



Seasearch

South and West Wales 2021

Summary Report



Report prepared by
Kate Lock, South and West Wales Co-ordinator

Crynodeb

Mae Seasearch yn gynllun gwirfoddol lle mae deifwyr a snorcelwyr hamdden ym Mhrydain ac Iwerddon yn arolygu cynefinoedd a rhywogaethau morol. Fe'i harweinir gan y Gymdeithas Cadwraeth Forol a chaiff ei gyflwyno mewn partneriaeth â sefydliadau eraill gan gynnwys Ymddiriedolaethau Natur Lleol.

Mae'r adroddiad hwn yn crynhoi gweithgarwch Seasearch yn Ne a Gorllewin Cymru (o aber afon Hafren i Aberystwyth) yn 2021. Mae'n cynnwys crynodebau o'r safleoedd a arolygwyd ac yn nodi rhywogaethau a chynefinoedd prin neu anarferol a gofnodwyd. Mae'r rhain yn cynnwys nifer o gynefinoedd a rhywogaethau sydd â blaenoriaeth yng Nghymru. Nid yw'r adroddiad hwn yn cynnwys holl ddata'r arolwg gan fod hyn wedi'i fewnbynnu i gronfa ddata Marine Recorder a'i gyflenwi i Cyfoeth Naturiol Cymru i'w ddefnyddio yn ei weithgareddau cadwraeth morol. Mae'r data ar rywogaethau hefyd ar gael ar-lein drwy'r Rhwydwaith Bioamrywiaeth Cenedlaethol.

Yn ystod 2021, parhaodd Seasearch yng Nghymru i ganolbwyntio ar rywogaethau a chynefinoedd â blaenoriaeth yn ogystal â chasglu gwybodaeth am wely'r môr a bywyd morol ar gyfer safleoedd nad oedd wedi'u harolygu o'r blaen. Arolygwyd ystod ddaearyddol eang o safleoedd yn yr ardal, y safle mwyaf gogleddol oedd y Borth ger Aberystwyth a'r mwyaf deheuol oedd Bae Dwnrhefn, Bro Morgannwg. Mae data o Dde a Gorllewin Cymru yn 2021 yn cynnwys 70 o ffurflenni gan Arolygwyr a 128 o ffurflenni gan Arsylwyr, 2 ffurflen ar gyfer môr-wyntyllau ac 1 ffurflen ar gyfer cimychiaid coch, sy'n rhoi cyfanswm o 201 o ffurflenni.

Mae Seasearch yn Ne a Gorllewin Cymru yn 2021 wedi'i gyflwyno gan gydlynnydd rhanbarthol Seasearch, Kate Lock. Darperir arweiniad a chymorth cyffredinol gan Gydlynnydd Cenedlaethol Seasearch, Charlotte Bolton.

Summary

Seasearch is a volunteer marine habitat and species surveying scheme for recreational divers and snorkellers in Britain and Ireland. It is coordinated by the Marine Conservation Society.

This report summarises the Seasearch activity in South and West Wales (from the Severn estuary to Aberystwyth) in 2021. It includes summaries of the sites surveyed and identifies rare or unusual species and habitats encountered. These include a number of priority habitat and species in Wales. This report does not include all the survey data as this has been entered into the Marine Recorder database and supplied to Natural Resources Wales for use in its marine conservation activities. The species data is also available online through the National Biodiversity Network.

During 2021, Seasearch in Wales continued to focus on priority species and habitats as well as collecting seabed and marine life information for sites that had not been previously surveyed. A wide geographic range of sites were surveyed in the region, the most northern site was Borth near Aberystwyth and the most southern Dunraven Bay, Vale of Glamorgan. Data from South and West Wales in 2021 comprises 70 Surveyor forms and 128 Observer forms 2 sea fan and 1 crawfish form, giving a total of 201 forms.

Seasearch in South and West Wales in 2021 has been delivered by Seasearch regional co-ordinator Kate Lock. Overall guidance and support are provided by the National Seasearch Co-ordinator, Charlotte Bolton.

MAE CYFOETH NATURIOL CYMRU A'R GYMDEITHAS CADWRAETH MOROL YN ARIANNU SEASEARCH CYMRU.

SEASEARCH WALES IS FUNDED BY NATURAL RESOURCES WALES AND THE MARINE CONSERVATION SOCIETY.



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1. Introduction

1.1 Seasearch

Seasearch is a UK volunteer project for both recreational and professional divers. The divers are trained in species and habitat recording and help survey the seabed around the British and Irish coasts. Completed survey forms¹ are quality checked by experienced marine biologists who enter all data into the UK national database Marine Recorder, managed by Joint Nature Conservation Committee (JNCC), which contributes to the National Biodiversity Network.

The main aim is to provide quality assured Seasearch data to partner organisations and the public. However, the project also aims to raise public awareness of the diversity of marine life and habitats in Britain and Ireland through the dissemination of information gathered and the identification of issues arising from it.

Seasearch surveys record the various types of seabed found in the near-shore zone around the whole of the UK and, as comprehensively as possible, the identity and frequency of the dominant animals and plants living at each survey site. Species frequencies are recorded using established semi-quantitative abundance scales². Habitats described on the survey form are assigned a biotope code by an experienced post survey analyst, using the JNCC Marine Nature Conservation Review (MNCR) set of biotopes (JNCC, 2015)³.

The surveys contribute to establishing the location of the richest sites for marine life, sites where there are environmental pressures and sites which are in need of protection.

Surveys target important habitats and species that have been identified by governments to need priority conservation action. In Wales these are detailed in Section 7 of the Environment (Wales) Act 2016⁴, which identifies duties to maintain biodiversity lists and to take steps to maintain and enhance biodiversity. Other important species recorded include invasive and non-native species (INNS) and notable species which have limited distribution ranges in the UK or are nationally rare or scarce.

1.2 South and West Wales 2021 surveys

A list of target dive areas was drawn up at the beginning of the year in meetings held with the Natural Resources Wales and the Pembrokeshire Marine SAC Officer. It was agreed, when conditions allowed, to continue targeting gaps of knowledge around Skokholm, St Brides Bay and the offshore islands.

¹ [Seasearch - Record](#)

² S = Super-abundant, A = Abundant, C = Common, F = Frequent, O = Occasional, R = Rare and NS = Not Seen. Actual numerical frequencies vary with taxonomic group and species. Abundance scores in the text are capitalised to distinguish them from standard grammatical usage, eg Common versus common.

³ JNCC (2015) The Marine Habitat Classification for Britain and Ireland Version 15.03 [Online] [accessed 2 January 2018]. Available from: jncc.defra.gov.uk/MarineHabitatClassification

⁴ [Wales Biodiversity Partnership - Environment \(Wales\) Act \(biodiversitywales.org.uk\)](#)

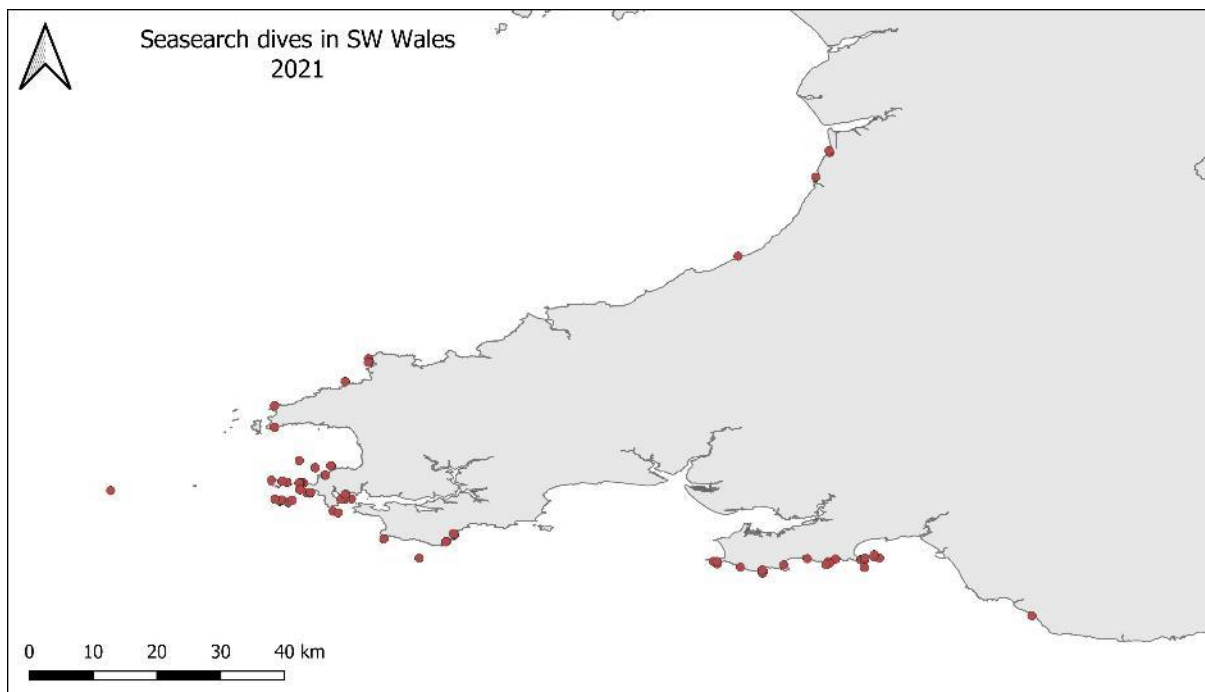
In addition, NRW requested sites along the North Pembrokeshire coast were re-visited. The reefs along this coast are distinct for their richness of sponge communities, extensive carpets of the yellow cluster anemone, *Parazoanthus axinellae* and the northern limit on mainland Britain of the pink sea fan *Eunicella verrucosa*. This habitat is classified as 'Fragile Sponge and Anthozoan' habitat and listed under both Section 7 habitats of 'principle importance' and OSPAR Convention list of 'threatened and/or declining species and habitats' in the North-East Atlantic. This important habitat in Wales is currently being assessed by NRW to record its condition.

Sixteen organised Seasearch diving days were planned; 14 went ahead and two planned days in May were cancelled due to bad weather. All weekends were organised and run by Kate Lock with marshalling support by Blaise Bullimore. An additional two days of survey were completed in North Pembrokeshire with the support of Cardigan Sub Aqua Club. A good combination of experienced Seasearch divers along with some new keen divers participated on the surveys. This allowed a good quality of survey data to be collected and the opportunity for new divers to gain experience and complete qualifications.

One day of diving was carried out at the two sites established in 2017/2018 for crawfish surveys⁵. Surveys repeated at each of these sites added to the survey data collected in previous years.

Additional survey forms were completed by Seasearch divers on their own independent dives in Gower and the Ceridigion coast. These records are welcome as areas where there are no dive charter boats available and it is difficult to organise weekend surveys. Observer forms were also completed at some Gower shore sites.

Survey dives and shore surveys were completed in the following locations:



⁵ https://s3.amazonaws.com/kajabi-storefronts-production/sites/2147503706/themes/2148215941/downloads/CYzWfP5AToeqrQywYhgD_2018-Pembrokeshire-crawfish.pdf

2. Important species recording

2.1 Priority species and habitats

The Wales Environment Act 2016 Section 7 species and habitats list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty “to have regard” to the conservation of biodiversity in all their activities.

In 2021 the following priority habitats and species were recorded:

Crawfish, *Palinurus elephas* recorded at 12 sites.

Pink sea fan, *Eunicella verrucosa* at Tri Maen Trae, Crab Rocks, SE Skokholm, Protheroes Dock, Martins Haven, Waybench.

Fragile sponge and anthozoan communities at V Reef, Tri Maen Trae, Pen Brush, Crab Rocks, SE Skokholm, Gateholm, Marloes reef.

Native oyster *Ostrea edulis* at Mumbles pier.



2.2 Other notable species records.

These species are notable for their rarity or scarcity in the UK or Wales, including some close to the edge of their distribution range, or being unrecorded previously in the UK or possibly new to science, such as some ascidian (sea squirt) species which seem to be locally common in Pembrokeshire.

In 2021 notable species records were:

Yellow staghorn sponge, *Axinella dissimilis*; Tri Maen Trae, V Reef, Pen Brush, Mad Bay, North Skokholm, SE Skokholm, Crab Rocks, Gateholm, Marloes reef, Matronna wreck, Mid Channel Rocks.

Mashed potato sponge, *Thymosia guernei*; Tri Maen Trae, Gateholm, Mad Bay, North Skokholm, SE Skokholm and Crab Rocks.

Crumpled duster sponge, *Axinella damicornis*; Tri Maen Trae, V Reef, Pen Rush, Mad Bay Pinnacles, SE Skokholm, Crab Rocks, Mid Channel Rocks.

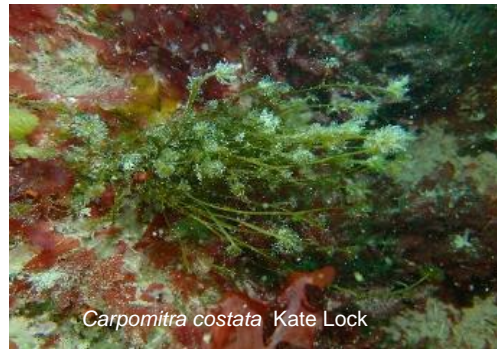
Prawn cracker sponge, *Axinella infundibuliformis*; Gateholm.

Spiky pink sponge, *Tethyspira spinosa*; North Skokholm.



Elegant sea slug, *Okenia elegans*; Marloes reef.

Tassel weed, *Carpomitra costata*; Marloes reef.



'Strawberry' and 'Honeycomb' *Aplidium* ascidian species are both regularly recorded in Pembrokeshire sites, they have been given temporary common names as they are still to be described and confirmed. They were recorded at Little Nose, North Skokholm and Gateholm.

Halcapa chrysanthellium burrowing anemone at Monk Haven recorded, this is the fifth record for SW Wales and the first since 1988.



3. Survey site descriptions

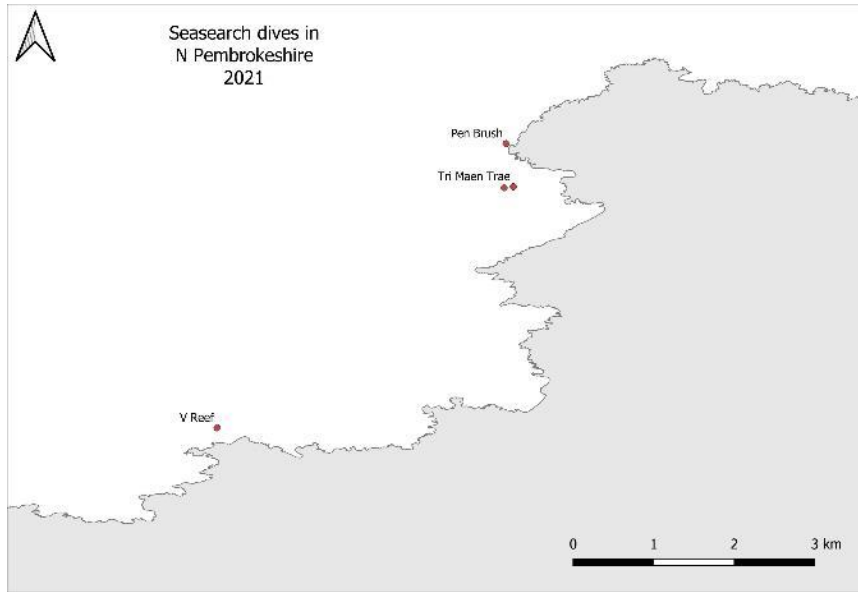
3.1 North Pembrokeshire Coast

Seasearch targeted the North Pembrokeshire coast just north of the Pembrokeshire Marine SAC boundary between 2002 and 2008 with survey dives completed from Porthgain to Strumble Head. Two Seasearch survey reports were completed⁶, the first for surveys between 2002 and 2004 by Jen Jones and the second between 2005 and 2008 by Kate Lock; a total of 13 sites were summarised and all data entered into Marine Recorder.

The sublittoral rocky reefs along this coast are distinct for their richness of sponge communities, extensive carpets of the yellow cluster anemone, *Parazoanthus axinellae* and the northern limit on mainland Britain of the pink sea fan *Eunicella verrucosa*.

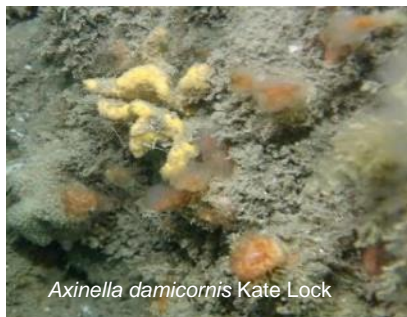
Dive planning for this area of coast is difficult due to its remoteness and lack of dive centres or facilities. Locally based Cardigan Sub-Aqua Club came to the rescue, providing new Seasearch recruits, enthusiasm and willingness to use their club boats to explore this area. Two successful days of diving with a combination of experienced surveyors and newly qualified observers were completed with recording at 3 sites: 'V reef' near Ynys Deulyn, west of Abercastle, and Tri Maen Tre and Pen Brush, both on the south side of Strumble Head Peninsula.

⁶ [Seasearch - Report - Wales](#)



3.1.1 V Reef

Low-lying tide swept bedrock with coarse sand in gullies and vertical faces one to two metres high. Between 13 and 15m depth the rocks were dominated by foliose seaweed including sea beech, *Delesseria sanguinea*, under-tongue weed, *Hypoglossum hypoglossoides*, beautiful kidney weed, *Kallymenia reniformis*, and brown fan weed, *Dictyota dichotoma*. From 15 to 18m animal fauna densely covered the rocks, in particular sponge and hydroid turf. Boring sponge, *Cliona celata*, was Common and the elephants hide sponge, *Pachymatisma johnstonia*, and shredded carrot sponge, *Amphilectus fucorum*, were both Frequent. Yellow staghorn sponge, *Axinella dissimilis*, erect sponge, *Stelligera stuposa* were Frequent, and hedgehog sponge, *Polymastia boletiformis*. Crumpled duster sponge, *Axinella damicornis*, and *Homaxinella subdola* were Occasional. Hydroid turf included luxuriant growths of antennae hydroids, *Nemertesia antennina* and *N. ramosa*, herring bone hydroid, *Halecium halecium*, and occasional *Sertularella gayi*. Crawfish, *Palinurus elephas*, and sponge crab, *Dromia personata*, were both recorded. Seven species of nudibranch were found including *Fjordia lineata* and *Diaphorodoris alba*.



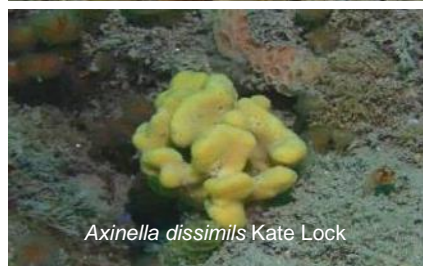
Axinella damicornis Kate Lock



Homaxinella subdola Kate Lock



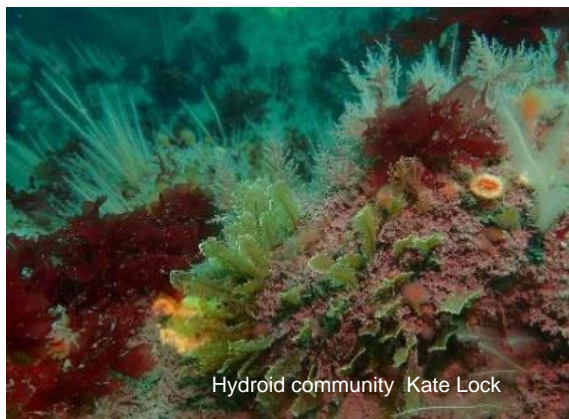
Diaphorodoris alba Kate Lock



Axinella dissimilis Kate Lock

3.1.2 Tri Maen Tre

At low water three kelp covered rocks are exposed at the surface. Below sea level are steep rock slopes with thick forest kelp, *Laminaria hyperborea*, and rich red seaweed meadows extending to 12m depth. Below the algae dense carpets of hydroids and large numbers of sponge species dominated the upward facing rocks. The antennae hydroid *Nemertesia antennina* was notably lush and dense along with *Nemertesia ramosa*, herring bone hydroid, *Halecium halecium*, squirrel's tail hydroid, *Sertularia argentea*, and patches of Indian feather hydroid, *Gymnangium montagui*. Numerous patches of light bulb squirt, *Clavelina lepadiformis*, were found and club sea squirt, *Aplidium punctum*. Sponges were prolific with over 20 species recorded although mostly in low numbers. Massive sponges included yellow boring sponge, *Cliona celata*, and elephants hide sponge, *Pachymatisma johnstonia*. Notable were records of yellow staghorn sponge, *Axinella dissimilis*, crumpled duster sponge, *Axinella damicornis*, and *Homaxinella subdola* along with erect sponges *Stelligera stuposa* and *Raspailia hispida*. The hedgehog sponge *Polymastia boletiformis*, chimney sponge *Polymastia penicillus* were both recorded as Occasional and a small patch of mashed potato sponge *Thymosia guernei* was found. Seven species of nudibranch were recorded including *Diaphorodoris alba*, *Fjordia lineata* and *Fjordia browni*. A single pink sea fan *Eunicella verrucosa* was found in a tide swept gully. Vertical and over hanging rock faces were covered in dense bryozoan turf, particularly white clawed sea moss *Crisia* sp and spiral bryozoan *Crisularia plumosa*. Dense patches of jewel anemone *Corynactis viridis* and patches of hydroids.

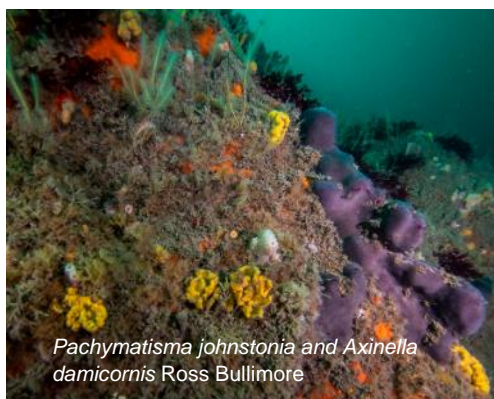
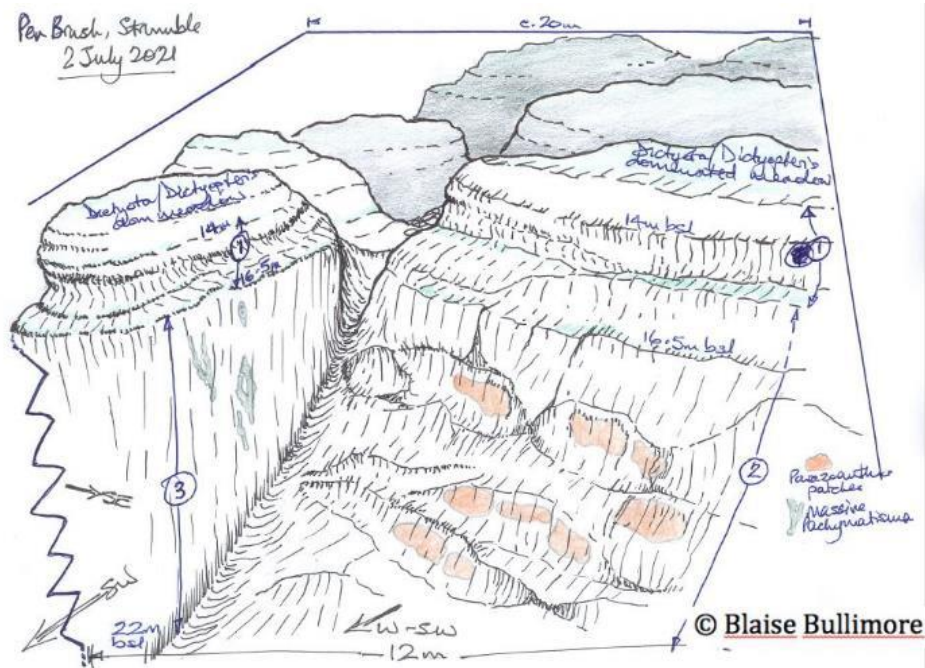


3.1.3 Pen Brush

A short distance offshore, moderately sloping rocky plateaux and shelves between 12 and 16m were densely covered with brown fan weed, *Dictyota dichotoma*, and netted wing weed, *Dictyopteris polypodioides*; this area was only partially surveyed. Below these, irregular, steep, rock slopes with vertical sections and lumpy outcrops formed the sides of open gullies open to the south-west swell and strong currents extended to 22m (limit of survey) and deeper. These steep rock faces were dominated by short bryozoan turf *Crisularia plumosa*, *Bugulina flabellata*, *Scrupocellaria* spp. and white clawed sea moss *Crisia* spp., all recorded as Abundant or Common. Extensive patches of yellow cluster anemone, *Parazoanthus axinellae*, were Super-abundant in areas mixed with crumpled duster sponge, *Axinella damicornis*, and large elephant hide sponge, *Pachymatisma johnstonia*.

Eighteen further sponge species were recorded including the yellow staghorn sponge, *Axinella dissimilis*, chocolate finger sponge, *Raspailia ramosa*, and erect sponge *Stelligera stuposa*. Notable were both the sponge crab *Dromia personata* and crawfish *Palinurus elephas*. Steep vertical walls on the side of the gullies were more exposed to both swell and current and here the rock was dominated with short bryozoan turf and large elephant hide sponge, *Pachymatisma johnstonia*, but there was an absence of the erect sponge species.

At the base of the cliff was gently sloping seabed of cobble and small boulders. The boulders were encrusted with similar fauna to bedrock areas; the cobbles and pebbles were covered in encrusting pink algae but supported little animal life.



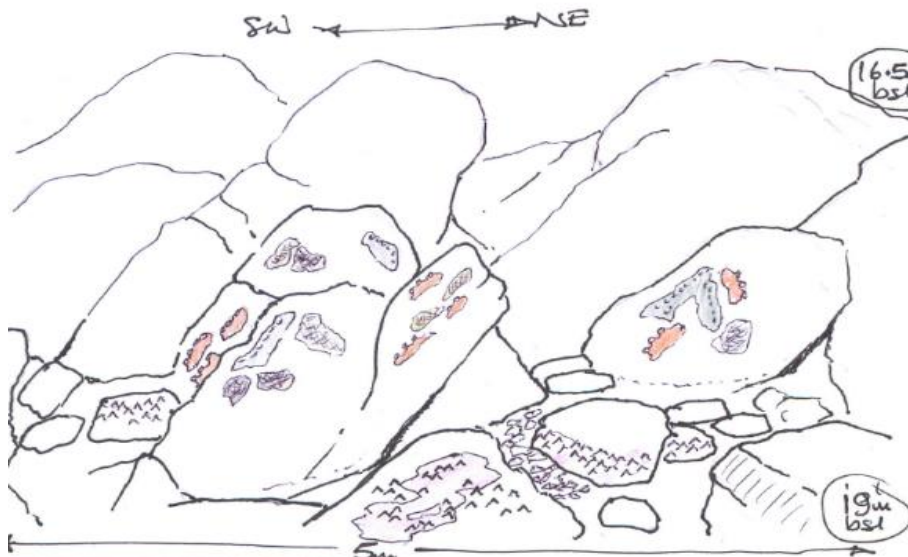
3.2 St Brides Bay

St Brides is a large bay with Ramsey island marking the northern extremity and Skomer island the south. Prominent features within the bay include Old Red Sandstone cliffs and headlands, small islands and islets, offshore reefs and mixed sediment plains. Seasearch survey diving has targeted many sites in the bay over the last 25 years. In 2021 surveys were completed at Handmarks, an extensive offshore reef, and the east side of Stack Rock in the central south end of the bay; site summaries are provided below. Observer forms were additionally completed for 'St Georges wreck' in Porthlisky Bay, 'Nimrod Paddlesteamer' north of Whitesands Bay and St Brides Haven shore dive, the data from these sites has been entered into Marine Recorder.

3.2.1 Handmarks

Several areas of the Handmarks have previously been surveyed. At this location, undulating bedrock ranged between between 16 and 19m depth with boulders and coarse sediment in gullies.

Sketch: Blaise Bullimore



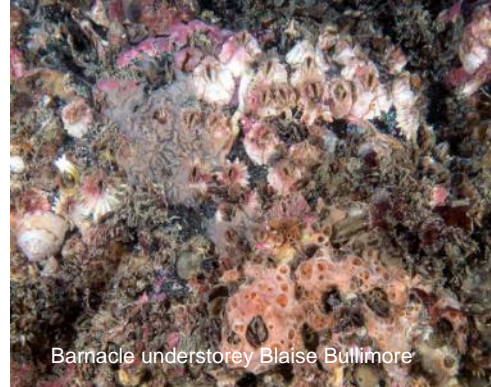
The rock surfaces were characterised by domed hummocks, small pinnacles and vertical to overhanging faces. The faces were heavily pitted and dominated by an understory of barnacles overgrown by short dense bryozoan turf mainly comprising *Scrupocellaria* spp and white clawed sea moss, *Crisia* spp, with sea squirts *Polycarpa scuba* and scrubby red seaweed patches. Frequent patches of cushion sponge *Myxilla incrustans*, shredded carrot sponge, *Amphilectus fucorum*, along with deadman's fingers, *Alcyonium digitatum*, also characterised rock surfaces. Patches of sea beech, *Delesseria sanguinea*, were heavily encrusted with fine hydroids and star sea squirt, *Botryllus schlosseri*. Areas with the least dense covering of erect and cushion-forming species showed evidence of extensive colonisation by rock boring bivalve molluscs; however, their abundance is likely to have been under-recorded because of the dense epifauna elsewhere. Notable were high numbers of the spindly spider crab *Inachus* spp.



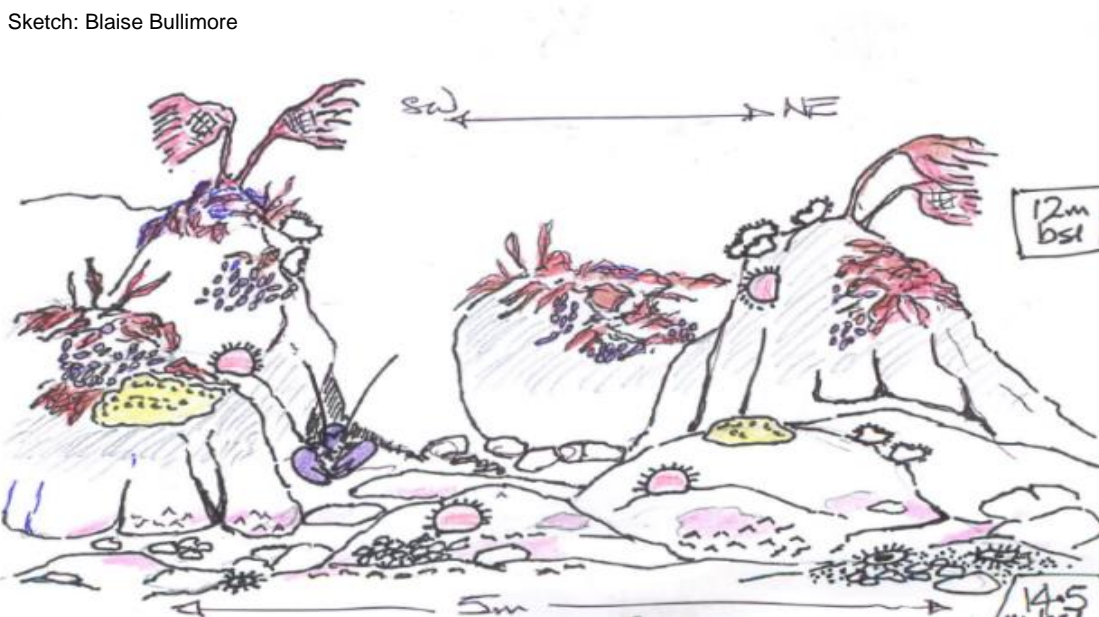
Alcyonium digitatum and sponge community Blaise Bullimore

3.2.4 Stack Rocks East

Rock ridges aligned NW to SE with 2m high faces which extended from 12 to 14m were surveyed. Rock surfaces were deeply fissured and sculptured, with sparse kelp *Laminaria hyperborea* on the ridge tops and extensive patches of degrading red seaweed (October survey), primarily cock's combs, *Plocamium* spp, and sea beech, *Delesseria sanguinea*, forming silty, felt-like mats were combined with dense carpets of small blue mussels, *Mytilus edulis*. Many rock faces were covered in an understory of barnacles with patches of feather stars, *Antedon bifida*, Occasional yellow boring sponge, *Cliona celata*, and deadman's fingers, *Alcyonium digitatum*. At the base of the bedrock were small boulders, cobbles and coarse mixed sediments. The boulders and cobbles were encrusted with pink algae, scattered barnacles and calcareous tube worms *Spirobranchus* spp with Occasional dahlia anemones, *Urticina felina*, daisy anemone, *Cereus pedunculatus*, bryozoan crusts and Common sea urchins, *Echinus esculentus*.



Barnacle understory Blaise Bullimore



Sketch: Blaise Bullimore

3.3 Skomer Marine Conservation Zone

Skomer MCZ is managed by Natural Resources Wales. Although the MCZ's dedicated team of marine scientists maintain a long established programme of littoral, sublittoral and oceanographic monitoring, and the habitat and species records within the MCZ are considerable, the MCZ's management plan identifies the need for continued updating with new records.

The popular shore diving site Martins Haven was used for new Observers to complete training dives. Surveys were also completed at Martins Haven East, Low Point, Rainy Rock and offshore from Prothroes Dock; site summaries are provided below. Single Observer

forms were additionally completed for Pains Rock and North Wall and a group Surveyor form for Waybench; the data from these sites has been entered into Marine Recorder.

3.3.1 Martins Haven East

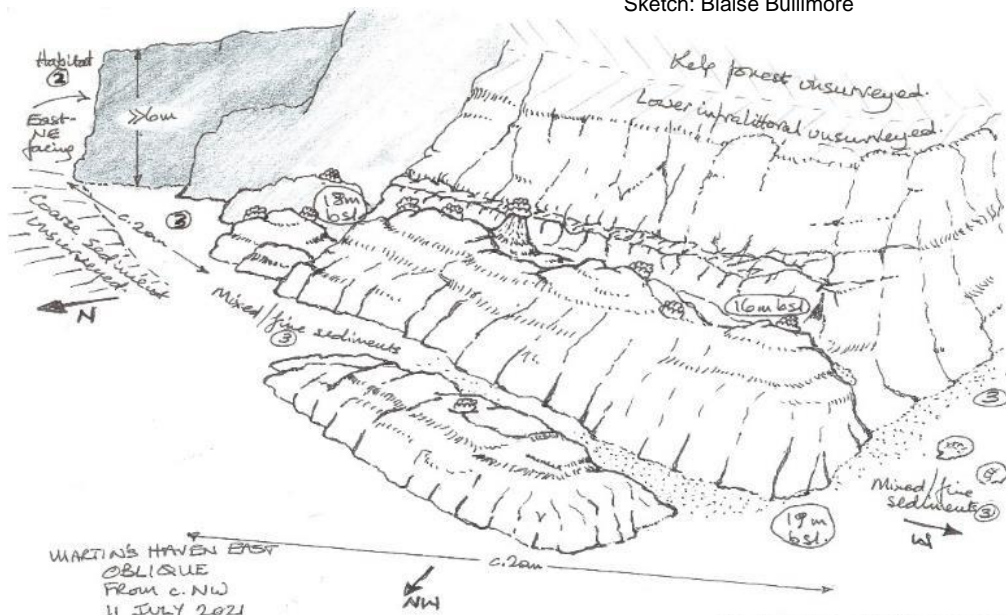
A rugged bedrock reef slope with varied topography gave way to elongated bedrock ridges running west to east parallel to the rock slope alongside rocky outcrops and steep to vertical walls up to 6m high. The rock slope gave way to a shallow mixed sediments slope at 16 - 18m depth; mixed sediments also formed small 'embayments' between rock outcrops and ribbons between the ridges. The sloping rocks and ridges were dominated by bryozoans *Cellaria sinuosa*



Pentapora foliacea Ross Bullimore

and white clawed sea moss, *Crisia* spp, along with thick growths of antennae hydroids *Nemertesia antennina* and *Nemertesia ramosa* and herring bone hydroid *Halecium halecium* over a barnacle understorey. Large growths of yellow boring sponge, *Cliona celata*, and potato crisp bryozoan, *Pentapora foliacea*, dominated the lower ridges. The steep vertical faces were dominated in deadman's fingers, *Alcyonium digitatum*, jewel anemones, *Corynactis viridis*, antennae hydroid *Nemertesia antennina* and white clawed sea moss, *Crisia* spp. Sediments were characterised by king scallops, *Pecten maximus* and Occasional burrowing gravel sea cucumbers, *Neopentadactyla mixta*.

Sketch: Blaise Bullimore

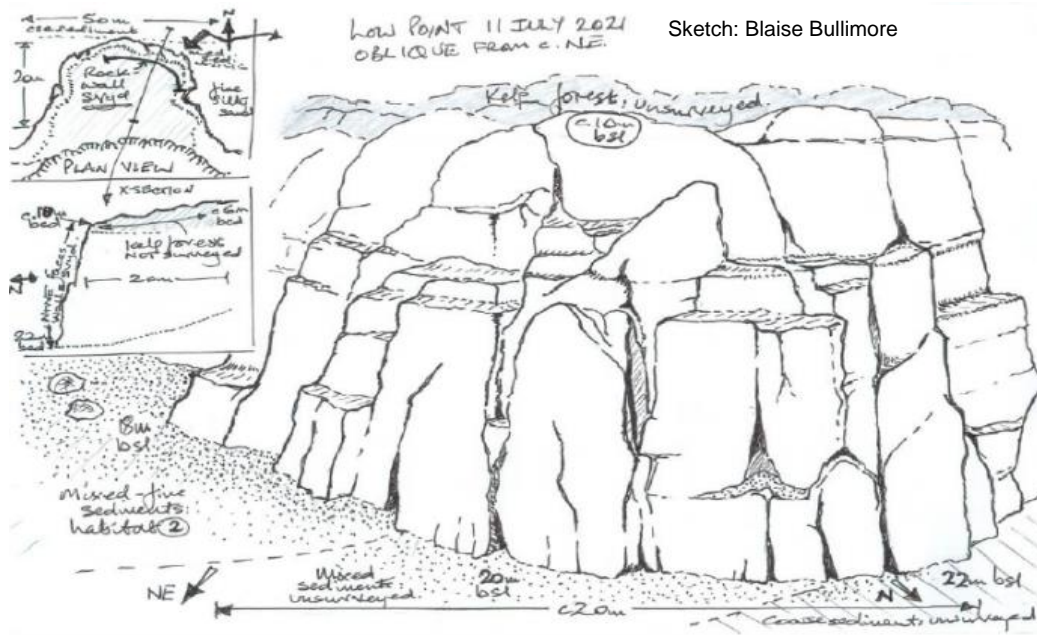


MARTIN'S HAVEN EAST
OBLIQUE
FROM c. NW
11 JULY 2021

© Blaise Bullimore

3.3.2 Low Point

The survey site comprised the outer part of a submerged rocky promontory. Steep, highly fissured bedrock walls with slight overhangs, vertical gullies and ledges with coarse sand and shell gravel patches, extended from 10 to 22m depth. The east and west faces were current sheltered but the north faces moderately current exposed. The gullies and fissures provide considerable local current shelter and were mainly characterised by solitary sea squirt, *Ascidia mentula*.

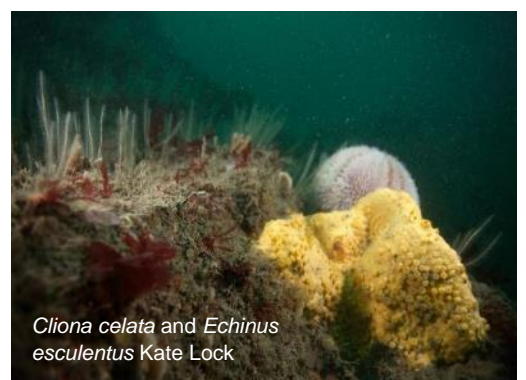


Walls were dominated in dense short bryozoan turf with Abundant *Scrupocellaria* spp. and Common *Crisularia plumosa*, *Bugulina flabellata*, *Chartella papyracea* and white-clawed sea moss, *Crisia* spp. Thick growths of antennae hydroids *Nemertesia antennina*, *Nemertesia ramosa* and herring bone hydroid, *Halecium halecium*, were all recorded and high numbers of Devonshire cup coral, *Caryophyllia smithii*. At the base of the rocks was mixed sediment characterised by king scallops, *Pecten maximus*, burrowing brittle stars, *Ophiura albida*, burrowing gravel sea cucumber, *Neopentadactyla mixta*, and burrowing anemone *Peachia cylindrica*.



3.3.4 Rainy Rock

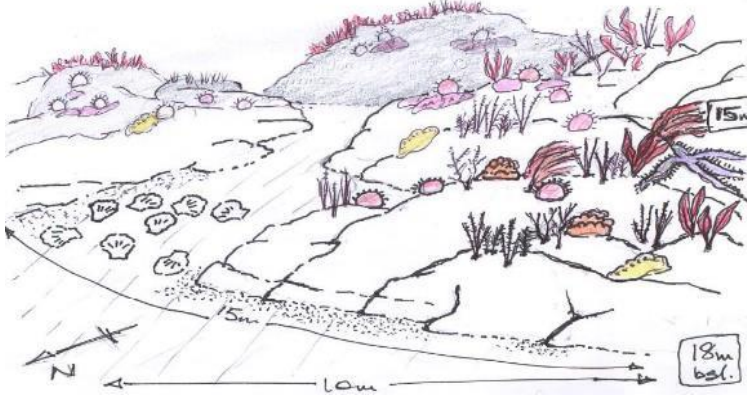
The surveyed site comprised rugged bedrock ridges between 16 and 18m depth with gullies up to 2 m width. The rocks were dominated in bryozoan turf, white clawed sea moss, *Crisia* spp and finger bryozoan, *Alcyonidium diaphanum*, herringbone hydroid *Halecium halecium*, yellow boring sponge, *Cliona celata*, and occasional patches of red seaweed. Large patches of orange sea squirt *Stolonica socialis* were recorded together with *Morchellium argus*, light bulb sea squirts, *Clavelina lepadiformis*, and club sea squirt, *Aplidium punctum*. Both spiny starfish, *Marthasterias glacialis*, and common urchin, *Echinus esculentus*, were recorded as Common. At the bottom of the gullies, horizontal bedrock was colonised with pink encrusting algae and barnacles with occasional patches of shell and gravel.



3.3.3 Protheroes Dock

Gently sloping, moderately wave and current exposed bedrock outcrops and ridges between 15 to 18m depth

Sketch: Blaise Bullimore

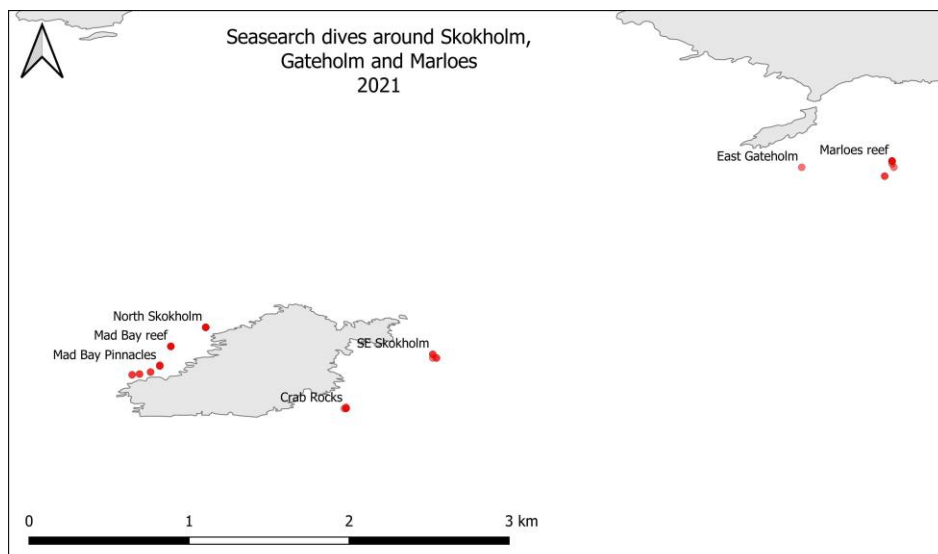


Eunicella verrucosa Ross Bullimore

Sparse, mixed red seaweed found on the tops of the outcrops and ridges included cock's combs, *Plocamium* spp, and sea beech, *Delesseria sanguinea*, mixed with yellow boring sponge, *Cliona celata*, and dense bryozoan turf of *Scrupocellaria* spp, *Cellaria* spp. and white clawed sea moss, *Crisia* spp, all recorded as Common. Luxuriant growths of antennae hydroids *Nemertesia antennina* and *Nemertesia ramosa* and herring bone hydroid, *Halecium halecium*, were all recorded. Large spiny starfish, *Marthasterias glacialis*, and pink sea fan, *Eunicella verrucosa*, were found and relatively high numbers of common urchin, *Echinus esculentus*, whose grazing had created areas of pink encrusting calcareous algae and barnacles. Between and down-slope from the rocky outcrops were areas of mixed sand and shell gravel with high densities of king scallops, *Pecten maximus*.

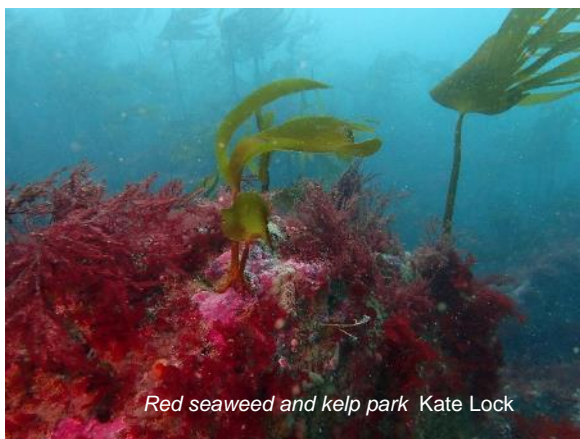
3.4 Skokholm, Gateholm and Marloes

Skokholm is an Old Red Sandstone island located two miles off the southwest Pembrokeshire coast. In 2021 diving was completed at Little Nose, Mad Bay Reef, Mad Bay Pinnacles, North Skokholm, all located on the exposed west and north coasts and Crab Rocks off the south coast; the South-east Reef was also re-visited. Additionally, reefs were surveyed off the east side of Gateholm island and off the Marloes peninsula on the mainland coast east of Skokholm.



3.4.1 Little Nose, Skokholm (west coast)

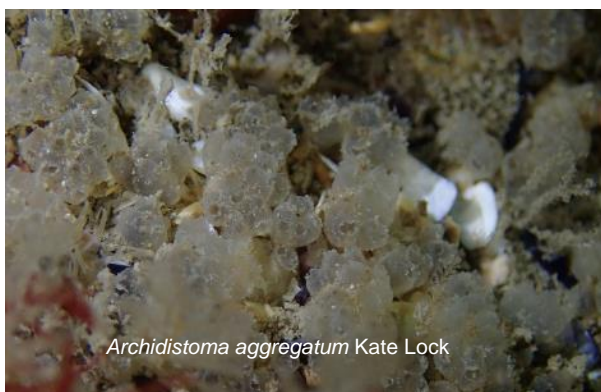
This high energy wave exposed site is located at the west end of the island. Rocky reef and boulders surveyed between 10 and 14m were covered in *Laminaria hyperborea* kelp park and red seaweeds. Pink encrusting calcareous algae, barnacles and *Spirobranchus* tubeworms indicating scour by sand and wave surge, dominated the deeper rocks adjacent to large sandy patches. Further bedrock outcrops were found further offshore between 15 and 17m depth. Between the seaweeds the rocks were densely packed with short faunal turf dominated by sea squirts, sponges and small hydroids. Fifteen species of sea squirt were recorded including pinhead sea squirts *Pycnoclavella aurilucens* and *Pycnoclavella producta*, the un-named sea squirts *Aplidium* 'strawberry' and *Aplidium* 'honeycomb' together with the sand encrusted species *Archidistoma aggregatum* and *Syonicum incrustatum*. Large yellow boring sponge, *Cliona celata*, elephant hide sponge, *Pachymatisma johnstonia*, shredded carrot sponge, *Amphilectus fucorum*, and breadcrumb sponge, *Halichondria panicea*, were recorded on the reef along together with encrusting sponge species *Myxilla incrustans* and *Phorbast fictitius*. Small patches of hydroids were found with antennae hydroid *Nemertesia antennina* and herring bone hydroid, *Halecium halecium*, both Frequent whilst squirrel's tail hydroid *Sertularia argentea*, *Aglaophenia tubulifera* and *Aglaophenia kirchenpaueri* were each recorded as Occasional. Hornwrack, *Flustra foliacea*, was found in large patches on the reef.



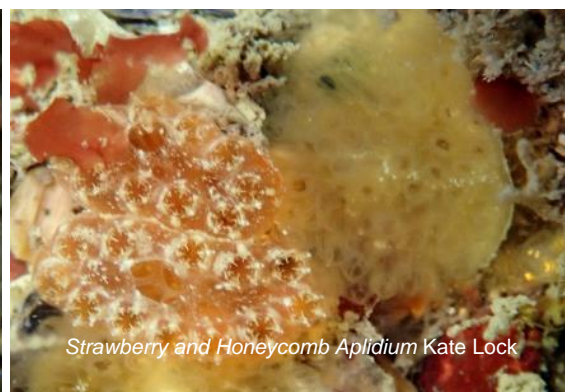
Red seaweed and kelp park Kate Lock



High energy communities Kate Lock



Archidistoma aggregatum Kate Lock

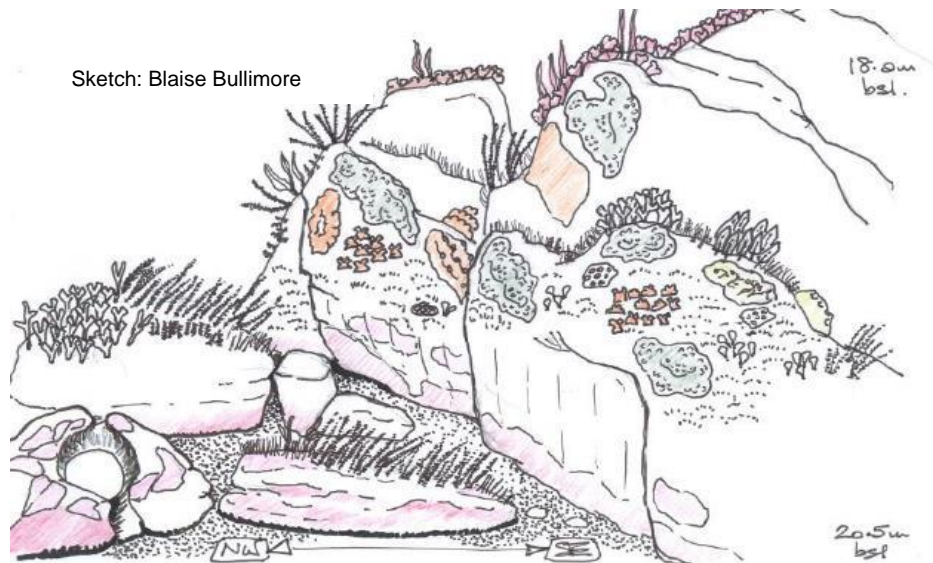


Strawberry and Honeycomb *Aplidium* Kate Lock

3.4.2 Mad Bay Reef, Skokholm (north coast)

An extensive area of reef lies along the wide NW facing Mad Bay. The surveyed area comprised very rugged, mixed reef of low-lying flat rocks and boulders interspersed with sand at 20m depth and bedrock outcrops standing 2-3m high from the seabed. The upward facing surfaces on top of the outcrops were covered in red seaweed including sea beech,

Delesseria sanguinea, and fine-veined crinkled weed, *Cryptopleura ramosa*, along with sparse *Laminaria hyperborea* kelp.



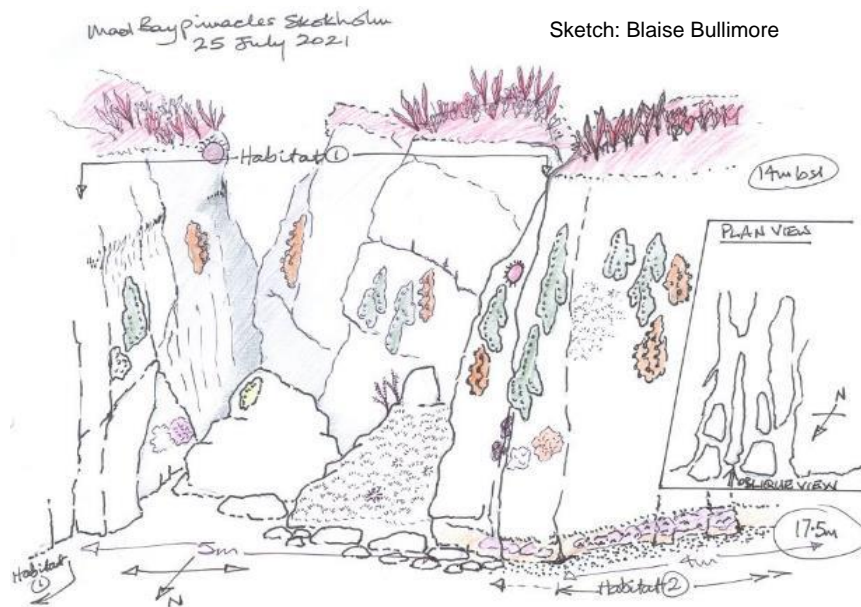
The vertical faces were packed with a dense mixed faunal turf of sponges, ascidians, hydroids and bryozoans. Massive sponge species yellow boring sponge, *Cliona celata*, elephants hide sponge, *Pachymatisma johnstonia* and shredded carrot sponge, *Amphilectus fucorum*, were spatially prominent. High densities of the pinhead seasquirts *Pycnoclavella aurilucens* and *Pycnoclavella producta* were recorded along with club sea squirt, *Aplidium punctum*, and luxuriant stands of hydroids including antennae hydroid *Nemertesia antennina*, *Aglaophenia tubulifera* and *Aglaophenia kirchenpaueri*. Bryozoans were predominantly white clawed sea moss *Crisia spp*, spiral bryozoan, *Crisularia plumosa*, and *Cellaria spp*. The low-lying flat rocks and boulders were covered in large patches of hornwrack, *Flustra foliacea*, and occasional colonies of potato crisp bryozoan, *Pentapora foliacea*. The squirrel's tail hydroid, *Sertularia argentea* was recorded as Abundant with nudibranch *Doto coronata* as Common.

3.4.3 Mad Bay Pinnacles, Skokholm (north coast)

These pinnacles are part of the extensive area of Mad Bay reef. Steep vertical faces and ridges between 14 and 17m depth with narrow gullies between them, floored by a mix of small and large angular boulders, were surveyed. The tops of the ridges were covered in red and brown seaweed meadows with both the siphoned feather weed, *Heterosiphonia plumosa*, and netted wing weed, *Dictyopterus polypodioides*, both recorded as Common. The steep faces were dominated by large yellow boring sponge, *Cliona celata*, elephant hide sponge, *Pachymatisma johnstonia*, shredded carrot sponge, *Amphilectus fucorum* and extensive examples of *Hexadella topsenti*, The crumpled duster sponge, *Axinella damicornis*, and mashed potato sponge, *Thymosia guernei*, were also recorded. Short bryozoan turf densely covered the rocks with *Scrupocellaria scruposa* and white clawed sea moss *Crisia spp* both noted as Abundant and spiral bryozoan *Crisularia plumosa* and *Bugulina flabellata* both as Common. Crustaceans included European

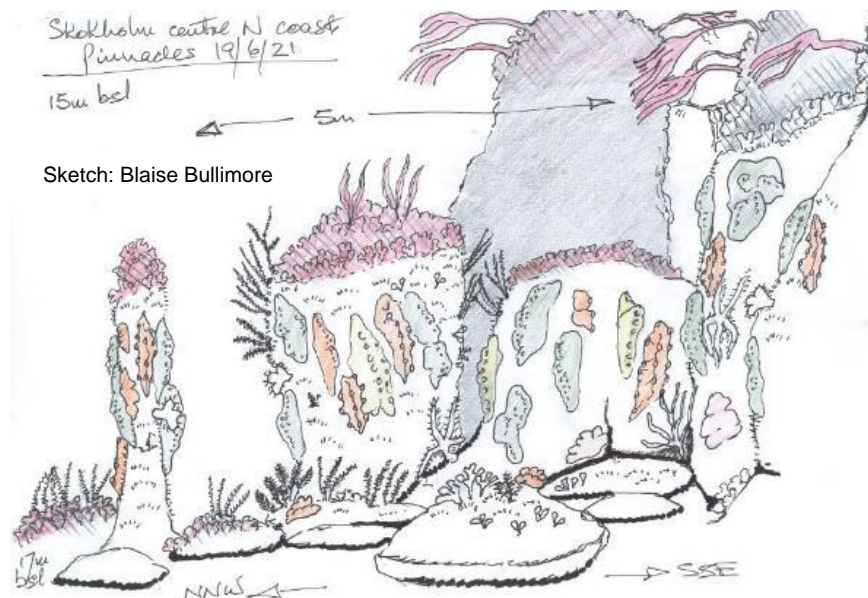


lobster, *Homarus gammarus*, squat lobster, *Galathea strigosa*, and crawfish, *Palinurus elephas*



3.4.4 North Skokholm reef (north coast)

A rugged seabed comprised of steep and vertical bedrock slopes and pinnacles was surveyed between 5 and 17m depth. The shallower surfaces were covered in *Laminaria hyperborea* kelp park and rich red seaweed meadows, below which the rocks were covered in faunal turf in particular large sponges, elephants hide sponge, *Pachymatisma johnstonia*, shredded carrot sponge, *Amphilectus fucorum* and breadcrumb sponge *Halichondria panicea*.



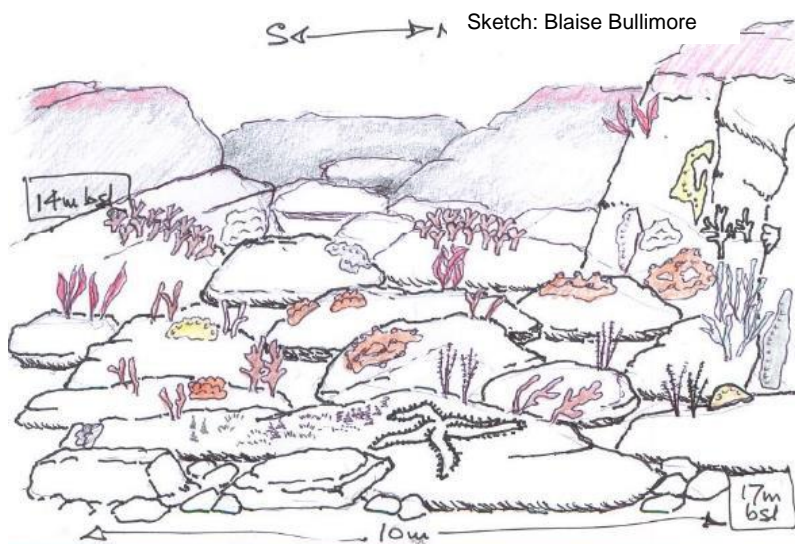
Twelve species of sea squirt were found including *Sidnyum turbinatum*, *Morchellium argus* and the pinhead sea squirts *Pycnoclavella aurilucens*, *P. producta* and *P. stolonialis*, all recorded as Frequent, and *Aplidium* 'strawberry' as Occasional. Mixed amongst the sea squirts were small and encrusting sponges including *Tethyspira spinosa*. Deadman's

fingers, *Alcyonium digitatum*, were Frequent and thick growths of antennae hydroid *Nemertesia antennina* along with spiral bryozoan, *Crisularia plumose*, and *Bugulina flabellata*. Below the steep walls were low-lying rocks and boulders with sand between. Here yellow staghorn sponge, *Axinella dissimilis*, and mashed potato sponge, *Thymosia guernei*, were recorded along with potato crisp bryozoan, *Pentapora foliacea*. Hydroids included squirrel's tail hydroid, *Sertularia argentea* and patches of Indian feather hydroid, *Gymnangium montagui*. Both the sponge or sleepy crab, *Dromia personata*, and crawfish *Palinurus elephas* were recorded.



3.4.5 Crab Rocks (south coast)

The survey site was located offshore SE from Crab Bay on the south coast of Skokholm. The area surveyed was wave and tide exposed, rugged bedrock reef between 14 and 17m depth with low ridges mostly about 1.5m high but occasionally rising to 2-3m, interspersed with large and small boulders, coarse sand and gravel. The rocks were dominated by dense bryozoan turf with *Scrupocellaria scruposa* and white clawed sea moss *Crisia* spp both Abundant and finger bryozoan, *Alcyonidium diaphanum*, Frequent. Orange sea squirt, *Stolonica socialis*, and *Morchellium argus* were both Frequent. Erect sponges *Stelligera stuposa*, yellow staghorn sponge, *Axinella dissimilis* and crumpled duster sponge, *Axinella damicornis* were recorded along with mashed potato sponge, *Thymosia guernei*, and mosaics of encrusting sponge species. Large patches of hornwrack, *Flustra foliacea*, along with occasional potato

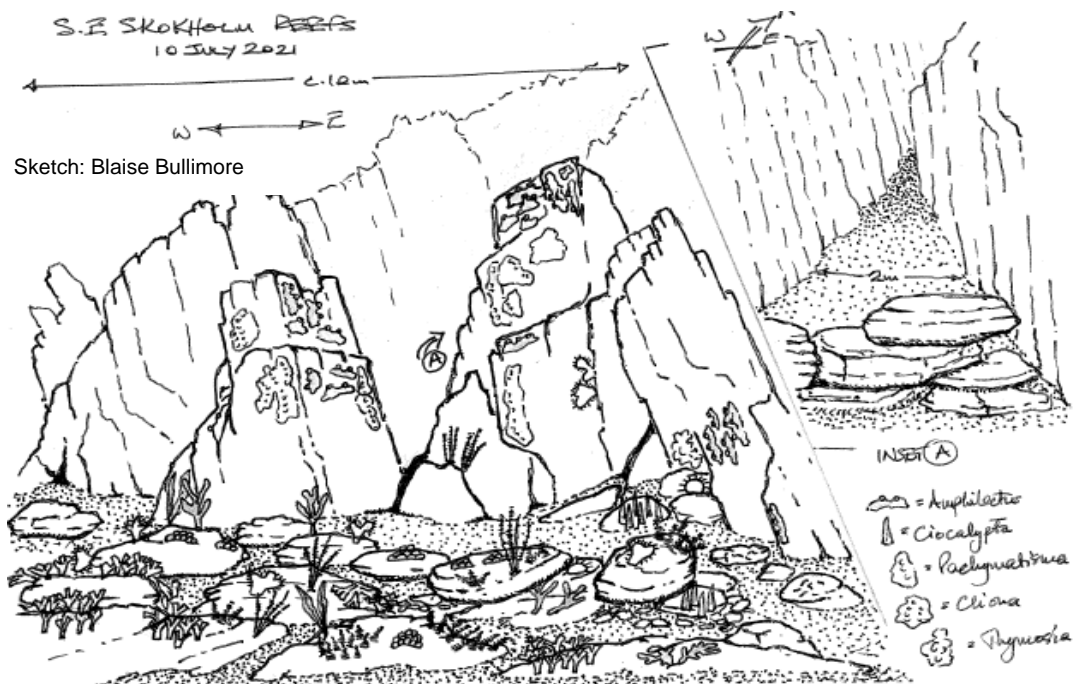


crisp bryozoan, *Pentapora foliacea*, were recorded on the horizontal rock surfaces. Single records of pink sea fan, *Eunicella verrucosa* and crawfish *Palinurus elephas* were recorded.

3.4.6 South-east Reef

An extensive area of rugged reef extends roughly 500m east and southeast from Skokholm island. Numerous sites across the reef have been surveyed since 2000 and the area continues to be explored.

The surveyed area comprised very steep, jagged, red Old Red Sandstone bedrock ridges with bedding planes at 70 to 80° pitch with deep gullies up to 2m wide at 15 to 18m depth with adjacent boulders at 18 to 19m deep. Coarse sand and fine shell gravel were noted at the base of gullies and between boulders.



Bryozoan and hydroid turf was dominant with *Scrupocellaria* spp and white clawed sea moss *Crisia* spp both Abundant and spiral bryozoan *Crisularia plumosa* Common. There was a mix of massive sponges, elephants hide sponge, *Pachymatisma johnstonia*, shredded carrot sponge, *Amphilectus fucorum* and small patches of *Iophon nigricans*, and erect sponges including *Stelligera stuposa*, *Raspailia hispida*, yellow staghorn sponge, *Axinella dissimilis*, and crumpled duster sponge, *Axinella damicornis*, together with some large mashed potato sponges, *Thymosia guernei*. Between 18 to 19m depth rugged horizontal roughly flat and angular boulders on low bedrock slabs with smaller boulders, coarse sand and fine shell gravel between were recorded.



Rock surfaces nearest to the sediments were heavily scoured with encrusting pink calcareous algae, barnacles, calcareous keel tubeworms, *Spirobranchus* sp, and occasional patches of *Ciocalyptra penicillus*, an sponge infrequently encountered in SW Wales which is characteristic of and restricted to bedrock/sediment interfaces in areas exposed to

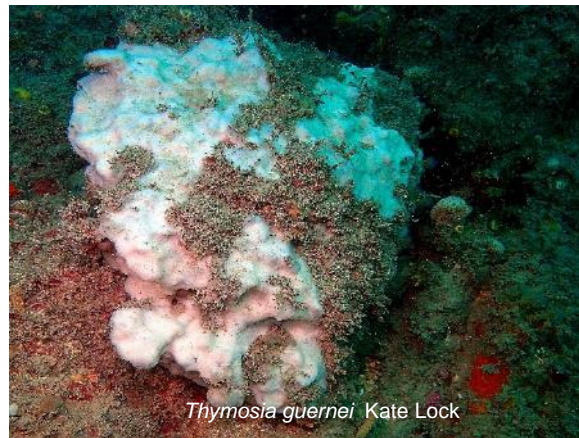
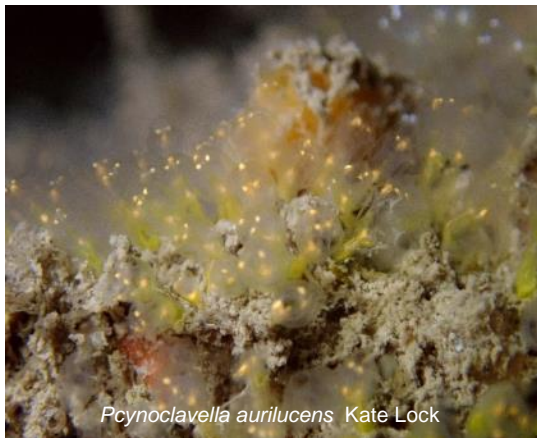
moderately strong wave action or tidal streams, where upward facing rock surfaces are overlaid by clean coarse sand or gravel.

Upward facing surfaces away from sediment were dominated by dense short bryozoan turf including patches of hornwrack, *Flustra foliacea*, finger bryozoan, *Alcyonidium diaphanum*, and potato crisp bryozoan, *Pentapora foliacea*, hydroid turf and a scattering of fine red seaweeds. Crustaceans included European lobster, *Homarus gammarus*, squat lobster, *Galathea strigosa*, and crawfish, *Palinurus elephas*. Records of 3 pink sea fan *Eunicella verrucosa* were notable.



3.4.7 East Gateholm

The survey site comprised a low-lying, rugged, bedrock reef of Old Red Sandstone between 12 and 16m depth, with occasional ridges 2-3m in height. Reef tops were covered in red and brown seaweeds and the faces dominated by sponge and sea squirt communities. Between the ridges and bedrock were patches of coarse sand and scoured cobbles with keeled tubeworms, *Spirobranchus* sp, and sparse animal turf. Twenty species of sponges were recorded including the erect sponges *Stelligera stuposa*, *Stelligera rigida*, *Raspailia hispida*, yellow staghorn sponge, *Axinella dissimilis*, crumpled duster sponge, *Axinella damicornis*, and prawn cracker sponge, *Axinella infundibuliformis* along with mashed potato sponge, *Thymosia guernei*. Twelve species of sea squirt were found including pinhead sea squirts *Pycnoclavella aurilucens* and *P. producta* along with *Polycarpa scuba* all recorded as Common and *Aplidium* 'strawberry' as Occasional. The potato crisp bryozoan, *Pentapora foliacea*, was Frequent and crawfish, *Palinurus elephas*, were recorded.



3.4.8 Marloes Reef

Scattered patches of reef lie to the south of the Marloes peninsula east and south-east of Gateholm island. The survey site consisted of undulating old Red Sandstone bedrock and very large boulders with angular cobbles between 10 and 15m depth.

Upward facing surfaces covered in sparse forest kelp *Laminaria hyperborea* and rich red seaweed meadows including beautiful fan weed *Metacallophyllis laciniata*, fine-veined crinkle weed *Cryptopleura ramosa*, sea beech *Delesseria sanguinea* and eye

lash weed *Calliblepharis ciliata*, brown seaweeds included brown fan weed *Dictyota dichotoma* and tassel weed *Carpomitra costata*.

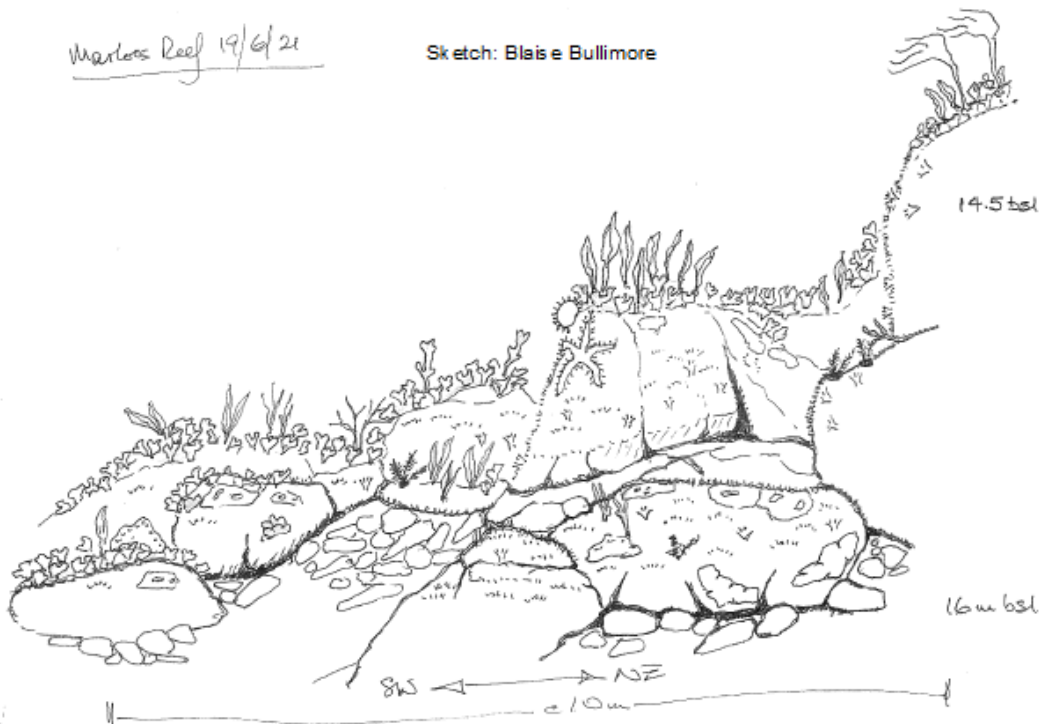
Vertical rock faces were packed with hydroid, bryozoan, sea squirt and sponge turf with high species diversity. Large boring sponge *Cliona celata*, elephant hide sponge *Pachymatisma johnstonia*, shredded carrot sponge *Amphilectus fucorum* were all recorded as Frequent. Erect sponges included *Stelligera stuposa*, *Stelligera rigida*, *Raspailia hispida*, yellow staghorn sponge *Axinella dissimilis*, crumpled duster sponge *Axinella damicornis*. Pinhead sea squirt *Pycnoclavella aurilucens* and *Pycnoclavella producta* along with *Didemnum maculosum* var. *dentata* were recorded as Common and *Lissoclinium weigelei* Rare. Bryozoan turf was dominated in spirial bryozoan *Crisularia plumosa*, white clawed sea moss *Crisia* spp. and finger bryozoan *Alcyonidium diaphanum* with potato crisp bryozoan *Pentapora foliacea* recorded as Occasional. Coarse sand and gravel were found in the gullies between rock ridges, but this was not surveyed.



Red algae community Blaise Bullimore

Marlous Reef 19/6/21

Sketch: Blaise Bullimore



Lissoclinium weigelei Blaise Bullimore



Axinella damicornis Kate Lock

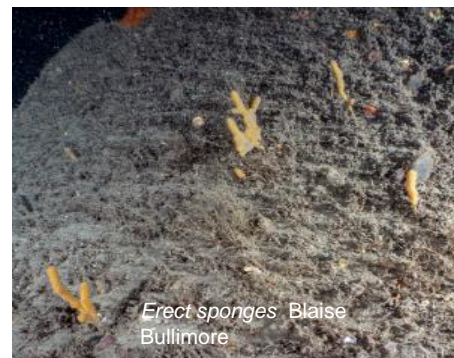
3.5 Milford Haven Waterway

The Milford Haven waterway has been a focused area for Seasearch and a twelve-year summary 2004 to 2015 report was produced⁷. Sites continued to be surveyed and in 2021 were completed in the lower waterway on the remains of the WWII wreck of the cargo ship 'Matronna' and offshore from Monk Haven; site summaries are provided below. Surveys at Castle Bay west were also completed by new Observers completing training dives; a single Observer form was completed for 'The Greek' wreck (Adamantios J Pithis) at St Anne's Head and a group form completed for Mid Channel Rocks; the data from these sites has been entered into Marine Recorder.

3.5.1 Matronna

Very broken, wreckage lying at 19 to 20m depth on a silty, fine mixed sediments plain with scattered pebbles and cobbles were surveyed.

The wreck's metal surfaces were covered in very silted short bryozoan turf with occasional finger bryozoans, *Alcyonidium diaphanum*, erect sponges, *Homaxinella subdola*, and yellow staghorn sponge, *Axinella dissimilis*, large patches of encrusting sponges and a sprinkling of sea squirts. Autumnally scruffy hydroids included squirrel's tail hydroid,



Sketch: Blaise Bullimore



Sertularia argentea, *Sertularella sp* and *Amphisbetia operculata* along with oaten pipe hydroid *Tubularia indivisa* stalks on the more upright wreck sections. Small groups of lesser spotted catshark *Scyliorhinus canicula* were seen resting together under pieces of wreckage.

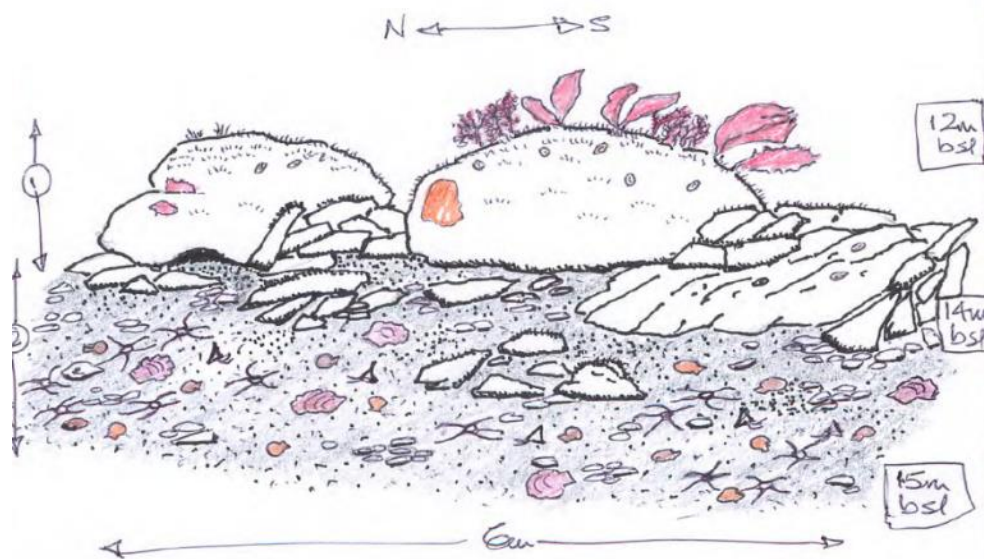
⁷ [COoDb4PARNajybsJ80Eh_2004-2015-Milford-Haven.pdf](#)

Sediments, pebbles and cobbles surrounding and between the wreckage fragments were covered in fine silt and characterised by seven-armed starfish, *Luidia ciliaris*, brittle stars, *Ophiura ophiura*, and king scallop *Pecten maximus*.

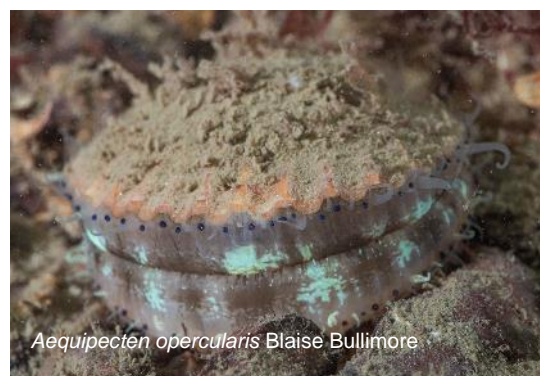
3.5.2 Monk Haven outer

The survey site comprised low bedrock outcrops with occasional very large boulders covered in beautiful eyelash weed, *Calliblepharis ciliata* and siphoned feather weed *Heterosiphonia plumosa* heavily encrusted in white clawed sea moss *Crisia spp.* Between the rocks small heaps of angular small boulders were found scattered on a seabed of mixed sediments. The rock faces and boulders were dominated in short heavily silted bryozoan turf with occasional Devonshire cup coral *Caryophyllia smithii*, solitary sea squirts, *Ascidia mentula*, *Ascidia virginea* and fluted sea squirt *Ascidiella aspersa*. Tucked in crevices and between boulders were squat lobster *Galathea strigosa*, velvet swimming crab *Necora puber*, common prawn *Palaemon serratus* and a European conger eel *Conger conger*. The mixed sediments comprised of rounded pebbles, muddy sand and shell debris, these were dominated by brittle stars *Ophiura ophiura*, hermit crabs *Pagurus bernhardus*, king scallop *Pecten maximus* and queen scallops *Aequipecten opercularis*. Notable was a single burrowing anemone *Halcapma chrysanthellum* recorded, this is the fifth record for SW Wales and the first since 1988.

Sketch: Blaise Bullimore



Crisia sp. encrusted red algae Blaise Bullimore



Aequipecten opercularis Blaise Bullimore

3.6 South Pembrokeshire

The south Pembrokeshire limestone coast has been a focus for Seasearch dives since 1998 and during 2021 three sites were explored. Surveys were completed at Stackpole Quay (west), Church Rock along with Crow Rock being re-visited.

3.6.1 Stackpole Quay west

Limestone rocky reef surveyed from 3 to 7m depth was covered in red seaweed meadow of beautiful eyelash weed, *Calliblepharis ciliata*, siphoned feather weed, *Heterosiphonia plumosa*, and fine-veined crinkle weed, *Cryptopleura ramosa*. Both trumpet anemones, *Aiptasia couchii*, and golf ball sponges, *Tethya citrina*, were Abundant. A sprinkling of sponge and bryozoan species were found including orange pumice bryozoan, *Cellepora pumicosa*, and goose bump sponge, *Dysidea fragilis*, both recorded as Frequent. Sea squirts included *Polycarpa scuba*, gooseberry sea squirt, *Dendrodoa grossularia*, and star sea squirt *Botryllus schlosseri*. Below the reef, mixed sediments with cobbles and shells were present; the cobbles were covered in encrusting pink algae and *Spirobranchus spp* tubeworms. Sediment tube-dwelling worms *Acromegalomma vesiculosum* and anemones *Cerianthus lloydii*, and daisy anemone *Cereus pedunculatus* were recorded together with numerous hermit crabs *Pagurus bernhardus* and common goby species. Notable was a common cuttlefish *Sepia officinalis* being recorded, which are not often found in Pembrokeshire.



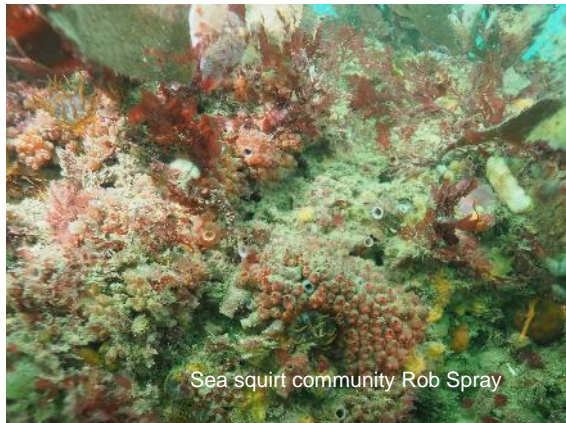
Aiptasia couchii Kate Lock



Sea squirt community Kate Lock

3.6.2 Church Rock

Church Rock is a small island in Broad Haven south bay. A limestone rocky reef and boulders are found between 5 to 7 m depth surrounded by a sandy seabed. The rocks are covered in mixed red algae species with forest kelp *Laminaria hyperborea* Occasional. Red algae included red rags *Dilsea carnosa*, beautiful eyelash weed, *Calliblepharis ciliata*, siphoned feather weed *Heterosiphonia plumosa* and sea beech *Delesseria sanguinea* all recorded as Frequent. Trumpet anemones, *Aiptasia couchii* were recorded as Common and snakelocks anemone *Anemonia viridis* as Frequent. Large boring sponge *Cliona celata*, golf ball sponge *Tethya citrina* and goosebump sponge *Dysidea fragilis* were Common. Sea squirt species *Distomus variolus*, *Polycarpa scuba*, orange sea squirt *Stolonica socialis* and star sea squirt, *Botryllus schlosseri* were all recorded as Frequent. 11 species of crustacean were recorded but all in low numbers, including the sponge crab *Dromia personata* and crawfish *Palinurus elephas*. A single grey triggerfish *Balistes caprisus* was found amongst the boulders.



Sea squirt community Rob Spray



Dromia personata Rob Spray



Homarus gammarus Rob Spray



Palinurus elephas Rob Spray

3.6.3 Crow Rock

The area around Crow Rock, an extensive reef system approximately 1 – 1.5km off the SW Castlemartin coast of South Pembrokeshire, has been surveyed on several occasions since 2006.

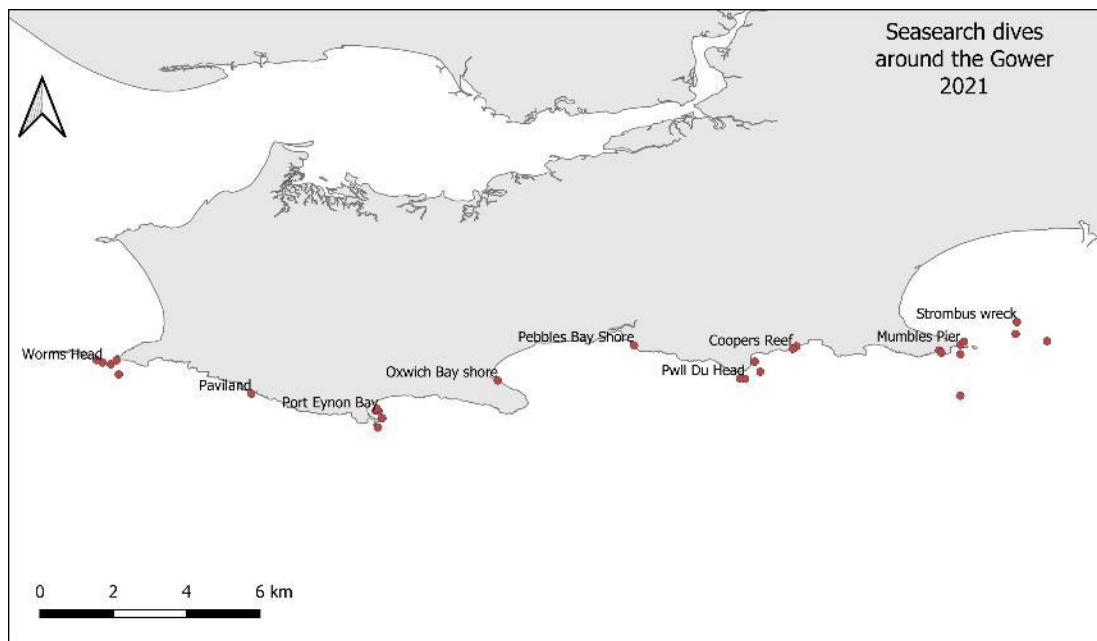
At this location, rugged limestone reef was surveyed between 7 and 12m depth. In the shallows, the bedrock was covered in a tide swept *Laminaria hyperborea* kelp park and a dense under storey of red seaweeds covered in caprellid skeleton shrimps. Seaweed species included fine-veined crinkle weed, *Cryptopleura ramosa*, beautiful kidney weed, *Kallymenia reniformis*, sea horsetail, *Halurus equisetifolius* and sea beech, *Delesseria sanguinea*.

Steep gully walls 2-3m high were covered in dense short bryozoan turf dominated by Abundant spiral bryozoan *Crisularia plumosa*, white clawed sea moss, *Crisia* spp, and *Scrupocellaria* spp . Sea squirts included *Distomus variolosus*, *Morchellium argus*, *Didemnum maculosum* var. *dentata* and orange sea squirt, *Stolonica socialis*. Deadman's fingers, *Alcyonium digitatum*, jewel anemones, *Corynactis viridis*, along with hydroid *Aglaophenia tubulifera* were recorded as Frequent. Large sponge formations of elephant hide sponge, *Pachymatisma johnstonia*, shredded carrot sponge, *Amphilectus fucorum*, yellow boring sponge, *Cliona celata*, and golf ball sponge, *Tethya citrina*, were also all Frequent. Red seaweeds present included flat tongue weed, *ErythroGLOSSUM laciniatum*, Holmes's rose weed, *Rhodymenia holmesii*, and some large patches of iridescent weed, *Drachiella spectabilis*.

3.7 Swansea and Gower

The south coast of Gower consists of Carboniferous limestone cliffs with caves, sheltered inlets and huge expanses of flat sand. In 2021, survey forms were completed by two local divers at Pwll Du, the 'Strombus' and 'Duisberg' wrecks, Coopers reef, Paviland and Worms Head.

Observer forms were additionally completed for Gower shores including: Port Eynon, Worm's Head causeway and Mumbles pier; sites summaries for these are provided below. Single Observer shore forms were also completed for Limeslade Bay, Pwll Du, Pobbles bay, Brandy Cove and Oxwich Bay; the data from these sites has been entered into Marine Recorder.



3.7.1 Pwll Du

A low-lying reef at 5 to 9m depth undulating with shallow gullies with up to 1m faces was surveyed. The reef was covered in short, scruffy bryozoan turf including *Scrupocellaria* spp and *Bugulina* spp. Deadman's fingers, *Alcyonium digitatum*, and antennae hydroids, *Nemertesia antennina*, were Frequent and feather stars, *Antedon bifida*, Abundant. Sponge species included mermaid's glove, *Haliclona oculata*, shredded carrot sponge, *Amphilectus fucorum* and sea orange, *Suberites ficus*. Large patches of horseshoe worm *Phoronis hippocrepia* were noted. Crustacean species included edible crab, *Cancer pagurus*, and common prawn, *Palaemon serratus*, spider crab *Maja brachydactyla* and European lobster, *Hommarus gammarus*. A European conger eel, *Conger conger* was recorded.

3.7.2 'Strombus' wreck

The Strombus was a Norwegian whale hunting boat, it lies on a sand and shell gravel seabed between 12 and 14m depth. The wreckage was dominated by spiral bryozoan, *Bugulina* spp, white clawed sea moss *Crisia*, spp, and occasional patches of hornwrack, *Flustra foliacea*. Oaten pipe hydroids, *Tubularia indivisa*, were recorded as Common on the upright sections



and antennae hydroids *Nemertesia antennina* and *N. ramosa*, herringbone hydroid, *Halecium halecinum*, and helter-skelter hydroid, *Hydrallmania falcata*, were also recorded. Feather stars, *Antedon bifida*, were Common and both plumose anemones, *Metridium dianthus* and deadman's fingers *Alcyonium digitatum* present. Nudibranchs included the crystal seaslug, *Antiopella cristata*, and *Facelina auriculata*.

3.7.3 'Duisberg' wreck

Broken up wreckage was recorded over low-lying bedrock reef from 10 to 14m depth. The wreck was covered in red seaweed and scruffy short bryozoan turf including white clawed sea moss *Crisia* spp. Hiding amongst the wreckage were long-spined sea scorpions, *Taurulus bubalis*, and tompot blennies, *Parablennius gattorugine*. On the reef, hedgehog sponge, *Polymastia boletiformis*, goosebump sponge, *Dysidea fragilis*, chocolate finger sponge, *Raspailia ramosa*, and yellow boring sponge, *Cliona celata*, were all found and in sandy patches chimney sponge, *Polymastia penicillus*. Crustacean species noted, included European lobster *Homarus gammarus*, velvet swimming crab, *Necora puber*, edible crab, *Cancer pagurus* and a single record of crawfish, *Palinurus elephas*



Palinurus elephas Jo Prosser

3.7.4 Coopers reef

Located west of Brandy Cove, this rocky reef extended out from the shore in low-lying ridges from 3 to 8m below sea level, with areas of sand in gullies between the rocks. On the reef tops was kelp park with a red seaweed understory; forest kelp, *Laminaria hyperborea*, was encrusted with sea mat, *Membranipora membranacea*, on which were dense aggregations of the sea slugs *Polycera quadrilineata* and *P. norvegica*. On the rock walls, deadman's fingers, *Alcyonium digitatum*, yellow boring sponge, *Cliona celata*, shredded carrot sponge, *Amphilectus fucorum* and some large mermaid's glove sponge, *Haliclona oculata* were found. Spiral bryozoans *Bugulina* spp, horseshoe worm, *Phoronis hippocrepia*, sea squirt, *Distaplia rosea* and snakelocks anemone, *Anemonia viridis* were all recorded. Crustaceans found amongst the seaweed and in crevices included velvet swimming crabs, *Necora puber*, spindly spider crabs, *Macropodia* spp, common lobster, *Homarus gammarus* and edible crab, *Cancer pagurus*. A highlight was spotting a common cuttlefish *Sepia officinalis* which are not regularly recorded in South Wales.

3.7.5 Paviland

A shallow low-lying reef at 8m depth with shallow, metre-deep, gullies was characterised by red seaweed meadows and dense areas of gooseberry sea squirt, *Dendrodoa grossularia*, together with white lace sponge, *Clathrina coriacea*. The reef was sprinkled with many animal species, though these were recorded in low numbers, including shredded carrot sponge, *Amphilectus fucorum*, yellow boring sponge, *Cliona celata*, star sea squirt, *Botryllus schlosseri* and *Morchellium argus*. High numbers of common starfish, *Asterias rubens*, were recorded and a European lobster, *Homarus gammarus*, was noted feeding on a barrel jellyfish, *Rhizostoma pulmo*.

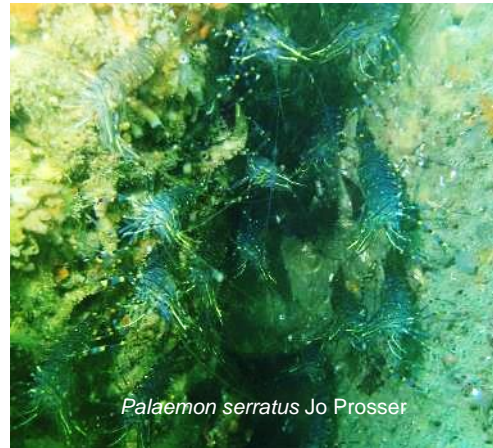
3.7.6 Worms Head

A shallow reef with walls from 4 to 8m depth with deep crevices and gullies between was surveyed. Rock walls were dominated by densely packed blue mussels, *Mytilus edulis*, with elegant anemones *Cylista elegans*, deadman's fingers *Alcyonium digitatum*,

and antennae hydroids *Nemertesia antennina*. Common starfish, *Asterias rubens*, spider crab, *Maja brachydactyla* and common prawn, *Palaemon serratus* were found in large numbers and large congregations of lesser spotted cat shark *Scyliorhinus canicula* piled on top of each other in crevices were notable. The highlight was spotting a grey seal, *Halichoerus grypus*.



Halichoerus grypus Jo Prosser



Palaemon serratus Jo Prosser

3.7.7 Port Eynon shore

Port Eynon shore is gentle sloping rocky shore predominantly with boulders, cobbles and pebbles with shallow rockpools and muddy sediment. The main reef is low to the ground although there are two higher ridges which are barnacle encrusted. The rocky shore is dominated with serrated wrack *Fucus serratus*, bladder wrack *Fucus vesiculosus* and sea lettuce *Ulva spp* and the reef building honeycomb worm *Sabellaria alveolata* is present. Rockpools contained common prawns *Palaemon serratus*, common starfish *Asterias rubens*, cushion starfish *Asterina gibbosa*, snakelocks anemone *Anemonia viridis* and beadlet anemone *Actinia equina*. Shore urchin *Psammechinus miliaris* were also found. Shore crabs *Carcinus maenas* was Common and other crabs such as furrowed crab *Xantho hydrophilus* were also recorded. A variety of molluscs such as dog whelk *Nucella lapillus*, grey top shell *Steromphala cineraria* and purple top shell *Steromphala umbilicalis* were all Common. The non-native slipper limpet, *Crepidula fornicata* and common whelk *Buccinum undatum* were both present. A small spotted catshark, *Scyliorhinus canicula* was also spotted close to the shoreline.



Asterina gibbosa Paula Sheldon



Psammechinus miliaris Tate

3.7.8 Worms Head Causeway

A finger-like limestone reef extends across the causeway creating gullies, overhanging ledges, crevices and shallow rockpools, with large boulders, cobbles and mixed sediment.



The site is dominated by blue mussels *Mytilus edulis* and barnacles *Semibalanus balanoides*. Short algal turf consisted mainly of pepper dulse *Osmundea pinnatifida* with occasional serrated wrack *Fucus serratus*. Beadlet anemone *Actinia equina*, snakelocks anemone *Anemonia viridis* and daisy anemone *Cereus pedunculatus* were found in pools and crevices. The common prawn *Palaemon serratus* was also present in rockpools and both shore crabs *Carcinus maenas* and edible crabs *Cancer pagurus* were found under boulders. Common starfish *Asterias rubens* was commonly found across the site. A tompot blenny, *Parablennius gattorugine* was found in a rock pool along with several cushion stars *Asterina phylactica* and a grey sea slug *Aeolidia filomenae*. In May large numbers of green paddle worm *Phyllodoce mucosa* eggs were found with young emerging.



3.7.9 Mumbles Pier

Mumbles Pier is located West of Swansea, in addition to the pier structure other debris is visible through the site, likely some remains from building the pier and or the lighthouse at the end of the causeway

The structures are dominated by barnacles and blue mussels *Mytilus edulis* with Occasional deadman's fingers *Alcyonium digitatum* and common starfish *Asterias rubens*. Sponges including orange sponge *Hymeniacion perlevis*, bread crumb sponge *Halichondria panicea* and the red encrusting *Microciona atrasanguinea* were recorded as Frequent, with *Haliclona fistulosa*, *Haliclona rosea*, *Halichondria bowerbanki*, *Haliclona rava* all recorded as Rare.

The rare sponge *Suberites massa* was identified on the pier, a first record for this species on this site, with only one previous record from 1970's in Wales (sponge samples taken and identified by Jen Jones December 2021).



Mumbles pier Marie Jones



Microciona atrasanguinea
& *Alcyonium digitatum* Matt Green

The shore itself is made up of muddy mixed sediments with boulders and cobbles, with a variety of seaweeds, including serrated wrack *Fucus serratus*, Irish moss *Chondrus crispus*, false Irish moss *Mastocarpus stellatus*, sea lettuce *Ulva lactuca*, and *Ulva tubula*. The site is very diverse with a number of crustaceans, molluscs, bryozoans, and sea squirts. Fish such as European conger eel *Conger conger*, common goby *Pomatoschistus microps* and five-bearded rockling *Ciliata mustela* were recorded as Rare. The native oyster *Ostrea edulis* was found both on the pier structure and on boulders in very low numbers.

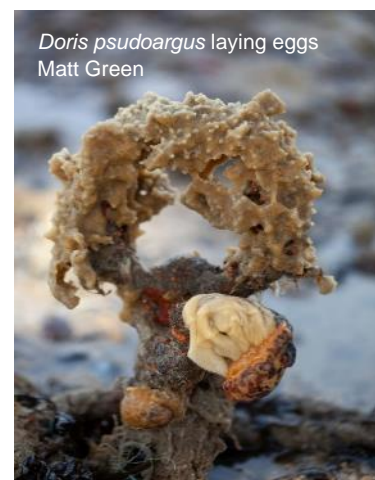


Ostrea edulis Matt Green

Several *Aeolidia filomenae* grey nudibranch and sea lemon *Doris pseudoargus* were found laying eggs.



Asterias rubens & *Aeolidia filomenae* laying eggs Marie Jones



Doris pseudoargus laying eggs
Matt Green

3.8 Additional individual forms

Additional forms were completed by Observers from their own organised dives and shore surveys. Observer forms were completed for dives at Borth and Aberystwyth Constitution Rocks and a shore survey at Aberaeron all in Ceredigion. One shore survey form was also completed for Dunraven Bay in the Vale of Glamorgan. A single Surveyor form was completed at The Smalls, offshore Pembrokeshire. The data from these sites has been entered into Marine Recorder.

4. Training and data

4.1 Training and qualifications

In South and West Wales there were two virtual online Observer courses run in 2021, these were run over a series of evenings. Advantages found were the large number of participants that signed up and no need for travel, however the disadvantages included: tutors not being able to get to know the participants, reduced questions and feedback, limitations with practical and interactive sessions and no dive survey practise during the course.

The first in March was targeted primarily to a community based in Swansea and Gower interested in learning more about marine life in their local area, the course with 27 participants was focussed on completing shore and snorkel surveying. The second course in April was for divers with 19 participants. Both courses were led by Kate Lock with assistance from Jennifer Jones and Sarah Bowen. Kate additionally led an online course in May organised and supported by Holly Date with participants primarily from North Wales. In June a weekend for training shore dives was run at Martins Haven, 8 new Observer divers and snorkellers participated with 5 experienced surveyors supporting.

During the 2021 season, 12 divers: Lisa and Paul Godfrey, Angharad and Jon Stobbs, Kaila Wheatley, Jason Burk, David Wilcockson, James King, Paula Sheldon, Ronnie White, Rebecca Grainger and Nerea Sanchis completed their Observer qualification. And a further two, Joleta Hooper Lee and Marie Jones completed their Observer qualification with independent shore surveys on the Swansea and Gower coast.

4.2 Forms

In 2021 201 forms were completed in South and West Wales. The forms comprised of 70 Surveyor forms (67 dives, 1 shore) and 128 Observer forms (100 dives, 27 shore), 2 sea fan and 1 crawfish form. The form total breaks down is 65% Observer forms and 35% Survey forms. The high percentage of observer forms is from encouraging and supporting observers to gain their qualifications. In 2021 there was also a number of participants completing shore survey forms in particular in the Swansea and Gower area following the course run in March.

The healthy number of Surveyor forms comes from the excellent support of qualified surveyor level divers in the area. This helps ensure high quality level of recording for the dives. These divers also regularly buddy up with new divers training for their Observer and Surveyor qualifications and provide their experience and help.

All data has been entered onto Marine Recorder and is available on the JNCC National Biodiversity Network Atlas. Crawfish data is entered onto Marine Recorder but is tagged as

sensitive data following Natural Resources Wales' guidelines; access to this data is therefore restricted.

5. Seasearch and Sustainable Management of Natural Resources

The Environment (Wales) Act and the Wellbeing of Future Generations (Wales) Act provide the framework for NRW's work to pursue the sustainable management of natural resources as defined in the former, while maximising our contribution to the well-being goals set out in the latter.

Sustainable management of natural resources follows nine main principles. The planning and delivery of Seasearch and the application of its outputs all support the delivery of these principles:

Adaptive management – the selection of survey sites for Seasearch incorporates a prioritisation process (for example, focus on priority feature, gap filling or targeting potential priority habitat) which results in a suite of possible survey locations that can be dived according to weather conditions and any other considerations on the day. The data collected through Seasearch contributes to improving the evidence base for Welsh marine habitats and species and helps to inform all types of marine management decision-making.

Scale – Marine habitat data is required from around the whole of the Welsh coast. The delivery structure for Seasearch with two regional co-ordinators (one based in south-west Wales and the other in north Wales) enables Seasearch to operate effectively throughout the whole of this area. Working collaboratively with others, Seasearch can develop and deliver specific projects appropriate to a local or regional scale as required.

Collaboration and engagement – The annual programme of Seasearch activity in Wales is developed through collaborative discussions with Natural Resources Wales, Special Area of Conservation officers and regional biodiversity officers to ensure integration with local projects and other relevant initiatives such as projects relating to Section 7 species and habitats (Environment (Wales) Act 2016). In 2021 this included supporting Fragile Sponge and Anthozoan and Crawfish targeted in Pembrokeshire.

Partnering with marine centres, Wildlife Trusts, local authorities and others enables Seasearch to bring the subtidal world to non-divers and engage with them to show them what is on their doorstep. Seasearch uses public events (on the beach as well as indoor talks/displays) to highlight this and connect people to their local marine environment. Seasearch also works with local dive clubs and dive centres to promote Seasearch recording.

Seasearch engages with academic institutions to identify possible projects or areas of work where Seasearch can provide vocational training and/or data. Engaging people at an early stage of their life and career makes them into lifelong ambassadors with a high level of 'ocean literacy' and excellent job prospects.

Public participation Volunteer involvement is at the heart of Seasearch, enthusing a particular community of individuals to take part in a specialised citizen science project and make records of seabed habitats and associated wildlife. Volunteers can take part through organised events but are also encouraged and supported to undertake the recording on their own independent dives and/or with their dive clubs. Public participation engendered by

Seasearch is wider than the community of scuba divers - the public and collaborative events that Seasearch is involved with establish connection with a much wider audience base and enthuse individuals to support Seasearch in other ways if they are not in a position to take part in the diving survey, or to become involved in other citizen science or environmental initiatives. The information collected by Seasearch is publicly available through the NBN Atlas thereby benefiting a much wider audience than those directly involved in the project.

Evidence – Seasearch provides data to help support marine management in Wales. To ensure high quality data the QA process has been reviewed and relies on robust training and ongoing mentoring of volunteers and subsequent multi-level validation of the submitted data. In 2021 training materials were modified to allow courses to be run virtually during COVID lockdowns. This included completing some virtual practical sessions and were followed up with dive training days, this provided support, so volunteers maximise the value and accuracy of the data collected. Quality as well as quantity of data is critical to reach robust decisions capable of withstanding challenge.

Multiple benefits – Collaborative partnerships will maximise the benefits to us all - more data, more engagement, more people having a purpose to dive in Wales. Welsh diving is exceedingly popular with divers from outside Wales who will travel very large distances to enjoy it - visitors who spend money on accommodation, subsistence and socialising, thus increasing the socio-economic benefits to the local area.

Seasearch is expanding its series of photo-identification guidebooks to marine life in Britain and Ireland which provide a key national (UK) resource for identification of underwater species aimed at a general diving audience. Plans for new guides on other common taxa (crustaceans, fish and echinoderms) are in the early stages. These are invaluable aids for both learning and engagement and they fill a gap between very basic and limited marine life guides and more technically complex taxonomic field guides, with the considerable benefit of providing *in situ* photographs of the animals and plants. Seasearch plays an important educational role in terms of providing opportunities for aspiring or qualified marine biologists to volunteer and gain valuable underwater survey skills by taking part in the marine recording. Few universities provide such opportunities and so for people with appropriate diving qualifications and experience, Seasearch enables them to develop and maintain practical surveying skills.

Long term – Information collected by Seasearch has helped inform decision making about one-off development applications as well as contributing to the body of knowledge being used for marine planning in Wales. Seasearch is able to contribute to monitoring of underwater habitats and wildlife to better understand the current status of particular species populations or to look at the consequences of human activities on marine habitats and improve understanding about impacts on seabed habitats and wildlife. Seasearch can collect data that helps monitor medium to long-term change in the marine environment in response to environmental changes and/or management decisions. Collaboration with the Angel Shark project, the crawfish surveys and previous surveys on seafans, native oysters, eelgrass beds and fan shells are examples of this.

Preventative action – The information collected by Seasearch contributes to collective understanding of the marine environment of Wales, helping identify the distribution and abundance of particular habitats and species. This information is essential to help inform sound decision making to avoid damage and degradation to Welsh seas and wildlife. The observation of seabed habitats, which are otherwise out of sight to most, can also help to highlight issues concerning marine wildlife and habitats that might otherwise be unknown and, if left, would lead to detrimental impacts on Wales' natural resources.

Building resilience – Data on marine habitats and species such as that collected by Seasearch is an essential component to help improve understanding of marine ecosystems and their functioning. It is only by continually developing this knowledge base alongside other information that it will be possible to gain some appreciation of the complexity and inter-connections of marine ecosystems that can be then used to inform sound decision making. It is vital that sound environmental principles are applied to ensure that (amongst other things) the diversity, abundance, connectivity and functioning of ecosystems are not degraded in order to contribute to building marine ecosystem resilience in the face of anthropogenic change.

6. Acknowledgements

Many thanks to all the Seasearch volunteers that have taken part and supported Seasearch in South and West Wales during the 2021 season.

Thanks are due to Jen Jones for Seasearch project support, Sarah Bowen for Observer course assistance, Blaise Bullimore for help with diving logistics and providing fantastic sketches that have been used in this report, Winter Dotto for completing the site descriptions for Gower shores and Matt Green for continued support in the Swansea and Gower area.

Cardigan Bay SAC members have provided incredible support with both diving and boats that allowed two fantastic extra days diving along the North Pembrokeshire coast, these would not have otherwise been possible.

Thanks goes to our dive charter boat skippers Andy Truelove, Atlantic Blue and David Stolwell, Overdale whose seafaring skills and local knowledge helps the teams safely dive in locations that would not otherwise be possible.

We would also like to thank Charlotte Bolton, Seasearch National co-ordinator for support throughout the year and Angus Jackson for providing maps for this report.

Photo and sketch credits

Blaise Bullimore, Kate Lock, Ross Bullimore, Jon Moore, Matt Green, Jo Prosser, Paula Sheldon, Marie Jones, Tate Lloyd and Rob Spray.



Kate Lock