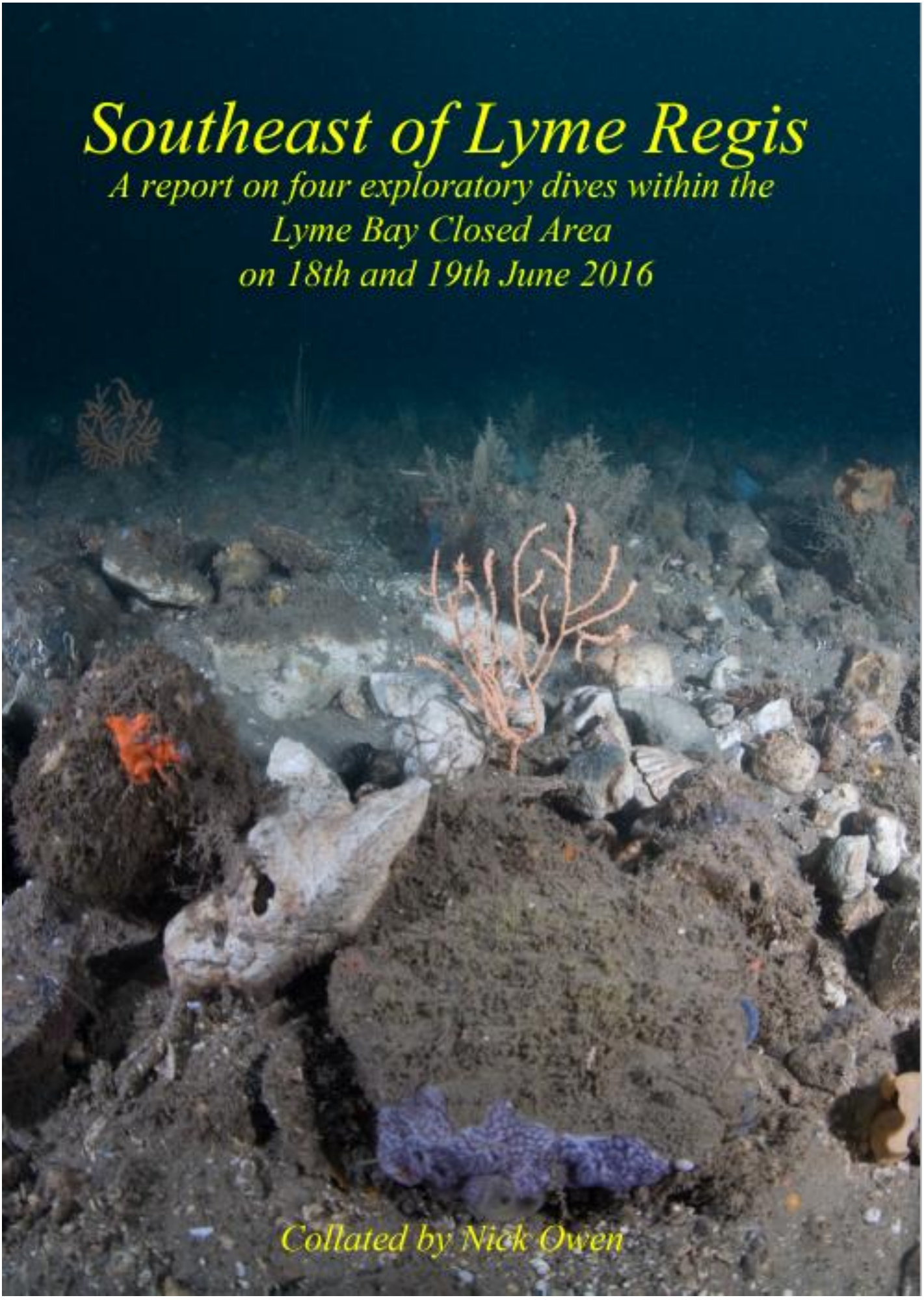
Southeast of Lyme Regis

A report on four exploratory dives within the Lyme Bay Closed Area on 18th and 19th June 2016



Collated by Nick Owen

Contents

Introduction

This survey was carried out by five volunteer divers on the chartered hardboat Blue Turtle based in Lyme Regis. The aim of the survey was to look at un-dived features from the DORIS multibeam sonar survey in and adjacent to the Closed Area with a primary emphasis on increasing the spread of Seasearch records. The DORIS map can be seen at http://www.dorsetwildlifetrust.org.uk/doris.html with details of the surveys contributing to it.

Diving practice

All divers on the trip were volunteers, had been Seasearch trained and were familiar with Lyme Bay diving in circa 25 metre depths. Four dives were carried out over the two days in conditions of underwater visibility ranging from four to eight metres. On each site the centre of the site was shotted and buddy pairs volunteered for a direction in which to head whilst recording. A Seasearch Surveyor form was completed by each “buddy pair” for each site using descriptions and species records from each diver. All divers took photographs, many of which have been made available in the form compilation process. Seasearch Surveyor forms (eight in total) have been lodged with Dorset Wildlife Trust. The data on the forms and in this report are presented in good faith with the aim that an accurate picture of seabed topography and biota should be achieved.

Diving conditions

Weather on the weekend was good, only deteriorating during the second day when the breeze went southwesterly and freshened to a force 3 and raising a surface chop which brought about a change in the dive site planned for the afternoon. Conditions on the Saturday were pleasant on the water with sun, light breezes and very slight sea conditions plus under water visibility of around 8m at 25m depth and little of the plankton which had been a feature in the weeks immediately before the survey.

Target selection

The following considerations played a part:

- Natural substrate showing contrast to the surrounding seabed in terms of elevation and apparent structure.
- Capable of being related back to DORIS from the sounder on the boat.
- No previous Seasearch data.

Sites dived are shown on figure 8 in Appendix 1. Site 5 (named in green) was originally planned for the last dive but weather conditions dictated a change to site 4 in deeper water.

Divers

Richard Yorke (RY), Hugh Waite (HW) Cathryn Quick (CQ), Nick Owen (NJO), Alison Bessell (AMB)

Summary descriptions of dived sites.

Seabed and habitat descriptions are taken from Seasearch Surveyor forms for the weekend.
All site names are arbitrary and serve only to distinguish between sites.
Depths on site diagrams given as metres Below Sea Level (BSL) and positions are of the shot.

1) "Caldera" Edge

Date 160618a
Position N50 39.498 W02 50.959 WGS84
DORIS shows the northeastern half of a circular feature delineated by a "rim" of raised features and with level seabed (possibly sediment) within. The target site was an apparently higher rocky area in the centre of the "rim".

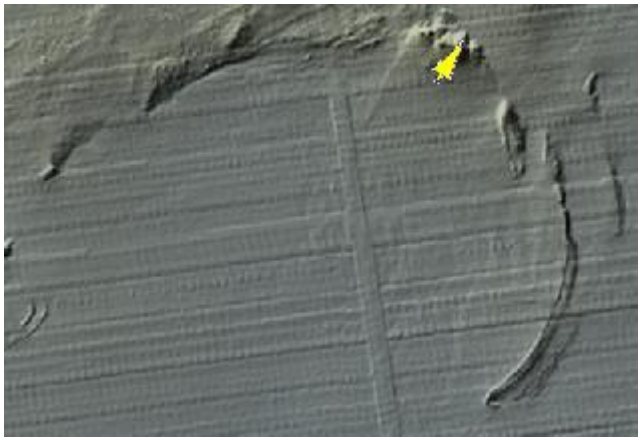


Figure 1 DORIS plot of "Caldera" Edge (yellow arrow).

Seabed description
The divers found an eroded chalk reef presenting as a gentle rise covered in cobbles and small boulders of chalk, plus cobbles and pebbles of harder rock. Fine silt was present, accumulating amongst shell fragments and chalk fragments in hollows, but not forming a separate biotope.
The reef supported diverse, didemnid-dominated turf with solitary squirts plus *Pentapora folicea, Cellepora pumicosa,* Sponge cushions (especially *Iophon cf nigricans*) and hydroids especially *Halecium halecinum and Nemertesia antennina*. Large amounts of an unusual blue colonial squirt thought to be *Tridemnum cereum* were a striking feature of the habitat. Patches of clean chalk rubble were noted. Algae were not recorded except rare encrusting corallines.
Despite swimming south, RY and NJO did not encounter a sediment habitat expected on the "floor" of the circular feature.

Noteworthy species and items: *Eunicella verrucosa*. *Phallusia mammillata*. Abundance and diversity of tunicates, especially colonial species. The presence of chalk rock.

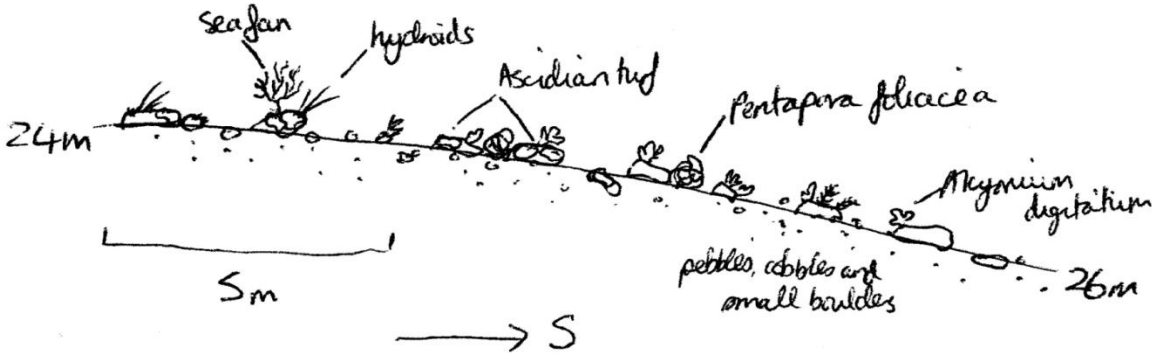


Figure 2 Diagram of "Caldera" Edge. All depths BSL. © Cathryn Quick

2) Try Reef Tail

Date 160618p
Position N50 41.574 W02 49.289 WGS84
The western part of Try Reef was seasearched in October 2013 (two records) and May 2014. The eastern end of this long, curving feature has not apparently been previously recorded.
DORIS shows a wedge-shaped feature with the tip pointing northeast with noticeable shadows to the southeast of the tip perhaps indicating a steep slope or undercuts.

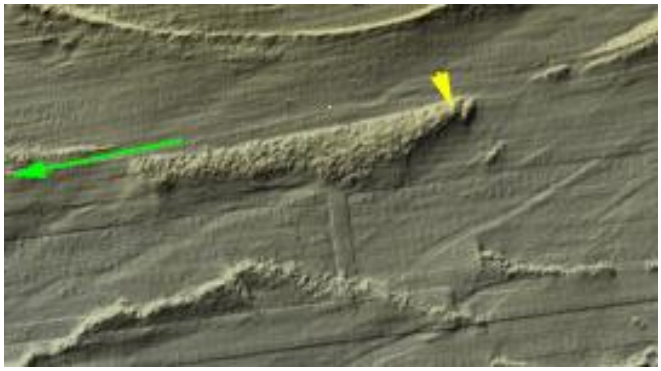


Figure 3 DORIS plot with dive site marked in yellow. Green arrow points towards 2013 & 2014 Try Reef dive sites (2.0 km).

Seabed description

Two habitats forming a mosaic:

1 Silty, rocky slab reef with overlying cobbles, small boulders and shale fragments with tall animal turf dominated by *Nemertesia spp., Eunicella verrucosa, Pentapora foliacea*, erect bryozoans plus other hydroids and sponge crusts. *Rocellaria dubia* siphons and *Cellepora pumicosa* were present throughout with bryozoan crusts and sponge crusts/cushions especially on verticals.

The site sloped very gently down to the east and became more rugged with less silt. Exposed rock (especially verticals) was heavily bored by piddocks and there were many undercuts especially towards the east but dimensions were too small to allow separate survey of these. Tall animal turf was more striking on higher slabs and depauperate on lower, siltier horizontals.

2 Silty accumulations in hollows. The presence of occasional *Rocellaria* siphons and crevice-dwellers such as *Thyone roscovita* indicated the presence of hard rock beneath the silt but little other life was apparent. Please see also comments for site 4 "Drowned Castle" which should apply here but note that there was less excavation by the diver on Try Reef Tail. Rock was found to underlie sediment at depths from 2cm to 10cm each time a test was made.

Noteworthy species and items: *Eunicella verrucosa* including well-encrusted specimens. Nationally scarce sponge *Adreus fascicularis*. Large numbers of bib and poor cod at the eastern end of the site. Potting noted in the vicinity. A couple of horizontal dead *Eunicella* were noted plus two live specimens pinned under a slab.

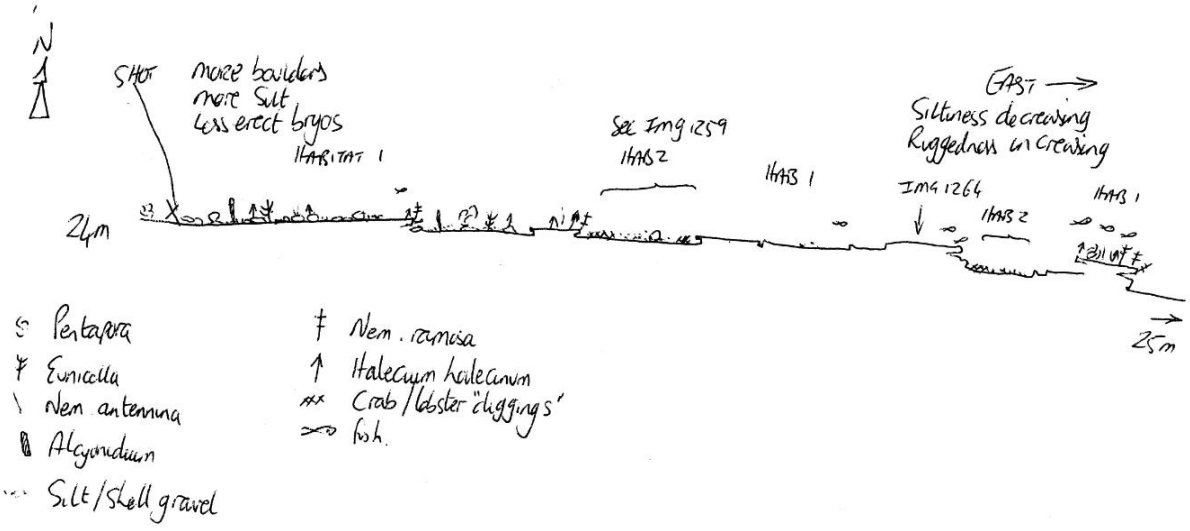


Figure 4 Diagram of dive site Try Reef Tail.

3) Lyme Roughs North

Date: 160619a

Position (shot) N50 47.472 W2 53.510 WGS84.

One Seasearch dive on Lyme Roughs was recorded on 09/06/2013 and found:

"a) Level seabed of silty, mixed ground dominated by tunicates.

b)Dead maerl gravel, *Aiptasia mutabilis* frequent. *Crepidula fornicata* was common."

No other records in a large "Seasearch blank spot" (see figure 9) were found.

The DORIS plot shows a low, broad rise of possible boulders running southwest to northeast.

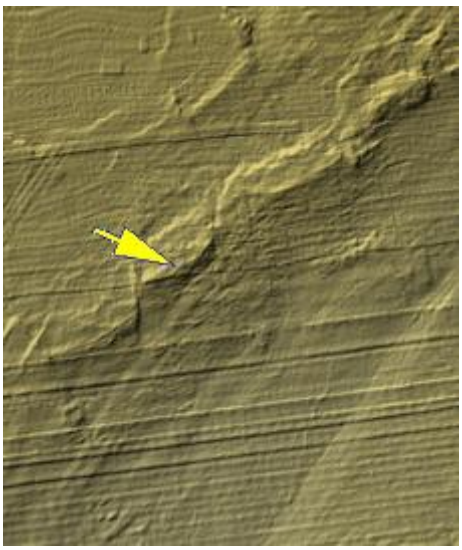


Figure 5 DORIS plot of Lyme Roughs North.

Seabed description

Habitat 1: Rocky reef of narrow horizontal beds of (?) sandstone occasionally exposed but more often underlying a silty field of small boulders partly composed of thin slabs of sandstone and chunks of shale eroded out of the reef but with cobbles and boulders of chert and other hard rock. The reef community was dominated by solitary squirts with sponge cushions and crusts with filamentous and foliose red algae, *Pentapora*, colonial squirts, hydroids, erect bryozoans and rare erect sponges. Habitat 1 included one area of hard rock with fewer boulders and less luxuriant turf (same composition) broken through by active animal burrows with large debris mounds of pebbles, shells and shell fragments. *Conger conger* in one burrow (see image 7) indicated a considerable size of excavation. A shale stratum could be seen under the bedrock (sandstone?) cap . Encrusting corallines were present on bedrock edges around excavation rims.

Habitat 2: Towards the end of the dive a large area was seen with accumulated silt over bedrock (indicated by *Rocellaria siphons*) and drifts of gravel/shell fragments with rare live maerl.

Noteworthy species: Habitat 1 *Aiptasia mutabilis, Eunicella verrucosa*. Habitat 2. *Aureliania heterocera* (now *Capnea sanguinea) Corymorpha nutans, Aporrhais pespelecani*.

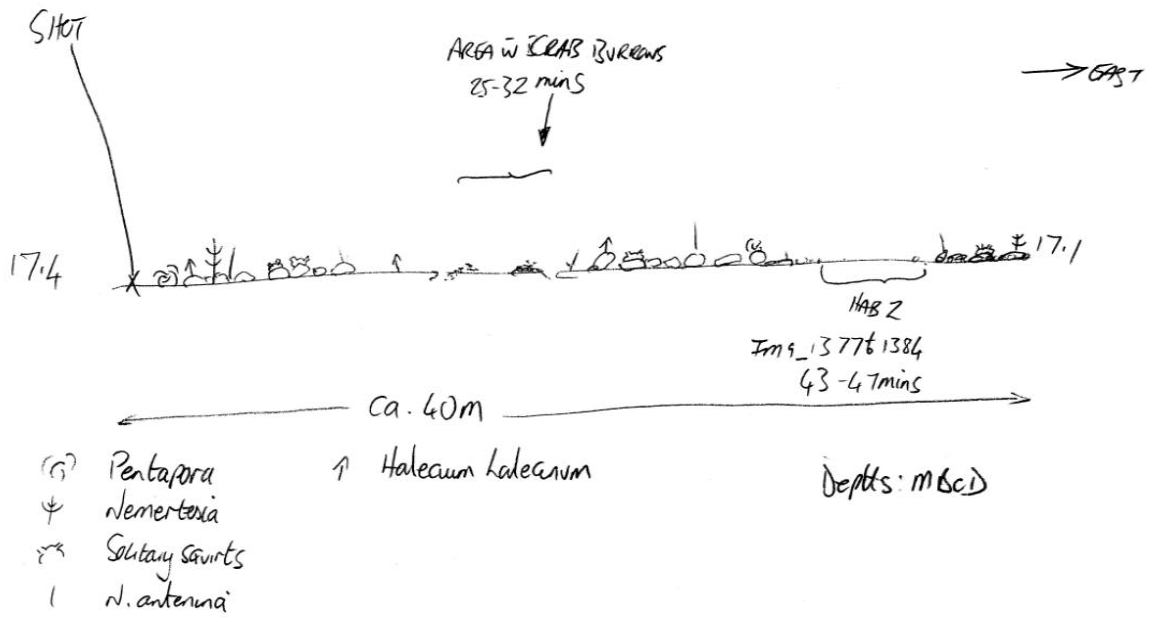


Figure 6 Diagram, Lyme Roughs North

4) Drowned castle

Date: 160619p

Position N50 42.186 W02 50.366 WGS84.

The DORIS plot shows an area of concentric ridges reminiscent of the western and southern ramparts of an Iron Age hill fort (figures 8 & 9).

Seabed description

The divers found two habitats:

Habitat 1: Rocky reef of hard sandstone (?) broken into slabs and boulders and overlain in places with small boulders, cobbles, pebbles and gravel, all silted. The bedrock and boulders supported diverse, silty tall animal turf of hydroids, erect bryozoans and sponges with sponge crusts and tunicates plus occasional foliose red algae.

Habitat 2: Silt accumulations, 2 to 4 cm deep in hollows either on flat, hard rock or (rarely) on compacted shell fragments/shells in a matrix of fine silt to at least 10cm below surface silt. Little life apparent and when seen these silt accumulations mostly showed rock dwelling species protruding through the silt e.g. *Rocellaria* siphons . These areas made up approximately 20% of the total area but were not surveyed in detail. Image 10 shows a patch of this habitat together with a “drop test” of a handful of sediment and its separation into shell fragments and suspended fine sediment.

Noteworthy species and items:

Habitat 1: Eunicella verrucosa with *Tritonia nilsodhneri, Phallusia mammillata, Pentapora foliacea*. Occasional evidence of overturn of individual boulders, one (30x20X5cm) with live seafans pinned beneath (Image 11 inset).

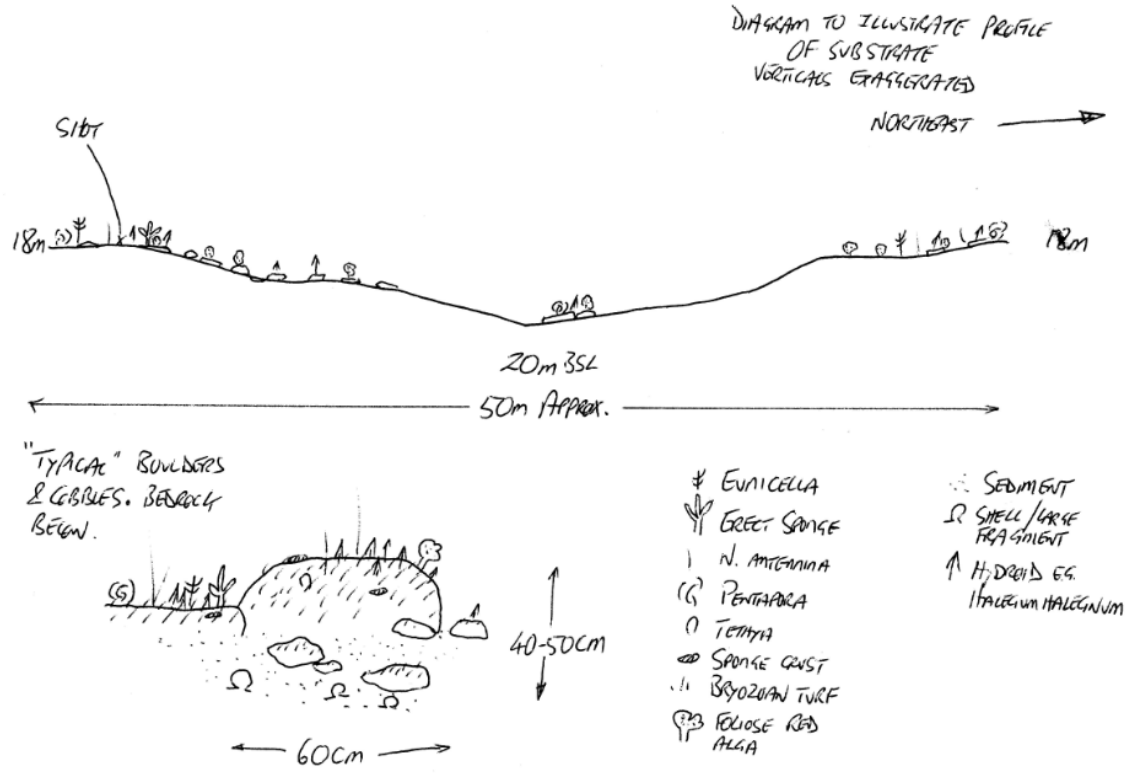


Figure 7 Diagram, Drowned Castle

Summary of Observations

All sites dived were reefs, selected on the basis of contrast to the surrounding seabed in terms of elevation and apparent structure. All bar one appeared to be composed of slabs of sedimentary rock eroded in situ from horizontal or near-horizontal strata with collapse downwards caused by faster erosion of less-resistant underlying strata exacerbated by piddock boring, plus crab or lobster excavation. All these three hard rock sites were overlain by boulders and cobbles to varying extent and were silty with accumulations of silt in hollows. Hard surfaces supported tall animal turf, the richness of which appeared to vary inversely with siltiness of the surfaces examined (see "Silt" below) . (Please see Owen 2014 for similarities with previously-Seasearched sites).

One site ("Caldera" Edge) was a chalk reef with predominantly chalk rubble/cobbles/small boulders. It supported a rich tall animal turf dominated by colonial tunicates and which is unusual in Lyme Bay. The presence of Chalk in the Lyme Bay circalittoral is noteworthy.

Silt.

"Siltiness" of dived sites was considered in previous Lyme Bay early summer surveys (Owen, 2014 and 2015) following the pronounced siltiness seen in 2014 coincident with the aftermath of the stormy winter of 2013/14. Silt was seen on all dives in this survey, accumulating in places to depths sufficient to apparently suppress colonisation of hard rock surfaces by species requiring hard attachment, but apparently not accommodating biotopes dependant upon sediment. See site 4, Drowned castle for examination of silty accumulations. Water conditions on this site allowed a "drop test" of a handful of sediment to be carried out:-

A handful of sediment from just below the surface was held two hand-heights above the substrate surface (an adjacent slabby cobble in this case) and dropped. The gentle current separated out the finer silt component allowing the larger particles to settle and to be examined at close quarters. This component proved to be almost exclusively composed of shell or barnacle carapace fragments. See image 10

Sea fan "erosion".
No erosion damage to the bases of *Eunicella verrucosa* colonies was noted, leading to an inference that any erosion damage (Owen 2014, Bolton) caused by movement of coarser sediment across the substrate during winter 2013/14 had been repaired (apparent repair noted Owen, 2014) or that damaged colonies had died and gone. A few dead *Eunicella* were noted lying on each site.

Site disturbance.
Isolated small patches of apparent disturbance were noted on three sites. "Caldera" Edge had patches of fresh, clean chalk rubble, Try Reef Tail and Drowned Castle had living Eunicella pinned under rock slabs. The upper face of these slabs supported an impoverished or absent turf community. It is inferred that presence of live sea fans under slabs indicates recent overturn of those slabs. This inference is supported by the presence of long-lived species on the tops of adjacent slabs, indicating that overturn of these slabs is an isolated occurrence not attributable to weather related phenomena (which would be expected to cause widespread disturbance). Together with the overall "non-rugged" profile of the reef, the absence of adjacent, higher rock surfaces with a similar, obviously depauperate open-living turf community (see image 11 inset) would be expected to preclude the possibility of a recent fall of the slab from an adjacent height due to erosion alone. The determination of the significance of this disturbance to the habitat together with an attribution of cause would require more data (e.g. more dives in the area). However, it would seem likely that the flipping of slabs is caused by the lifting of pots or similar static gear.
The Chalk rubble at site 1 "Caldera" Edge, being composed of soft rock and supporting an unusual and highly biodiverse community, would be extremely vulnerable to dredging or trawling. The lack of "in-situ" reef structure would indicate that it may have been impacted by mobile gear in the past, before the establishment of the Lyme Bay Closed area.

Site condition/biodiversity.
All sites were in apparently good condition with diverse animal turf including tall, long-lived species (pink sea fan *Eunicella verrucosa, the tall sponge Adreus fascicularis* and the potato crisp bryozoan *Pentapora foliacea*) indicating no or low levels of recent mechanical disturbance or damage to substrates. Man-made debris were not recorded. Potting noted in the vicinity of all sites.
Red algae were recorded on Drowned Castle, Lyme Roughs North and on the deepest (least silty) part of Try Reef Tail.
Live maerl was recorded at low density in Habitat 2 of Lyme Roughs North at 17m BSL.

Notable species and occurrences.

- *Eunicella verrucosa* (species of principal importance in England) on all sites, often in large numbers and at all growth stages plus frequent sea fan sea slug *Tritonia nilsodhneri* and eggs. White form of Eunicella noted on Drowned Castle.
- *Okenia elegans* a nationally rare sea slug and predator on tunicates.
- *Aiptasia mutabilis*. Trumpet anemone listed nationally scarce.

- *Phallusia mammillata.* Nationally scarce large sea squirt. Many noted with Scyliorhinus canalicula egg cases attached.
- *Adreus fascicularis*. Erect sponge, nationally scarce
- *Aureliania heterocera* (now *Capnea sanguinea)*
- Chalk reef/rubble at site 1. Subtidal chalk exposures are a UK Biodiversity Action Plan priority habitat (Maddock 2008).

Species diversity

Site	**1** 60618a "Caldera" Edge	**2** 160618p Try Reef Tail	**3** 160619a Lyme Roughs North	**4** 160619p Drowned Castle
Number of species/biota recorded	116	86	139	91

Note that these numbers are taken from the Seasearch forms and cannot be regarded as exhaustive catalogues of the species present on each site. Other species have since been recorded on photographs taken during the survey, an indication that true species richness of these sites is greater than indicated here.

Acknowledgements

The skill and commitment of the divers should be recognised, as should the generous offer by skipper Rob King of dive boat Blue Turtle to run the trip on a "per diver" basis rather than the full charter cost in the face of poor bookings in the lead-up to the trip.
All DORIS snapshots are taken from the Dorset Wildlife Trust website . Seabed Imagery © Dorset Wildlife Trust Contains Maritime and Coastguard Agency data, Crown copyright
All Seasearch Surveyor forms from these dives have been lodged with Dorset Wildlife Trust.
All image copyrights remain with photographers. Images are used here by permission.

References

Lyme Bay Rocky Reefs, Seasearch report on four dives. Baldock October 2013.
Lyme Bay Reefs and Cobbles, Seasearch report on four dives. Owen June 2014.
Chesil Beach and Stennis Ledges MCZ Seasearch Site Surveys 2014, DWT/C Bolton.
Lyme Bay Rocky Reefs – Seasearch Survey Dives 4th May 2014, DWT/ C Bolton.
All these reports are available on DWT (Dorset Wildlife Trust) website (June 2016).
UK Biodiversity Action Plan. Priority Habitat Descriptions. BRIG (ed.Ant Maddock) 2008
http://www.jncc.gov.uk/page-5155

Appendix 1 Dived sites 2016 – Locations.

Number on plan figure 8	Date dived	Reference	Position (WGS84)	Depth (m, BCD)
1	160618a	"Caldera" edge	N50 39.498 W2 50.959	22.1 (shot) to 23.1
2	160618p	Try Reef Tail	N50 41.574 W2 49.289	20.0 (shot) to 20.8
3	160619a	Lyme Roughs North	N50 42.472 W2 53.510	15.5 (shot) to 15.2
4	160619p	Drowned Castle	N50 42.186 W2 50.366	16.6 (shot) through 19 to 16.6 at dive end.
5	not dived see text.	Reef off Charmouth	N50 43.455 W2 53.949	Data blank spot 14m calculated

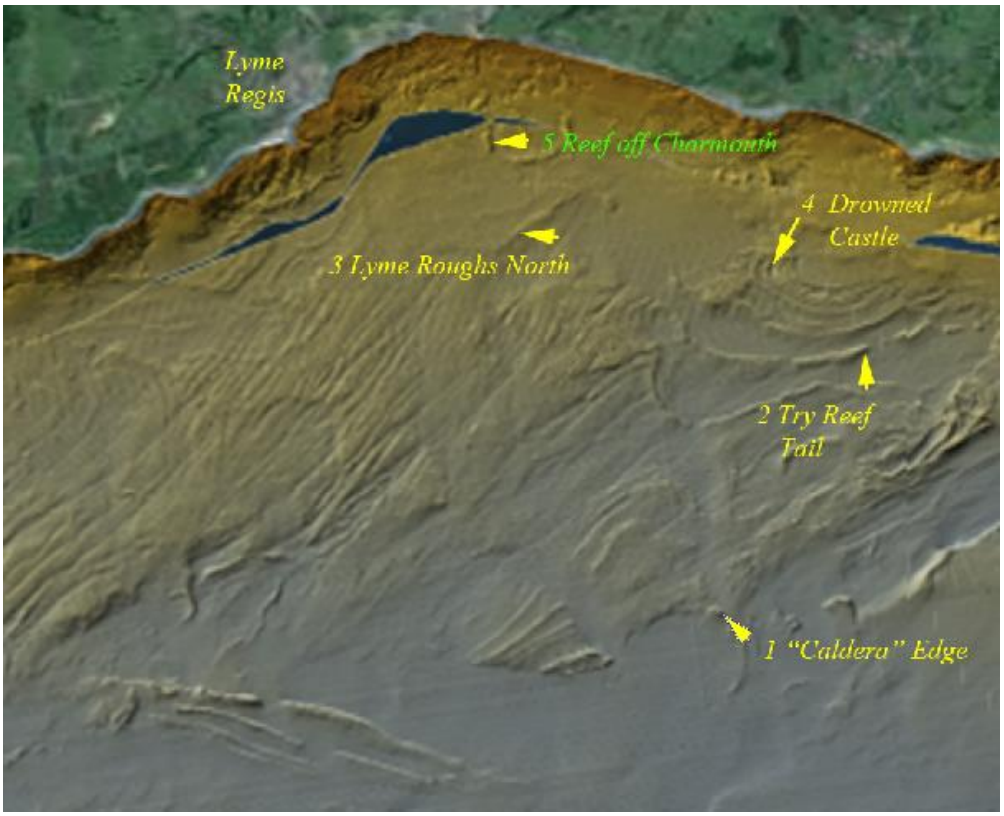


Figure 8 DORIS plot of sites dived.

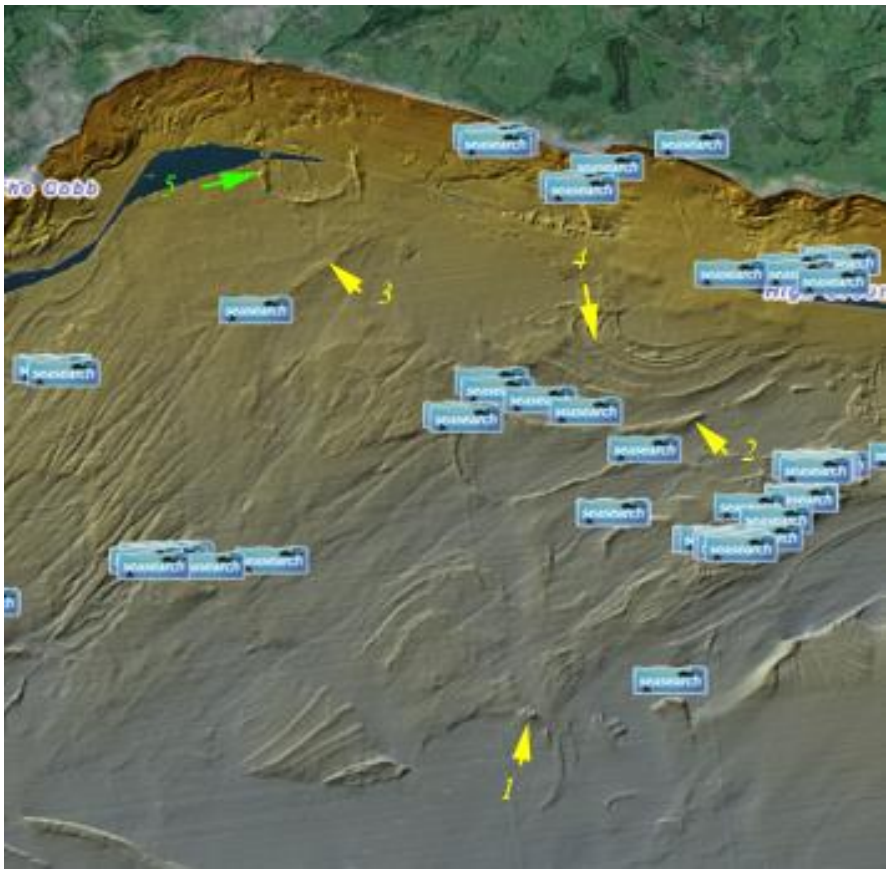


Figure 9 Sites seasearched to 2013, with June 2016 sites marked.

Appendix 2: Images from dives

1) 160618a Caldera edge

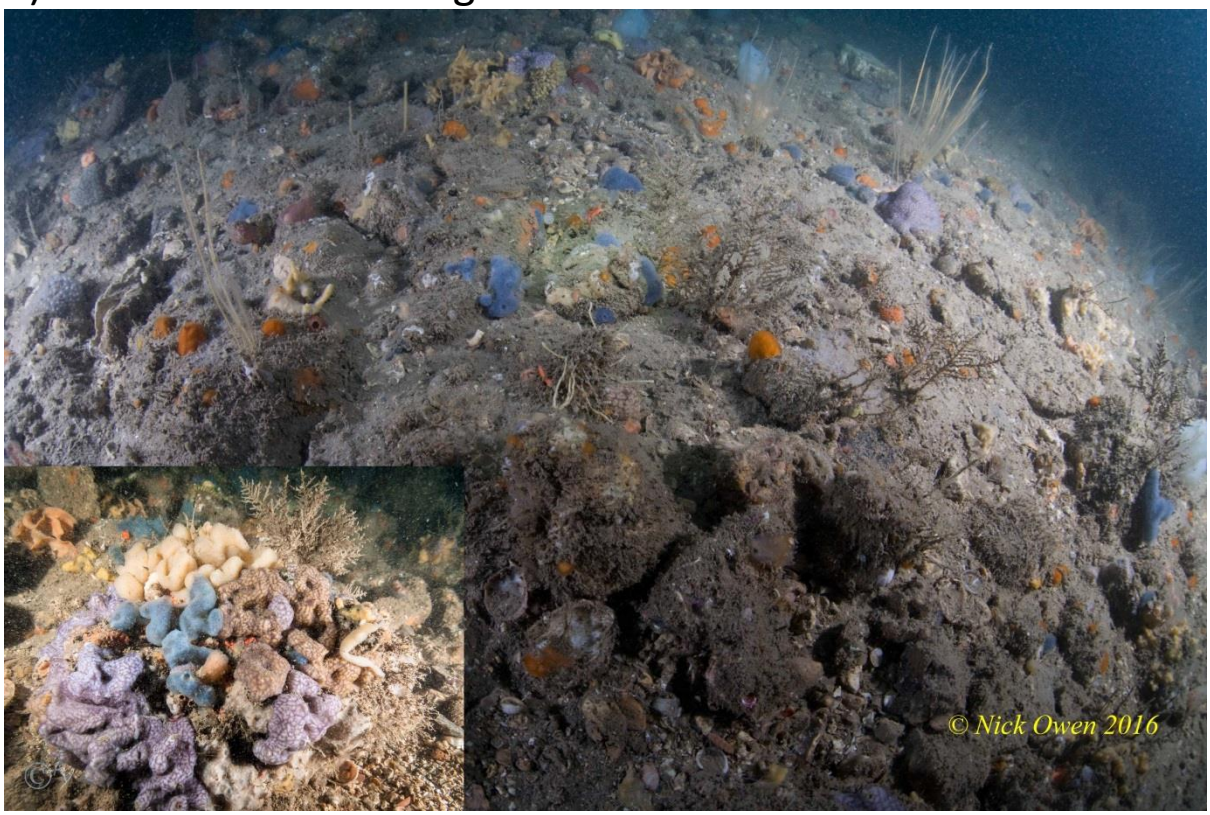


Image 1: Overview of habitat showing chalk bedrock fractured into boulders covered in dense animal turf with sponges, hydroids, soft corals and bryozoans. Inset © Richard Yorke showing a range of colonial tunicates with sponges and hydroids.

Image 2: Okenia Elegans © Alison Bessell

Image 3: Tunicate turf © Alison Bessell

2) 160618p Try Reef Tail

Image 4: Silty tall animal turf with *Adreus fascicularis*

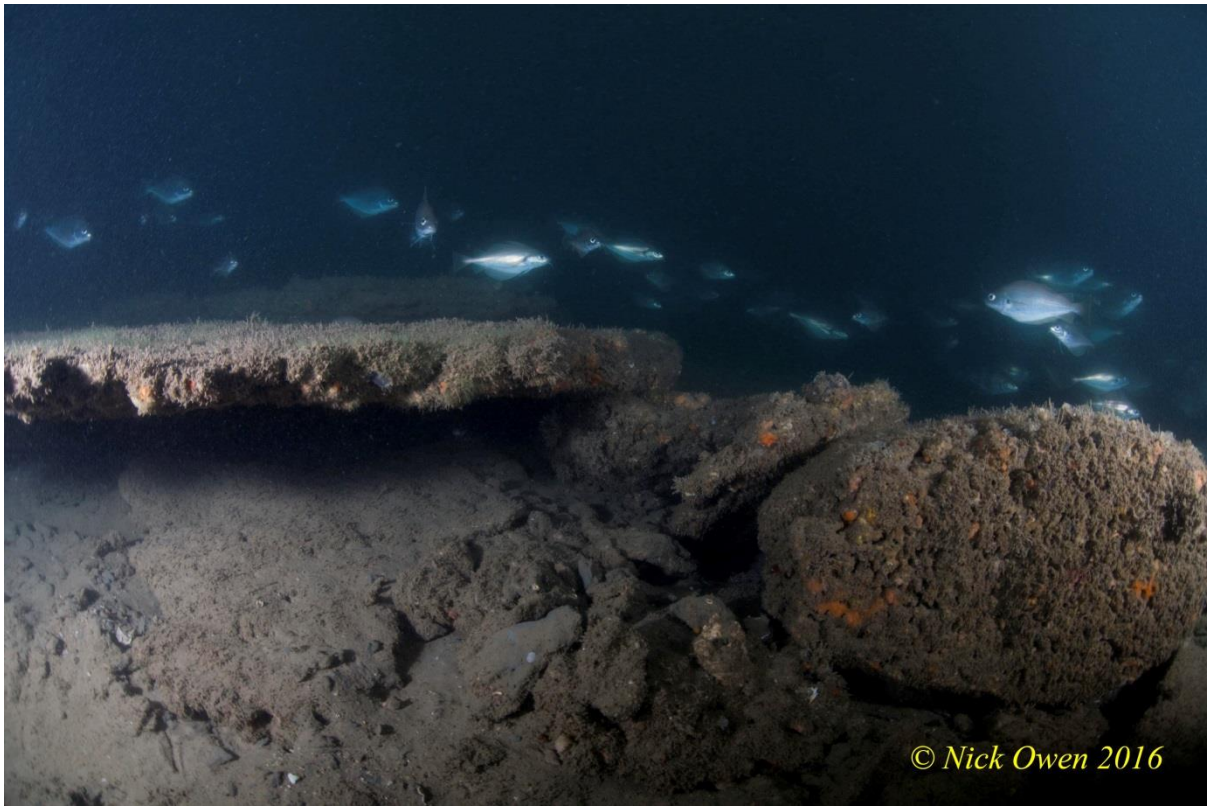


Image 5: Undercut stratum and boulders. Note texture of tilted face of slab on right.

3) 160619a Lyme Roughs North

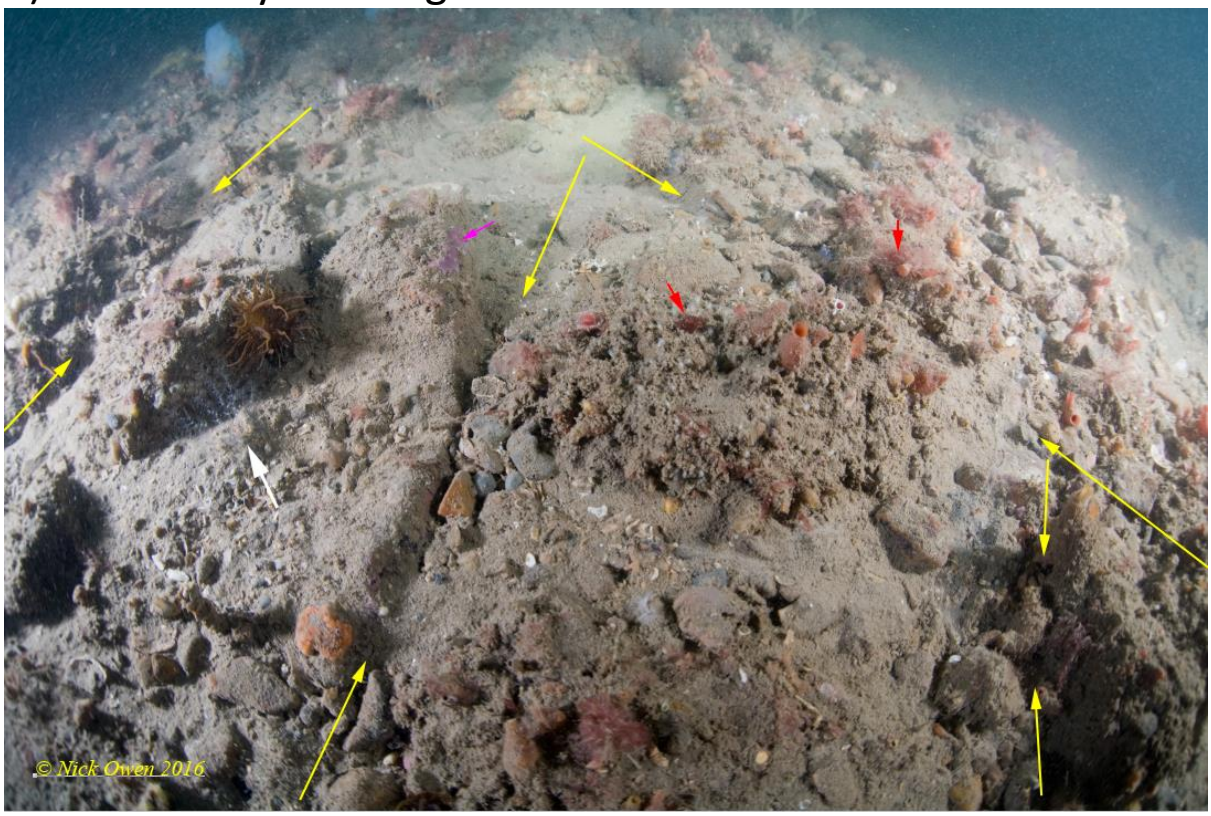


Image 6: Habitat 1. Reef overlain with cobbles.
Note fractures in upper reef stratum (yellow arrows), crevice-dwelling holothurian (white arrow), foliose and filamentous red algae (red arrows), coralline crust (pink arrow), silt accumulation in hollow (12 o'clock) and heavily piddock-bored boulder at centre with several tunicate species.

Image 7: Habitat 1. Area of animal burrows highlighting thinness of upper reef stratum (see inset with *Conger conger*).

Image 8: Habitat 2 drift of pebbles and gravel with scattering of live maerl and *Capnea sanguinea.* Silt with *Aporrhais pespelecani* in background. Note *Rocellaria* siphons just left of centre.

4) 1606119p Drowned Castle

Image 9: Boulders with sponges, bryozoan turf, hydroids, tunicates and red algae. Inset ©Richard Yorke showing the red alga *Hypoglossum hypoglossoides* and erect bryozoans.

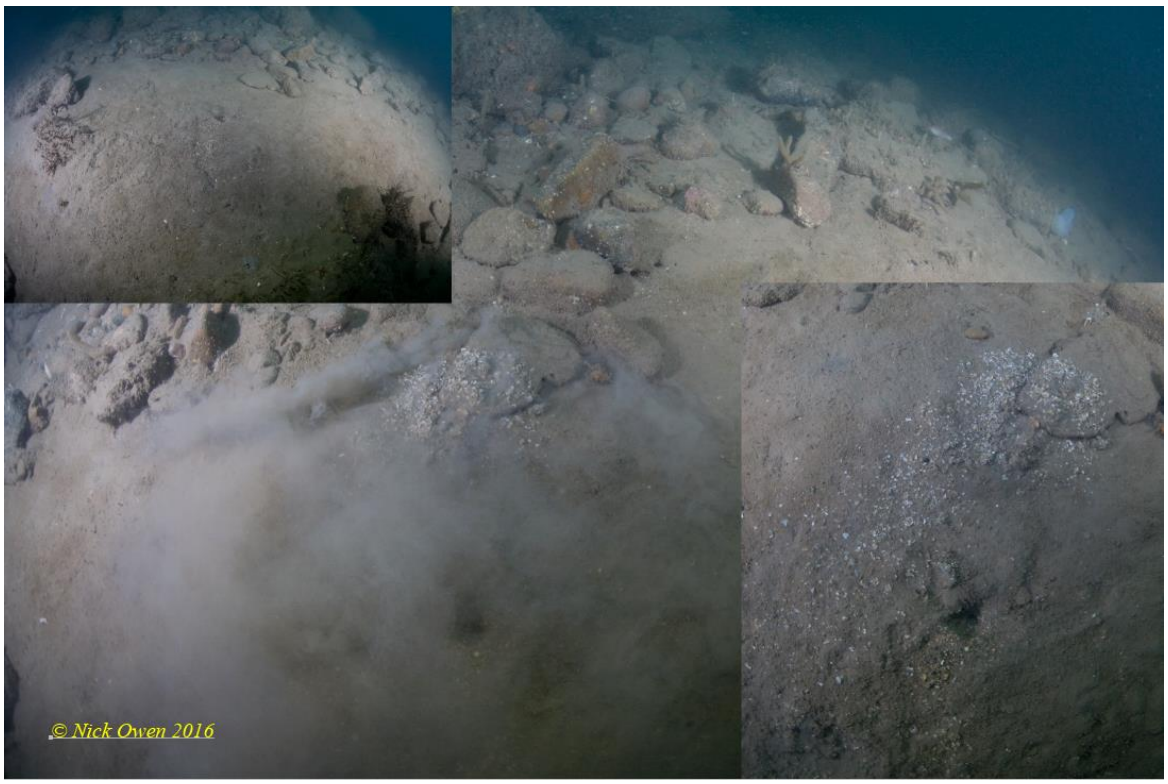


Image 10: Habitat 2 silt/shell fragment accumulation in hollow. Top left to bottom right: boulder habitat in background; dropped handful of sediment with silt in water column; shell/barnacle carapace fragments with sample site in foreground.

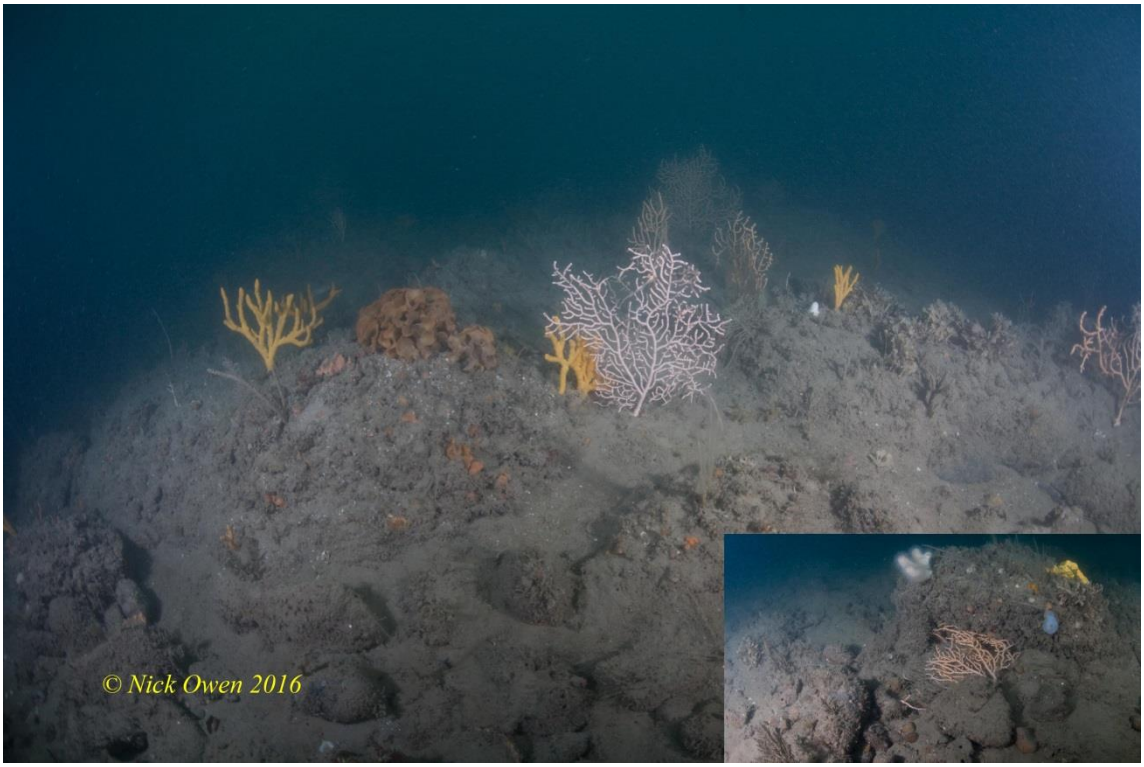


Image 11: Reef top habitat with white form of *Eunicella verrucosa*. Inset: Pinned *Eunicella.*

Front cover: Reef at “Caldera” Edge with colonial tunicates and bare chalk cobbles with piddock borings.