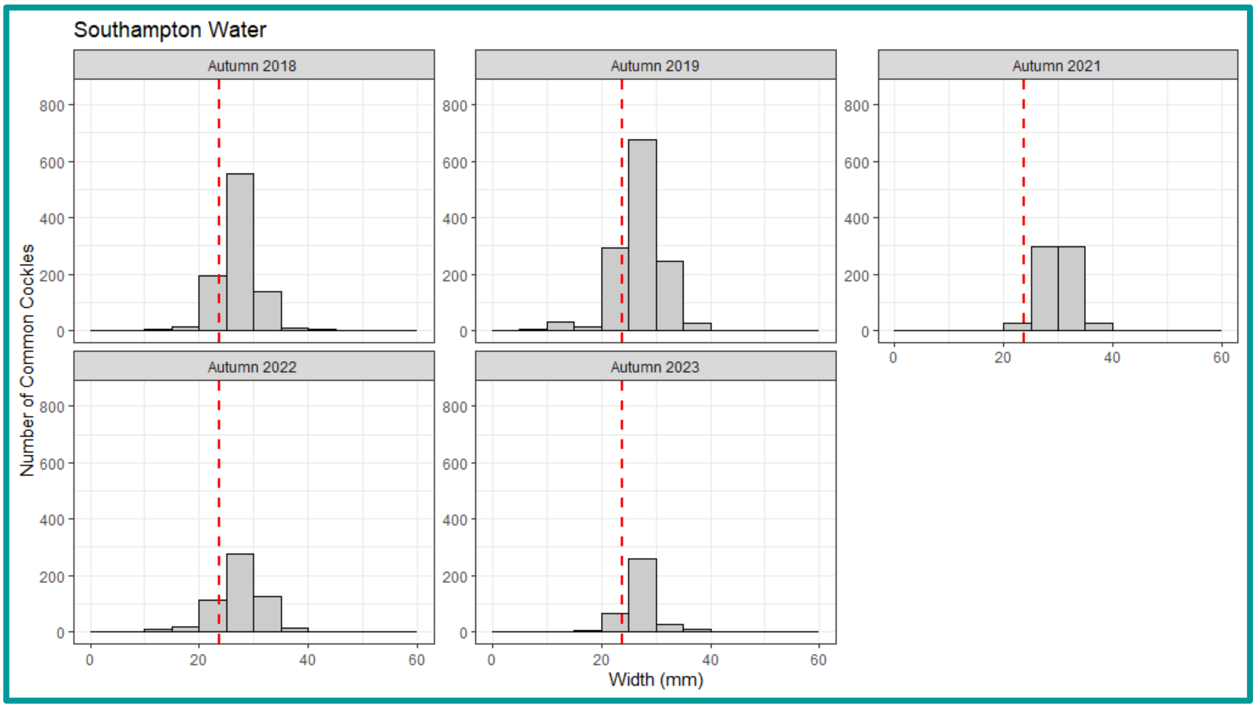

Figure 25: Comparison of average length of Common Cockle between the (available) Autumn surveys in Southampton Water. The red reference line is provided to show the Minimum Conservation Reference Size (23.8mm).

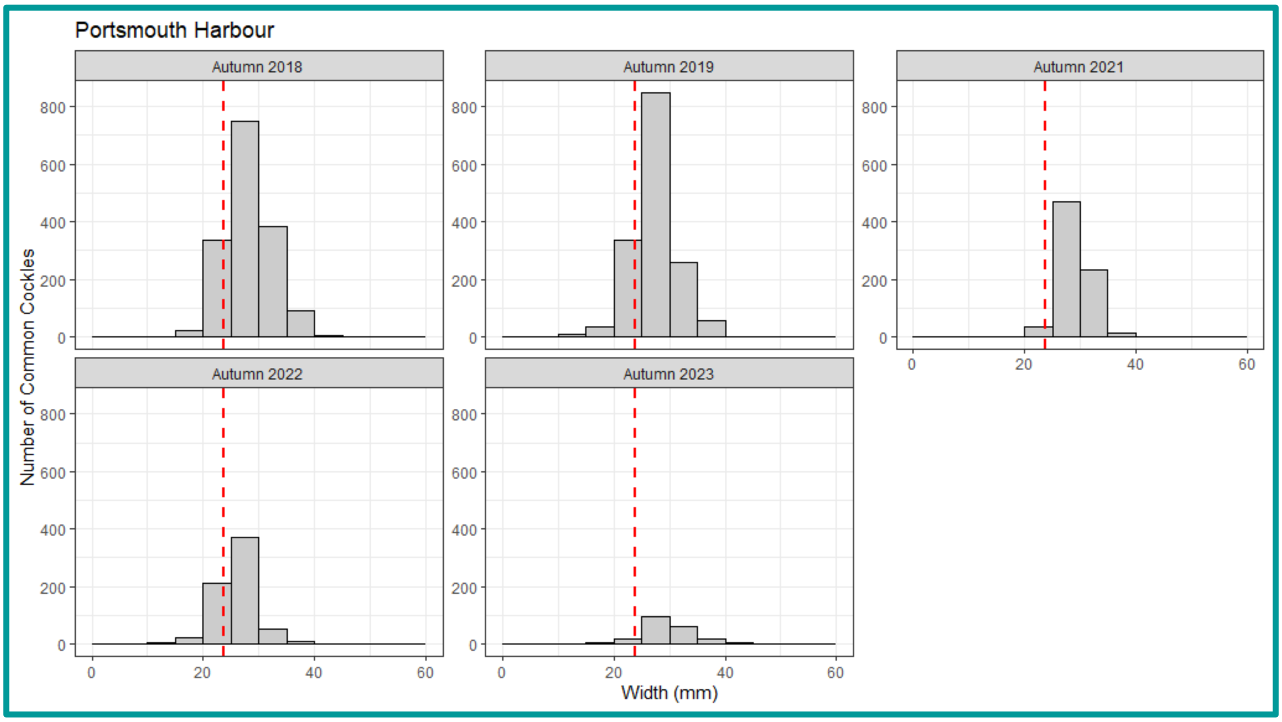

Figure 26: Comparison of average length of Common Cockle between the (available) Autumn surveys in Portsmouth Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (23.8mm).

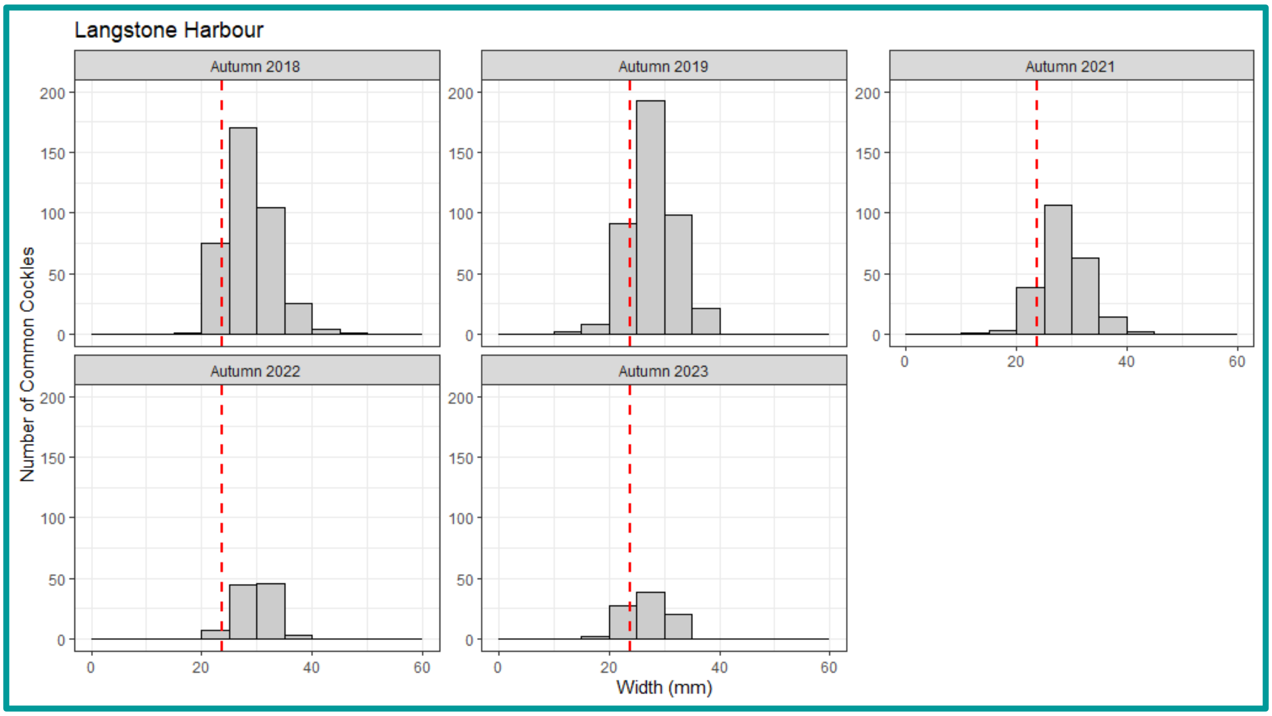

Figure 27: Comparison of average length of Common Cockle between the (available) Autumn surveys in Langstone Harbour. The red reference line is provided to show the Minimum Conservation Reference Size (23.8mm).

Southern IFCA Inshore Fisheries and Conservation Authority

EXECUTIVE SUMMARY

Marked I

Fisheries Management Plans Updates
Paper For Information

Report by PO I. Wright

A. Purpose

For Members to receive updates on the development of Fisheries Management Plans (FMPs)

1.0 Introduction

- FMPs, developed under the Joint Fisheries Statement (JFS) aim to carry out the objectives of the Fisheries Act 2020 by ensuring the continued provision of a shared natural resource for future generations, through the management of fish stocks, geographic area and fishing methods.
- Each FMP is developed by a delivery partner which, to date, includes Defra, the MMO, Seafish, the AIFCA and industry bodies.
- The development process includes collaborative engagement between delivery partners and stakeholders and each FMP will be monitored, reviewed and adapted every 6 years.

2.0 Summary of Key Points

- **Tranche 1 and Tranche 2 FMPs**
  - Defra hosted a Fisheries Management Plans (FMPs) Collaborative Online Workshop on the 12th March 2024. This was attended by DCO Birchenough and PO Wright.
  - The aim of the workshop was to understand and discuss a collaborative evidence approach for FMPs, understand the evidence gaps identified for the first five published FMPs and how organisations/authorities/stakeholders can work with Defra support a collaborative process going forward to help address these evidence gaps.
  - The main points raised by stakeholders fall into the following categories: representation and inclusivity in stakeholder involvement, how management will be delivered under each published FMP, funding/provision of resources, collation, collection and handling of data and the issues and logistics of achieving a collaborative approach.
  - Concerning the collation, collection and handling of data there was particular discussion around utilising data which is already held by/collected by IFCAs and the MMO as part of ongoing monitoring programs, creating standardisation for data collection, analysis and reporting, collaboration across established stakeholder groups and the need for transparency and communication regarding what data is being collected and how it will be used in relation to the FMPs and management.
  - Defra are going to review the outcomes of this wider workshop and a workshop held in February 2024 attended in person by invited parties (including IFCAs, MMO, NE, JNCC, Defra, Welsh Government, NFFO, NUTFA and other industry groups) and provide an update on progression with evidence workstreams associated with T1&2 FMPs once all the information/input has been reviewed.

- **Tranche 3 FMPs**
  - Southern IFCA was given an opportunity to view and respond to a draft of the

Southern North Sea and Channel Skates and Rays FMP. A response was submitted to the MMO on the 23rd February 2024.

- **Tranche 4 FMPs**
  - Tranche 4 FMPs have been announced, with the following associated Delivery Partners:
    - Black seabream (MMO)
    - Wrasses complex (MMO)
    - Celtic Sea and Western Channel demersal (MMO)
    - Celtic Sea and Western Channel pelagic (Defra)
  - The tranche 4 FMPs will be delivered by the end of 2025.
  - At this time, each FMP is proposing to cover the following species:
    - Wrasses complex FMP
      - ballan, corkwing, rock cook and goldsinny.
      - covering all English waters.
    - Black seabream FMP
      - black seabream
      - covering all English waters.
    - Celtic Sea and Western Channel demersal FMP
      - monkfish/anglerfish, cod, haddock, plaice, thornback ray, sole, blue ling, deep water sharks*, saithe, round nose grenadier, red seabream, skates and rays*, megrim, four spotted megrim, pollack, nephrops and whiting (*species in scope to still be confirmed).
      - covering ICES areas 7e, 7d, 7g and 7h.
    - Celtic Sea and Western Channel pelagic FMP
      - pilchards (sardines), anchovy, herring, horse mackerel and greater silver smelt.
      - covering ICES areas 7e, 7d, 7g and 7h.
  - Any information received on contact details for relevant Delivery Partners or engagement events for the T4 FMPs will be published on the Southern IFCA website on the FMPs page.

3.0 Next Steps

- That Members note the report.

EXECUTIVE SUMMARY

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Marine Licencing Update
Paper For Information

Report by IFCO H. Churchouse

A. Purpose

To provide a quarterly update on Southern IFCA's input into the marine licencing process between February 2024 to April 2024

1.0 Introduction

- Marine licencing is one of the principal responsibilities of the Marine Management Organisation (MMO) to facilitate the sustainable use of the UK marine environment whilst minimising negative environmental effects and avoiding interference with navigation.
- Southern IFCA is a consultee on Marine Licence Applications (MLAs). For MLAs relevant to the Southern IFCA District, the IFCA is given 21 days to review the application and determine if a response is required to aid the MMO in it's decision making and to further inform the applicant of any relevant fisheries information or considerations.
- The South Marine Plan introduces a strategic approach to planning within the inshore and offshore waters between Folkestone in Kent and the River Dart in Devon. The aim is to provide a clear, evidence-based approach, to inform marine users and regulators on where activities might take place within the Marine Plan area, allowing for national policies to be applied in a local context.
- In responding to MLAs, the IFCA must consider any advice relevant to its remit as a fisheries regulator and with regard to the South Marine Plan, taking account of the objectives and policies listed which are related to that remit. The objectives and policies of the South Marine Plan can be viewed in the plan document online - South_Marine_Plan_2018.pdf (publishing.service.gov.uk).

2.0 Summary of Key Points

- A summary table is provided indicating the detail of any MLAs which required a response during the last quarter outlining the nature of the MLA and the points included in the Southern IFCA response.
- There were nine MLAs requiring a response between February 2024 and April 2024.
- There were four additional MLAs received by Southern IFCA where it was determined that no comment was required.

3.0 Next Steps

- That Members receive the report.

EXECUTIVE SUMMARY

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Summary of MLA consultation requests submitted to Southern IFCA where a response was issued					
Project Name	**Application No.**	**Application Type**	**Applicant**	**Summary of MLA**	**Response Points**
Portland Underhill to Wyke Regis Flood and Coastal Erosion Management Strategy	N/A – invitation for consultation received directly from EA	Draft Strategy	AECOM Limited	• Documents outlining the development of the criteria for a new, integrated Flood and Coastal Risk Management Strategy for the coastline between Portland Underhill and Wyke Regis.	• Detailed the management Southern IFCA currently has in place within the Strategy Area. • Informed the applicant of recreational fishing activity that occurs along Chesil Beach and the Fleet. • Requested more information on two elements referenced in the Strategy documents; a Fisheries Management Plan for 'the area of Chesil Beach to Weston on the Isle of Portland' and a reference to 'partnership planning for Marine Protected Areas'.
Southsea Coastal Flood and Erosion Risk Management Scheme SZ 65009 98398	MLA/2019/00316/3	MLA	Coastal Partners	• A variation request for the works to improve the flood defences along the Southsea frontage. • This variation applied for the alignment of seawall in one subsection of the frontage to move 6 metres further seaward, and for rock revetments in the same frontage subsection to extent further west than in the original application.	• Referenced potential impacts for recreational fishing activities that occur along Southsea frontage.

Construction of new works, Disposal of dredged material, navigation dredging at the Ocean Infinity Woolston Site SZ 73504 77562	MLA/2023/00463	MLA	Ocean Infinity	• Application for a 10-year licence to complete works to improve the quayside at Ocean Infinity's base in Southampton. • Works to include dredging to increase available operating depths, installation of floating pontoons for vessel berthing and access, and installation of a hoist dock for vessel launching and recovery.	• Informed the applicant of anecdotal evidence received from local fishers that increased usage of The Nab for dredging disposal has caused a decline in productivity of the Brown Crab and Lobster fisheries in the area. • Suggested that assessments should include in-combination impacts of noise and dredging on fish and shellfish populations around The Nab and other disposal sites. • Reaffirmed previously stated advise (for previous licence application for the same works) that dredging and installation works should take place while water temperatures are below 14°C so as not to coincide with peak periods for larval survival and development. • Directed the applicant to engage with local stakeholders to facilitate development of optimal mitigation measures. Offer to facilitate contact with stakeholders in this regard.
Marine Aggregate South Coast regional supporting studies – scoping study	ENQ/2023/00227	Scoping Study	Tarmac Marine Dredging Limited	• Documents on a scoping study to be undertaken by members of the South Coast Dredging Association. • Study will determine which tests will be necessary before they can re-licence the South Coast aggregate	• Informed the applicant the Southern IFCA holds species population information from survey work, as well as information on the location of fishing activity within the District, which could be made available if required.

				extraction areas, and before they can licence potential new extraction areas.	
Subhub Tidal Platform and Turbine Performance Trials, Langstone Harbour	MLA/2023/0400	MLA	QED Naval Limited	• The Subhub tidal turbine and support platform have been in Langstone Harbour for storage for about a year. • This application is for the turbine and platform to begin trials in Langstone Harbour, rather than moving on to another site as originally planned.	• Outlined the dredging and hand-gathering fisheries that occur within Langstone Harbour. • Raised concerns that sediment mobilisation caused by operation and maintenance of the tidal turbine could impact the classification of shellfish beds within Langstone Harbour. • Directed the applicant to engage with local stakeholders to facilitate development of optimal mitigation measures. Offer to facilitate contact with stakeholders in this regard.
Kingstone Wharf Maintenance Dredging – Disposal SZ 73527 77534	MLA/2023/00411	MLA	Cowes Harbour Commission	• Application for a 10-year licence for routine dredging in the Wharf. • Dredging will take place every 3 years, with disposal occurring at Nab Tower and Hurst Fort.	• Informed the applicant of anecdotal evidence received from local fishers that increased usage of The Nab for dredging disposal has caused a decline in productivity of the Brown Crab and Lobster fisheries in the area. • Suggested that assessments should include in-combination impacts of noise and dredging on fish and shellfish populations around The Nab and other disposal sites. • Directed the applicant to engage with local stakeholders to facilitate development of optimal mitigation measures. Offer to facilitate contact with stakeholders in this regard.

EXECUTIVE SUMMARY

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New Discharge Permit into the Wareham Channel	EPR/UP3429SQ/A001	Received direct from EA	BCL Consultants on behalf of Hanson	• Application for two new discharge points into the River Frome and River Piddle from a Hanson Quarry site in Wareham. • Discharge is of the category ‘discharge of groundwater and surface/rainwater from site after extracting minerals from sub water table level’.	• Raised concerns over whether the input of discharge into the Wareham Channel could impact the commercially important dredge fisheries within Poole Harbour if such discharges altered bed classification. • Response received from the Environment Agency stated they felt the discharge points were far enough from the shellfish beds to cause no impact.
Seawall Replacement, Stokes Bay, Gosport	MLA/2023/00506	MLA	Coastal Partners	• Application for repair works along 135m of frontage of the seawall in Stokes Bay. • Works will increase the current footprint of the seawall seawards marginally.	• Provided applicant with information on the Solent scallop fishery and potential recreational activities that occur within Stokes Bay.
Replacement and Reconstruction of sections of the river wall in Berthon Shipyard in Lymington	MLA/2023/00525	MLA	Berthon Boat Company Limited	• Application for works to repair five sections of the river wall that divides Berthon Shipyard from the Lymington River. • Works to occur between October and June to avoid busy summer season.	• Highlighted current management in place for this area for fishing activity and the reasons for particular management measures being in place.