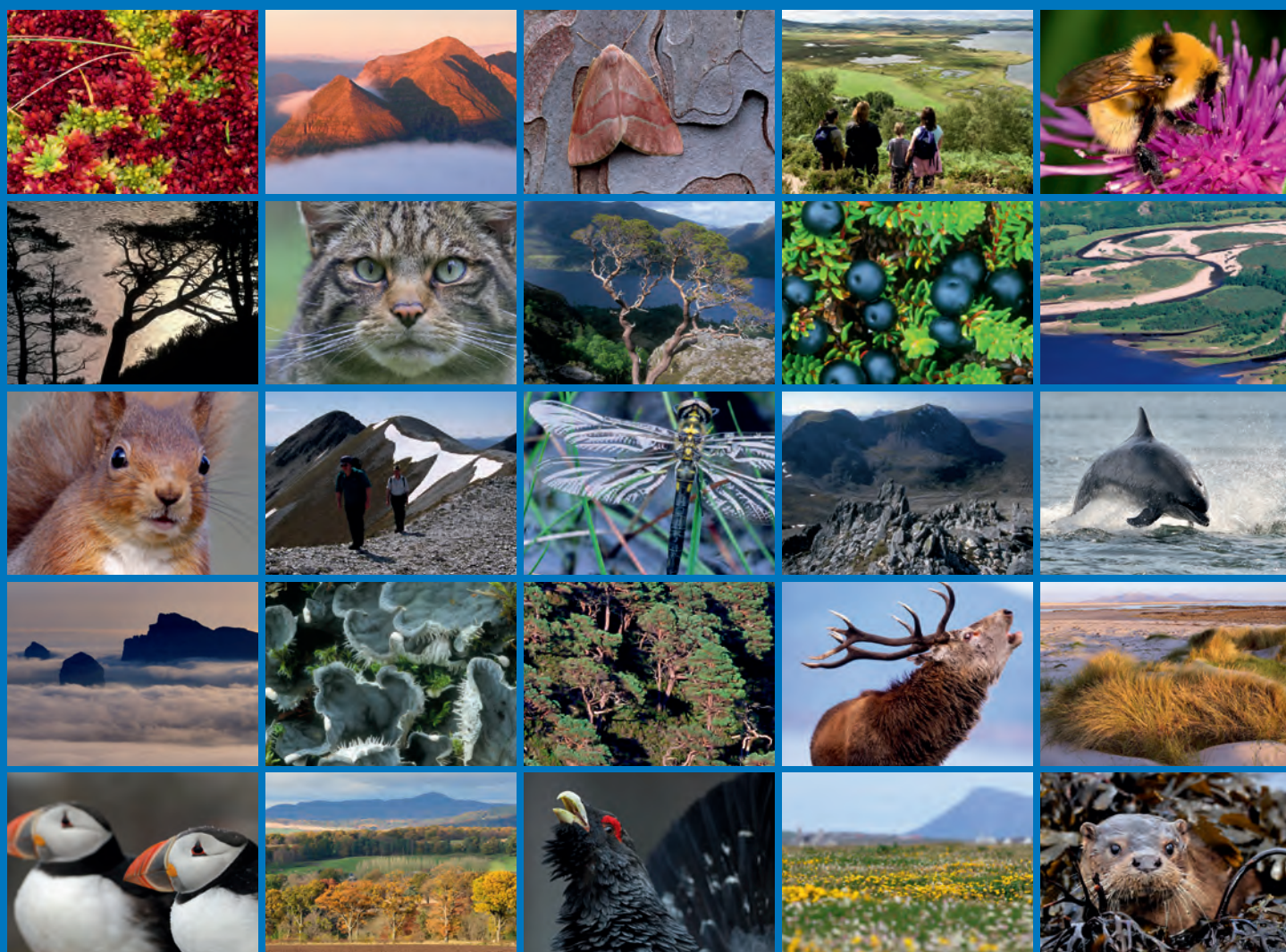


# Validation of seabed habitat MPA search feature records relating to the South Arran Nature Conservation MPA





**Scottish Natural Heritage**  
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# COMMISSIONED REPORT

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**Commissioned Report No. 620**

## **Validation of seabed habitat MPA search feature records relating to the South Arran Nature Conservation MPA**

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*This report should be quoted as:*

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# COMMISSIONED REPORT

# Summary

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## Validation of seabed habitat MPA search feature records relating to the South Arran Nature Conservation MPA

**Commissioned Report No. 620**  
**Contractor: Christine Howson**  
**Year of publication: 2014**

### Background

A suite of Nature Conservation Marine Protected Areas (MPAs) has been developed across Scottish waters based on the presence of key habitats, species and large-scale features of functional significance (collectively termed MPA search features - see Marine Scotland, 2011). The MPAs include several derived from proposals submitted in 2012 by local coastal communities, recreational marine users and environmental interest groups.

One such third-party proposal, encompassing waters off the south of Arran in the Clyde Sea, was submitted by the Community of Arran Seabed Trust (COAST). The proposal included records of seabed habitat MPA search features not held by Scottish Natural Heritage (SNH). This study was commissioned to validate these records utilising available photographs, video and volunteer data recording forms. The findings of the work informed SNH's subsequent detailed assessment of the South Arran area against the MPA Selection Guidelines. The resultant South Arran Nature Conservation MPA incorporates relevant validated records of seabed habitats that were subsequently confirmed as protected features of the site.

### Main findings

- Additional records of five MPA search features were confirmed within the area of the COAST third-party MPA proposal: kelp and seaweed communities on sublittoral sediment (**SS.SMp.KSwSS**); tide-swept algal communities (**IR.HIR.KSed.XKHal**); seagrass beds (**SS.SMp.Sgr.Zmar**); maerl beds (**SS.SMp.Mrl**); and maerl or coarse shell gravel with burrowing sea cucumbers (**SS.SCS.CCS.Nmix**).
- Additional records of the shallow tide-swept coarse sands with burrowing bivalves (**SS.SCS.ICS.MoeVen**) MPA search feature may be present but this cannot be confirmed without supplementary infaunal sampling and analyses.
- There was no evidence to support the presence of horse mussel beds or deep sponge communities (part of the northern sea fan and sponge communities MPA search feature) which were included in the original COAST third-party MPA proposal.
- No evidence was available to confirm the current status of populations of native oysters *Ostrea edulis*.

- The report outlines possible future survey work that could help to address a number of information gaps that remain in relation to the distribution of MPA search features around the south of Arran. Proposed studies include mapping the distribution, extent and quality of maerl beds on the south and west coasts, and infaunal sampling to establish the presence and distribution of shallow tide-swept coarse sands with burrowing bivalves (**SS.SCS.IC.S.MoeVen**). Some aspects of the recommended marine survey work were progressed in 2013.

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## SNH notes regarding the re-issuing of Commissioned Report No. 620 (July 2014)

This report has been re-issued following a review of the South Arran MPA evidence-base undertaken in response to concerns raised during the 2013 formal public consultation on the suite of proposed Nature Conservation MPAs (*'Planning Scotland's Seas'*<sup>1</sup>).

The review highlighted that there was insufficient evidence in relation to three of the COAST records originally proposed as suitable for use within the MPA assessment process. We had previously accepted a 'verbal record' [KC3] with no additional supporting evidence and there were no recording forms for two other records [SS11 & SS21] which proved to be the entry positions for two dive sites already logged. Further, following the initial publication of this report in 2013, SNH received a routine update of formal Seasearch records and subsequently adopted their feature assignments (because they are the data 'owners') for a number of the records encompassed by this study. This resulted in a change of feature category at one location [SB5] where Seasearch assigned the kelp and seaweed communities on sublittoral sediment feature rather than the maerl beds feature. These changes are reflected in this updated version of the report. A new 'evidence' annex (Annex B) displaying the photographs and recording forms for relevant records has also been added to the report to improve transparency in the decision-making process.

Details about the evidence review undertaken in spring 2014 are provided in SNH's post MPA consultation report (Commissioned Report No. 747<sup>2</sup> - SNH, 2014).

The review of the South Arran MPA evidence-base also highlighted possible inaccuracies in the predicted extent of three features (namely maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; and, shallow tide-swept coarse sands with burrowing bivalves) and / or inconsistencies in habitat assignments made by different surveyors / analysts. To explore these issues in greater detail we commissioned an external appraisal of all of the data available to support these nearshore coarse sediment habitats.

The external appraisal (Commissioned Report No. 749<sup>3</sup> - Moore, 2014) confirmed the presence of all three of the features but recommended refinements to a number of the individual records and also to the current predicted extents of these habitats. The changes highlighted in CR749 supersede the contents of this report and readers are pointed to CR749 for further details. The data refinements proposed in CR749 were taken forward in the completion of the MPA assessment process. These changes did not affect the MPA boundary or the case for designation.

References within the original version of this report to the South Arran 'possible MPA' and to 'proposed protected features' have been updated to reflect the designation of the site as a Nature Conservation MPA (the terms 'possible' and 'proposed' have been dropped throughout). Readers should note that the original third-party MPA proposal boundary is still used within the report and that this differs from the finalised boundary of the Nature Conservation MPA. Readers should also note that not all of the MPA search feature categories explored within this study were subsequently taken forward as protected features of the MPA.

For further details about the South Arran MPA please refer to - <http://www.snh.gov.uk/mpas>

<sup>1</sup> See - <http://www.scotland.gov.uk/Topics/marine/marine-consultation>

<sup>2</sup> Available from - [http://www.snh.org.uk/pdfs/publications/commissioned\\_reports/747.pdf](http://www.snh.org.uk/pdfs/publications/commissioned_reports/747.pdf)

<sup>3</sup> Available from - [http://www.snh.org.uk/pdfs/publications/commissioned\\_reports/749.pdf](http://www.snh.org.uk/pdfs/publications/commissioned_reports/749.pdf)

## **Acknowledgements**

We would like to thank Howard Wood and Andrew Binnie of COAST for the time, knowledge and enthusiasm they contributed to this data validation exercise, which would not have been possible without their cooperation. The majority of the photographs and video footage reviewed were taken by Howard Wood with contributions from his fellow divers, particularly Angus Robson and assorted Seasearch surveyors. The authors would also like to thank Siobhán Mannion, formerly of SNH, for her input during the meetings on Arran and her subsequent help with the report preparation.

# 1. INTRODUCTION

The Community of Arran Seabed Trust (COAST) submitted a third-party proposal<sup>4</sup> for a Nature Conservation Marine Protected Area (MPA) around the south of Arran in the Clyde Sea in May 2012 (COAST, 2012). Upon receipt of the third-party submission and to inform the assessment of the proposal against the MPA Selection Guidelines, Scottish Natural Heritage (SNH) extracted available MPA search feature records from relevant data repositories (primarily GeMS<sup>5</sup>, Marine Recorder and Marine Scotland Science datasets but also relevant scientific reports and source literature).

The third-party submission from COAST contained additional mapped records of seabed habitat MPA search features not held within existing data repositories (from COAST surveyors and also a number of recent Seasearch<sup>6</sup> volunteer diver recording forms that were yet to be formally archived and mobilised). The primary objective of this current study was to discuss and validate the evidence-base behind a number of the records included within the COAST proposal.

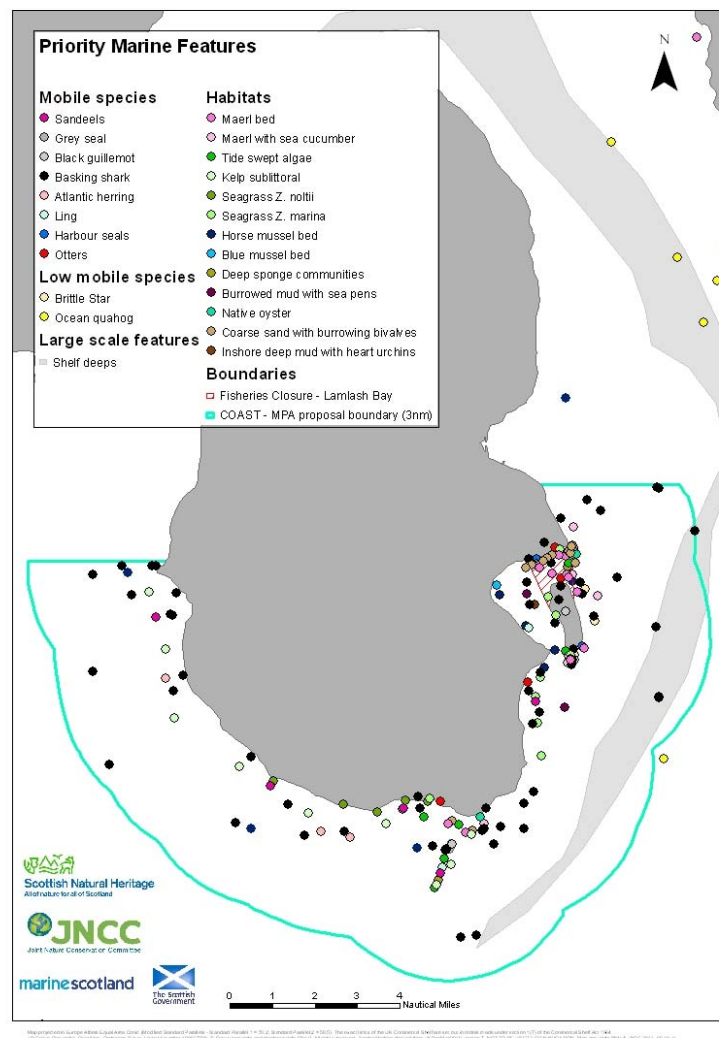


Figure 1. Habitat and species records as presented within the COAST third-party proposal.

<sup>4</sup> See - [http://arrancoast.com/website\\_pdf/COAST Arran South MPA proposal\\_9May\\_FinalP.pdf](http://arrancoast.com/website_pdf/COAST_Arran_South_MPA_proposal_9May_FinalP.pdf)

<sup>5</sup> [Geodatabase of Marine features in Scotland \(GeMS\)](#)

<sup>6</sup> For further details see - <http://www.seasearch.org.uk/>

## 2. METHODS

Preliminary discussions between COAST and SNH confirmed that a number of the MPA search feature records were based on the knowledge of local divers and biological surveyors (dive log format supported by underwater photography) rather than formally lodged within recognised data repositories such as the National Biodiversity Network (NBN) or Marine Recorder. To enable consideration of these records within the MPA assessment process, it was first necessary to determine whether the records aligned with the specified MPA search feature categories. It was anticipated that the data validation exercise would entail discussions with COAST surveyors on Arran and the review and cataloguing of relevant fundamental supplementary sampling details (dates, surveyor(s), depths, positional information etc.) as well as available underwater photography / video footage.

The following generic questions were relevant to all of the records and formed the basis of discussions with the COAST surveyors -

- What are the details for the records (who were the surveyors, when were the records made, what is the positional information and how was it derived)?
- Is there some form of photographic supporting material?
- What seabed substrates and associated biological communities are present at these locations? Do these align with specific MPA search feature categories?
- Do the records include any measure of 'qualities' of the seabed habitats e.g. extent, numbers of different species present, density / abundance estimates, etc.?

Christine Howson (contractor) and Siobhán Mannion (SNH) visited the COAST offices on Arran on the 14<sup>th</sup> - 16<sup>th</sup> August, 2012. Discussions were held with Howard Wood, the Chair of COAST, and Andrew Binnie, COAST's Marine Project Officer. Howard Wood supplied relevant details from dives undertaken within the area of the third-party MPA proposal, including supplementary oral descriptions, photographs and video footage (where applicable). Relevant Seasearch recording forms were also supplied.

Christine Howson subsequently worked through the photographic / video material and the Seasearch forms, reviewing and recording information on the seabed substrates and habitats / species present. The sites were classified into biotopes / biotope complexes (Connor *et al.*, 2004) where possible and a correlation made with MPA search features. The information gathered was compiled into an Excel spreadsheet and ArcGIS project. Depths where known were recorded as given and not corrected to chart datum; there was generally insufficient information available to achieve this with any accuracy.

### 3. RESULTS

The seabed habitat records provided by COAST for detailed analysis did not fully align with the records included within the original third-party MPA proposal submission (see Figure 2 for details). A number of the records included within the third-party proposal were illustrative only, depicting the broad, indicative distribution of some seabed habitats.

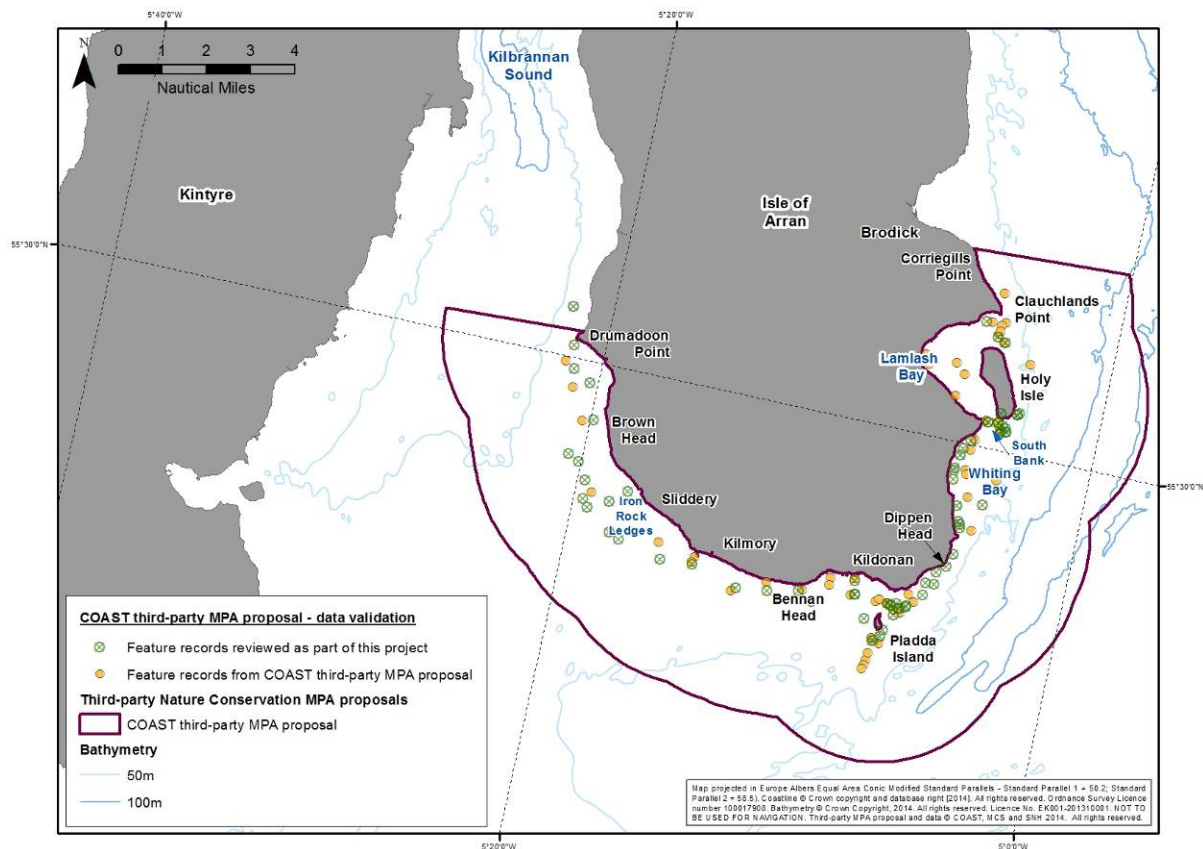


Figure 2. Habitat and species records as presented within the COAST third-party MPA proposal together with the records reviewed as part of this validation study.

The remainder of this section presents the results of the data validation exercise, structured around MPA search feature categories. Annex A provides a summary of the evidence reviewed. The locations of all records discussed are displayed in Figure A1 (Annex A).

#### 3.1 MPA search feature - Kelp and seaweed communities on sublittoral sediment

##### 3.1.1 Feature description (from Tyler-Walters et al., 2012)

##### **Kelp and seaweed communities on sublittoral sediment (SS.SMp.KSwSS)**

Shallow sublittoral sediments which support seaweed communities typically including the sugar kelp *Saccharina latissima*, the bootlace weed *Chorda filum* and various red and brown seaweeds, particularly filamentous types. With increasing shelter from wave action, some communities develop as loose-lying mats on the sediment surface. A diverse array of animals are associated with these kelps and seaweeds, e.g. burrowing polychaete worms and bivalves, scavenging hermit crabs, crabs, starfish, fish and grazing top shells.

Only found in shallow water (max. 20 m), on a wide variety of substrates (muddy sands and gravels through to cobbles and boulders) that reflect prevalent environmental conditions.

The COAST third-party MPA proposal contained a number of ‘kelp sublittoral’ records that possibly represented examples of the kelp and seaweed communities on sublittoral sediment (**SS.SMp.KSwSS**) MPA search feature.

### 3.1.2 Findings upon analysis of photographic materials and relevant Seasearch forms

- The majority of the ‘kelp sublittoral’ records included in the original third-party MPA proposal were of kelp forest on rock and so did not align with the **SS.SMp.KSwSS** MPA search feature category.
- Figure 3 shows the distribution of five records that were attributable to the MPA search feature.
- An area adjacent to the seagrass beds in Whiting Bay has been classified as the component biotope **SS.SMp.KSwSS.LsacR.Sa** (Plate 1). *Halidrys siliquosa* was also present along with the non-native species *Sargassum muticum* which was widespread in this area.
- Component biotopes of **SS.SMp.KSwSS** were also found at sites at Kingscross Point, on the South Bank and to the north-west of Pladda.
- It was not possible to assess the richness of the algal communities from the photographic material available.
- No evidence was available to support the proposed presence of **SS.SMp.KSwSS** to the south-west of Arran or to the south of Pladda.

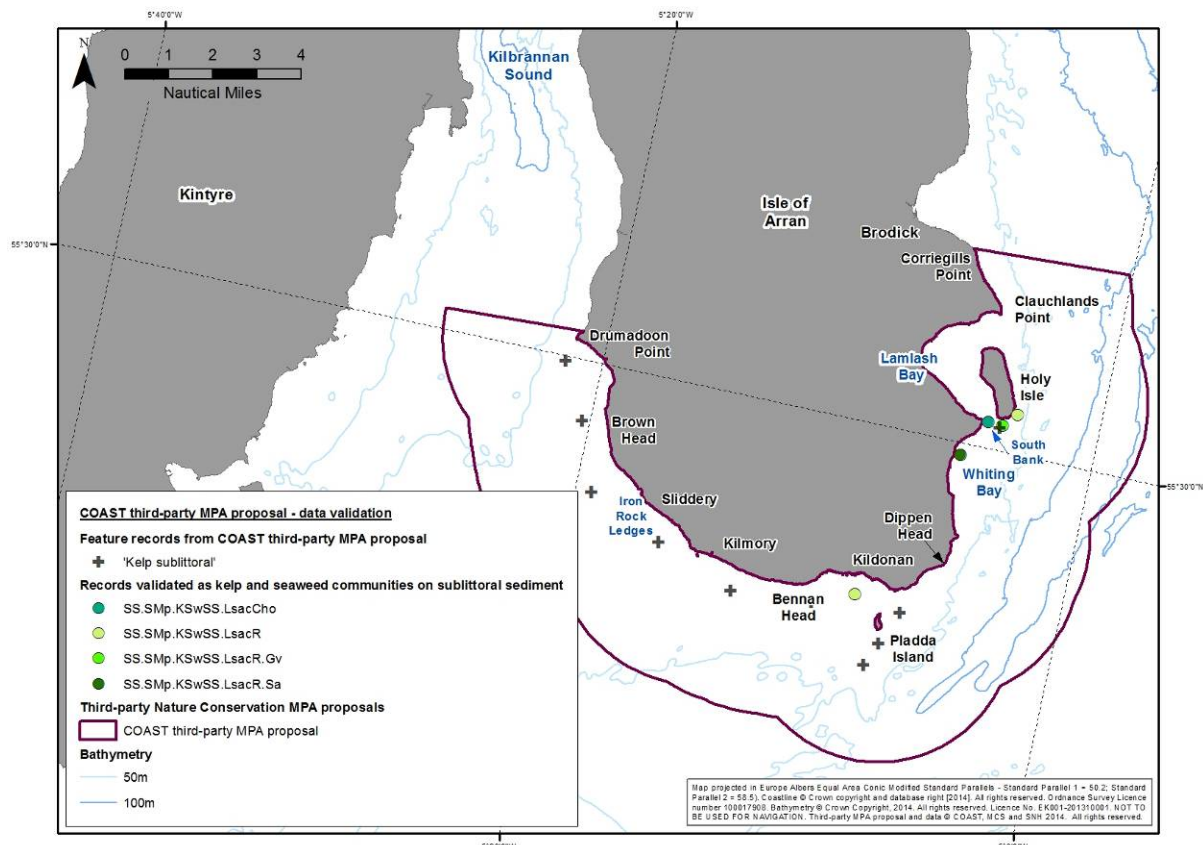


Figure 3. Records of kelp and seaweed communities on sublittoral sediment (**SS.SMp.KSwSS**) identified from COAST and Seasearch data. Records of ‘kelp sublittoral’ from the third-party MPA proposal are also shown.



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Plate 1. Foliose algae on sand in Whiting Bay assigned to the **SS.SMp.KSwSS.LsacR.Sa** biotope which is a component of the kelp and seaweed communities on sublittoral sediment MPA search feature. Also present is the non-native alga *Sargassum muticum*.

### 3.2 MPA search feature - Tide-swept algal communities

#### 3.2.1 Feature description (from Tyler-Walters et al., 2012)

**Tide-swept algal communities (LR.HLR.FT; IR.HIR.KSed.XKHal; IR.MIR.KR.LhypTX; IR.MIR.KT)**

Bedrock and mixed substrata swept by strong tidal currents and dominated by large seaweeds such as fucoids and kelps that form dense forests or sparse parks with increasing water depth. As in terrestrial forests, the kelps and fucoids form a canopy that provides shelter for an under-storey of sheltering plants and animals such as foliose red seaweeds, sea squirts, sea mats and sea firs. Some species grow on the seaweeds themselves. The bedrock or boulders below provide important habitats for limpets, winkles, dog whelks, tube worms, sponges, crabs and starfish.

Found in sheltered to wave-exposed tidal channels, often at the entrance of or near to sea lochs, between coastal islands, or between islands and the mainland where tidal flow is funnelled by the shape of the coastline. This habitat can occur from the mid shore down to depths of 30 m, in full or variable salinity.

The COAST third-party proposal contained a number of ‘tide-swept algae’ records which possibly represented examples of the tide-swept algal communities MPA search feature.

#### 3.2.2 Findings upon analysis of photographic materials and relevant Seasearch forms

- The majority of the COAST ‘tide-swept algae’ records comprised mixed kelp species, a result of a scoured environment in moderately wave exposed and tide-swept conditions, and were classified as **IR.HIR.KSed.XKScrR**. This is not a component biotope of the MPA search feature.
- Figure 4 shows three records on the south-east corner of Arran that can be attributed to the MPA search feature component biotope **IR.HIR.KSed.XKHal** (Plate 2). This biotope it is likely to be more widely distributed.

- Bedrock grades into boulders, cobbles and gravel substrates along much of the south coast of Arran and these mixed sediments appear to support a rich flora and fauna that proved difficult to classify. It is possible that additional infralittoral cobble / pebble sites should be classified as **IR.HIR.KSed.XKHal** despite the absence of *Halidrys siliquosa*. Although it is difficult to identify many algal species from photographs, the red algal flora includes *Halarachnion ligulatum* which is characteristic of tide-swept, mobile substrata.
- It was not possible to assess the richness of the algal communities from the photographic material available.
- No evidence was available to support the proposed presence of **IR.HIR.KSed.XKHal** to the south of Pladda or on the outer, eastern edge of Lamlash Bay.

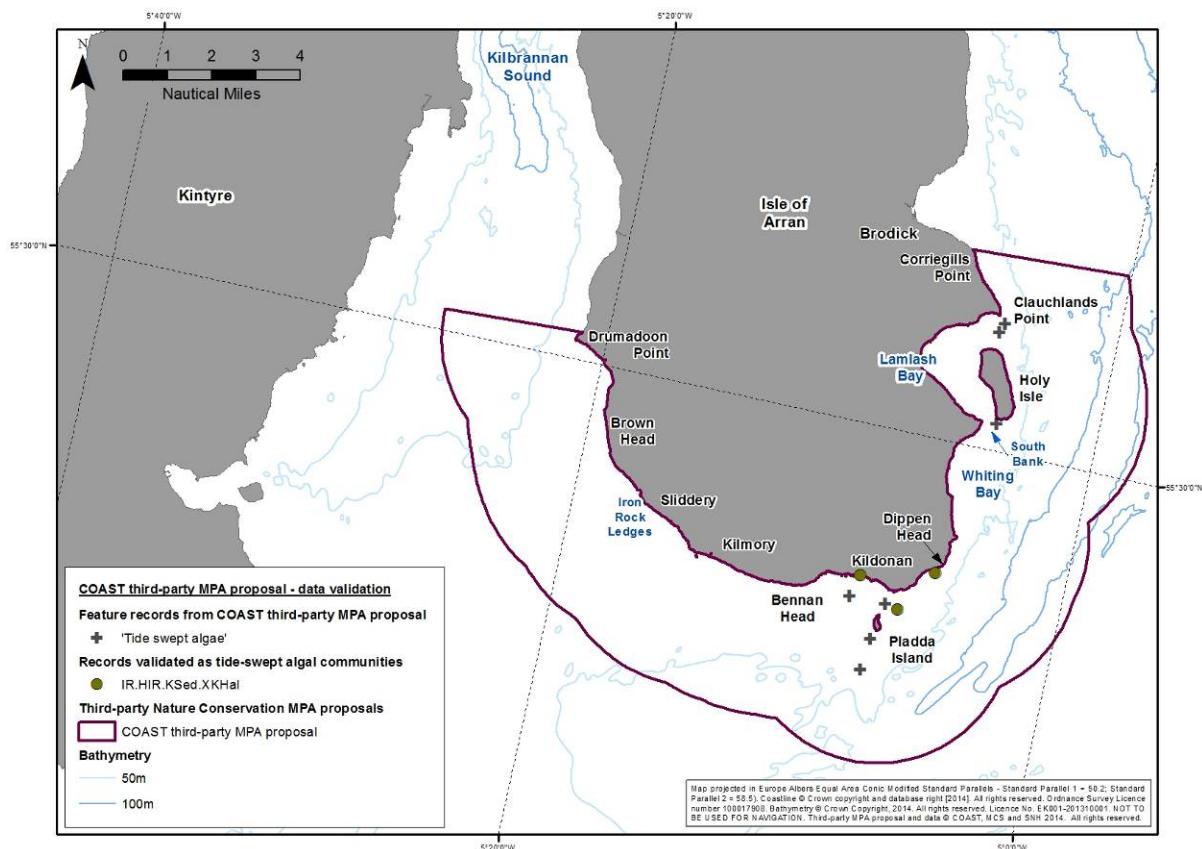


Figure 4. Records of tide-swept algal communities (**IR.HIR.KSed.XKHal** component biotope) identified from COAST and Seasearch data. Records of 'tide swept algae' from the original third-party MPA proposal are also shown.



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Plate 2. *Halidrys siliquosa* and kelps on sand and boulders at Kildonan assigned to the **IR.HIR.KSed.XKHal** component biotope of the tide-swept algal communities MPA search feature.

### 3.3 MPA search feature - Seagrass beds

#### 3.3.1 Feature description (from Tyler-Walters et al., 2012)

##### **Seagrass beds (SS.SMp.SSgr.Zmar; LS.LMp.LSgr.ZnoI; SS.SMp.SSgr.Rup)**

Seagrasses are marine flowering plants found in shallow coastal areas around the world, typically on sheltered sandy or muddy substrata. Seagrasses often grow in dense, extensive beds or meadows, stabilising the sediment and creating productive habitats that provide shelter and food for a wide variety of plants and animals (including other species of conservation importance and commercially important fish species). Three seagrass bed communities are encompassed by this broad habitat; two eelgrass biotopes (*Zostera* spp.) and one dominated by the tasselweed *Ruppia maritima*.

The seagrasses grow in sands and muds from the middle of the shore down to 10 m, in areas at least moderately sheltered from wave action such as sea lochs, inlets, bays, sounds, channels and lagoons. Dwarf eelgrass (*Zostera noltii*) is found highest on the shore, while the common eelgrass (*Z. marina*) is predominantly subtidal. Narrow-leaved eelgrass, a variety of common eelgrass (*Z. marina* var. *angustifolia*), is found intertidally on the mid to lower shore. The beaked tasselweed (*Ruppia maritima*) is usually found in the shallow subtidal from 1 - 5 m.

The COAST third-party MPA proposal contained a number of 'seagrass' records which possibly represented examples of the seagrass beds MPA search feature. The data review also considered the results of a seagrass mapping study subsequently undertaken by COAST later in 2012 (Binnie et al., 2012).

#### 3.3.2 Findings upon analysis of photographic materials and relevant Seasearch forms

- Twelve records of *Zostera marina* seagrass beds (see Table A2 and Figure A1; Annex A for details) are present along approximately four kilometres of Whiting Bay (Figure 5). The seagrass is mostly distributed between 4 - 8 m depth with one small area recorded from 2 m. The seagrass occurs in patches ranging in size from c. 25 m long to 100 - 150 m long. No seagrass is present in the region of the freshwater stream inflow in the centre of the bay. A Seasearch Observer recording form was available for all bar one of the records of the seagrass beds feature. A series of photographs were available in support of the other record (WB1).

- The seagrass in Whiting Bay is patchier at the northern end of the bay but the available video and photographs show no indication of any habitat damage (Plate 3).
- The sea bed in Whiting Bay is gently sloping with a sudden steeper drop-off. This change in slope is likely to determine the eastern limit of the seagrass.
- One record of seagrass beds from the south coast of Arran at Kildonan (SS) was validated as part of this review. Recent data from Binnie *et al.* (2012) has since confirmed that seagrass beds are more widespread along this coast. Figure 6 shows the wider distribution of seagrass reported in Binnie *et al.* (2012) along with the one record validated as part of this current study. The shore along this stretch of coast is interspersed by numerous dykes that provide sufficient shelter to trap sediments within which the seagrass grows.
- The seagrass on the south coast is present in the shallow sublittoral and is exposed on extremely low tides. Photographs show the seagrass growing in dense patches on mixed grounds of cobbles, shells and sandy sediments (Plate 4).

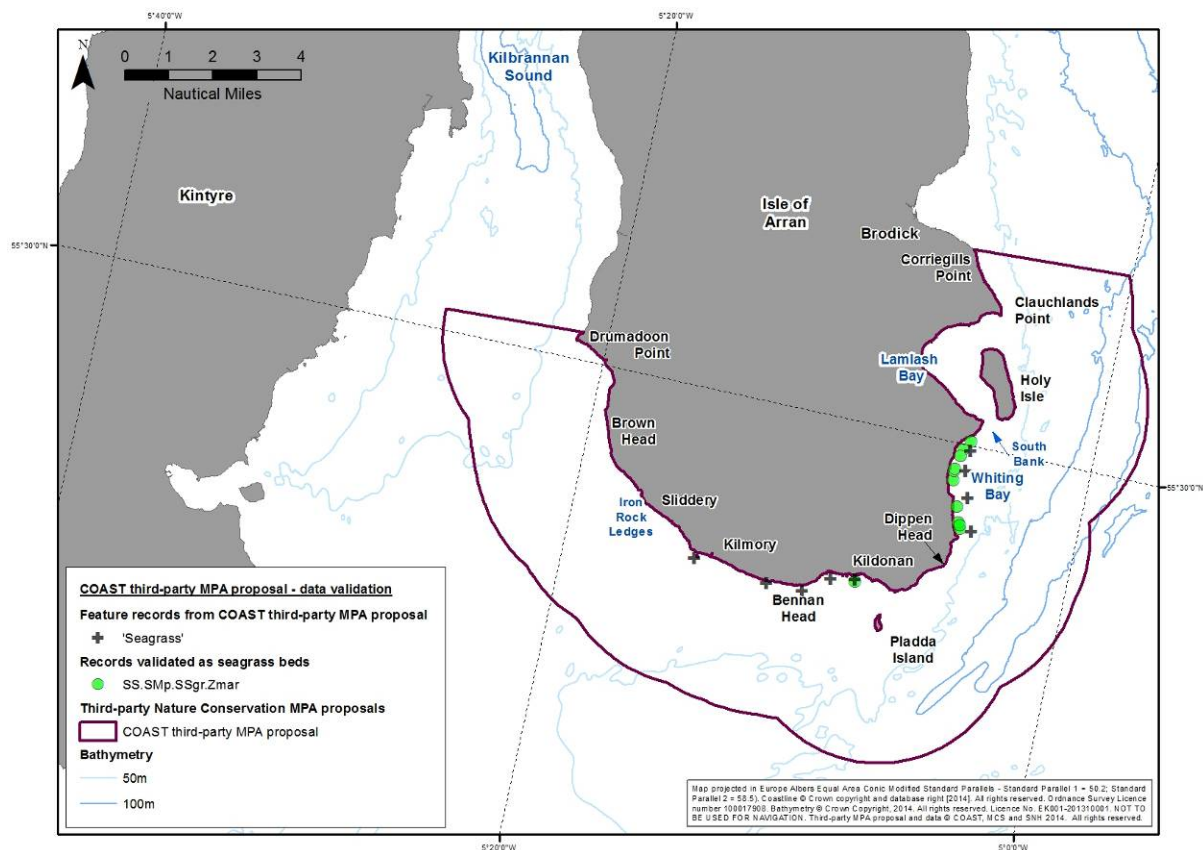


Figure 5. Records of *Zostera marina* seagrass beds identified from COAST and Seasearch data reviewed as part of the data validation exercise. Records of 'seagrass' from the third-party MPA proposal are also shown. A number of the records from the original third-party proposal on the south coast were not validated as part of this study but do reflect the broad distribution of the feature subsequently reported in detail in Binnie *et al.*, 2012 - see Figure 6 overleaf for details.



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Plate 3. A subtidal seagrass bed (*SS.SMp.SSgr.Zmar*) on sandy substrates in Whiting Bay.

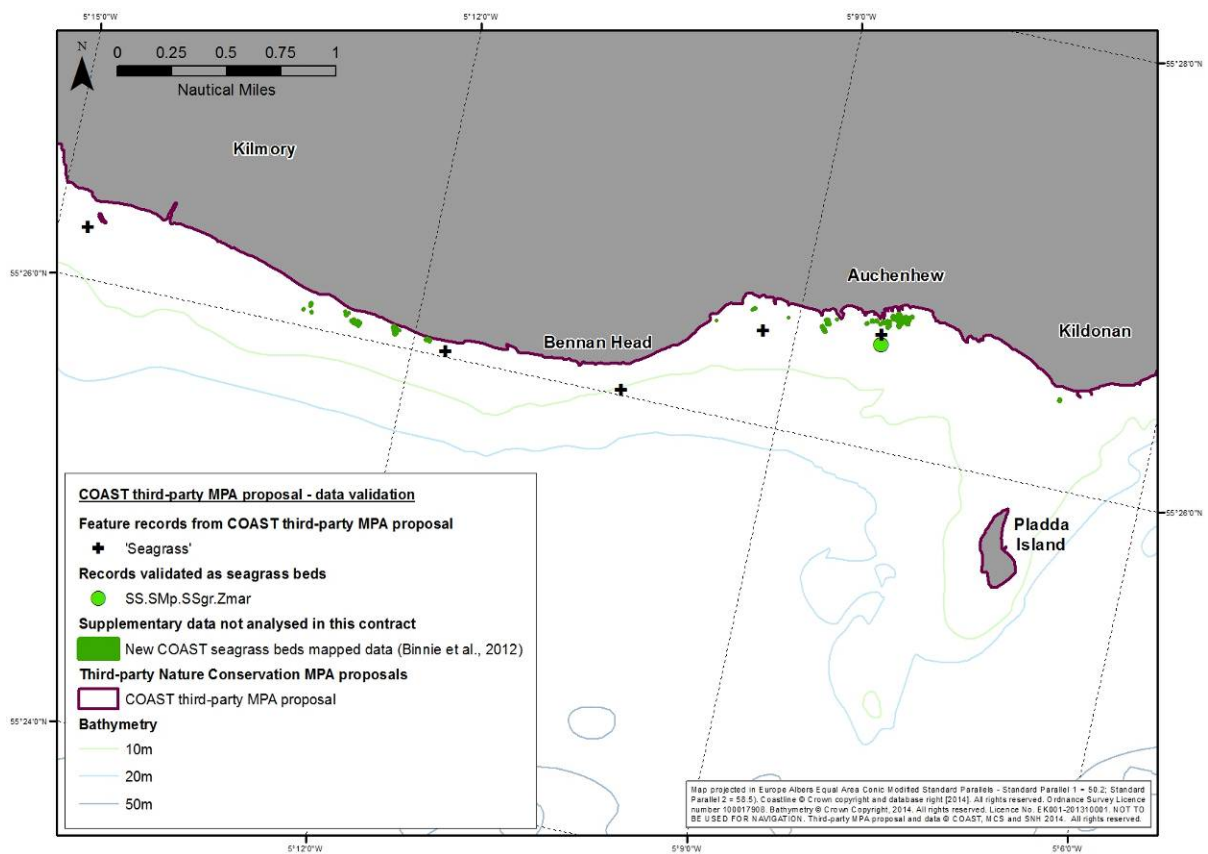


Figure 6. The location of the validated *Zostera marina* seagrass bed record on the south coast of Arran at Kildonan (*SS*) with additional mapped seagrass bed polygon data derived from a subsequent detailed mapping report produced by COAST (Binnie et al., 2012). Indicative data points from the original third-party MPA proposal are also shown.



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Plate 4. A seagrass bed on cobbles (**SS.SMp.SSgr.Zmar**) in the sublittoral fringe at Kildonan on the south coast of Arran.

### 3.4 MPA search feature - Maerl beds

#### 3.4.1 Feature description (from Tyler-Walters et al., 2012)

##### **Maerl beds - SS.SMp.Mrl**

Maerl is an unusual red seaweed with a hard chalky skeleton that grows as small rounded nodules or short branched twig-like shapes. In high abundance, maerl can form loosely interlocking beds through which water is able to circulate, providing the perfect conditions for the development of diverse communities of plants and animals (on, within or under the beds). Red seaweeds, sea firs, sea urchins, brittlestars, starfish, sea anemones and scallops may colonise the surface. Maerl needs light to grow, so living maerl is restricted to the surface of the beds overlying the chalky skeletons of dead maerl. Three maerl species exist in the British Isles and the relative composition of these within a bed, and the proportion of living / dead maerl within and between beds, varies with factors such as salinity and wave exposure. Maerl is extremely slow growing and extensive beds may be over 1,000 years old.

Coarse clean sands and gravels either on the open coast or in tide-swept channels to a depth of about 20 m. Occasional records from muddier sediments e.g. Loch Torridon.

The COAST third-party MPA proposal contained a number of 'maerl bed' records which possibly represented examples of the MPA search feature.

#### 3.4.2 Findings upon analysis of photographic materials and relevant Seasearch forms

- The information provided confirmed the presence of maerl beds in four main areas outside Lamlash Bay: on the South Bank / south of Holy Island; to the north-east of Pladda; off the Iron Rock Ledges on the south-west corner of Arran; and at Drumadoon (Figure 7).
- Figure 7 shows the distribution of the 19 records that have been attributed to the maerl beds MPA search feature (see also Table A2 and Figure A1; Annex A for details).

- On the South Bank the maerl lies between approximately 8 - 14 m and covered approximately 80% of the area of sea bed studied by divers in this zone (Howard Wood pers. comm.). An estimated 5% of the maerl is live although on the basis of the available photographs the percentage of live maerl is higher in some places. The maerl beds records have mainly been assigned to the *Phymatolithon calcareum* dominated **SS.SMp.Mrl.Pcal** biotope although maerl gravel with the burrowing sea cucumber *Neopentadactyla mixta* has also been recorded (**SS.SMp.Mrl.Pcal.Nmix**).
- There is a strong tidal flow of 3 - 5 knots around Pladda and there appears to be an extensive maerl bed here. In places, and particularly between Pladda and Arran, there is almost 100% cover of maerl and maerl gravel, intermixed with cobbles, pebbles and shell material. It is formed into waves with live maerl aggregated in the troughs and much of the maerl takes the form of large, flat medallions.
- Available photographs suggest a diverse algal flora associated with the maerl and tide-swept cobbles in the Pladda area. However, the difficulties of identifying algae from photographs have prevented any real assessment of diversity.
- At Iron Rock Ledges, there is a shallow boulder bank that extends some distance offshore and maerl beds have been found at stations along the edge of this, roughly along the 20 m contour. The full extent of the maerl habitat has not been detailed. The maerl substrates are formed into waves, with twiggy nodules of *P. calcareum* and *Lithothamnion glaciale* maerl species seen. Maerl is mixed with cobbles and boulders in places.

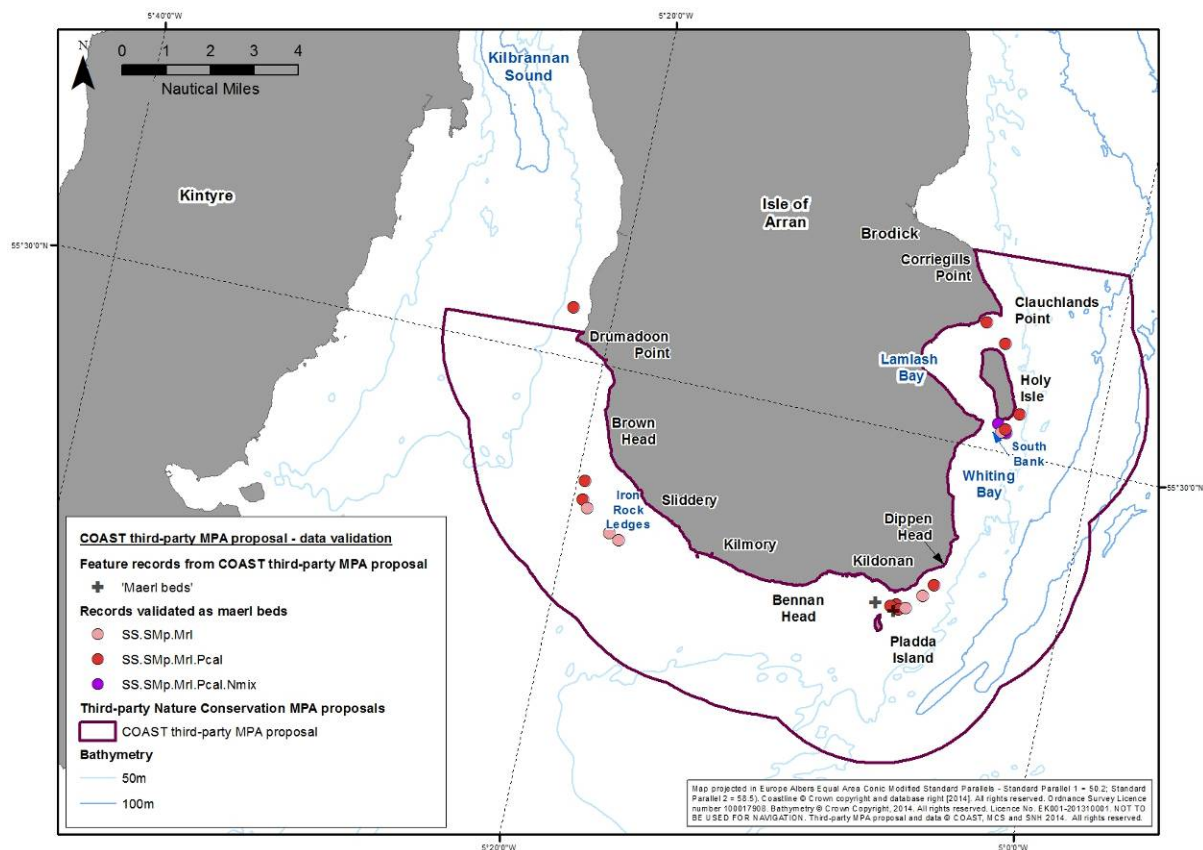


Figure 7. Records of maerl beds validated upon analysis of COAST and Seasearch data. Records of 'maerl beds' from the third-party MPA proposal are also shown.



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*Plate 5. Algae on a maerl bed to the north-east of Pladda.*



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*Plate 6. Medallions of Phymatolithon calcareum maerl amongst cobbles at Kildonan.*



© Angus Robson

*Plate 7. Maerl and maerl gravel waves at Iron Rock Ledges.*

### 3.5 MPA search feature - Maerl or coarse shell gravel with burrowing sea cucumbers

#### 3.5.1 Feature description (from Tyler-Walters et al., 2012)

##### ***Neopentadactyla mixta* in circalittoral shell gravel or coarse sand (SS.SCS.CCS.Nmix)**

Gravel, maerl gravel (dead maerl) or coarse sands with high densities of the gravel sea cucumber, *Neopentadactyla mixta*. Scallops, brittlestars, crabs and dragonets live on the surface of the sediment (some seaweeds may also be present) with widespread species such as tube dwelling sea anemones, sand mason worms and parchment worms living within the coarse substrates. This biotope may occur adjacent to maerl beds. During winter months, gravel sea cucumbers bury deep in the sediment and become dormant.

Found in sublittoral clean, gravel, maerl gravel (dead maerl) and / or coarse sands in moderately wave-exposed, fully saline conditions at 10 - 50 m.

The COAST third-party MPA proposal contained a number of 'maerl with sea cucumbers' records which possibly represented examples of the maerl or coarse shell gravel with burrowing sea cucumbers MPA search feature.

#### 3.5.2 Findings upon analysis of photographic materials and relevant Seasearch forms

- The MPA search feature **SS.SCS.CCS.Nmix** is a circalittoral biotope related to **SS.SMp.Mrl.Pcal.Nmix** (one of the component biotopes of the maerl beds MPA search feature), and these two biotopes typically grade into each other. Some of the records around South Arran of *N. mixta* relate to the maerl biotope **.Pcal.Nmix**, although it is difficult to be precise about the distinction in some areas.
- Shell gravels and large quantities of dead shell containing *N. mixta* representing the **SS.SCS.CCS.Nmix** biotope have been found at Drumadoon on the west coast, to the north of the third-party MPA proposal.
- Figure 8 shows the two records that can be attributed to this MPA search feature. It also shows three records that may be attributable to **SS.SCS.CCS.Nmix**. However, the biotope cannot be assigned with certainty to two of these three records and positional uncertainties preclude the use of the third (HIP1). The three 'uncertain' records cannot therefore be included in the assessment against the MPA Selection Guidelines.
- **SS.SCS.CCS.Nmix** may be more widespread, as coarse shelly sediments, maerl gravel and *Neopentadactyla mixta* are common within the area of the third-party MPA proposal. However, most of the dives which provide the background information are in the infralittoral and there is relatively little information available for the circalittoral zone.
- There was no evidence available to support the presence of **SS.SCS.CCS.Nmix** to the south-east of Arran.

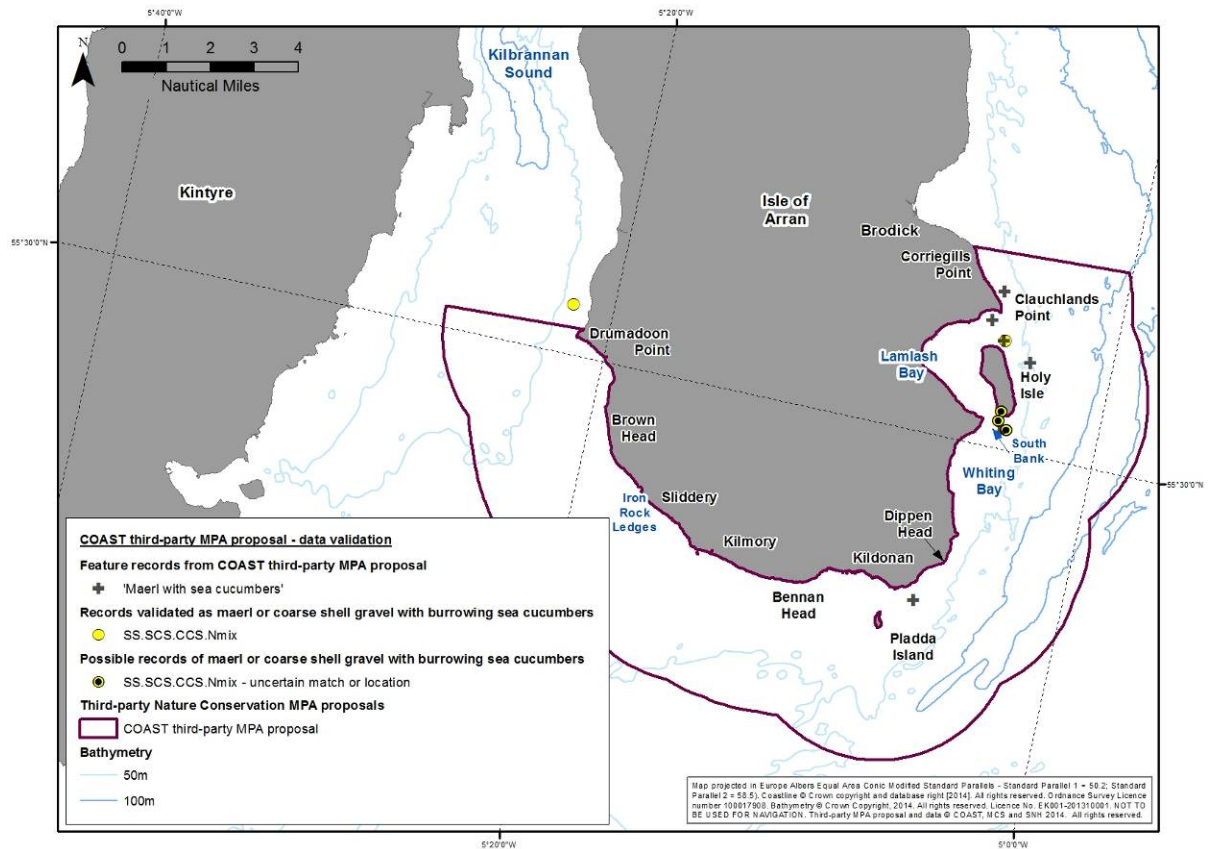


Figure 8. Records of the maerl or coarse shell gravel with burrowing sea cucumbers (**SS.SCS.CCS.Nmix**) MPA search feature identified from COAST and Seasearch data. Records of 'maerl with sea cucumbers' from the original third-party MPA proposal are also shown.



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Plate 8. Maerl or coarse shell gravel with burrowing sea cucumbers (**SS.SCS.CCS.Nmix**) to the south of Holy Isle (image from location HIPP1 - positional uncertainties preclude adoption of this record within the MPA assessment process - see Table A2 for details).

### 3.6 MPA search feature - Shallow tide-swept coarse sands with burrowing bivalves

#### 3.6.1 Feature description (from Tyler-Walters et al., 2012)

***Moerella* spp. with venerid bivalves in infralittoral gravelly sand (SS.SCS.ICS.MoeVen)**

Tide-swept coarse and gravelly sands in the shallow subtidal support an abundance of burrowing bivalves, particularly *Tellina* spp. and polychaete worms. In some areas, this habitat supports surf clams (*Spisula solida*). Suspension feeding bivalves dominate and are abundant in the coarse sediment. Infaunal species also include tanaids (shrimp-like crustaceans) and sand hoppers. The bivalves may be preyed upon by starfish, snails and flatfish. Seaweeds including sugar kelp (*Saccharina latissima*) and *Ulva* spp. may be present on the sediment surface attached to small pebbles and larger shells.

Found in coarse, gravelly infralittoral sand (0 - 20 m) on open coasts and in the mouths of sea lochs, subject to moderately strong tidal water movement.

The COAST third-party MPA proposal contained a number of 'coarse sand with burrowing bivalves' records which possibly represented examples of the shallow tide-swept coarse sands with burrowing bivalves MPA search feature.

#### 3.6.2 Findings upon analysis of photographic materials and relevant Seasearch forms

- From the seabed surface features observed on the available photographs and video (conspicuous bivalve siphons and empty robust bivalve shells), it is possible that the MPA search feature (**SS.SCS.ICS.MoeVen** biotope) is widespread around Pladda and Dippin Head and also present off the south-west of Holy Isle and off the south coast at Kilmory. Coarse mixed gravels, sands and cobbles with large quantities of dead shell are common in tide-swept conditions within the third-party MPA proposal.
- However, this MPA search feature is primarily assigned on the basis of the infaunal community present and in the absence of suitable detailed information on this aspect, the diver observation records cannot be assigned to the component biotope with certainty and should not be used in the assessment against the MPA Selection Guidelines.
- Figure 9 shows the ten records that may represent the MPA search feature. Additional survey work would be required in these locations to confirm whether the MPA search feature is present.

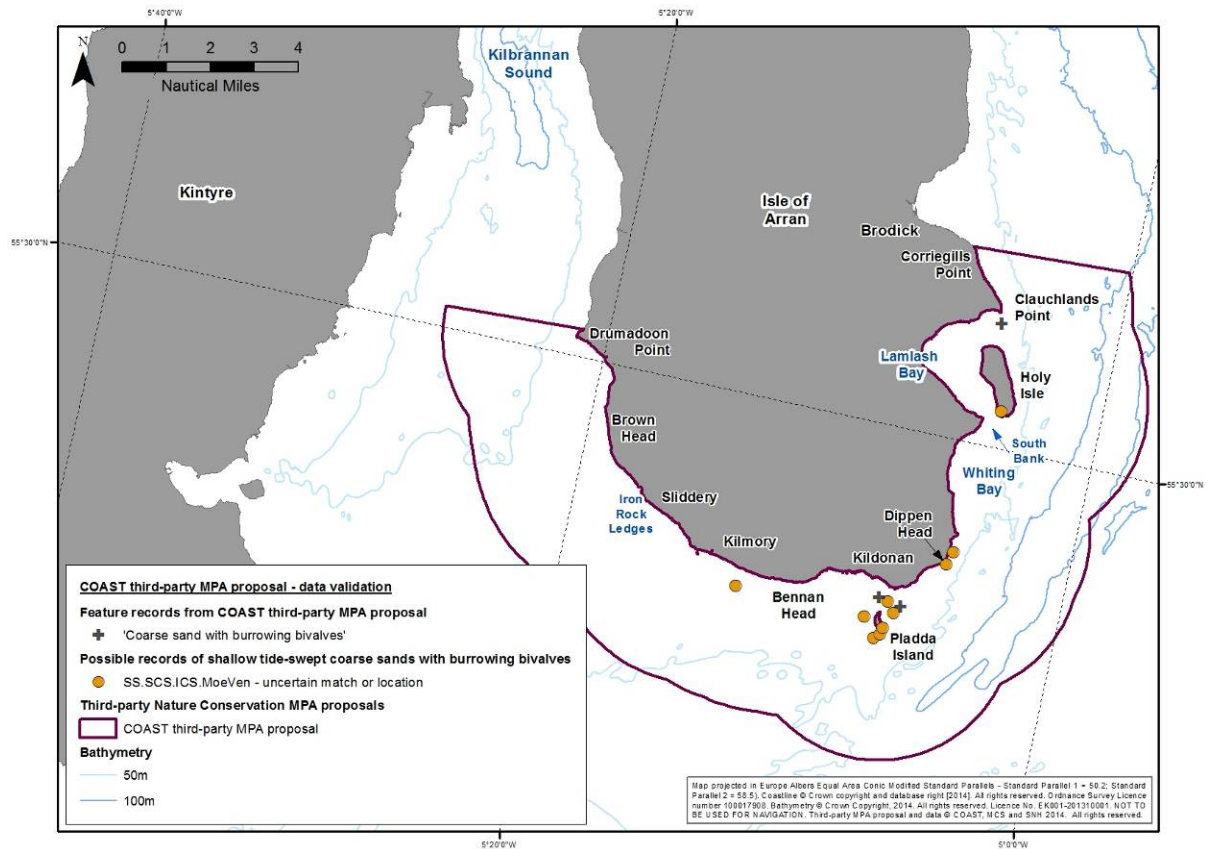


Figure 9. Possible shallow tide-swept coarse sands with burrowing bivalves (SS.SCS.ICS.MoeVen) MPA search feature records identified from data provided by COAST and Seasearch. Records of 'coarse sand with burrowing bivalves' from the original third-party MPA proposal are also shown.



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Plate 9. Bivalve siphons in sand at Dippen Head.

### 3.7 MPA search feature - Horse mussel beds

#### 3.7.1 Feature description (from Tyler-Walters et al., 2012)

**Horse mussel beds (SS.SBR.SMus.ModT; SS.SBR.SMus.ModMx; SS.SBR.SMus.ModHAs; SS.SBR.SMus.ModCvar)**

The horse mussel *Modiolus modiolus* forms scattered clumps, thin layers or dense raised beds several metres in height and length. Raised beds are formed of horse mussels, bound together by a matrix of byssus threads which accumulate a sediment of silt, organically rich faeces and shells, further increasing the bed height. They significantly modify sedimentary habitats and provide hard substratum, refuge and ecological niches for a wide variety of organisms.

Found at depths of 5 - 220 m in weak to strong water movement on a variety of mixed substrata.

The COAST third-party MPA proposal contained a number of records of 'horse mussel beds' which possibly represented examples of the MPA search feature.

#### 3.7.2 Findings upon analysis of photographic materials and relevant Seasearch forms

- As far as it can be ascertained, the records of horse mussels *Modiolus modiolus* from the south-west coast of Lamlash Bay relate to records of individual mussels only.
- No evidence was available to support the presence of horse mussel beds within the area of the third-party MPA proposal.
- Survey work completed in 2010 in Lamlash Bay (Munro et al., 2014) recorded *M. modiolus* juveniles in high numbers but no *Modiolus* beds.

### 3.8 MPA search feature - Northern sea fan and sponge communities

#### 3.8.1 Feature description (from Tyler-Walters et al., 2012)

**Northern sea fan and sponge communities (CR.MCR.EcCr.CarSwi; CR.HCR.XFa.SwiLgAs; CR.HCR.DpSp; and *Swiftia pallida*)**

A diverse habitat characterised by aggregations of the sea fan *Swiftia pallida* and the cup coral *Caryophyllia smithii* (.CarSwi) on upper and vertical surfaces of bedrock and boulders (10 - 50 m). With increasing water depth (35 - 120 m+), and in areas of low tidal flow, erect branching sponges replace sea fans as the most striking component of the habitat (.DpSp). Rock is colonised by sea fans, soft corals (e.g. dead man's fingers) and large sea squirts, with crevices providing shelter for sea cucumbers, squat lobsters and wrasse. In silty conditions (.CarSwi.Aglo) sea fans, cup corals, and red sea fingers abound. As water flow increases (.CarSwi.LgAs) less sponges and sea fans are present but sea fans are still frequent and, as the current increases further (.XFa.SwiLgAs), so does the biodiversity.

Found on circalittoral bedrock and boulders on silty sediment, in extremely wave-exposed to wave sheltered areas and in fully marine conditions at 10 - 120 m+.

The COAST third-party MPA proposal contained a number of records of 'deep sponge communities' which possibly represented component biotopes of the northern sea fan and sponge communities MPA search feature.

#### 3.8.2 Findings upon analysis of photographic materials and relevant Seasearch forms

- No evidence was available to support the proposed presence of the northern sea fan and sponge communities MPA search feature. Records which had been labelled as deep sponge communities related to exposed circalittoral habitats which look intrinsically interesting but do not support the species pertaining to the component MPA search feature biotopes.

### 3.9 MPA search feature - Native oysters

#### 3.9.1 Feature description (from Tyler-Walters et al., 2012)

##### **Native oysters (SS.SMx.IMx.Ost and *Ostrea edulis*)**

This once widespread habitat is comprised of dense beds of the native oyster *Ostrea edulis* (at densities of 5 or more per m<sup>2</sup>). A diverse community of organisms live on, amongst, or in the sediment beneath the bed. Dead oyster shells, which may make up a large proportion of the substratum, support sea squirts, sponges, hydroids and a turf of algae. Large polychaete worms are often present, along with predatory fish, starfish and crabs.

Native oysters are associated with productive estuarine and shallow coastal water habitats on firm mud, muddy sand and muddy gravel with shells and stones. The oyster larvae settle on hard substrates. Sheltered coasts from the intertidal to 5 m and occasionally to 20 m.

The COAST third-party MPA proposal contained records of 'native oysters' which possibly represented examples of the MPA search feature.

#### 3.9.2 Findings upon analysis of evidence provided - Native oysters

- Native oysters *Ostrea edulis* are known from along the south coast of Arran. COAST staff (Howard Wood pers. comm.) referred to a report of at least one collector picking up a large number on one occasion in recent years. The current status of native oyster populations along the south coast of Arran is not known.
- No evidence was available to support the presence of native oysters within the area of the third-party MPA proposal.

### 3.10 MPA search feature - Ocean quahog aggregations

#### 3.10.1 Feature description (from Tyler-Walters et al., 2012)

##### **Ocean quahog aggregations (*Arctica islandica*)**

The ocean quahog is the longest living mollusc and may live for over 400 years. It is a large, slow growing clam, oval or circular in shape, reaching 11 - 13 cm in length. The outer layer of the shell is thick, glossy and brown, greenish brown or black in colour. Parts of the outer layer may be worn away to reveal a white, pale brown to yellow shell.

Found in the subtidal, burrowing 6 cm down into sandy and muddy sediment. It is most often found between depths of 10 - 280 m, although may be found as deep as 480 m.

The COAST third-party MPA proposal contained records of 'ocean quahogs' which possibly represented examples of the ocean quahog aggregations MPA search feature.

#### 3.10.2 Findings upon analysis of evidence provided - ocean quahog aggregations

- Individual records of the ocean quahog *Arctica islandica* exist within the area of the third-party MPA proposal, including photographs of fresh dead shells on the sediment surface. However, evidence to support the presence of aggregations of the species was not available.

## 4. CONCLUSIONS

On the basis of the evidence reviewed, additional records of the following five MPA search features were validated within the area of the third-party MPA proposal:

- Kelp and seaweed communities on sublittoral sediment (**SS.SMp.KSwSS**)
- Maerl beds (**SS.SMp.Mrl**)
- Maerl or coarse shell gravel with burrowing sea cucumbers (**SS.SCS.CCS.Nmix**)
- Seagrass beds (**SS.SMp.SSgr.Zmar**)
- Tide-swept algal communities (**IR.HIR.KSed.XKHal**)

Table A2 (Annex A) outlines the validated records considered suitable for inclusion within the detailed assessment against the MPA Selection Guidelines. Four of the MPA search feature categories (excluding tide-swept algal communities from the above list) are protected features of the South Arran Nature Conservation MPA.

The shallow tide-swept coarse sands with burrowing bivalves (**SS.SCS.ICS.MoeVen**) MPA search feature may be present outwith existing confirmed records in Lamlash Bay. Native oysters may also be present along the south coast of Arran. Further work is required to validate the presence of these features.

No evidence was available to support the presence of horse mussel beds, ocean quahog aggregations, or component biotopes of the northern sea fan and sponge communities MPA search feature.

### 4.1 Recommendations for future survey work

There are a number of possibilities for additional survey work to fill gaps in the existing information-base on MPA search features within the area of the third-party MPA proposal:

- A video survey within Whiting Bay to map the *Zostera marina* seagrass beds and to establish the distribution of the kelp and seaweed communities on sublittoral sediments feature in this area.
- Survey work to establish the status of the native oyster *Ostrea edulis*. This is likely to involve intertidal and nearshore snorkelling work and may be suitable for a Seasearch-style survey.
- Exploration of the inshore area to the west of Pladda which may support maerl beds and areas of tide-swept algal communities.
- The maerl records from Drumadoon south to Iron Rock Ledges are currently no more than a series of discrete point samples. Remote video with supplementary grab or diver sampling could establish the wider distribution and extent of the maerl beds, providing detailed information on the quality of the beds and the range of biotopes present.
- Infaunal sampling of some of the gravel areas to confirm the biotopes present and any presence of the shallow tide-swept coarse sands with burrowing bivalves (**SS.SCS.ICS.MoeVen**) MPA search feature should also be considered.

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**ANNEX A: COAST AND SEASEARCH DATA REVIEWED AS PART OF THIS PROJECT**

*Table A1. Summary of the broad geographical locations around Arran referred to in Table A2 and their associated abbreviation(s). The codes are used in Figure A1 (overleaf).*

<b>Broad location</b>	<b>Associated abbreviation</b>
Black Cave	BC
Brown Head	BH
Black Rocks	BR
Cleats Shore	CL
Dippen Head	DH
Drumadoon	DD
Iron Rock Ledges	IRL
Kildonan Castle	KC
Lenamhor	LM
No take zone	NTZ
Pladda East	PE
Pladda West	PW
Pladda Reef	PR
Pladda South	PS
Porta Leacach	PL
Powerpole (Holy Isle)	HIPP
South Bank (Holy Isle)	SB
Viking Fort	VF
Whiting Bay	SG, SS (also off Kildonan), WB

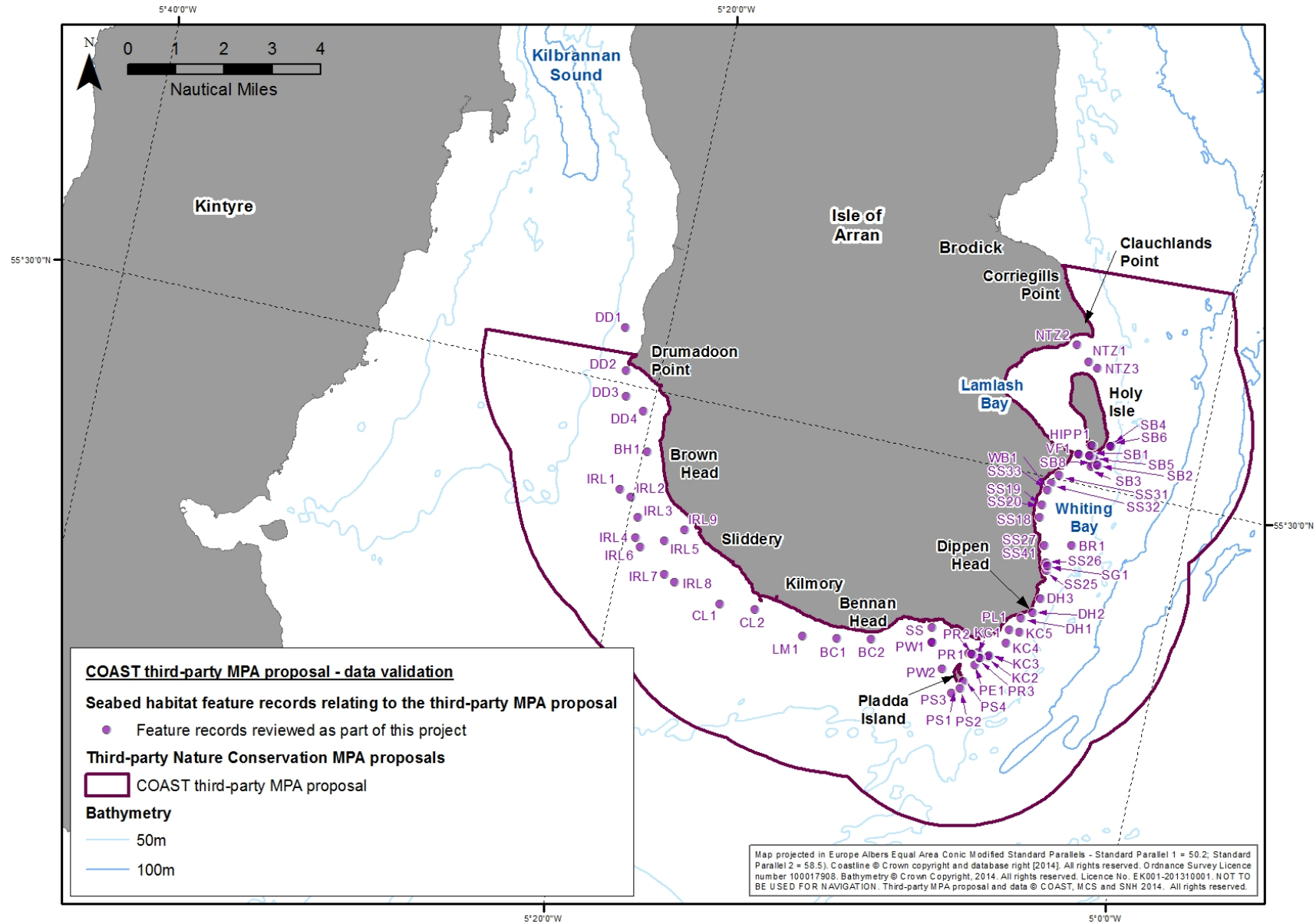


Figure A1. Locations of COAST and Seasearch data reviewed as part of this project and referred to in Table A2. Location abbreviation codes as per Table A1.

Table A2. COAST / Seasearch diving records reviewed as part of this project to inform the validation of MPA search feature status for appropriate seabed habitat records within the South Arran third-party MPA proposal.

As outlined in Sections 4 and 4.1, records assigned to the **SS.SCS.ICS.MoeVen** biotope (the 'shallow tide-swept coarse sands with burrowing bivalves' MPA search feature) require additional infaunal sampling to confirm presence of the feature and are therefore not recommended for use in the MPA process. Only those entries marked with a \* (39 rows in the table below that are coloured with a green fill) are recommended by this project for inclusion within the detailed assessment against the MPA Selection Guidelines [restricted to the MPA search features that have subsequently been adopted as Protected Feature (PF) categories of the South Arran MPA]. A further review of the South Arran MPA evidence-base (Moore, 2014) was undertaken following the 2013 MPA consultation. That study recommended further refinements to a small number of the biotope assignments outlined below and the conclusions of that work were subsequently adopted wrt: the incorporation of PF records within the Geodatabase of Marine features in Scotland (GeMS) and the finalisation of the accompanying MPA site designation documentation.

Location	Date of Record	Surveyor(s)	Record type	Evidence-base (photos, video, Seasearch form)	Biotope assigned by reviewer	Is biotope an MPA search feature?	Confidence in biotope assignment	Suitable for use in MPA assessment and a PF?
BC1	24/06/2011	Howard Wood, Tim Cross	Seasearch survey, Photographs	31 Photos: P624005 - P6240035. 1 Seasearch form	No Determination	No	-	N/A
BC2	24/06/2011	Claire Youdale, Leigh Howarth	Seasearch survey, Photographs	22 photos: DPP_0079 - DPP_0143. 1 Seasearch form	No Determination	No	-	N/A
BH1	12/07/2012	Angus Robson	Photographs	38 photos: DSC_0100 - DSC_0133	IR.HIR.KSed.XKScrR	No	-	N/A
BR1	23/06/2007	Howard Wood	Photographs	21 photos: P6230018 - P6230066	No Determination	No	-	N/A
CL1	09/08/2012	Howard Wood	Photographs	24 photos: P7090005 - P7090030	No Determination	No	-	N/A
CL2	30/08/2010	Howard Wood	Seasearch survey, Photographs	45 photos: P8300052 - 084 incl. 12 labelled Cleat Dyke / SS Cleat. 1 Seasearch form	IR.HIR.KSed.XKScrR	No	-	N/A
*DD1	21/05/2012	Howard Wood	Photographs	25 photos: P521004 - 5210028 plus 3 surface views	SS.SMp.Mrl.Pcal	Yes	Probable	Yes
*DD1	21/05/2012	Howard Wood	Photographs	25 photos: P521004 - 5210028 plus 3 surface views	SS.SCS.CCS.Nmix	Yes	Certain	Yes
DD2	21/05/2012	Angus Robson	Photograph	1 photo: DSC_0068	No Determination	No	-	N/A

Location	Date of Record	Surveyor(s)	Record type	Evidence-base (photos, video, Seasearch form)	Biotope assigned by reviewer	Is biotope an MPA search feature?	Confidence in biotope assignment	Suitable for use in MPA assessment and a PF?
DD3	12/07/2012	Howard Wood	Photographs, Video	14 Photos: IMG_0313 - 0326; 1 video clip: MV1_0327	IR.HIR.KSed.XKScrR	No	-	N/A
DD4	21/05/2012	Howard Wood	Photographs	30 photos: P5210029 to 058	IR.HIR.KSed.XKScrR	No	-	N/A
DH1	19/07/2012	Angus Robson	Photographs	12 photos: DSC0044 - 0055	IR.HIR.KSed.XKHal	Yes	Probable	No (not a PF)
DH2	17/06/2012	Howard Wood, Claire Youdale	Seasearch survey, Photographs	48 photos: P6170087 - 0137. 1 Seasearch form	SS.SCS.ICS.MoeVen	Yes	Probable	No (infaunal info. req <sup>d</sup> )
DH3	19/07/2012	Howard Wood	Photographs, Video	14 photos: IMG_0368 - 0381; 2 video clips: MVBI_0366, 0367	SS.SCS.ICS.MoeVen	Yes	Probable	No (infaunal info. req <sup>d</sup> )
HIPP1	16/05/2005		Photographs	26 photos: P5160053 - 0078	SS.SCS.CCS.Nmix	Yes	Certain	No (cite but cannot use in MPA process - positional issues)
HIPP1	16/05/2005		Photographs	26 photos: P5160053 - 0078	SS.SCS.ICS.MoeVen	Yes	Probable	No (infaunal info. req <sup>d</sup> ; positional issues also apply)
IRL1	12/07/2012	Howard Wood	Photographs, Video	12 photos: IMG_0300 - 0311; 1 video clip: MV1_0312	No Determination	No	-	N/A
IRL2	12/07/2012	Angus Robson	Photographs	40 photos: DSC_0063 - 0099	No Determination	No	-	N/A
*IRL3	12/07/2012	Howard Wood	Photographs, Video	8 photos: IMG_0291 - 0298; 1 video clip: MV1_0299	SS.SMp.Mrl.Pcal	Yes	Certain	Yes
*IRL4	12/07/2012	Angus Robson	Photographs	14 photos: DSC_0045 - 58	SS.SMp.Mrl.Pcal	Yes	Certain	Yes
IRL5	30/08/2010	Howard Wood	Seasearch survey, Photographs	51 photos: P8300001 - 0051. 1 Seasearch form	IR.HIR.KSed.XKScrR	No	-	N/A
*IRL6	01/07/2012	Calum Duncan, Tom Kerr	Seasearch survey, Photographs	3 photos: 120701_maerl02[-04]_SWArran. 2 Seasearch forms	SS.SMp.Mrl	Yes	Certain	Yes
*IRL7	01/07/2012	Jo Porter, Mike Winson, Sally Rouse	Seasearch survey, Photographs	24 photos: DSC_8604 - 8629. 1 Seasearch form	SS.SMp.Mrl	Yes	Certain	Yes
*IRL8	01/07/2012	Nicola Faulks, Paula Lightfoot	Seasearch survey, Photographs	2 photos: MDSCF_2856, 2857. 1 Seasearch form	SS.SMp.Mrl	Yes	Certain	Yes
IRL9	21/05/2012	Howard Wood	Photographs	17 photos: P5210059 - 075	IR.HIR.KFaR.FoR	No	Uncertain	N/A
*KC1	19/07/2012	Angus Robson	Photographs	35 photos: DSC_0111 - 431	SS.SMp.Mrl.Pcal	Yes	Certain	Yes

Location	Date of Record	Surveyor(s)	Record type	Evidence-base (photos, video, Seasearch form)	Biotope assigned by reviewer	Is biotope an MPA search feature?	Confidence in biotope assignment	Suitable for use in MPA assessment and a PF?
*KC2	18/06/2011	Howard Wood, Tim Cross	Seasearch survey, Photographs	21 photos: P618001 - 19. 1 Seasearch form	SS.SMp.Mrl	Yes	Certain	Yes
KC3	01/01/2010	Howard Wood, Leigh Howarth	Verbal report from HW	None	SS.SMp.Mrl.Pcal	Yes	Certain	No (verbal report only - insufficient evidence)
*KC4	18/06/2011	Claire Youdale, Leigh Howarth	Seasearch survey, Photographs	4 photos: IMG_0076, 113, 117, 120. 1 Seasearch form	SS.SMp.Mrl	Yes	Certain	Yes
*KC5	19/07/2012	Howard Wood	Photographs, Video	12 photos: IMG_0354 - 0365; 1 video clip; MVI_0353	SS.SMp.Mrl.Pcal	Yes	Certain	Yes
LM1	07/08/2012	Howard Wood	Photographs, Video	25 photos: IMG_0565 - 0590; 2 video clips; MVI_05642, 05643	SS.SCS.ICS.MoeVen	Yes	Probable	No (infaunal info. req <sup>d</sup> )
NTZ1	30/06/2012	Jo Porter	Seasearch survey, Photographs	36 photos: DSC_8541 - 8576. 1 Seasearch form	SS.SMx.CMx.ClloMx.Nem	No	Probable	N/A
NTZ1	30/06/2012	Jo Porter	Seasearch survey, Photographs	36 photos: DSC_8541 - 8576. 1 Seasearch form	IR.HIR.KFaR.FoR	No	Probable	N/A
*NTZ2	24/07/2008	Howard Wood	Photographs	29 photos: P7240030 - P7240058	SS.SMp.Mrl.Pcal	Yes	Certain	Yes
*NTZ3	24/07/2008	Howard Wood	Photographs	28 photos: P724001 - P7240029	SS.SCS.CCS.Nmix	Yes	Certain	Yes
*NTZ3	24/07/2008	Howard Wood	Photographs	28 photos: P724001 - P7240029	SS.SMp.Mrl.Pcal	Yes	Certain	Yes
PE1	24/07/2012	Howard Wood, Gavin Cameron	Photographs	2 photos: IMG_0423, 0424; 1 video clip: MVI_0422	SS.SCS.ICS.MoeVen	Yes	Probable	No (infaunal info. req <sup>d</sup> )
PL1	01/07/2005	Howard Wood	Photographs	32 photos: P4300023 - P7010032	No Determination	No	-	N/A
PR1	19/07/2012	Howard Wood	Photographs, Video	21 photos: IMG_0333 - 0352; 1 video clip: MVI_0332	SS.SCS.ICS.MoeVen	Yes	Probable	No (infaunal info. req <sup>d</sup> )
PR1	19/07/2012	Howard Wood	Photographs, Video	21 photos: IMG_0333 - 0352; 1 video clip: MVI_0332	IR.HIR.KSed.XKScrR	No	-	N/A

Location	Date of Record	Surveyor(s)	Record type	Evidence-base (photos, video, Seasearch form)	Biotope assigned by reviewer	Is biotope an MPA search feature?	Confidence in biotope assignment	Suitable for use in MPA assessment and a PF?
*PR2	24/07/2012	Howard Wood	Photographs, Video	15 photos: IMG_0425 - 0441; 2 video clips: MVI_0433, MVI_0437	SS.SMp.Mrl.Pcal	Yes	Certain	Yes
PR2	24/07/2012	Howard Wood	Photographs, Video	15 photos: IMG_0425 - 0441; 2 video clips: MVI_0433, MVI_0437	IR.HIR.KSed.XKScrR	No	-	N/A
*PR3	24/07/2012	Angus Robson	Photographs	131 photos: DSC_0030 - 0811	SS.SMp.Mrl.Pcal	Yes	Certain	Yes
PR3	24/07/2012	Angus Robson	Photographs	131 photos: DSC_0030 - 0811	IR.HIR.Ksed.XKHal	Yes	Probable	No (not a PF)
PS1	24/07/2012	Howard Wood	Photographs, Video	47 photos: IMG_0383 - IMG_0421; P7240011 - P7240018; 1 video clip: MVI_0382	SS.SCS.ICS.MoeVen	Yes	Possible	No (infaunal info. req <sup>d</sup> )
PS2	24/07/2012	Angus Robson	Photographs	29 Photos: DSC_0002 - DSC_0028	SS.SCS.ICS.MoeVen	Yes	Possible	No (infaunal info. req <sup>d</sup> )
PS2	24/07/2012	Angus Robson	Photographs	29 Photos: DSC_0002 - DSC_0028	CR.HCR.Xfa.SpNemAdia	No	-	N/A
PS3	07/08/2012	Angus Robson	Missing	None	No Determination	No	-	N/A
PS4	17/06/2012	Claire Youdale	Seasearch survey, Photographs	54 photos: P6170032 - P6170085. 1 Seasearch form.	SS.SCS.ICS.MoeVen	Yes	Possible	No (infaunal info. req <sup>d</sup> )
*PW1	24/06/2011	Howard Wood, Tim Cross	Seasearch survey, Photographs	34 photos: DPP_001, 06, 08, 10 - 13, 20, 22 - 25, 27, 31, 32, 34, 35, 38, 41, 43 - 47, 49, 51 - 53, 57, 59, 63, 66, 72, 75. 1 Seasearch form	SS.SMp.KSwSS.LsacR	Yes	Certain	Yes
PW1	24/06/2011	Howard Wood, Tim Cross	Seasearch survey, Photographs	34 photos: DPP_001, 06, 08, 10 - 13, 20, 22 - 25, 27, 31, 32, 34, 35, 38, 41, 43 - 47, 49, 51 - 53, 57, 59, 63, 66, 72, 75. 1 Seasearch form	IR.HIR.KSed.XKScrR	No	Certain	N/A
PW2	09/07/2012	Howard Wood	Photographs	26 photos: P7090031 - 056	SS.SCS.ICS.MoeVen	Yes	Probable	No (infaunal info. req <sup>d</sup> )
*SB1	24/04/2012	Howard Wood	Photograph, Video	1 photo: IMG_0127.tif; 4 video clips: MVI_0119 - 0122	SS.SMp.Mrl.Pcal.Nmix	Yes	Certain	Yes

Location	Date of Record	Surveyor(s)	Record type	Evidence-base (photos, video, Seasearch form)	Biotope assigned by reviewer	Is biotope an MPA search feature?	Confidence in biotope assignment	Suitable for use in MPA assessment and a PF?
SB1	24/04/2012	Howard Wood	Photograph, Video	1 photo: IMG_0127.tif; 4 video clips: MVI_0119 - 0122	SS.SCS.CCS.Nmix	Yes	Probable	No (.Pcal.Nmix selected - see above - not clear cut)
*SB2	25/07/2012	Howard Wood	Photographs, Video	34 photos: IMG_0449 - 0485; 3 video clips: MVI_0464, 0476, 0482	SS.SMp.Mrl.Pcal.Nmix	Yes	Certain	Yes
SB2	25/07/2012	Howard Wood	Photographs, Video	34 photos: IMG_0449 - 0485; 3 video clips: MVI_0464, 0476, 0482	SS.SCS.CCS.Nmix	Yes	Probable	No (.Pcal.Nmix selected - see above - not clear cut)
SB3	15/05/2010	Howard Wood	Photographs	12 Photos: P5150081 - 093	No Determination	No	-	N/A
*SB4	03/09/2010	Howard Wood	Photographs	55 photos: P9030001 - 055	SS.SMp.Mrl.Pcal	Yes	Certain	Yes
*SB5	30/06/2012	Nic Faulks, Paula Lightfoot	Seasearch survey	1 Seasearch form	SS.SMp.KSwSS.LsacR.Gv	Yes	Certain	Yes
*SB6	30/06/2012	Calum Duncan, Tom Kerr	Seasearch survey	1 Seasearch form	SS.SMp.KSwSS.LsacR	Yes	Probable	Yes
SB6	30/06/2012	Calum Duncan, Tom Kerr	Seasearch survey	1 Seasearch form	SS.SMx.CMx.ClloMx	No	Uncertain	N/A
*SB8	30/06/2012	Jo Porter	Seasearch survey, Photographs	18 photos: DSC_8578 - 8603. 1 Seasearch form	SS.SMp.Mrl	Yes	Probable	Yes
*SB9	21/06/2005	Howard Wood	Photographs	48 photos: P6210077 - P6210128	SS.SMp.Mrl.Pcal	Yes	Probable	Yes
*SG1	01/07/2012	S.Rouse, J.Porter, M.Winson	Seasearch survey, Photographs	28 photos: DSC_8630 - DSC_8660. 1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*SS	14/05/2005	Howard Wood	Seasearch survey, Photographs	46 photos P514001 - P5140052. 1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
SS	14/05/2005	Howard Wood	Seasearch survey, Photographs	46 photos P514001 - P5140052. 1 Seasearch form	IR.HIR.Ksed.XKHal	Yes	Certain	No (not a PF)
*SS18	26/08/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*SS19	24/04/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*SS20	24/04/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*SS25	30/05/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*SS26	30/05/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes

Location	Date of Record	Surveyor(s)	Record type	Evidence-base (photos, video, Seasearch form)	Biotope assigned by reviewer	Is biotope an MPA search feature?	Confidence in biotope assignment	Suitable for use in MPA assessment and a PF?
*SS27	30/05/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*SS31	13/06/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*SS32	13/06/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*SS33	13/06/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*SS41	28/08/2004	Howard Wood	Seasearch survey	1 Seasearch form	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*VF1	01/07/2012	Paula Lightfoot	Seasearch survey	1 Seasearch form	SS.SMp.KSwSS.LsacCho	Yes	Probable	Yes
VF1	01/07/2012	Paula Lightfoot	Seasearch survey	1 Seasearch form	SS.SMx.CMx.CiloMx.Nem	No	Uncertain	N/A
*WB1	11/10/2009	Howard Wood	Photographs	74 photos: PA110233 - PA110311	SS.SMp.SSgr.Zmar	Yes	Certain	Yes
*WB1	11/10/2009	Howard Wood	Photographs	74 photos: PA110233 - PA110311	SS.SMP.KSwSS.LsacR.Sa	Yes	Certain	Yes

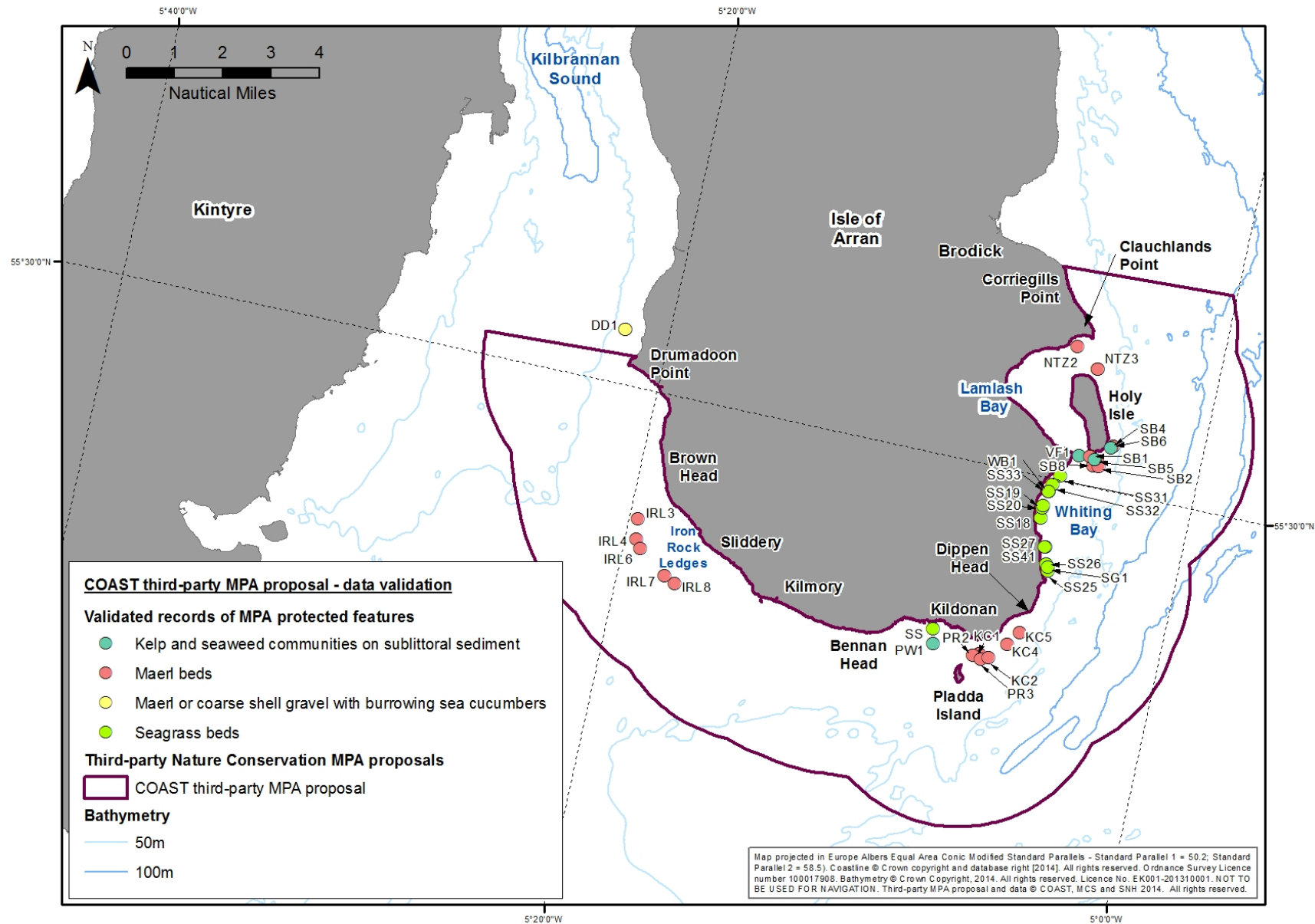


Figure A2. Validated records of protected features of the South Arran MPA recommended by this project for inclusion within the MPA assessment process (green rows from Table A2).

**ANNEX B: THE EVIDENCE-BASE BEHIND RECORDS OF PROTECTED FEATURES OF THE SOUTH ARRAN NATURE CONSERVATION MPA VALIDATED AND RECOMMENDED BY THIS STUDY FOR INCLUSION WITHIN THE MPA ASSESSMENT PROCESS**

The images on the following pages are provided courtesy of COAST and Seasearch surveyors and all copyright remains with original photographers.

Codes are used to denote the following protected features (PFs) -

KS = Kelp and seaweed communities on sublittoral sediment

MB = Maerl beds

MC = Maerl or coarse shell gravel with burrowing sea cucumbers

SG = Seagrass beds

**Survey location - DD1**

**PFs:** MC                      **Biotoxes:** SS.SCS.CCS.Nmix  
MB                              SS.SMp.Mrl.Pcal

**Evidence:**      Images: 25 (+3 surface) Video: no      Seasearch form: no

**Example images showing PFs**

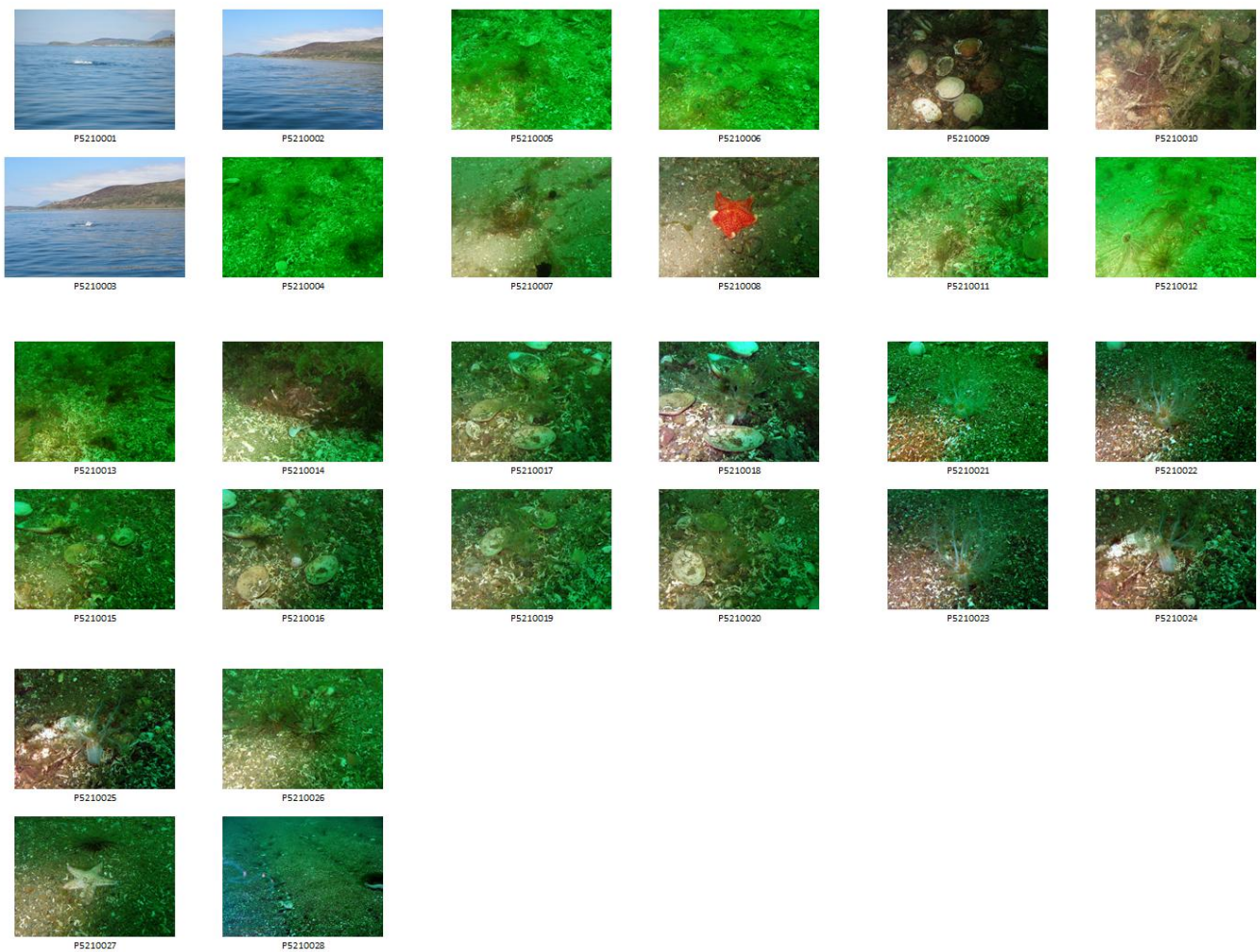


DD1:P5210021 - MC



P5210013.jpg - MB

**All images for survey location - DD1**



**Survey location - IRL3**

PF: MB                      Biotope: SS.SMp.Mrl.Pcal

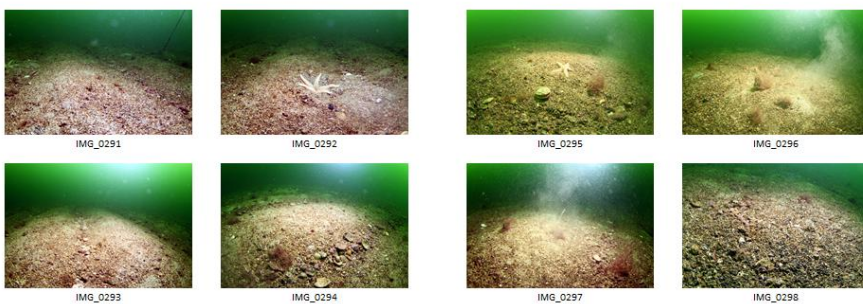
Evidence:      Images: 8      Video: yes      Seasearch form: no

**Example image showing PF**



IRL3: IMG\_0298.jpg - MB

**All images for survey location - IRL3**

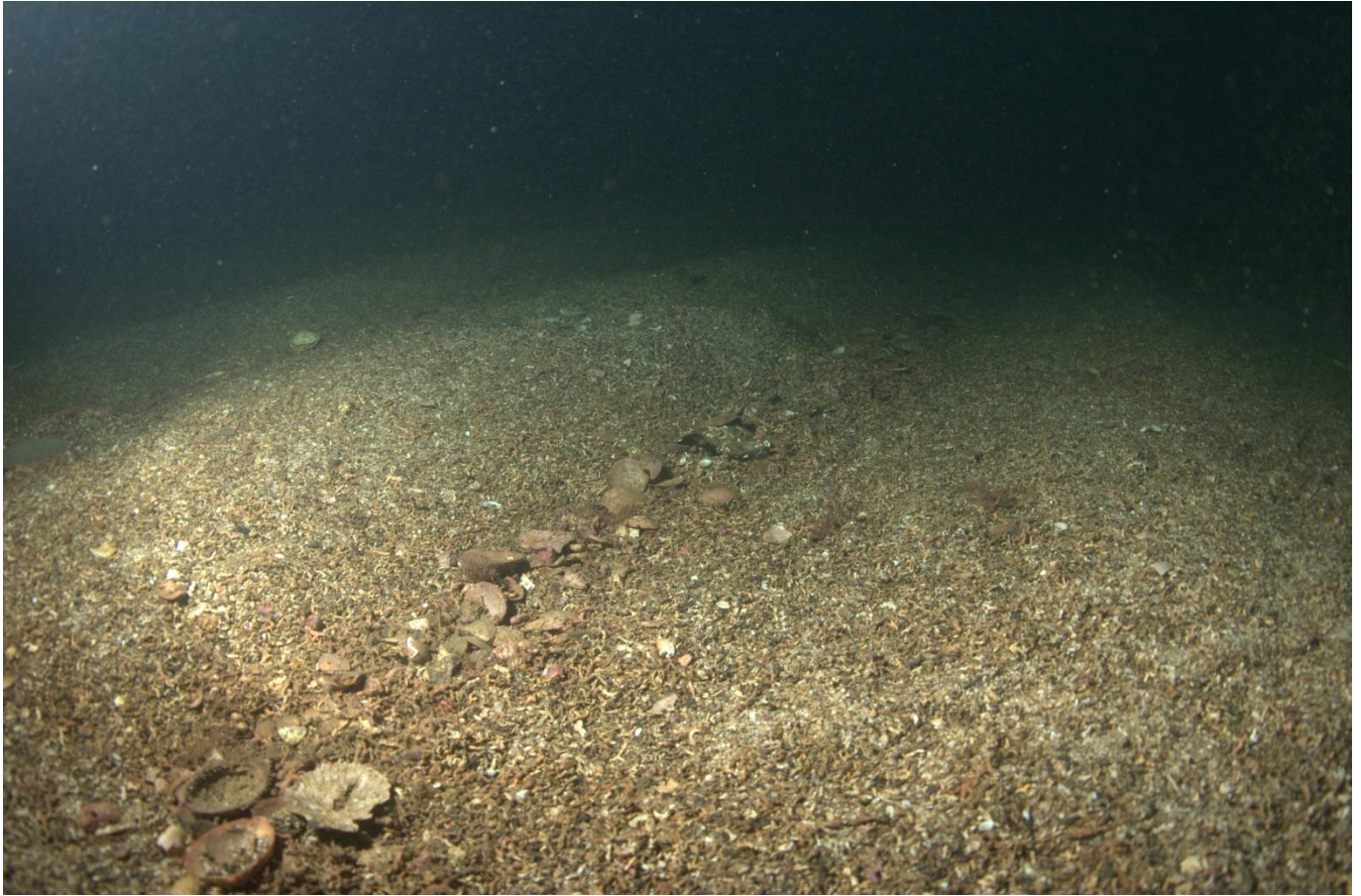


## Survey location - IRL4

PF: MB                      Biotope:                      SS.SMp.Mrl.Pcal

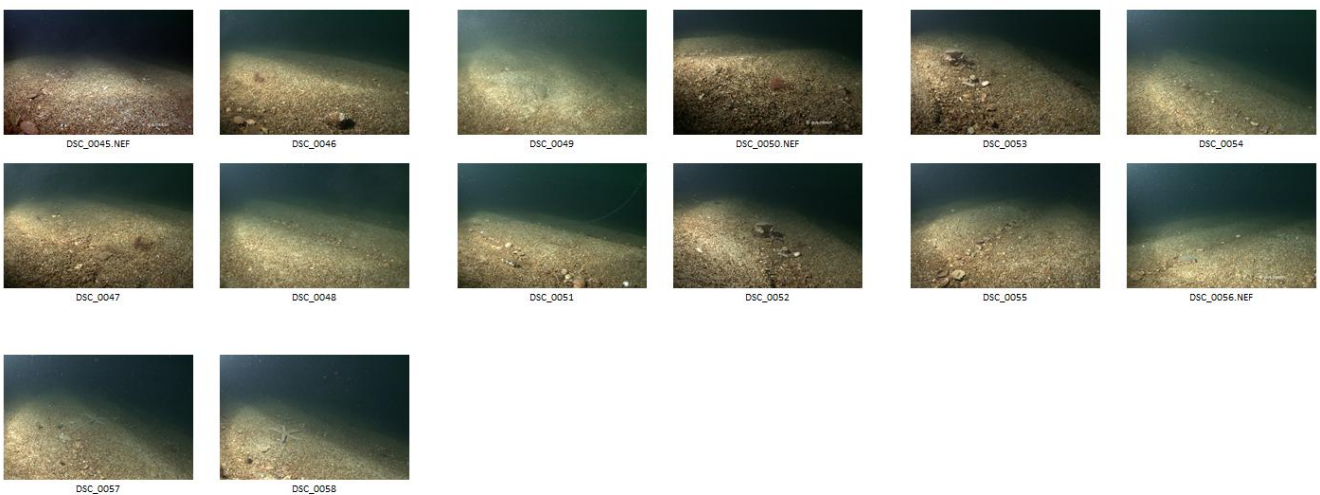
Evidence:              Images: 14              Video: no              Seasearch form: no

### Example image showing PF



IRL4: DSC\_0055.jpg

### All images for survey location - IRL4

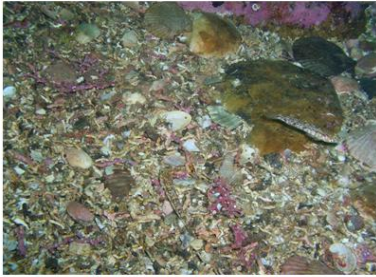


**Survey location - IRL6**

PF: MB                      Biotope: SS.SMp.Mrl

Evidence: Images: 3            Video: no            Seasearch form: yes (x2)

**All images for survey location - IRL6**



120701\_maerl02\_swArran\_CalumDuncanMCS



120701\_maerl03\_swArran\_CalumDuncanMCS



120701\_maerl04\_swArran\_CalumDuncanMCS

**Seasearch form 1 for IRL6**

**Dive/Site details**

Site name <b>IRON ROCK LEDGES</b>					Date of dive: <b>01 dd / 07 mm / 12 yy</b>	
General location <b>SW CORNER OF ARRAN (HISTORIC HERRING SPAWNING GROUNDS), ISLE OF ARRAN, CLYDE</b>					Start of dive: <b>10 : 15</b> (24hr)	
					Dive duration: <b>36 40</b> (mins)	
					Sea temperature: <b>10</b> °C	
Position (degrees and decimal minutes – state if in any other format)					Underwater visibility: <b>10</b> m	
	Latitude		Longitude		W or E	Drift dive? <b>yes / no</b>
Centre of site	<b>55° 26.764</b>	<b>05° 19.464</b>	<b>W</b>			Night dive? <b>yes / no</b>
For drift dives					Did you or your buddy take any of the following?	
From	0	0			photographs	<b>yes / no</b>
To	0	0			video footage	<b>yes / no</b>
Or OS Grid Reference					specimens	<b>yes / no</b>
Position derived from: (circle) <b>GPS</b> Chart OS map Web mapping <b>WGS84</b> OSGB36					seaweeds for pressing	<b>yes / no</b>
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input checked="" type="checkbox"/>					For the area surveyed, what was	
mod exposed <input type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>					the shallowest depth? (m) <b>18.6</b> bsl <input type="checkbox"/> bcd	
Max tidal stream:					the deepest depth? (m) <b>19.5</b> bsl <input type="checkbox"/> bcd	
>6kt <input type="checkbox"/> 3-6kt <input type="checkbox"/> 1-3kt <input type="checkbox"/> <1kt <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>					Tidal correction to chart datum <input type="checkbox"/> m*	

**Seabed summary**

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

a. **SCATTERED BOULDERS WITH RED ALGAE AND HYDROIDS BLENDING TO LARGE WAVES OF MAERL GRAVEL (~5% LIVE)**

b. **MAERL (~5% LIVE)**

c. **LARGE AMOUNT OF WHOLE AND BROKEN SHELL IN FURROWS, POSSIBLE DREDGE DETRITUS.**

### Habitat descriptions

Complete a box below for each **habitat** you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

#### 1. DESCRIPTION (physical + community)

SCATTERED BOULDERS WITH RED ALGAE AND HYDROIDS (N. row, N. out AND Sertularia) AMONG SCATTERED OF PEBBLES AND GRAVEL

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

#### 2. DESCRIPTION (physical + community)

WAVES OF MAERL (5% LIVE) RUNNING WEST TO EAST (ALONG THE RIDGES i.e. WAVES TRAVELLING NORTH) WITH SHELL DETRITUS (Ensis etc) IN TROUGHS

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other  MAERL

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

#### 3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

1	2	3	
m			<b>DEPTH LIMITS</b>
18.6	19.5		Upper (from sea level) (i.e. minimum)
19.5	19.5		Lower (from sea level) (i.e. maximum)
			Upper (from chart datum) *
			Lower (from chart datum) *

%			<b>SUBSTRATUM</b>
			Bedrock type?:
			Boulders - very large > 1.0 m
10			- large 0.5 - 1.0 m
30			- small 0.25 - 0.5 m
20	3		Cobbles (fist - head size)
10	7		Pebbles (50p - fist size)
10			Gravel - stone
10	10		- shell fragments
5			Sand - coarse
			- medium
			- fine
			Mud
	20		Shells (empty - or as large pieces)
			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
5	60		Other (state) <b>MAERL (5% LIVE)</b>
100	100	100	<b>Total</b>

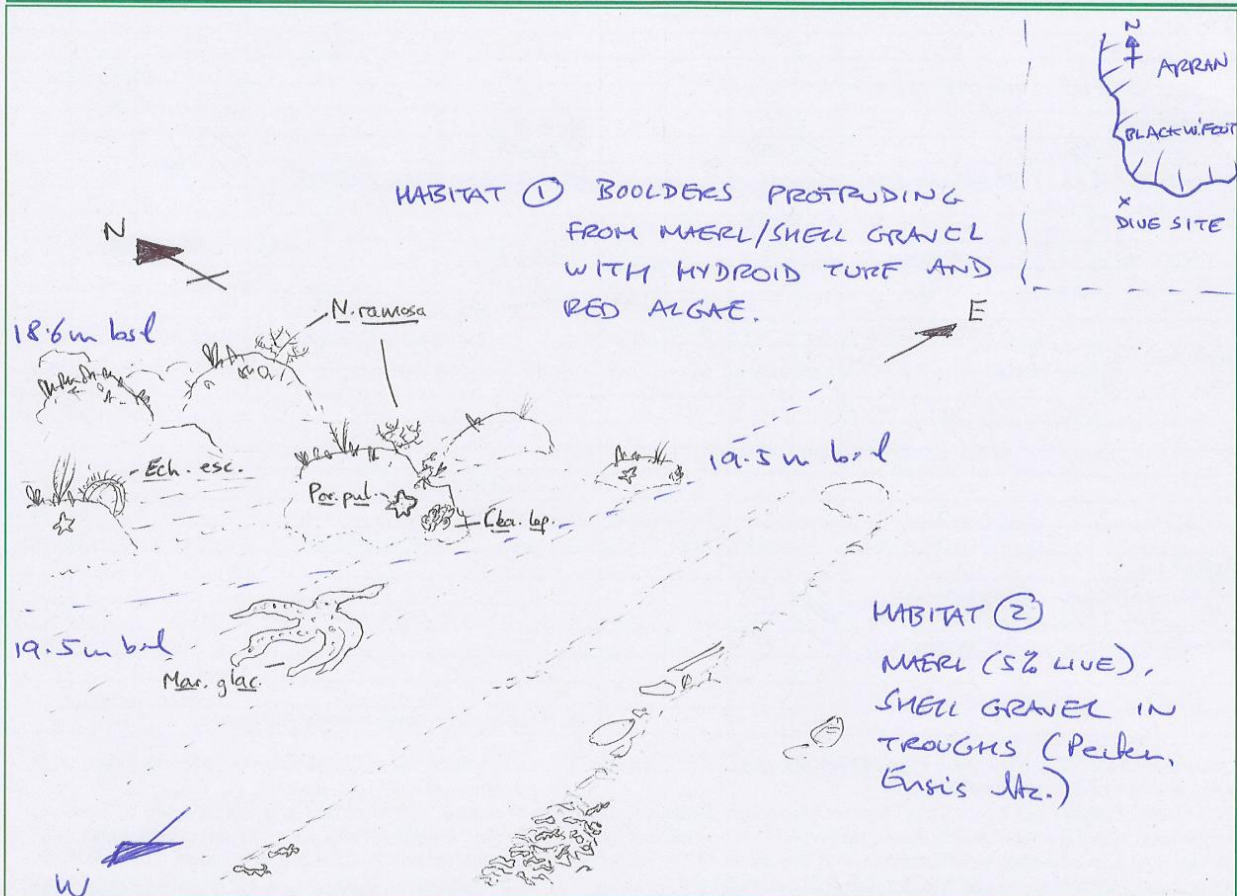
1	2	3	
1-5			<b>FEATURES - ROCK (all categories)</b>
3			Relief of habitat (even - rugged)
1			Texture (smooth - pitted)
2			Stability (stable - mobile)
3			Scour (none - scoured)
1			Silt (none - silted)
2			Fissures > 10 mm (none - many)
1			Crevices < 10 mm (none - many)
2			Boulder/cobble/pebble shape (rounded - angular)
			Sediment on rock? (tick if present)

✓			<b>FEATURES - SEDIMENT (1)</b>
			Mounds / casts
			Burrows / holes
			Waves (>10 cm high)
			Ripples (< 10 cm high)
			Subsurface coarse layer?
			Subsurface anoxic (black) layer?

1-5			<b>FEATURES - SEDIMENT (2)</b>
			Firmness (firm - soft)
			Stability (stable - mobile)
			Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance** scale (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.





**Seasearch form 2 for IRL6**

**Dive/Site details**

Site name <i>IRON ROCK LEDGES</i>				Date of dive: <i>01</i> dd / <i>07</i> mm / <i>2012</i> yy	
General location <i>SOUTH WEST CORNER OF ARRAN</i> <i>(HANNING SPANNING GROUNDS)</i>				Start of dive: <i>10</i> : <i>15</i> (24hr)	
<i>ARRAN</i> <i>N. AYRSHIRE</i> <i>ARGYLE AND HIGHLAND, SCOTLAND</i>				Dive duration: <i>36</i> (mins)	
Position (degrees and decimal minutes – state if in any other format)				Sea temperature: <i>10</i> °C	
		Latitude	Longitude	W or E	Underwater visibility: <i>10</i> m
Centre of site	<i>55°</i>	<i>26.764</i>	<i>005°</i>	<i>19.464</i>	<i>W</i>
For drift dives					Drift dive? yes <input type="radio"/> no <input checked="" type="radio"/>
From	<i>0</i>		<i>0</i>		Night dive? yes <input type="radio"/> no <input checked="" type="radio"/>
To	<i>0</i>		<i>0</i>		Did you or your buddy take any of the following?  photographs <input checked="" type="radio"/> yes / no video footage <input type="radio"/> yes / no specimens <input type="radio"/> yes / no seaweeds for pressing <input type="radio"/> yes / no
Or OS Grid Reference					
Position derived from: (circle)		GPS Datum (circle)			
<input checked="" type="radio"/> GPS	<input type="radio"/> Chart	<input type="radio"/> OS map	<input type="radio"/> Web mapping	<input checked="" type="radio"/> WGS84	<input type="radio"/> OSGB36
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input checked="" type="checkbox"/>				For the area surveyed, what was	
mod exposed <input type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>				the shallowest depth? (m) <i>18.3</i> bsl <input type="checkbox"/> bcd <input type="checkbox"/>	
Max tidal stream:				the deepest depth? (m) <i>19.5</i> bsl <input type="checkbox"/> bcd <input type="checkbox"/>	
<i>29</i> >6kt <input type="checkbox"/> 3-6kt <input type="checkbox"/> 1-3kt <input checked="" type="checkbox"/> <1kt <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>				Tidal correction to chart datum <input type="checkbox"/> m*	

**Seabed summary**

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

*a) A fairly flat sea bed which had waves greater than 10cm running South to North. The substrate consisted of boulders, corals, pebbles, gravel and dead broken maerl. There was also shells broken and whole.*

*b) Interspersed with the dead maerl, there was nodules of live maerl.*

*c) The broken maerl and shells could be evidence of dredging or trawling.*

## Habitat descriptions

Complete a box below for each **habitat** you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

### 1. DESCRIPTION (physical + community)

A gravel and dead broken maerl and shelly seabed interspersed with boulders cobbles and pebbles. The action of waves was very obvious on the sea bed. There were many small nodules of maerl present in the substrate. Most of the boulders had algae and barnacles attached.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

### 2. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

### 3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

1	2	3	
m			<b>DEPTH LIMITS</b>
18.3			Upper (from sea level) (i.e. minimum)
19.5			Lower (from sea level) (i.e. maximum)
			Upper (from chart datum) *
			Lower (from chart datum) *
%			<b>SUBSTRATUM</b>
			Bedrock type?:
			Boulders - very large > 1.0 m
			- large 0.5 - 1.0 m
10			- small 0.25 - 0.5 m
5			Cobbles (fist - head size)
5			Pebbles (50p - fist size)
25			Gravel - stone
25			- shell fragments
			Sand - coarse
			- medium
			- fine
			Mud
			Shells (empty - or as large pieces)
			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
30			Other (state) <i>Mammal Bones</i>
100	100	100	<b>Total</b>

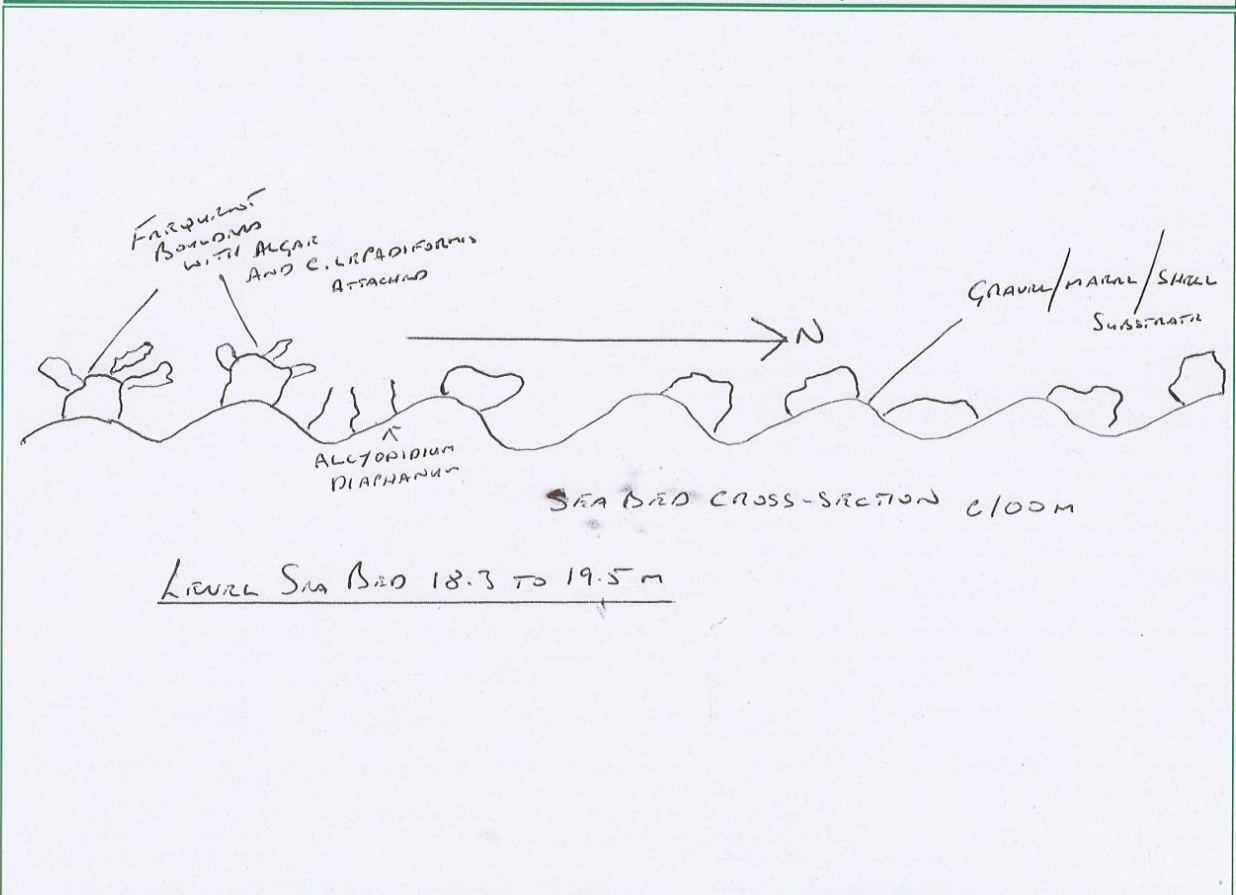
1	2	3	
1-5			<b>FEATURES - ROCK (all categories)</b>
3			Relief of habitat (even - rugged)
1			Texture (smooth - pitted)
3			Stability (stable - mobile)
1			Scour (none - scoured)
1			Silt (none - silted)
3			Fissures > 10 mm (none - many)
1			Crevices < 10 mm (none - many)
2			Boulder/cobble/pebble shape (rounded - angular)
			Sediment on rock? (tick if present)

✓			<b>FEATURES - SEDIMENT (1)</b>
✓			Mounds / casts
✓			Burrows / holes
✓			Waves (>10 cm high)
			Ripples (< 10 cm high)
			Subsurface coarse layer?
			Subsurface anoxic (black) layer?

1-5			<b>FEATURES - SEDIMENT (2)</b>
2			Firmness (firm - soft)
2			Stability (stable - mobile)
5			Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance** scale (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.





**Survey location - IRL7**

PF: MB                      Biotope: SS.SMp.Mrl

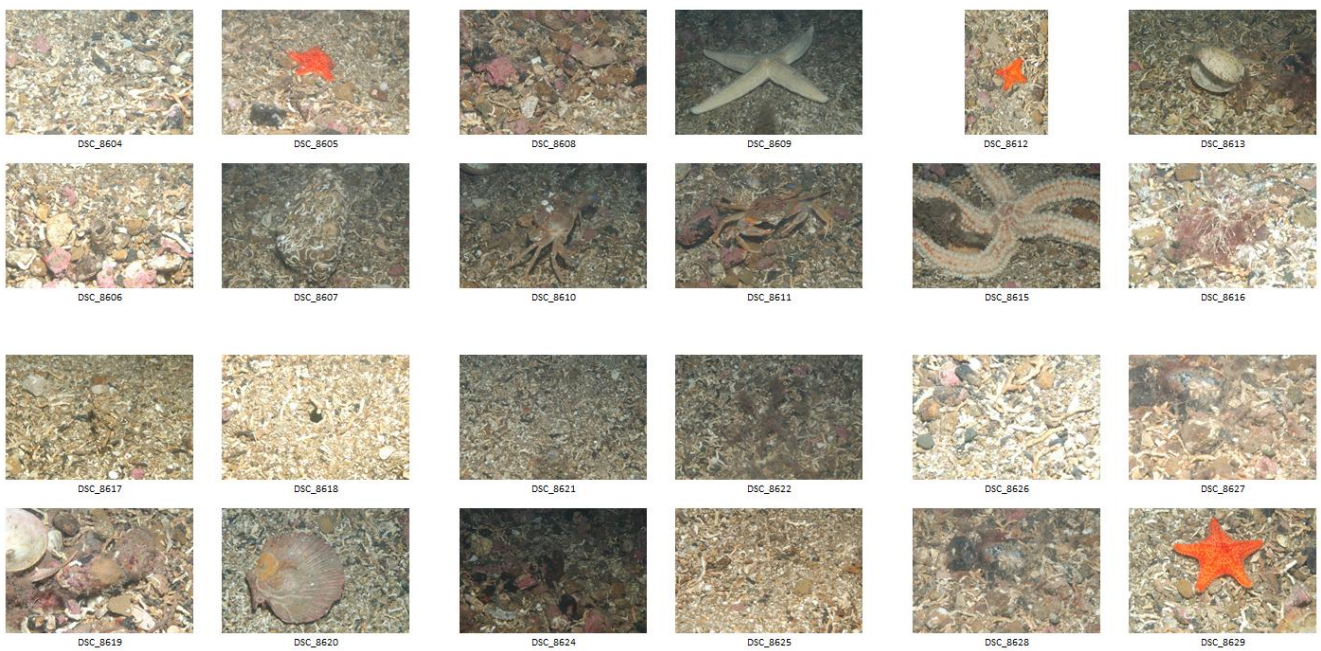
Evidence: Images: 24      Video: no      Seasearch form: yes

**Example image showing PF**



DSC\_8613.jpg

**All images for survey location - IRL7**





**Habitat descriptions**

Complete a box below for each **habitat** you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

1. DESCRIPTION (physical + community)

The habitat was a flat/shallow slope profile sediment sea bed composed mainly of maerl gravel in a wave formation. Waves were approx 1m across and approx 15cm deep. The trough of the waves were filled with small pebbles. The associated community was starfishes, several types of crab, some crusts of bryozoans on the pebbles and some worm tubes (Chaetoptus) and bivalve siphons.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other  maerl gravel.

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

2. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

m		DEPTH LIMITS
20.5		Upper (from sea level) (i.e. minimum)
20.9		Lower (from sea level) (i.e. maximum)
		Upper (from chart datum) *
		Lower (from chart datum) *

%		SUBSTRATUM
		Bedrock type?:
		Boulders - very large > 1.0 m
		- large 0.5 - 1.0 m
		- small 0.25 - 0.5 m
5		Cobbles (fist - head size)
10		Pebbles (50p - fist size)
		Gravel - stone
10		- shell fragments
		Sand - coarse
		- medium
		- fine
		Mud
5		Shells (empty - or as large pieces)
		Shells (living - eg mussels, limpets)
		Artificial - metal
		- concrete
		- wood
70		Other (state) <i>maerl gravel</i>
100	100	100
		Total

1-5		FEATURES - ROCK (all categories)
		Relief of habitat (even - rugged)
		Texture (smooth - pitted)
		Stability (stable - mobile)
		Scour (none - scoured)
		Silt (none - silted)
		Fissures > 10 mm (none - many)
		Crevices < 10 mm (none - many)
		Boulder/cobble/pebble shape (rounded - angular)
		Sediment on rock? (tick if present)

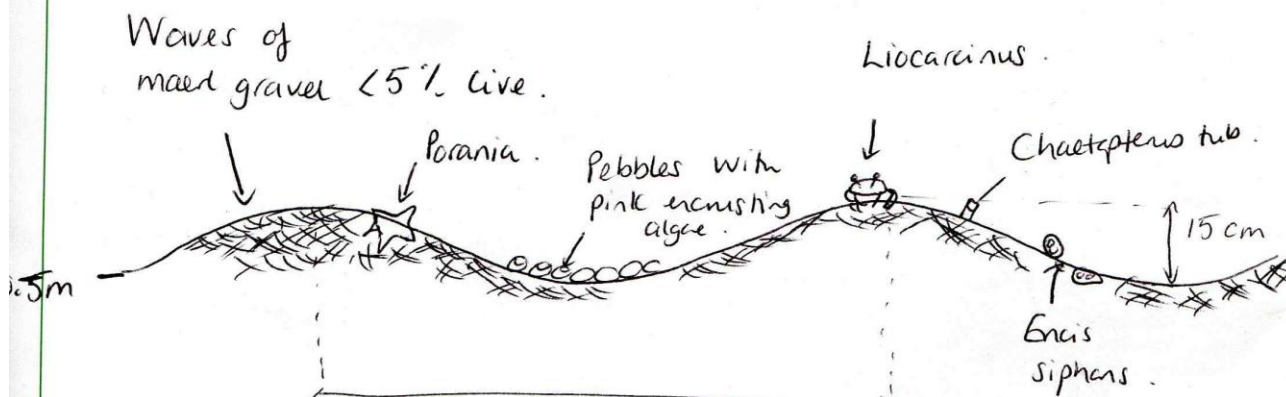
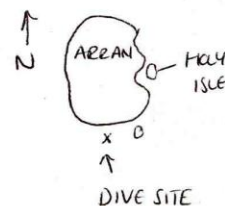
✓		FEATURES - SEDIMENT (1)
✓		Mounds / casts
✓		Burrows / holes
✓		Waves (>10 cm high)
		Ripples (< 10 cm high)
		Subsurface coarse layer?
		Subsurface anoxic (black) layer?

1-5		FEATURES - SEDIMENT (2)
2		Firmness (firm - soft)
2		Stability (stable - mobile)
3		Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance** scale (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.

\* My feeling was that waves were arranged parallel to the shoreline.



## Species List

Score the abundance of each group of animals and plants **in each habitat** alongside the name. In the blank spaces list the seaweeds & animals which you were able to identify **positively** from the different habitats. Use latin names if possible, but if you don't know them, common or descriptive names are acceptable. If you are not 100% sure about any, add a question mark. Do not enter names as guesses - it's better to exclude them than to include incorrect identifications. Give abundances in the columns: **S**uper abundant, **A**bundant, **C**ommon, **F**requent, **O**ccasional & **R**are. If you did not note abundances, simply enter a **P** for Present. Continue on a separate sheet, if necessary. If you have a photograph of the species tick the **ph** column.

	ph	1	2	3		ph	1	2	3
sponges					echinoderms				
					<i>Perania pulvillus</i>		O		
					<i>Mastomaster glacialis</i>		R		
					<i>Askenias rubens</i>		R		
cnidarians: hydroids, anemones, corals,					sea squirts				
					fishes				
					<i>Pholis gunnellus</i>		R		
worms									
<i>Chaetopterus tubes</i>		O							
<i>Pomatoceros triqueter</i>		O							
<i>Lania conciliata</i>		R							
crustaceans					seaweeds				
<i>Liocarcinus depurator</i>		O			Pink encrusting algae		O		
Barnacles		R			Maer fragments		C		
<i>Macropodia</i>		R							
<i>Cancer pagurus</i>		R							
molluscs									
					other or continuations				
					<i>Fenestrulina malusii</i>		P		
bryozoans					<i>Escharella immersa</i>		P		
Bryozoan crusts =					<i>Tubalipca</i> sp.		P		
<i>Hippothoa flagellum</i>		P							
<i>Dispora hispidula</i>		P							
<i>Escharella decurva</i>		P							
<i>Escharella varicosa</i>		P							
<i>Puellina innervata</i>		P							
					Continue on a separate sheet if you need to				

Once completed, return the form to the Dive Organiser or to: Seasearch, Marine Conservation Society, Unit 3, Wolf Business Park, Alton Road, Ross on Wye, HR9 5NB.

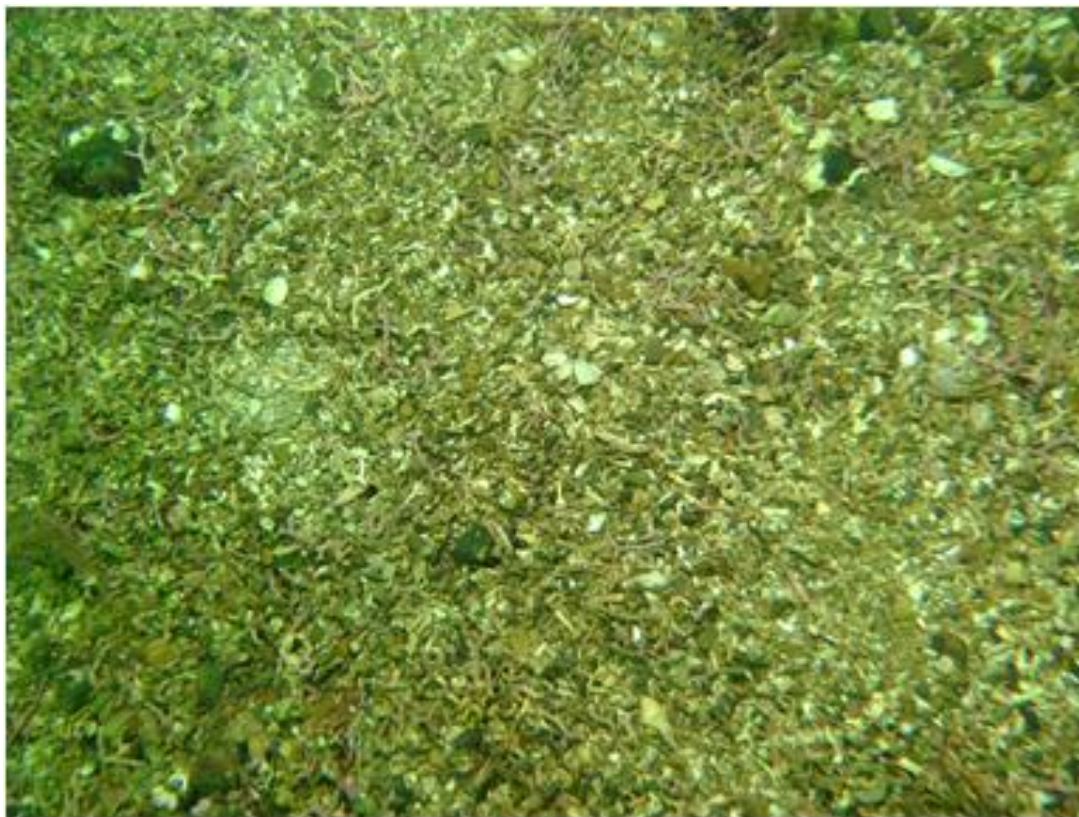
Your contact details will be included on the Seasearch database and those of partner organisations and will be used to send you information about Seasearch and associated projects. They will not be passed to third parties without your consent. The location, dive details, habitats and species information and the name of the recorder will be entered into a database and made available to the participating organisations and the general public through the Seasearch and NBN websites. If you do not agree with this use of the data do not submit the form.

**Survey location - IRL8**

PF: MB                      Biotope:                      SS.SMp.Mrl

Evidence:              Images: 2              Video: no              Seasearch form: yes

**All images for survey location - IRL8**



MDSCF2856



MDSCF2857

**Seasearch form IRL8**

**Dive/Site details**

Site name <i>South Arran</i>				Date of dive: <i>01</i> dd / <i>07</i> mm / <i>2012</i> yy	
General location <i>South Coast of Arran.</i>				Start of dive: <i>10:17</i> (24hr)	
				Dive duration: <i>46</i> (mins)	
				Sea temperature: <i>11</i> °C	
Position (degrees and decimal minutes – state if in any other format)				Underwater visibility: <i>8</i> m	
	Latitude	Longitude	W or E	Drift dive? yes / <input checked="" type="radio"/> no	
Centre of site	<i>55° 26.209</i>	<i>05° 17.971</i>	<i>W</i>	Night dive? yes / <input checked="" type="radio"/> no	
For drift dives				Did you or your buddy take any of the following?	
From	0	0		photographs	<input checked="" type="radio"/> yes / no
To	0	0		video footage	yes / <input checked="" type="radio"/> no
Or OS Grid Reference				specimens	
Position derived from: (circle) <input checked="" type="radio"/> GPS <input type="radio"/> Chart <input type="radio"/> OS map <input type="radio"/> Web mapping				seaweeds for pressing	
GPS Datum (circle) <input checked="" type="radio"/> WGS84 <input type="radio"/> OSGB36				yes / <input checked="" type="radio"/> no	
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input checked="" type="checkbox"/>				For the area surveyed, what was	
mod exposed <input type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>				the shallowest depth? (m) <input type="text" value="18"/> bsl <input type="text"/> bcd	
Max tidal stream:				the deepest depth? (m) <input type="text" value="19.2"/> bsl <input type="text"/> bcd	
>6kt <input type="checkbox"/> 3-6kt <input type="checkbox"/> 1-3kt <input type="checkbox"/> <1kt <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>				Tidal correction to chart datum <input type="text"/> m*	

**Seabed summary**

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

*Very constant depth profile. Areas of boulders and cobbles interspersed with MAERL with had formed small wave affected ridges.*

### Habitat descriptions

Complete a box below for each **habitat** you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

#### 1. DESCRIPTION (physical + community)

Maert beds present between the boulder areas. The maert tended to lie over the cobbles + pebbles sometimes forming wee 'sand dune' type maert ridges (tidal action?).

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  ~~enc~~ pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

#### 2. DESCRIPTION (physical + community)

Areas of boulders present, there appeared to be a stable environment covered with fine filament red algae - impossible to identify!

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

#### 3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

1	2	3	
m			<b>DEPTH LIMITS</b>
18	16		Upper (from sea level) (i.e. minimum)
19.2	19.2		Lower (from sea level) (i.e. maximum)
			Upper (from chart datum) *
			Lower (from chart datum) *

%			<b>SUBSTRATUM</b>
			Bedrock type?:
			Boulders - very large > 1.0 m
	50		- large 0.5 - 1.0 m
	40		- small 0.25 - 0.5 m
40	10		Cobbles (fist - head size)
20			Pebbles (50p - fist size)
20			Gravel - stone
20			- shell fragments
			Sand - coarse
			- medium
			- fine
			Mud
			Shells (empty - or as large pieces)
			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
			Other (state)
100	100	100	<b>Total</b>

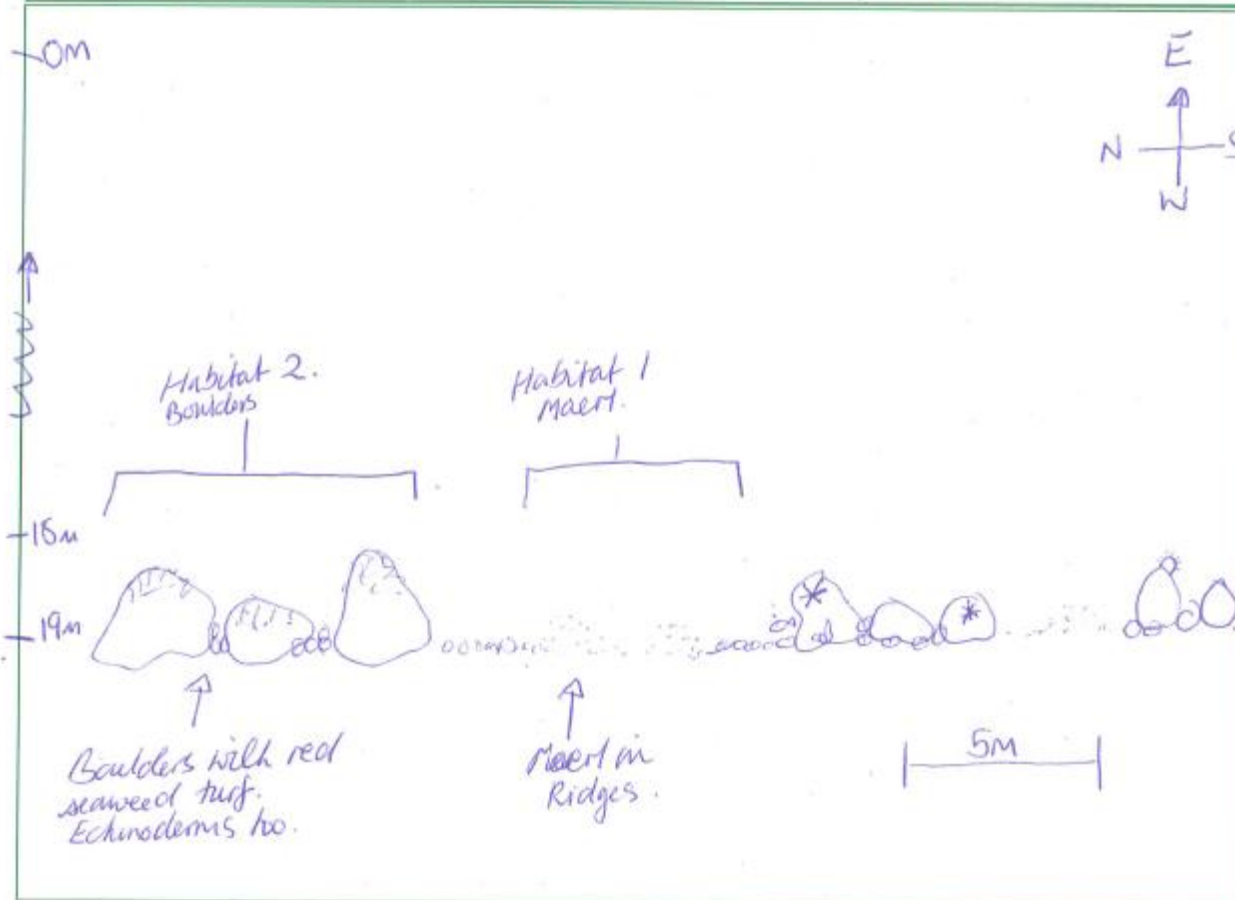
1	2	3	
1-5			<b>FEATURES - ROCK (all categories)</b>
2	4		Relief of habitat (even - rugged)
2	3		Texture (smooth - pitted)
4	2		Stability (stable - mobile)
1	1		Scour (none - scoured)
1	1		Silt (none - silted)
1	2		Fissures > 10 mm (none - many)
1	2		Crevices < 10 mm (none - many)
2	2		Boulder/cobble/pebble shape (rounded - angular)
			Sediment on rock? (tick if present)

✓			<b>FEATURES - SEDIMENT (1)</b>
			Mounds / casts
			Burrows / holes
			Waves (>10 cm high)
			Ripples (< 10 cm high)
			Subsurface coarse layer?
			Subsurface anoxic (black) layer?

1-5			<b>FEATURES - SEDIMENT (2)</b>
			Firmness (firm - soft)
			Stability (stable - mobile)
			Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance scale** (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.



## Species List

Score the abundance of each group of animals and plants in each habitat alongside the name. In the blank spaces list the seaweeds & animals which you were able to identify positively from the different habitats. Use latin names if possible, but if you don't know them, common or descriptive names are acceptable. If you are not 100% sure about any, add a question mark. Do not enter names as guesses - it's better to exclude them than to include incorrect identifications. Give abundances in the columns: Super abundant, Abundant, Common, Frequent, Occasional & Rare. If you did not note abundances, simply enter a P for Present. Continue on a separate sheet, if necessary. If you have a photograph of the species tick the ph column.

	ph	1	2	3		ph	1	2	3
sponges					echinoderms				
					HEGGLIA SPP	✓		O	
					ASTERIAS RUBENS	✓	O	F	
					LODIA CILIATA	✓	R		
					ECHINUS ESCULENTUS		R	O	
					MARTHASTERIAS GLACIUS	✓	R		
					FORANIA PULVILLUS	✓	R	R	
					ANTEDON BIFIDA	✓		O	
					CROSSASTER PAPPUSUS	✓	R		
cnidarians: hydroids, anemones, corals,					sea squirts				
OBELIA SENICULATA.	✓		F		CLADUNA LEPAEFORMIS			F	
KIRCHENWALLERIA SPP.	✓		R		ASCIDIA MENTULA			O	
					LOBELIA PARALITICORANNA	✓		O	
					fishes				
					GABIOSOMUS FLAVESCENS		O	O	
					PHOLIS GUNNELLUS.			O	
worms					POMATOSCHISTUS PICTUS		F		
POMATOCEROUS	✓	F	F						
SABELLA PAONIA.	✓	O							
crustaceans					seaweeds				
CARRIPEDA	✓		C		MAEUL SP	✓	A		
NECORA PUBER			O		ENCRUSTING PINK ALGAE			O	
CANCER PAGURUS	✓		R						
BALANUS BILANUS??	✓								
PAGURUS BERNHARDUS	✓	O							
molluscs					other or continuations				
PECTEN MAXIMUS	✓	O	R						
AEQUIPETEN OERCCULARIS		O							
GIBBULA ANAGUS		O							
PALMPLACOPORA			R						
FAVORINUS BLANUS.	✓	R							
bryozoans									
ALCYONIDIUM DAPHANUM	✓	O							
ENCRUSTING BRYZOANS	✓		F						
BUSULLA FLABELLATA	✓		O						
BUSULLA PLUMOSA	✓		O						
					Continue on a separate sheet if you need to				

Once completed, return the form to the Dive Organiser or to: Seasearch, Marine Conservation Society, Unit 3, Wolf Business Park, Alton Road, Ross on Wye, HR9 5NB.

Your contact details will be included on the Seasearch database and those of partner organisations and will be used to send you information about Seasearch and associated projects. They will not be passed to third parties without your consent. The location, dive details, habitats and species information and the name of the recorder will be entered into a database and made available to the participating organisations and the general public through the Seasearch and NBN websites. If you do not agree with this use of the data do not submit the form.

## Survey location - KC1

PF: MB                      Biotope:                      SS.SMp.Mrl.Pcal

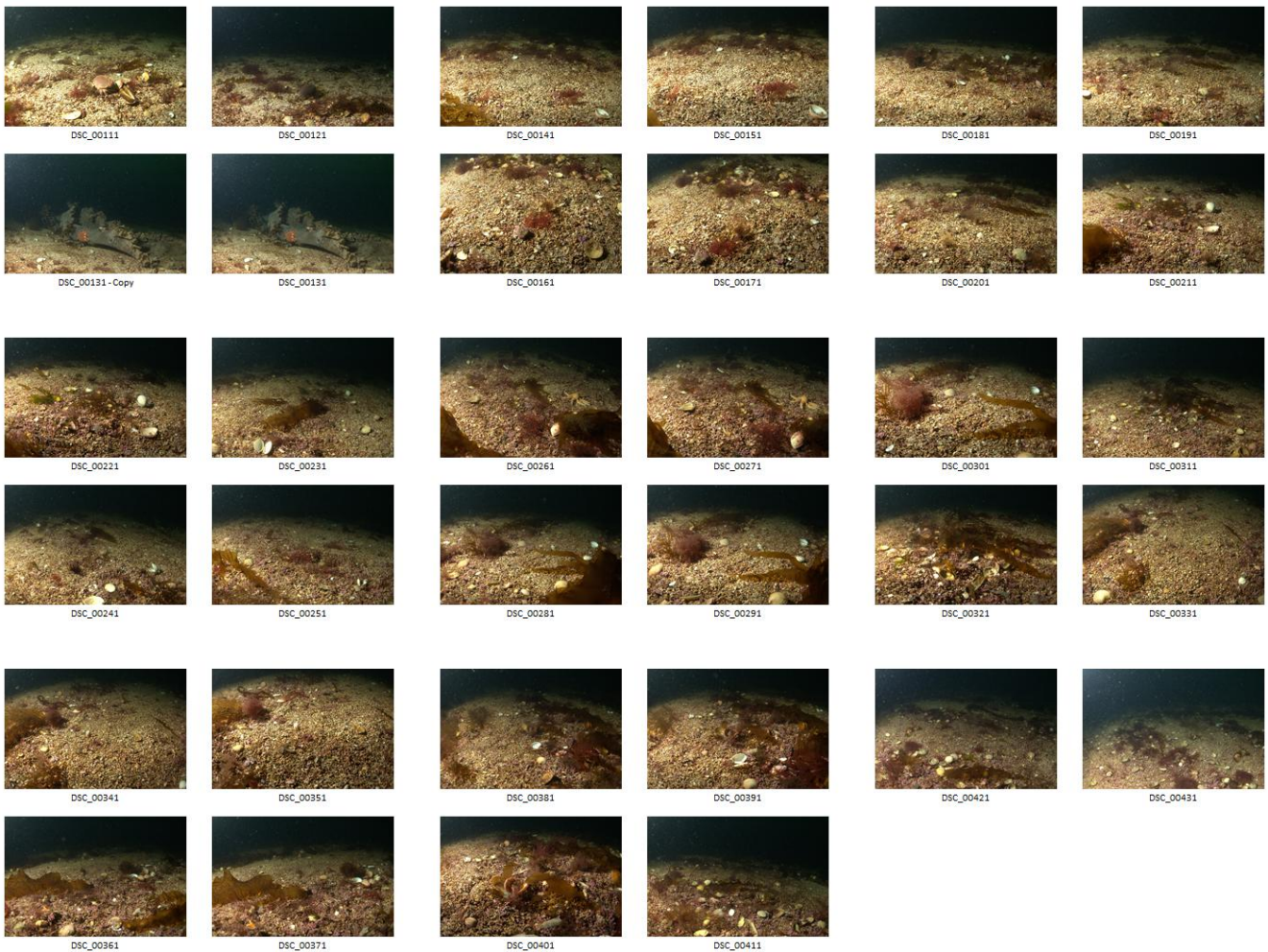
Evidence:            Images: 34            Video: no            Seasearch form: no

### Example image showing PF



KC1: DSC\_00391.jpg

### All images for survey location - KC1 (one picture is a duplicate)

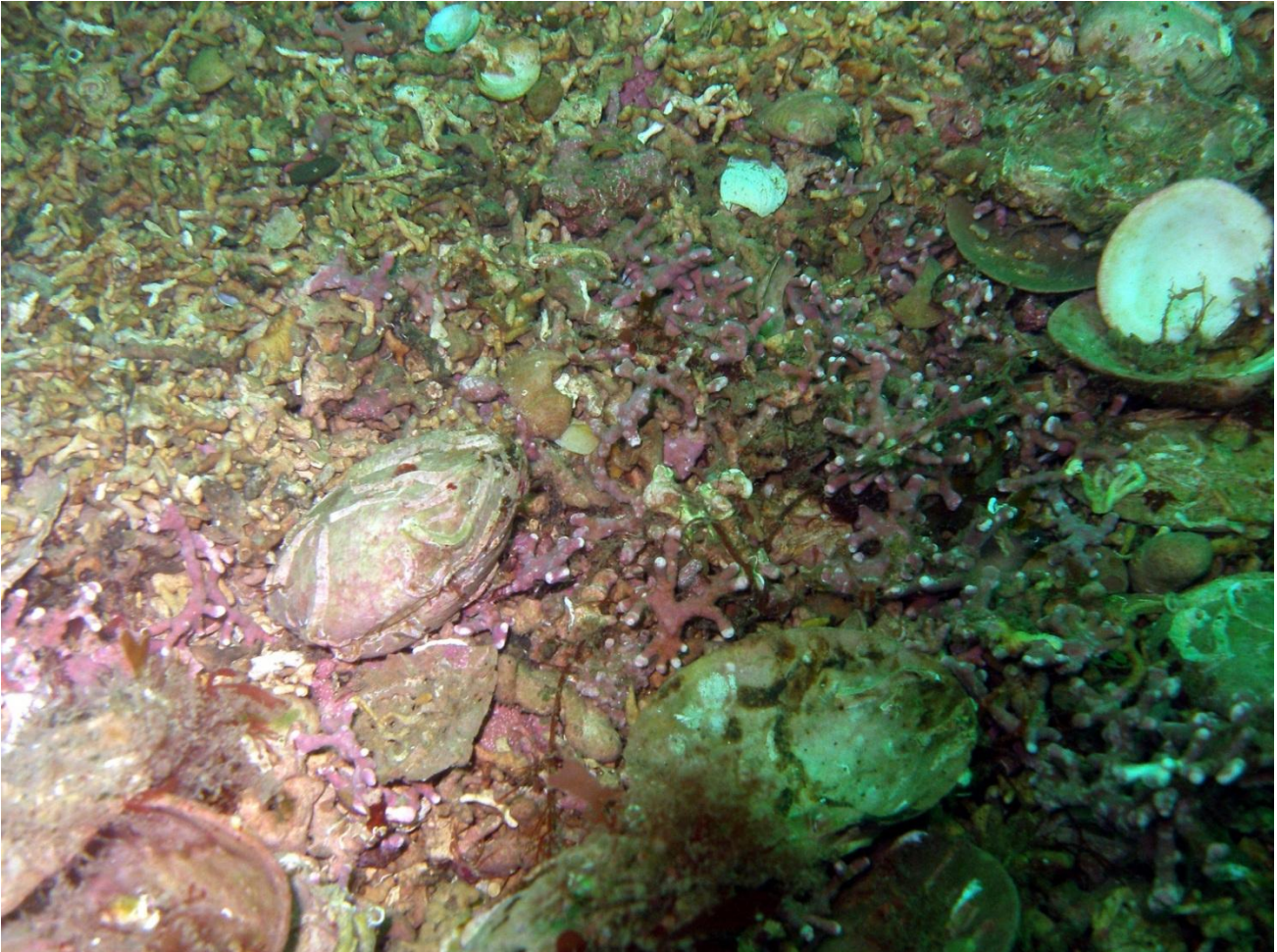


**Survey location - KC2**

PF: MB                      Biotope:                      SS.SMp.Mrl

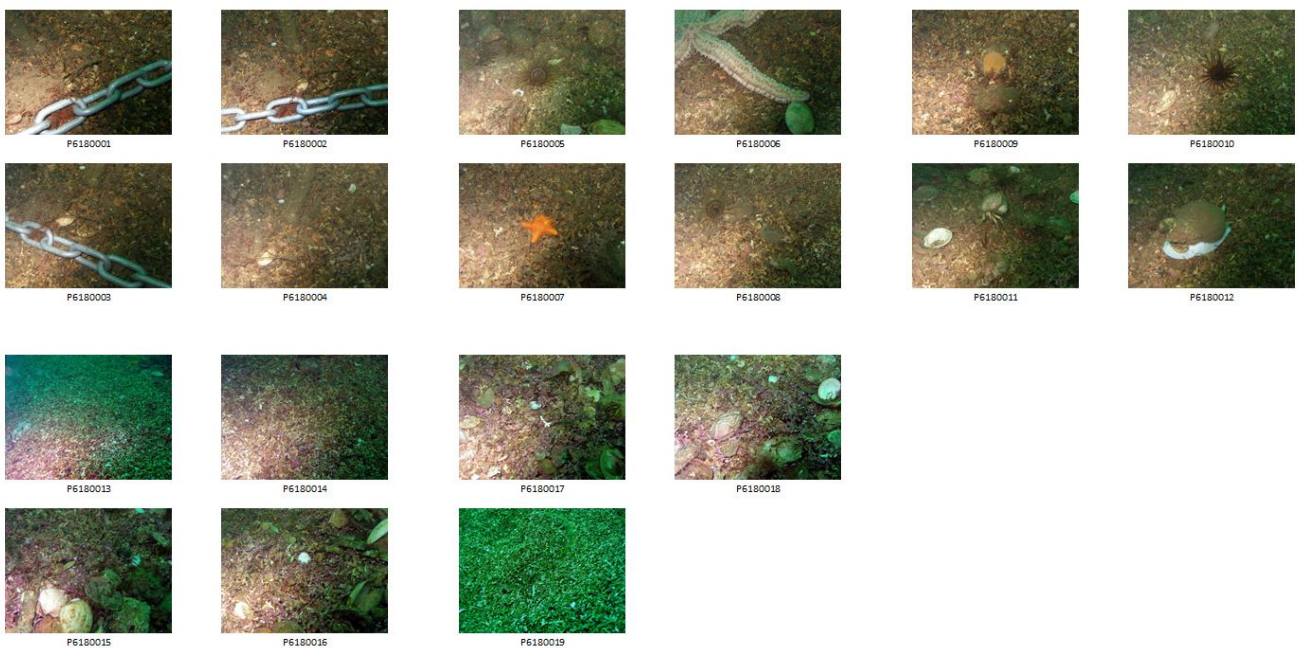
Evidence:              Images: 21              Video: no              Seasearch form: yes

**Example image showing PF**



KC2: P6180018.jpg

**All images for survey location - KC2**



KC2 Seasearch form

Dive/Site details

Site name <i>Kildonan off Old Castle.</i>				Date of dive: <i>dd/18 mm/06 yy11</i>	
General location <i>South of Aran</i>				Start of dive: <i>13:19</i> (24hr)	
				Dive duration: <i>39</i> (mins)	
				Sea temperature: <i>10</i> °C	
Position (degrees and decimal minutes – state if in any other format)				Underwater visibility: <i>6</i> m	
	Latitude		Longitude		W or E
Centre of site	<i>55° 26.093</i>	<i>5° 06.183</i>			<i>W</i>
For drift dives					
From	<i>0</i>	<i>0</i>			
To	<i>0</i>	<i>0</i>			
Or OS Grid Reference				Drift dive? <i>yes / <input checked="" type="radio"/></i>	
Position derived from: (circle) <input checked="" type="radio"/> GPS <input type="radio"/> Chart <input type="radio"/> OS map <input type="radio"/> Web mapping				Night dive? <i>yes / <input checked="" type="radio"/></i>	
GPS Datum (circle) <input checked="" type="radio"/> WGS84 <input type="radio"/> OSGB36				Did you or your buddy take any of the following?	
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input type="checkbox"/>				photographs <i>yes / <input checked="" type="radio"/></i> no	
mod exposed <input checked="" type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>				video footage <i>yes / no</i>	
Max tidal stream:				specimens <i>yes / no</i>	
>6kt <input type="checkbox"/> 3-6kt <input type="checkbox"/> 1-3kt <input type="checkbox"/> <1kt <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>				seaweeds for pressing <i>yes / no</i>	
				For the area surveyed, what was	
				the shallowest depth? (m) <i>14.5</i> bsl <input type="checkbox"/> bcd	
				the deepest depth? (m) <i>20.1</i> bsl <input type="checkbox"/> bcd	
				Tidal correction to chart datum <input type="checkbox"/> m*	

Seabed summary

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

*1. Gently sloping seabed dropping off to the south. Approximately 15% live maerl at beginning of dive. As dive progressed in a Northwesterly direction % cover of maerl increased to 75%+ in tidal furrows, but remained low on the main substrate. Furrows had a depth of around 30cm. Different Maerl spp. & shape in furrows to nearby Lambash bay.*

SS1 02/10

1

Habitat descriptions

Complete a box below for each habitat you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

1. DESCRIPTION (physical + community)

Gently sloping seabed with around 15% <sup>HVE</sup> <sub>n</sub> maerl cover.

Spiny starfish, cushion starfish, brown saccorhizae, cerianthus, s. cucumbers, anemones, shore crabs, hermit crabs, gobies, whelms.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other  Maerl

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf  Maerl / dead maerl

animal bed  sediment with life  barren sediment  Biotope Code

2. DESCRIPTION (physical + community)

Similar to above but with tidal furrows of around 30cm depth. High % cover of live maerl at the bottoms of these.

Maerl appeared to be a different species to that found in nearby Lambh bay, with larger and heavier structure.

To my knowledge THE ONLY PLACE IN THE CLYDE AREA YOU GET "RIDGE & FURROW FORMATIONS" OF MAERL

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other  Maerl

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf  Maerl

animal bed  Scallops.  sediment with life  barren sediment  Biotope Code

3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

1	2	3	
m			DEPTH LIMITS
16	14		Upper (from sea level) (i.e. minimum)
20	15		Lower (from sea level) (i.e. maximum)
			Upper (from chart datum) *
			Lower (from chart datum) *

%			SUBSTRATUM
			Bedrock type?
			Boulders - very large > 1.0 m
			- large 0.5 - 1.0 m
			- small 0.25 - 0.5 m
			Cobbles (fist - head size)
			Pebbles (50p - fist size)
			Gravel - stone
			- shell fragments
			Sand - coarse
			- medium
			- fine
			Mud
5	5		Shells (empty - or as large pieces)
			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
95	95		Other (state) MAERL
100	100	100	Total

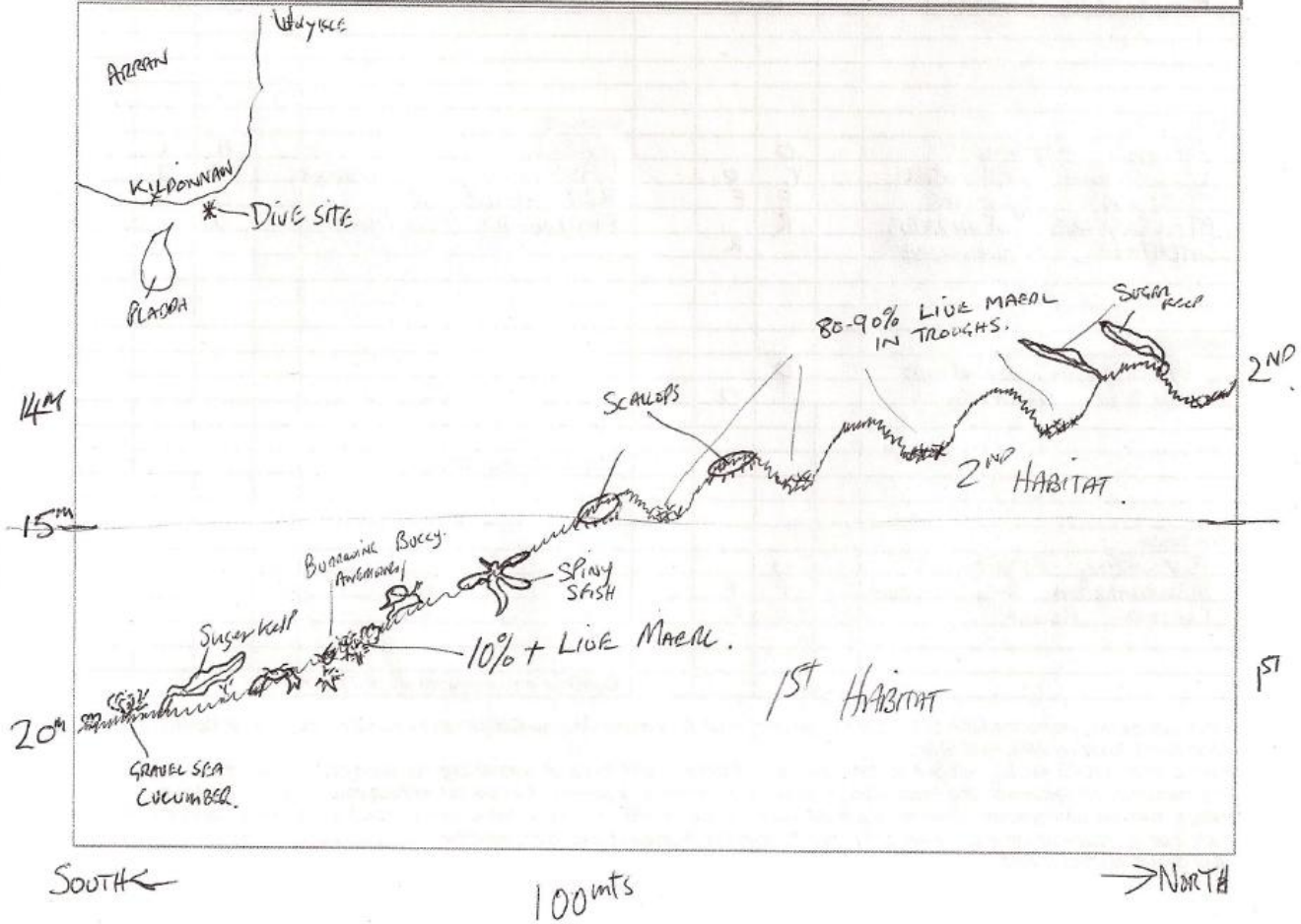
1	2	3	
1-5			FEATURES - ROCK (all categories)
			Relief of habitat (even - rugged)
			Texture (smooth - pitted)
			Stability (stable - mobile)
			Scour (none - scoured)
			Silt (none - silted)
			Fissures > 10 mm (none - many)
			Crevices < 10 mm (none - many)
			Boulder/cobble/pebble shape
			(rounded - angular)
			Sediment on rock? (tick if present)

			FEATURES - SEDIMENT (1)
✓	✓		Mounds / casts
✓		✓	Burrows / holes
			Waves (>10 cm high)
			Ripples (< 10 cm high)
			Subsurface coarse layer?
			Subsurface anoxic (black) layer?

			FEATURES - SEDIMENT (2)
3	4		Firmness (firm - soft)
2	4		Stability (stable - mobile)
2	2		Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance** scale (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.



Species List

Score the abundance of each group of animals and plants in each habitat alongside the name. In the blank spaces list the seaweeds & animals which you were able to identify positively from the different habitats. Use latin names if possible, but if you don't know them, common or descriptive names are acceptable. If you are not 100% sure about any, add a question mark. Do not enter names as guesses - it's better to exclude them than to include incorrect identifications. Give abundances in the columns: Super abundant, Abundant, Common, Frequent, Occasional & Rare. If you did not note abundances, simply enter a P for Present. Continue on a separate sheet, if necessary. If you have a photograph of the species tick the ph column.

	ph	1	2	3		ph	1	2	3
sponges					echinoderms				
					PORANIA PULVILLAS		O		
					ASTROPECTEN IRREGULARIS			R	
					ASTERIA RUBENS		F	F	
					MARTHASTERIAS GLACIALIS		C	F	
					ECHINUS ESCULENTUS			O	
					NEOPENTADACTYLA MIXTA		R		
cnidarians: hydroids, anemones, corals,					sea squirts				
CYANEA CAPILLATA		O	O						
AURELIA AURITA		O							
OBELIA GENICULATA		O	O						
CERIANTHUS LLOYDII		F							
					fishes				
					DIPLECOGASTER BIMACULATA		R		
					CTENOLABRUS RUPESTRIS		O		
worms					POMATOSCHISTUS SP		O	O	
POMATOCEROS LAMACKI		O	O						
crustaceans					seaweeds				
PASURUS BERGHAUS		O			MAERL		A	A	
LIOCARCINUS DEPURATOR		C	O		LAMINARI SACCHARINA		O	O	
CARCINUS MAENAS		F	F		RED ALGAE SP		O		
ATELECYCLUS ROTUNDATUS		R			RHODYMENIA PSEUDOPHYLLATA		O		
GALATHEA SQUAMIFERA			R						
molluscs									
BUCCINUM UNDATUM		O							
PECTEN MAXIMUS			O						
					other or continuations				
bryozoans									
ENCROSTING BRYOZOANS		O							
MEMBRANIPORA MEMBRANACEA		F	F						
ELECTRA PLOSA		O	O						
					Continue on a separate sheet if you need to				

Once completed, return the form to the Dive Organiser or to: Seasearch, Marine Conservation Society, Unit 3, Wolf Business Park, Alton Road, Ross on Wye, HR9 5NB. Your contact details will be included on the Seasearch database and those of partner organisations and will be used to send you information about Seasearch and associated projects. They will not be passed to third parties without your consent. The location, dive details, habitats and species information and the name of the recorder will be entered into a database and made available to the participating organisations and the general public through the Seasearch and NBN websites. If you do not agree with this use of the data do not submit the form.

**Survey location - KC4**

PF: MB                      Biotope:                      SS.SMp.Mrl

Evidence:              Images: 4              Video: no              Seasearch form: yes

**All images for survey location - KC4**



IMG\_0076



IMG\_0113



IMG\_0117



IMG\_0120

**Seasearch form for KC4**

**Dive/Site details**

Site name <i>Luldunan Maerl</i>					Date of dive: <i>18</i> dd / <i>6</i> mm / <i>11</i> yy	
General location <i>Luldunan, South of Isle of Arran</i>					Start of dive: <i>12:00</i> (24hr)	
					Dive duration: <i>35</i> (mins)	
					Sea temperature: <i>10</i> °c	
Position (degrees and decimal minutes – state if in any other format)					Underwater visibility: <i>6</i> m	
	Latitude		Longitude		W or E	Drift dive? yes <input type="radio"/> no <input checked="" type="radio"/>
Centre of site	<i>55</i> °	<i>26.45</i> N	<i>05</i> °	<i>05.633</i>	<i>W</i>	Night dive? yes <input type="radio"/> no <input checked="" type="radio"/>
For drift dives						Did you or your buddy take any of the following?  photographs <input checked="" type="radio"/> yes <input type="radio"/> no video footage <input type="radio"/> yes <input checked="" type="radio"/> no specimens <input type="radio"/> yes <input checked="" type="radio"/> no seaweeds for pressing <input type="radio"/> yes <input checked="" type="radio"/> no
From	<i>0</i>		<i>0</i>			
To	<i>0</i>		<i>0</i>			
Or OS Grid Reference						
Position derived from: (circle) <i>GPS Datum (circle)</i>						
GPS Chart OS map Web mapping WGS84 OSGB36						
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input type="checkbox"/> mod exposed <input checked="" type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>					For the area surveyed, what was	
Max tidal stream: >6kt <input type="checkbox"/> 3-6kt <input type="checkbox"/> 1-3kt <input type="checkbox"/> <1kt <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>					the shallowest depth? (m) <i>16.0</i> bsl <input type="checkbox"/> bcd	
					the deepest depth? (m) <i>18.4</i> bsl <input type="checkbox"/> bcd	
					Tidal correction to chart datum <input type="checkbox"/> m*	

**Seabed summary**

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

*a. Maerl tidal furrows, <5% live maerl. Abundant Ceramium*

*b. Maerl in waves.*

*c. Dredging as delicate species mostly absent.*

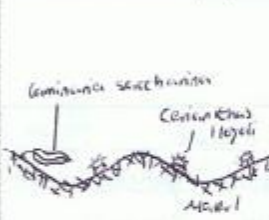
SS1 02/10

1

**Habitat descriptions**

Complete a box below for each habitat you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

**1. DESCRIPTION (physical + community)**



Maerl in waves dredging activity as delicate hydroids + bryozoans mostly absent.  
 Abundant C. Hoylei + Asthenis rubens.  
 Lots of dead shells + scavenger species.  
 <5% live maerl.  
 Occasional Laminaria saccharina.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

**2. DESCRIPTION (physical + community)**

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

**3. DESCRIPTION (physical + community)**

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

1	2	3
	m	DEPTH LIMITS
16.0		Upper (from sea level) (i.e. minimum)
18.4		Lower (from sea level) (i.e. maximum)
		Upper (from chart datum) *
		Lower (from chart datum) *

%	SUBSTRATUM
	Bedrock type?
	Boulders - very large > 1.0 m
	- large 0.5 - 1.0 m
	- small 0.25 - 0.5 m
5	Cobbles (fist - head size)
	Pebbles (50p - fist size)
	Gravel - stone
5	- shell fragments
	Sand - coarse
10	- medium
	- fine
	Mud
20	Shells (empty - or as large pieces)
	Shells (living - eg mussels, limpets)
	Artificial - metal
	- concrete
	- wood
60	Other (state) <i>Moor!</i>
100	100
100	100
	Total

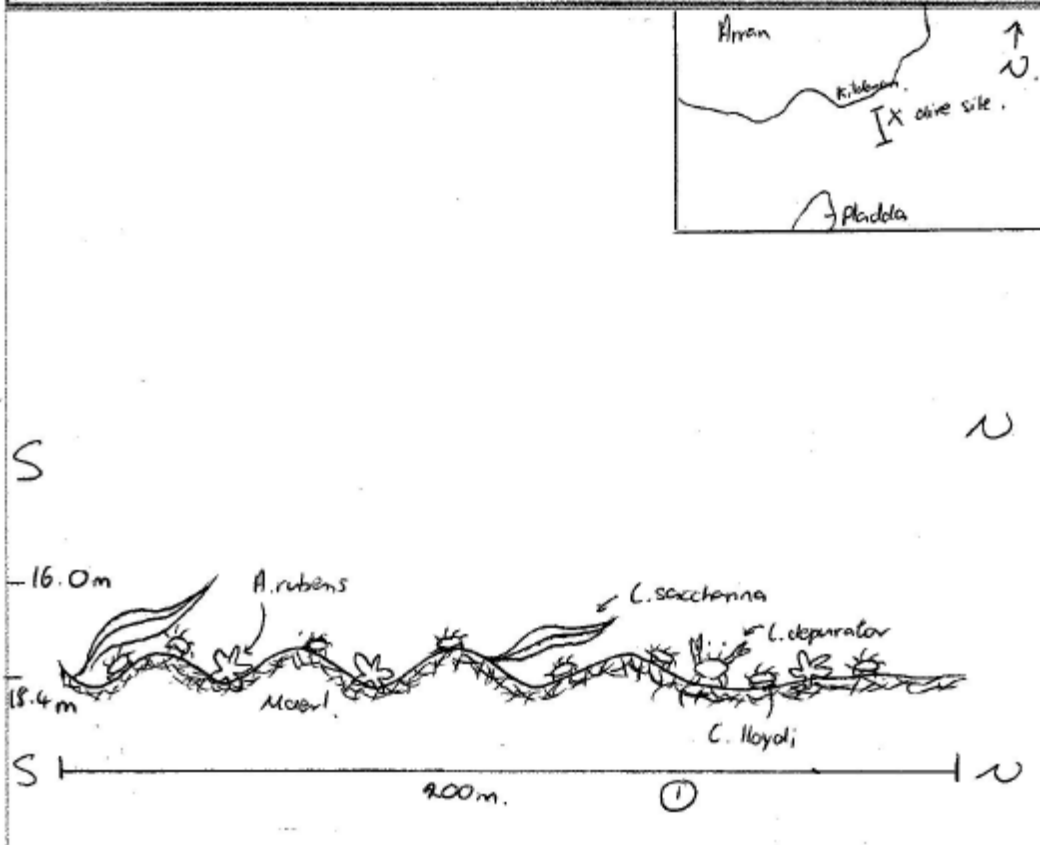
1	2	3
	1-5	FEATURES - ROCK (all categories)
-		Relief of habitat (even - rugged)
-		Texture (smooth - pitted)
-		Stability (stable - mobile)
-		Scour (none - scoured)
-		Silt (none - silted)
-		Fissures > 10 mm (none - many)
-		Crevices < 10 mm (none - many)
2		Boulder/cobble/pebble shape (rounded - angular)
-		Sediment on rock? (tick if present)

✓	FEATURES - SEDIMENT (1)
-	Mounds / casts
✓	Burrows / holes
✓	Waves (>10 cm high)
-	Ripples (< 10 cm high)
-	Subsurface coarse layer?
-	Subsurface anoxic (black) layer?

1-5	FEATURES - SEDIMENT (2)
3	Firmness (firm - soft)
4	Stability (stable - mobile)
1	Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance** scale (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.



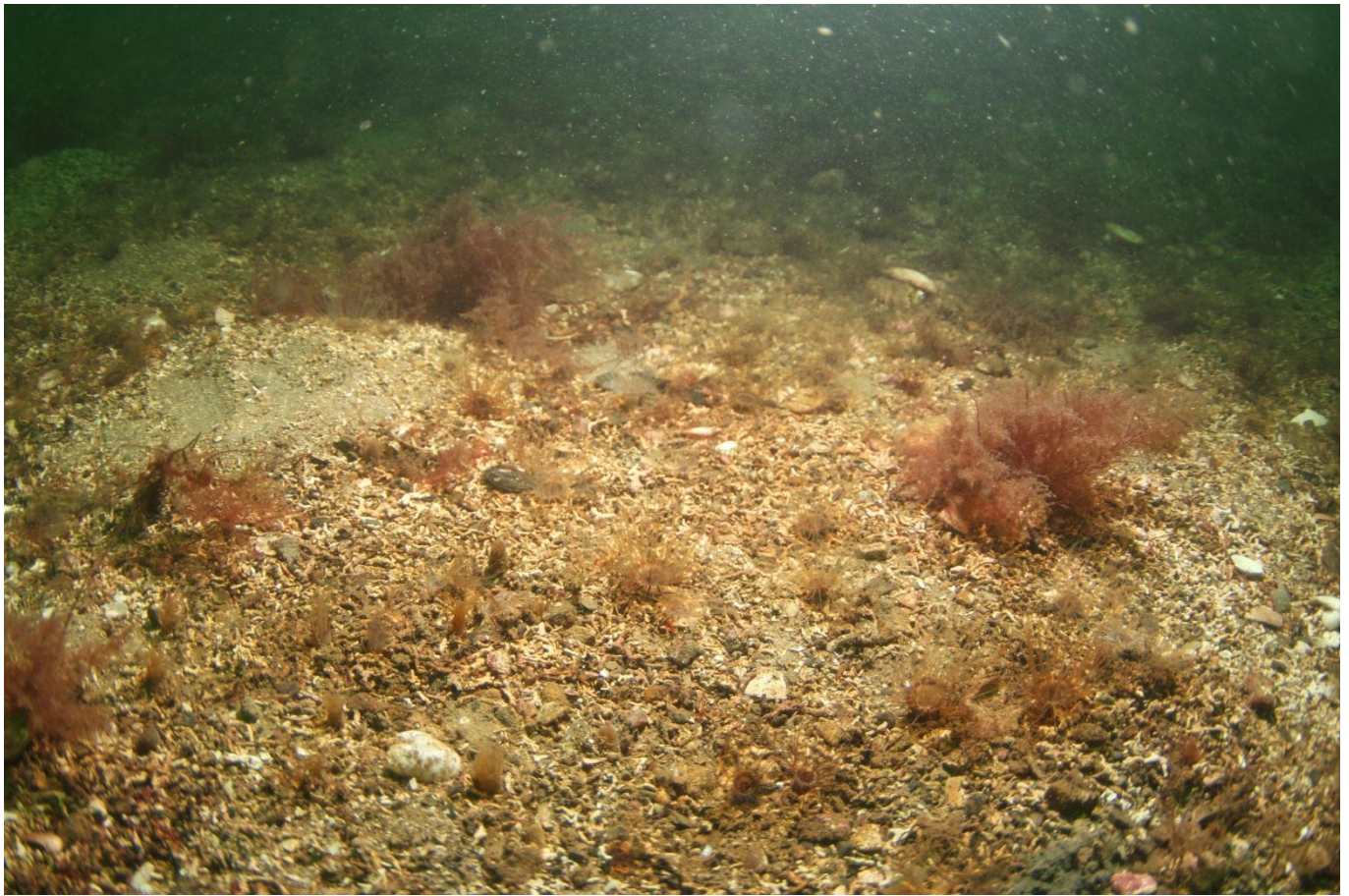


**Survey location - KC5**

PF: MB                      Biotope:                      SS.SMp.Mrl.Pcal

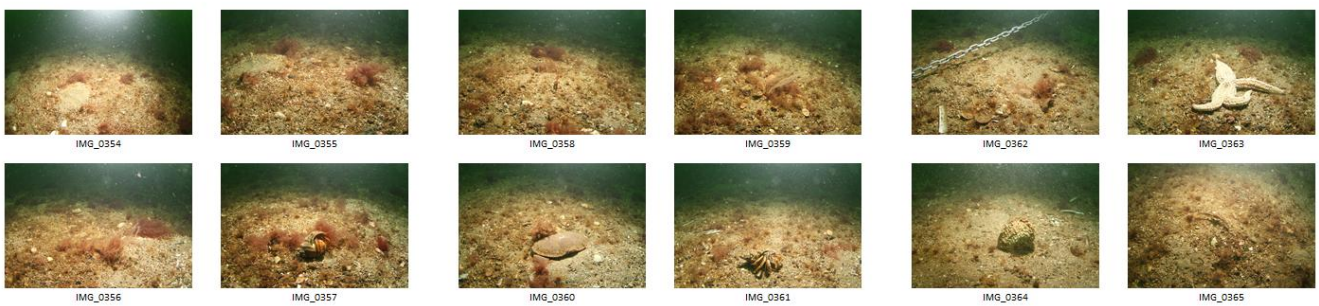
Evidence:            Images: 12            Video: yes            Seasearch form: no

**Example image showing PF**



KC5: IMG\_0355.jpg

**All images for Survey location - KC5**



**Survey location - NTZ2**

PF: MB                      Biotope:                      SS.SMp.Mrl.Pcal

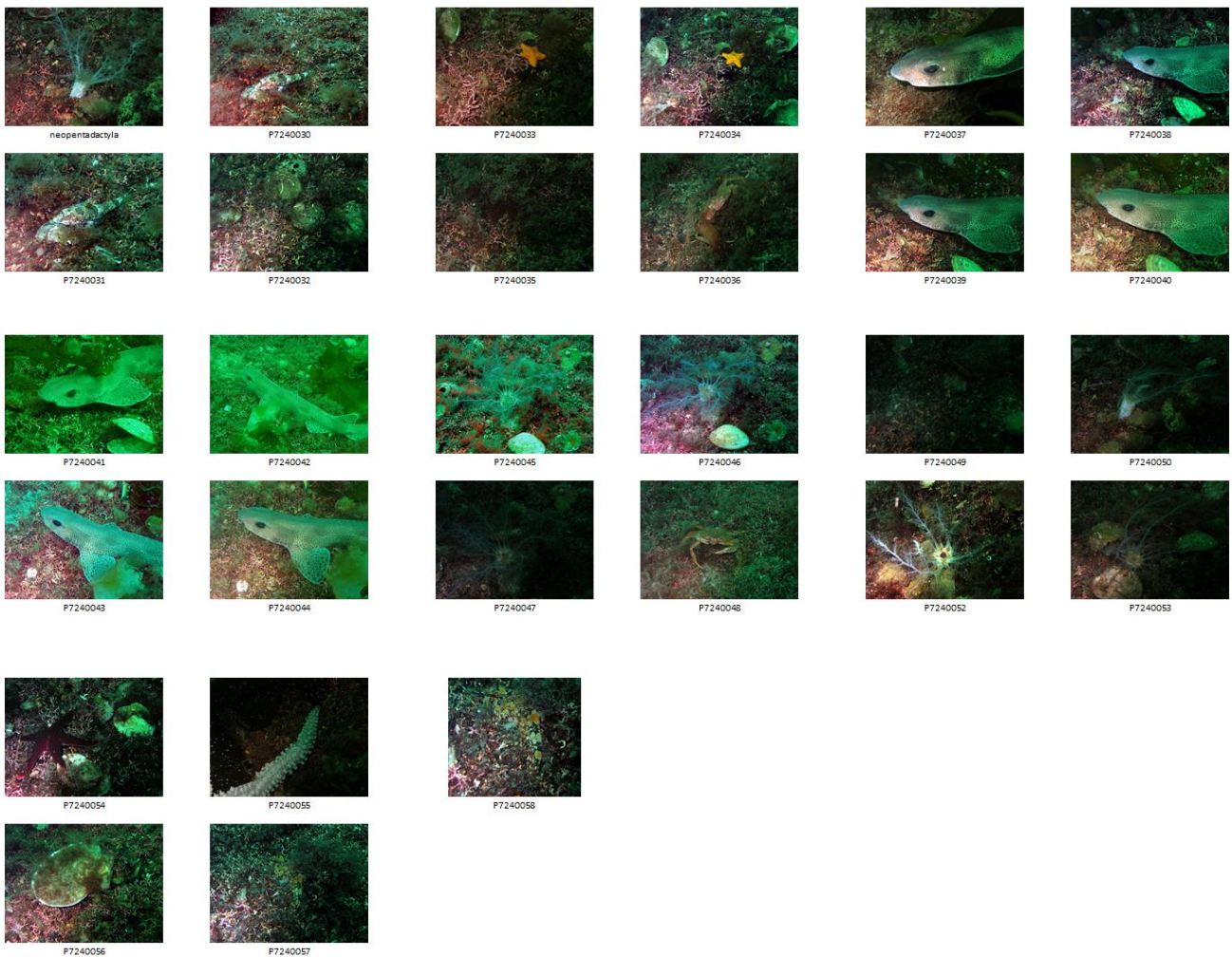
Evidence:           Images: 29           Video: no           Seasearch form: no

**Example image showing PF**



NTZ2: P7240034.jpg

**All images for survey location - NTZ2**

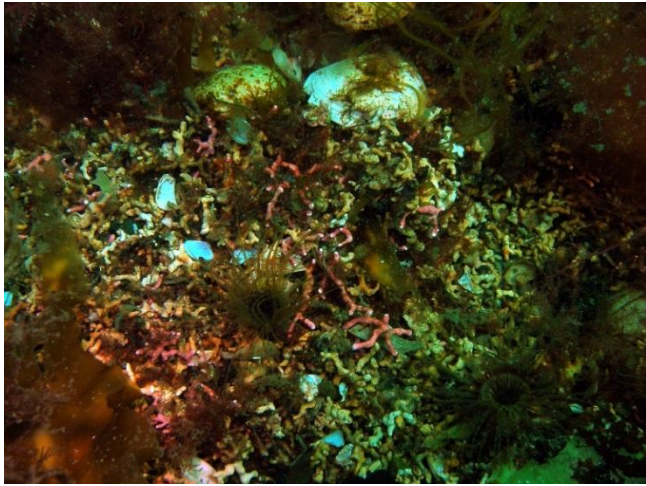


## Survey location - NTZ3

PFs: MB                      Biotopes: SS.SMp.Mrl.Pcal  
MC                              SS.SCS.CCS.Nmix

Evidence:      Images: 28      Video: no      Seasearch form: no

### Example images showing PFs

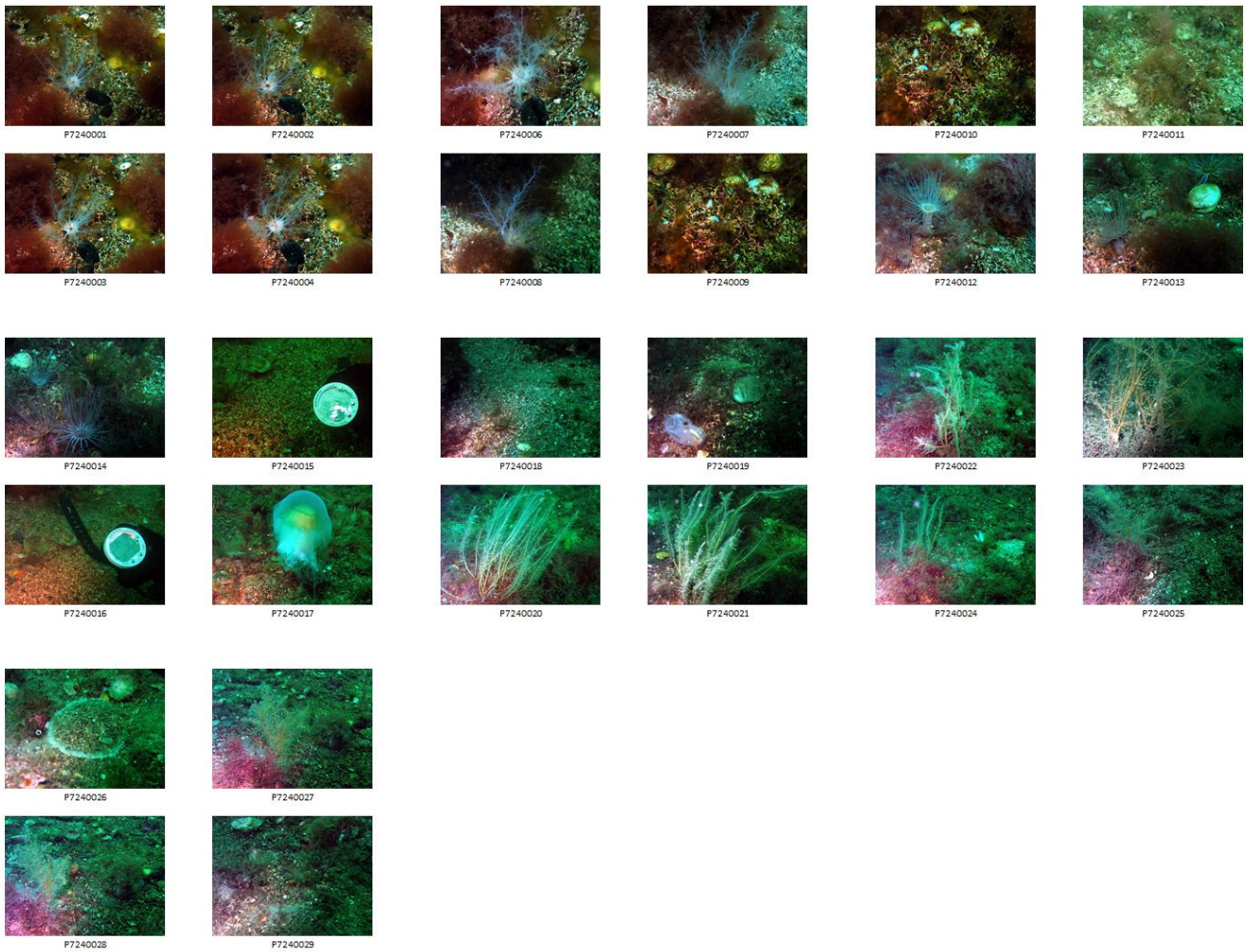


NTZ3: 7240010.jpg - MB



NTZ3: P724002.jpg - MC

### All images for survey location - NTZ3

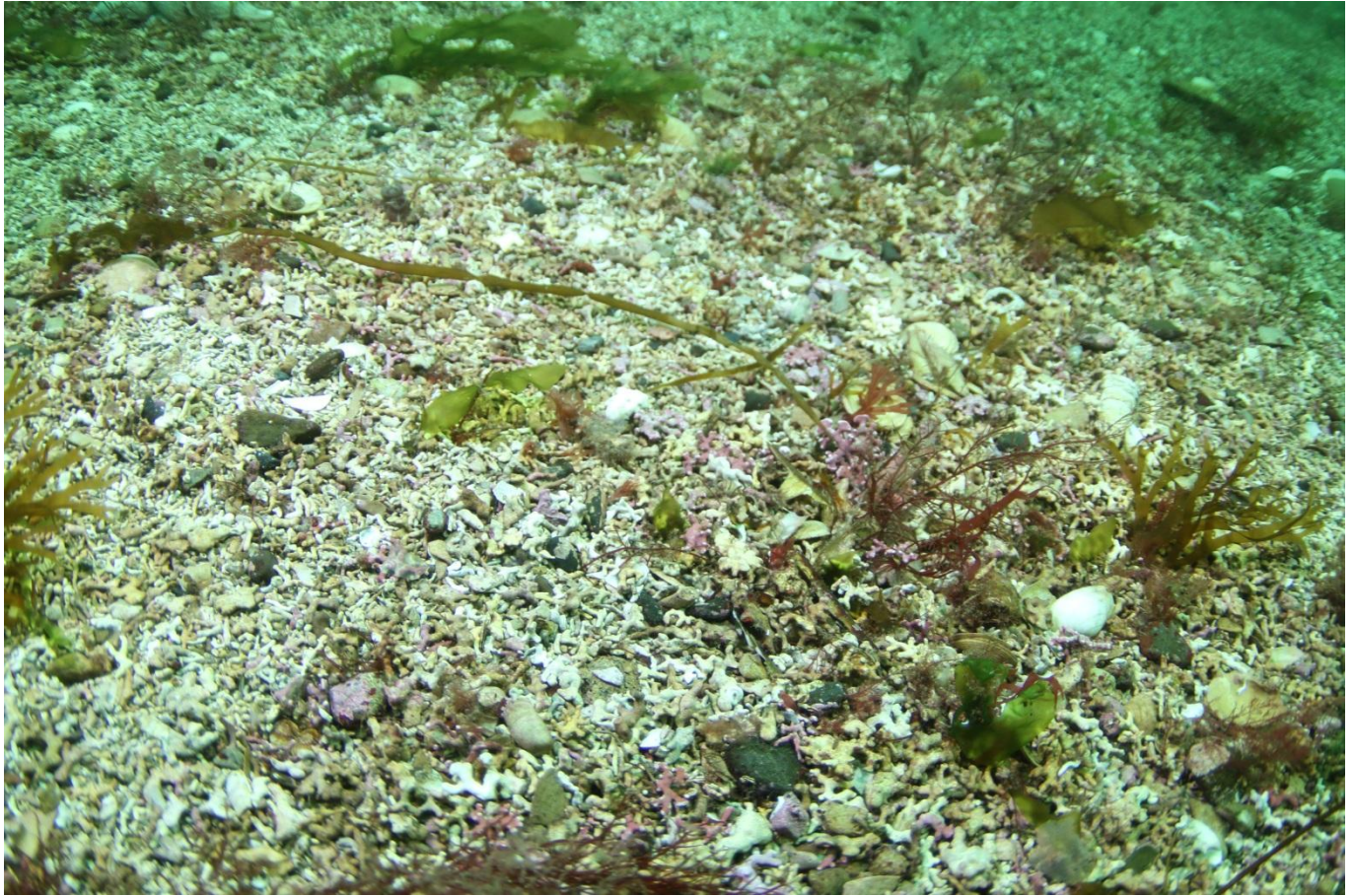


## Survey location - PR2

PF: MB                      Biotope:                      SS.SMp.Mrl.Pcal

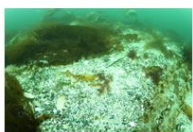
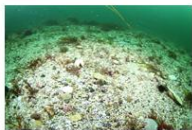
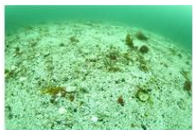
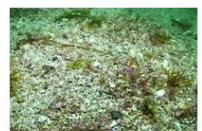
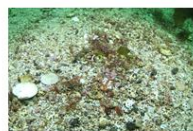
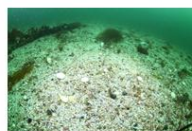
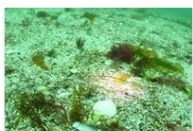
Evidence:            Images: 29            Video: yes            Seasearch form: no

### Example image showing PF



PR2: IMG\_0435.jpg

### All images for survey location - PR2



Text Box

## Survey location - PR3

PF: MB                      Biotope:                      SS.SMp.Mrl.Pcal

Evidence:            Images: 131            Video: no            Seasearch form: no

### Example image showing PF

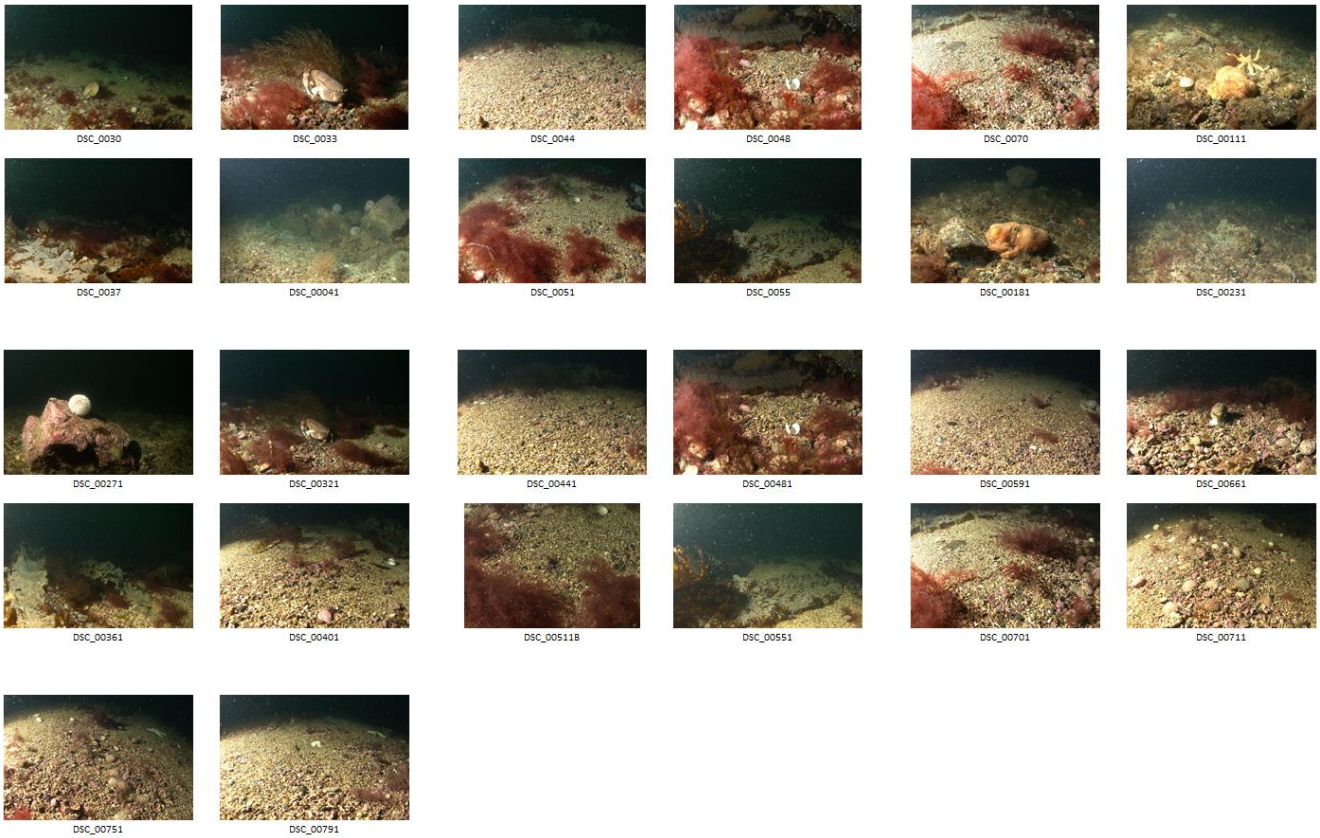


PR3: DSC\_00791B.jpg



DSC\_0045.jpg

### Selection of images for survey location - PR3 (every 4<sup>th</sup> image)



## Survey location - PW1

PF: KS                      Biotope:                      SS.SMp.KSwSS.LsacR

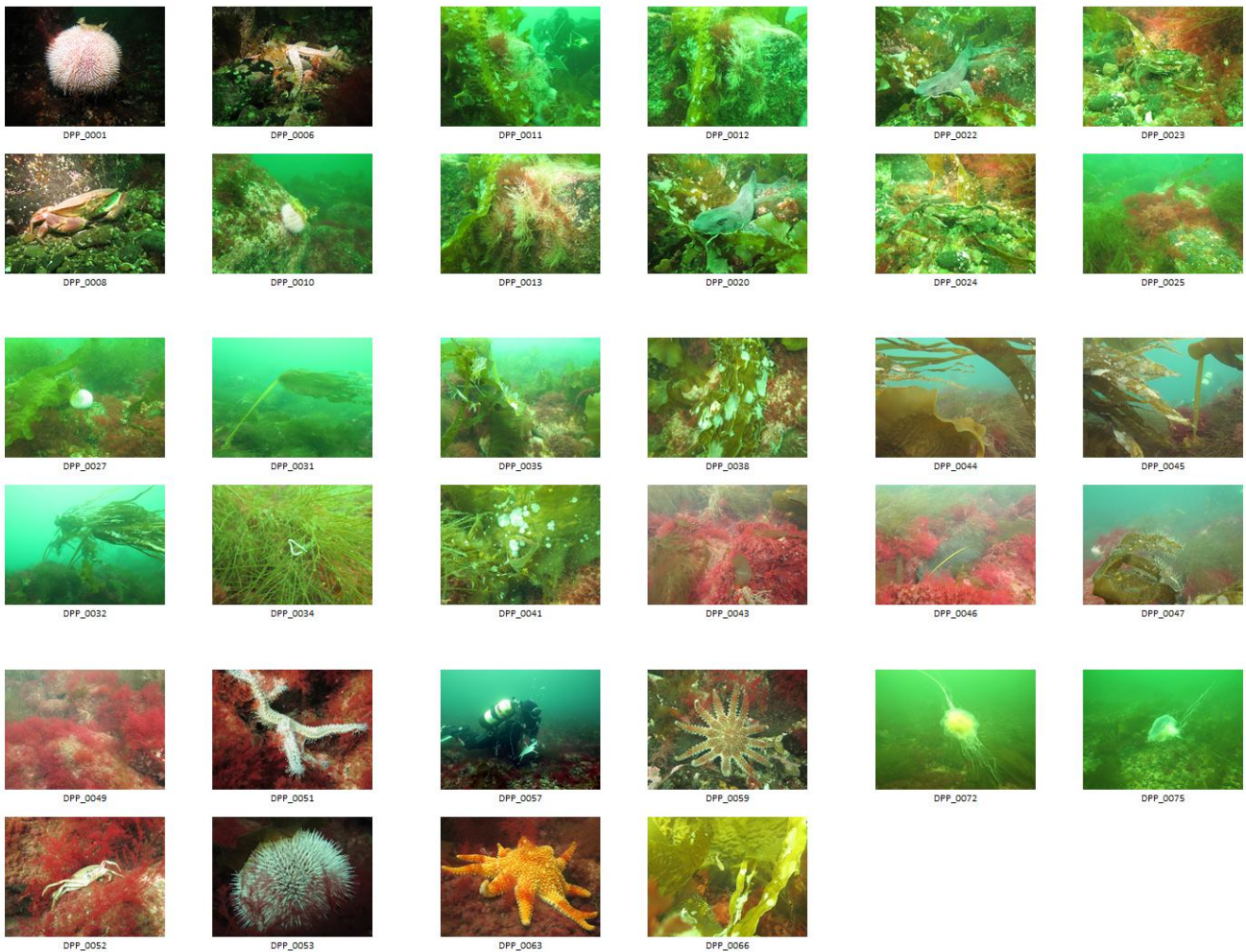
Evidence:            Images: 34            Video: no            Seasearch form: yes

### Example image showing PF



PW1: DPP\_0057.jpg

### All images for survey location - PW1



**Seasearch form for PW1**

Dive/Site details					
Site name <i>Double boulder bank S of old post</i>			Date of dive: <i>24 dd / 06 mm / 2011 yy</i>		
General location <i>OFF KILDONAN</i> <i>SOUTH ARRAN</i>			Start of dive: <i>11:40</i> (24hr)		
			Dive duration: <i>53</i> (mins)		
			Sea temperature: <i>11</i> °C		
Position (degrees and decimal minutes – state if in any other format)			Underwater visibility: <i>6</i> m		
	Latitude		Longitude		W or E
Centre of site	<i>55° 26.138</i>		<i>05° 08.285</i>		<i>W</i>
For drift dives					
From	<i>0</i>		<i>0</i>		
To	<i>0</i>		<i>0</i>		
Or OS Grid Reference			Did you or your buddy take any of the following?		
Position derived from: (circle) <input checked="" type="checkbox"/> GPS Chart <input type="checkbox"/> OS map <input type="checkbox"/> Web mapping <input checked="" type="checkbox"/> WGS84 <input type="checkbox"/> OSGB36			photographs <input checked="" type="checkbox"/> / no video footage <input type="checkbox"/> / no specimens <input type="checkbox"/> / no seaweeds for pressing <input type="checkbox"/> / no		
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input checked="" type="checkbox"/> mod exposed <input type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>			For the area surveyed, what was		
Max tidal stream: >6kt <input type="checkbox"/> 3-6kt <input type="checkbox"/> 1-3kt <input type="checkbox"/> <1kt <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>			the shallowest depth? (m) <i>9</i> bsl <input type="checkbox"/> bcd the deepest depth? (m) <i>13.5</i> bsl <input type="checkbox"/> bcd		
			Tidal correction to chart datum <input type="checkbox"/> m*		

**Seabed summary**

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

*Boulder bank sloping upwards to the N, with a ridge and then a second boulder bank sloping down towards the N. Beds of sugar kelp, red algal turf encrusting boulder and shoals of juvenile gobbling wrasse.*

### Habitat descriptions

Complete a box below for each *habitat* you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

#### 1. DESCRIPTION (physical + community)

Sloping bank littered with boulders. Encrusting red algal turf on boulders. Kelp beds - many individuals covered with bryozoans. Depth from 12-9 m.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

#### 2. DESCRIPTION (physical + community)

Gravel and cobbles inbetween larger boulders. Depth from 13-11 m. Encrusting pink algae and red seaweeds = *Agardhiopsis* & ENCRUSTING BRYZOEANS

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

#### 3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

1	2	3	
m			DEPTH LIMITS
9	12		Upper (from sea level) (i.e. minimum)
12	13		Lower (from sea level) (i.e. maximum)
			Upper (from chart datum) *
			Lower (from chart datum) *

%			SUBSTRATUM
			Bedrock type?
			Boulders - very large > 1.0 m
20	10		- large 0.5 - 1.0 m
20	30		- small 0.25 - 0.5 m
			Cobbles (fist - head size)
30			Pebbles (50p - fist size)
30	30		Gravel - stone
<del>40</del>	30		- shell fragments
			Sand - coarse
			- medium
			- fine
			Mud
			Shells (empty - or as large pieces)
			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
			Other (state)
100	100	100	Total

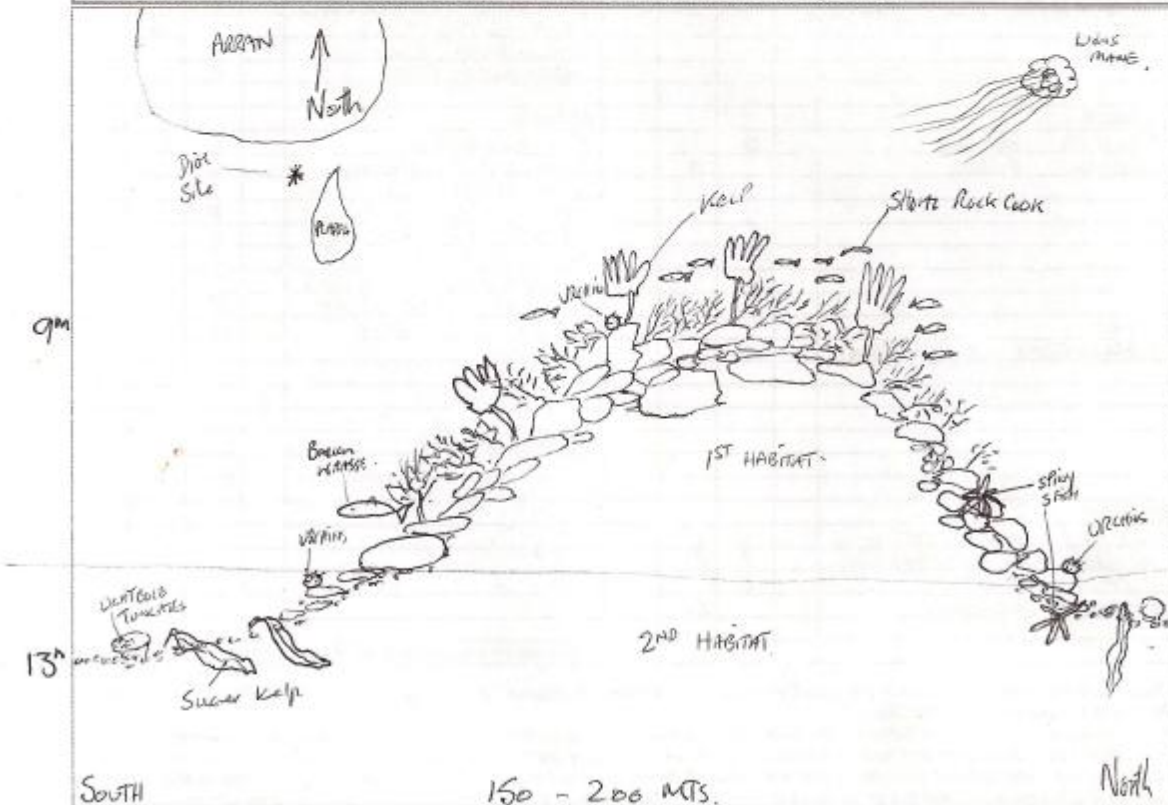
1	2	3	
1-5			FEATURES - ROCK (all categories)
4	3		Relief of habitat (even - rugged)
2	2		Texture (smooth - pitted)
2	2		Stability (stable - mobile)
2	2		Scour (none - scoured)
1	1		Silt (none - silted)
3	1		Fissures > 10 mm (none - many)
4	1		Crevices < 10 mm (none - many)
R1	R1		Boulder/cobble/pebble shape (rounded - angular)
			Sediment on rock? (tick if present)

✓			FEATURES - SEDIMENT (1)
			Mounds / casts
			Burrows / holes
			Waves (>10 cm high)
			Ripples (< 10 cm high)
			Subsurface coarse layer?
			Subsurface anoxic (black) layer?

1-5			FEATURES - SEDIMENT (2)
			Firmness (firm - soft)
			Stability (stable - mobile)
			Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance scale** (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.



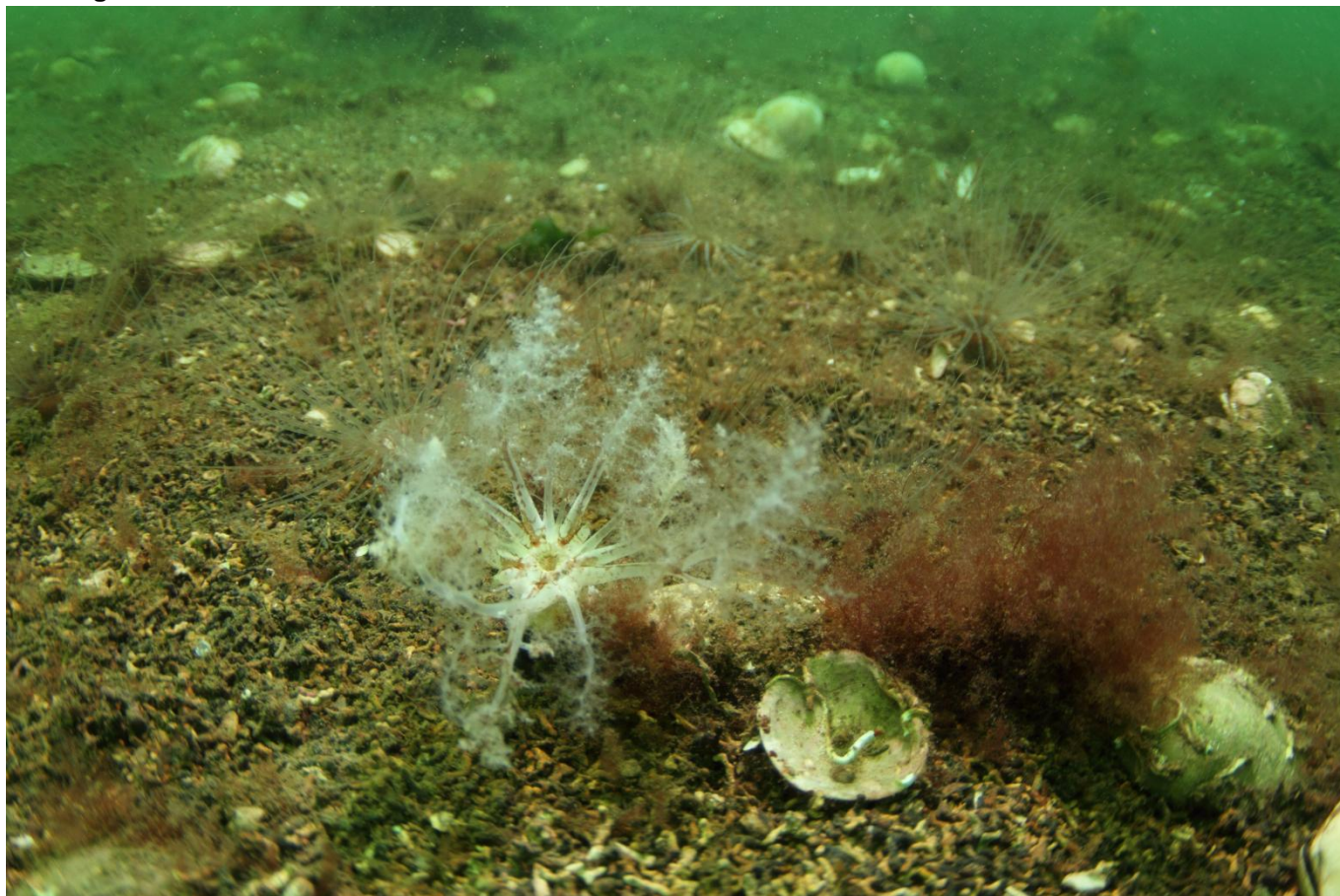


**Survey location - SB1**

PF: MB Biotope: SS.SMp.Mrl.Pcal.Nmix

Evidence: Images: 1 Video: yes (x4) Seasearch form: no

**All images for SB1**



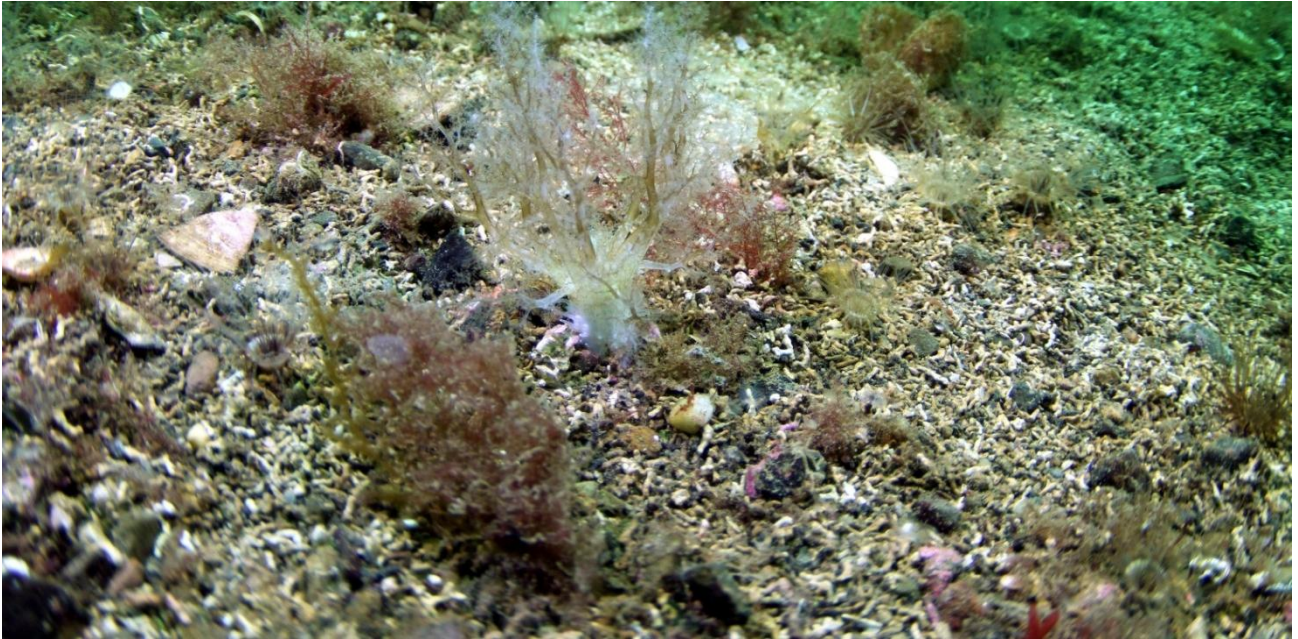
SB1: IMG\_0127.tif

## Survey location - SB2

PF: MB Biotope: SS.SMp.Mrl.Pcal.Nmix

Evidence: Images: 34 Video: yes (x3) Seasearch form: no

### Example image showing PF



SB2: IMG\_0465 .jpg

### All images for survey location - SB2

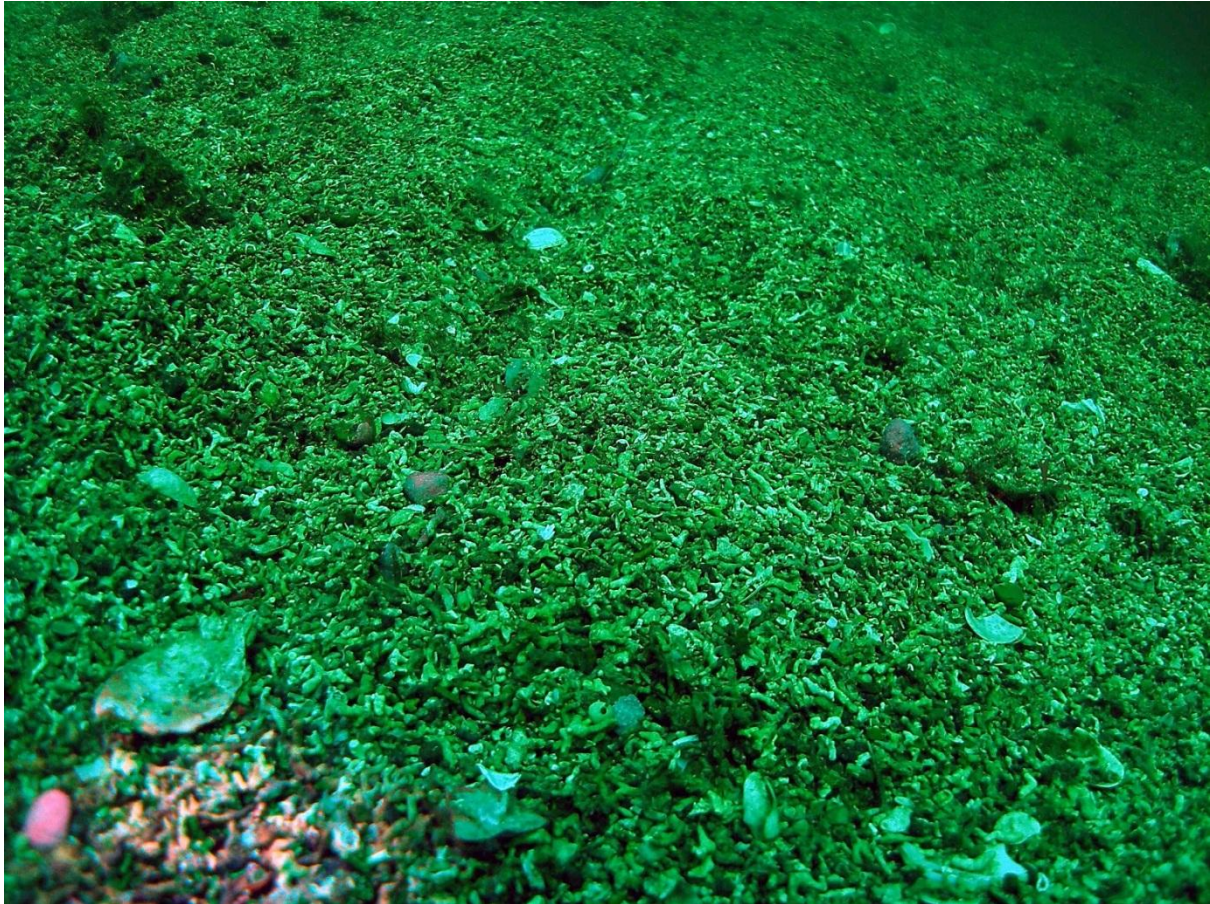


**Survey location - SB4**

PF: MB                      Biotope:                      SS.SMp.Mrl.Pcal

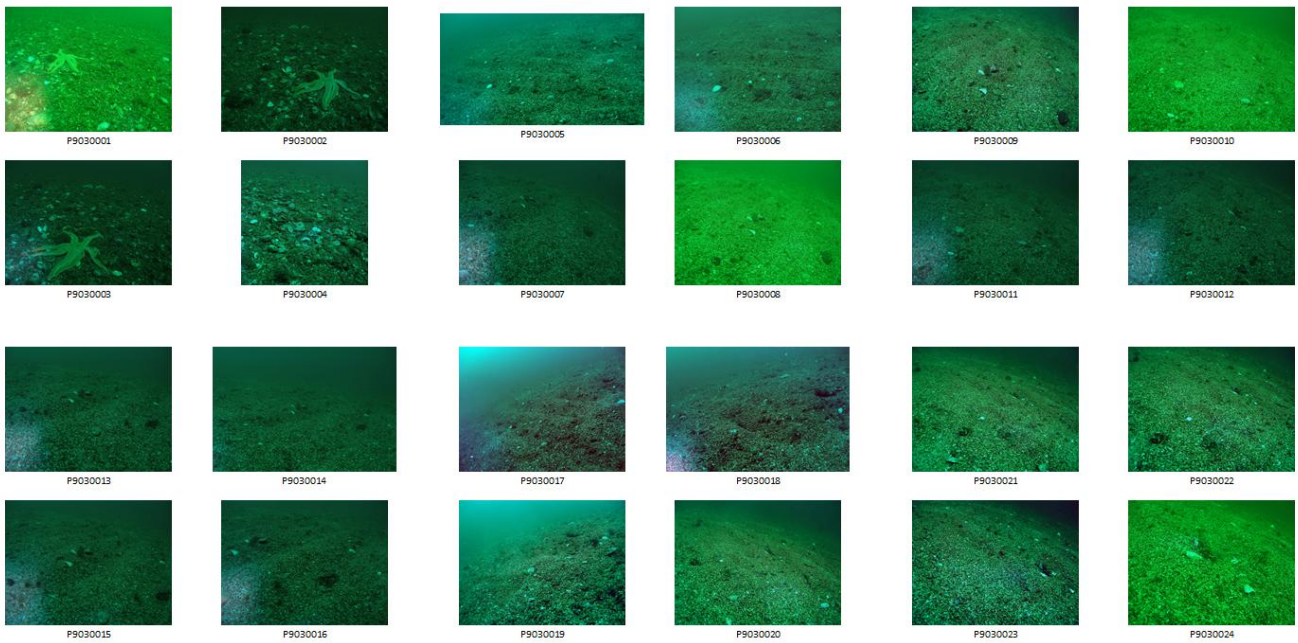
Evidence:              Images: 55              Video: no              Seasearch form: no

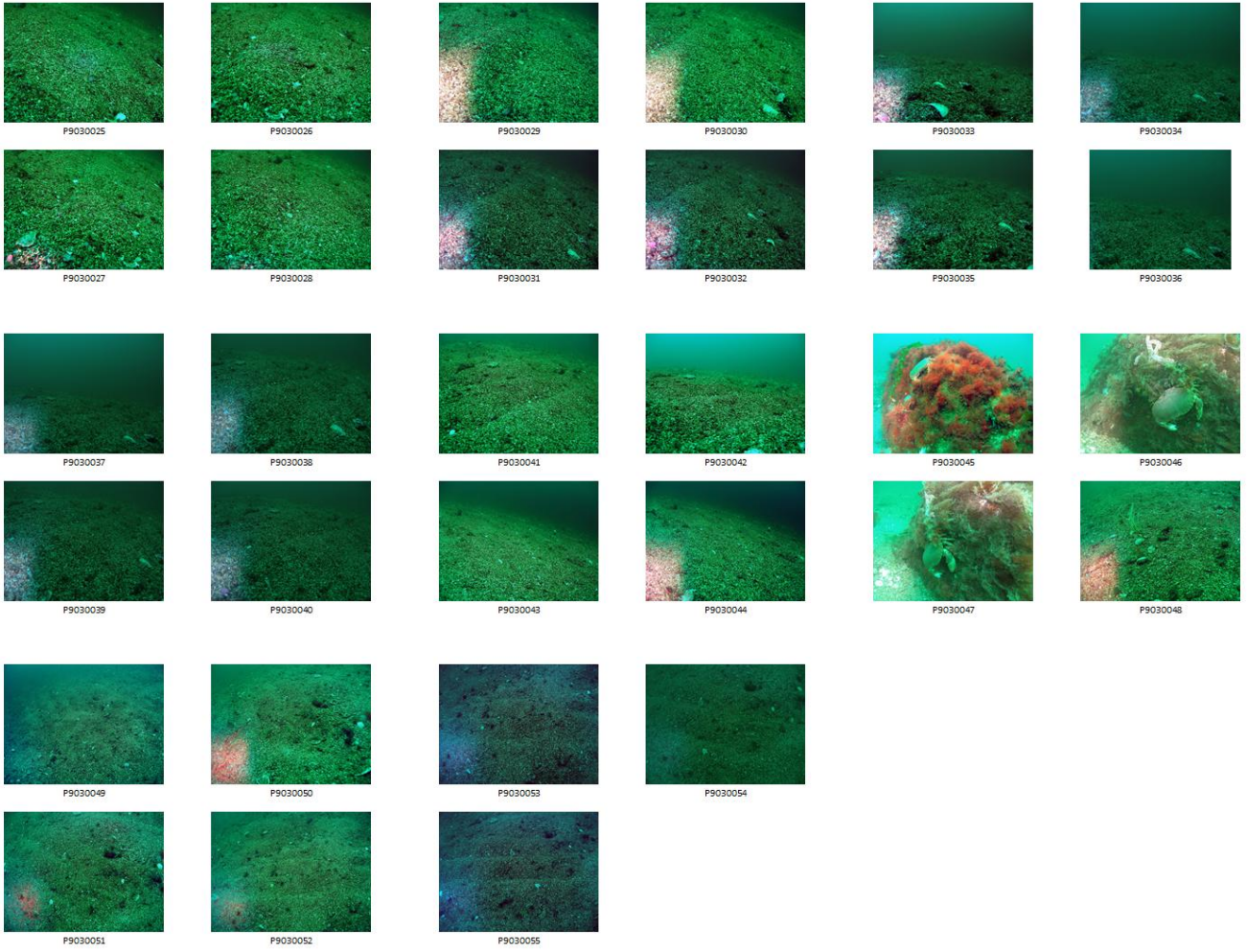
**Example image showing PF**



SB4: P9030027.jpg

**All images for survey location - SB4**





**Survey location - SB5**

PF: KS                      Biotope: SS.SMp.KSwSS.LsacR.Gv

Evidence: Images: no      Video: no      Seasearch form: yes

**SB5 Seasearch form**

**Dive/Site details**

Site name <b>HOLY ISLE SOUTH</b>				Date of dive: <b>30</b> dd / <b>06</b> mm / <b>2012</b> yy	
General location <b>SOUTH OF HOLY ISLE (JUST PAST LIGHTHOUSE) LARGISH BAY ISLE OF ARRAN</b>				Start of dive: <b>3 : 42</b> (24hr)	
				Dive duration: <b>40</b> (mins)	
				Sea temperature: <b>11</b> °C	
Position (degrees and decimal minutes – state if in any other format)				Underwater visibility: <b>6</b> m	
	Latitude	Longitude	W or E	Drift dive? yes / <b>(no)</b>	
Centre of site	<b>55° 30.559</b>	<b>5° 03.930</b>	<b>W</b>	Night dive? yes / <b>(no)</b>	
For drift dives				Did you or your buddy take any of the following?	
From	0	0		photographs	<b>(yes)</b> no
To	0	0		video footage	yes / <b>(no)</b>
Or OS Grid Reference				specimens	
Position derived from: (circle)                      GPS Datum (circle)				seaweeds for pressing	
GPS	Chart	OS map	Web mapping	WGS84	OSGB36
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input type="checkbox"/>				For the area surveyed, what was	
mod exposed <input checked="" type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>				the shallowest depth? (m) <b>9.0</b> bsl <input type="checkbox"/> bcd	
Max tidal stream:				the deepest depth? (m) <b>11.9</b> bsl <input type="checkbox"/> bcd	
>6kt <input type="checkbox"/> 3-6kt <input type="checkbox"/> 1-3kt <input type="checkbox"/> <1kt <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>				Tidal correction to chart datum <input type="checkbox"/> m*	

**Seabed summary**

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

a) **FAIRLY GRAVEL SLOPING SEA BED WITH OCCASIONAL Boulders**  
**FAUNAL TURF, PREDOMINANTLY FEATHER STARS.**

b) **LARGE NUMBERS OF FEATHER STARS + SEA SPIDERS**

c) **SUGGESTED EVIDENCE OF DRIFTING, BUT GOOD-SIZED SCALLOPS PRESENT.**

**Habitat descriptions**

Complete a box below for each **habitat** you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

**1. DESCRIPTION (physical + community)**

BOULDERS WITH PREDOMINANTLY FAUNAL TURF - MAINLY CRINOIDS - AND SOME FILAMENTOUS RED ALGAE.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

**2. DESCRIPTION (physical + community)**

MAERL GRAVEL WITH SCALLOPS + LOTS OF (BROKEN) AND EMPTY SHELLS. OCCASIONAL LARGE SACCHARINA LATISSIMA.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

**3. DESCRIPTION (physical + community)**

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

near

1	2	3	
m			<b>DEPTH LIMITS</b>
9.0	11.0		Upper (from sea level) (i.e. minimum)
11.0	14.9		Lower (from sea level) (i.e. maximum)
			Upper (from chart datum) *
			Lower (from chart datum) *

%			<b>SUBSTRATUM</b>
			Bedrock type?:
50			Boulders - very large > 1.0 m
20			- large 0.5 - 1.0 m
30			- small 0.25 - 0.5 m
			Cobbles (fist - head size)
	30		Pebbles (50p - fist size)
			Gravel - stone
			- shell fragments
			Sand - coarse
			- medium
			- fine
			Mud
	20		Shells (empty - or as large pieces)
			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
	30		Other (state) <b>MAEEL CA 50% LIVING</b>
100	100	100	Total

middle near

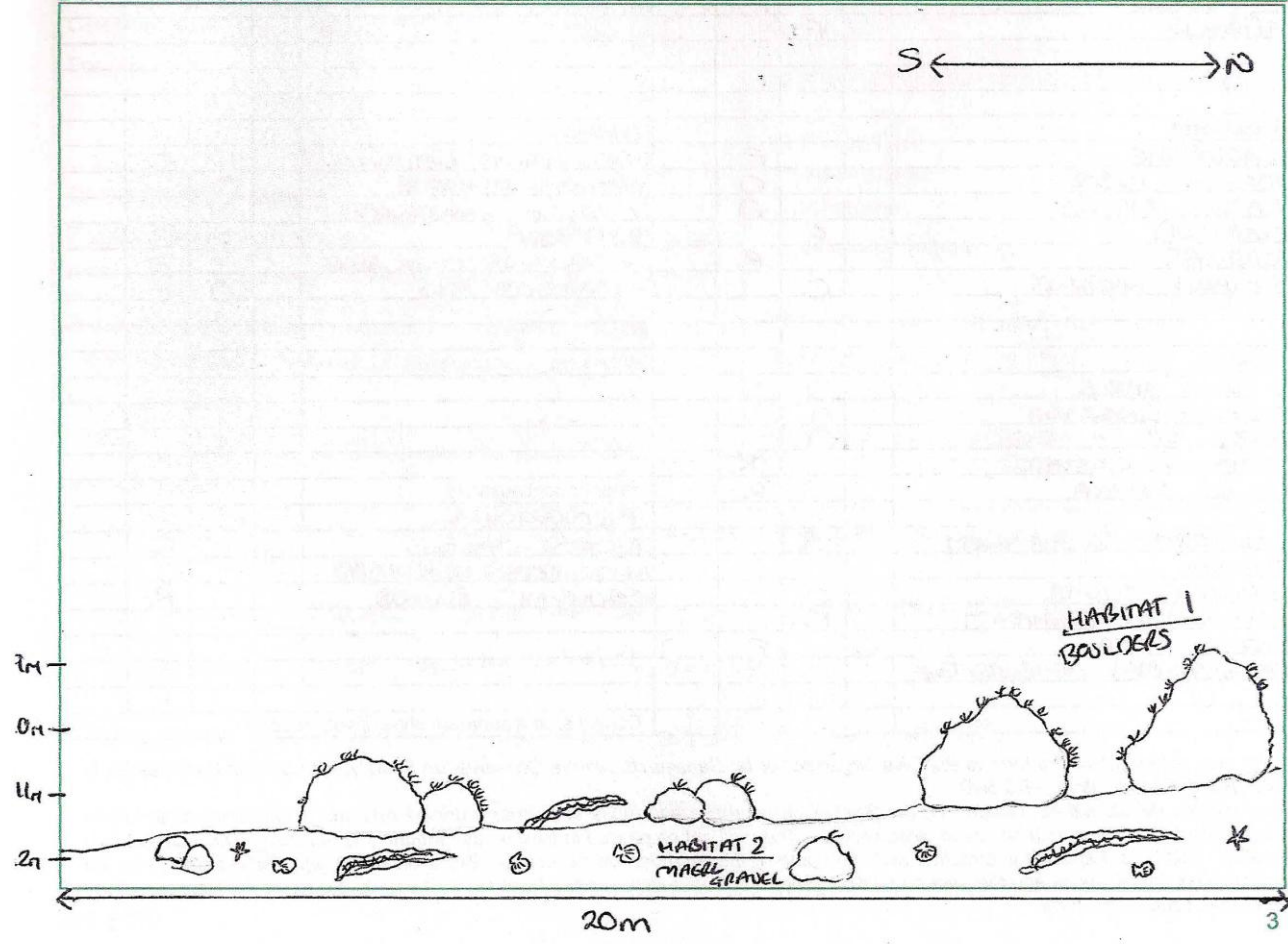
1	2	3	
1-5			<b>FEATURES - ROCK (all categories)</b>
4			Relief of habitat (even - rugged)
			Texture (smooth - pitted)
2			Stability (stable - mobile)
1			Scour (none - scoured)
2			Silt (none - silted)
			Fissures > 10 mm (none - many)
			Crevices < 10 mm (none - many)
3			Boulder/cobble/pebble shape (rounded - angular)
			Sediment on rock? (tick if present)

✓			<b>FEATURES - SEDIMENT (1)</b>
			Mounds / casts
	✓		Burrows / holes
			Waves (>10 cm high)
			Ripples (< 10 cm high)
			Subsurface coarse layer?
			Subsurface anoxic (black) layer?

1-5			<b>FEATURES - SEDIMENT (2)</b>
3			Firmness (firm - soft)
3			Stability (stable - mobile)
5			Sorting (well - poor)

**Sketches and plans**

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance scale** (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.



Species List

DAY 1 DIVE 2

Score the abundance of each group of animals and plants in each habitat alongside the name. In the blank spaces list the seaweeds & animals which you were able to identify positively from the different habitats. Use latin names if possible, but if you don't know them, common or descriptive names are acceptable. If you are not 100% sure about any, add a question mark. Do not enter names as guesses - it's better to exclude them than to include incorrect identifications. Give abundances in the columns: Super abundant, Abundant, Common, Frequent, Occasional & Rare. If you did not note abundances, simply enter a P for Present. Continue on a separate sheet, if necessary. If you have a photograph of the species tick the ph column.

	ph	1	2	3		ph	1	2	3
sponges					echinoderms				
					PORANIA PULVILLUS			O	
					LUIDIA QUARS			O	
					MERCURIA			O	
					ASTROPECTEN IRREGULARIS			R	
					CROSSASTER PAPPOSUS			R	
					ANTEDON BIFIDA		A	O	
					ECHINUS ESCULENTUS		O		
					PARATHALASSIA GLACIALIS		O	O	
					HELOTHURIDAE			R	
cnidarians: hydroids, anemones, corals,					sea squirts				
CERASTIUM LYCIDIUM			F		CLONA INTESTINALIS		R		
NOBILITIA ANTENNATA		F			CORELLA PARALLELOGRAMMA		O	O	
NEPTHECIA RAIOSA		F			CLAVELINA LEPTOCEPHALA		F		
					ASCIDIUM APERISTUM			O	
					fishes				
					Gobiusscolus flavescens		O		
					Gobiidae			O	
worms									
Panatocecos			F						
Spiracles		F							
crustaceans					seaweeds				
Paguridae			F		Saccharina latissima			O	
Negrea puber			O		Dicyota achnota		O		
Cancer pagurus			O		Desmarestia saevissima		F		
Curippedia		F			Desmarestia			O	
Caridea			P		Encrusting pink algal			O	
Homarus gammarus		O			Filamentous reds		O	O	
molluscs									
Gibbula magus		O			other or continuations				
Gibbula cineraria		O			Pycnogonida		C		
Doto sp + eggs		O			Pecten maximus			C	
Janus cristatus			R		Aequipecten opercularis			C	
Ancora sulcata			R		Faucinus blandus			R	
Callostoma zizyphinum		R							
bryozoans									
Bugula flabellata		O							
Alcyonidium diaphanum		O							
Electra pilosa			F						
Membranipora membranacea			F						

Continue on a separate sheet if you need to

Once completed, return the form to the Dive Organiser or to: Seasearch, Marine Conservation Society, Unit 3, Wolf Business Park, Alton Road, Ross on Wye, HR9 5NB.

Your contact details will be included on the Seasearch database and those of partner organisations and will be used to send you information about Seasearch and associated projects. They will not be passed to third parties without your consent. The location, dive details, habitats and species information and the name of the recorder will be entered into a database and made available to the participating organisations and the general public through the Seasearch and NBN websites. If you do not agree with this use of the data do not submit the form.

**Survey location - SB6**

PF: KS                      Biotope: SS.SMp.KSwSS.LsacR

Evidence: Images: no      Video: no      Seasearch form: yes

**Seasearch form for SB6**

**Dive/Site details**

Site name <b>OFF PILLAR ROCK POINT, HOLY ISLE</b>				Date of dive: <b>30</b> dd / <b>06</b> mm / <b>12</b> yy	
General location <b>LAMLASH BAY, EAST ISLE OF ARRAN, FIRTH OF CLYDE</b>				Start of dive: <b>15 : 32</b> (24hr)	
				Dive duration: <b>42</b> (mins)	
				Sea temperature: <b>11</b> °C	
Position (degrees and decimal minutes – state if in any other format)				Underwater visibility: <b>10</b> m	
	Latitude		Longitude		W or E
Centre of site	<b>55</b> °	<b>30.875</b>	<b>05</b> °	<b>03.443</b>	<b>W</b>
For drift dives					
From	0		0		
To	0		0		
Or OS Grid Reference				Did you or your buddy take any of the following?	
Position derived from: (circle)                      GPS Datum (circle)				photographs <b>CD &amp; TK</b> <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	
GPS	Chart	OS map	Web mapping	WGS84	OSGB36
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input checked="" type="checkbox"/>				video footage <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	
mod exposed <input type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>				specimens <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	
Max tidal stream:				seaweeds for pressing <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	
>6kt <input type="checkbox"/> 3-6kt <input type="checkbox"/> 1-3kt <input type="checkbox"/> <1kt <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>				For the area surveyed, what was	
				the shallowest depth? (m) <b>9</b> bsl <input type="checkbox"/> bcd	
				the deepest depth? (m) <b>22.6</b> bsl <input type="checkbox"/> bcd	
				Tidal correction to chart datum <input type="checkbox"/> m*	

**Seabed summary**

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

a. BANK OF DEAD MAERL/SHELL GRAVEL/FINE SAND/MUD/PEBBLES WITH MACRO-ALGAE DECLENDING QUITE STEEPLY TO ZOW AND BEYOND. CRUSTACEANS AND STARFISH NUMEROUS

b. GREY GURNARD

c. MANY BROKEN ENSIS SHELLS ZOW+ AND A NOTICEABLE DECLINE IN VISIBILITY – POSSIBLE CONSEQUENCE OF DREDGING?

**Habitat descriptions**

Complete a box below for each **habitat** you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

1. DESCRIPTION (physical + community)

SHALLOW FLAT PORTION OF BANK OF MIXED SEDIMENT (DEAD MAERL/SHELL GRAVEL/FINE SAND/MUD/PEBBLES) WITH RED AND BROWN MACRO-ALGAE AND NUMEROUS CRAISS (*L. depurator*, *C. paganus*, *N. puber*) AND STARFISH (*Por. pul.*, *Mar. gla.*, *Lui. cil.*). ABUNDANT *Cer. Uo.*

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

2. DESCRIPTION (physical + community)

SLOPING MIXED SEDIMENT - AS ABOVE WITH LESS PEBBLES AND MORE BROKEN SHELLS - DESCENDING BELOW THE MACROALGAE ZONE TO 22m AND BEYOND AT WHICH DEPTH THERE WAS AN INCREASE IN BROKEN *ENUS* SHELLS AND REDUCED VISIBILITY.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

1	2	3	
m			<b>DEPTH LIMITS</b>
9	12.5		Upper (from sea level) (i.e. minimum)
12.5	22.6		Lower (from sea level) (i.e. maximum)
			Upper (from chart datum) *
			Lower (from chart datum) *

%			<b>SUBSTRATUM</b>
			Bedrock type?:
			Boulders - very large > 1.0 m
			- large 0.5 - 1.0 m
			- small 0.25 - 0.5 m
3	1		Cobbles (fist - head size)
15	9		Pebbles (50p - fist size)
5	5		Gravel - stone
30	20		- shell fragments ( <del>fine</del> <del>MAERL</del> )
			Sand - coarse
			- medium
			- fine
6	5		Mud
6	5		
15	25		Shells (empty - or as large pieces)
			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
30	30		Other (state) MAERL (DEAD)
100	100	100	<b>Total</b>

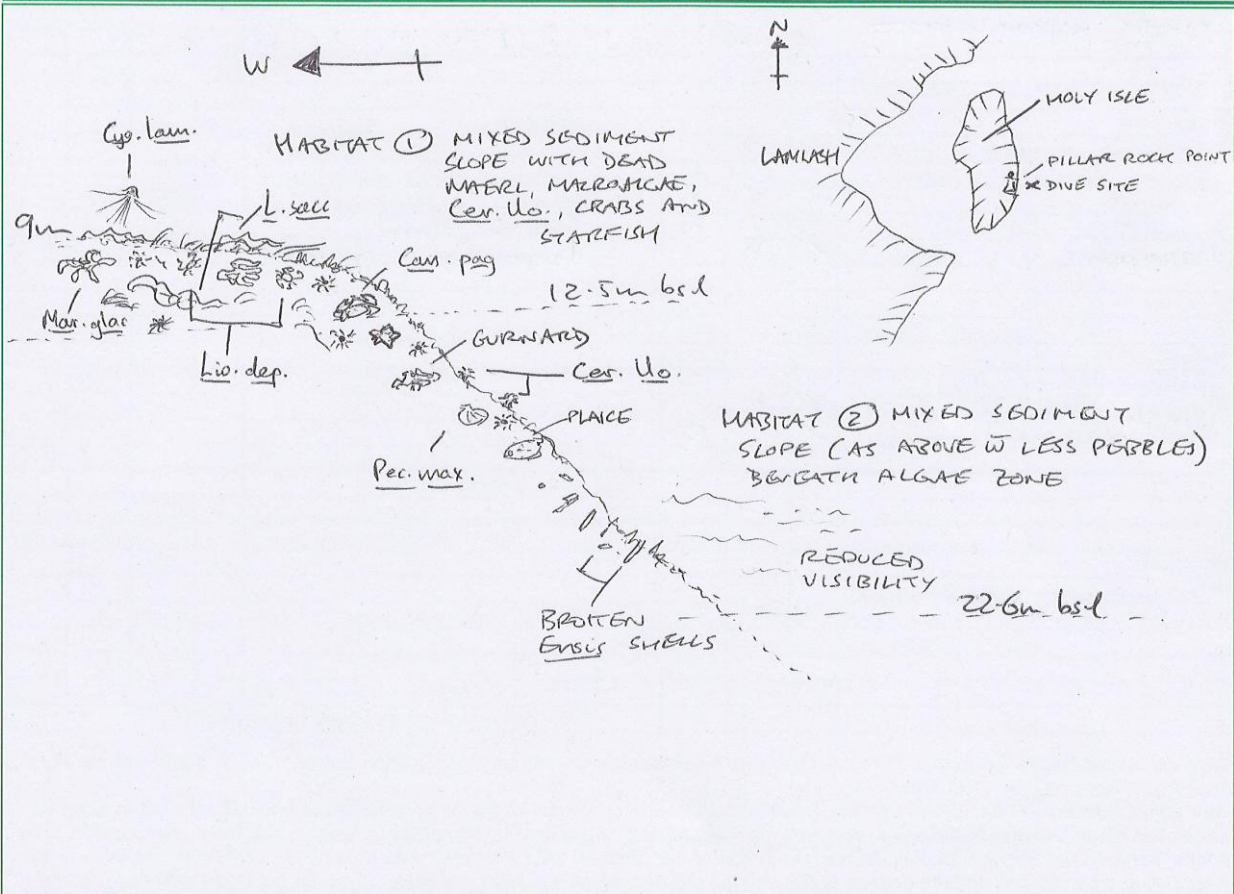
1	2	3	
1-5			<b>FEATURES - ROCK (all categories)</b>
			Relief of habitat (even - rugged)
			Texture (smooth - pitted)
			Stability (stable - mobile)
			Scour (none - scoured)
			Silt (none - silted)
			Fissures > 10 mm (none - many)
			Crevices < 10 mm (none - many)
			Boulder/cobble/pebble shape (rounded - angular)
			Sediment on rock? (tick if present)

			<b>FEATURES - SEDIMENT (1)</b>
✓	✓		Mounds / casts
✓	✓		Burrows / holes
			Waves (>10 cm high)
			Ripples (< 10 cm high)
✓	✓		Subsurface coarse layer?
			Subsurface anoxic (black) layer?

1-5			<b>FEATURES - SEDIMENT (2)</b>
3	3		Firmness (firm - soft)
3	3		Stability (stable - mobile)
5	5		Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance** scale (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.





**Survey location - SB8**

PF: MB                      Biotope:                      SS.SMp.Mrl

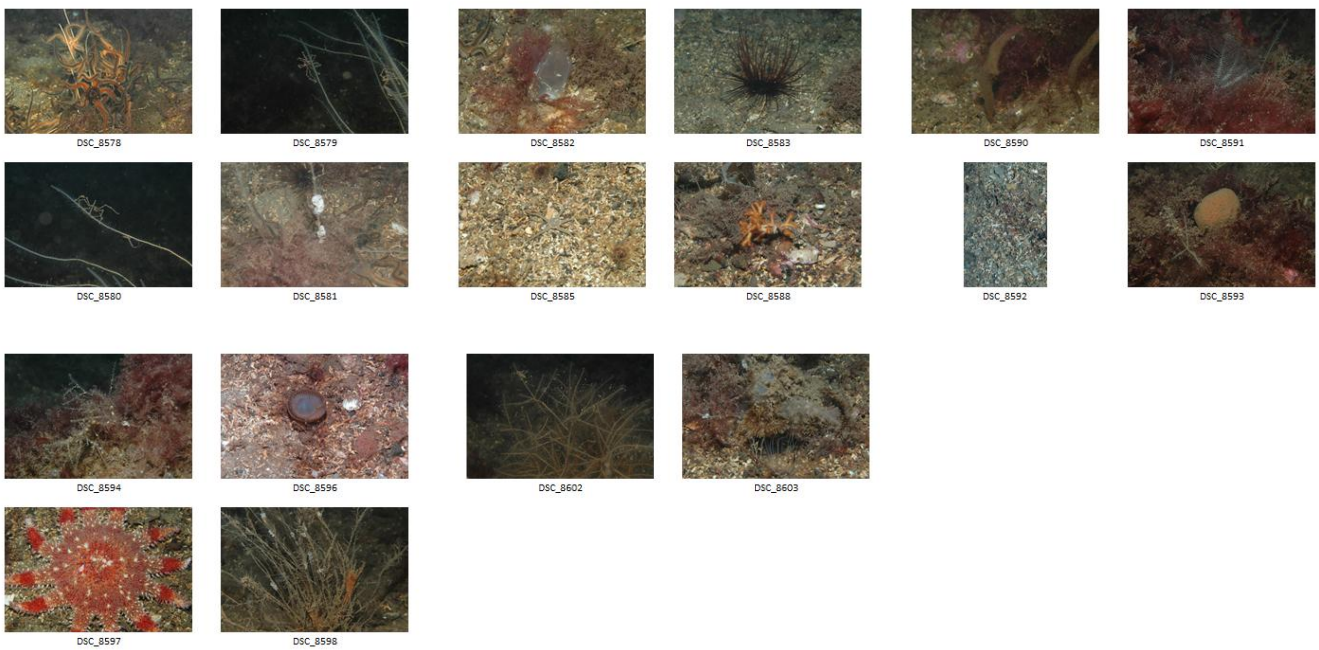
Evidence:              Images: 18              Video: no              Seasearch form: yes

**Example image showing PF**



SB8: DSC8592.jpg

**All images for survey location - SB8**



# Seasearch form for SB8

## Dive/Site details

Site name <u>HOLY ISLAND SOUTH (2)</u>					Date of dive: <u>30 dd / 06 mm / 12 yy</u>	
General location <u>LAMLASH BAY, ISLE OF ABERN, WEST COAST OF SCOTLAND</u>					Start of dive: : (24hr)	
					Dive duration: <u>40</u> (mins)	
					Sea temperature: <u>11</u> °C	
Position (degrees and decimal minutes – state if in any other format)					Underwater visibility: <u>8-10</u> m	
	Latitude		Longitude		W or E	Drift dive? yes / <u>no</u>
Centre of site	<u>55°</u>	<u>30.435</u>	<u>05°</u>	<u>03.940</u>	<u>W</u>	Night dive? yes / <u>no</u>
For drift dives						Did you or your buddy take any of the following?  photographs <u>yes</u> / no video footage yes / <u>no</u> specimens yes / <u>no</u> seaweeds for pressing yes / <u>no</u>
From	°		°			
To	°		°			
Or OS Grid Reference						
Position derived from: (circle) GPS Datum (circle)						
GPS	Chart	OS map	Web mapping	WGS84	OSGB36	
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input type="checkbox"/> mod exposed <input checked="" type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>					For the area surveyed, what was	
Max tidal stream:					the shallowest depth? (m) <u>12.8</u> bsl <input type="checkbox"/> bcd	
>6kt <input type="checkbox"/>	3-6kt <input type="checkbox"/>	1-3kt <input type="checkbox"/>	<1kt <input checked="" type="checkbox"/>	v. weak <input type="checkbox"/>	the deepest depth? (m) <u>13.2</u> bsl <input type="checkbox"/> bcd	
					Tidal correction to chart datum <input type="checkbox"/> m*	

B 1200 C 47

## Seabed summary

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

- a) The site was dominated by maerl gravel, broken shell sediment with pebbles, cobbles and boulders - occasionally large. There was red algal turf on hard substrates and large animal turf.
- b) *Omalesecosa ramulosa* growing on hydroids.

**Habitat descriptions**

Complete a box below for each **habitat** you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

1. DESCRIPTION (physical + community)

Sediment sea bed composed of maerl gravel (<5% live), broken shell, large boulders and pebbles. Tufts of red algae and hydroids on hard substrates. Abundant brittlestars present, along with *Cerianthus lloydii*.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other  maerl gravel

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

2. DESCRIPTION (physical + community)

Large boulders with red algae and tall animal turf.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

1	2	3	
m			<b>DEPTH LIMITS</b>
12.8	17.8		Upper (from sea level) (i.e. minimum)
13.2	13.2		Lower (from sea level) (i.e. maximum)
			Upper (from chart datum) *
			Lower (from chart datum) *

% CD			<b>SUBSTRATUM</b>
			Bedrock type?:
	100		Boulders - very large > 1.0 m
			- large 0.5 - 1.0 m
			- small 0.25 - 0.5 m
10			Cobbles (fist - head size)
			Pebbles (50p - fist size)
5			Gravel - stone
			- shell fragments
			Sand - coarse
			- medium
			- fine
			Mud
15			Shells (empty - or as large pieces)
			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
70			Other (state) <i>maert gravel.</i>
100	100	100	<b>Total</b>

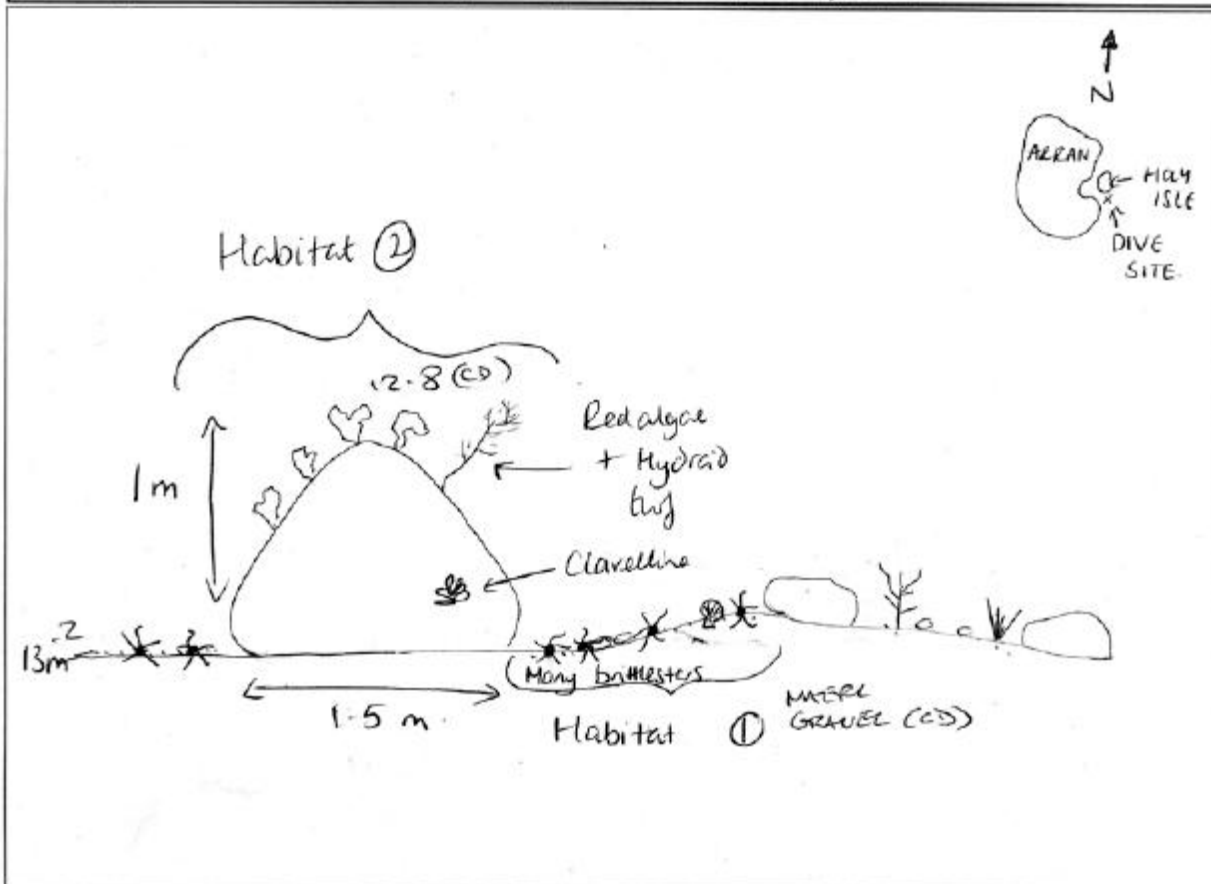
1	2	3	
1-5			<b>FEATURES - ROCK (all categories)</b>
	2		Relief of habitat (even - rugged)
	2		Texture (smooth - pitted)
	2		Stability (stable - mobile)
	1		Scour (none - scoured)
	1		Silt (none - silted)
	2		Fissures > 10 mm (none - many)
	2		Crevices < 10 mm (none - many)
		3	Boulder/cobble/pebble shape (rounded - angular)
			Sediment on rock? (tick if present)

✓			<b>FEATURES - SEDIMENT (1)</b>
✓			Mounds / casts
			Burrows / holes
			Waves (>10 cm high)
			Ripples (< 10 cm high)
			Subsurface coarse layer?
			Subsurface anoxic (black) layer?

1-5			<b>FEATURES - SEDIMENT (2)</b>
2			Firmness (firm - soft)
2			Stability (stable - mobile)
2			Sorting (well - poor)

**Sketches and plans**

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance** scale (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.





**Survey location - SB9**

PF: MB                      Biotope:                      SS.SMp.Mrl.Pcal

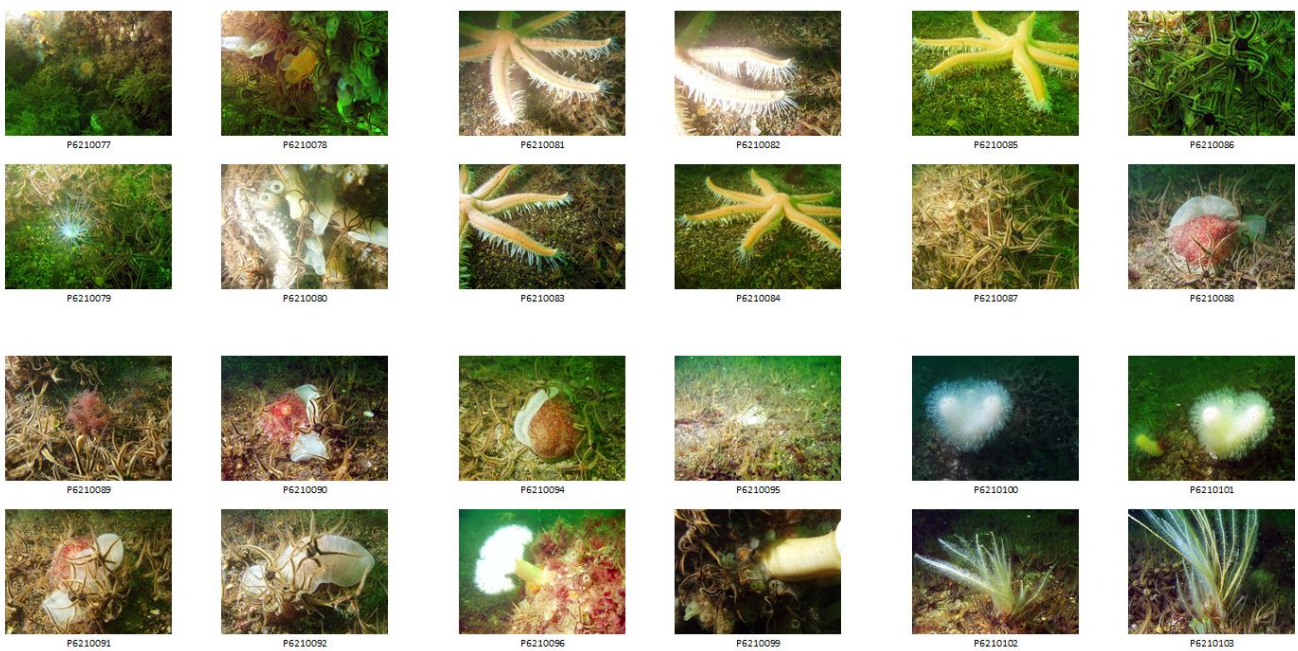
Evidence:              Images: 48              Video: no              Seasearch form: no

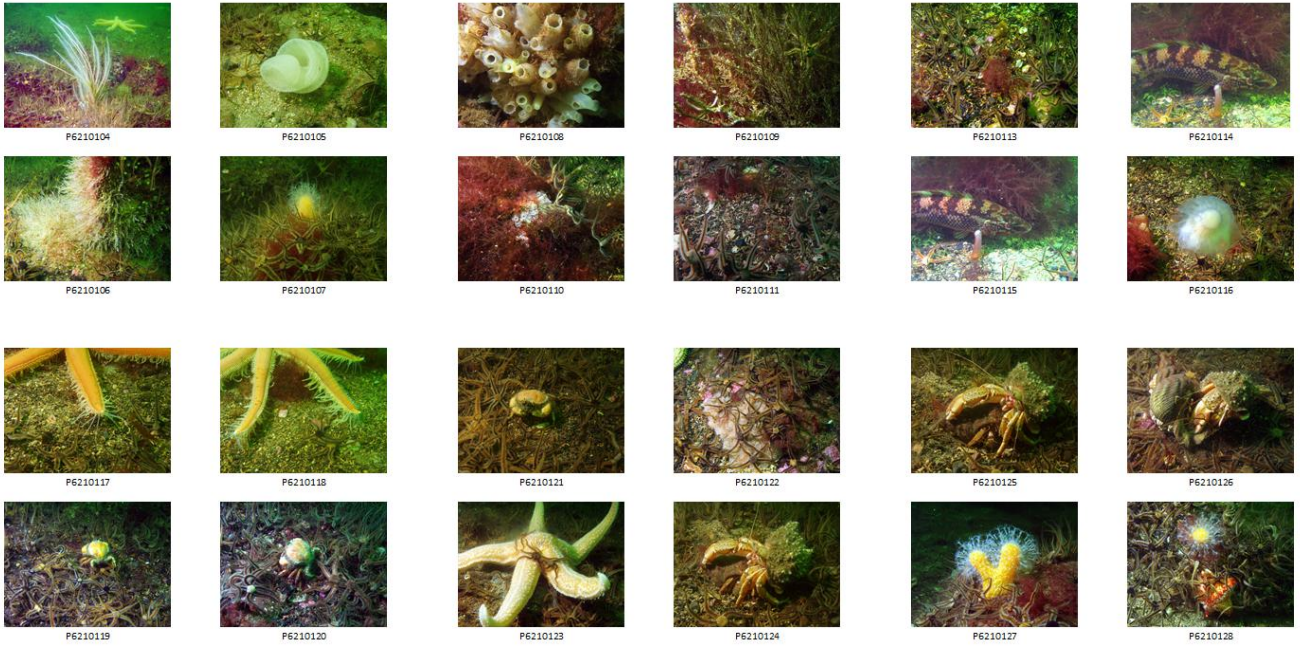
**Example image showing PF**



SB9: P6210111.jpg

**All images for survey location - SB9**





**Survey location - SG1**

PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: 28 Video: no Seasearch form: yes

**Example image showing PF**



SG1: DC8631.jpg

**All images for survey location - SG1**



**Seasearch form SG1**

**Dive/Site details**

Site name <i>Seagrass Bed, Whiting Bay</i>				Date of dive: <i>01 dd / 07 mm / 2012 yy</i>	
General location <i>Whiting Bay, SE Arran, Clyde Sea.</i>				Start of dive: <i>113: 122</i> (24hr)	
				Dive duration: <i>48</i> (mins)	
				Sea temperature: <i>11</i> °C	
Position (degrees and decimal minutes – state if in any other format)				Underwater visibility: <i>8-10</i> m	
	Latitude	Longitude	W or E	Drift dive? yes / <input checked="" type="radio"/> no	
Centre of site	<i>55° 28.186</i>	<i>05° 04.771</i>	<i>W</i>	Night dive? yes / <input checked="" type="radio"/> no	
For drift dives				Did you or your buddy take any of the following?	
From	<i>0</i>	<i>0</i>			photographs <input checked="" type="radio"/> yes / no
To	<i>0</i>	<i>0</i>			video footage yes / <input checked="" type="radio"/> no
Or OS Grid Reference				specimens yes / <input checked="" type="radio"/> no	
Position derived from: (circle)		GPS Datum (circle)		seaweeds for pressing yes / <input checked="" type="radio"/> no	
<input checked="" type="radio"/> GPS	<input type="radio"/> Chart	<input type="radio"/> OS map	<input type="radio"/> Web mapping	<input checked="" type="radio"/> WGS84	<input type="radio"/> OSGB36
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input type="checkbox"/>				For the area surveyed, what was	
mod exposed <input type="checkbox"/> sheltered <input checked="" type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>					
Max tidal stream:					
<i>&gt;6kt</i> <input type="checkbox"/> <i>3-6kt</i> <input type="checkbox"/> <i>1-3kt</i> <input type="checkbox"/> <i>&lt;1kt</i> <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>				the shallowest depth? (m) <i>5.6</i> bsl <input type="checkbox"/> bcd	
				the deepest depth? (m) <i>6.0</i> bsl <input type="checkbox"/> bcd	
				Tidal correction to chart datum <input type="checkbox"/> m*	

**Seabed summary**

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

*A seagrass bed site, with a flat + sand substrate. Seagrass was approx 20 shoots / m<sup>2</sup>. Sediment had obvious signs of life (siphons + burrowing anemones). No evidence of human impacts. Many juvenile flat fish and edible mussels.*

**Habitat descriptions**

Complete a box below for each **habitat** you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

1. DESCRIPTION (physical + community)

The habitat was a flat/shallow seabed of coarse sand and fine sand with empty razor clam and clam shells. There were living razor clam siphons and burrowing anemones in the sediment.

Zostera sp. was fairly dense (approx 20 stems/m<sup>2</sup>) and shoots were heavily encrusted with byzocans. Occasional areas where Zostera thinned out, and sugar kelp growing.

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

2. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

m		DEPTH LIMITS
5.6		Upper (from sea level) (i.e. minimum)
6.0		Lower (from sea level) (i.e. maximum)
		Upper (from chart datum) *
		Lower (from chart datum) *

%			SUBSTRATUM
			Bedrock type?:
			Boulders - very large > 1.0 m
			- large 0.5 - 1.0 m
			- small 0.25 - 0.5 m
			Cobbles (fist - head size)
			Pebbles (50p - fist size)
			Gravel - stone
			- shell fragments
60			Sand - coarse
25			- medium
			- fine
			Mud
10			Shells (empty - or as large pieces)
5			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
			Other (state)
100	100	100	<b>Total</b>

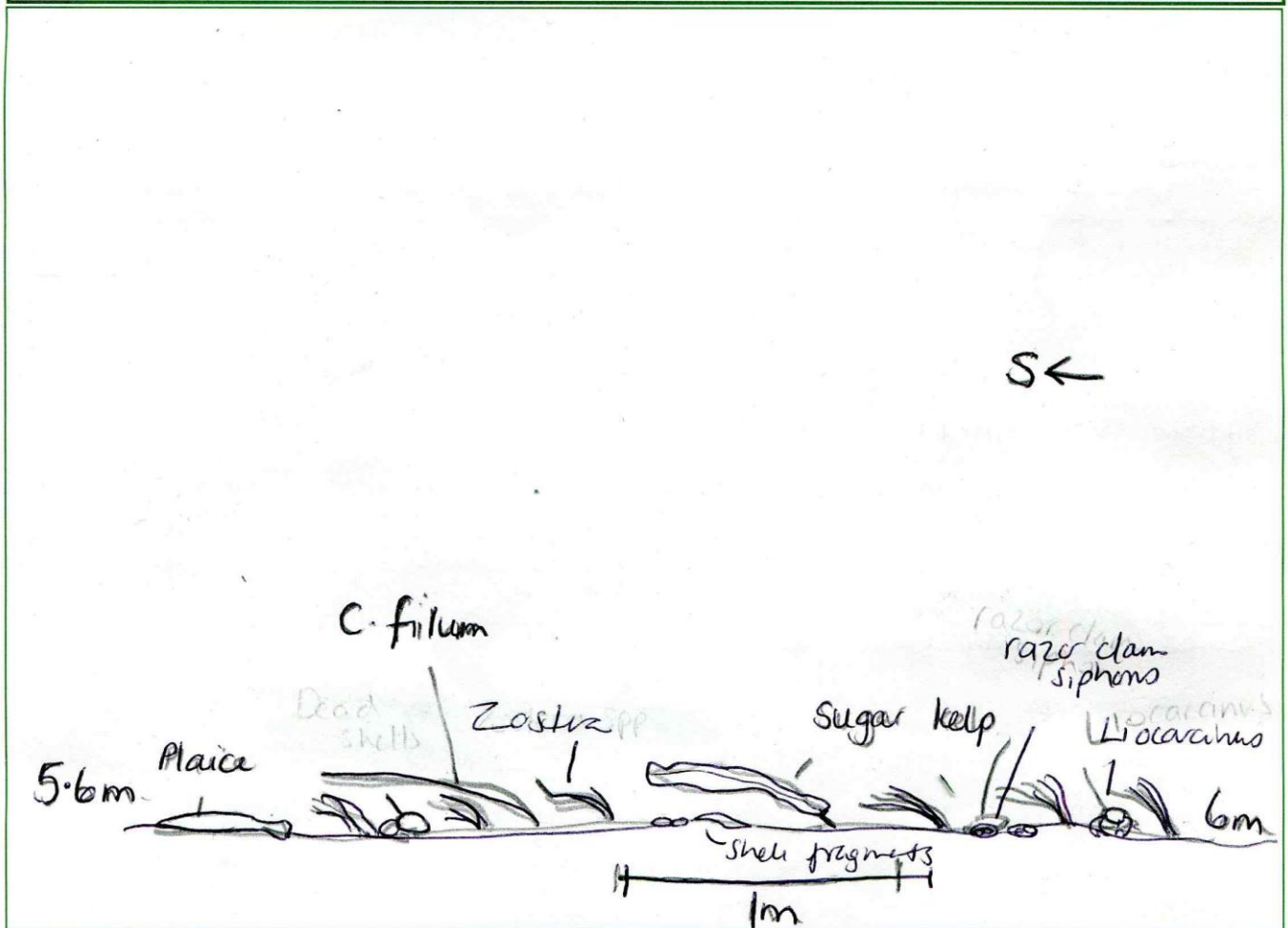
1-5		FEATURES - ROCK (all categories)
		Relief of habitat (even - rugged)
		Texture (smooth - pitted)
		Stability (stable - mobile)
		Scour (none - scoured)
		Silt (none - silted)
		Fissures > 10 mm (none - many)
		Crevices < 10 mm (none - many)
		Boulder/cobble/pebble shape (rounded - angular)
		Sediment on rock? (tick if present)

✓		FEATURES - SEDIMENT (1)
		Mounds / casts
✓		Burrows / holes
		Waves (>10 cm high)
		Ripples (< 10 cm high)
		Subsurface coarse layer?
		Subsurface anoxic (black) layer?

1-5		FEATURES - SEDIMENT (2)
3		Firmness (firm - soft)
2		Stability (stable - mobile)
2		Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance** scale (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.



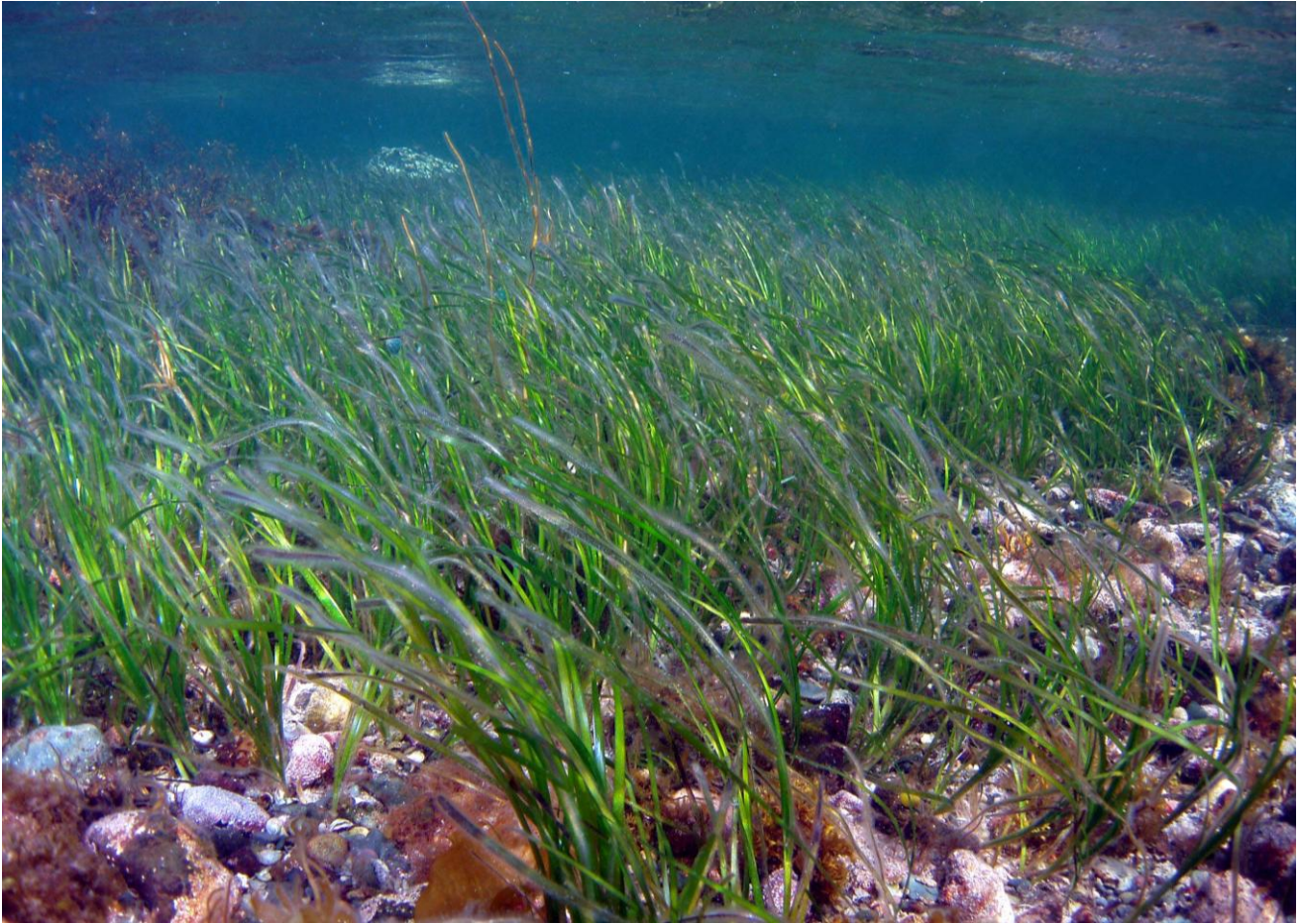


**Survey location - SS**

PF: SG Biotope: SS.SMp.SSgr.Zmar

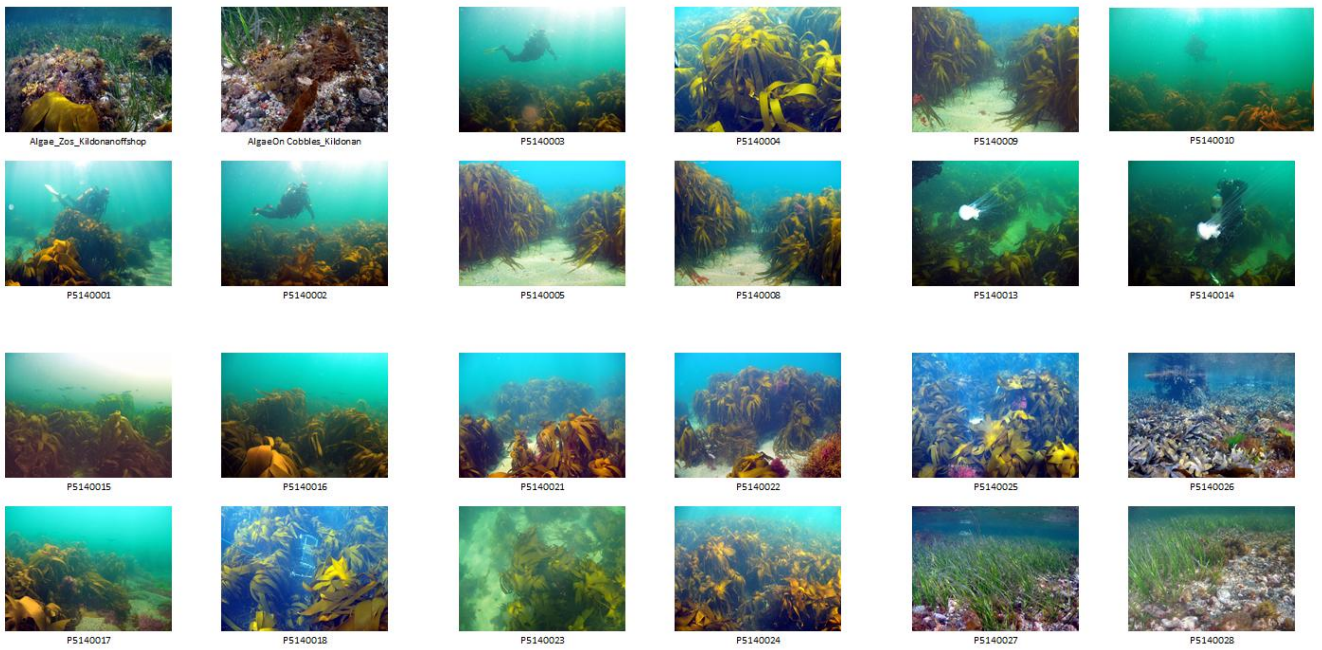
Evidence: Images: 46 Video: no Seasearch form: yes

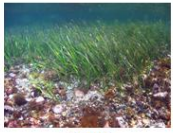
**Example image showing PF**



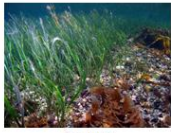
SS: P5140027.JPG

**All images for survey location - SS (two duplicated images not counted)**

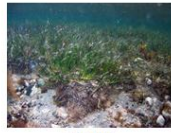




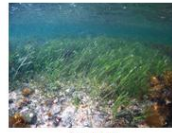
F5140029



F5140030



F5140033



F5140034



F5140037



F5140038



F5140031



F5140032



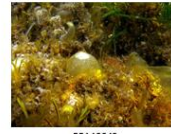
F5140035



F5140036



F5140039



F5140040



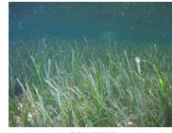
F5140041



F5140042



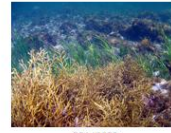
F5140045



F5140046



F5140049



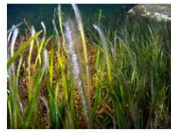
F5140050



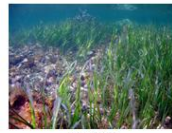
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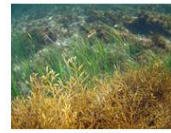
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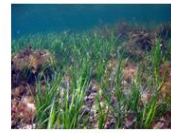
F5140047



F5140048



F5140051



F5140052

Seasearch form for SS

Site Name <b>KILDONAN OFF SHIP</b>	Date of Dive <b>14 / 05 / 05</b>
	Start of dive <b>11:30</b> (24hr)
General Location (inc county) <b>ARRAN</b> <b>NORTH AYSHIRE</b>	Dive duration <b>60</b> (mins)
	U/W visibility <b>6</b> m
	Sea Temperature <b>9.0</b> °C
Position of centre of site or OS Grid Reference	
<b>55</b> <sup>0</sup> <b>26.431</b> N <b>05</b> <sup>0</sup> <b>08.406</b> W or <del>E</del>	
Position derived from (circle) <input checked="" type="radio"/> GPS <input type="radio"/> Admiralty Chart <input type="radio"/> OS Map <input type="radio"/> Other	Drift dive? yes / <input checked="" type="radio"/> no Night dive? yes / <input checked="" type="radio"/> no
Did you take any photographs? <input checked="" type="radio"/> yes / no or video footage? yes / <input checked="" type="radio"/> no	

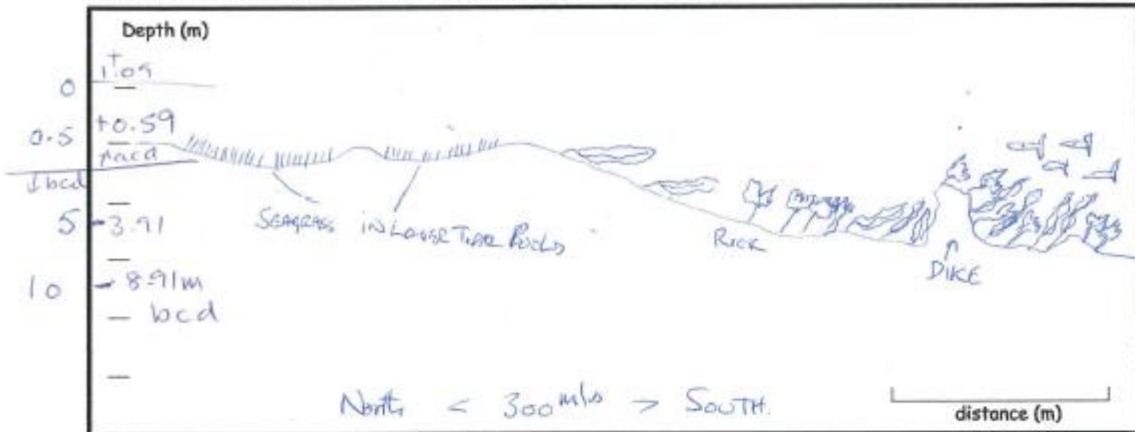
12:00

S01-3/03

HACD Brodick 1.09m

**Description of the seabed**

Please draw an approximate profile of the seabed (i.e. a side-on view), labeling features and dominant forms as appropriate. Remember to show the depth range and a distance scale.



**Types of seabed present:** (please tick all that you saw and circle the dominant one)

- Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?

Was there any litter or were there any man-made objects apparent?

LARGE AREAS OF SEAGRASS IN LOWER TIDAL POOLS

LOBSTER POTS

**What marine life did you see on your dive?**

**Seabed cover types** (tick all those present)

**Kelp forest**



**Animal turf on rocks**



**Kelp park**



**Tall**



**Mixed seaweeds**



**Animal Beds**  
(e.g. mussels, brittlestars, scallops - state which)



**Encrusting pink algae**



**Sediment with life apparent**  
(tubes, burrows etc)



**Barren sediment**  
(no life or structures apparent)



Illustrations by Bob Foster-Smith

**Species you saw**

Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	abundance	R, O, C or P
ZOSTERA ANGSTUFOLIA	angustifolia	C
OPALWEED KELP		C
SEA BLET	SUGAR Kelp	O
COBALT WEED	Combinables?	O
ORCHINS		O
2 SPOTTED GOBBIES		O
SPINY STARFISH		O
SHARP CRAB		R
SWIMMING CRAB		R
EATABLE CRAB		R
LOBSTER IN POT		R
PAINTED TOPSHELL		O
SEA HARE		C
SEA MAT		O
SITTIE		O
BALLER WRASSE		O
SAND EEL		R /

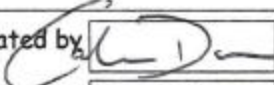
\* check in by this sp instead of 2 minims?

VISSPP

**Thank you for completing this form**

All that's left for you to do is to either hand it to the Dive Organiser or fold it into thirds along the dotted lines, tuck one part into the other, add a stamp and send it off. Your name and address will be included on the Seasearch database and those of partner organisations. You will also receive Seasearch newsletters and information about other marine surveys and projects.

Please tick here if you do NOT want to be sent newsletters or details of other marine surveys.

For Seasearch use only	Validated by		date	6/12/05
Record No	Verified by		date	

MR MCS 002 000000 E8 Smithell 7/12/5

first fold

**Survey location - SS18**

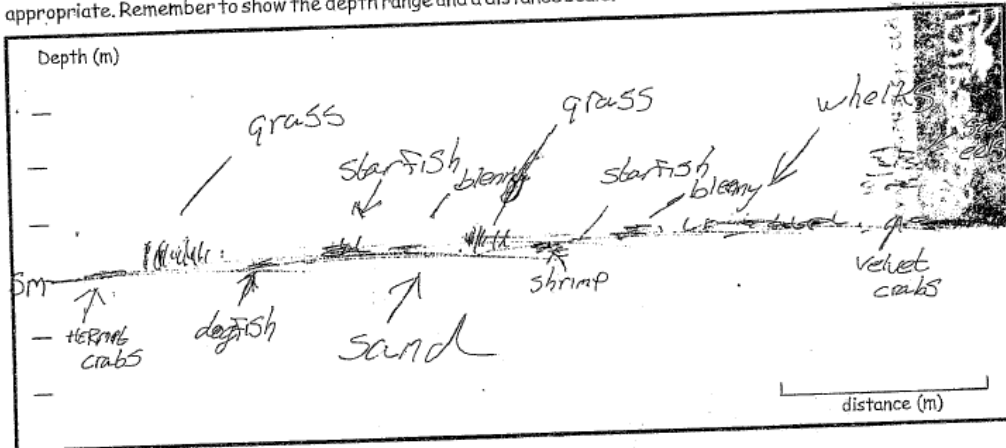
PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no Video: no Seasearch form: yes

**Seasearch form SS18**

18/

Description of the seabed  
Please draw an approximate profile of the seabed (i.e. a side-on view), labeling features and dominant forms as appropriate. Remember to show the depth range and a distance scale.



Types of seabed present: (please tick all that you saw and circle the dominant one)  
 Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?  
 Was there any litter or were there any man-made objects apparent?

**What marine life did you see on your dive?**

Seabed cover types (tick all those present)

- Kelp forest 
- Kelp park 
- Mixed seaweeds 
- Encrusting pink algae 
- Barren sediment (no life or structures apparent) 
- Animal turf on rocks - Short 
- Animal turf on rocks - Tall 
- Animal Beds (e.g. mussels, brittlestars, scallops - state which) 
- Sediment with life apparent (tubes, burrows etc) 

Species you saw

Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C or P
dogfish	O
starfish	C
velvet crabs	C
sea grass	O
blenny	P
pipefish	R
sand eel	R
whelk	P
shrimp	O
hermit crabs	P

OFF MONTROSE TERE W/BAY 26/08/04  
 55° 29.139 N 005° 05.419

**Survey location - SS19**

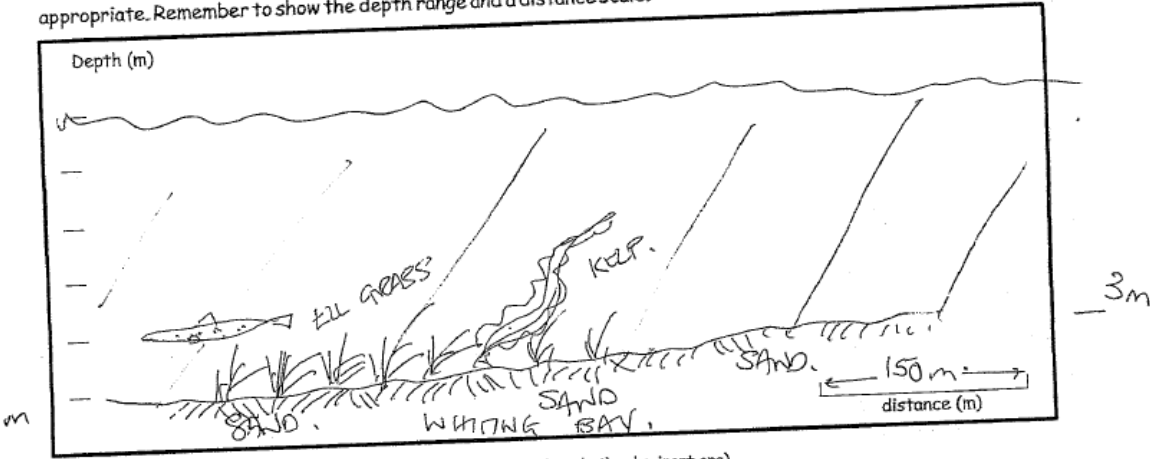
PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no Video: no Seasearch form: yes

**Seasearch form SS19**

19

Please draw an approximate profile of the seabed (i.e. a side on view), including appropriate. Remember to show the depth range and a distance scale.



Types of seabed present: (please tick all that you saw and circle the dominant one)  
 Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?

Was there any litter or were there any man-made objects apparent?

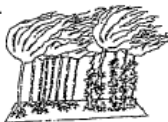
LARGE AREA OF EEL GRASS

MOORING CHAIN

**What marine life did you see on your dive?**

Seabed cover types (tick all those present)

Kelp forest



Animal turf on rocks



Kelp park



Tall



Mixed seaweeds



Animal Beds (e.g. mussels, brittlestars, scallops - state which)



Encrusting pink algae



Sediment with life apparent (tubes, burrows etc)



Barren sediment (no life or structures apparent)



Illustrations by Bob Foster-Smith

Species you saw

Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C, or P
SEA HARE	R
SEA SQUIDS	O
RAZOR FISH	C
HERMIT CRABS	C
VELVET CRABS	C
FAN WORM	O
BURROWING ANEM	O
SPOTTED DOG FISH	R
SMALL SAND EEL	O
JELLY FISH (TRANSPARENT)	C
ZOSTERA MARINA	C

24/4/04 W/BAY MOORINGS.  
 55° 29.36N 05° 05.45W.

**Survey location - SS20**

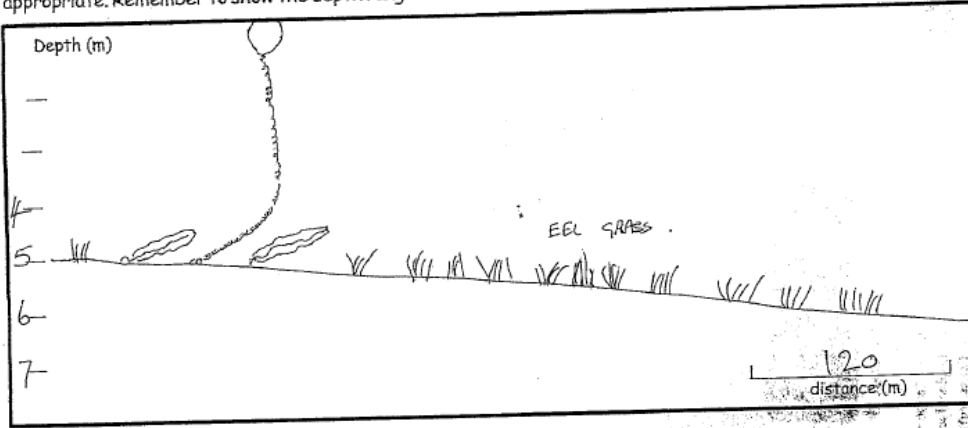
PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no Video: no Seasearch form: yes

**Seasearch form SS20**

20

Please draw an approximate profile of the seabed appropriate. Remember to show the depth range and a distance scale.



Types of seabed present: (please tick all that you saw and circle the dominant one)  
 Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life? Was there any litter or were there any man-made objects apparent?

EEL GRASS.

Moorings.

**What marine life did you see on your dive?**

Seabed cover types (tick all those present)

- Kelp forest
- Animal turf on rocks  Short  Tall
- Kelp park
- Mixed seaweeds
- Animal Beds (e.g. mussels, brittlestars, scallops - state which)
- Encrusting pink algae
- Sediment with life apparent (tubes, burrows etc)
- Barren sediment (no life or structures apparent)

Species you saw  
 Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C or P
ZOSTERA MARINA	C
BLOOD HENRY STARFISH	O
SAND EELS	O
SEA HARE	R
DOG WHELKS	O
LEOPARD SPOTTED GOBY	C
HERMIT CRAB	O
HARBOR CRAB	O
SPIDER CRAB	O
BURROWING ANEMONE	O
CLARK ANEMONE	R
SEA SQUIDS	R
SEA POTATO	O
FAN WORMS	O
FOOTBALL JERSEY WORM	R

24/4.04 WHITING BAY MOORINGS ✓  
 55° 29.403N 05° 05.439W

**Survey location - SS25**

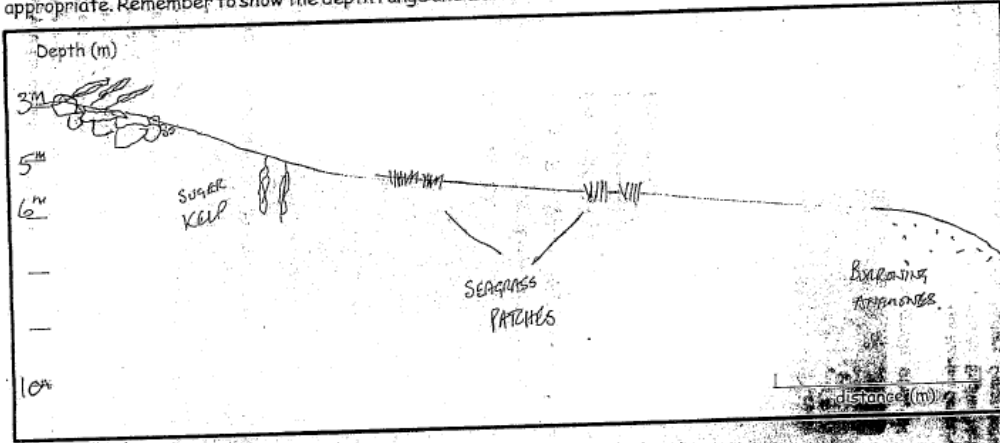
PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no Video: no Seasearch form: yes

**Seasearch form SS25**

25

Please draw an approximate profile of the seabed appropriate. Remember to show the depth range and a distance scale.



Types of seabed present: (please tick all that you saw and circle the dominant one)  
 Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?

Was there any litter or were there any man-made objects apparent?

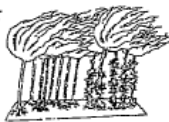
SMALL PATCHES OF ZOSTERA MARINA - SOUTHERN END OF WILBY SEAGRASS BED FOUND SO FAR



**What marine life did you see on your dive?**

Seabed cover types (tick all those present)

Kelp forest



Animal turf on rocks



Kelp park



Short



Mixed seaweeds



Animal Beds (e.g. mussels, brittlestars, scallops - state which)



Encrusting pink algae



Sediment with life apparent (tubes, burrows etc)



Barren sediment (no life or structures apparent)



Illustrations by Bob Foster-Smith

**Species you saw**

Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C, P
ZOSTERA MARINA	C
DOG WELK	O
RED STAR CUSHION	C
FAN WORM	R
PIPE FISH	R
SCALLOP	O
BURROWING ANEMONES	C
7 ARMED STARFISH	O
COMMON STARFISH	O
PRINTED GOBIES	C
DAB	R
JUVENILE FLATFISH	O
HERMIT CRABS	C
SPIDER CRABS	O
RARE SHELLS	C

30/05/04. LARGY BAS. S/GRASS.  
 55° 28.094N 050 04.757W.

**Survey location - SS26**

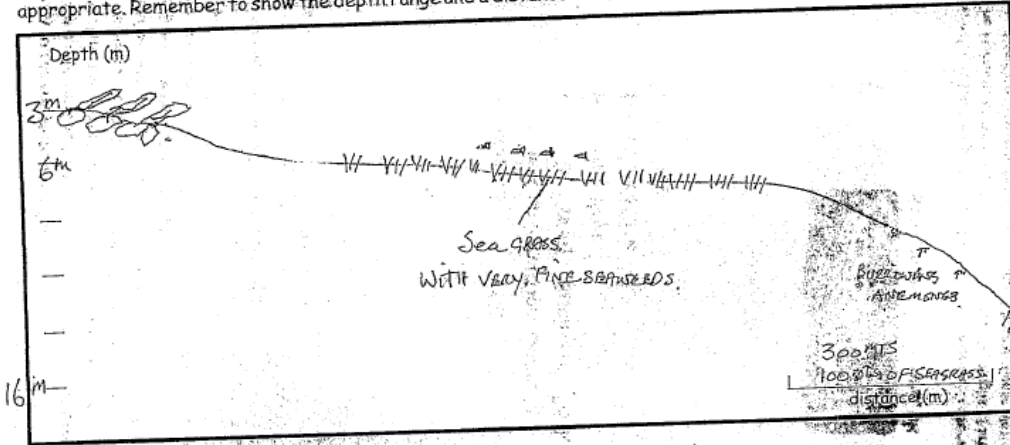
PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no Video: no Seasearch form: yes

**Seasearch form SS26**

26

Please draw an approximate profile of the seabed at an appropriate. Remember to show the depth range and a distance scale.



Types of seabed present: (please tick all that you saw and circle the dominant one)  
 Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?

LARGE AREA OF ZOSTERA MARINA.  
LARGE SHOALS OF YOUNG FISH.

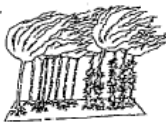
Was there any litter or were there any man-made objects apparent?

APPROX 16m SCALLOP DRESSER MARKS.

**What marine life did you see on your dive?**

Seabed cover types (tick all those present)

Kelp forest



Animal turf on rocks

 Short


Kelp park


 Tall


Mixed seaweeds



Animal Beds (e.g. mussels, brittlestars, scallops - state which)



Encrusting pink algae



Sediment with life apparent (tubes, burrows etc)



Barren sediment (no life or structures apparent)



Illustrations by Bob Foster-Smith

Species you saw

Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C or P
ZOSTERA MARINA	C
FAN WORMS	O
HERMIT CRABS	C
SWIMMER CRABS	O
SCALLOPS	R.
BURROWING ANEMONES	C
HERMIT CRABS EATING LARGE WORM	R
MYXICOLA INFUNDIBULUM	O
SPIKER CRABS LONG LEGGED.	O
SAND STAR	R
RED CUSHION STAR	C
SEVEN ARMED STARFISH	O
SPINY STARFISH	O
RAZOR SHELL	C
CODAB Jelly	C
COMMON HIGHLY DECHIA	R
FIFTEEN SPINED STICKLEBACK	R
MOON Jellyfish	C

SEE PHOTO

30/05/04 AM

LARGYMORE. H-DRIVERS HOUSE ✓

55° 28.24N 05.04.85W.

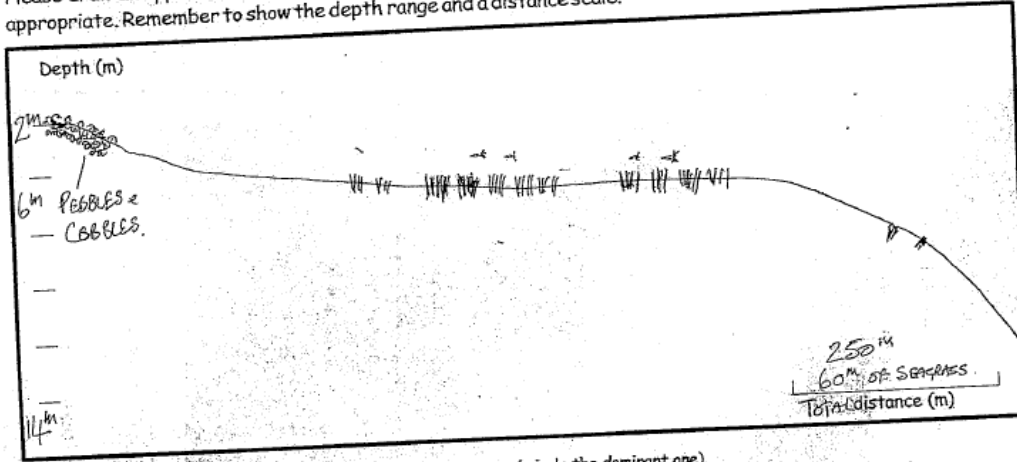
**Survey location - SS27**

PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no Video: no Seasearch form: yes

**Seasearch form SS27**

Description of the seabed  
Please draw an approximate profile of the seabed (i.e. a side-on view), labeling features and dominant forms as appropriate. Remember to show the depth range and a distance scale.

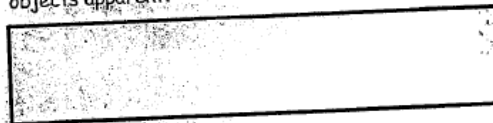


Types of seabed present: (please tick all that you saw and circle the dominant one)  
 Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?

Was there any litter or were there any man-made objects apparent?

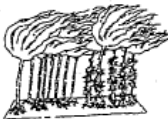
AREA OF ZOSTERA MARINA IN 5-6MTS RUNNING NORTH TO SOUTH DIRECTION SHORTS OF SMALL FISH



**What marine life did you see on your dive?**

Seabed cover types (tick all those present)

Kelp forest



Animal turf on rocks

Short



Kelp park



Tall



Mixed seaweeds



Animal Beds (e.g. mussels, brittlestars, scallops - state which)



Encrusting pink algae



Sediment with life apparent (tubes, burrows etc)



Barren sediment (no life or structures apparent)



Illustrations by Bob Foster-Smith

**Species you saw**

Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C or P
ZOSTERA MARINA	C
SMALL PLATICE	O
MEAN JELLY FISH	O
BUBBLING ANEMONES	C
HERMIT CRABS	C
VELVET SWIMMER CRABS	C
SCALLOP	O
RAZOR SHELL	C
LESSER SPOTTED DOGFISH	R
SPINY STARFISH	O
MYXICOLA INFUNDIBULUM	O
PEACOCK WORM	O
SEVEN ARMED STARFISH	O
EDIBLE CRABS	R
LARGE QUANTITY SMALL FISH FRY	C

30.05.04 BLACK ROCKS.  
55° 28.577N 05° 05.043W

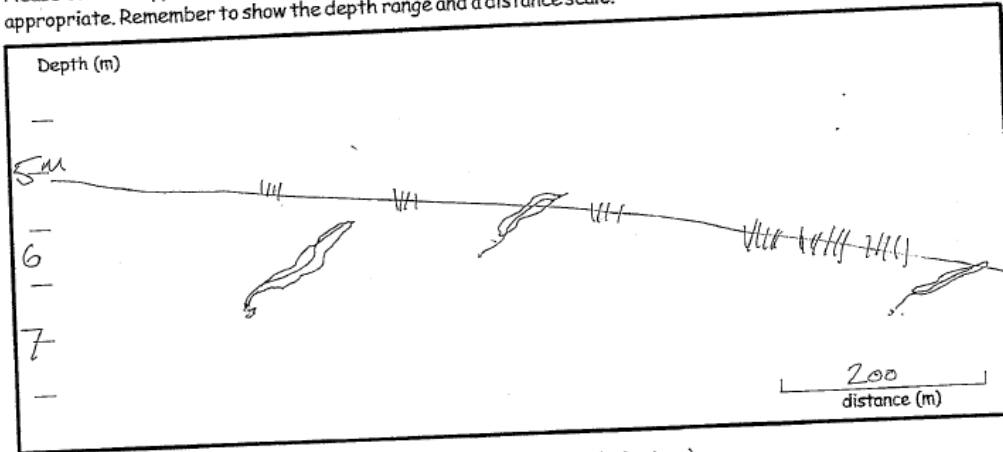
**Survey location - SS31**

PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no Video: no Seasearch form: yes

**Seasearch form SS31**

Description of the seabed  
Please draw an approximate profile of the seabed (i.e. a side-on view), labeling features and dominant forms as appropriate. Remember to show the depth range and a distance scale.



Types of seabed present: (please tick all that you saw and circle the dominant one)  
Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?

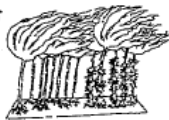
Was there any litter or were there any man-made objects apparent?

PATCHES OF SEA GRASS

**What marine life did you see on your dive?**

Seabed cover types (tick all those present)

Kelp forest



Animal turf on rocks



Kelp park



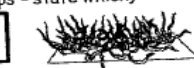
Short



Mixed seaweeds



Animal Beds (e.g. mussels, brittlestars, scallops - state which)



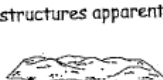
Encrusting pink algae



Sediment with life apparent (tubes, burrows etc)



Barren sediment



Illustrations by Bob Foster-Smith

**Species you saw**

Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C or P
ZOSTERA MARINA	C
SUGAR KELP	O
LESSER SPOTTED DOG FISH	R
RAZOR SHELLS	C
SCALLOP	R
HERMIT CRABS	O
RED STAR CRUSTACEAN	R
BURROWING ANEMONE	O
LIONS MANE JELLYFISH	O
MOON JELLYFISH	O

13.6.04 SANDRAES REEF  
55° 30' 75" N 005° 05' 045"

**Survey location - SS32**

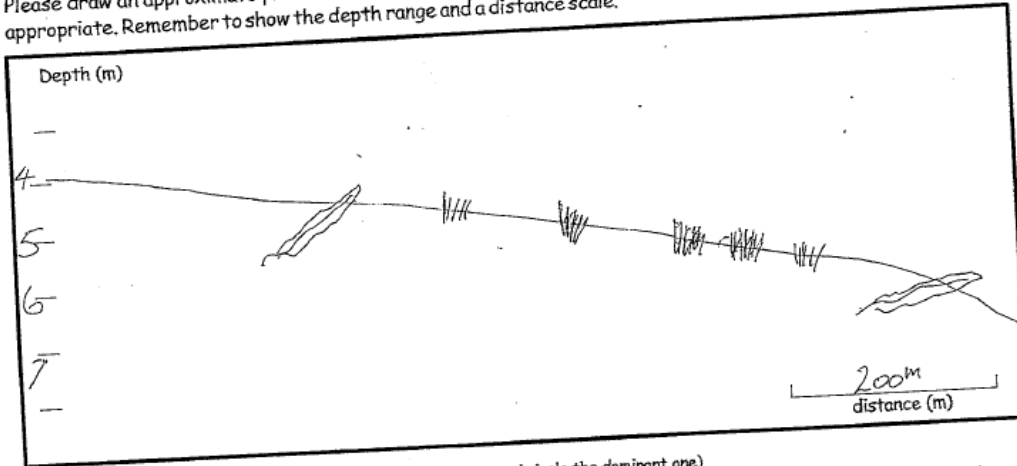
PF: SG      Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no      Video: no      Seasearch form: yes

**Seasearch form SS32**

32

**Description of the seabed**  
Please draw an approximate profile of the seabed (i.e. a side-on view), labeling features and dominant forms as appropriate. Remember to show the depth range and a distance scale.



**Types of seabed present:** (please tick all that you saw and circle the dominant one)  
 Rocky Reef     Boulders     Cobbles and Pebbles     Mixed Ground     Sand and Gravel     Mud     Wreckage     Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?

Was there any litter or were there any man-made objects apparent?

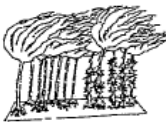
PATCHES OF SEA GRASS

PLASTIC BAG.

**What marine life did you see on your dive?**

**Seabed cover types** (tick all those present)

Kelp forest



Animal turf on rocks

Short 

Kelp park



Tall 

Mixed seaweeds



Animal Beds (e.g. mussels, brittlestars, scallops - state which)



Encrusting pink algae



Sediment with life apparent (tubes, burrows etc)



Barren sediment (no life or structures apparent)



Illustrations by Bob Foster-Smith

**Species you saw**

Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C or P
ZOSTERA MARINA	C
ROCK SHELLS	C
HERMIT CLABS	O
DOG WELK	O
SEVEN ARM STARFISH	O
LIONS MANE JELLYFISH	O
MOON JELLYFISH	C
BURROUING ANEMONES	O
SAGE KELP	O

13.6.04      SANDBRATES CHURCH  
 55° 29.875N      005° 05.267W.

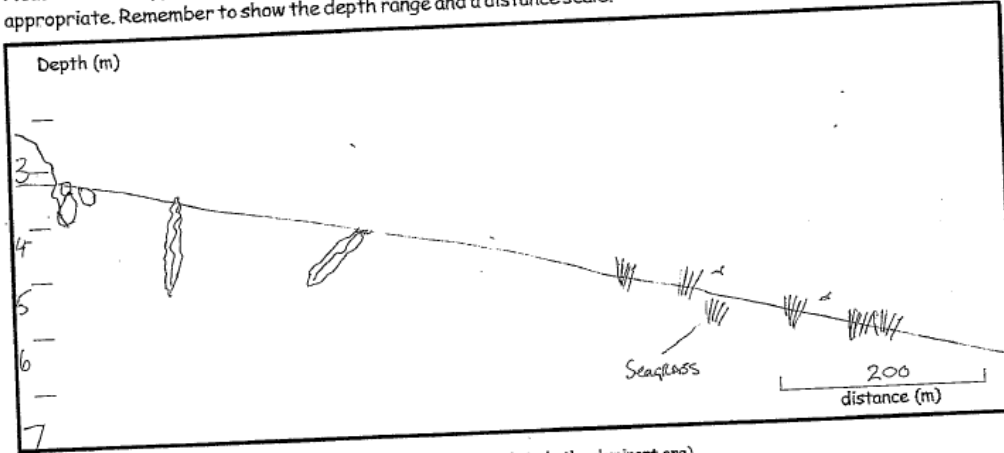
**Survey location - SS33**

PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no Video: no Seasearch form: yes

**Seasearch form SS33**

Description of the seabed  
Please draw an approximate profile of the seabed (i.e. a side-on view), labeling features and dominant forms as appropriate. Remember to show the depth range and a distance scale.



Types of seabed present: (please tick all that you saw and circle the dominant one)  
 Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?

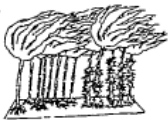
SMALL PATCHES OF SEAGRASS.

Was there any litter or were there any man-made objects apparent?

**What marine life did you see on your dive?**

Seabed cover types (tick all those present)

Kelp forest



Animal turf on rocks



Kelp park



Short



Mixed seaweeds



Animal Beds (e.g. mussels, brittlestars, scallops - state which)



Encrusting pink algae



Sediment with life apparent (tubes, burrows etc)



Barren sediment (no life or structures apparent)



Illustrations by Bob Foster-Smith

**Species you saw**

Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C or P
ZOSTERA MARINA	C
RAZOR FISH	C
Sm PLICE	O
HERMIT CRABS	O
PEACOCK WORMS	O
EDIBLE CRABS	R
COMMON STARFISH	O
SWEET KELP	O
BURROWING ANEMONES	O
SPIDER CRAB	O
DOG WELK	C

13.6.04 WHITTING BAY SCHOOL.  
55° 29.716 N 005° 05.339 W.

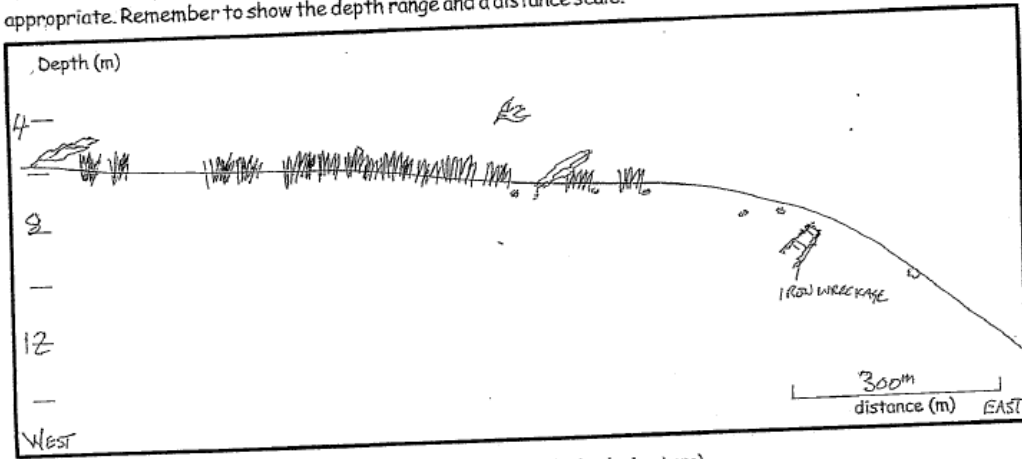
**Survey location - SS41**

PF: SG Biotope: SS.SMp.SSgr.Zmar

Evidence: Images: no Video: no Seasearch form: yes

**Seasearch form SS41**

**Description of the seabed**  
Please draw an approximate profile of the seabed (i.e. a side-on view), labeling features and dominant forms as appropriate. Remember to show the depth range and a distance scale.



**Types of seabed present:** (please tick all that you saw and circle the dominant one)  
 Rocky Reef  Boulders  Cobbles and Pebbles  Mixed Ground  Sand and Gravel  Mud  Wreckage  Other

Did you notice anything unusual or noteworthy about the seabed or the marine life?

Was there any litter or were there any man-made objects apparent?

LARGE AREAS OF SEA GRASS  
GUILLEMOT SWAM AROUND US FOR 1/2 THE DIVE

SMALL IRON WRECKAGE.

**What marine life did you see on your dive?**

**Seabed cover types** (tick all those present)

- Kelp forest
- Kelp park
- Mixed seaweeds
- Encrusting pink algae
- Barren sediment (no life or structures apparent)
- Animal turf on rocks
  - Short
  - Tall
- Animal Beds (e.g. mussels, brittlestars, scallops - state which)
- Sediment with life apparent (tubes, burrows etc)

**Species you saw**  
Show abundance of each species as Rare, Occasional, Common, or if you're unsure, Present.

Species	R, O, C or P
ZOSTERA MARINA	C
SUSER KELP	O
BURROWING ANEMONES	C
VELVET SWIMMING CRABS	C
HELLBENT CRABS	C
JUVENILE QUEENIE SCALLOPS	C
SCALLOPS	O
GREATER PIPEFISH	R
GUILLEMOT	R
LIONS MANE JELLY FISH	O
SAND MASON	O
MYXICOLA INFUNDIBULUM	R
PEACOCK WORM	C
JUVENILE PLICE or DABS	C
COMMON STARFISH	O
SPINY STARFISH	O
SEVEN ARMED STARFISH	O
COMMON HEART URCHIN	O

28/8/04 300MTS SOUTH OF BLACK ROCKS  
55° 28.58'N 05° 05.03'W

**Survey location - VF1**

PF: KS                      Biotope: SS.SMp.KSwSS.LsacCho

Evidence: Images: no      Video: no      Seasearch form: yes

**Seasearch form VF1**

**Dive/Site details**

Site name <b>KINGS CROSS POINT</b>				Date of dive: <b>01 dd / 07 mm / 2012 yy</b>		
General location <b>MAY ISLE, LANLASH BAY ARRAN</b>				Start of dive: <b>13:19</b> (24hr)		
				Dive duration: <b>41</b> (mins)		
				Sea temperature: <b>11</b> °C		
Position (degrees and decimal minutes – state if in any other format)				Underwater visibility: <b>6</b> m		
	Latitude	Longitude	W or E	Drift dive? yes / <b>no</b>		
Centre of site	<b>55° 30.351</b>	<b>5° 4.384</b>	<b>W</b>	Night dive? yes / <b>no</b>		
For drift dives				Did you or your buddy take any of the following?		
From	°	°		photographs	yes / <b>no</b>	
To	°	°		video footage	yes / <b>no</b>	
Or OS Grid Reference				specimens		yes / <b>no</b>
Position derived from: (circle)                      GPS Datum (circle)				seaweeds for pressing		yes / <b>no</b>
<b>GPS</b>	Chart	OS map	Web mapping	WGS84		OSGB36
Exposure of site: extremely exposed <input type="checkbox"/> v exposed <input type="checkbox"/> exposed <input type="checkbox"/>				For the area surveyed, what was		
mod exposed <input checked="" type="checkbox"/> sheltered <input type="checkbox"/> v sheltered <input type="checkbox"/> ext sheltered <input type="checkbox"/>				the shallowest depth? (m) <b>6.0</b> bsl <input type="checkbox"/> bcd		
Max tidal stream:				the deepest depth? (m) <b>12.2</b> bsl <input type="checkbox"/> bcd		
>6kt <input type="checkbox"/> 3-6kt <input type="checkbox"/> 1-3kt <input type="checkbox"/> <1kt <input checked="" type="checkbox"/> v. weak <input type="checkbox"/>				Tidal correction to chart datum <input type="checkbox"/> m*		

**Seabed summary**

Summarise: a. The main features of the site, b. Any unusual features or species, c. Any human activities or impacts at the site

- a) **SLOPING SANDY SEABED WITH COBBLES, PEBBLES, SHELLS + OCCASIONAL SMALL BouldERS. SUGAR KELP + CHORDA FILUM**
- b) **JUGONICE GADIDAE + PLEURONECTIPORTIES. SEVERAL LARGE KING SCALLOPS**
- c) **SIGNS SUGGESTIVE OF DREDGING, LOTS OF BROKEN SHELLS.**

**Habitat descriptions**

Complete a box below for each habitat you found on your dive. Normally the shallowest habitat is No. 1 even if you have done the dive deepest first. Each written description should tally with the information entered in the columns and diagrams on the next page. If you found more than 3 habitats, continue your descriptions on another form. Tick boxes where shown, and insert percentages (they must add up to 100%) or assign a score from 1-5 as appropriate. If you are uncertain leave the box blank. The biotope code will be assigned later from your description.

1. DESCRIPTION (physical + community)

SAND WITH COBBLES + OCCASIONAL SMALL Boulders DOMINATED BY SUGAR Kelp + REEFMAIDS TREESSES

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code SS SMP KSWSS WC

2. DESCRIPTION (physical + community)

SLOPING SEABED OF SAND WITH SPARSE SEAWEEDS + BURROWING + TIDBLE FAUNA

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

3. DESCRIPTION (physical + community)

Seabed type: rock  boulders  cobbles  pebbles  gravel  sand  mud  wreckage  other

Communities: kelp forest  kelp park  red seaweeds  enc pink algae  animal turf

animal bed  sediment with life  barren sediment  Biotope Code

	2	3	
	m		<b>DEPTH LIMITS</b>
60	70		Upper (from sea level) (i.e. minimum)
70	120		Lower (from sea level) (i.e. maximum)
			Upper (from chart datum) *
			Lower (from chart datum) *

%			<b>SUBSTRATUM</b>
			Bedrock type?:
			Boulders - very large > 1.0 m
5	5		- large 0.5 - 1.0 m
10	10		- small 0.25 - 0.5 m
5	5		Cobbles (fist - head size)
10	10		Pebbles (50p - fist size)
			Gravel - stone
			- shell fragments
			Sand - coarse
50	50		- medium
			- fine
			Mud
20	20		Shells (empty - or as large pieces)
			Shells (living - eg mussels, limpets)
			Artificial - metal
			- concrete
			- wood
			Other (state)
100	100	100	<b>Total</b>

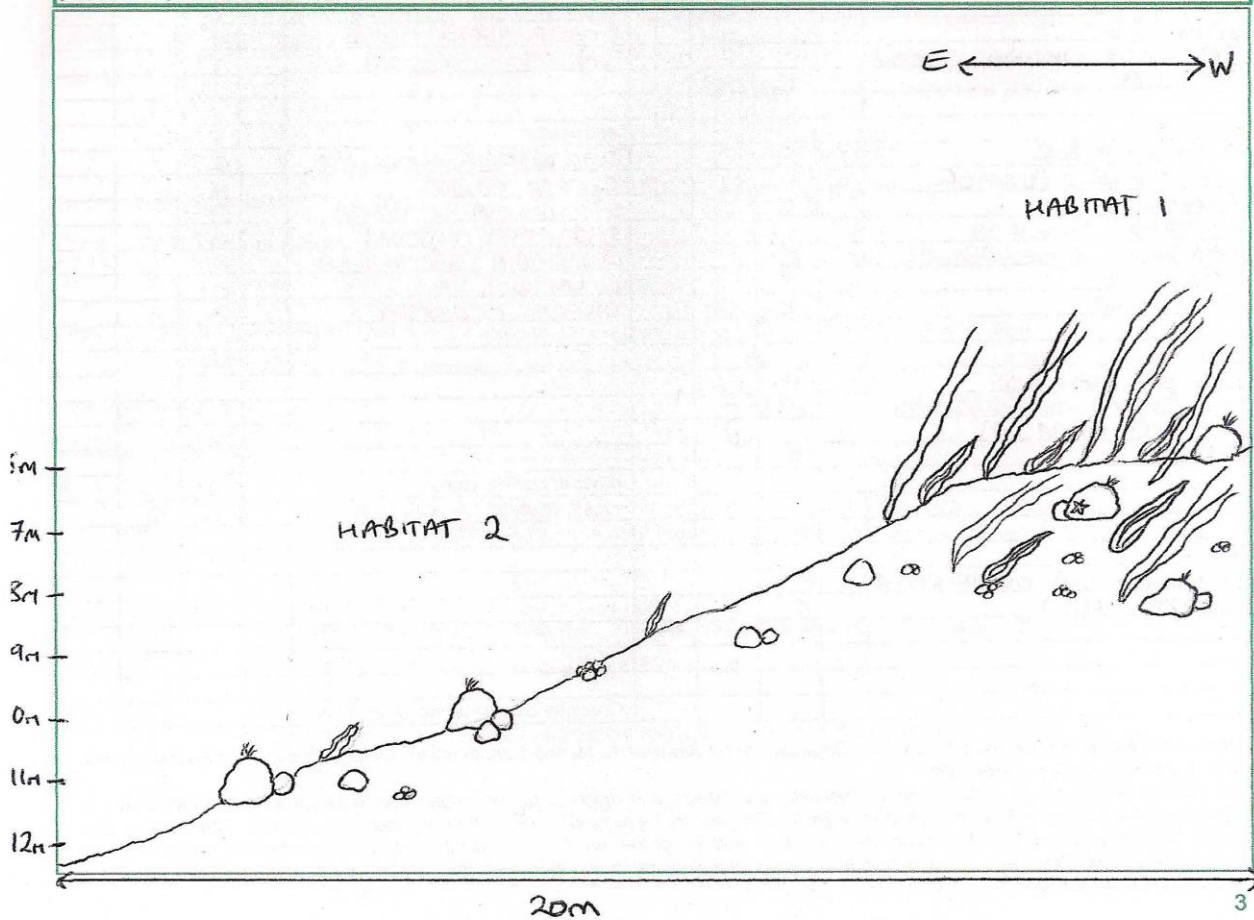
1	2	3	
1-5			<b>FEATURES - ROCK (all categories)</b>
			Relief of habitat (even - rugged)
			Texture (smooth - pitted)
			Stability (stable - mobile)
			Scour (none - scoured)
			Silt (none - silted)
			Fissures > 10 mm (none - many)
			Crevices < 10 mm (none - many)
			Boulder/cobble/pebble shape (rounded - angular)
			Sediment on rock? (tick if present)

✓			<b>FEATURES - SEDIMENT (1)</b>
✓	✓		Mounds / casts
✓	✓		Burrows / holes
			Waves (>10 cm high)
			Ripples (< 10 cm high)
			Subsurface coarse layer?
✓			Subsurface anoxic (black) layer?

1-5			<b>FEATURES - SEDIMENT (2)</b>
4	4		Firmness (firm - soft)
4	4		Stability (stable - mobile)
4	4		Sorting (well - poor)

### Sketches and plans

Draw a **profile and/or plan** of the sea bed you encountered on your dive in the space below. Mark (& number) the different habitats, corresponding to the written descriptions on p.2. Indicate conspicuous and/or characteristic species. Make sure you include **depth(s)** (vertical axis) and a **distance** scale (horizontal axis) for a profile and scale and north point for a plan. Indicate the direction of the profile or plan and the direction of any current.



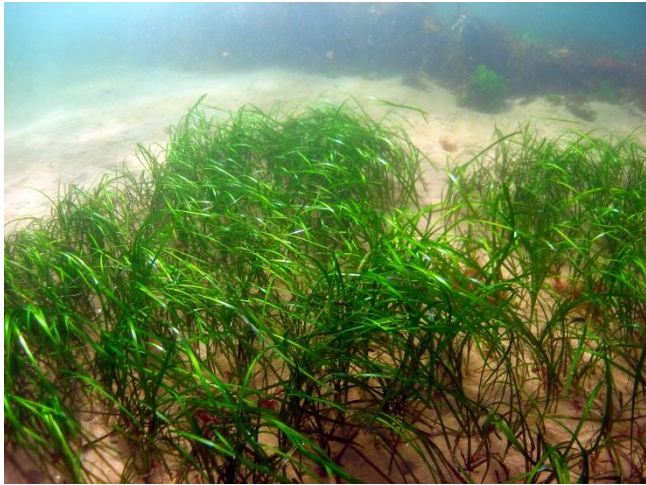


## Survey location - WB1

**PFs:** SG                      **Biotores:** SS.SMp.SSgr.Zmar  
KS                              SS.SMp.KSwSS.LsacR.Sa

**Evidence:**      Images: 74      Video: no      Seasearch form: no

### Example images showing PFs

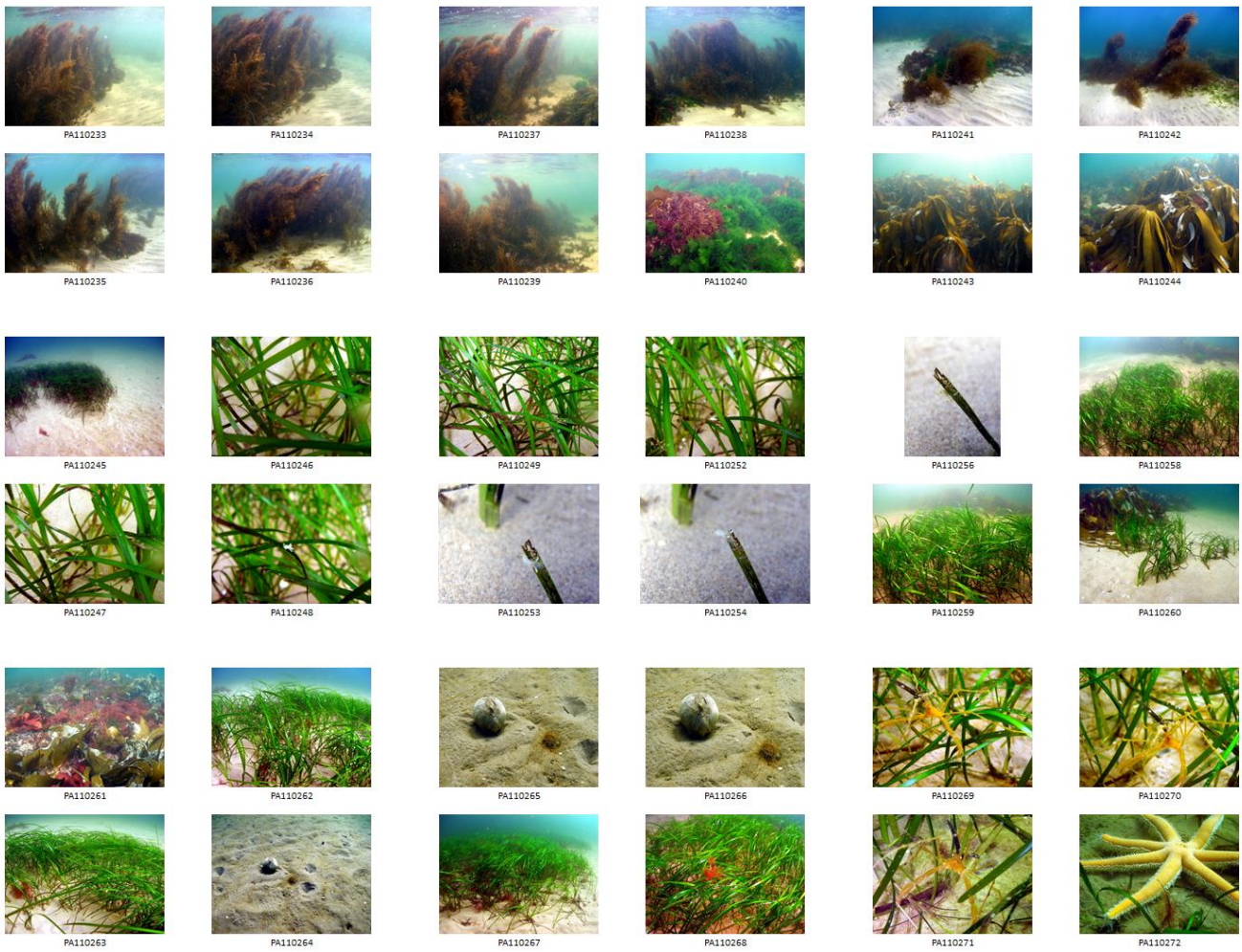


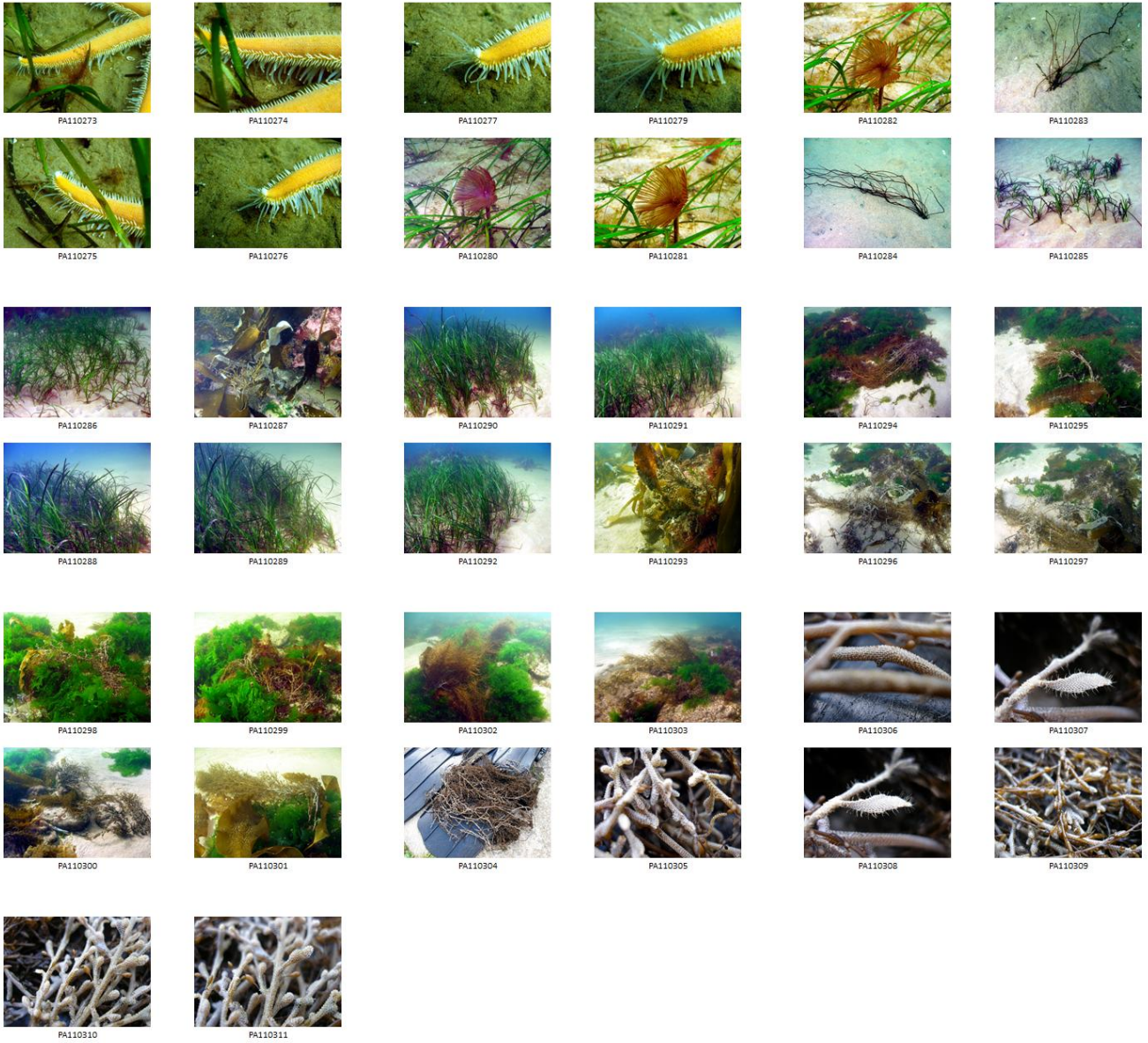
WB1: PA110258.jpg - SG



WB1: PA110296.jpg - KS

### All images for survey location - WB1





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Nàdar air fad airson Alba air fad