SEASEARCH SURVEY- MANACLES MCZ

8th and 9th July 2017

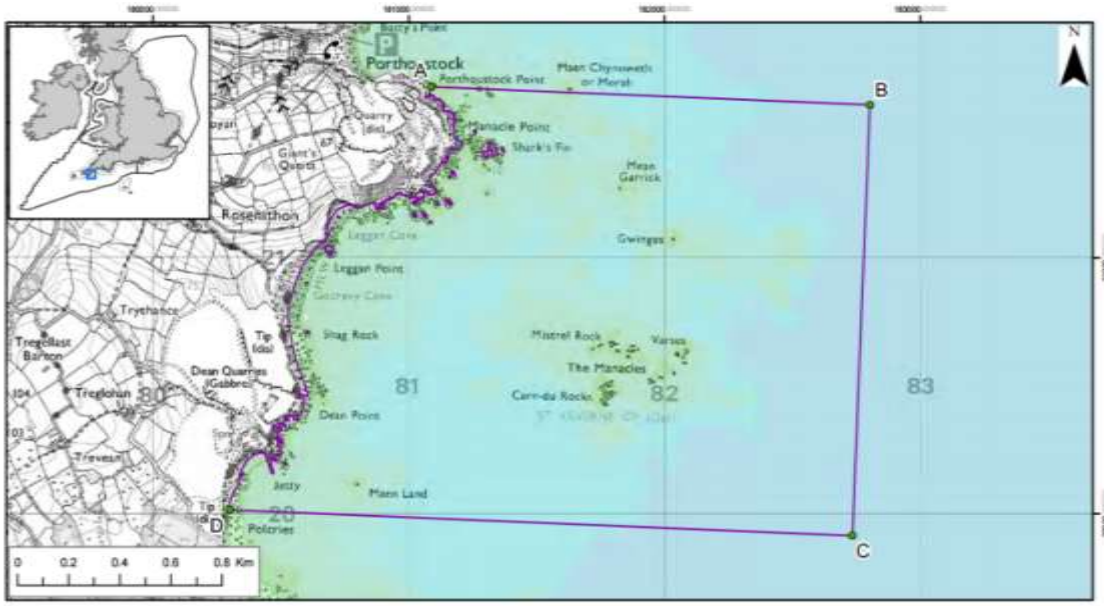
Matt Slater, Cornwall Wildlife Trust

This is a report on the findings of a weekend of Seasearch dive surveys carried out in and around The Manacles Marine Conservation Zone, organized by Cornwall Wildlife Trust and funded by Sea-Changers. Photos by Matt Slater except where labelled.

SEASEARCH SURVEY-Manacles MCZ

THE MANACLES MCZ

The Manacles Marine Conservation Zone was designed by the UK government in 2013. The Manacles MCZ is an inshore site located on the southern coast of Cornwall which covers a total area of approximately 3.5 km^2. The MCZ extends 2 km from the coastline to encompass a series of large underwater rocky outcrops known as The Manacles. The map below shows the extent of the zone which takes in the rocky headlands and reef and the south edge of Falmouth Bay in South Cornwall on the Lizard Peninsula.



The Manacles MCZ Boundary

- Marine Conservation Zone
- MCZ boundary co-ordinates
- 12nM Territorial Seas Limit
- Land

Point	Lat	Long
A	50°3' 17.164" N	5°3' 34.398" W
B	50°3' 17.144" N	5°2' 8.124" W
C	50°2' 22.669" N	5°2' 8.127" W
D	50°2' 22.693" N	5°4' 10.637" W

Depth Areas (metres)

-20.0 - -10.0
-9.9 - -5.0
-4.9 - 0.0
0.1 - 5.0
5.1 - 10.0
10.1 - 25.0
25.1 - 50.0
50.1 - 100.0
100.1 - 250.0
250.1 - 500.0
500.1 - 1000.0

Reference: Theme ID: 1477653
Map Projection: British National Grid

CONSERVATION OBJECTIVES

The site's conservation objectives apply to the Marine Conservation Zone and the individual species and/or habitat for which the site has been designated (the "Designated Features" listed below). The conservation objective of the zone is that the protected habitats:

1. are maintained in favourable condition if they are already in favourable condition

2. be brought back to favourable condition if they are not already in favourable condition

For each protected feature, favourable condition means that, within a zone:

1. its extent is stable or increasing

2. its structure and functions, its quality, and the composition of its characteristic biological communities (including diversity and abundance of species forming part of or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

For each species of marine fauna, favourable condition means that the population within a zone is supported in numbers which enable it to thrive, by maintaining:

1. the quality and quantity of its habitat

2. the number, age and sex ratio of its population

Any temporary reduction in numbers of a species is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

DESIGNATED FEATURES FOR THE MANACLES MCZ

Features	General management approach
Intertidal coarse sediment	Maintain in favourable condition
Subtidal sand	Maintain in favourable condition
Subtidal macrophyte dominated sediment	Recover to favourable condition
Moderate energy intertidal rock	Maintain in favourable condition
Moderate energy infralittoral rock	Maintain in favourable condition
Moderate energy circalittoral rock	Maintain in favourable condition
Maerl beds	Recover to favourable condition
Sea-fan anemone (*Amphianthus dohrnii*)	Maintain in favourable condition
Spiny lobster (*Palinurus elephas*)	Recover to favourable condition
Stalked jellyfish (*Haliclystus auricula*)	Maintain in favourable condition
Subtidal coarse sediment	Recover to favourable condition
Subtidal mixed sediments	Recover to favourable condition
Pink sea-fan (*Eunicella verrucosa*)	Recover to favourable condition

Aim of the dive survey

Our aims for this survey were

- To collect data from some un-surveyed and poorly studied areas of the MCZ to add to the already good level of knowledge of this MCZ. See the full report of Seasearch surveys at the Manacles from 2005 to 2015 author Chris Wood here http://seasearch.org.uk/downloads/Manacles-2001-2015.pdf
- To explore and assess conditions of dive sites outside the Southern boundary of the MCZ.
- To increase our knowledge of the species and habitats found in the area.
- To raise public awareness by photographing and filming marine life during the surveys to be a significant contribution to films being made on MCZs and other marine life by www.hydromotionmedia.com
- To develop the skills of our team of volunteer divers.

Seasearch data collected in previous years was plotted on a map so we could see where there were gaps.

The team

We were fortunate to have the help of a hugely experienced team at Porthkerris Diving. Our skipper for the weekend was Dave Brown whose knowledge of the Manacles reef is second to none. We dived from the Celtic Kitten an 8.5 meter power cat with a hydraulic lift which makes getting out of the water easy.

We were joined by the following volunteer divers:

Saturday 13th May

1. Thomas Daguerre – Seasearch Observer, zoologist and Film Maker www.hydromotionmedia.com
2. Andrew Ball – videographer – assisting Tom
3. Lorena Prieto Cacabelos – Seasearch Observer
4. Jan Ziolo – Seasearch Surveyor (trainee)
5. James Wright – Curator of National Marine Aquarium and Seasearch Observer
6. Jess Hirons – Seasearch Observer
7. Gary Gubby – Seasearch Observer
8. Janet Dallimore – Seasearch Surveyor (trainee)
9. Andrew Grant – Seasearch Surveyor and photographer
10. Sean Dixon – Seasearch Observer
11. John Yarrow – Photographer and Seasearch Surveyor (trainee)
12. Matt Slater – Marine biologist, Seasearch Surveyor and tutor (trainee)
13. Josie Pegg – Seasearch Surveyor and tutor

Sunday 14th May

Sally Sharrock – Seasearch Surveyor, Tutor, videographer and legend, replaced Janet Dallimore.

Figure 1 The dive team (minus Sally who joined us on day 2)

The Dives carried out

The following dive locations were chosen

- **Sharks Fin Rock**
- **The Gwinges** – an area inside the outer edge of the reef which has not been extensively surveyed in the past
- Reefs off the south of **Lowland Point** (inside) just outside the boundary of the MCZ and poorly surveyed
- **Puskys Reef** – a spectacular reef just to the south of the boundary of the MCZ.

Although it can be extremely rough there on a southerly or easterly gale the Manacles is sheltered from our prevailing westerly winds and we were fortunate on this weekend to have relatively light westerly winds and a favorable tide (not full neaps but pretty good).

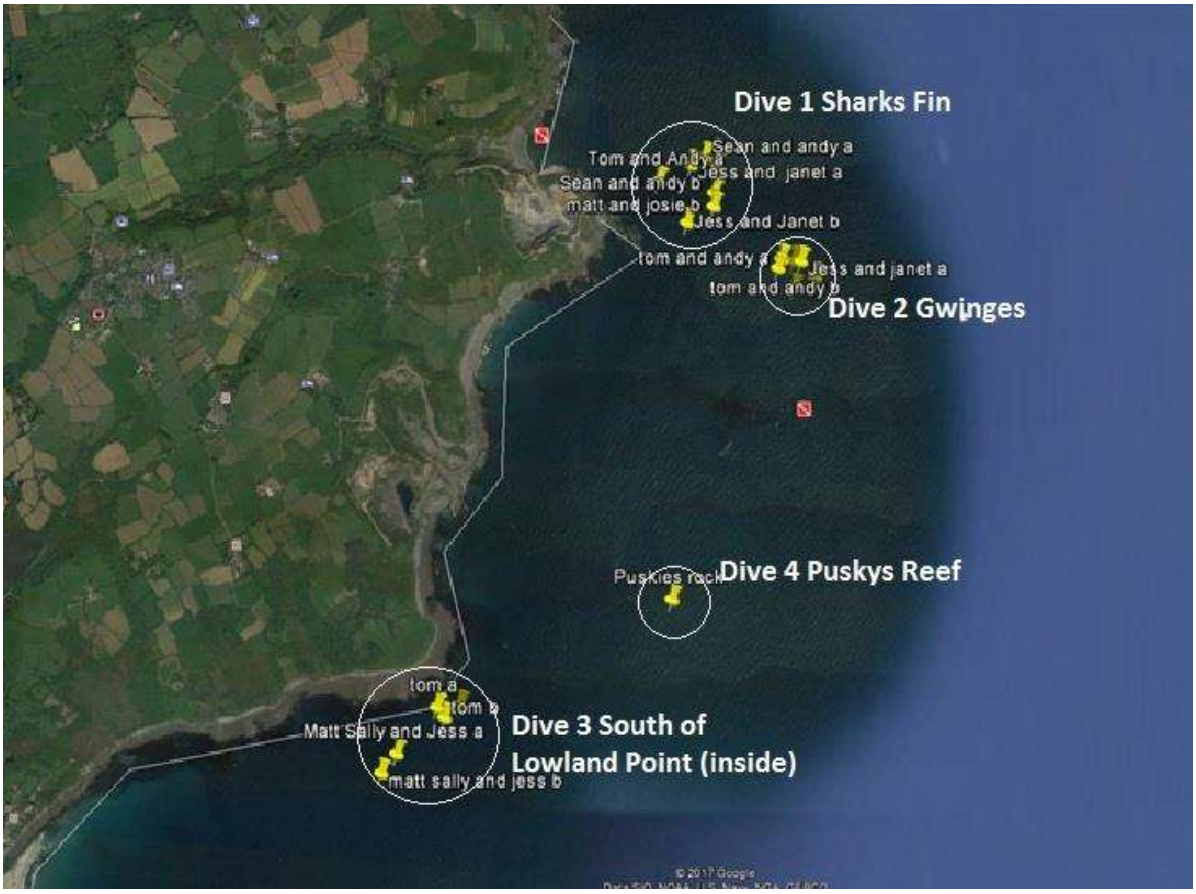


Figure 2 Dives carried out – for each buddy pair the position has been plotted for start and finish.

Dive 1 – Sharks Fin Rock
Summary of findings

Figure 3 Dive buddies start and finish positions plotted using Google Earth

Divers were positioned roughly in a line from west to east away from sharks fin rock. The current meant that all divers travelled in a southerly direction over the seabed at a slow pace. Where matt and Josie were placed the seabed was relatively flat with mixed ground of rock and sand with gravel and sand. The majority of the area dived was comprised of moderate energy infralittoral rock and subtidal sand, coarse sediment and mixed sediments , all designated features for The Manacles MCZ. The rocks were home to a mixture of algae and large animal turf species including Dead mens' fingers *Alcyonium digitatum*, jewel anemones *Corynactes viridis*, sponges including *Cliona celata, Raspailia ramosa*, *Dysidia fragilis*, and *Haliclona viscosa*, potato crisp bryozoan *Pentapora foliacea*. Only one Pink Seafan (nationally uncommon BAP species) was found on our dive. The Bryozoan *Schizomaevella sarniensis* was also found. Egg masses of *Simnia sp.* were found on Dead mens' fingers.

Red seaweed – Sea beech *Delesseria sanguinea* was common and was often encrusted with the bryozoan *Electra pilosa*. *Heterosiphonia plumosa* was common and there were many other species occasionally found including *Scinaia ciliata*. *Laminaria sp.* and *Polyschides sacchorhiza* were both occasional. The brown algae *Dichyopterus polypodioides* was

common and *Dictyota dichotoma* was abundant. Cuttlefish were seen by Jess Hirons. Sean and Andy found a Crawfish – *Palinurus elephas*. Lorena Prieto Cacabelos reported a red cushion star *Porania pulvillus* – a species rarely recorded on Seasearch dives in our area. *Meredithia microphyllia* was recorded by Jan Ziolo.

Hydroids such as *Halecium sp, Nemertesia ramosa* and *Gymnagium montagui* were all seen occasionally and were common in some places on the reefs.

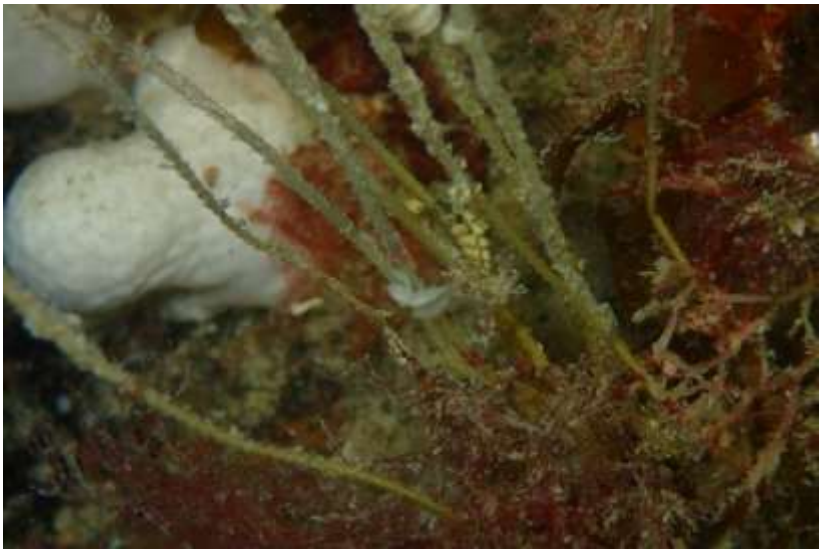


Figure 4 Nemertesia ramosa and nudibranch Doto pinnatifida

Figure 5 Indian feather hydroids Gymnangium montagui and brown alga Dichtyota dichotoma

Figure 6 Rock outcrop with Halecium sp. hydroids, sponge, bryozoan and Dictyota dichotoma

Figure 7 Unidentified sponge possibly Phorbas ficticus

Figure 8 Pentapora foliacea – Potato crisp bryozoan, aka ross coral

Figure 9 Female cuckoo wrasse, Labrus mixtus

Figure 10 Seven-armed starfish Luidia ciliaris regenerating legs

Biotopes and species recorded at Sharks Fin Rock:

IR.MIR.KR.LhypT.Pk	Infralittoral rock moderate energy, *Laminaria hyperborea* kelp park on tide swept rock in exposed or moderately exposed situations with rich understory of red and brown seaweeds and fauna of sponges, dead men's fingers, hydroids (*Aglaophenia* and *Nemertesia*), sea squirts and bryozoans. MCZ DESIGNATED FEATURE
SS.SCS	Subtidal sediment , unstable cobbles, pebbles, gravels and coarse sand. MCZ DESIGNATED FEATURE
SS.SCS.ICS	Coarse sediment, coarse sand, gravel and pebbles in the Infralittoral zone. MCZ DESIGNATED FEATURE

IR.MIR.KR.LhypT.Ft Infralittoral rock with *Laminaria hyperborea* kelp forest in exposed or moderately exposed conditions with a rich understory of red and brown seaweeds and fauna of sponges, dead men's fingers and elegant anemones. MCZ DESIGNATED FEATURE

IR.MIR.KFaR.LhypR.Loch Golden kelp community on infralittoral medium engery rock – predominantly Golden kelp forest or mixed cuvie and golden kelp in exposed or very exposed situation with foliose red seaweeds, encrusting pink algae and brown seaweeds. MCZ DESIGNATED FEATURE

SS.SCS.ICS.SLan Dense sand mason worms (*Lanice conchiglega*) in coarse to medium gravelly sand where there are strong tidal streams or wave action. MCZ DESIGNATED FEATURE

IR.MIR.KR.XFoR Dense foliose red seaweeds, moderately exposed bedrock and boulders with dense red seaweeds and no kelp

SHARKS FIN – SPECIES LIST	ABUNDANCE
Species Name	SACFORN
Rhodophyta (Red algae)	ABUNDANT
Delesseria sanguinea (Sea beech)	A
Electra pilosa (Frosted sea mat)	A
Heterosiphonia plumosa (feather weed)	A
Aglaophenia pluma (feathery hydroid)	COMMON
Aglaophenia tubulifera (feathery hydroid)	C
Alcyonium digitatum (Dead mens' fingers)	C
Aslia lefevrii (crevice sea cucumber)	C
Asterias rubens (Common starfish)	C
Balanus Balanus (barnacles)	C
Bugula flabellata (bryozoan)	C
Cerianthus lloydii (anemone)	C
Cliona celata (boring sponge)	C
Corallina officinalis(coral weed)	C
Corynactis viridis (jewel anemone)	C
Crisia sp. (bryozoan)	C
Ctenolabrus rupestris (goldsinney wrasse)	C
Dictyopteris polypodioides (winged weed)	C
Dictyota dichotoma (brown fan weed)	C
Encrusting algae indet.	C
Eunicella verrucosa (pink sea fan)	C
Filamentous red algae	C
Gymnangium montagui (Indian feather hydroid)	C
Halecium sp.(hydroid)	C

Labrus bergylta (ballan wrasse)	C
Laminaria hyperborea (forest kelp)	C
Laminaria ochroleuca (golden kelp)	C
Maja brachydactyla (spider crab)	C
Marthasterias glacialis(Spiny star)	C
Membranipora membranacea (sea mat)	C
Mytilus edulis(blue mussel)	C
Nemertesia antennina (antenna hydroid)	C
Pagurus bernhardus (hermit crab)	C
Pollachius pollachius(pollack)	C
Saccorhiza polyschides (furbellows kelp)	C
Sphacelariaceae (brown fluffy algae)	C
Spirobranchus(keel worm)	C
Spirorbis (spiral tube worm)	C
Symphodus melops (corkwing wrasse)	C
Ulvales (sea lettuce)	C
Urticina felina (dahlia anemone)	C
Antennella secundaria (hydroid)	FREQUENT
Bryozoa indet crusts	F
Henricia sp. (bloody henry starfish)	F
Holothuria forskali (cotton spinner cucumber)	F
Labrus mixtus (cuckoo wrasse)	F
Lanice conchilega(sand mason worm)	F
Meredithia microphylla (mermaids ear seaweed)	F
Obelia geniculata (kelp fur hydroid)	F
Alcyonidium diaphanum (sea chervil fleshy bryozoan)	OCCASIONAL
Anemonia viridis (snakelocks anemone)	O
Aplidium punctum (fluffy club squirt)	O
Axinella dissimilis (yellow staghorn sponge)	O
Bryopsis (green fluffy seaweed)	O
Bugula (bryozoan)	O
Bugula plumosa (feather bryozoan)	O
Calliblepharis ciliata (eyelash weed)	O
Caryophyllia smithii (Devonshire cup coral)	O
Centrolabrus exoletus (goldsinney wrasse)	O
Chrysaora hysoscella (compass jellyfish)	O
Ciona intestinalis (squirt)	O
Dysidea fragilis (goosebump sponge)	O
Echinus esculentus (edible urchin)	O
Halecium halecinum (herring bone hydroid)	O
Halichondria panacea (breadcrumb sponge)	O
Haliclona (Rhizoniera) viscosa (volcano sponge)	O
Halopteris filicina (brown fluffy algae)	O

Hemimycale columella (crater sponge)	O
Nemertesia ramosa (branched antenna hydroid)	O
Pomatoschistus minutus (sand goby)	O
Porifera indet. crusts (sponge)	O
Raspailia ramosa (chocolate finger sponge)	O
Saccharina latissima (sugar kelp)	O
Saccorhiza polyschides (furbellows kelp)	O
Scinaia (red algae)	O
Sphacelaria (brown fluffy algae)	O
Suberites ficus (orange ball sponge)	O
Sycon ciliatum (purse sponge)	O
Alcyonium glomeratum (red fingers)	RARE
Botryllus schlosseri (star ascidian)	R
Calliostoma zizyphinum (painted top shell)	R
Cancer pagurus (brown crab)	R
Dilsea carnosa (red rags)	R
Doris pseudoargus (nudibranch)	R
Doto pinnatifida (nudibranch)	R
Luidia ciliaris (seven armed star)	R
Neopentadactyla mixta (gravel sea cucumber)	R
Nymphon (sea spider)	R
Pachymatisma johnstonia (elephant hide sponge)	R
Palinurus elephas (crawfish)	R
Parablennius gattorugine (tompot blenny)	R
Polycera faeroensis (nudibranch)	R
Polymastia boletiformis (yellow hedgehog sponge)	R
Polymastia penicillus (chimney sponge)	R
Porania (Porania) pulvillus (red cushion star) LPC	R
Scyliorhinus canicula (small spotted catshark)	R
Tethya citrina (golf ball sponge)	R
	total taxa 99

Dive 2 -The 'Gwinges' Summary of findings

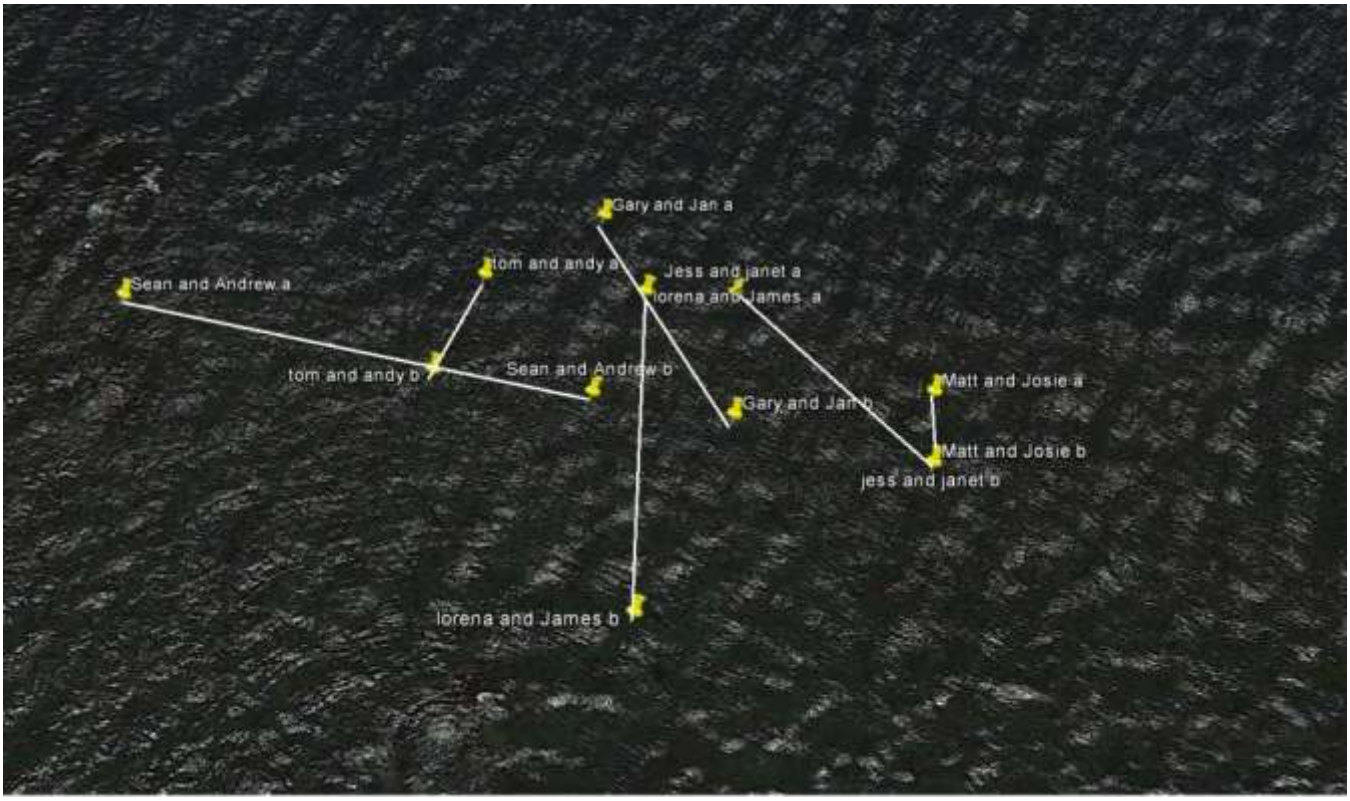


Figure 11 Dive buddy tracks - Dive 2 The Gwinges

The Gwinges are a fairly large area of rocky ground inside of the main (and well surveyed) reefs on the edge of the Manacles. The reef has deep gullies and all surfaces are covered in animal life including *Eunicella verrucosa* (pink sea fan) (a designated feature of The Manacles MCZ), *Corynactis viridis* (jewel anemones) and *Nemertesia* (antenna hydroids). Notable feature was that many of the *Eunicella* had pink sea fan anemones *Amphianthus dornhii* (also a designated feature of the MCZ). It was estimated by Matt Slater that on their dive site that approx. 20% of the fans observed had the anemones and there were usually more than one per fan. One seafan was recorded as hosting 11 individual sea fan anemones (see Fig 12). The most abundant echinoderm was the crinoid *Antedon bifida,* the feather star which was abundant and could be seen climbing onto any available surface to reach out for plankton. *Holothuria forskali* were common on the reefs and crevice sea cucumbers *Aslia lefevrei* were also common on the reefs. Spider crabs and lobsters were seen. The most common fish were goldsinney wrasse *Ctenolabrus rupestris* and cuckoo wrasse *Labrus mixtus*. Ballan wrasse were also seen (*Labrus bergylta*).

There was abundant life on all surfaces of the reef and the sandy areas between reefs were also host to abundant life, one buddy pair Jess Hirons and Janet Dallimore saw a large monkfish on the sand between the reefs. The clock face

anemone *Peachia cylindrica* was seen by James Wright and Lorena Prieto Cacabelos as was the burrowing anemone *Cerianthus loydii*. Cotton spinner sea cucumbers, *Holothuria forskali*, were common.

It was a truly beautiful dive site – we dived at neap tide so we had very little current to deal with. Visibility was good approx.. 9m. Max depth was 26 meters and the shallowest was 22m (bsl).

Figure 12 Single Eunicella verrucosa hosting eleven Amphianphus dorhnii, the seafan anemone.

Figure 13 Feather stars Antedon bifida, climbing up onto Cliona celata – boring sponge

Figure 14 Corynactis viridis - jewel anemones pink colour morph - Photograph by John Yarrow

Figure 15 Corynactis viridis and Crisia sp. bryozoans

Figure 16 Large, and bushy pink sea fans Eunicella verrucosa

Figure 17 Hydroid (Halecium) and bryozoan (Cellaria spp) turf

Figure 18 Male Cuckoo wrasse and Eunicella verrucosa by Andy Ball, Hydro Motion Media

BIOTOPES AND SPECIES - RECORDED AT GWINGES

SS.SCS.CCS	Sublittoral coarse sediment, tide swept sand gravel and pebbles beneath 15m. A DESIGNATED FEATURE OF THE MCZ

CR.HCR.XFa.ByErSp.Eun Circalittoral rock high energy, dominated by pink sea fans with potato crisp bryozoans (*Pentapora foliacea*) red fingers (*Alcyonium glomeratum*) and cup corals , Dead mens' fingers yellow cluster anemones and *Nemertesia spp.* often present.

CR.HCR.XFa Mixed faunal turf communities on circalittoral bedrock and boulders in extremely or very wave exposed situations.

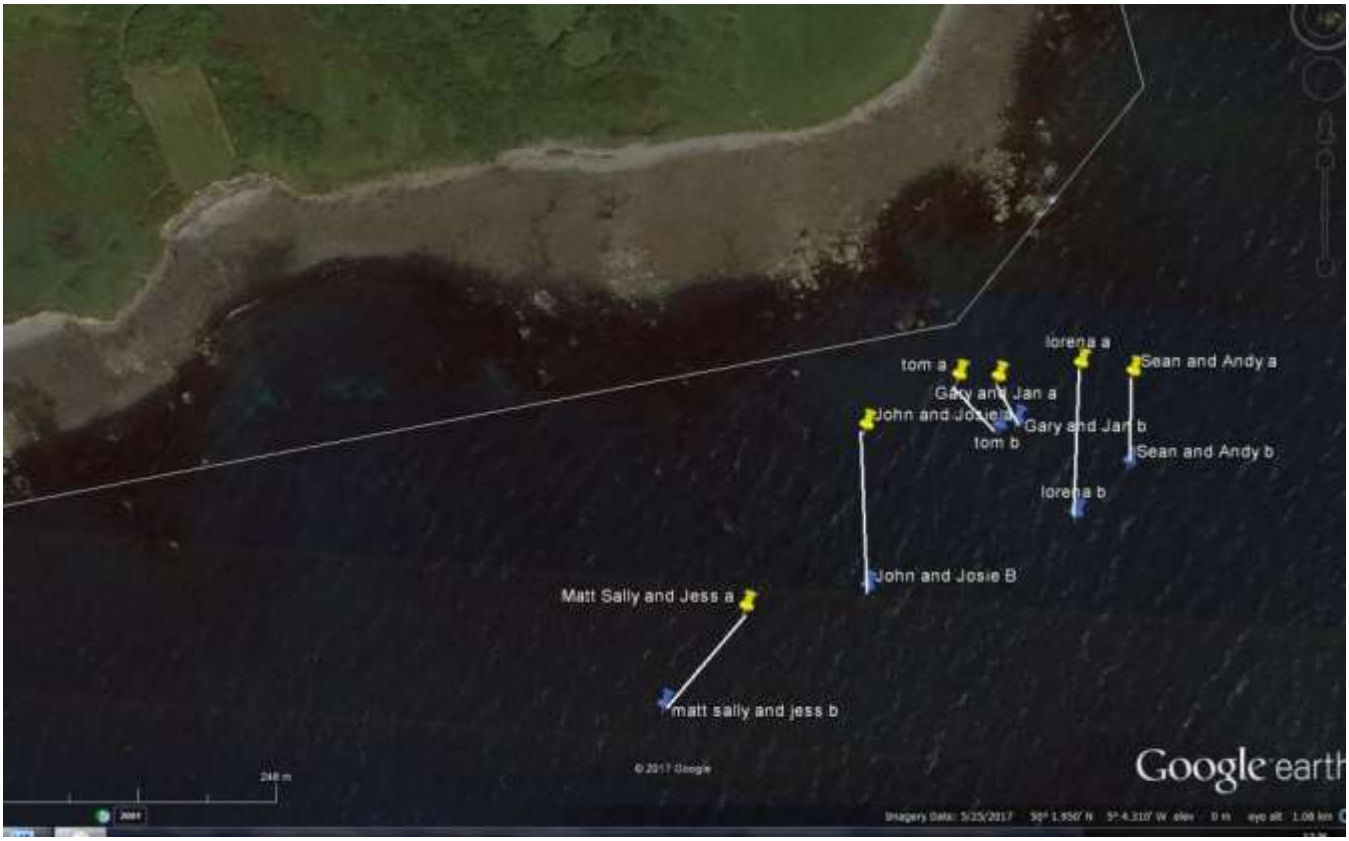
CR.HCR.XFA.CvriCri Jewel anemone walls in wave exposed areas with abundant jewel anemones with cup-corals and short bryozoan turf (*Crisia sp*).

SPECIES LIST - GWINGES	ABUNDANCE
SpeciesName	SACFORN
Antedon bifida (feather star)	A
Corynactis viridis (jewel anemone)	A
Crisiidae (white claw sea moss bryozoan)	A
Aglaophenia (feathery hydroid)	C
Alcyonium digitatum (dead men's fingers)	C
Asterias rubens (common star)	C
Balanus balanus (barnacles)	C
Callophyllis laciniata (beautiful fan weed)	C
Caryophyllia smithii (Devonshire cup coral)	C
Cliona celata (boring sponge)	C
Crisia (white claw sea moss bryozoan)	C
Ctenolabrus rupestris (goldsinney wrasse)	C
Dictyota dichotoma (brown algae)	C
Eunicella verrucosa (pink sea fan)	C
Gymnangium montagui (Indian feathers hydroid)	C
Halichondria panacea (sponge)	C
Heterosiphonia plumosa (feather weed)	C
Holothuria forskali (cotton spinner cucumber)	C
Labrus mixtus (cuckoo wrasse)	C
Laminaria hyperborea (forest kelp)	C
Lanice conchilega (sand mason worm)	C
Marthasterias glacialis (spiny seastar)	C
Membranipora membranacea (sea mat)	C
Nemertesia (hydroid)	C
Nemertesia antennina (antenna hydroid)	C
Obelia geniculata(hydroid)	C

Pentapora foliacea (potoato crisp bryozoan)	C
Porifera indet crusts (sponge)	C
Raspailia ramosa (chocolate finger sponge)	C
Saccorhiza polyschides (furbellows kelp)	C
Sagartia elegans (elegant anemone)	C
Sertularia (hydroid)	C
Spirorbis (spiral worm)	C
Terebellidae (worm)	C
Urticina felina (dahlia anemone)	C
Alcyonidium diaphanum (sea chervil)	F
Cellaria (bryozoan)	F
Ciona intestinalis (squirt)	F
Neopentadactyla mixta (gravel sea cucumber)	F
Sepia officinalis	F
Tritonia nilsodhneri (sea fan nudibranch)	F
Aeolidioidea (nudibranch)	O
Aglaophenia tubulifera (Hydroid)	O
Ammodytidae (sand eel)	O
Amphianthus dohrnii (seafan anemone)	O
Ascidia mentula (red sea squirt)	O
Axinella dissimilis (yellow staghorn sponge)	O
Bispira volutacornis (double spiral worm)	O
Bugula (Bryozoan)	O
Centrolabrus exoletus (rock cook wrasse)	O
Corallina officinalis (coral weed)	O
Diplosoma spongiforme (colonial squirt)	O
Echinus esculentus (edible urchin)	O
Gobiusculus flavescens (two spot goby)	O
Halecium (hydroid)	O
Halecium halecinum (herring bone hydroid)	O
Hemimycale columella (crater sponge)	O
Henricia sp. (bloody Henry starfish)	O
Labrus bergylta (ballan wrasse)	O
Maja brachydactyla (spider crab)	O
Nassarius incrassatus (gastropod)	O
Nemertesia ramosa (branched antenna hydroid)	O
Pollachius pollachius (pollack)	O
Polymastia penicillus (chimmey sponge)	O
Spirobranchus (keel worm)	O
Stolonica socialis (orange squirt)	O
Suberites ficus (sponge)	O
Adamsia palliata (cloak anemone)	R
Alcyonium glomeratum (red fingers)	R

Aslia lefevrii (crevice cucumber)	R
Callionymus (dragonet fish)	R
Calliostoma zizyphinum (painted topshell)	R
Cancer pagurus (brown crab)	R
Chondrus crispus (irish moss)	R
Chrysaora hysoscella (compass jellyfish)	R
Corella parallelogramma (gas mantle squirt)	R
Dictyopteris polypodioides (winged weed)	R
Galathea strigosa (squat lobster)	R
Homarus gammarus (lobster)	R
Lophius piscatorius (monkfish or angler fish)	R
Myxicola infundibulum (eyelash worm)	R
Pagurus bernhardus (hermit crab)	R
Pagurus prideaux (cloak anemone hermit crab)	R
Palinurus elephas (crawfish)	R
Peachia cylindrical (clock face anemone)	R
Polycera (nudibranch)	R
Scyliorhinus canicula (lesser spotted dogfish)	R
Symphodus melops (Corkwing wrasse)	R
Tethya citrina (orange ball sponge)	R

Dive 3 - South of Lowland Point – (inside)



The first dive of day 2 (9/07/2017) was south of Lowlands Point on the inside of the main reef. This is a very healthy area of seabed dominated by rocky reefs gullies and with sand patches. The maximum depth dived was 20 meters by the buddy pair who were the furthest East (Sean and Andy). All the other buddy pairs had a maximum of 15 meters approx. and a minimum depth of 8m.

The seabed was rocky with kelp forest *Laminaria hyperborea* and *Saccorhiza polyschides* covering reefs and boulders. Brown algae *Dictyopteris polypodioides* and *Dictyota dichotoma*, and red algae *Delessaria sanguinea* (sea beech) were all common.

One crawfish *Palinurus elephas* (approx. 10cm carapace length) was spotted by Matt, Sally and Jess. This species is a designated feature of the Manacles MCZ whose conservation objective is to recover to favourable condition.

In gullies and overhangs which were shaded faunal turf created a different biotope. Consisting of sponges including *Cliona celata* (boring sponge), *Haliclona viscosa* (volcano sponge) *Amphilectus fucorum* (shredded carrot sponge) and *Hemimycale columella* (crater sponge) along with *Phorbas fictitus* red encrusting sponge. Bryozoans such as *Bugula* and *Crisia* were common and the gelatinous bryozoans *Alcyonidium diaphanum* were recorded. *Pentapora* foliacea (Ross coral or potato crisp bryozoan) was also seen. Devonshire cup corals *Caryophyllia smithii* were found occasionally on overhanging and vertical rock faces. Soft corals *Alcyonium digitatum* (dead mens' fingers) and feather hydroids

Aglaophenia tubulifera and *Halecium haliclinum* were all occasionally found. Grazing among this faunal turf were found the nudibranchs *Cadlina laevis* and *Diaphorodoris alba*.

Pollack and wrasse (rock cooks, goldsinney and ballan) were common among the kelp.

Figure 19 Rock cook wrasse (Centrolabrus exoletus) in the kelp

Figure 20 Sally Sharrock

Figure 21Vertical rock face with dead mens' fingers, sponges, Crisia and Marthasterias glacias

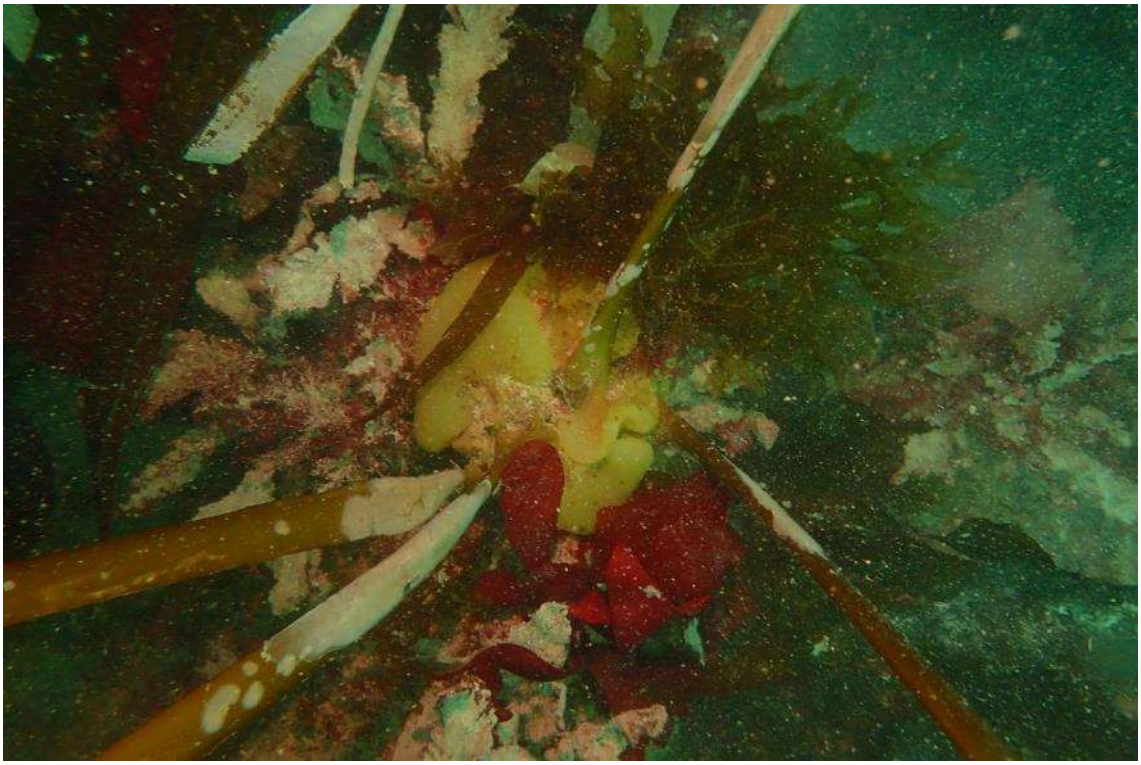


Figure 22 Holdfasts of Sacchoriza polyschides, with red seaweeds and Dictyopteris polypodioides

Figure 23 A crevice, home to Cellepora pumicosa (Pumice bryozoan) and Alcyonidium diaphanum (sea chervil, fleshy bryozoan) as well as Crisia and red seaweeds

Figure 24 Palinurus elephas, Crawfish

Figure 25 Gravel seacucumber Neopendactyla mixta

Figure 26 Cadlina laevis

Figure 27 Diaphorodoris alba

BIOTOPES AND SPECIES RECORDED OFF LOWLAND POINT

IR.MIR.KR.Lhyp.Ft Infralittoral rock , medium energy, *Laminaria hyperborea* – Kelp forest on bedrock and boulders with less tidal streams than above. Dense foliose red seaweeds beneath the canopy with pink encrusting algae on rocks with encrusting sponges. DESIGNATED FEATURE OF MCZ.

CR.HCR.XFa Circalittoral rock, High Energy, bedrock or boulders with strong to moderately strong tidal streams. A diverse range of hydroids bryozoans and sponges forming an often dense mixed animal turf

SS.SCS.CCS Sublittoral coarse sediment, tide swept sand gravel and pebbles beneath 15m DESIGNATED FEATURE OF MCZ.

SPECIES LIST – OFF LOWLAND POINT	ABUNDANCE
SpeciesName	SACFORN
Aglaophenia tubulifera (feather hydroid)	COMMON
Alcyonium digitatum (dead men's finger)	C
Brongniartella byssoides (Brongarts thread weed)	C
Centrolabrus exoletus (rock cook wrasse)	C
Cliona celata (boring sponge)	C
Crisia (white moss claw bryozoan)	C
Cryptopleura ramosa (crinkle weed red)	C
Ctenolabrus rupestris (goldsinney wrasse)	C
Delesseria sanguinea (sea beech)	C
Dictyopteris polypodioides (brown winged weed)	C
Dictyota dichotoma (brown algae)	C
Echinus esculentus (edible urchin)	C
Eunicella verrucosa (pink sea fan)	**C**
Halidrys siliquosa (sea oak brown algae)	C
Hemimycale columella (crater sponge)	C
Heterosiphonia plumosa (feather weed)	C
Holothuria forskali (cotton spinner cucumber)	C
Labrus mixtus (cuckoo wrasse)	C
Laminaria hyperborea (forest kelp)	C
Marthasterias glacialis (spiny starfish)	C
Membranipora membranacea (sea mat)	C
Obelia geniculata (hydroid)	C
Pentapora foliacea (potato crisp bryozoan)	C
Pollachius pollachius (Pollack)	C
Saccorhiza polyschides (furbellows kelp)	C

Spirobranchus (keel worm)	C
Anemonia viridis (snakelocks anemone)	FREQUENT
Labrus bergylta (ballan wrasse)	F
Phycodrys rubens (red sea oak seaweed)	F
Ulva (sea lettuce)	F
Amphilectus fucorum (shredded carrot sponge)	OCCASIONAL
Aslia lefevrii (crevice cucumber)	O
Botryllus schlosseri (star ascidian)	O
Bugula (fluffy small bryozoan)	O
Caryophyllia (Caryophyllia) smithii (Devonshire cup coral)	O
Corynactis viridis (jewel anemone)	O
Electra pilosa (frosted sea mat)	O
Haliclona (Rhizoniera) viscosa (volcano sponge)	O
Henricia sp. (bloody henry starfish)	O
Nemertesia antennina (antenna hydroid)	O
Polymastia boletiformis (yellow hedgehog sponge)	O
Porifera (sponge)	O
Porifera indet crusts (sponge)	O
Symphodus melops (corkwing wrasse)	O
Alcyonium glomeratum (red fingers soft coral)	RARE
Ammodytidae (sand eel)	R
Amphianthus dohrnii (sea fan anemone)	***R***
Calliostoma zizyphinum (painted topshell)	R
Cancer pagurus (brown crab)	R
Chrysaora hysoscella (compass jellyfish)	R
Galathea strigosa (squat lobster)	R
Gobiusculus flavescens (2 spot goby)	R
Goneplax rhomboides JR (box crab)	R
Homarus gammarus (lobster)	R
Neopentadactyla mixta (gravel cucumber)	R
Palinurus elephas (crawfish)	R
Raspailia (Raspailia) ramosa (choclolate finger sponge)	R
Sepia officinalis (cuttlefish)	R
Stolonica socialis (orange squirt)	R
Trisopterus minutus (poor cod)	R
Tritonia nilsodhneri (sea fan nudibranch)	R
	Total taxa 62

Dive 4 – Puskys Rock – summary of findings

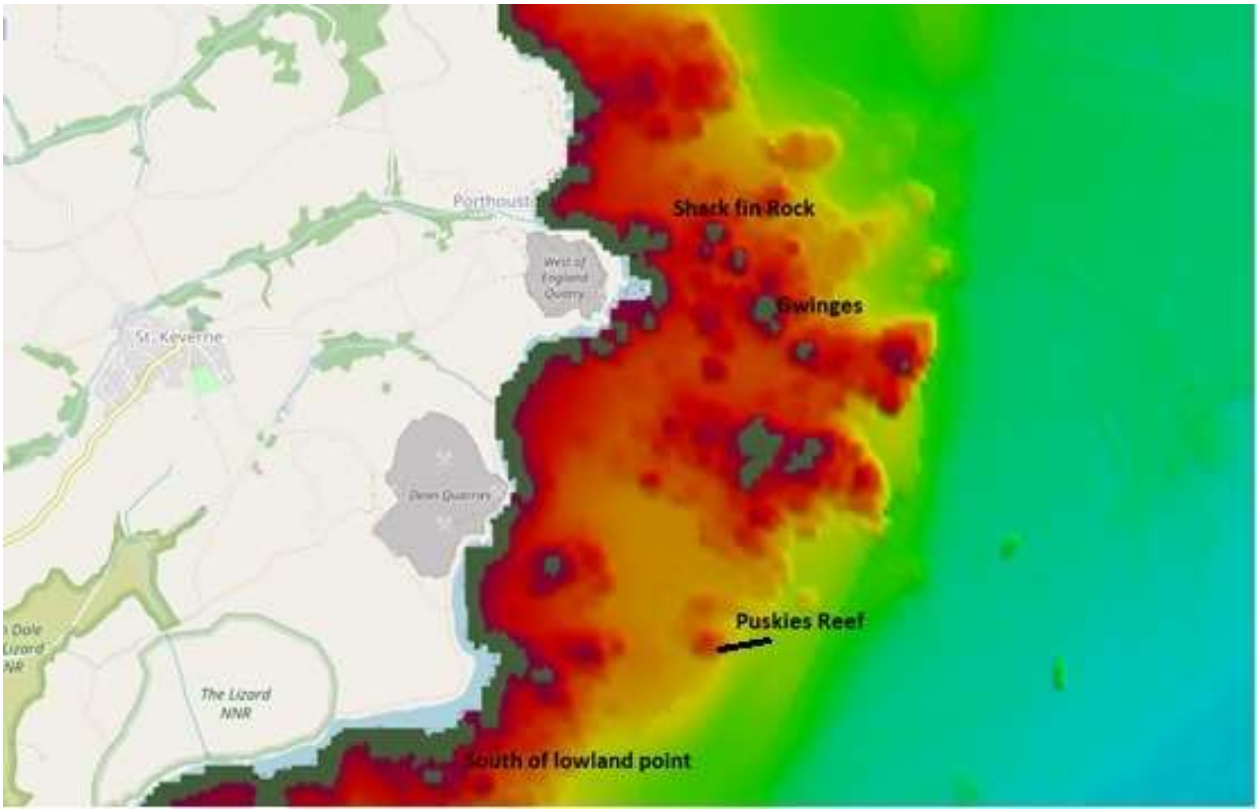


Figure 28 Underwater topography from UK Govt Inspire portal - depth shown by colour – blue equals deep, red equals shallow.

As you can see from Fig 28 Puskys Reef is a rocky pinnacle which lies just to the south of the boundary of the MCZ. All the divers descended via the same shot which was placed on the top of the reef at 50° 02.245'N 005° 03.165'W. The top of the reef was at approx. 16m (bsl). Conditions at the time of the dive were challenging and indicative of the high energy environment and thus a flourishing biological community.

The reef was characterized by vertical walls of high energy circalittoral rock, covered in animal turf both long and short– with Dead mens' fingers, *Eunicella verrucosa* and *Halecium halecinum*. *Cellaria* bryozoan was also common. Sally Sharrock also recorded the monkey puzzle bryozoan *Omalesecosa ramosa*.

There were also large areas dominated by jewel anemones *Corynactis viridis* and *Crisia* bryozoan. One Crawfish (*Palinurus elephas*) was seen (a designated feature of the MCZ) and one lesser spotted cat shark *Scylorhinus caniculata* was found resting on a shelf on the edge of the reef. The Devonshire cup-coral *Carophyllia smithii* was common and the southern cup coral *Carophyllia inornata* was recorded by Jan Ziolo.

Many of the dead mens' fingers Alcyonium digitatum were covered in brown patches – the egg masses of the false cowrie *Simnia patula*.

There were abundant Antenna hydroids – *Nemertesia antennina*, and the red fingers, *Alcyonium glomeratum* were also seen but these less common than the ordinary ones. Pink seafans were recorded as Common and the Pink seafan anemone was recorded by Sally Sharrock as rare (both are designated features of The Manacles MCZ).

At the top of the reef there was some *Dictyopteris polypodioides and Dictyota dichotoma,* brown algae.

Figure 29 Vertical rock face with jewel anemones Corynactis viridis and urchin

Figure 30 Eunicella verrucosa and Halecium, Nemertesia hydroid turf. *Note brown egg masses of Simnia patula on Alcyonium digitatum.*

Figure 31 Red fingers Alcyonium glomeratum

Figure 32 Red fingers with polyps retracted - photo Gary Gubby

Figure 33 Simnia hiscocki on Eunicella verrucosa - Photo Tom Daguerre Hydro Motion Media

Figure 34 Unusual yellow colour morph of Cotton Spinner Holothuria forskali, Photo by Gary Gubby

Figure 35 Lesser spotted catshark Scyliorhinus canicula by Gary Gubby

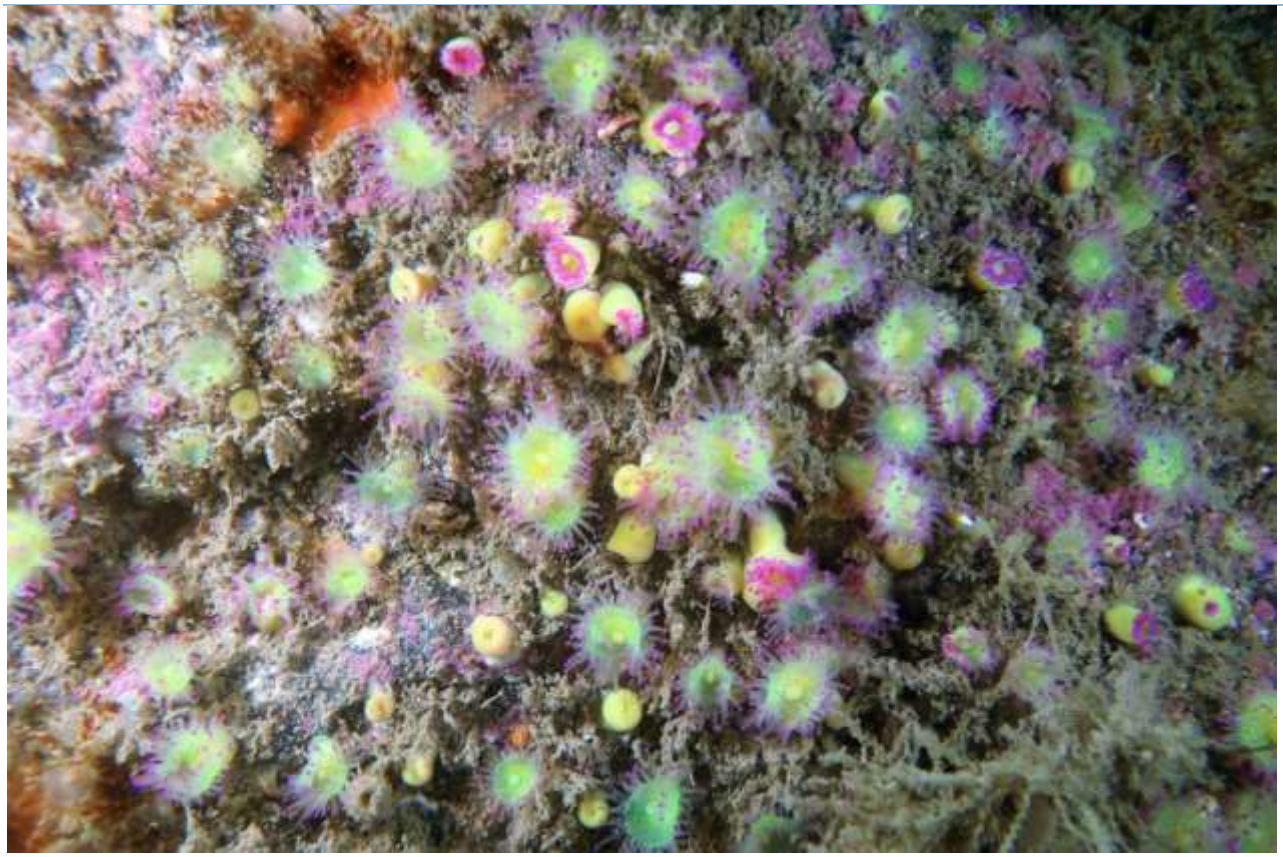


Figure 36 Corynactis viridis and Crisia bryozoan turf- *photo by Gary Gubby*

Biotopes and species recorded at Puskys Reef

CR.HCR.XFa.CvriCri Circalittoral Rock, high energy, steep vertical bedrock / boulders with surfaces dominated by jewel anemone (C*orynactis viridis*) with cup corals, a short bryozoan turf (*Crisia* spp) and a variety of sponges.

CR.HCR.XFa.ByErSp.Eun Circalittoral rock high energy, dominated by pink sea fans with potato crisp bryozoans (*Pentapora foliacea*) red fingers (*Alcyonium glomeratum*) and cup corals , dead mens' fingers, yellow cluster anemones and *Nemertesia* spp often present.

SPECIES LIST – PUSKY'S REEF	ABUNDANCE
SpeciesName	SACFORN
Corynactis viridis (Jewel anemone)	SUPER ABUNDANT

Crisiidae (white claw moss bryozoan)	A
Aglaophenia (feathery hydroid)	COMMON
Aglaophenia tubulifera (feathery hydroid)	C
Alcyonidium diaphanum (sea chervil)	C
Alcyonium digitatum (dead mens' fingers)	C
Alcyonium glomeratum (red fingers)	C
Bryozoa indet crusts	C
Caryophyllia smithii (Devonshire cup coral)	C
Cliona celata (boring sponge)	C
Crisia (white claw moss bryozoan)	C
Ctenolabrus rupestris (goldsinny wrasse)	C
Dictyota dichotoma (brown algae)	C
Eunicella verrucosa (pink sea fan)	C
Halecium halecinum (herring bone hydroid)	C
Labrus mixtus (cuckoo wrasse)	C
Marthasterias glacialis (spiny star)	C
Nemertesia antennina (antennae hydroid)	C
Nemertesia ramosa (branching antennae hydroid)	C
Parasmittina trispinosa(orange encrust bryozoan)	C
Pentapora foliacea(potato chip bryozoan)	C
Symphodus melops (corkwing wrasse)	C
Tritonia nilsodhneri (sea fan nudibranch)	C
Aslia lefevrii (crevice cucumber)	FREQUENT
Clavelina lepadiformis (light bulb sea squirt)	F
Anemonia viridis (snakelocks anemone)	OCCASIONAL
Antedon bifida (feather star)	O
Bugula (bryozoan)	O
Callionymus (dragonet)	O
Centrolabrus exoletus (rock cook)	O
Dendrodoa grossularia (squirt)	O
Dictyopteris polypodioides (brown winged weed)	O
Gymnangium montagui (Indian feather hydroid)	O
Haliclona (Rhizoniera) viscosa (volcano sponge)	O
Hemimycale columella (crater sponge)	O
Henricia sp. (bloody henry star)	O
Heterosiphonia plumosa (feather weed)	O
Holothuria forskali (cotton spinner cucumber)	O
Labrus bergylta (ballan wrasse)	O
Maja brachydactyla (spider crab)	O
Omalosecosa ramulosa (monkey puzzle bryozoan)	O
Spirobranchus (keel worm)	O
Stolonica socialis (orange squirts)	O
Trisopterus minutus (Poor cod)	O

Amphianthus dohrnii (sea fan anemone)	RARE
Amphilectus fucorum (shredded carrot sponge)	R
Calliostoma zizyphinum (painted top shell)	R
Caryophyllia inornata(southern cup coral) JZ	R
Cellariidae (bryozoan)	R
Chrysaora hysoscella (compass jelly)	R
Conger conger (eel)	R
Diaphorodoris alba (nudibranch)	R
Galathea squamifera (squat lobster)	R
Halichondria panicea (bread crumb sponge	R
Palinurus elephas (crawfish)	R
Parablennius gattorugine (tompot blenny)	R
Pawsonia saxicola (sea gherkin cucumber)	R
Phorbas fictitius (red sponge)	R
Prostheceraeus vittatus (candy striped flat worm)	R
Rhodophyta (red alga)	R
Scyliorhinus canicula (lesser spotted cat shark)	R
Simnia (gastropod)	R
Simnia patula (gastropod)	R
Tethya citrina (golfball sponge)	R
	total taxa 65

Summary

Exceptional biodiversity was recorded at every dive site in and around The Manacles MCZ. This adds to the already comprehensive knowledge of the area from fifteen years of surveys carried out through the Seasearch project Wood. C 2016. Notable trends are the recent increase in the abundance of crawfish *Elephas palinurus*. It is hoped that this increase will result in long term recovery of this species in the MCZ as it is a designated feature of the MCZ and the habitat should allow a far greater population to inhabit this area. All of the designated features of the MCZ with the exception of maerl beds and stalked jellyfish were found. The features were all in favourable condition particularly the Pink seafans and pink seafan anemones although quantifiable comparison was not carried out comparing this with past data. The sites surveyed to the south of the border of the MCZ – south of Lowland Point and Puskys Reef are both high in diversity and worthy of protection. There is a strong argument for extending the boundary of the MCZ further south to include these features.

Press release

Vibrant marine life surveyed on Manacles Reef

Thursday 20th July 2017

Henricia starfish by Matt Slater

The Manacles, a treacherous rocky reef that juts out from the Lizard peninsula, famous for the shipwrecks that it has caused, is also designated as a Marine Conservation Zone. Cornwall Wildlife Trust has now carried out a Seasearch Dive expedition to survey its marine life. It was strikingly clear from the very first dive what an amazing underwater area this is.

Twelve highly experienced volunteer divers took part in the surveys, made possible with a grant from marine charitySea-Changers, and carried out from Porthkerris Dive Centre.

They also took in areas just to the south of the Marine Conservation Zone, off Lowland Point and a rocky pinnacle called Pusky's rock, both of which are also home to some stunning marine creatures.

Marine Awareness Officer for Cornwall Wildlife Trust, Matt Slater said,

"On the Manacles huge numbers of filter feeding organisms take advantage of plankton-rich seawater currents that buffet the reef. As a result every surface of the reef is totally covered in colourful anemones, sponges, soft corals, such as pink sea fans, and dead man's fingers, and fluffy coral like animals, known as hydroids".

Matt Slater continued,

"You can see why this area is so famous for its marine life and it is fantastic that this reef has been designated as a Marine Conservation Zone".

Many different species of fish were seen including, pollack, corkwing wrasse and inquisitive cuckoo wrasse, among the UK's most brightly coloured fish species, and they are abundant on this productive reef.

Another highlight was the discovery of a rarely recorded species, the sea fan anemone, *Amphianthus dohrnii*. This species is only ever found growing attached to the impressive soft coral called the pink sea fan which itself is nationally scarce. On the Manacles pink sea fans are common and we noted that on one dive site at least 60% of the sea fans were home to these rare anemones with up to ten anemones per sea fan.

There are abundant kelp forests in the shallower areas of the reef which are home to juvenile pollack and a huge diversity of red seaweeds. Further out the walls of rock are covered in fluorescent jewel anemones in a wide variety of gaudy colours.

A species which was notably present was the Crawfish, also known as the spiny lobster which was seen on most of the dive sites. This is a species which became very rare in our waters in the 1980s and was virtually extinct by the 1990's but now seems to be making a welcome return to our shores.

Matt Slater continues,

"We are calling on divers to record their sightings of this species and to report them to Cornwall Wildlife Trust".

Marine biologist and underwater film maker Thomas Daguerre described the Manacles as one of the most incredible dive sites he had seen and along with dive buddy Andrew Ball they are making a promotional film about the expedition.

For more photos and videos of the survey results go to the Facebook group "Seasearch Cornwall". As part of a national project called Seasearch, Cornwall Wildlife Trust is training divers to help with their conservation work by recording the marine life encountered on dives! There are many more dives and training opportunities coming up this summer including, a seaweed Identification workshop and a Sea squirts Identification workshop.

Find out more atwww.cornwallwildlifetrust.org.uk/seasearch

Ends

Media summary

After each day of diving Facebook posts were put up on our group "Seasearch Cornwall" and these were shared and liked! Participants also shared their best photos in this way. Two press releases were issued to all of Cornwall Wildlife Trust's local contacts and the photos and text featured on many online articles and in newspapers including Newquay Voice and West Briton.
Here are some links to social media posts and articles

http://www.divernet.com/home-diving-news/p320021-crawfish-back-in-cornwallseasearch-team-reports.html

http://www.cornwallwildlifetrust.org.uk/news/2017/07/20/vibrant-marine-life-surveyed-Manacles-reef

https://www.facebook.com/HydroMotionMedia/videos/1679671122337277/

http://www.cornwallwildlifetrust.org.uk/news/2017/05/18/seasearch-uncovers-newquay%E2%80%99s-hidden-underwater-treasures

https://www.piratefm.co.uk/news/latest-news/2292005/photos-divers-uncover-newquays-underwater-treasures/

https://www.facebook.com/groups/443039552386703/permalink/1611912575499389/

https://www.facebook.com/groups/443039552386703/permalink/1612613232095990/

Feedback from Participants

Verbally all the participants were very pleased with their weekend and participants were asked to filled in a feedback questionnaire. All were positive about the event as a good use of Sea-Changers funding and a great opportunity to get involved in active conservation while improving ID skills and having fun diving with like minded people.

Many thanks for an unbelievable weekend, it was well worth the drive down, the diving was fantastic as well as the company. Special thanks to Matt Slater for organising the trip and also Sea-Changers for sponsoring the event, also to Jan Ziolo for been an excellent dive buddy. Looking forward to meeting up with you all again. Seasearch Diver and photographer Gary Gubby.

Areas for further study

We would like to continue to monitor the spread and recolonization of the crawfish *Palinurus elephas* through our waters and this research will provide vital evidence in arguing for practical conservation measures to protect this species which has been overfished in the past. We would also like to continue to monitor this important site which is still potentially threatened by the proposed redevelopment of Dean Quarry. We would also like to further explore dive sites to the south of the Manacles and around the Lizard –Cornwall's most southerly point.

Acnowledgments

I would like to thank our sponsors Sea-Changers whose grant allowed us to subsidise the diving by 50% for our volunteers. Without this the surveys would not have happened!

Thanks also to Mike and Jo Anselmi of Porthkerris Divers for their support and expert guidance and of course skipper Dave Brown. Thanks to Chris Wood for all the work that he has put into previous surveys and for help planning our dives. Thanks to Sally Sharrock for her enthusiasm and amazing knowledge and help with entering all the data collected onto marine recorder. Finally thankyou to all the amazing volunteer divers! We really appreciate all your hard work and the data you have collected is vital for the future protection of our seas. Filling in the forms takes ages and we really appreciate your hard work! Thanks to you all and we look forward to seeing the film produced by Hydro Motion media on the MCZ later this year.