



**West Angle Bay,
survey of shallow subtidal habitats,
14 May 2021**

A report for MarineSpace

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1 Introduction

Environmental surveys for the Project Erebus array and export cable corridor undertaken in summer 2020, collected seabed habitat and associated biological data for offshore seabed and intertidal areas at West Angle Bay. However, due to the offshore survey vessel not being able to collect data right up to the Mean Low Water Springs (MLWS) mark because of the draught of the vessel a gap in the data existed in the nearshore/shallow subtidal area (MarineSpace 2021). This area is approximately 100 m in length (west to east) and lies within the boundary of the Pembrokeshire Marine Special Area of Conservation (SAC). As the 2020 surveys identified areas of subtidal and intertidal Annex I rocky reef within the nearshore section of the cable corridor a precautionary approach currently has to be adopted by assuming the habitats in this “gap” area comprise high quality Annex I reef. As open cut trenching is currently included within the Project Design Envelope (PDE) there is potential for direct impacts on seabed habitats in this nearshore region. It was, therefore, important to gather additional information on the exact nature and extent of habitats in this “data-gap” region to inform the EIA/HRA process. MarineSpace contracted CALM to carry out this work.

2 Methods

2.1 Planning

MarineSpace provided Lat/Long coordinates for the 21 stations to be surveyed (Figure 1) and a detailed specification for the information required.

A risk assessment and method statement was prepared by CALM and reviewed by MarineSpace and BGW. Approval to undertake the survey was given to CALM by MarineSpace on 27 April 2021. Survey was then planned for next available dates with spring tides.

2.2 Fieldwork

The survey work was carried out on 14 May 2021 from 12:45 to 16:15, by Jon Moore, with assistance from Cait Moore (kayak support) and Brynley Moore (shore cover). The weather was dry and often sunny with a force 3 south westerly breeze. Sea state was slight, with a long low swell. Tides (Milford Haven): Low water 1.1m @ 14:45.

The survey was carried out by free-diving (snorkelling) with support from an assistant on a 4 metre sit-on-top kayak. Survey and safety equipment was carried on the kayak, including:

- Handheld GPS (Garmin Montana 610) with survey target points pre-uploaded.
- A buoyed shot line, with 12 kg iron weight.
- A metal probe (road pin, 60 cm, marked at 10 cm intervals), tied to the shot weight.
- Camera (Olympus TG5 in underwater housing, with Olympus strobe).
- Slate & pencil with bespoke designed recording form on waterproof paper. Map of site and stations on reverse side of slate.
- Samples bags and pots.
- Underwater torch & magnifying lens.

Survey procedure at each station:

- Kayaker locates the station, using the GPS, and holds position.
- Diver lifts weighted shot from previous station, carries it to kayak position, and drops shot where indicated by kayaker (typical accuracy <4m).

- Diver descends to seabed, carrying camera. Takes habitat photo(s), uses probe to measure sediment depth (if any), makes mental notes of habitat and species and collects specimens (if necessary). Two or three dives were needed to complete these tasks at some stations.
- Diver ascends and records time, photo numbers, habitat and species description and sediment depth on recording form. Specimens placed in labelled bags / pots by kayaker.

Survey operations were completed as planned with no unforeseen holdups or issues.

3 Results

The main habitats and communities (=biotopes) are summarised below and in Table 1. Their distribution is shown in Figure 2. Biotope codes from the National Marine Habitat Classification (JNCC, 2015) are listed in Table 2. Species names (listed with typical abundances in Table 3) are based on the nomenclature given in the World Register of Marine Species¹. Representative photographs are given in Table 4.

The whole of the surveyed area can be characterised as a mosaic of mobile sand and low-lying sand-influenced upper infralittoral limestone bedrock, from 1 to 2.5m below chart datum. The bedrock is, therefore, colonised by sand-tolerant algae, with algal abundance and composition largely determined by the level of exposure to sand. Thus, very low-lying rock that is frequently sand-scoured or covered by sand has very little foliose algal cover and is often characterised by encrusting coralline algae and keel worms (*Spirobranchus*, which live in hard calcareous tubes). Some bedrock ridges, however, which rise above the sediment by up to half a metre, have surfaces that are high enough above the sediment to be much less affected by sand scour. These areas are dominated by kelp, mainly *Laminaria hyperborea*, and a dense understorey of red algae; though even in the highest areas the algal composition is still dominated by sand-tolerant species. A variety of red and brown algae find their habitat niche between these two extremes, depending on their tolerance to sand. These bedrock habitats do not fit perfectly into the national biotope classification, but they include characteristics of the following four biotopes so may be considered a mosaic of these biotopes (see Table 1):

- IR.HIR.KSed.ProtAhn;
- R.HIR.KSed.XKHal;
- IR.HIR.KSed.XKScrR
- IR.HIR.KSed.DesFilR..

The well-sorted mobile fine sands of the main beach are also the main sediment facies of this shallow subtidal area (assigned to biotope SS.SSa.IFiSa.IMoSa). However, moderately well-sorted mobile coarse sand (assigned to biotope SS.SCS.ICS) is also common and dominates an area in the middle of the surveyed area. Some of the bedrock in those areas showed signs of being recently inundated by a layer of this coarse sand – i.e. the only signs of the rock at some stations was kelp and other large algae poking up through the sand. At the time of the survey these algae appeared to be in good condition, suggesting recent inundation.

Sediment depth, which was measured at each station, varied considerably. In those areas that are furthest from the visible bedrock ridges the sediment was deeper than the maximum extent of the probe (60 cm). However, in many other areas the sediment formed a layer or veneer over underlying bedrock, ranging from very thin (<1cm) to some tens of centimetres thick. As described above, both the fine and the coarse sand is mobile, and it is likely that the depth of sediment varies considerably with storms and currents.

¹ <http://www.marinespecies.org>

With the exception of *Spirobranchus*, conspicuous animal life is very sparse, consisting primarily of occasional top shells *Steromphala cineraria* and occasional encrusting bryozoa on algae. However, a few bedrock ridges have steep sides and the typical eroded texture of limestone, which provides suitable habitat for some sponges, sea squirts and bryozoan turf. This was only recorded from one station (12), but is likely present on any of the larger bedrock ridges. In the national biotope classification this habitat is closest to IR.HIR.KFaR.LhypRVt.

4 Conclusions

Extensive, but patchy, bedrock habitats are present across much of the surveyed area; comprising an estimated 70% of the 100 metre by 10 metre corridor. All these bedrock habitats are classified as Annex I bedrock reef habitat (H1170), within the definitions given in the Conservation of Habitats and Species Regulations 2017 (JNCC 2021). [Note: While some boulders and cobbles were also present, they were insufficient to be considered additional habitat, so the extent of stony reef habitat was insignificant.] However, all of the reef habitats described are commonly occurring, both within the Pembrokeshire Marine SAC and nationally. They are also strongly influenced by sand and are characterised by benthic communities that have a relatively low species richness. All the species recorded are common, both within the Pembrokeshire Marine SAC and nationally. No habitats or species of known nature conservation importance were found during the survey.

5 References

- JNCC (2015) *The Marine Habitat Classification for Britain and Ireland Version 15.03* [Online]. [Accessed: 15 May 2021]. Available from: <http://jncc.defra.gov.uk/MarineHabitatClassification>.
- JNCC (Joint Nature Conservation Committee), 2021. 1170 Reefs. Available at <https://sac.jncc.gov.uk/habitat/H1170/> [Accessed February 2021].
- MarineSpace (2021) Briefing Note: Annex I Habitats Ground-Truthing Survey Scope - West Angle Bay. Version 2.0 – Issued 13/04/2021. 6 pages.

Table 1. Station descriptions. Stn = Station number; Sed (cm) = sediment depth in centimetres, Biotope codes according to JNCC (2015)

Stn	Habitat description	Sed (cm)	Primary biotope	Secondary biotope	Tertiary biotope
0	Rippled fine sand with no conspicuous life. Bedrock 5m west	52	SS.SSa.IFiSa.IMoSa		
1	Mosaic of mobile fine sand, low-lying sand scoured rock and bedrock ridges with kelp forest, foliose algae tolerant to sand and encrusting coralline algae.	0 - 2	IR.HIR.KSed.Pr otAhn	IR.HIR.KSed.X KScrR	SS.SSa.IFiSa.IMoSa
2	Mosaic of low-lying sand scoured rock and bedrock ridges with kelp forest, foliose algae tolerant to sand and encrusting coralline algae.	0	IR.HIR.KSed.Pr otAhn	IR.HIR.KSed.X KScrR	
3	Mobile fine sand. Bedrock ridge to north, with kelp, foliose algae tolerant to sand and encrusting coralline algae.	0 - 5	SS.SSa.IFiSa.IMoSa	IR.HIR.KSed.Pr otAhn	IR.HIR.KSed.X KScrR
4	Mosaic of mobile sand (coarse & fine) and low-lying sand scoured rock with foliose algae tolerant to sand and encrusting coralline algae.	0 - 40	SS.SSa.IFiSa.IMoSa	IR.HIR.KSed.Pr otAhn	IR.HIR.KSed.DesFilR
5	Waves of mobile coarse sand, covering underlying rock. Kelp and some sand tolerant algae poking through the sand.	0 - 15	SS.SCS.ICS	IR.HIR.KSed.X KScrR	
6	Waves of mobile coarse sand. Bedrock reef 5m east	55	SS.SCS.ICS		
7	Waves of mobile coarse sand, covering underlying rock. Some sand tolerant algae poking through the sand.	0 - 20	SS.SCS.ICS	IR.HIR.KSed.DesFilR	
8	Mobile sand (mainly fine), covering underlying rock in places. Some sand tolerant algae poking through the sand.	60+	SS.SSa.IFiSa.IMoSa	IR.HIR.KSed.DesFilR	
9	Rippled fine sand with no conspicuous life.	60+	SS.SSa.IFiSa.IMoSa		
10	Mobile fine sand, covering underlying rock. Kelp and Halidrys poking through the sand.	0 - 30	SS.SSa.IFiSa.IMoSa	IR.HIR.KSed.X KScrR	IR.HIR.KSed.X KHal

Stn	Habitat description	Sed (cm)	Primary biotope	Secondary biotope	Tertiary biotope
11	Mosaic of low-lying sand scoured bedrock, pebbles cobbles and fine sand, with foliose algae tolerant to sand, encrusting coralline algae, kelp and Halidrys.	0	IR.HIR.KSed.Pr otAhn	IR.HIR.KSed.D esFilR	IR.HIR.KSed.X KHal
12	Mosaic of low-lying sand scoured rock and bedrock ridges with kelp forest, foliose algae tolerant to sand and encrusting coralline algae. Some of the higher ridges with steep sides colonised by sponges, sea-squirts and brozoan turf.	0	IR.HIR.KSed.X KScrR	IR.HIR.KSed.D esFilR	IR.HIR.KFaR.L hypRVt
13	Mosaic of mobile coarse sand, low-lying sand scoured rock and bedrock ridges with kelp forest, foliose algae tolerant to sand and encrusting coralline algae.	2	IR.HIR.KSed.Pr otAhn	IR.HIR.KSed.D esFilR	SS.SCS.ICS
14	Waves of mobile coarse sand, covering underlying rock. Some bedrock uncovered, with kelp and some sand tolerant algae.	2	SS.SCS.ICS	IR.HIR.KSed.D esFilR	IR.HIR.KSed.X KScrR
15	Waves of mobile coarse sand, covering underlying rock. Some sand scoured rock with encrusting coralline algae and sparse foliose algae tolerant to sand.	1	SS.SCS.ICS	IR.HIR.KSed.Pr otAhn	
16	Low-lying sand scoured rock with sand tolerant algae and encrusting coralline algae.	0	IR.HIR.KSed.Pr otAhn		
17	Rippled fine sand with no conspicuous life.	42	SS.SSa.IFiSa.IM oSa		
18	Rippled fine sand with no conspicuous life.	60+	SS.SSa.IFiSa.IM oSa		
19	Rippled fine sand with no conspicuous life.	60+	SS.SSa.IFiSa.IM oSa		
20	Rippled fine sand with no conspicuous life.	35	SS.SSa.IFiSa.IM oSa		

Table 2. Biotopes assigned to the surveyed areas. Based on National Marine Habitat Classification (JNCC 2015)

Biotope code	Biotope name
SS.SSa.IFiSa.IMoSa	Infralittoral mobile clean sand with sparse fauna
SS.SCS.ICS	Infralittoral coarse sediment
IR.HIR.KSed.ProtAhn	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock
IR.HIR.KSed.XKHal	<i>Halidrys siliquosa</i> and mixed kelps on tide-swept infralittoral rock with coarse sediment
IR.HIR.KSed.XKScrR	Mixed kelps with scour-tolerant and opportunistic foliose red seaweeds on scoured or sand-covered infralittoral rock
IR.HIR.KSed.DesFilR	Dense <i>Desmarestia</i> spp. with filamentous red seaweeds on exposed infralittoral cobbles, pebbles and bedrock
IR.HIR.KFaR.LhypRVt	<i>Laminaria hyperborea</i> and red seaweeds on exposed vertical rock

Table 3. Species recorded from the survey area. Nomenclature according to World Register of Marine Species (<http://www.marinespecies.org>)

Name	Low / scour	Reef top	Reef side	Taxonomic authority
<i>Amphilectus fucorum</i>			F	(Esper, 1794)
<i>Haliclona</i>			R	Grant, 1841
<i>Dysidea fragilis</i>			O	(Montagu, 1814)
<i>Spirobranchus</i>	F		O	Blainville, 1818
<i>Steromphala cineraria</i>	O	O		(Linnaeus, 1758)
<i>Anomiidae</i>			P	Rafinesque, 1815
<i>Membranipora membranacea</i>		O		(Linnaeus, 1767)
<i>Electra pilosa</i>		O		(Linnaeus, 1767)
<i>Scrupocellaria</i>			O	van Beneden, 1845
<i>Lissoclinum perforatum</i>			R	(Giard, 1872)
<i>Polycarpa scuba</i>			F	Monniot C., 1971
<i>Rhodophyta</i> (dark red encrusting)	O	O		Wettstein, 1901
<i>Rhodophyta</i> (small foliose)	O	F	F	Wettstein, 1901
<i>Palmaria palmata</i>		F		(Linnaeus) F.Weber & D.Mohr, 1805
<i>Dilsea carnosa</i>		O		(Schmidel) Kuntze, 1898
<i>Metacallophyllis laciniata</i>		O		(Hudson) A.Vergés & L.Le Gall, 2017
<i>Corallinaceae</i>	C	F	F	Lamouroux, 1812
<i>Corallina</i>		O	F	Linnaeus, 1758
<i>Ahnfeltia plicata</i>	F			(Hudson) Fries, 1836
<i>Chondrus crispus</i>	O	F		Stackhouse, 1797
<i>Polyides rotunda</i> *	F	R		(Hudson) Gaillon, 1828
<i>Plocamium</i> *	O	F		J.V.Lamouroux, 1813
<i>Calliblepharis ciliata</i>		F		(Hudson) Kützing, 1843

Name	Low / scour	Reef top	Reef side	Taxonomic authority
<i>Ceramium virgatum</i> *	R	F		Roth, 1797
<i>Ceramium secundatum</i> *	P	P		Lyngbye, 1819
<i>Cryptopleura ramosa</i>	O	C	O	(Hudson) L.Newton, 1931
<i>Delesseria sanguinea</i>		O		(Hudson) J.V.Lamouroux, 1813
<i>Hypoglossum hypoglossoides</i> *		F		(Stackhouse) Collins & Hervey, 1917
<i>Nitophyllum punctatum</i> *		O		(Stackhouse) Greville, 1830
<i>Phycodrys rubens</i>		F		(Linnaeus) Batters, 1902
<i>Heterosiphonia plumosa</i>		F		(J.Ellis) Batters, 1902
<i>Vertebrata fucoides</i> *	O	F		(Hudson) Kuntze, 1891
<i>Rhodomela confervoides</i> *	R	O		(Hudson) P.C.Silva, 1952
<i>Cladostephus spongiosus</i>		O		(Hudson) C.Agardh, 1817
<i>Dictyota dichotoma</i>		F		(Hudson) J.V.Lamouroux, 1809
<i>Desmarestia aculeata</i>	F	C		(Linnaeus) J.V.Lamouroux, 1813
<i>Laminaria hyperborea</i>	R	C	O	(Gunnerus) Foslie, 1884
<i>Saccorhiza polyschides</i>		O		(Lightfoot) Batters, 1902
<i>Halidrys siliquosa</i>	R	O		(Linnaeus) Lyngbye, 1819

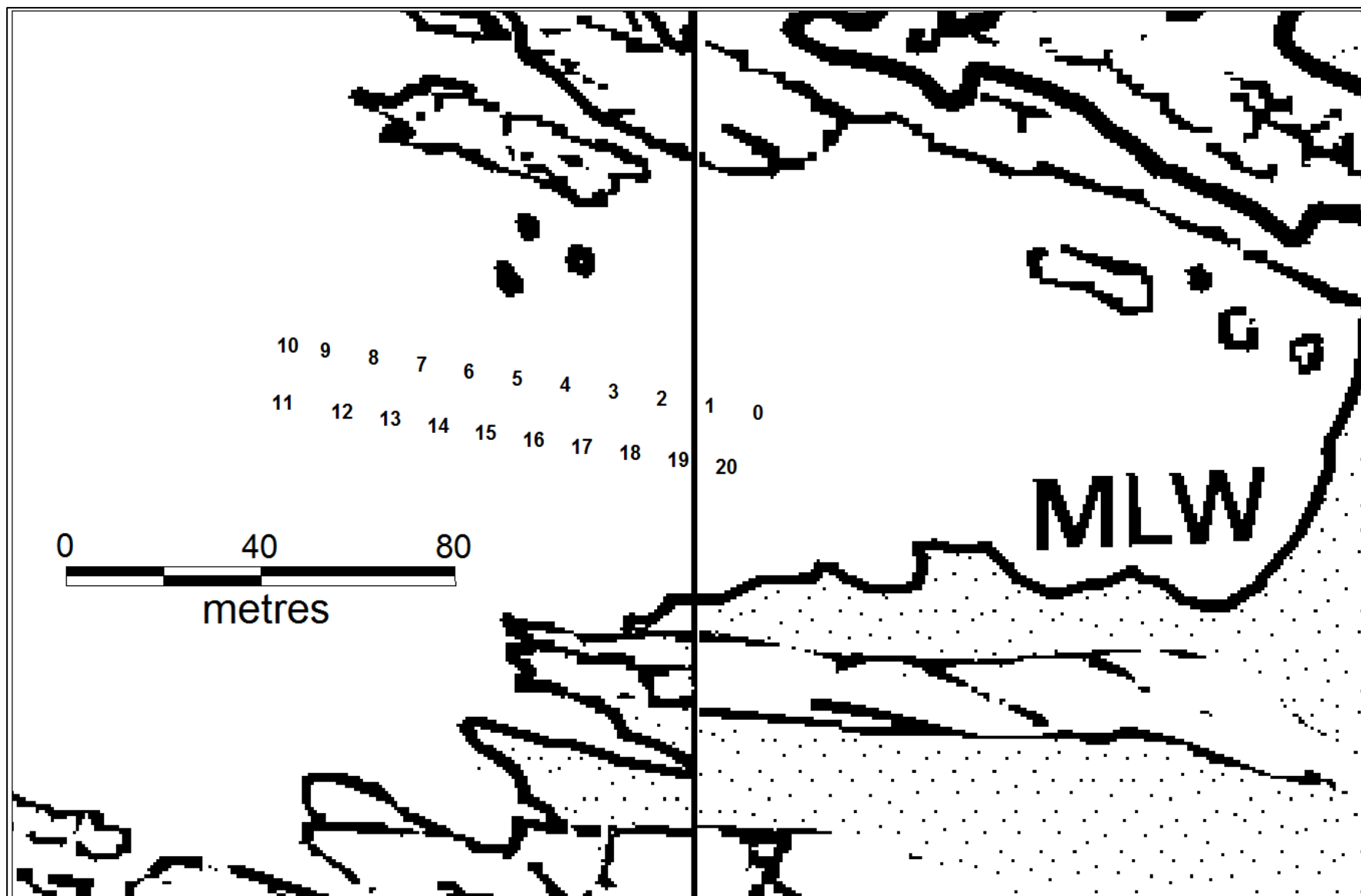


Figure 1. Locations of the 21 stations, West Angle Bay, Pembrokeshire.

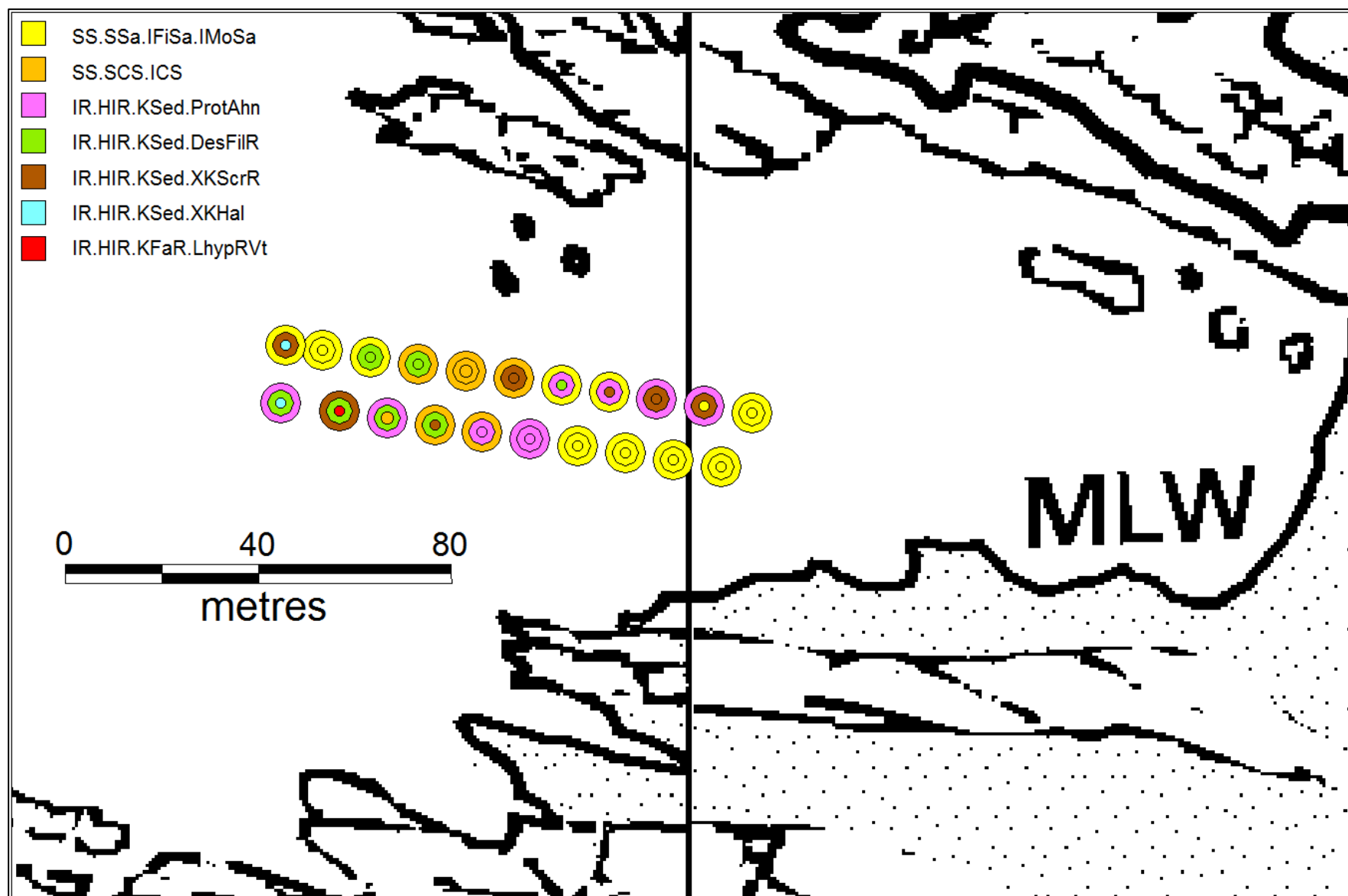


Figure 2. Biotopes assigned to the 21 stations, West Angle Bay, Pembrokeshire. Outer ring = primary biotope, inner ring = tertiary biotope

Table 4. Selected photographs to illustrate the character of the habitats. Labels start with station number.

