ISSN 2054-7137

BULLETIN of the PORCUPINE MARINE NATURAL HISTORY SOCIETY

Spring 2018 — Number 9

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Porcupine Marine Natural History Society

No. 9 Spring 2018

Hon. Chairman — Susan Chambers
National Museums Scotland
242 West Granton Road
Edinburgh EH5 1JA
07528 519465
chairman@pmnhs.co.uk
s.chambers@nms.ac.uk

Hon. Treasurer — Jon Moore
Ti Cara,
Point Lane,
Cosheston,
Pembroke Dock,
Pembrokeshire SA72 4UN
01646 687946
treasurer@pmnhs.co.uk
jon@ticara.co.uk

Hon. Editor — Vicki Howe
White House,
Penrhos,
Raglan NP15 2LF
07779 278841
editor@pmnhs.co.uk

Newsletter Layout & Design
— Teresa Darbyshire
Department of Natural Sciences,
Amgueddfa Cymru — National Museum Wales,
Cathays Park,
Cardiff CF10 3NP
029 20 573 222
Teresa.Darbyshire@museumwales.ac.uk

Hon. Secretary — Frances Dipper
18 High St
Landbeach
Cambridge CB25 9FT
secretary@pmnhs.co.uk
frances.dipper@sustenergy.co.uk

Hon. Membership Secretary — Roni Robbins
ARTOO Marine Biology Consultants,
Ocean Quay Marina,
Belvidere Road,
Southampton SO14 5QY
membership@pmnhs.co.uk

Hon. Records Convenor — Julia Nunn
Cherry Cottage
11 Ballyhaft Road
Newtownards
Co. Down BT22 2AW
jdn@cherrycottage.myzen.co.uk

Hon. Web-site Officer — Tammy Horton
National Oceanography Centre,
Waterfront Campus,
European Way,
Southampton SO14 3ZH
webofficer@pmnhs.co.uk

Ordinary Council Members

Peter Barfield	peter@seanature.co.uk
Sarah Bowen	seaweedsarah@icloud.com
Anne Bunker	abunker@marineseen.com
Fiona Crouch	ficr@MBA.ac.uk
Becky Hitchin	Becky.Hitchin@jncc.gov.uk
Dawn Powell	dkpowell1@hotmail.com
Fiona Ware	f.ware@nms.ac.uk
Séamus Whyte	sea.whyte@btinternet.com

Porcupine MNHS welcomes new members - scientists, students, divers, naturalists and lay people.
We are an informal society interested in marine natural history and recording particularly in the North Atlantic and 'Porcupine Bight'.
Members receive 2 Bulletins per year which include proceedings from scientific meetings, field visits, observations and news.

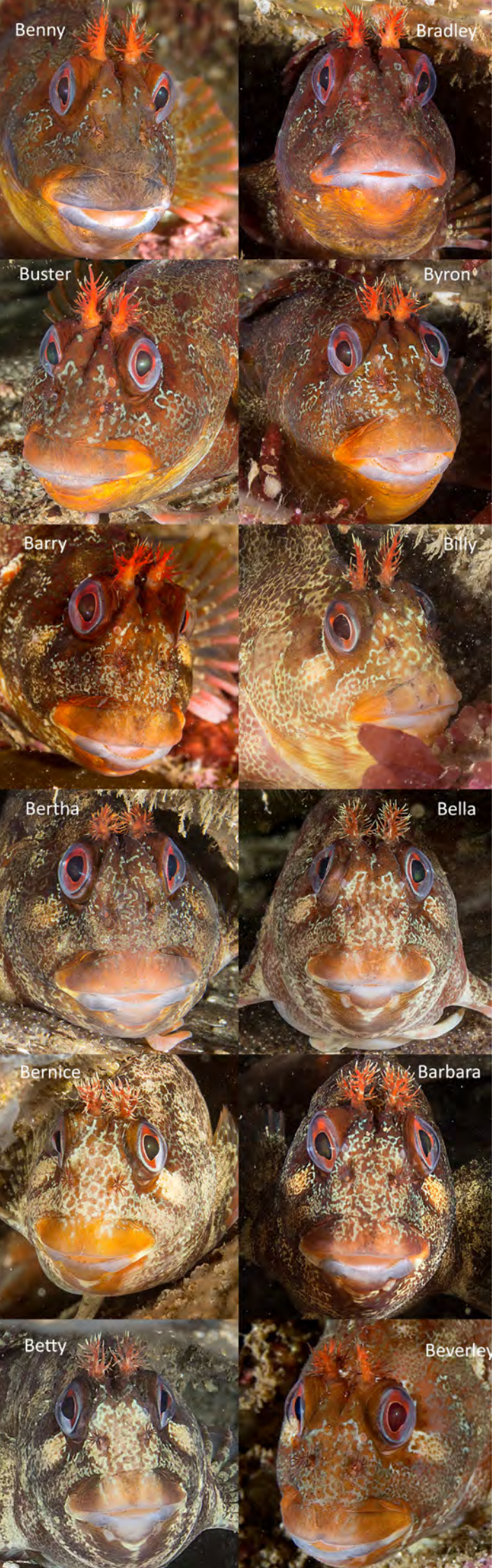
Membership fees: Individual £18 Student £10

www.pmnhs.co.uk

http://www.facebook.com/groups/190053525989

@PorcupineMNHS

Cover Image: Frank Evans, aboard the Princess Royal*, Newcastle University Research Vessel (see Obituary, p.55)*



Editorial

Sometimes it is easy to write the editorial and sometimes my mind is blank and I don't know where to start. This time I have been struggling .... a dismal, cold winter with little opportunity for exploring has left me feeling rather cooped up and 'missing' the sea. Nevertheless an early preview of the Spring Bulletin has inspired and enthused me to plan some ventures to the shoreline and below.

This Bulletin has 'noticing' at its very heart; from an extensive Porcupine field report on the Northward Migration of *Scubahystrix boadeni* (Smith, 1978), to a paper on the rarely reported scale-rayed wrasse, *Acantholabrus palloni* (Risso, 1810), to the lives and times of the underwater photographer's favourite, the Tompot blenny (*Parablennius gattorugine* (Linnaeus, 1758)) to the adventures of a Scottish rock pooling cat called Silverclaw. These articles are what really makes the Bulletin what it is, I hope you enjoy them as much as I did.

Here is what Frank Evans requested for copy in his first editorial in March 1981.

"COPY. The editor hopes that the Newsletter will continue to be serious without being solemn and is anxious to receive contributions in the form of scientific communications, news of Porcupine members, appropriate oceanographic and natural history notes, news of activities of other bodies and any trifles concerning the doings of *Hystrix* spp. (Mam.). Please note that we can now publish illustrations."

Sadly Frank passed away in October last year and I am sure I speak for all members when I say that we will miss him and his unique contributions to the Society. With this in mind I hand the final words of this editorial over to Frank...

"MEMBERSHIP. Our welcoming attitude to new members, together with our outstandingly low annual subscription, makes Porcupine an attractive proposition to interested young people. You can help Porcupine by publicising this fact."

Vicki Howe, Hon. Editor

Rogues' gallery of Tompot blennies (Images: Paul Naylor; see p28 for article on Tompot blenny recognition and behaviour)

ANNOUNCEMENTS

First Welsh National Marine Plan

The Draft Welsh National Marine Plan was released for public consulatation on 7th December 2017. This is the first marine plan for Welsh seas and covers the inshore and offshore areas for which Welsh Ministers are the marine planning authority.

The Plan:

- introduces a framework to support sustainable decision-making for our seas
- sets out our vision and strategic objectives
- presents general policies (economic, environmental and social)
- includes policies specific to the sectors that operate in our seas (aquaculture, aggregates, defence, etc.).

Consultation ends on 29th March 2018 and can be responded to online at: https://consultations.gov.wales/consultations/draft-welsh-national-marine-plan

UK Government launches 25 year Environment Plan

On 11th January 2018, the UK Government released its 25 year Environment Plan entitled: 'A Green Future: Our 25 Year Plan'.

The environment plan sets out the UK Government's goals for improving the environment, within a generation, and leaving it in a better state than it started with. It details how the government will work with communities and businesses to do this, and sets out what it will do over the next 25 years.

The marine environment is brought into the plan in Chapter 5 under the title 'Securing clean, healthy, productive and biologically diverse seas and oceans'. There is also a brief mention of tackling marine litter in the previous chapter on reducing pollution and waste.

The plan can be downloaded at https://www.gov.uk/government/publications/25-year-environment-plan

Notice

Porcupine Summer Fieldtrip 2018

Dorset: May 16th-19th

Porcupine will be visiting Dorset for four days in May (this field trip is in addition to the Ireland Mullet Peninsula field trip in September - see p4) and will be based around Bridport (West Bay), Dorset. Over the four days we will visit a variety of shores within Lyme Bay that have rocky areas. Potential candidates are West side of Portland Bill, Great Ebb (from Eype), East Ebb and Goldencap (from Seatown), Canary Ledges (from Charmouth), Broad ledge and rocky shore west of Lyme Regis. One particular aim is to collect records for *Sabellaria alveolata* (Linnaeus, 1767) along the Lyme Bay shore and we also aim to add to the Dorset Algal Atlas. Charlotte Bolton and Lin Baldock are planning to arrange some Seasearch diving, to add to the Dorset Seasearch database.

Details are currently being finalised and will be posted on the website and sent to members via email. Please contact Frances on secretary@pmnhs.co.uk if you might are interested.

Capturing our Coast Marine Bioblitz events 2018: Yorkshire

This year, a series of seashore bioblitzes are being held along the Yorkshire coast, supported by the Yorkshire Naturalists Union.

Sun 1st April: Saltwick Bay

Sat 19th May: Thornwick Bay, Flamborough

Sat 16th June: Filey Brigg

Sat 4th August: Spurn

Sun 12th August: Sandsend

Sun 9th September: Boggle Hole
Sat 27th October: South Landing, Flamborough

For further information visit: www.ynu.org.uk or contact Paula Lightfoot on p.lightfoot@btinternet.com

15th MBA Postgraduate Conference

Plymouth University
21st-23rd May

The Marine Biological Association Postgraduate Conference returns to Plymouth in 2018, for its 15th anniversary, at the University of Plymouth.

The key aim of the conference is to provide a platform to showcase postgraduate research, in the marine biological and ecological disciplines, in a friendly and encouraging environment.

For information on the conference visit: https://www.plymouth.ac.uk/whats-on/15th-mba-postgraduate-conference-2018

MBA Short Courses

Introduction to British Crab Identification: 15th June

A one-day introduction to the wide diversity of crabs found in British waters. Participants will learn how to identify the crabs they find, on the shore and shallow seas through a combination of interactive talks, viewing specimens and a field trip to a local shore site.

Rocky Shore species identification: 15th July

A basic introduction to the main groups of animals and seaweeds likely to be found on British rocky shores. This introduction will include an explanation of key identification methods, species confusions as well as a more in-depth look at some commonly found species. Through interactive lectures and demonstrations, quizes and laboratory sessions, participants will become familiar with common species and learn how to identify and record rocky shore finds.

Visit http://www.mba.ac.uk/events for further details on all courses and how to book.

National Oceanography Centre Open Day

Southampton: 9th June

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

For one day of the year, NOC open the doors of their Southampton Institute to the public, giving a unique view of the ground breaking science and engineering undertaken across the NOC.

The day is a mix of hands on science, exhibits and talks, with content aimed at all age groups. This is a unique opportunity to get close to their fleet of robotic vehicles and to talk to scientists and engineers about the work that they do.

Registration will be opened a few weeks prior to the event but if you subscribe to their 'Public Events' newsletter you will be notified when registration opens. You can also visit http://noc.ac.uk/education/educational-resources/visits-talks/open-days

8th Unknown Wales 2018
A day to celebrate Welsh wildlife

Amgueddfa Cymru-National Museum Wales, Cardiff, Saturday 27th October

Cynhadledd Cymru Anhysbys
Unknown Wales Conference

This one-day meeting celebrates Welsh wildlife, highlighting the icons as well as the less well-known flora and fauna. The day will showcase new discoveries and new thinking on nature in Wales, whether on land or in the sea, through a series of short talks.

Details of the conference will be uploaded as they are available at: https://www.welshwildlife.org/unknown-wales/unknown-wales-2018/

Mullet peninsula, Co. Mayo, Ireland

Provisional notice of field meeting

Sat 8th – Sat 15th September 2018

Leader: Julia Nunn

Portglash

The Mullet peninsula (a relatively remote area in the NW of Co. Mayo) has been studied since the early 20th century when it was visited by Farran in 1909 (dredging /intertidal). Few records were made in the interim period until the University of Reading (including Peter Hayward) visited for four successive years (1969-1972). Although divers undoubtedly visited before the 1970s, Queen's University Sub-Aqua Club visited occasionally from 1978 onwards, Bernard Picton and Dave Connor being amongst those present. In 1988, the National Museum Wales and the National Museums Northern Ireland expedition recorded mainly intertidal molluscs (Graham Oliver, Alison Trew, Helena Chesney).

Map of the Mullet Peninsula

I started diving there in 1990 (and subsequently every year to 1995) with Dolphins Sub-Aqua Club, mainly the NW peninsula and Eagle Island. The BioMar project surveyed in 1994 (intertidal/sublittoral), followed by a diving survey, in 2008, by the company MERC for the designated SAC. Intertidal areas were surveyed for molluscs by myself and Shelagh Smith in 1997 (blue dots on map above), with only myself returning in 2000. *Ad hoc* visits in 2001 (Leam Lough), 2005 (Inishkeas) and 2014 (Scotchport Bay) were my last visits to the area. A visit is therefore long overdue!

216 species of mollusc have been found on the shores of Mullet (198 living). Necessarily this implies that the same sites will also be very good for a wide range of other marine fauna and flora. The sites encompass a broad range of exposures and habitats, from sand to mud to rock. To my knowledge, the non-native species have not been specifically surveyed here; and other groups are almost certainly under-recorded. Some of the intertidal sites on the peninsula are amongst the best that I know in Ireland including Barranagh Island and Elly Bay (see figures on next page).

The purpose of this field meeting is to introduce these shores (and some brackish loughs) to

Barranagh Island

those interested, and to survey all taxa where there is appropriate experience.

The excursion is for 7 days, Saturday 8th September to Saturday 15th September inclusive. The majority of the fieldwork will be for six days from Sunday 9th to Friday 14th.

It is hoped that a Seasearch diving week will be organised in parallel with the intertidal using a local dive operator. Although there have been professional surveys, and some *ad hoc* club diving, no Seasearch expedition has yet taken place in the area. The diving that I experienced in the NW of the peninsula was excellent. In the event of poor weather, the sheltered east side of the peninsula should provide ample interesting diving (*Zostera* beds etc.). A local dive operator would charge 400 euro per day for a boat to take 12, fills included. For a minimum party of 8, that would be 50 euro per day. There are also shore dives available.

The centre for the activities has not yet been determined, as no accommodation has been booked yet. However, all sites will be within 30mins drive. It is my intention to book at least one large self-catering house which will have plenty of room for participants to work on material, to get help with identifications and to socialise.

A copy of all records generated will be passed to National Parks & Wildlife Service, Dublin, and uploaded to the NBN Atlas. I have consulted NPWS as Mullet is an SAC, and there are no conservation issues with this field meeting for intertidal or diving.

All are welcome to attend for any part of the trip or for the entire week.

For expressions of interest and updates please contact Julia at jdn@cherrycottage.myzen.co.uk.

It is essential that all who wish to attend should make contact as soon as possible, as accommodation and the dive boat must be booked and deposits paid asap.

Elly Bay

PMNHS Field Trip to the Northumberland and Durham Coast (or the Northward Migration of *Scubahystrix boadeni*)

Frances Dipper (general, intertidal & seabed sampling), Sarah Bowen (diving in the Farne Islands) & Paula Lightfoot (Tyne & Wear diving, species list and survey organiser)

Photo credits: Frances Dipper (FD), Paula Lightfoot (PL), John Buckley (JB), David Kipling (DK), Sarah Bowen (SB), Teresa Darbyshire (TD), Lucy Smibert (LS)

Early September 2017 saw, not a trickle, but a 'prickle' of Porcupines converge on the Dove Marine Lab (University of Newcastle) situated on the shore in Cullercoats Bay, just north of the mouth of the Tyne, ready to do what Porcupines do best – record and survey a fascinating variety of shores and sublittoral sites. Under the leadership of Paula Lightfoot, and with her superb organisational skills, the five days of the survey sped past in well-ordered style. This was quite a feat considering the spread of sites was from the Farne Islands in the north, nearly to Hartlepool in the south, a stretch of coast of about 80 miles (in a straight line). Over the five days duration, five well-dispersed shores were visited by 13 different recorders and six Porcupines spent a day seabed sampling with Northumberland IFCA from their new survey and patrol vessel. Seventeen Seasearch divers also carried out dives over three days in the Farne Islands and the Tyne and Wear coast. There were 30 participants in total. Seven of these plus two others attended a Seasearch fish ID course run by Frances Dipper on the Sunday before the true start of the field trip (Figure 1). Low tides were in the morning which allowed at least the shore parties plenty of time to identify specimens in the laboratory in the afternoons. The divers, of course, had a different schedule, and that, coupled with longish car journeys, meant that the shore parties and divers were rarely able to meet to talk about their finds; perhaps the only drawback of tackling sites so far afield.

Fig. 1: Participants from the Fish Identification course, delivered by Frances Dipper just prior to the fieldtrip.

The species data from each day's survey were entered onto an Excel spreadsheet each afternoon/evening by Paula Lightfoot so that almost all the data were collated without the need for any 'chasing' after the survey (a technique highly recommended for any future Porcupine surveys). Specialist lists such as for polychaetes (Teresa Darbyshire), bivalve molluscs (Anna Holmes) and 'small animals' that needed further work after the survey, were sent in to Paula later.

A grand total of 385 species were recorded by the shore searchers, divers and remote sampling group (Tables 1–3). Molluscs, arthropods and annelid worms were the three largest groups.

Shore Surveys

There are a wide range of open coast shores within about an hour's drive of the Dove Lab. To the north are the species-rich shores of the Berwickshire and North Northumberland Coast Special Area of Conservation and the Coquet to St Mary's Marine Conservation Zone. To the south, across the Tyne in County Durham, are some moderately rich shores now recovering from many decades of dumping of coal mine waste on the shore, which ceased over 20 years ago.

The most biodiverse shore in terms of species was Inner Farne and the least diverse was Blackhall Rocks. However, it must be remembered that there were different numbers of recorders at the different sites. Also, the rather long lists of worms and small molluscs at some sites are largely due to the expert attention and collecting strategies of Teresa and Anna. Small arthropods had the undivided attention of Adam Jenkins and so were also well recorded. Intertidal fish were well-covered by Doug Herdson and Frances Dipper, but as on any such survey, more species would have been found with more time/recorders, the use

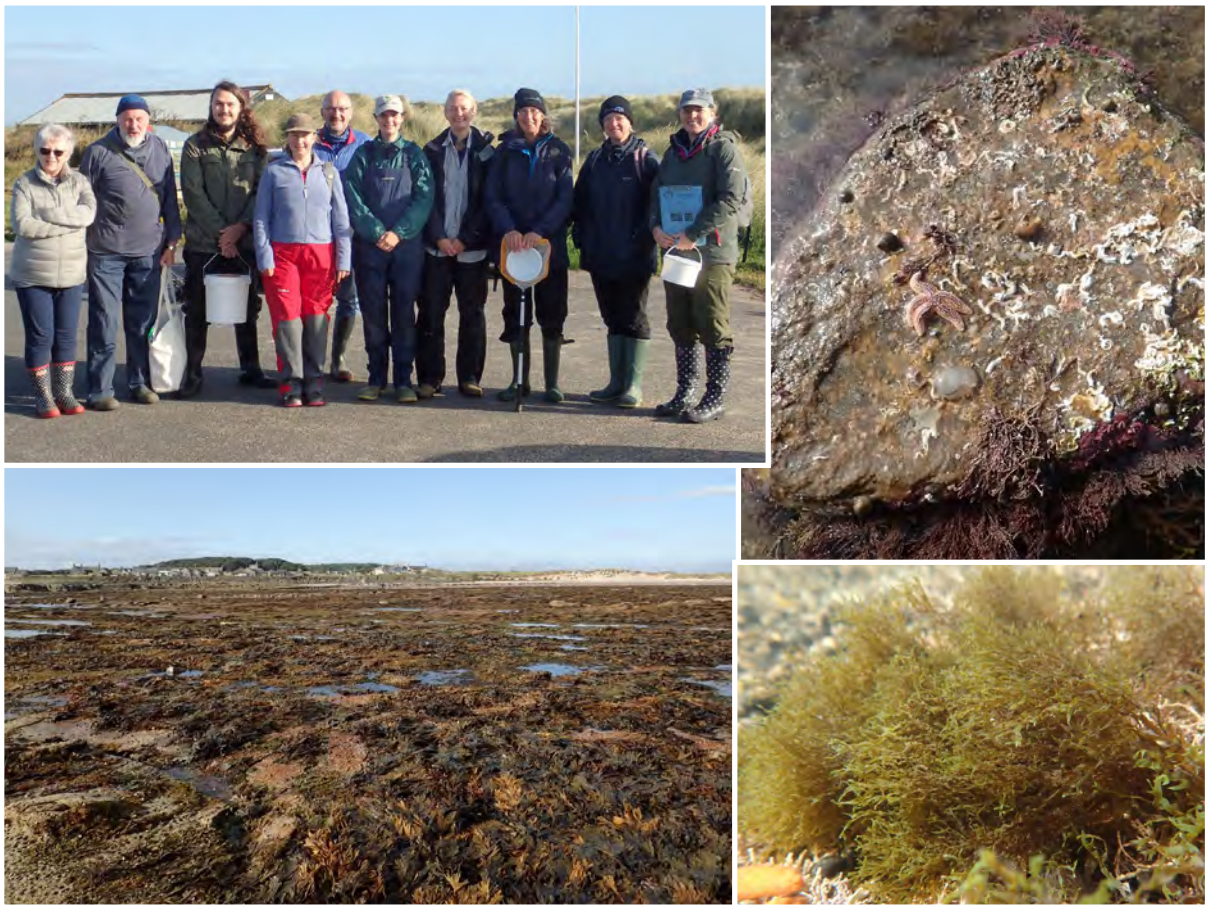


Fig. 2: Cresswell shore (clockwise from top left): team, under-boulder with Corella eumyota, *fine form of* Dictyota dichotoma, *shore from low tide. (All photos: FD)*

of fish traps and other techniques, such as taking along small children.

Cresswell, Northumberland (Figure 2)
06/09/2017 NZ295939

Cresswell is an exposed and very diverse shore situated at the southern end of Druridge Bay. This was an excellent place to start the survey with extensive areas of low-lying bedrock, angular boulders and shallow rock pools to explore. The shore is backed by sand and sand dunes with easy access directly from a quiet coastal road, though the walk down to the lower shore level is a long, slippery trek in wellies. An extensive kelp bed of *Laminaria digitata* with *Alaria esculenta*, was exposed at the sublittoral fringe on a substratum of relatively smooth bedrock interspersed with small gullies. Mid-shore bedrock platforms were dominated by fucoid seaweeds with barnacles covering the tops of any slightly raised areas. Rock pools provided a foothold for coral weed, *Corallina officinalis,* and a variety of other foliose seaweeds. Under boulder communities were relatively diverse, with plenty of small crabs, especially porecelain crabs *Porcellana platycheles*, amphipods, brittlestars, the squat lobster *Galathea squamifera,* encrusting bryozoans and tube worms. The non-native ascidian, *Corella eumyota,* was also present. The upper shore was mainly a jumble of barnacle-covered boulders. A particularly finely branched version of brown fan weed, *Dictyota dichotoma,* led to later discussion (on our Facebook© group) over whether this was actually *Dictyota spiralis*. Although it was later confirmed (by Francis Bunker) that it was not that species, it did look remarkably similar to the photograph of *D. spiralis* in the 2nd edition of the Seasearch seaweed guide (at least to non-seaweed experts) illustrating the importance of careful checks and the retention of voucher specimens (which we had) as well as photographs.

A very pleasant coffee and sandwich sitting in the sun (yes!) in the nearby beach café completed a very satisfactory first day of survey.

Featherbed Rocks, Seaham, Co. Durham (Figure 3) 07/09/2017 NZ431497

Seaham is a limestone shore and Featherbed Rocks has an interesting topography of surge gullies and overhangs. It is 'in town' and lies just north of Seaham harbour. Access is down an easy stairway from the road; easy on the way down anyway. The rocks run almost to the top of the shore with 50 m or so of sand and pebbles and some shore defence boulders, between them and the sandstone cliffs. The bedrock platform is heavily eroded and dissected, with numerous pits, depressions and gullies, making progress down the shore slow. The rock in the middle and lower shore had a thick cover of fucoid seaweeds. However, the projecting rock and tops of boulders were almost bare. A closer look showed that this was the result of limpet grazing with numerous live *Patella vulgata*, plus feeding trails and empty limpet scars. Sides and tops of rocks adjacent to sand-filled depressions had a thick cover of the sand-binding seaweed, *Rhodothamniella floridula*. On the lower shore small patches of various sponges were tucked away in crevices and overhangs. Green seaweeds (*Ulva* spp.) were common on the upper shore where freshwater runoff is likely from the cliffs.

Inner Farne 08/09/2017 NU219360 (Figure 4)

A visit to the Farne Islands was the highlight of the field trip. After an early start, Porcupines converged on the seawall at Seahouses Harbour for a 9 am boat trip. The Seasearch divers too were diving in the area but not until the afternoon (see report below). After finding our guides and hosts from the National Trust (NT) and paying our entry fees, the boat set off with a cheerful crowd of eight Porcupines all looking forward to surveying a shore off the beaten track. The data from the survey has been passed to the NT and will hopefully be useful, especially if return visits are made in the future. It should provide a guide and baseline for the NT volunteers and staff to carry out their own surveys. After donning high visibility jackets, the Porcupines spread out along the shore adjacent to the landing jetty, to 'boldly survey where few have surveyed before'!

The shore consisted predominantly of small boulders, and was separated from an adjacent small island by a narrow channel through which the tide runs. It is therefore exposed to fairly strong tidal currents but is relatively sheltered

Fig. 3: Featherbed Rocks (clockwise from top left): team (JB), sponge overhang (PL), team in action (PL), shore and Rhodothamniella *covered rocks (FD).*

Fig. 4: Inner Farne shore (clockwise from top left): team, butterfish Pholis gunnellus, *shore, under boulder fauna. (Photos: FD)*

from wave action. This, and the undisturbed nature of the shore, results in a very rich under boulder fauna, which was avidly explored until the tide turned and hunger necessitated a stop for lunch. Undersides of almost all the lower and middle shore boulders were encrusted by sponges (*Halichondria, Halisarca, Haliclona*), crust and tuft bryozoans, hydroids and colonial sea squirts. Seaweeds on the boulder tops were heavily encrusted with the hydroid *Dynamena pumila* and the bryozoan *Electra pilosa*. Hidden between and under the rocks were green sea urchins, *Psammechinus miliaris,* and intertidal common urchins, *Echinus esculentus*, an unusual occurrence. Shore fish included sea stickleback, *Spinachia spinachia,* and large butterfish, *Pholis gunnellus*. Teresa and Anna again produced (even longer) lists of worms and molluscs.

At this time of the year, most of the nesting seabirds for which the island is famous, had long gone. However, with time to spare before the last boat back to the mainland, most people stayed on for an easy walk around the island following the boardwalks. Deserted puffin burrows riddled the ground and a peer over the cliffs showed up a few shags as well as the obligatory seagulls. Sea campion still adorned the edges of the boardwalk and a few pairs of charming eider ducks, bobbing near the jetty, entertained the last stragglers waiting for their ride home. A pair of nesting swallows flew in and out of the little chapel on the island, totally at ease with the human visitors.

Howdiemont Sands & Sugar Sands, Longhoughton (Figure 5)
09/09/2017 NU262160

Accessing this beautiful and remote shore was an interesting experience as, after passing through the village of Longhoughton, it involved driving down a long winding lane, opening the gate, paying 50p into an honesty box and then driving through a farmer's yard! On the way back, a large farm trailer with a (correctly) relaxed attitude to time only added to the fun of this site.

Fig. 5: Howdiemont Sands (clockwise from top left): view over shore (FD), nudibranch Hermaea bifida *(PL), shore vista (FD), stalked jellyfish* Calvadosis cruxmelitensis *(PL)*

Two beautiful bays of sand, Howdiemont and Sugar Sands, are separated by, and flanked by extensive areas of rocky ridges. The rocky area between the sands formed the focus for this part of the survey, but the sands provided a chance for Doug to get out his famous push net. A tiny and charming squid, *Sepiola,* swept up in the net was the centre of attention, but soon disappeared back into the sand once released along with some juvenile flatfish (flounder and plaice). Charlotte and Paula of course, took to the water, snorkelling along the edges of the rocky areas. The highlights of their dip were a good population of the stalked jellyfish *Calvadosia cruxmelitensis* and a fascinating little sacoglossan sea slug, *Hermaea bifida*. The NBN Atlas had no records of either species for this stretch of coast.

Previous sites had seemed like long scrambles, but were nothing compared to the acres of boulders at this site. Small to medium-sized boulders make up most of the rocky area, looking as though some giant in a temper, had thrown down handfuls of pebbles. Near low water the substratum changed to bedrock ridges, though still with plenty of boulders strewn around. This lower shore and sublittoral fringe area was, as might be expected, the richest in terms of species diversity. There was an interesting sward of red foliose seaweeds, especially winged weed *Membranoptera alata,* fern weeds *Osmundea* spp. and false carrageen *Mastocarpus stellatus*. Sides of the rocks were covered by *Rhodothamniella*, again as might be expected with plenty of sand surrounding the rocky areas. Swathes of thong weed, *Himanthalia elongata,* draped the rocky ridges with a kelp, *L. digitata,* forest just visible beyond.

The middle shore boulder tops were either bare or covered in barnacles, with their usual following of hungry dog whelks, *Nucella lapillus*, plus scattered limpets. Extensive shallow rock pools, floored with small rocks and sandy patches, were not particularly species rich and very few rock pool fish made themselves obvious, in spite of careful searching.

Blackhall Rocks (Figure 6)
10/09/2017 NZ471393

The final shore survey was spent south of Newcastle, in Co. Durham. Blackhall Rocks lies at the base of limestone cliffs, in an area formerly heavily polluted by coal mining, but now recovering well, and defined as Heritage Coast. Evidence of its past history showed up in the form of 'black sand' patches, consisting of tiny grains of coal. The shore is accessed after a delightful walk along a defined path from the small car park and then down the cliffs via a long set of gentle steps. The cliffs are riddled with caves, though these are more or less above high tide mark and did not have much marine biological interest.

The rocky shore starts some distance down the beach after a wide upper shore area of mixed sand, stones and rocky debris from previous mining activities. After an initial upper area of small boulders, rocks and sand, the rest of the rocky shore consisted of extremely dissected bedrock, which at the lower shore, turned into very deep, mud-scoured gullies. The three Porcupines who tackled this shore soon disappeared with only the occasional head popping up over person-high walls to see where they were and to confer on their finds. The shore had a blanket cover of fucoid seaweeds, predominantly serrated wrack, *Fucus serratus*. Foliose seaweeds were sparse with patches of carrageen, *Chondrus crispus*, banded pincer weed, *Ceramium* and siphon weeds, *Polysiphonia*. There were dense patches of *Mytilus edulis* spat under the seaweed cover, a feature of several other sites as well. The vertical sides of the gullies were covered in mud, trapped by filamentous weeds and probably bryozoans, but this was not looked at in detail. Beadlet anemones, *Actinia equina,* were abundant on the walls and dahlia anemones, *Urticina felina,* lurked in deep horizontal crevices. Cleaner areas higher up the gully walls had a cover of barnacles and mussel spat, limpets and marauding dog whelks. Relatively deep, steep-sided rock pools at the mid-shore level had a limited diversity but a good number of fish especially adult and juvenile long spined sea scorpion, *Taurulus bubalis*, along with five-bearded rockling, *Ciliata mustela*, and their totally different 'mackerel midge' juveniles. Tiny 0-group shannies, *Lipophrys pholis,* were also common.

Fig. 6: Blackhall Rocks (clockwise from top left): views of Blackhall Rocks shore, beadlet anemone Actinia equina *on mud-covered gulley wall (Photos: FD)*

Species	Authority	Identifier	Cresswell	Featherbed Rocks	Inner Farne	Howdiemont Sands	Blackhall Rocks
PORIFERA							
Leuconia nivea	(Grant, 1826)			?		?	
Grantia compressa	(Fabricius, 1780)			C			
Leucosolenia sp.	Bowerbank, 1864			O			
Sycon ciliatum	(Fabricius, 1780)			O	O		
Halisarca dujardinii	Johnston, 1842		O		O	O	
Halichondria (Halichondria) panicea	(Pallas, 1766)		O	F	F	C	
Haliclona (Haliclona) oculata	(Linnaeus, 1759)			O	O		
Amphilectus fucorum	(Esper, 1794)			O			
Oscarella sp.	Vosmaer, 1884		R				
CNIDARIA							
Actinia equina	(Linnaeus, 1758)		O	O	O	O	C
Urticina felina	(Linnaeus, 1761)		R	O			R
Sagartia elegans	(Dalyell, 1848)				F		
Sagartia troglodytes	(Price in Johnston, 1847)				O		
Alcyonium digitatum	Linnaeus, 1758				R		
Tubularia indivisa	Linnaeus, 1758			O			
Obelia geniculata	(Linnaeus, 1758)		R		O		
Dynamena pumila	(Linnaeus, 1758)		O	O	C		O
NEMERTEA							
Lineus longissimus	(Gunnerus, 1770)		O				
ANNELIDA							
Gattyana cirrhosa	(Pallas, 1766)	TD	P				
Harmothoe extenuata	(Grube, 1840)	TD			P	P	
Harmothoe imbricata	(Linnaeus, 1767)	TD	P		P	P	
Harmothoe impar	(Johnston, 1839)	TD	P				
Harmothoe pagenstecheri	Michaelsen, 1896	TD	P				
Pholoe baltica	Örsted, 1843	TD	P				
Pholoe inornata	Johnston, 1839	TD	P			P	
Sthenelais boa	(Johnston, 1833)	TD	P		P		
Eteone longa	(Fabricius, 1780)	TD			P		
Eulalia sp.	Savigny, 1822			O		R	
Eulalia clavigera	(Audouin & Milne Edwards, 1833)	TD	P		P	P	
Eulalia bilineata	(Johnston, 1840)	TD	P				
Eumida bahusiensis	Bergstrom, 1914	TD	P				
Phyllodoce maculata	(Linnaeus, 1767)	TD	P			P	
Phyllodoce mucosa	Örsted, 1843	TD			P	P	
Glycera lapidum	Quatrefages, 1866	TD			P		
Psamathe fusca	Johnston, 1836	TD	P		P		
Parapionosyllis minuta	(Pierantoni, 1903)	TD	P				
Nereis pelagica	Linnaeus, 1758	TD	P		P	P	
Perinereis cultrifera	(Grube, 1840)	TD	P			P	
Nephtys cirrosa	Ehlers, 1868	TD	P			P	
Lumbrineris cingulata	Ehlers, 1897	TD			P		
Protodorvillea kefersteini	(McIntosh, 1869)	TD			P		
Aonides oxycephala	(Sars, 1862)	TD	P		P		
Boccardia proboscidea	Hartman, 1940	TD	P				
Dipolydora flava	(Claparède, 1870)	TD	P				
Malacoceros sp.	Quatrefages, 1843	TD	P		P, 2 spp.	P	
Polydora sp.	Bosc, 1802	TD				P	
Polydora cornuta	Bosc, 1802	TD	P				
Pygospio elegans	Claparède, 1863	TD				P	
Scolelepis (Scolelepis) squamata	(O.F. Muller, 1806)	TD	P				
Cirratulus cirratus	(O. F. Müller, 1776)	TD	6				
Cirriformia tentaculata	(Montagu, 1808)	TD	P		P		
Capitella capitata	(Fabricius, 1780)	TD				P	
Arenicola defodiens	Cadman & Nelson-Smith, 1993	TD	P casts		P casts	P	
Arenicola marina	(Linnaeus, 1758)	TD	P casts		P casts	P	

Table 1. Table of species recorded from intertidal sites. (R=rare, O=occasional, F=frequent, C=common, A=abundant, P=present, TD=Teresa Darbyshire, AJ=Adam Jenkins, AH=Anna Holmes)

Species	Authority	Identifier	Cresswell	Featherbed Rocks	Inner Farne	Howdiemont Sands	Blackhall Rocks
Arenicolides ecaudata	(Johnston, 1835)	TD			P		
Nicomache personata	Johnson, 1901	TD	P			P	
Sabellaria sp.	Lamarck, 1818			O			
Sabellaria spinulosa	(Leuckart, 1849)	TD	P			P	
Lanice conchilega	(Pallas, 1766)			O		O	
Fabricia stellaris	(Müller, 1774)	TD				P	
Spirobranchus sp.	Blainville, 1818			F	C	F	O
Spirobranchus triqueter	(Linnaeus, 1758)		P				
Spirorbinae	Chamberlin, 1919		O		C	C	
ARTHROPODA							
Pycnogonida	Latreille, 1810				F		
Achelia echinata	Hodge, 1864	AJ				P	
Ammothella longipes	(Hodge, 1864)	AJ	P			P	P
Phoxichilidium femoratum	(Rathke, 1799)	AJ	P			P	P
Dexamine spinosa	(Montagu, 1813)	AJ	P				
Gammarellus angulosus	(Rathke, 1843)	AJ	P				
Gammarellus homari	(Fabricius, 1779)	AJ					P
Gammarus locusta	(Linnaeus, 1758)	AJ	P				P
Jassa pusilla	(Sars, 1894)	AJ	P				
Stenothoe monoculoides	(Montagu, 1815)	AJ				P	
Bodotria scorpioides	(Montagu, 1804)	AJ	P			P	
Decapoda larvae	Latreille, 1802	AJ	P			P	
Cancer pagurus	Linnaeus, 1758		F juvs.	O	O	O	O juvs
Crangon crangon	(Linnaeus, 1758)		O				R
Galathea squamifera	Leach, 1814		O		R	O	
Eualus gaimardii gaimardii	(H. Milne Edwards, 1837 [in Milne Edwards, 1834-1840])	AJ					P
Eualus occultus	(Lebour, 1936)	AJ					P
Eualus pusiolus	(Krøyer, 1841)	AJ	P				
Hippolyte varians	Leach, 1814 [in Leach, 1813-1814]	AJ	P				P
Paguridae	Latreille, 1802				R		
Palaemon longirostris	H. Milne Edwards, 1837 [in H. Milne Edwards, 1834-1840]	AJ				P	
Necora puber	(Linnaeus, 1767)			O	O	R	
Pisidia longicornis	(Linnaeus, 1767)		C		F	O	
Porcellana platycheles	(Pennant, 1777)		O			R	
Carcinus maenas	(Linnaeus, 1758)		F	O	O	R	
Cryptoniscidae	Kossmann, 1880	AJ	P				
Cleantis prismatica	(Risso, 1826)	AJ	P			P	
Idotea balthica	(Pallas, 1772)	AJ	P			P	P
Idotea emarginata	(Fabricius, 1793)	AJ				P	
Idotea granulosa	Rathke, 1843	AJ	O	O	O	P	
Jaera (Jaera) albifrons	Leach, 1814	AJ				P	
Janira maculosa	Leach, 1814	AJ	P				
Haplostylus normani	(G.O. Sars, 1877)	AJ					P
Leptomysis lingvura	(G.O. Sars, 1866)	AJ					P
Schistomysis ornata	(G. O. Sars, 1864)	AJ					P
Siriella jaltensis	Czerniavsky, 1868	AJ	P				
Semibalanus balanoides	(Linnaeus, 1767)		A	C	A	A	O-F
Austrominius modestus	(Darwin, 1854)			R			
Balanus balanus	(Linnaeus, 1758)				O		
Balanus crenatus	Bruguière, 1789	AJ					P
Verruca stroemia	(O.F. Müller, 1776)			O		R	
MOLLUSCA							
Hiatella arctica	(Linnaeus, 1767)	AH	R		P		R
Hiatella rugosa	(Linnaeus, 1767)			O			
Mya arenaria	Linnaeus, 1758	AH					P
Mytilus edulis	Linnaeus, 1758		F spat	F spat	O spat	O spat	C-A spat
Anomiidae	Rafinesque, 1815		C	F	F	F	

Table 1 (cont.): Table of species recorded from intertidal sites. (R=rare, O=occasional, F=frequent, C=common, A=abundant, P=present, TD=Teresa Darbyshire, AJ=Adam Jenkins, AH=Anna Holmes)

Species	Authority	Identifier	Cresswell	Featherbed Rocks	Inner Farne	Howdiemont Sands	Blackhall Rocks
Venerupis corrugata	(Gmelin, 1791)	AH					R
Tectura virginea	(O. F. Müller, 1776)		O		R		
Patella sp.	Linnaeus, 1758			C	C	C	O
Patella pellucida	Linnaeus, 1758		C	O	F		
Steromphala cineraria	(Linnaeus, 1758)		C	O	O	O	
Aplysia punctata	(Cuvier, 1803)				P eggs		
Lacuna pallidula	(da Costa, 1778)		O		O		
Lacuna vincta	(Montagu, 1803)		F	F	F	F	
Littorina fabalis/obtusata			O		O		
Littorina littorea	(Linnaeus, 1758)		A	F	C	C	O
Littorina saxatilis	(Olivi, 1792)				F		
Rissoa parva	(da Costa, 1778)			F	F		
Trivia arctica	(Pulteney, 1799)				R		
Lamellaria sp.	Montagu, 1816				O		
Buccinum undatum	Linnaeus, 1758		F		R	F	
Nucella lapillus	(Linnaeus, 1758)		A + eggs	F	F	C & eggs	O-F
Tritia incrassata	(Strøm, 1768)		C		O		
Geitodoris planata/Archidoris	(Alder & Hancock, 1846)		?FD photo				
Jorunna tomentosa	(Cuvier, 1804)		R				
Eubranchus farrani	(Alder & Hancock, 1844)				O		
Goniodoris nodosa	(Montagu, 1808)			O	O		
Acanthodoris pilosa	(Abildgaard in Müller, 1789)		R				
Onchidoris bilamellata	(Linnaeus, 1767)			R			
Onchidoris muricata	(O. F. Müller, 1776)				R		
Limacia clavigera	(O. F. Müller, 1776)		R		O		
Polycera quadrilineata	(O. F. Müller, 1776)		R	O	O		R
Berthella plumula	(Montagu, 1803)					O	
Acanthochitona crinita	(Pennant, 1777)		R				
Lepidochitona cinerea	(Linnaeus, 1767)		O	O	O	O	
Boreochiton ruber	(Linnaeus, 1767)		R				
BRYOZOA							
Bryozoa					C		
Schizomavella (schizomavella) linearis	(Hassall, 1841)		R		R		
Scrupocellaria sp.	Van Beneden, 1845				F		
Electra pilosa	(Linnaeus, 1767)		O	O	F		F
Membranipora membranacea	(Linnaeus, 1767)		F		F		
Alcyonidium hirsutum	(Fleming, 1828)				O		
Flustrellidra hispida	(O. Fabricius, 1780)				R		
Crisia sp.	Lamouroux, 1812				F		
ECHINODERMATA							
Asterias rubens	Linnaeus, 1758		O		O		
Echinus esculentus	Linnaeus, 1758				R	R	
Psammechinus miliaris	(P.L.S. Müller, 1771)		O		R		
Amphipholis squamata	(Delle Chiaje, 1828)				O	O	
Ophiothrix fragilis	(Abildgaard in O.F. Müller, 1789)		C		R	O	
TUNICATA							
Didemnidae	Giard, 1872				O	O	
Aplidium turbinatum	(Savigny, 1816)		O			R	
Ciona intestinalis	(Linnaeus, 1767)		O				
Corella eumyota	Traustedt, 1882		O	O		F	
Botrylloides leachii	(Savigny, 1816)		O			O	
Botryllus schlosseri	(Pallas, 1766)				O	O	
PISCES							
Ciliata sp.	Couch, 1832					R	
Ciliata mustela	(Linnaeus, 1758)						O
Spinachia spinachia	(Linnaeus, 1758)				R		
Ammodytidae	Bonaparte, 1835				R		

Table 1 (cont.): Table of species recorded from intertidal sites. (R=rare, O=occasional, F=frequent, C=common, A=abundant, P=present, TD=Teresa Darbyshire, AJ=Adam Jenkins, AH=Anna Holmes)

Species	Authority	Identifier	Cresswell	Featherbed Rocks	Inner Farne	Howdiemont Sands	Blackhall Rocks
Lipophrys pholis	(Linnaeus, 1758)		C		R		0 juvs
Gobiusculus flavescens	(Fabricius, 1779)		R juv.				
Pomatoschistus	Gill, 1863		C				
Labrus bergylta	Ascanius, 1767		R juv.				
Pholis gunnellus	(Linnaeus, 1758)			R	0		
Taurulus bubalis	(Euphrasen, 1786)		0		R		F + juvs
Liparis sp.	Scopoli, 1777		R				R
OCHROPHYTA							
Dictyota dichotoma	(Hudson) J.V.Lamouroux, 1809		C				
Leathesia marina	(Lyngbye) Decaisne, 1842		F		0	R	
Ascophyllum nodosum	(Linnaeus) Le Jolis, 1863				C	F	
Fucus serratus	Linnaeus, 1753		A	C	C	A	A
Fucus spiralis	Linnaeus, 1753				C	C	
Fucus vesiculosus	Linnaeus, 1753		C	C	C	C	F
Pelvetia canaliculata	(Linnaeus) Decaisne & Thuret, 1845				C		
Himanthalia elongata	(Linnaeus) S.F.Gray, 1821					R	
Halidrys siliquosa	(Linnaeus) Lyngbye, 1819		C			F	
Alaria esculenta	(Linnaeus) Greville, 1830		R		F		
Chorda filum	(Linnaeus) Stackhouse, 1797					R	
Laminaria digitata	(Hudson) J.V.Lamouroux, 1813		C	F	C	A	
Laminaria hyperborea	(Gunnerus) Foslie, 1884		0	R	C	0	
Saccharina latissima	(Linnaeus) C.E.Lane, C.Mayes, Druehl & G.W.Saunders, 2006				F	0	
Ralfsia verrucosa	(Areschoug) Areschoug, 1845				0	F	
Cladostephus spongiosus	(Hudson) C.Agardh, 1817		0	0	0	0	0
Saccorhiza polyschides	(Lightfoot) Batters, 1902				R		
CHLOROPHYTA							
Chaetomorpha melagonium	(F.Weber & Mohr) Kützing, 1845		R		0		
Cladophora rupestris	(Linnaeus) Kützing, 1843		F		0	F	
Ulva sp.	Linnaeus, 1753		F	C	F		
Ulva intestinalis							F
Ulva lactuca	Linnaeus, 1753			0	0	F	R
RHODOPHYTA							
Porphyra sp.	C.Agardh, 1824			0	0		F
Ahnfeltia plicata	(Hudson) E.M.Fries, 1836		R		R		
Ceramium sp.	Roth, 1797		0	P	R	F	0
Membranoptera alata	(Hudson) Stackhouse, 1809		0		F	F	
Phycodrys rubens	(Linnaeus) Batters, 1902				R		
Osmundea hybrida	(A.P.de Candolle) K.W.Nam, 1994			R			
Osmundea pinnatifida	(Hudson) Stackhouse, 1809		F	0	0	C	
Polysiphonia	Greville, 1823				F		F
Vertebrata lanosa	(Linnaeus) T.A.Christensen, 1967				F	F	
Corallinaceae	Lamouroux, 1812		C	F	F	C	
Corallina officinalis	Linnaeus, 1758		C	0	0	C	
Dilsea carnosa	(Schmidel) Kuntze, 1898					R	
Dumontia contorta	(S.G.Gmelin) Ruprecht, 1850		0				
Furcellaria lumbricalis	(Hudson) J.V.Lamouroux, 1813					0	
Chondrus crispus	Stackhouse, 1797		F	0	0	F	0
Mastocarpus stellatus	(Stackhouse) Guiry, 1984		F	0	F	C	
Palmaria palmata	(Linnaeus) Weber & Mohr, 1805		F	F	F		
Rhodothamniella floridula	(Dillwyn) Feldmann, 1978		0	F	0	A	
Lomentaria articulata	(Hudson) Lyngbye, 1819		0	0	0		
LICHENS							
Verrucaria maura	Wahlenberg, 1803				A		
Verrucaria mucosa	Wahlenberg, 1803				F		
Caloplaca sp.	Th. Fr., 1860				F		
Xanthoria parietina	(L.) Beltr., 1858				C		

Table 1 (cont.): Table of species recorded from intertidal sites. (R=rare, 0=occasional, F=frequent, C=common, A=abundant, P=present, TD=Teresa Darbyshire, AJ=Adam Jenkins, AH=Anna Holmes)

Farne Islands Diving (Figure 7)

The sublittoral element of the fieldtrip was represented by three days of diving; two in the Farne Islands and one day from Newcastle-upon-Tyne. On the Friday, nine divers assembled at Seahouses in time to witness a previous wave of recreational divers being disgorged and an exceptionally efficient turnaround by skipper Andrew. We were diving with 'Sovereign Diving' on *Serenity II*, a roomy and comfortable catamaran. Conditions were slightly choppy but with blue skies and sunshine nobody minded and soon the Farnes were speeding into view.

Our first dive was at the Crumstone (55° 37.630' N, 01° 35.637' W), an iconic Farnes site with a bit of everything. We dropped into an area of vertical walls covered by *Alcyonium digitatum* from around 8-18 m depth, with abundant foliose red weeds in depths of less than 10m. Away from the cliffs at depths ranging from 16-22 m were boulder fields covered in keel worms, *Spirobranchus* sp., interspersed with sediment areas of coarse gravel and rocky outcrops with feathery hydroids.

The tide-swept boulder and gravel areas were dominated by branching hydroids, mainly *Abietinaria abietina, Nemertesia ramosa* and *N. antennina,* having what looked like a second flush of growth. Many small prawns, *Pandalus montagui,* and occasional *Pholis gunnellus* were also seen. On the walls, the dominant species was *Alcyonium* but with some patches of anemones, *Sagartia elegans*, small *Metridium dianthus* (the accepted name for *Metridium senile*) and the colonial seasquirt, *Lissoclinum perforatum,* in the more sheltered overhangs. Although not a great deal of time was spent in the slightly surge-swept shallows near the top of the rocks, meadows of mixed red weeds were dominated by cock's comb *Plocamium* sp., fine veined crinkle weed, *Cryptopleura ramosa,* and sea oak, *Phycodrys rubens*.

At the Hopper (55° 38.637' N, 01° 36.276' W), our second dive, the visibility was noticeably more murky. Skipper Andrew casually informed us on returning to the boat that this is a well-known seal toilet area! The underwater landscape was somewhat similar to the Crumstone, with walls deeply cut by small gullies and extensive boulder fields reaching beyond our maximum depth of 21 m. The diversity of sessile species was noticeably lower, and with abundant *Echinus esculentus*, appeared heavily grazed. However, the boulder field, which started at around 12 m had plenty of crevices in between supporting interesting creatures, including Yarrell's blenny *Chirolophis ascani*, conger eels, *Conger conger*, and tiny *Sarcodictyon*, a stoloniferan octocoral. Other highlights included numerous small specimens of the seasquirt *Pycnoclavella stolonialis*. This site had the most diverse assortment of fish seen during the weekend with nine species recorded.

The following day, Longstone End (55° 38.420' N, 01° 36.355' W) was the first dive. This area resembles an underwater rock-fall with an extensive jumbled assortment of large boulders at depths between 10 and 20 m. Highlights were numerous small *Tritonia hombergi* nudibranchs, feeding on the *Alcyonium* and a few large specimens of *Dendronotus frondosus*. The bedrock wall was deeply cut with vertical gashes and a range of seasquirts, including *Trididemnum cereum*, encrusting bryozoans and anemones, were seen. The bryozoan *Smittina landsborovii* was seen in several areas, and is well-recorded from this location and elsewhere in Northumberland.

Back at the Crumstone (55° 37.583' N, 01° 35.787' W) for our final Farnes dive, we dropped into the channel between it and the Calf, where our maximum depth was 16 m. Extensive carpets of *Sagartia elegans* (mostly var. miniata) covered the walls at the narrowest part of the swim through, clearly enjoying being force fed by the current! The smaller gullies and underhangs supported assemblages of seasquirts, small *Metridium dianthus* and sponges such as *Myxilla incrustans*. A particular highlight was seeing some small patches of star ascidian *Botrylloides leachii* (var radiata), originally named by Alder and Hancock, who were based locally. In the kelp zone, mixed foliose red weeds were seen, as well as dabberlocks *Alaria esculenta*.

No report about diving in the Farnes could be complete without mention of inquisitive pinnipeds! Of course there was plenty of seal action; juveniles showing off and playing around us, then nibbling any piece of loose kit they could get their teeth around. The influence of man is plain to see elsewhere too; over-friendly ballan wrasse *Labrus bergylta*, broken urchins and occasional pieces of lost fishing gear.

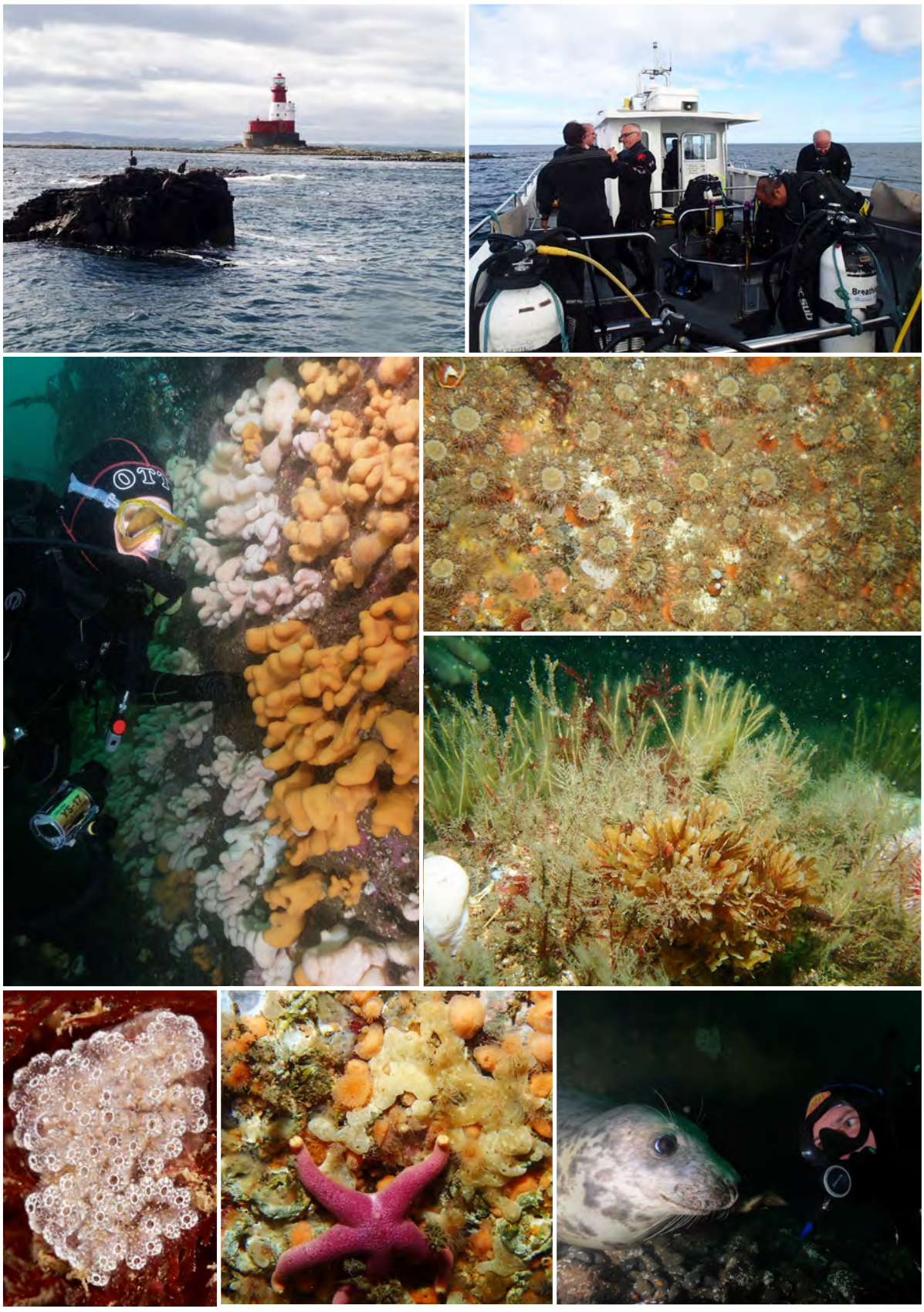


Fig. 7: Diving the Farne Islands (clockwise from top left): Farnes view, kitting up, Sagartia elegans*, hydroid and bryozoan turf (all SB), grey seal meets diver (KL),* Tridemnum cereum *&* Henricia *(SB),* Botrylloides leachii *var.* radiata *(DK),* Alcyonium *wall (KL).*

		Cullercoats	Howdiemont snorkel	Farne Islands				Tyne & Wear		
Species	**Authority**	**Browns Bay**	**Howdiemont snorkel**	**Crumstone (gullies)**	**Crumstone (wall)**	**The Hopper**	**Longstone End**	**Allan's Garden**	**Briardene Bushes**	**Oslofjord wreck**
PORIFERA										
Porifera	Grant, 1836	R		F						F
Clathrina coriacea	(Montagu, 1814)			R	O					
Leucosolenia sp.	Bowerbank, 1864		R							
Halichondria (Halichondria) panicea	(Pallas, 1766)	R	R					O		
Haliclona (Haliclona) oculata	(Linnaeus, 1759)							R		O
Amphilectus fucorum	(Esper, 1794)									R
Myxilla (myxilla) incrustans	(Johnston, 1842)			O	F					
Raspailia (Raspailia) ramosa	(Montagu, 1814)							R		
CNIDARIA										
Actinia equina	(Linnaeus, 1758)		R							
Urticina eques	(Gosse, 1858)			R						
Urticina felina	(Linnaeus, 1761)	R		R-O		O		O	O	O
Metridium dianthus	(Ellis, 1768)			F	O-F		F			O
Sagartia elegans	(Dalyell, 1848)			O-C	A		C			
Alcyonium digitatum	Linnaeus, 1758			C-A	F-C	C	O-C	O-C	F	R
Sarcodictyon sp.	Forbes (in Johnston), 1847					O				
Tubularia indivisa	Linnaeus, 1758						O	O		O
Obelia geniculata	(Linnaeus, 1758)		R	C	A	C	C	R		O
Tima bairdii	(Johnston, 1833)		R							
Halecium halecinum	(Linnaeus, 1758)			O						
Kirchenpaueria pinnata	(Linnaeus, 1758)						R			
Nemertesia antennina	(Linnaeus, 1758)			O				O		
Nemertesia ramosa	(Lamarck, 1816)			O						
Plumularia setacea	(Linnaeus, 1758)			O						
Abietinaria abietina	(Linnaeus, 1758)			F						
Sertularia sp.	Linnaeus, 1758							R		
Sertularia argentea	Linnaeus, 1758						O			
Cyanea capillata	(Linnaeus, 1758)	R						R	R	
Calvadosia cruxmelitensis	(Corbin, 1978)		O							
Caryophyllia (caryophyllia) smithii	Stokes & Broderip, 1828					R				
ANNELIDA										
Phyllodocidae	Örsted, 1843		O eggs							
Sabellaria sp.	Lamarck, 1818	F								O

Table 2: Table of species recorded from sublittoral sites by diving (and snorkelling at Howdiemont during the intertidal survey). (R=rare, O=occasional, F=frequent, C=common, A=abundant, P=present). Records from Brown's Bay are a shore dive from the Dove Marine Lab, Cullercoates, made by a few intrepid Porcupines.

		Cullercoats	Howdiemont snorkel	Farne Islands				Tyne & Wear		
Species	**Authority**	**Browns Bay**	**Howdiemont snorkel**	**Crumstone (gullies)**	**Crumstone (wall)**	**The Hopper**	**Longstone End**	**Allan's Garden**	**Briardene Bushes**	**Oslofjord wreck**
Polydora sp.	Bosc, 1802			P	P	P				
Sabellaria sp.	Lamarck, 1818	F								O
Lanice conchilega	(Pallas, 1766)	R	O							
Spirobranchus sp.	Blainville, 1818	O		C-A	C	C-A		C	F	
ARTHROPODA										
Iphimedia obesa	Rathke, 1843			R					R	
Jassa sp.	Leach, 1814				F					
Cancer pagurus	Linnaeus, 1758	R	O	R-O					O	F
Crangon crangon	(Linnaeus, 1758)		R							
Galathea intermedia	Lilljeborg, 1851			R						
Galathea nexa	Embleton, 1834									O
Galathea squamifera	Leach, 1814	O								
Galathea strigosa	(Linnaeus, 1761)	R		O	O	O	O			O
Inachus sp.	Weber, 1795				R					O
Macropodia sp.										F
Homarus gammarus	(Linnaeus, 1758)	O	R	R-O	O	O	O	O		O
Paguridae	Latreille, 1802		C							O
Pagurus bernhardus	(Linnaeus, 1758)			O-F		O	O			
Pandalus montagui	Leach, 1814 [in Leach, 1813-1814]	F		O-F			O	F	F	
Liocarcinus depurator	(Linnaeus, 1758)			R						
Necora puber	(Linnaeus, 1767)	R	O	F	O	O	O	O-F		F
Carcinus maenas	(Linnaeus, 1758)		O							
Mysida	Boas, 1883	F								
Balanus balanus	(Linnaeus, 1758)								O	
Pycnogonida	Latreille, 1810						R	R	O	
MOLLUSCA										
Mytilus edulis	Linnaeus, 1758		P spat					O spat		F
Anomiidae	Rafinesque, 1815	R						F		
Pecten maximus	(Linnaeus, 1758)								O juvs	
Calliostoma zizyphinum	(Linnaeus, 1758)					O	O			
Tectura virginea	(O. F. Müller, 1776)		R						R	
Testudinalia testudinalis	(O. F. Müller, 1776)						P			
Patella pellucida	Linnaeus, 1758	F	F			F		O	R	
Steromphala cineraria	(Linnaeus, 1758)	F	F		O			O	O	

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		Cullercoats	Howdiemont snorkel	Farne Islands				Tyne & Wear		
Species	**Authority**	**Browns Bay**	**Howdiemont snorkel**	**Crumstone (gullies)**	**Crumstone (wall)**	**The Hopper**	**Longstone End**	**Allan's Garden**	**Briardene Bushes**	**Oslofjord wreck**
Aplysia punctata	(Cuvier, 1803)	O	F					O-C	C	
Lacuna vincta	(Montagu, 1803)	O	O					O	F	
Euspira nitida	(Donovan, 1804)								P eggs	
Rissoa parva	(da Costa, 1778)	C	C					F	C	C
Trivia sp.	Gray, 1837						R			
Trivia monacha	(da Costa, 1778)					R				
Tritia incrassata	(Strøm, 1768)									R
Aegires punctilucens	(d'Orbigny, 1837)							R	R	
Aeolidia papillosa	(Linnaeus, 1761)						R			
Cadlina laevis	(Linnaeus, 1767)							R		
Dendronotus frondosus	(Ascanius, 1774)						R			
Doris pseudoargus	Rapp, 1827						R			
Eubranchus farrani	(Alder & Hancock, 1844)			R	R					
Facelina auriculata	(Müller, 1776)							R		
Edmundsella pedata	(Montagu, 1816)									F
Goniodoris nodosa	(Montagu, 1808)	R			R			O		
Acanthodoris pilosa	(Abildgaard in Müller, 1789)			R						
Diaphorodoris luteocincta	(M. Sars, 1870)					R		O	R	
Onchidoris bilamellata	(Linnaeus, 1767)								R	
Limacia clavigera	(O. F. Müller, 1776)	O		O	R	O	R	O	O	
Polycera faeroensis	Lemche, 1929									R
Polycera quadrilineata	(O. F. Müller, 1776)	F	R	O				O		O
Janolus cristatus	(Delle Chiaje, 1841)	R		R	R			O	O	O
Tritonia hombergii	Cuvier, 1803			F			F	F		
Hermaea bifida	(Montagu, 1816)		R							
Elysia viridis	(Montagu, 1804)		O							
Lepidochitona cinerea	(Linnaeus, 1767)		R					R		
BRYOZOA										
Bryozoa		R								
Schizomavella (schizomavella) linearis	(Hassall, 1841)			O	O-F			R		
Bugula sp.	Oken, 1815								O	
Bugulina flabellata	(Thompson in Gray, 1848)			O						
Crisularia plumosa	(Pallas, 1766)			O						
Scrupocellaria sp.	Van Beneden, 1845	O			F			F	O	F

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		Cullercoats	Howdiemont snorkel	Farne Islands				Tyne & Wear		
Species	**Authority**	**Browns Bay**	**Howdiemont snorkel**	**Crumstone (gullies)**	**Crumstone (wall)**	**The Hopper**	**Longstone End**	**Allan's Garden**	**Briardene Bushes**	**Oslofjord wreck**
Cellaria sp.	Ellis & Solander, 1786						F			
Cellepora pumicosa	(Pallas, 1766)								O	
Electra pilosa	(Linnaeus, 1767)	R	O	R			O			
Flustra foliacea	(Linnaeus, 1758)							C	F	
Securiflustra securifrons	(Pallas, 1766)			R						
Membranipora membranacea	(Linnaeus, 1767)			O	C		F	O		
Smittina landsborovii	(Johnston, 1847)			O			O			
Crisia sp.	Lamouroux, 1812				C		O			
Crisia eburnea	(Linnaeus, 1758)				F					
Disporella hispida	(Fleming, 1828)				R					
ECHINODERMATA										
Asterias rubens	Linnaeus, 1758				O	O	O	O-F	O	
Henricia sp.	Gray, 1840	O	O	O-F	O	O	O	O	O	
Crossaster papposus	(Linnaeus, 1767)					R		R		
Antedon bifida	(Pennant, 1777)			R-F		O		R		
Echinus esculentus	Linnaeus, 1758	R			O-F	F-C	F	O	O	
Psammechinus miliaris	(P.L.S. Müller, 1771)				R	R				
Ophiuroidea	Gray, 1840								F	
TUNICATA										
Clavelina lepadiformis	(Müller, 1776)	R						O	R	
Diplosoma listerianum	(Milne Edwards, 1841)			O	O	R				
Lissoclinum perforatum	(Giard, 1872)			F	F		O			
Trididemnum cereum	(Giard, 1872)			F	F	F	O			
Aplidium punctum	(Giard, 1873)							R		
Aplidium turbinatum	(Savigny, 1816)		R		R			R		
Polyclinum aurantium	Milne Edwards, 1841			R						
Pycnoclavella stolonialis	Pérez-Portela, R., Goodwin, C.E., Picton, B.E. & X. Turon, 2010					C				
Ascidia conchilega	Müller, 1776	R								
Ascidiella scabra	(Müller, 1776)				R					
Ciona intestinalis	(Linnaeus, 1767)	O		R	O	O	R	F	O	
Corella parallelogramma	(Müller, 1776)				R	R		O	O	
Botrylloides leachii var. *radiata*	(Savigny, 1816)			R		R				
Botrylloides leachii	(Savigny, 1816)			R	O	O				

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Botrylloides sp.	(Savigny, 1816)					P				
Botryllus schlosseri	(Pallas, 1766)	O		O	O	O	R	O	O	
Dendrodoa grossularia	(Van Beneden, 1846)	F								
Polycarpa sp.	Heller, 1877	P								
PISCES										
Conger conger	(Linnaeus, 1758)					R				
Gadus morhua	Linnaeus, 1758				R juv	R juv				
Pollachius pollachius	(Linnaeus, 1758)	R juv	R juv							
Pollachius virens	(Linnaeus, 1758)						F			
Lophius piscatorius	Linnaeus, 1758							R		
Lipophrys pholis	(Linnaeus, 1758)	O								
Callionymus reticulatus	Valenciennes, 1837			R		O			R	
Aphia minuta	(Risso, 1810)	R								
Gobiusculus flavescens	(Fabricius, 1779)	R						R		
Pomatoschistus sp.	Gill, 1863	R								
Pomatoschistus pictus	(Malm, 1865)	R		R						
Thorogobius ephippiatus	(Lowe, 1839)	R				R		R		
Ctenolabrus rupestris	(Linnaeus, 1758)				O		O			
Labrus bergylta	Ascanius, 1767	R	R			R	R	R		
Pholis gunnellus	(Linnaeus, 1758)	R		R		R	R	O		F
Chirolophis ascanii	(Walbaum, 1792)					R				
Microstomus kitt	(Walbaum, 1792)							R		
Platichthys flesus	(Linnaeus, 1758)		R							
Pleuronectes platessa	Linnaeus, 1758		O							
Phrynorhombus norvegicus	(Günther, 1862)					R	R			
Taurulus bubalis	(Euphrasen, 1786)	R	R	O	R-O	O	O	O	R	O
MAMMALIA										
Halichoerus grypus	(Fabricius, 1791)			F				R		
OCHROPHYTA										
Desmarestia aculeata	(Linnaeus) J.V.Lamouroux, 1813		R			C	F		C	
Desmarestia ligulata	(Stackhouse) J.V.Lamouroux, 1813		O					O		
Dictyota dichotoma	(Hudson) J.V.Lamouroux, 1809			O		O	F	O	F	
Taonia atomaria	(Woodward) J.Agardh, 1848								O	
Fucus serratus	Linnaeus, 1753		R							

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Halidrys siliquosa	(Linnaeus) Lyngbye, 1819		O							
Alaria esculenta	(Linnaeus) Greville, 1830				O					
Laminaria sp.	J.V. Lamouroux, 1813								O	
Laminaria hyperborea	(Gunnerus) Foslie, 1884	O	C	A	A	C	A	C		
Saccharina latissima	(Linnaeus) C.E.Lane, C.Mayes, Druehl & G.W.Saunders, 2006		O		F		O			
RHODOPHYTA										
Rhodophyta	Wettstein, 1901								F	
Bonnemaisonia asparagoides	(Woodward) C.Agardh, 1822			P					F	
Ceramium sp.	Roth, 1797		O							
Cryptopleura ramosa	(Hudson) L.Newton, 1931		O	C	F	C				
Delesseria sanguinea	(Hudson) J.V.Lamouroux, 1813	R		F			F	F	F	
Hypoglossum hypoglossoides	(Stackhouse) F.S.Collins & Hervey, 1917	R						O	O	F
Membranoptera alata	(Hudson) Stackhouse, 1809		F							
Phycodrys rubens	(Linnaeus) Batters, 1902		O	F	C	O-F	C		O	F
Vertebrata byssoides	(Goodenough & Woodward) Kuntze, 1891								O	
Osmundea pinnatifida	(Hudson) Stackhouse, 1809		O							
Corallinaceae	Lamouroux, 1812	C	C	F	F-C	F-C	F-C	O	O	
Corallina officinalis	Linnaeus, 1758	O	C							
Dilsea carnosa	(Schmidel) Kuntze, 1898	R	O					O		
Furcellaria lumbricalis	(Hudson) J.V.Lamouroux, 1813	O	F							
Chondrus crispus	Stackhouse, 1797	O	O							
Callophyllis laciniata	(Hudson) Kützing, 1843				F	F				
Phyllophora pseudoceranoides	(S.G.Gmelin) Newroth & A.R.A.Taylor, 1971	O						O		
Polyides rotunda	(Hudson) Gaillon, 1828	O								
Palmaria palmata	(Linnaeus) Weber & Mohr, 1805		F		O					
Rhodothamniella floridula	(Dillwyn) Feldmann, 1978		O							
Plocamium sp.	J.V.Lamouroux, 1813	C		O	O	O	F	F		R
Lomentaria orcadensis	(Harvey) F.S.Collins, 1937				P					
CHLOROPHYTA										
Bryopsis sp.	J.V.Lamouroux, 1809		P							R
Chaetomorpha melagonium	(F.Weber & Mohr) Kützing, 1845		R							
Cladophora rupestris	(Linnaeus) Kützing, 1843		R							
Ulva lactuca	Linnaeus, 1753		O							

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Tyne and Wear diving

On Sunday morning, ten Seasearchers boarded the dive boat *Spellbinder II*, looking forward to a day's diving at local sites to round off the trip. As we cruised out of the Tyne, those who had been at the Farnes for the past two days entertained us with their tales of curious seals and other highlights of their dives. Our first site was an old favourite named Allan's Garden, after *Spellbinder*'s skipper Allan Lopez, who discovered it. Just north of St Mary's Island, this site consists of deep gullies with a great diversity of sessile fauna on the walls and a rich kelp park with mixed red seaweeds in the shallows. However, on this occasion the stars of the show were the vast numbers of spawning sea hares, *Aplysia punctata*, some forming mating chains of up to six individuals, veritable towers of sea hares swaying seductively in the swell. Our second stop was Briardene Bushes to the north, a site which had never been Seasearched before. Here we found a rock and boulder seabed with a dense turf of *Dictyota dichotoma,* landladies' wig *Desmarestia aculeata* and mixed red seaweeds, home to a variety of fauna including reticulated dragonets, long-spined sea scorpions *Taurulus bubalis,* arctic cowries *Trivia arctica,* the extremely well camouflaged nudibranch *Aegires punctilucens*… and yet more amorous sea hares! Of note is a record of the brown seaweed dotted peacock weed *Taonia atomaria*, which is only the 5th record in NE England, and all records are since 2011. A southern species spreading north! Both of these sites are within the St Mary's to Coquet MCZ, which was designated in 2016. Having warmed up with a lunch of curry and rice (all part of the service on *Spellbinder*), we opted for a third dive on the wreck of the Oslofjord just south of the Tyne. Unfortunately by this time the swell had increased, reducing the visibility on this notoriously silty site. Nevertheless, we managed to record a good number of species including the squat lobsters *Galathea nexa* and *G. strigosa*, the spider crabs *Inachus* and *Macropodia*, and large numbers of very pretty violet sea slugs, *Edmundsella pedata*. From there it was a short trip back up the Tyne to disembark at Royal Quays and head home …to make a start on those Seasearch forms!

Seabed sampling (Figure 8)

On the Thursday (07/09/2017) a band of six Porcupines met at the Royal Quays Marina on the north bank of the Tyne. Here they boarded the NIFCA (Northumberland Inshore Fisheries and Conservation Authority) survey and patrol vessel *St Aidan*, with Mark Southerton, Deputy Chief (Operations), Vicky Rae and Natalie Wallace, Environmental Inshore Fisheries and Conservation Officers.

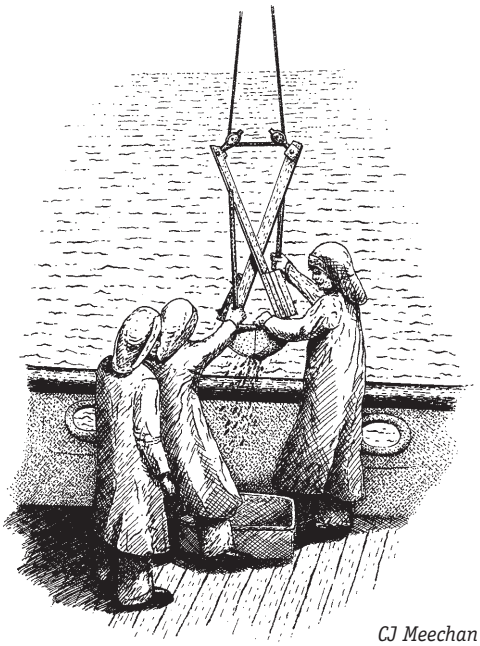
The following (written by Natalie Wallace and Vicky Rae) is taken from NIFCA News (November 2017 Issue 17): "Six members of the society joined NIFCA officers on-board PV *St Aidan* to gather seabed data to inform a 'Before After Control Impact' assessment of the proposed open areas under NIFCA byelaw 7 within the English section of the Berwickshire and North Northumberland Coast SAC. NIFCA officers conducted seabed sampling deploying a Day grab off the back of *St Aidan* to collect 10 sediment samples, five from Amble Houp (potentially open to mobile gear) and five from Middle Bank (remain closed). Core samples were collected from each grab sample and frozen for Particle Size Analysis (to be conducted by NIFCA at a later date) and the remaining sample was then sieved by the society through a 0.5 mm sieve for species composition analysis. The society collected specimen samples and identified the organisms found to species level and provided NIFCA with a list of their findings which included 21 species of mollusc and 26 species of annelid worms. The data collected will be used as a baseline along with underwater video, photos and sidescan sonar data for future monitoring work at the sites".

Full station data are available for all samples (contact Paula Lightfoot). Worms were collected and identified by Teresa Darbyshire and molluscs by Anna Holmes. Sand eels were recorded from two samples. The substratum at Amble Houp was fine, muddy sand with much dead shell. Obvious fauna were many *Amphiura* sp. brittlestars, *Scalibregma inflatum, Lagis koreni, Glycera*, capitellids, *Thyasira*, *Yoldiella, Nucula*, venerid bivalves, *Lucinoma* and some cumaceans. The substratum at Middle bank was 'muddy sand', 'shelly medium sand/mud' or 'coarse sand'.

Fig. 8: (clockwise from top left) NIFCA Fisheries Patrol vessel St Aidan*, day grab, inspecting the sievings (all TD); operating a grab from the NIFCA vessel* St Aidan (LS).

Summary

A breakdown of the taxa recorded across all of the sites during the fieldtrip period is presented after the species list (p37) (Figure 9).



CJ Meechan

Acknowledgements

PMNHS is very grateful to Jane Delany, Director of the Dove Marine Lab for hosting us and to technician John Knowles and Administrator Jill Cowans for their unstinting help. We are also very grateful to NIFCA for a wonderful (and comfortable) opportunity to carry out seabed sampling; to the National Trust staff and volunteers who helped us to access the Inner Farne shore, organised boat transport and helped in the survey; to Sovereign Diving and *Spellbinder II* for efficient and fun diving; and finally to Paula Lightfoot, who was a super-efficient leader. Thanks are also due to her and all participants for providing their species lists so promptly.

Species	Authority	Identifier	Amble Houp	Middle Bank	Site not specified
ANNELIDA					
Pholoe pallida	Chambers, 1985	TD	P1		
Sthenelais limicola	(Ehlers, 1864)	TD	P1	P1	
Glycera fallax	Quatrefages, 1850	TD		P (?)1	
Glycera lapidum	Quatrefages, 1866	TD		P3	
Glycera tridactyla	Schmarda, 1861	TD	P1		
Glycera unicornis	Lamarck, 1818	TD	P2		
Glycinde nordmanni	(Malmgren, 1866)	TD		P1	
Sphaerodorum gracilis	(Rathke, 1843)	TD	P1		
Aglaophamus sp.	Kinberg, 1865	TD		P1	
Nephtys cirrosa	Ehlers, 1868	TD	P1		
Nephtys hombergii	Savigny in Lamarck, 1818	TD		P2	
Nephtys kersivalensis	McIntosh, 1908	TD	P1		
Lumbrineris cingulata	Ehlers, 1897	TD	P1	P1	
Scoloplos armiger	(Müller, 1776)	TD		P1	
Laonice bahusiensis	Söderström, 1920	TD		P2	
Spiophanes kroyeri	Grube, 1860	TD	P1		
Magelona alleni	Wilson, 1958	TD		P1	
Cirratulidae	Carus, 1863	TD		P1	
Chaetozone christiei	Chambers, 2000	TD		P1	
Diplocirrus glaucus	(Malmgren, 1867)	TD	P2		
Notomastus sp.	M. Sars, 1851	TD	P3	P1	
Ophelia borealis	Quatrefages, 1866	TD		P1	
Scalibregma inflatum	Rathke, 1843	TD	P3	P2	
Lagis koreni	Malmgren, 1866	TD	P4		
Sabellaria sp.	Lamarck, 1818	TD			
Anobothrus gracilis	(Malmgren, 1866)	TD	P1		
Pista cristata	(Müller, 1776)	TD		P1	
ARTHROPODA					
Nebalia bipes	(Fabricius, 1780)	AJ			P
Ampelisca tenuicornis	Lilljeborg, 1855	AJ			P
Nototropis vedlomensis	(Spence Bate & Westwood, 1862)	AJ			P
Leptocheirus hirsutimanus	(Spence Bate, 1862)	AJ			P
Leucothoe incisa	Robertson, 1892	AJ			P
Urothoe marina	(Spence Bate, 1857)	AJ			P
Astacilla dilatata	(G. O. Sars, 1883)	AJ			P
Astacilla longicornis	(Sowerby, 1806)	AJ			P
Eurydice inermis	Hansen, 1890	AJ			P
Bodotria scorpioides	(Montagu, 1804)	AJ			P
Diastylis sp.	Say, 1818	AJ			P
Diastylis laevis	Norman, 1869	AJ			P
Diastylis rathkei	(Krøyer, 1841)	AJ			P
MOLLUSCA					
Ensis sp.	Schumacher, 1817	AH	P1	Y	
Thracia phaseolina	(Lamarck, 1818)	AH	P1	Y	
Lucinoma borealis	(Linnaeus, 1767)	AH	P2		
Thyasira sp.	Lamarck, 1818	AH	P1		
Thyasira biplicata	(Philippi, 1836)	AH	P1		
Thyasira flexuosa	(Montagu, 1803)	AH	P2		
Nucula nitidosa	Winckworth, 1930	AH	P1	Y	
Kurtiella bidentata	(Montagu, 1803)	AH		Y	
Gari tellinella	(Lamarck, 1818)	AH		Y	
Abra nitida	(O. F. Müller, 1776)	AH	P2	Y	
Asbjornsenia pygmaea	(Lovén, 1846)	AH		Y	
Cerastoderma edule	(Linnaeus, 1758)	AH			

Table 3: Table of species identified from seabed sampling grabs. The five grab samples from each of the two sites have been amalgamated. P2 (for example) indicates the species was recorded from two of the grabs at that site. (P=present; TD=Teresa Darbyshire, AJ=Adam Jenkins, AH=Anna Holmes).

Species	Authority	Identifier	Amble Houp	Middle Bank	Site not specified
Spisula elliptica	(Brown, 1827)	AH			
Thracia villosiuscula	(MacGillivray, 1827)	AH			
Diplodonta rotundata	(Montagu, 1803)	AH	P1	Y	
Chamelea striatula	(da Costa, 1778)	AH	P1	Y	
Clausinella fasciata	(da Costa, 1778)	AH		Y	
Dosinia exoleta	(Linnaeus, 1758)	AH	P1	Y	
Venus casina	Linnaeus, 1758	AH	P1		
Turritella communis	Risso, 1826	AH		Y	
Scaphander sp.	Montfort, 1810	AH		Y	

Table 3 (cont.): Table of species identified from seabed sampling grabs. The five grab samples from each of the two sites have been amalgamated. P2 (for example) indicates the species was recorded from two of the grabs at that site. (P=present; TD=Teresa Darbyshire, AJ=Adam Jenkins, AH=Anna Holmes).

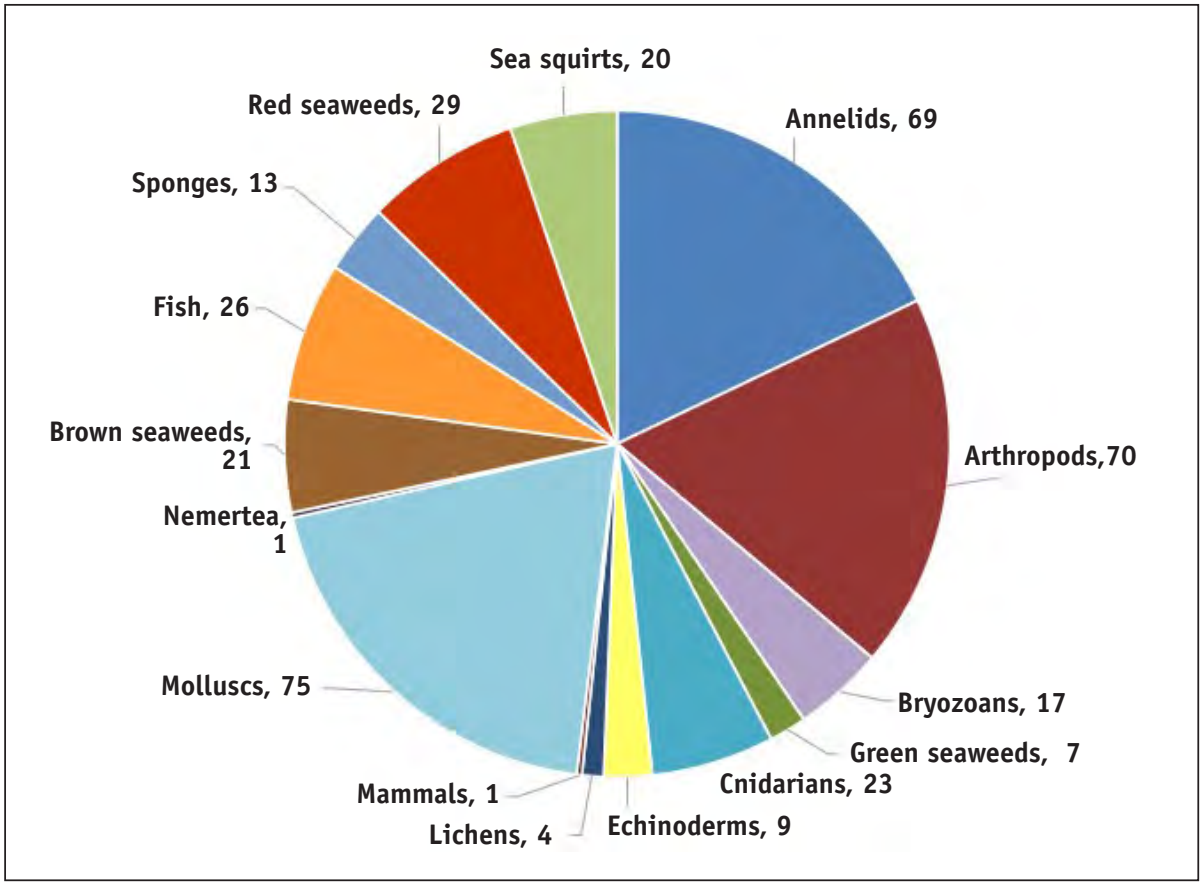


Fig. 9: Percentages of species groups recorded in total (n=385). Numbers refer to the number of species recorded in each group. Molluscs, arthropods and annelid worms all had an expert recording and identifying them as well as general records from all recorders.

The Lives and Times of Tompot Blennies

Territorial, agonistic and courtship behaviour in *Parablennius gattorugine*

Paul Naylor

paul@marinephoto.co.uk

To see videos of the behaviour described in this article, please visit:
vimeo.com/paulnaylormarinephoto

Summary

The tompot blenny (*Parablennius gattorugine* Linnaeus, 1758) is one of our most distinctive and charismatic coastal fish, but its fascinating behaviour has received little study to date. I hope this article shines some light on the many intriguing aspects of this wonderful animal's 'life and times'. It is a compilation of information obtained from underwater observations, supported by photography and video, of tompot blennies in their natural habitat. Most of these observations are from a small area of Devon reef between 2011 and 2017, where 44 individual tompot blennies were recognised from their distinctive skin markings. They are supported by other, less systematic, observations from the same reef prior to 2011, and also at other locations in Dorset, Devon and Cornwall.

Observations show that a male tompot blenny can retain the same crevice territory for up to 4 consecutive breeding seasons and suggest that competition for a suitable breeding crevice is intense. Females can also be seen in the same area of reef over 3 years and visit several males within a breeding season and over subsequent years. There appears to be rivalry between females as well as between males, and there are unexplained interactions between males and females outside the breeding season. Intriguingly, the colour and pattern of individual tompot blennies varies with the rôle they are playing in the interactions. 'Sneaker' behaviour by male tompot blennies is reported for the first time, and new observations on courtship and guarding behaviour are also described.

1) The tompot blenny; an introduction

The tompot blenny, *Parablennius gattorugine*, is a common fish of shallow subtidal rocky habitats in northern Europe (Wheeler 1969, Almada *et al.* 2001) but, although its visual appeal and charisma are familiar to divers and snorkelers, there has been little study of its behaviour (Faria *et al.* 2010) and surprisingly little is still known about its biology (Henderson 2014). It is a fractional spawner, (i.e. multiple batches per season, Dunne & Byrne 1979) with the female laying demersal eggs in the late spring and early summer (Wheeler 1969). The male guards eggs laid by several females in its resident rocky crevice, in a similar way to other blenny species (Zander 1986).

The family Blenniidae, to which the tompot blenny belongs, shares several traits that make them likely to display complex reproductive behaviour (Neat & Lengkeek 2009). These include a promiscuous mating system where males and females mate with multiple partners, so competition within the sexes tends to be strong. The paternal care of eggs means that males make a significant investment in reproduction and this can lead to males being choosy about mates in addition to females benefitting from choosing high quality caring males. Demersal eggs and territoriality also promote competition between males and increase the likelihood that alternative tactics develop, where some individual males sneak into the breeding territories of conventional, egg-guarding males during spawning activity.

2) Study locations and observation method

The majority of observations on tompot blennies reported in this study were from a small area (15 m^2) of algae-covered, subtidal rocky reef in Wembury Bay, Devon, UK. There are several horizontal crevices in the reef, which is approximately 2 metres tall. Water depth at the base of the reef varies between 3 and 8 metres, depending on tidal state. Observations were generally made around high water, as this gave easier swimming access from the shore (approximately 300 metres away) and better visibility than at low water. Observations were made at different times throughout the day due to tidal influence.

Observations of behaviour from other Devon reefs, including in Wembury Bay, from Swanage Pier in Dorset, and St Agnes (Trevaunance Cove) in Cornwall are included where relevant. Where location is not mentioned, the observation is from the studied Wembury Bay reef.

Dives were mostly made with open-circuit SCUBA, although a few observations were made while snorkeling. Photographs were taken with Nikon or Sony cameras in waterproof housings or an Olympus waterproof compact camera. Lighting was provided by flashguns or video lights depending on whether the emphasis was on still or video photography. Lighting was set on the minimum power that gave reasonable quality images. Care was taken when approaching and photographing the tompot blennies to minimise disturbance. Some was inevitable but blennies appeared to be particularly insensitive to disruption when interacting with other blennies.

3) Recognising individual tompot blennies

Much of this study originated from the exciting realisation that, using close-up photographs, individual tompot blennies could be recognised from the intricate pattern of markings on their scaleless skin with a high degree of certainty (Naylor & Jacoby 2016). Given the tendency of tompot blennies to peek watchfully from rocky crevices, markings on the head are used. Wherever possible, photographs from the right, left and front are obtained for each recognised individual for comparison with ongoing records. Because the angle from which photographs are taken varies with the blenny's position, markings close to a fixed reference point (such as the eye) are most helpful. Figure 1 shows examples of individual blennies and their distinctive markings.

4) Determining the gender of tompot blennies

The gender of tompot blennies is not immediately apparent from their appearance and this can complicate the interpretation of observations because, for instance, similar 'stand-off' interactions can occur between males, between females and between a male and a female.

Individuals were confirmed as males by observing the presence of obvious, cauliflower-like, anal bulb glands, one on each of the front two fin rays of the anal fin, as is typical of the males in this genus (Zander 1975). Anal glands were enlarged and particularly obvious when the males were guarding eggs but were often not visible when the blenny was within a crevice. Individuals were confirmed as females if observed laying eggs within the resident crevice of a male (Figure 2). Identifying individual blennies is valuable because, once their gender has been confirmed by one of these methods, this information is carried over into earlier or later observations.

Males are generally darker and more reddish in colour while females are usually paler and often have a prominent pale patch mark beneath the eye. The colour of individuals, however, can vary with time (see Section 9) and is therefore not reliable in determining gender.

5) Males: territory retention and rivalry

The occupancy of crevices by male tompot blennies on the studied reef in Wembury Bay is summarised in Figure 3. This shows that individual males often occupied the same location over 2 or 3 consecutive years. One male (WBM5 'Bradley') has completed his 4th breeding season in the same crevice (A). Before this study, there was no information on whether tompot blennies retained their territories between breeding seasons (Kay & Dipper 2009, Naylor & Jacoby 2016).

The tenacity of the male tompot blennies within each breeding season is also impressive. Over 7 years, and 25 blenny-breeding seasons

Fig. 1: Five of the 44 recognised individual tompot blennies on the Wembury Bay reef, with close-ups of their distinctive markings.

Fig. 2: a) Male with obvious anal glands guarding eggs; b) Female laying eggs with a male (showing obvious anal glands) behind.

observed, no male crevice occupants were seen to have abandoned the eggs they were guarding, or have been removed by predation.

Competition between rival males over territory is intense, as suggested by long-term retention of residences and the territorial fighting injuries indicated by the coincidence of mouth and fin damage with changes in crevice occupancy (see Figure 3). Individuals can recover from their injuries surprisingly quickly (Figure 4).

Stand-off' interactions between two males, typically an occupant and an intruder very close to the occupant's crevice, were observed on occasion (Figure 5). They typically faced up to each other a few cm apart for between 5 s and 1 min before the intruder swam away, although much longer stand-offs lasting more than 20 min (studied Wembury Bay reef) and 8 min (Swanage, Dorset) were seen. Infrequently, stand-offs developed into actual 'mouthing attacks' (as described by Zander 1986) with a blenny attempting to bite the side of the head, mouth area or the fins of their rival (Figure 6). This is consistent with the damage observed to coincide with changes in crevice occupancy (Figure 7). Intruding males on the Wembury Bay reef were sometimes subsequently observed as territory holding occupants.

Rivalry between males may arise partly because some crevice territories are preferable to others. An 'ideal' crevice for a male tompot blenny appears to have an easily accessible area for egg laying females linked to a narrow part into which the occupant can withdraw to evade a predator. On one occasion, in Wembury Bay, but not at the studied reef, when a tompot blenny was seen being eaten within a crevice by a predator (a small conger eel, *Conger conger*, see Figure 8), there appeared to be no 'refuge' within that crevice. Initial observations suggest larger, healthy males occupy 'safer' crevices while smaller or injured males occupy the more vulnerable crevices.

The home range of male tompot blennies from their resident crevices is not known. They are regularly observed returning 'home' over 1 to 2 metres but they may well have travelled further. On one occasion (September 2016) male WBM5 'Bradley' was observed swimming out approximately 15 metres from his crevice. Unsurprisingly, long journeys are not observed when males are guarding eggs.

6) Females: visits to territory-holding males and egg-laying

Female tompot blennies were seen laying eggs in the crevices occupied by males on

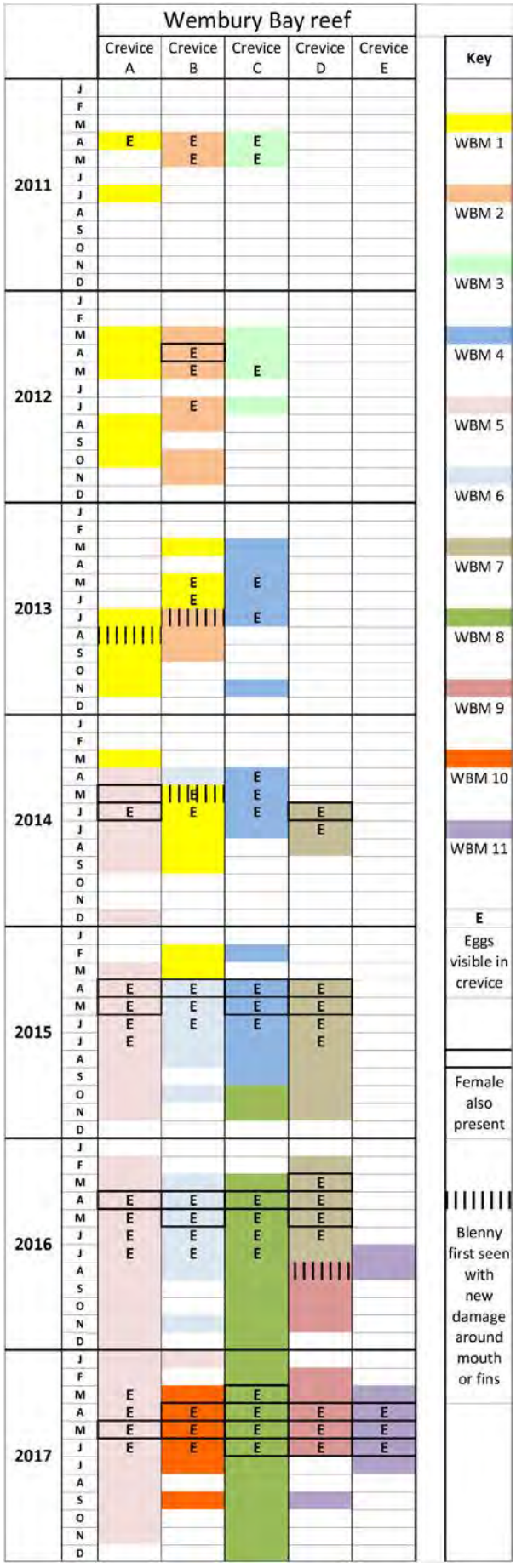


Fig. 3: Occupancy of crevices by males on the Wembury Bay reef. A coloured block represents the occupancy of an individual confirmed by at least one photograph during that month. The number of crevices monitored and the intensity of the observations have increased with time.

the studied Wembury Bay reef between late March and mid-June. Figure 9 (also known as 'the dating chart') indicates which female visited which male in all the observed visits from 2012 to 2017. It shows that, within a breeding season, a male hosts several females and a female visits several males. It also shows that females visited crevices occupied by males on the reef in subsequent breeding seasons. Figure 9 is based on observing the reef for less than 2% of the time available for breeding, so the total picture of visits could be at least 50 times more intense than shown here; the reef is a busy place! The raft of eggs guarded by each male was also usually composed of different patches of eggs, each at a different stage of development (see Section 10). These observations are all consistent with the tompot blenny following the characteristic Blenniidae pattern of fractional spawning (Dunne & Byrne 1979) and a promiscuous mating system (Neat & Lengkeek 2009). Surprisingly, on 5 occasions, two females were observed in a crevice with the male occupant at the same time (Figure 10) although an apparent female can actually be a 'sneaker' male, see Section 7!

When females were observed with male crevice occupants, they were usually already inside the crevice and apparently laying eggs. However, on five occasions, each with a different male, a female was observed entering the crevice. On all these occasions, this coincided with the male making rapid, darting swimming movements in front of the crevice. These movements by males were unlike those observed at any other time and it is therefore likely that they are a part of courtship display. There currently appears to be no information on the courtship of tompot blennies. During egg laying within the crevice, males often nibbled the female's fins, nudging and pushing her (Figure 11). These appeared to be attempts to influence where the female laid her eggs, on the floor or the ceiling of the crevice for example, but they may also represent courtship.

The typical duration of a female's visit to a male's crevice could not be determined but it

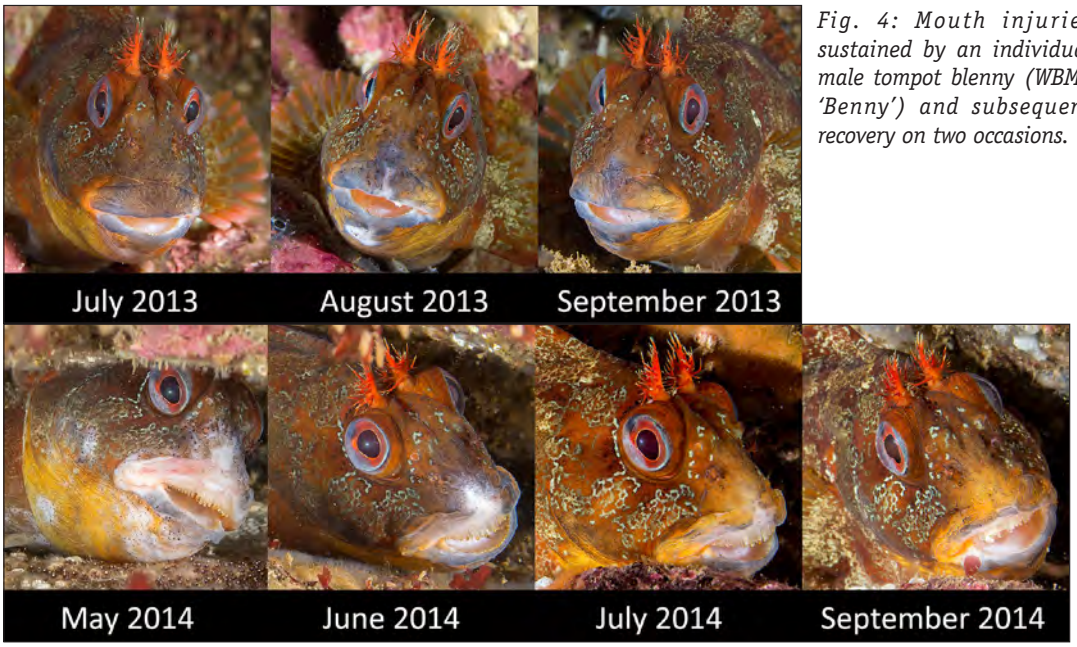


Fig. 4: Mouth injuries sustained by an individual male tompot blenny (WBM1 'Benny') and subsequent recovery on two occasions.

regularly exceeded 50 min (usual dive time at the reef). The same female was never seen in the same male's crevice on the next dive, even when these were 12 hours (i.e. the next high tide) apart. The length of a female's visit may be dependent on many factors such as the amount of remaining available space for egg laying. On a number of occasions, female visits appeared to be very brief, only lasting a few minutes, sometimes with no indication of egg-laying activity. Some of these short visits may have resulted from observer disturbance but the apparent high frequency of female visits (relative to patches of eggs laid) implies that, quite naturally, a significant proportion of visits do not result in egg laying. Initial observations suggest that females lay larger batches of eggs, earlier in the breeding season, with longer-established males in the 'safer' crevices. All this may reflect 'choosiness' by female tompot blennies. Additionally, aggressive interactions between females (see Figure 12) and the behaviour described in Section 8 suggests there is competition between females, indicating male choosiness and thus mutual mate choice.

Fig. 5: Stand-off between occupant male WBM1 'Benny' and intruder WBM8 'Byron' outside crevice A in August 2013 where 'Benny' was dominant. 'Byron' subsequently occupied crevice C from October 2015 until November 2017 (ongoing).

Fig. 6: Two mouthing attacks by a male on another male at Swanage, Dorset.

Fig. 7: Dorsal fin damage (circled) on male WBM9 'Barry' in August 2016 soon after he had replaced male WBM7 'Buster' as the occupant of crevice D. These two males had been observed in a lengthy stand-off outside crevice D in August 2015.

Fig. 8: Tompot blenny being eaten by a small conger eel within a rock crevice.

This would be entirely consistent with observations on other species. For example, Neat & Lengkeek (2009) reviewed studies of mate choice in blennies and noted that there was evidence of female mate selection, or 'choosiness', in every case. Male 'choosiness' was also demonstrated in studies of several different blenny species. Male blennies can be expected to be selective in their choice of mating partner because they have a limited resource in terms of crevice space for eggs and spend significant effort looking after them. Mutual mate choice, with both females and males being 'choosy', is therefore likely to occur in tompot blennies.

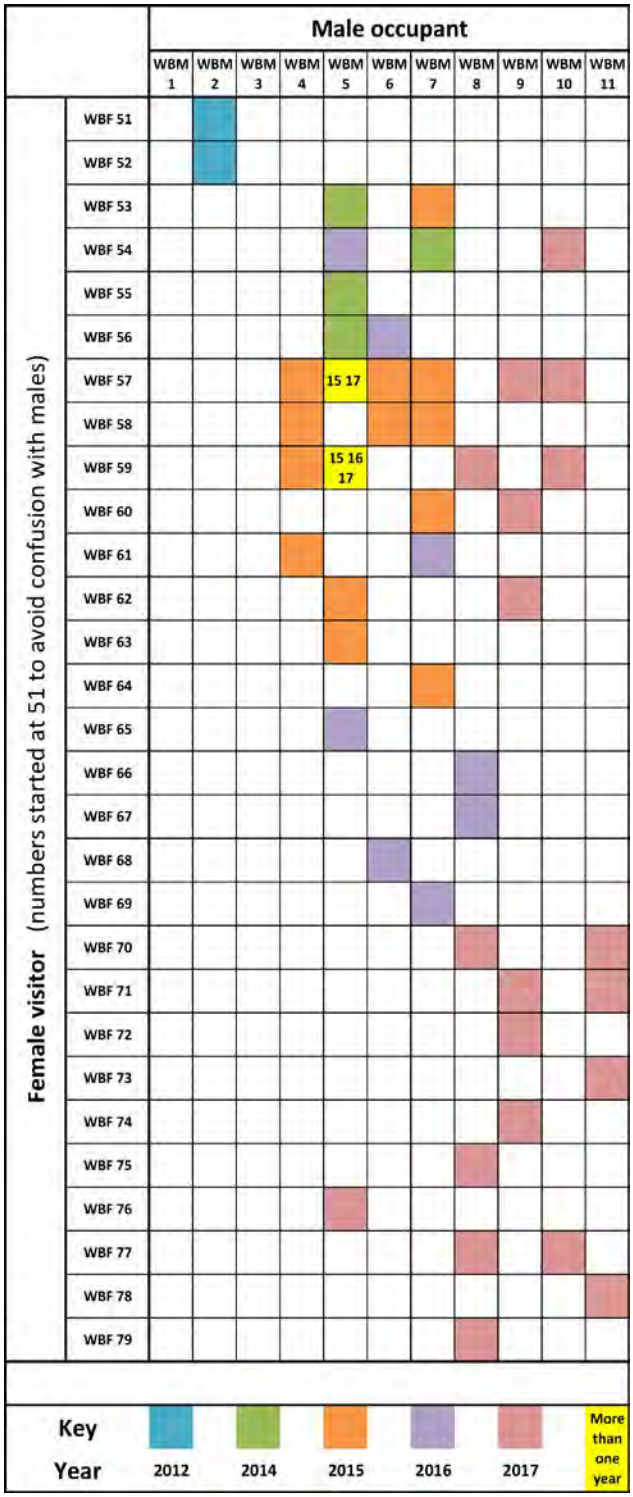


Fig. 9: Observed visits by female tompot blennies to male crevice occupants on the Wembury Bay reef in the breeding seasons from 2012 to 2017.

No information appears to be available on the process of egg-laying and fertilisation in tompot blennies. Close–up video of a female laying eggs at Wembury showed that she deposits the white adhesive 'cup', which attaches the egg to the rock surface, at the same time as each egg. It is not clear whether the male lays down a layer of sperm first, onto which the female lays, or if he fertilises them after they are laid. The male appears to move onto each group of a few eggs after they are laid, as if to fertilise them. However, the male's efforts in appearing to direct the female's laying position may suggest he has put down sperm first.

As expected from their breeding habits, the females at Wembury were regularly observed swimming out in the open across the seabed. On two occasions, larger females swam approximately 1 m above the seabed. Recognised females, including WBF58 'Bernice' and WBF59 'Barbara', were often observed occupying holes on the reef, separate from the crevice territories occupied by the breeding males. The same female could be seen in the same hole over subsequent visits but these observations were too irregular to determine whether females maintain territories.

7) 'Sneaker' behaviour by males

Alternative reproductive tactics occur in a number of blenny species (reviewed by Oliveira *et al.* 2009), where some males exploit the investment of conventional males by sneaking into their territories during spawning without contributing to subsequent egg care. 'Sneaker' behaviour occurs in the same genus (specifically the Azorean rock-pool blenny *Parablennius parvicornis*) but has not been previously reported in the tompot blenny.

Likely sneaker behaviour in the tompot first came to light following the observation of 3 visiting blennies within crevice C occupied by male WBM8 'Byron' in April 2016. At the time, all three visitors were assumed to be female but, in April 2017, one of these individuals (now recorded as WBM10 'Billy') was observed to have become a territory-holding, breeding male with obvious anal glands! See Figure 13.

A clear example of sneaker behaviour was then recorded in May 2017. Two females appeared to be laying eggs in crevice A occupied by WBM5 'Bradley' when another male (confirmed by obvious anal glands) approached the crevice. The intruding male was immediately driven away by 'Bradley' but returned around 4 min later. This time, the intruder entered the crevice and stayed there for approximately 3 min (Figure 14a). While in the crevice, the intruder remained close to a female and

Fig. 10: Male WBM9 'Barry' (centre, partly hidden) with two female visitors and a large raft of eggs.

exhibited fertilising-type behaviour similar to that seen in territory-holding males when with a female. 'Bradley' was on the far side of the female from the intruder and did not appear to initially notice him but, once aware, chased him away immediately.

A further example was identified by closely examining video stills of the blenny assumed to be a second female visiting WBM9 'Barry' within crevice D in June 2017. This revealed it had small anal glands and was actually a male exhibiting fertilising-type behaviour initially mistaken for egg laying (Figure 14b). 'Barry' tolerated this sneaker in full view for 12 mins, including for 10 mins after the female had left, before eventually chasing him away. Sneaker males in other blenny species typically have female features and rely on disguise (Oliveira *et al.* 2009). The intruder seen in 2016 (later 'Billy') and the sneaker with 'Barry' were paler than typical territory-holding males, while the sneaker with 'Bradley' had more typical male colouring and appeared to rely on speed and position to avoid detection. Colour change is discussed in Section 9.

8) Tompot blenny interactions outside the breeding season

This is now the more mysterious part of the study!

Fig. 11: Typical nibbling and nudging behaviour by males (on left in both photos) towards females laying eggs.

Fig. 12: Stand-off between 2 females (WBF58 'Bernice' and WBF77 'Bernadette') that ended in a mouthing attack by 'Bernice'. It was adjacent to crevice A occupied by male WBM5 'Bradley'.

On a total of 16 occasions, at the studied Wembury Bay reef, another Wembury location, St Agnes (Cornwall) and Swanage (Dorset), a smaller tompot blenny was observed approaching a larger individual and rolling into a partially sideways position that appeared submissive (Figure 15). The approaching 'submissive' blenny would then swim away or be chased away by the larger 'dominant' individual; these descriptions are now used for clarity. The gender of the 'dominant' individual could be confirmed in 12 of the encounters and it was a male in eight of these instances and a female in four. The gender of the smaller, 'submissive' blenny was only known on six occasions and it was either a recognised female (four instances) or male WBM10 'Billy' (two instances). 'Billy' was thought to be female at the time of those two encounters in 2015 and 2016, but was confirmed as a male in 2017. What is perhaps most mystifying, is that all 16 encounters were observed between late July and early October,

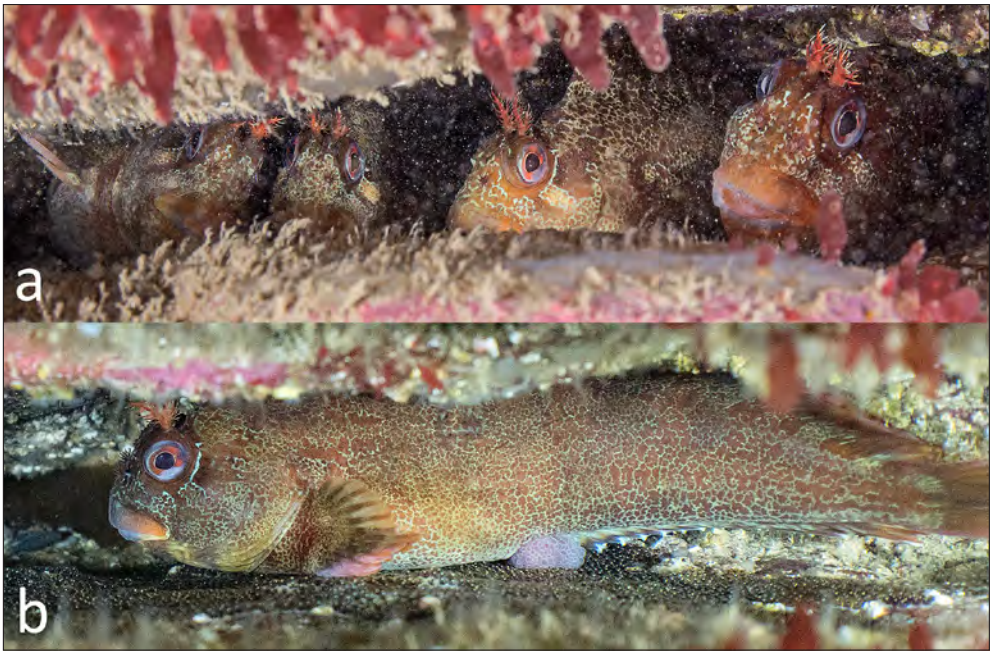


Fig. 13: a) Three visiting blennies in crevice C occupied by male WBM8 'Byron' (far right) in April 2016; b) The visitor second from right in a) was identified as a male (WBM10 'Billy') with obvious anal glands and guarding eggs in April 2017.

Fig. 14: a) Male WBM5 'Bradley' (left) with female (centre) and sneaker male (right) at crevice A; b) Male WBM9 'Barry' (left) with female (centre) and sneaker male (right) at crevice D.

outside the breeding season. Is it possible that the behaviour represents territories being established for over-wintering or the following breeding season?

Two encounters at St Agnes followed one another in quick succession as the 'submissive' individual from the first encounter moved just a few cm and received a 'submissive' posture from a smaller (third) individual before returning to again display a 'submissive' posture to the original, larger individual (Figure 16). At the studied Wembury reef, two recognised females (WBF65 'Beverley' and WBF59 'Barbara') were seen to act as 'submissive' to a recognised male and 'dominant' to a smaller, unrecognised blenny on different occasions. These observations, along with those from St Agnes, may suggest a hierarchy or 'pecking order' amongst a reef's tompot community.

A further intriguing feature of these tompot blenny interactions is that the dominant individual sometimes appeared to engage in display activity involving biting of objects such as tufts of seaweed or worm tubes. A striking and extreme example of such behaviour was observed at Swanage (Naylor & Jacoby 2016) where a large male tompot blenny moved an empty whelk *Buccinum undatum* shell around the seabed with a series of head movements. The male moved the shell on 10 separate occasions over six mins and, while this happened, two smaller, paler tompot blennies of unidentified gender approached the male and appeared to watch this activity (Figure 17). One of these smaller individuals also exhibited the 'submissive' rolling posture (Figure 15b) to the large male.

9) Colour changes

The colour and patterning of individual tompot blennies is changeable and variations were observed that appeared to correlate with the rôle of the individual in interactions with other tompot blennies. This aspect of the study is in its early stages but some clear examples are shown in Figure 18. In general, individuals appear to be darker when playing a dominant rôle in an interaction and paler (either generally or with more prominent pale markings) when playing a submissive rôle or, in the case of females, laying eggs.

The observed colour variations did not appear to correlate well with background, so were concluded not to arise simply from camouflage adjustment.

10) What happens to the eggs (egg maintenance by males and subsequent life history)?

Male occupants remained in their crevices on the studied Wembury reef over winter although

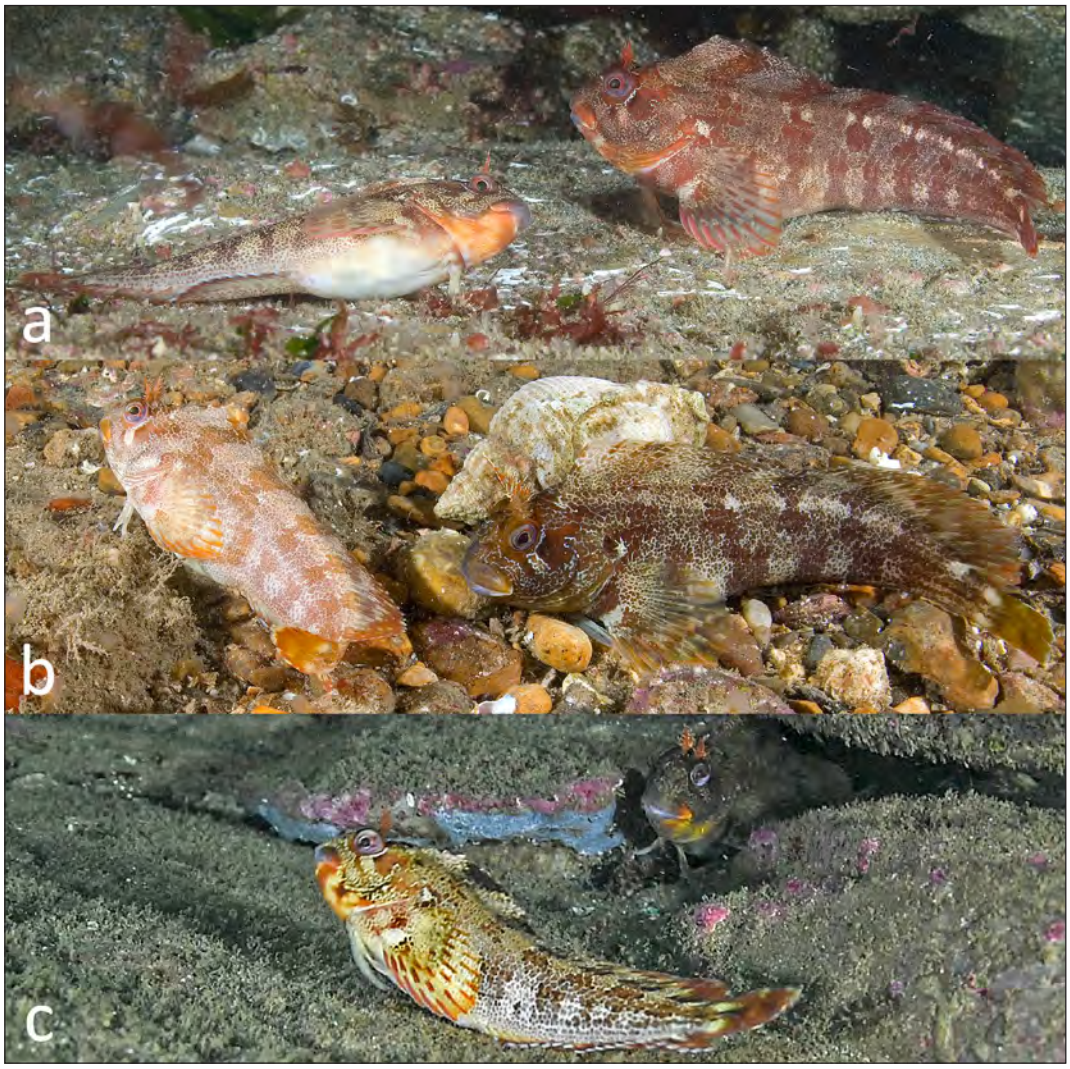


Fig. 15: Rolling and apparently submissive behaviour by a tompot blenny to a larger individual at a) St Agnes, b) Swanage and c) Wembury Bay.

they were often withdrawn and difficult to observe. They appeared to remove sediment from the rock surfaces before the arrival of egg-laying females but such 'spring cleaning' requires further observation. Eggs, laid between late March and mid-June, formed a single layer raft on the floor and often the ceiling of the crevices. Within a raft, there were patches of eggs laid at different times and therefore at different stages of development (Figure 19).

Once males had eggs to guard, they were regularly observed wiping their enlarged anal-bulb glands across the eggs as they wriggled within the crevice, also turning over to wipe eggs on the crevice ceiling. In other blenny species, the anal glands have been shown to produce mucus containing anti-microbial compounds that, when applied to eggs, improve their survival (Pizzolon *et al.* 2010). Other egg maintenance activities by male tompots included removing debris such as fragments of seaweed. They were seen picking up pieces in their mouth then swimming out of their crevice, by up to 50 cm, before spitting them out.

Male crevice occupants were observed driving away potential egg predators including the crustaceans *Necora puber* (velvet swimming crab), *Cancer pagurus* (edible crab) and *Galathea strigosa* (spiny squat lobster). The blennies generally achieved this with sudden attacks on their legs or abdomen (Figure 20). On two occasions, WBM5 'Bradley' was seen evicting a velvet swimming crab from his occupied crevice by supplementing darting attacks with forcing movements of the muscular rear part of his body.

Despite being frequent co-residents, common prawns, *Palaemon serratus,* were never observed

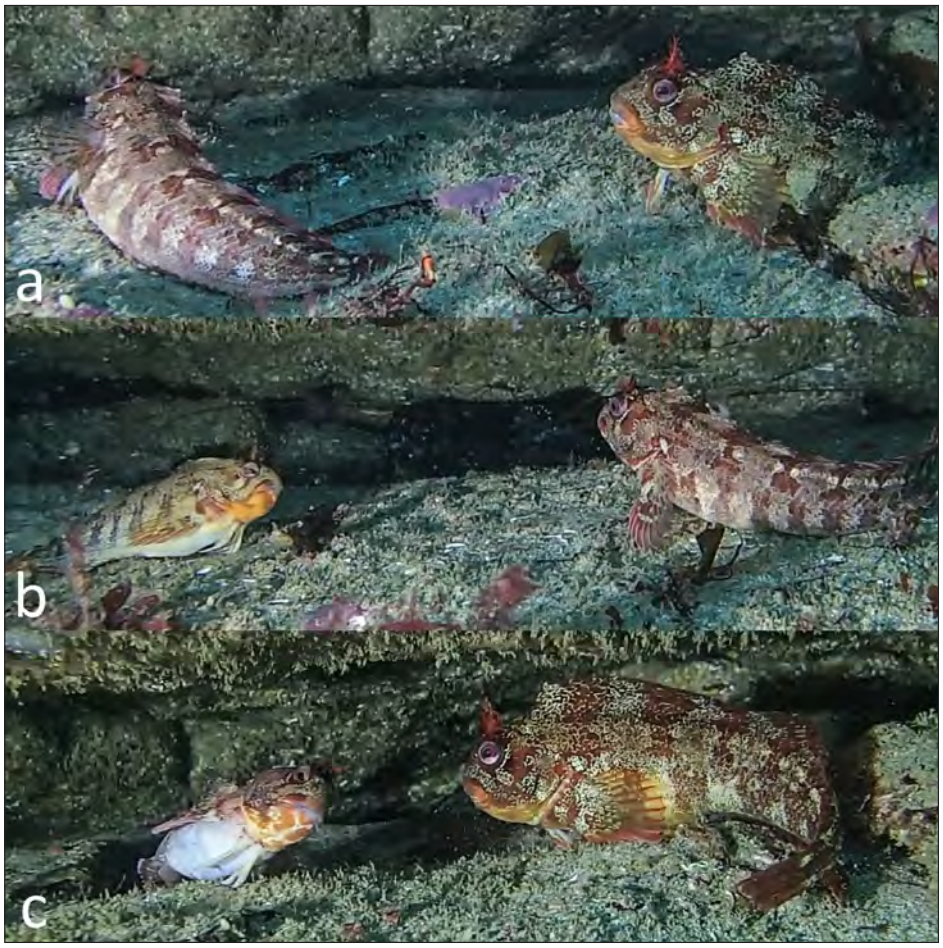


Fig. 16: a) St Agnes tompot exhibits rolling, submissive behaviour to a larger individual then… b) receives similar behaviour from a smaller blenny then… c) returns to again display a submissive posture towards the first, largest blenny.

Fig. 17: A large male tompot blenny moves a whelk shell around the seabed with a series of head movements while watched by two smaller individuals, one of which had also exhibited the rolling, 'submissive' behaviour.

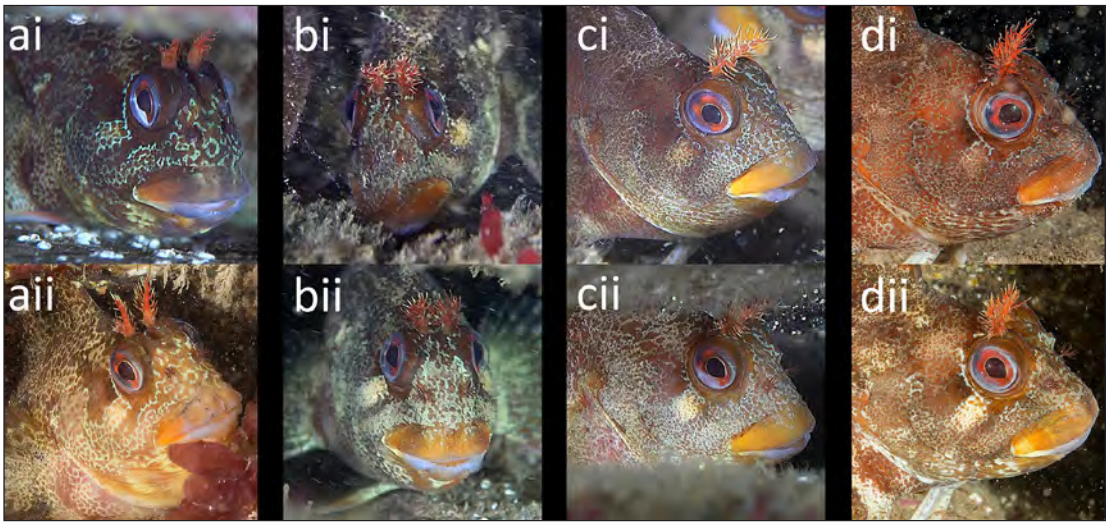


Figure 18: a) Male WBM10 'Billy' i: guarding eggs April 2017, ii: 'sneaking' April 2016. b) Female WBF58 'Bernice' i: fighting with 'Bernadette' May 2017, ii: with male 14 minutes earlier. c) Female WBF77 'Bernadette' i: fighting with Bernice May 2017, ii: with male 20 days later. d) Female WBF65 'Beverley' i: interacting with smaller individual September 2013, ii: exploring reef May 2015.

being attacked. Fish species seen driven away by tompot crevice occupants included *Zeugopterus punctatus,* topknot, *Ctenolabrus rupestris,* goldsinny wrasse, and *Lepadogaster candollei,* Connemara clingfish. With goldsinny and clingfish, tompot blennies typically drove them away when they were guarding eggs but tolerated their presence at other times.

Tompot blenny eggs appeared to mainly hatch in June and July, with the latest eggs seen around 20th July on the studied Wembury Bay reef. The pale attaching 'cups' were not usually obvious after the eggs had hatched, but Figure 21 shows an unusually clear patch.

Tompot blenny larvae develop in the plankton and settle when around 18 mm total length (Fives 1986). In August and September, small tompot blennies between 20 and 30 mm were seen on the Wembury Bay reef (Figure 22) and were assumed to have recently settled. In September 2014, bouts of aggression including stand-offs and mouthing attacks were observed between juveniles approximately 25 mm in length.

Tompot blennies of varying sizes between 20 mm and the reproductive adult size (approximately 100 to 200 mm) were seen on the studied Wembury Bay reef. The longest period over

Figure 19: Eggs within a raft at different stages of development including recently laid (dark purple), intermediate (yellow) and nearly ready to hatch (silver with obvious eyes). The female is laying more.

Fig. 20: a) Male WBM1 'Benny' waits for the right moment before… b) attacking the rear of a velvet swimming crab and ejecting it from his crevice.

which a recognised individual has been observed stands currently at 4.3 years and counting. This individual ('Byron') was an adult when first recorded so the maximum lifespan is certainly greater than five years and may be much longer.

11) The tompot blenny as ambassador for the marine environment

Showing people the appealing countenance of tompot blennies, and describing the intricacies of their behaviour, is an excellent way of introducing the fascination and beauty of our marine life. The stoniest-faced non-biologist audience starts to respond positively at the first sighting of that distinctive head peering out of its home! The fact that individual tompot blennies are recognisable adds yet further to that charm and helps engage the audience and draw them into the marine world.

Favourite quotes from media coverage of our tompot blenny studies include:

'the small fish with a big personality' – The Guardian

'looking like a clown but nobody's fool' – Daily Express

'Glam rocks' – BBC Wildlife

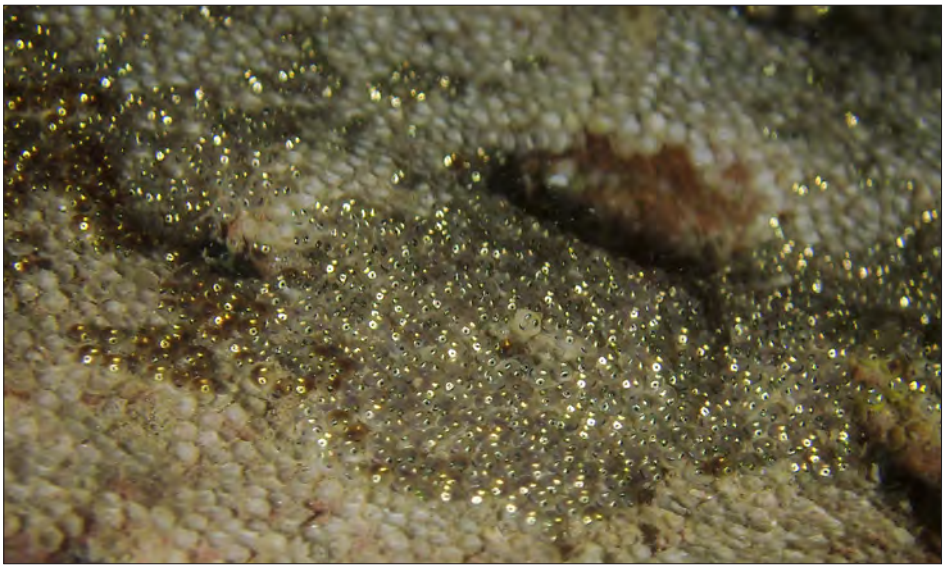


Fig. 21: Tompot blenny eggs and the attaching 'cups' that remained after some had (presumably) hatched; Paignton, Devon.

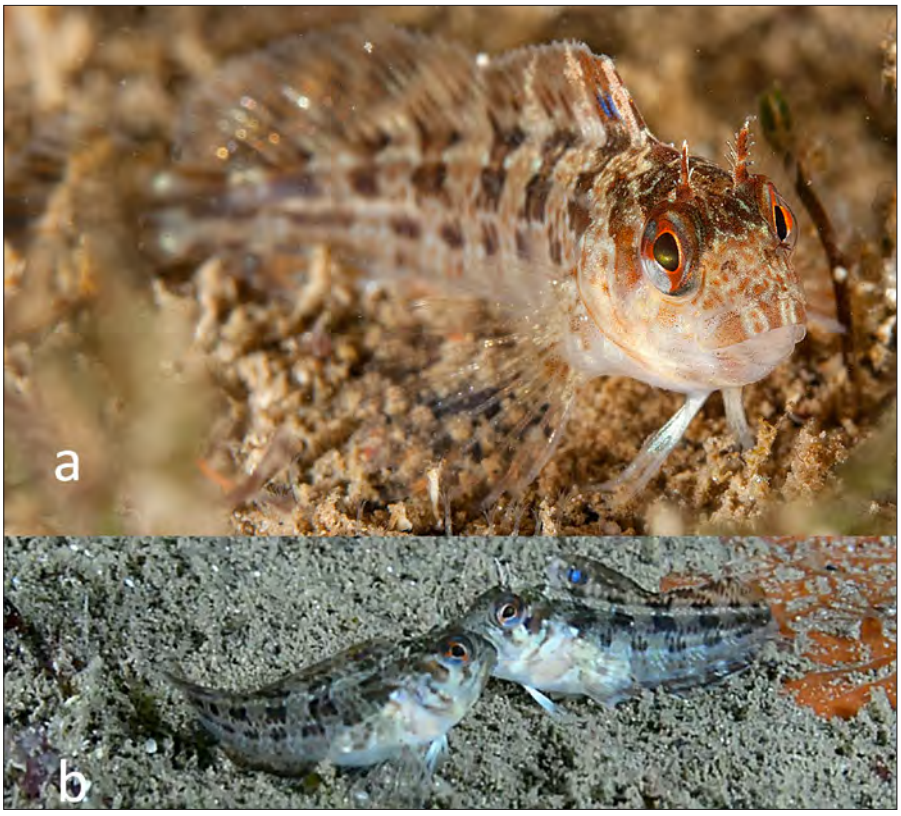


Fig. 22: a) Juvenile tompot blenny, approximately 25 mm long, on the Wembury Bay reef. b) Two juveniles fighting.

'underwater soap opera with its cast of characters… intimate insight into the life of this charismatic little fish…' – The One Show

All these pieces have met our aim of raising awareness of the colourful nature of British marine life and the importance of its protection.

Figure 23 shows a wonderful example of tompot blenny charisma. During promotion of the educational book *Benny the Blenny's Shallow Sea Adventure*, we took a copy underwater in the hope of getting photographs with an inquisitive blenny. Male WBM1 'Benny' exceeded our wildest expectations by swimming from his crevice to have a good look! The results are great for engaging schoolchildren by showing 'Benny' as a 'real fish'.

Conclusions

Summarised conclusions from my observations:

• Male tompot blennies can retain a crevice territory for up to four consecutive breeding seasons and stay there over the winter.

• Competition between males for crevice territories is intense but retention is strong; no eggs were seen abandoned by a male before hatching.

• Egg-guarding activities by males include wiping the layer of eggs with their enlarged anal glands, removing debris and driving away potential predators.

• Mating follows the expected promiscuous blenny pattern of a female visiting several males to lay eggs and a male hosting several females. Males occasionally host two females simultaneously.

• When a female arrives at a male's resident crevice, he makes darting movements of a type not seen at any other time.

• 'Sneaker' fertilisation behaviour by intruding males was observed; which has not previously been reported in the tompot blenny. A potential 'sneaker' male became a territory holding male the following year.

• A variety of agonistic interactions occur among males, among females and between males and females. Many of these happen outside the breeding season.

• Agonistic interactions may be accompanied by a) the apparently submissive participant rolling their body to a sideways position and b) the apparently dominant participant biting at or moving seaweed or other objects.

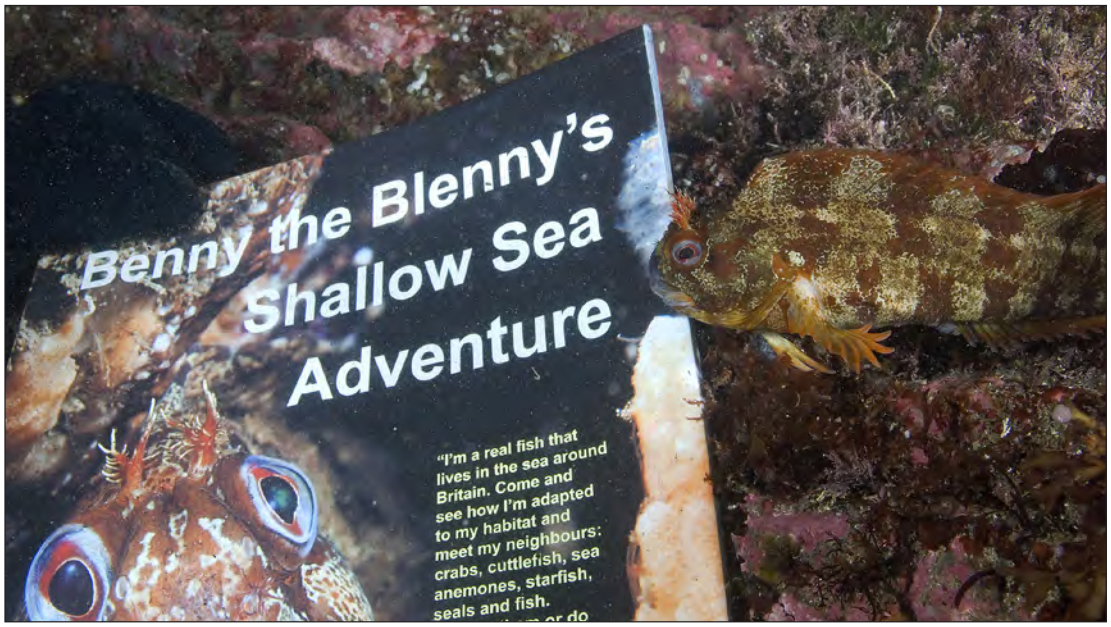


Figure 23: Male WBM1 'Benny' looks at a book!

- The colouration and patterning of individuals is changeable and appears to vary with their rôle in inter-blenny interactions.
- Several aspects of tompot blenny behaviour are consistent with mutual mate selection where both males and females are choosy.
- Behaviour in this charismatic species is complex.

Final note

Above all, I hope these observations demonstrate a little of the complexity and intrigue in the wonderful marine habitats 'on our doorstep' and encourage more observations on tompot blennies and other species. I am certain that tompot blennies are not unique in exhibiting such fascinating behaviour, but they do seem unusual in their tolerance of being watched!

Acknowledgements

I would like to thank Teresa for all her wonderful support, especially for being so captivated by tompot blennies and therefore being an extremely patient dive buddy, observer, video editor and proofreader.

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Biological Observations

Peter Barfield

Sea-nature Studies
Email: peter@seanature.co.uk

At the Plymouth Porcupine conference in March 2017 I chaired a session on 'Biologcal Observations'. Jon Moore had come up with the idea to ask members if they had any interesting / unexplained / new observations of species biology and ecology. A selection could then be presented and discussed during the session. Jon provided an example of his own for the Porcupine website in the run-up to the conference to get people thinking:

*'Why would several (10+) baby starfish (*Asterias rubens*) position themselves upside down, mouth held outwards into the water column, arms bent downwards so that the tips held onto rock, on lower shore rock?'.*

Jon had observed this at two sites in South Pembrokeshire in October 2016.

These types of encounters might, at first glance, elicit an open-mouthed, head-scratching moment of delight, followed by the question, 'just what am I seeing?'. By way of an introduction to the session I presented three such observations, now reported here, two personal and a third from fellow Porcupiner, Richard Lord.

The three parts were titled as follows:

(1) Masked crabs on a muddy-sand shore;

(2) The tortoise and the hare (or, slowly, slowly, catchy monkey); and,

(3) Mud-shrimp mind map.

I began my talk with an example of how these things can sometimes make headlines. In December 2016, BBC Scotland reported on a kingfisher in the Montrose Basin which had been observed pinning sticklebacks it had caught to a branch it was using as a perch. It was baffling behaviour which prompted a Ranger from the Scottish Wildlife Trust's Montrose Basin wildlife reserve to say, "We'd like anyone who has seen anything like this before to get in touch".

Part One - Masked crabs on a muddy-sand shore

The crab only buried itself when I stood next it rudely taking macroshots (above). This is how I found it (below).

Corystes cassivelaunus *(Pennant, 1777) standing proud of the sediment at low water in the Solent February 2016.*

There were several examples over a relatively short distance. Apparently, it's not unusual to find them like this sublittorally. But intertidally, with predators near-by? The over-riding question was, 'Why is this crab behaving in this way?'.

Christy (1987) noted:

'Corystes cassivelaunus do not mate when the female moults and is vulnerable (Hartnoll, 1968). Yet there appears to be especially strong sexual selection favouring mate guarding and associated male behaviour and morphology (large chelae). Perhaps male size and aggressive ability in these crabs are correlated with genetic determinants of reproductive or general fitness…'

Is it an expression of an aggressive propensity?

Or perhaps parasitism resulting in behavioural changes? The University of Portsmouth Press Office posted this on research being conducted by Dr. Alex Ford:

'A new species of brain-altering parasite has been discovered in Hampshire by University of Portsmouth scientists.

A study led by marine biologist Dr Alex Ford of the University's Institute of Marine Sciences, found that amphipod shrimps in Langstone Harbour, Portsmouth, were infected with a species of trematode that changed the shrimps' behaviour to make them swim into the light, where they were more likely to be eaten by birds.

Dr Ford, said: "We think we know all the species that live on our doorstep, so it's really exciting when we find a new one. I expect that shores around the UK will be harbouring other parasites that are completely unknown to science at the moment."'

Other ideas floated and discussed were:

• Unaware that the tide was out…?!

Divers report that masked crabs behave similarly sublittorally so maybe it's just an extension of that. It doesn't explain the behaviour but suggests it is perhaps consistent.

• Breathing?

It's well documented that the crab uses its antennae when buried to form a tube and breathes through this might the behaviour be related to this?

• Bad taste?

Perhaps, they just don't taste very good so the birds avoid them at this time?

• Poor energetic return?

Or, maybe the energetic return is poor for the effort of eating them and the birds are old enough at this point in the winter to have learnt this?

Birds certainly do eat the crabs (see below).

Bird tracks and peck marks in the sediment around a dead masked crab on the same shore in the summer of 2016.

Part Two - The tortoise and the hare

This example is short and sweet and asks how did a snail catch a razor shell (below)?

Buccinum undatum Linnaeus, 1758 *(common whelk) holding onto the tip of* Solen marginatus *Pulteney, 1799 (grooved razor shell)*

Whelks are well known to feed on bivalves but equally, razor shells can retreat down their burrow very quickly so how does the whelk do this?

Part Three - Mud-shrimp mind map (Richard Lord)

Axius stirhynchus *Leach 1815 (mud shrimp) taken by Richard Lord on the shore at Le Hocq, Jersey on the 23rd July 2005*

These events can stick in the memory, more than just curiosities, they leave us with

questions, speculations which stay with us. For Richard, it raised questions on our understanding of intelligence and how we perceive intelligent life. This is my recollection of the fascinating story he recounted to me over the phone.

This observation is tied to a conference on marine biology that took place in Jersey that year (2005). Jersey tides can get very low, up to mile or more offshore.

Richard was with a group of children and mums a couple of hundred yards offshore and came across a large (perhaps 100 feet by 100 feet or so) and very shallow pool filled with cobbles and pebbles and gravel.

The children were catching various animals with small nets and buckets and one girl had caught an *Axius* sp.. Richard asked her where she got it and she said she just saw it walking around on the edge of the pool.

Ingle and Christiansen (2004) provide two vernacular names for the species. The first is the generic 'mud shrimp' and the second is specific to the Channel Islands, 'la lipolte'.

The species is known to live beneath stones in mud and build complex networks of tunnels through the substrate. Apparently, they are frequently dislodged by bait diggers using trenching tools to find polychaetes. In fact, the species is associated with *Marphysa* sp. (Ingle & Christiansen, 2004) and in the Channel Islands, *Marphysa sanguinea* (Montagu, 1813), which can reach between 300-600 mm long and is valued as angling bait. This species can be found in mucus-lined galleries in muddy sand under stones and among old shells on the lower shore (Fowler 1999). It sometimes referred to as 'rock-worm' or more simply, 'verm'.

Richard had never observed a mud shrimp just walking around freely on the surface and he was keen to take a photograph but the water was filled with sediment kicked up by the eager hunters so he couldn't take a picture near to where the specimen was found. So, he walked to the centre of the pool many yards from all the children and put the *Axius* down into clearer water whereupon it turned itself around in a 360-degree circle as if orientating itself and then proceeded to quickly and carefully move bits of shell and gravel with its chelae to expose an entrance to a burrow before disappearing down it. It was so fast that Richard only managed one or two photos before it was gone. Richard stood there in open mouthed amazement, in his own words it 'blew him away' and the experience was so memorable it has stayed with him to this day.

The questions of course, are numerous. How did it recognise where it was? Did it have a 'map' in its neural network? Was it responding to some chemical signature? Just how big are their burrows? Do they share? Are burrows in fact communal? Or was it simply the case of, 'any port in a storm'?

There won't always be answers to the questions raised from such observations but perhaps Porcupine can continue to capture them at future conferences and this resource may be of some small use to students or researchers looking for interesting topics for investigation.

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Reports of the scale-rayed wrasse *Acantholabrus palloni* from waters around the British Isles: 1830–2016

Mike Markey

Acantholabrus palloni (Risso, 1810) is a medium sized wrasse, with an Eastern Atlantic distribution ranging from West Africa and offshore islands to Norway and into the Mediterranean and Adriatic seas (Fishbase: Froese & Pauly 2017), though it has been reported only very rarely from British waters and on present evidence is absent from Ireland.

The two earliest records from waters around the British Isles both come from Jonathan Couch's *Natural History Journals* (Couch 1805-1870). These journals are in twelve manuscript volumes, with each volume indexed by Couch himself. They are held at the Courtney Library in the Royal Institution of Cornwall. The same library also holds a number of Couch's original illustrations. Couch (1868) suggested that the 29 years between the two specimens being brought to him, pointed to the fish being rare. Nevertheless, in volume 11 of his Journals (p.53, July 1863) he noted that "Robert Hicks informs me that he knows this fish as not uncommon at rocks at a distance from land and in rather deep water". Hicks was a fisherman living in Polperro. Following Couch's second record there is a gap of 127 years before seven further observations spanning the period from 1986 to 2016. All of these relate to catches by anglers, except one, where the fish was spotted in a fish market, and the final one, which is an underwater photograph taken by the author. All the reports are from Cornish waters, with the exception of one where the fish was caught off western Scotland. Each of these records is detailed below with the date of capture of the fish, its location & depth, the source of the record and a reference to an image where one exists, followed by other notes.

1830, February

- Cornwall
- Couch (*Natural History Journals*, volume 5, pp. 114 – 115)
- Colour plate in Couch (1868). The fish is the top one of the two illustrated in the plate

Notes

The fish was brought to Jonathan Couch by an unknown fisherman who may have lived in Polperro, Cornwall (where Couch practised as a doctor), though he did not record the exact location and depth of the catch. Couch states that it was caught on a line and says of the species "their resort is in deeper water" (Couch 1868)

Couch's journal entry states:

> *"Wrass. 12 inches long, greatest depth exclusive of the fins 2¼ inches, the body plump. Head elongated, lips membranous, teeth numerous in several rows, those in front larger & more prominent, rather incurved. Eye moderately large. Anterior gillplate serrate, six gill rays. Body and gill covers with large scales. Lateral line nearer the back, descending with a sweep opposite the termination of the dorsal fin, & then passing straight back. Dorsal 21/8, the edge of the elongated portion of the dorsal fin reaching back to the rise of the base of the tail. Pectoral 14, the fin round. V 6 The outermost simple, stout firm, tippd; between these fins a large scale. Anal 6/8. The soft posterior part of this fin, like that of the dorsal, enlarged. Tail round, 15 rays. Between the rays of the dorsal anal & caudal fins is a process formed of firm elongated imbricated scales. Colour uniform light brown, lighter on the belly; black upper eyelid; at the edge of the base of the caudal fin a dark spot. Pectoral fin yellow, dorsal bordered with yellow. This is the only one of the fish that I have seen."*

Couch indexed this entry as 'Wrass, strange'. He published his description and a line drawing of the fish in Loudon's Magazine (Couch 1832) but apparently mis-read his own journal, giving the length as 22 inches. This figure has been repeated without question by authors including Couch himself (1836, 1868), Yarrell (1836), Hamilton (1843) and Day (1880).

The fish is named in Couch (1832) as *Labrus luscus* Linnaeus, 1758, in Couch (1836) as *L. luscus / Crenilabrus luscus* (Linnaeus, 1758) and in Yarrell (1836) as *C. luscus*. Hamilton called it *Acantholabrus couchii* Valenciennes, 1839, and Day *Acantholabrus palloni* (Risso, 1810).

1859, 24 March

• Deadman [now Dodman] Point, Cornwall. "… the depth of water was above fifty fathoms" (Couch 1868)

• Couch (*Natural History Journals*, volume 10, pp. 432 - 433)

• Couch's original water colour illustration of this fish is in the collection of the Courtney Library, Royal Institute of Cornwall. The picture has 'P38 Vol III' written below it, clearly associating it with the colour plate on page 38 of Couch (1868), although the direction of the fish is reversed in the printed version. The water colour is signed "J.C. 1859 March 24".

Notes

Couch's journal entry states:

> *"March 24 – Scale rayed wrass – a specimen brought to me – 10 inches long. Paler in colour than the former specimen & without its finer markings – a dusky pink over the body a dash of dark over the eye. Eye - iris silvery, a blue border. A black spot on the dorsal fin where the spinous processes join the fanshaped rays. A spot on the upper margin of setting on of the tail – another fainter and more scattered on the lower margin. I cannot find a nostril.*
>
> *D 21.8. Va 5.7. P 15 – the sh very short. V 1.5. C. fanshaped – their stems covered with the scales, and so not easily counted. This fish was taken with a line – off the Deadman in upwards of 50 fathom water. The top of the head is remarkably flat. It appears there to be a deepwater species: but perhaps not so rare as it seems; for our fisher are accustomed to cut up all such fish for bait & so do not bring them ashore. In the present instance the fisherman had cut off one of the sides before he thought of bringing it. At first view it has much the look of a Serranus."*

It is almost certain that the stuffed specimen held at the Natural History Museum in London is this fish (though the specimen is eleven inches long). Couch said that the fisherman who caught it "had already cut off a slice from the side" and "after being preserved, as well as it could be done under the circumstances . . . the specimen was handed over to the collection of the British Museum" (Couch 1868). The NHM specimen is missing its left side. The name *Acantholabrus couchii* is written on a card backing that retains the stuffing, with '*Acantholabrus palloni*, Cornwall' written on the front of the plinth. Günther (1862) lists one stuffed specimen under the name *Acantholabrus palloni*, with the description "Adult: stuffed. Cornwall. From Mr. Couch's collection as *A. couchii* (anal spines 5)". He also remarks separately under *Acantholabrus couchii* that "Only one specimen, from which Mr. Couch has given his description, has occurred, and it was not preserved", suggesting that he thought at the time that the two fish were separate species.

1986

• 8 miles S of Looe, Cornwall

• http://data.nhm.ac.uk/object/26eafdb5-9d64-4ba2-9207-27cee9d9e956, NHM catalogue number 1986.2.13.1

• No image

Notes

Specimen presented to NHM by Roger Swinfen, MBA

1986, 31 July

• Eddystone Reef (7 miles south of Plymouth)

• http://data.nhm.ac.uk/object/9c23646a-918c-4295-a857-f8e2e68cf677, NHM catalogue number 1986.10.13.1

• No image

Notes

Specimen presented to NHM by Roger Swinfen, MBA

1986, 25 June

• Approximately 5nm north west of the Cairns of Coll (the NHM record has 'Off Tobermory, Isle of Mull'), water depth probably between 30m and 70m. The area was indicated to the author on a copy of a marine chart.

• http://data.nhm.ac.uk/object/8631ade3-ad70-457f-8d6d-ee9e7fef922d, NHM catalogue number 1986.10.13.2 and Brian Swinbanks (pers. comm.)

• Scan of photograph (B. Swinbanks)

Notes

Rod and line capture by Jeffrey Teal Bishop. Specimen donated to NHM by Brian Swinbanks, who was the boat skipper at the time of capture. The seabed in the area where the fish was caught was described by Brian Swinbanks as "ground which rises and falls, up and down by 30m with steep cliffs and gullies". There are water depths of over 60m in the immediate vicinity.

1992, 31 July

- Eddystone Reef, 11 Nm south south west of Plymouth
- http://www.anglingtrust.net/page.asp?section=41 BRFC Sea Fishing Records – Dec 2016
- No image

Notes

The fish was caught on rod and line by J Vaughan, and its size is given in the BRFC records list as 418g. It was also recorded by NHM at http://data.nhm.ac.uk/object/fb52ee4b-b53d-4351-9ac2-bf883d986765 catalogue number 1993.1.28.1. This seems to be the same fish recorded by ERCCIS, reference ERICA-ST27544, and noted there as having been seen at Plymouth MBA by Douglas Herdson, Geoff Potts and Silja Swaby; the weight was given as 419g. Herdson, however, was not at the MBA in 1992 (pers. comm.), so clearly the ERCCIS record is not completely accurate.

2011, 21 August

- 7 miles off Newquay, over reef in 150-200m
- http://data.nhm.ac.uk/object/8e4a71df-373a-4edb-9dd4-2cf9f8c9a24b, NHM catalogue number 2012.1.21.1
- No image

Notes

This is likely to be the same fish recorded by ERCCIS (ref. ERICA-ST27543) with the same date and location as above, and noted by them as having been caught on rod and line. The angler's name is given there as Mr. Williams, though the NHM record states that their specimen was donated by Mr. Pinney. According to Douglas Herdson (pers. comm.) it is likely that Mr. Pinney was the angler and Marcus Williams the aquarist at the MBA who identified the fish.

2016

- Cornwall
- http://data.nhm.ac.uk/object/4a0d6e69-47d5-408f-a061-90ca57719fd7, NHM catalogue number 2016.5.18.14
- No image

Notes

The specimen was donated to NHM by Andrew Drysdale. Drysdale found it in Looe fish market in a box with other wrasse, particularly cuckoo wrasse *Labrus mixtus* Linnaeus, 1758. He thought that it had probably been caught in nets set for grey mullet *Mullus surmuletus* Linnaeus, 1758 (pers. comm.)

2016, 26 October

- Hand Deeps, East Cornwall, 26m water depth
- Observation by the author
- Underwater photograph (Figure 1)

Notes

The fish, estimated to be 20cm long, was feeding amongst a group of rock cooks *Centrolabrus exoletus* (Linnaeus, 1758) from the short turf near the top of an underwater cliff. The seabed at the base of the reef was around 45m deep. The fish disappeared as soon as the camera flash fired.

Fig. 1: Acantholabrus palloni *at 26m off Plymouth (Photo: Mike Markey)*

A further record, in CEFAS Technical Report no. 150 (Silva, Ellis & Ayers, 2013) has been re-examined by one of the authors and found to be a mis-identification (J. Ellis, pers. comm.)

Couch's manuscripts

In addition to his printed works and the twelve volumes of his *Natural History Journals* Jonathan Couch wrote two very substantial manuscript volumes devoted entirely to fish, in both of which he repeated information about the scale rayed wrasse that he first recorded in his journals. Both include the mistaken length of 22 inches for the 1830 specimen.

His *Natural History of Cornish Fishes* was 'finished' in 1827 (p. 421) apparently using only one side of each page, but further notes, illustrations, newspaper cuttings and letters were inserted later, many on the backs of existing pages, with the latest dated entry being from 1855. The page describing his first scale rayed wrasse is in a supplement glued into the back of the volume. The original manuscript is now held by the library of Princeton University, New Jersey. An article (Savage, 1959) explaining its presence there and describing the manuscript in detail was published in the Princeton University Library Chronicle, an offprint of which is held by the Linnean Society library in London. A microfilm copy of the whole manuscript can be seen at the Cornish Studies Library, Redruth, Cornwall.

A more wide-ranging work titled *A Natural History of the Fishes of the United Kingdom* has no date on the title page but presumably was completed in 1836, or earlier: Couch has written on the flyleaf:

> *"This volume was employed by W. Yarrell in the Composition of his History of British Fishes: being the same that is quoted in that work, by the name of Couch's M.S.*
>
> *Jonathan Couch*
> *Polperro 1836*
> *September 23rd."*

He heads his entry for the scale rayed wrasse with the names *L. luscus*, Lin and *Crenilabrus luscus*. Cuv., and finishes it with a comment about possible juveniles that appears nowhere else in his works, either manuscript or published:

> *"I have seen only one specimen of this wrass of the size mentioned . . . but I have met with specimens, about 3 inches long, that resemble it too nearly to permit me to consider them as different species." (p. 75)*

This volume is held in the Linnean Society, London.

Acknowledgements

The following people have provided valuable information and suggestions in the course of the compilation of these notes: Lin Baldock, Andrew Drysdale, James Ellis (CEFAS), Douglas Herdson, James Maclaine (NHM), Declan Quigley, Brian Swinbanks.

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Return of the crawfish?

Charlotte Bolton
National Seasearch Co-ordinator

Divers around the western coasts of the UK have been witness to an amazing phenomenon as the charismatic species *Palinurus elephas* (Fabricius, 1787), the spiny lobster, crayfish or crawfish, returns to our inshore waters. The species has been recorded in ever-increasing numbers since 2014 (see Figure 1 for sightings in England), having been exploited almost to extinction in the previous four decades primarily due to the use of tangle nets. Historically, *Palinurus* fisheries existed in the south-west, particularly Cornwall and the Isles of Scilly, Pembrokeshire, the south and west coasts of Ireland and the west coast of Scotland (Hepper 1977, also compare Hunter *et al.* 1996). The subsequent decrease in the population, measured by landings records, could arguably categorize *P. elephas* as 'critically endangered' under the IUCN criteria (IUCN 2017); although it is officially considered 'vulnerable'. *Palinurus elephas* was included on the original UK BAP (Biodiversity Action Plan) list (JNCC 2016) and subsequently on the separate country priority lists of the post-2010 Biodiversity Framework. Management of the *Palinurus* fishery relies on technical measures (e.g. minimum landing size, MLS) and local, often voluntary, regulations (e.g. prohibition on landing berried females (DEFRA 2017[1]) in place to protect stock levels, with varying levels of compliance.

Seasearch in South and West Wales have run focused surveys to establish the status of the species in that area (Lock 2010, Jones & Lock 2014), with associated publicity encouraging recreational scuba divers to report their sightings, and in 2009, an online recording process was created to facilitate the capture of those records. This year, Seasearch have targeted divers, charter boats and dive centres throughout the South-West and further afield, to raise awareness of the burgeoning *Palinurus* population and to generate some meaningful data to inform management measures (Figure 2). For example, the Manacles Marine Conservation Zone (MCZ) on the eastern side of the Lizard peninsula in South Cornwall lists *P. elephas* as one of its designated features, with a conservation objective of 'recover to favourable condition'. Marine Protected Areas have been shown to act as an effective tool to rebuild populations of *P. elephas* in the western Mediterranean (Goñi *et al.*, 2002) with increased numbers migrating out from the protected area.

[1]Subsequently prohibited in England under 'The Lobsters and Crawfish (Prohibition of Fishing and Landing) (Amendment) (England) Order 2017", http://www.legislation.gov.uk/ukia/2017/136/pdfs/ukia_20170136_en.pdf

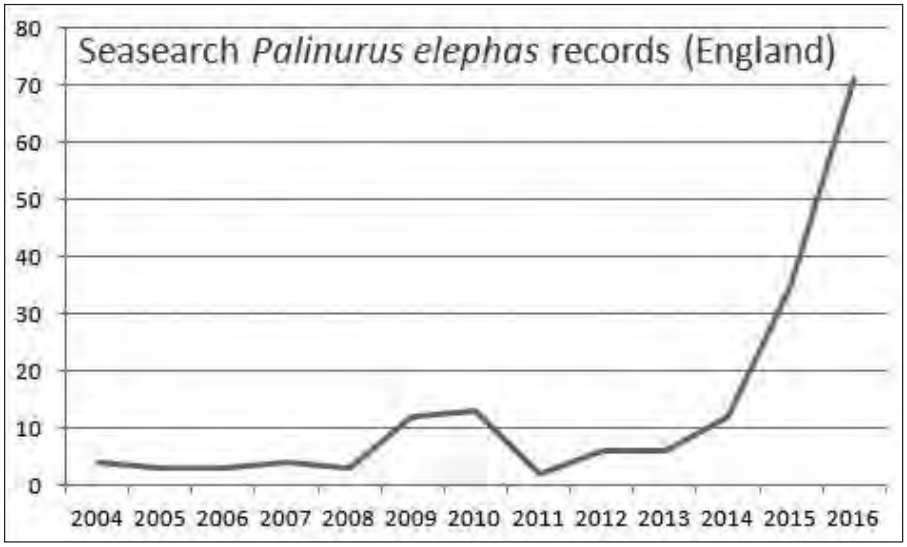

Fig. 1: Graph showing reported crawfish sightings in England 2004-2016

Fig. 2: Seasearch poster circulated to encourage reporting of crawfish sightings 2017

One of the difficulties with juvenile crawfish is to estimate their size without disturbing the animal. Measuring the carapace length is almost impossible when the target is firmly entrenched in a fissure in the reef! (See Figure 3 for a photographic size estimate guide.) As a result, the recording process needs to be simplified so that divers can submit a photo (or photos) of their sighting together with an accurate position and description of the habitat. Social media is a prime source of records as divers share their photos online.

Sue Daly, a professional wildlife photographer and film-maker based on the island of Sark in the Channel Islands, has produced a short film to highlight the situation and as a call for immediate protection to avoid a repeat of the over-exploitation of the past. Check it out at https://vimeo.com/234074069.

What next?

We will be presenting the crawfish story at the South West Marine Ecosystems meeting in Plymouth in April 2018, and publicising as widely as possible to gather sightings. Local focused surveys will take place in Cornwall and South Wales – check out the Seasearch website for dates and details. Seasearch will also be participating in discussions with regulators about how to maximise the benefit of the collected data.

We encourage all diving Porcupines to report their sightings!

http://www.seasearch.org.uk/downloads/crawfish-recording-form.pdf

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Hunter, E. Shackley, S.E. & Bennett, D.B. 1996. Recent studies on the crawfish *Palinurus elephas* in South Wales and Cornwall. *Journal of the Marine Biological Association of the UK* (1996) **76**,963-983 (https://doi.org/10.1017/S0025315400040911)

Fig. 3: Estimating Palinurus elephas *sizes from photos, from 'very large' (A), 'large' (B), 'medium' (C), 'small (D) to 'tiny' (E). It is almost impossible to get an accurate estimation of carapace length until the animal has attained 'medium' status and is bold enough to emerge from the reef.*

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Lock, K. 2010. *Seasearch Wales: Crawfish* Palinurus *elephas historical diver records*. Download from http://www.seasearch.org.uk/downloads/crawfishWales2011%20report.pdf (accessed 2017-12-04)

Seasearch wins NBN awards!

Sarah Bowen

Paula Lightfoot, who so ably organised the Porcupine Fieldtrip in Newcastle in September, is the 2017 winner of the National Biodiversity Network (NBN) David Robertson Adult Award for marine and coastal wildlife. The award was presented at a ceremony during the annual NBN conference held in the National Museum of Wales in Cardiff on November 16th.

David and I, being fairly local, felt it would be good to go to support the prize-winner and fly the Seasearch flag, and so duly appeared at the appointed time, sporting our Seasearch T-shirts. Glasses of wine in hand, we found a table right at the front of the action and waited for the announcements.

We raised a glass to Paula and her great achievement in both subtidal and intertidal recording around the Durham Heritage Coast. Her records are contributing to the building of a clear picture of communities that are re-colonizing the Magnesian Limestone formerly despoiled by mining activity. As the Seasearch Co-ordinator for the North East, she also trains volunteer divers and is responsible for arranging surveys and ensuring that records are produced from the dives. Paula then verifies the records and ensures that they are shared via the NBN Atlas.

As it turned out, Paula was not the only winner this year! Seasearch won the John Sawyer NBN Open Data Award for their contribution to ensuring that data is accessible to all who wish to refer to it. In a recent survey, carried out by Seasearch Co-ordinators to discover what participants want from the project, many people stated that a strong motivating factor for their involvement is the thought of their records being useful. It is particularly gratifying to have this recognised by NBN in this way.

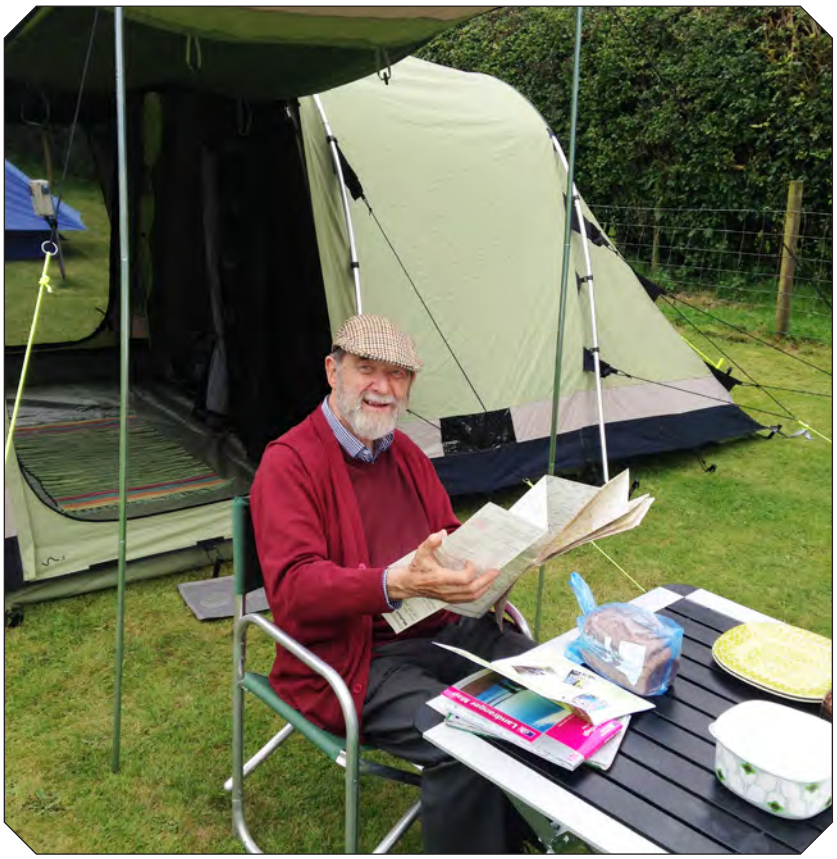
So, having felt slightly like gate-crashers initially, it was a complete delight to witness the National Seasearch Co-ordinator, Dr Charlotte Bolton being utterly speechless with surprise! No-one had any idea about that award. On a personal note, I continue to be excited, challenged and extremely proud to be involved with Seasearch and look forward to the 2018 diving season.

(from left to right) Paula Lightfoot, Sarah Bowen, David Kipling and Charlotte Bolton holding the certificates and award.

OBITUARY

Frank Evans

28 August 1926 – 26 October 2017, aged 91 years.



Frank camping in Pickering, July 2017

Born in 1926, Frank grew up in Thornton Heath, Croydon, where his parents Alf and Beatrice were school teachers. They were active, outdoors people; Alf was a football referee and his mother Beatrice was a keen camper: Frank's first camp was at the age of ten months, complete with nappies blowing on a makeshift washing line strung from the tent. His final night under canvas was in July 2017, just a few weeks before he died…a full ninety years of, usually wild, camping!

An only child, his parents always had very big expectations about their son, but Frank had ideas of his own. From a very young age: he always wanted to go to sea. At thirteen he was evacuated to Devon with the start of the Second World War and got his chance, learning to sail in a dinghy, and arguably never looked back - to shore - again.

Joining the merchant navy as a sixteen year old and training at Navigation School meant that he quickly became a ship's officer. Once qualified he joined the ongoing "Battle of the Atlantic", sailing with the Atlantic convoys, including on a MAC ship. This was a tanker with an aircraft carrier deck added and three Fairey Swordfish biplanes aboard. He then spent a number of years aboard the burgeoning oil tanker and cargo fleets as the world economy picked up.

There was just one snag with all of this as a career: Frank had met the love of his life when she was still at school. Rosie lived in the next street - and he made a solemn promise to her that once they married he would leave his merchant navy days behind. Frank and Rosie were married in December 1948 and Frank came ashore for a place at the University of London to read zoology and chemistry.

He told the tale of how he came to choose his specialism…waiting in line to sign up with the Prof, the chap in front declared he would

Frank on Petula

study Marine Biology. That was it! The sea, ships, marine life!

During his undergraduate course, he hatched a plan to investigate the sea surface from a yacht. With youthful enthusiasm plus great support from his professor, Gordon Newell, a PhD proposal was formulated and sponsored, by the Belgian National Academy of Science.

Frank found a suitable yacht, the *Petula*, purchasing it from the WW11 hero Blondie Hasler. She was an 18-ton gaff yawl, a classic Victorian racing yacht designed and built on the Clyde. Two other scientists were enlisted, a biologist, Roland Sharma and a meteorologist, "Dick" Dixon, the boat was prepared with all the necessary equipment and supplies for the voyage.

In 1953, Frank and his two novice crew sailed the boat to Dakar in Senegal, where the expedition commenced. The purpose of the voyage was to drift in the North Equatorial Current of the Atlantic Ocean taking samples from the sea surface – an activity impossible from a large motor-powered ship. This was the fieldwork for his PhD, and also for authoring a book, "*The Voyage of the Petula*" and completing a film documentary about the trip. Frank then completely landed on his feet with a job as a lecturer in Marine Biology at Newcastle University, based in the Dove Marine Laboratory overlooking Cullercoats Bay - and he immediately fell in love with Northumberland.

Frank aboard the Princess Royal*, Newcastle University Research Vessel*

He became a father in 1957, Susie was his first born, followed two years later by Liza when the family were living in Accra in Ghana, where Frank had taken another university teaching post.

Malta, in 1966, was another foreign post, much enjoyed by the family, but they all returned to Cullercoats where he worked at the Dove Marine Laboratory again until retirement. Frank was a dedicated teacher, and had a passion for long-term recording, particularly the plankton of the North Sea. Working from the Dove Marine Laboratory, Frank and the crew of the Newcastle University boat collected regular plankton samples sailing out from Blyth, for over 50 years. He saw the damage being done to the sea and the seabed by human activity. He had a great interest in a particular barnacle, *Elminius modestus* Darwin, 1854, and every few years, he and Rosie would embark on another episode of "The Great *Elminius* Hunt" to track how far this migrant had established itself around our coasts.

He was very flattered when one of his ex-students, Martin Sheader, discovered a new amphipod and named it after his old teacher. (*Primno evansi*)

Frank was a founder member of Porcupine. He went on to be a long-standing and well regarded editor of the newsletter, constantly working to persuade and cajole people to write up their contributions in order to have full and varied content each time. He even persuaded his daughter Susie to draw for the publication too.

Having perfected his rowing skills on ship's tenders Frank eagerly joined the Rowing Club of Queen Mary College, while studying for his degree. Later, when teaching young sailors from Tynemouth Sea Scouts how to sail dinghies on the River Tyne, he also encouraged them to join up for Tynemouth Rowing Club. He was very honoured to be a Vice President of the club, though he was always amused to add that there were seventeen other Vice Presidents!

The skills of a ship's navigator are similar to those of a sundiallist, and in retirement Frank became very interested in sundials. He used his astronomical understanding to calculate the layouts for dials for friends and family. He particularly enjoyed designing dials for schoolchildren to use their own bodies to cast the shadow to tell the time. An active member of the British Sundial Society, he again developed data-recording interests in logging and cataloguing dials across the UK and beyond.

All the organisations of which he was a member came to love him for one of the things he did best…entertaining groups with monologues, epic poems and tall tales, even colluding with his grandson's best man at his wedding in June to subvert the traditional wedding speeches with one of his funny stories. Porcupine members may well remember some of his tales!

Married to Rosie for 67 years, the two were completely devoted to each other and they were rarely apart for very long. After Rosie's death in October 2016, Frank worked very hard to build up his life, determined to carry on all his previous activities, and even to add a new one: he decided to volunteer as a befriender for AgeUK (saying it was either that or ask for someone to befriend him). He never dared to tell the old gent he was visiting that he was 90 himself!

Another passion of Frank's was ice-skating. Taught to skate as a child by an uncle, some of his first wage packet was spent on a pair of ice skates on a trip to New York. He then ensured that both his daughters and his grandsons learned to skate too. On the fateful day of his stroke, his elder daughter Susie was joining him for his weekly spin round Whitley Bay Ice Rink. Sadly, it was not to be.

Frank leaves his two daughters, Susie and Liza, sons-in-law, Stephen and Bob and three grandsons, Josh, Jim and Matt.

Susie Arnott
(daughter)

Frank – Reflections on an extraordinary Porcupine

Vicki Howe

It is with sadness yet also a smile as I think about Frank and our unexpected friendship. He died peacefully on Thursday 26th October and in his daughter Susie's words, "He was bright and chatty the morning he died".

His funeral was held on 8th November at Tynemouth Crematorium and was followed by a reception at The Grand Hotel, Tynemouth. It was wonderful to meet and chat with Frank's family, friends and past colleagues and also learn more about Frank and his extraordinary life. One thing that tickled me was that Frank continued with his passion for ice skating right until the day of his stroke back in September. He regularly went ice skating with his family and, having recently been ice skating myself, I am completely in awe of Frank and his unexpected talents and how, at the grand old age of 91, he was brave enough to step on to an ice rink surrounded by folk like me slipping and sliding all over the place!

Frank was one of the founder members of Porcupine and Honorary Editor of the *Porcupine Newsletter* between 1981 and 1985. His first article, Marine Biological Films, was published in PNV1N3 August 1977. The Autumn 2017 Bulletin contained his last two articles and were submitted by Frank in the spring of 2017 - his commitment and passion for the Porcupine Natural History Society never waned and never failed to add a "certain something" to the publication. In 1991 he was made a Life Member.

I first met Frank when I attended a Porcupine conference dinner in the early 2000s and I was most surprised when a gentleman rapped on a glass calling for everyone's attention and then commenced on a random "story" with a twist at the end. My experience with Frank and his after dinner monologues had begun. I didn't know who he was or that he would become a friend, mentor and dedicated supporter of my role as Honorary Editor of the Bulletin, but what I did learn very rapidly, was that he was a highly respected Porcupine, and someone held with great affection by many. His lead

Frank as a Merchant Navy apprentice, aged 17, 1943. He had been taught to fire the gun.

in balancing marine natural history (the core of Porcupine) with a relentless curiosity and quirky sense of fun has been the very "thing" that attracted me to Porcupine and has continued to inspire me to keep this blend as an integral part of the Bulletin. Thank you, Frank.

Frank always had time for people and I enjoyed chatting with him at the Porcupine events, marvelling at his memory and his many interests - I still plan to make a sundial from the instructions he emailed me after one such conversation. Thank you, Frank. Frank had a unique ability to story tell; from his time at Newcastle University, to his adventures on the *Petula,* to his traditional after dinner monologue at the Porcupine conference and this is something that I am sure many of us will miss. Although I doubt anyone could take on the baton of an after dinner speech with such finesse, I do hope that Porcupine will find a way to continue his legacy of gentle, witty humour to bring us a giggle during a fun evening with fellow Porcupines. Thank you again, Frank.

And on a more personal note .....over the past four years Frank has never failed to email me ideas for articles for each Bulletin. These have always been interesting, unexpected and

very welcome and with these articles there has always been kind words about what he has appreciated in the previous Bulletin. Thank you, Frank. I will miss you and all you have done for Porcupine.

Frank Evans - An Appreciation

Shelagh Smith

Porcupine Newsletter, March 1977:

Any dog that a porcupine nudges
Cannot be blamed for harbouring grudges.
I know one hound that laughed all winter
At a porcupine that sat on a splinter.

Ogden Nash

I have known Frank since the beginnings of Porcupine. He and Rosie have always been great friends. Very early memories include visiting them at home and laughing that we had the same crockery, of which I still have few pieces now used to set out to dry washed shells. I think it was the same Porcupine occasion when he took us onto the shore at Cullercoats and stood and directed us to the best places. According to my specimen lists this would have been 5 June 1977, the first Porcupine field excursion.

Frank's first contribution to the *Porcupine Newsletter* was August 1977, p. 36, describing short films he made and the techniques used. David Attenborough pinched this and developed filming to bring natural history and marine life to the general public.

Frank became Hon. Editor of Porcupine in 1981 and soon persuaded his daughter Susie to draw the Porcupine animals which grace the newsletter, now the Bulletin, to this day. Thank you, Susie, please continue.

August 1982: Porcupine went to Sherkin Island where we stayed in rather basic accommodation at the marine station. Apart from scientific memories, I recall that it was wet and cold. The ablutions were a long way away at the end of a field mined with thistles and cowpats. Frank and I couldn't imagine how nobody had met in the night popping behind the huts where we slept. Rosie and Frank left Sherkin to go camping round Ireland while I, with Morag McKinnon, retreated to a luxury hotel for the night.

There were many happy Porcupine meetings and dinners at which Frank regaled everybody with his perspicacious and highly witty ditties loosely based on his experiences, with a twist in the tail. I only wish I could remember them better. Everybody looked forward to them.

When I married David in 1994 I soon persuaded him to join Porcupine and he came to many meetings with me and enjoyed Frank's company. They had a common interest in sundials and Frank explained to him how to make a sundial, with lots of detailed plans but we haven't used any as none of our walls face the right way.

We were very happy to meet Frank, unfortunately for the last time, at the Porcupine meeting in Millport in March 2016, when despite incipient infirmity he was his usual self and regaled us with his usual tales.

Thank you, Frank for adding to my life's pleasures.

Frank Evans

Jon Moore

Frank gave me one of my first jobs in marine biology in 1983. He had found some money to pay for the analysis of his large collection of plankton samples and I became part of his small dedicated team at the Dove Marine Laboratory. The collection, monthly samples since 1968 from a station off Blyth, was already one of the longest unbroken series of plankton from a fixed location, nicely complementing the continuous plankton recorder programme. While most of the team were based in a separate lab, I had the privilege of working in Frank's office for almost a year, designing and populating the project's database on his Apple IIe, one of the first personal computers to be used at the Dove. He was a good boss – easy going, supportive, encouraging and very knowledgeable, about lots of things. Apart from plankton and many other aspects of marine biology and oceanography, he also taught me about life at sea, navigation, the

history of marine science and, of course, sun dials! He was very entertaining and had an inexhaustible supply of interesting and humorous stories, which he loved to tell – a trait well known to anyone who met him at a Porcupine conference. A founder member and steadfast supporter of the Society, Frank also spent time as editor of the newsletter. That period overlapped with my time at the Dove, so I was quickly indoctrinated, became a member and occasionally helped licking envelopes! Porcupine remained our connection for the next 33 years, and catching up with Frank became an integral part of the conference for me. I will miss that.

Some web links on Frank:

https://www.warsashassociation.net/data/attachment.php?id=713&for_session=43014b33c24ccc49b4feeccfc008d8be See articles by Frank on pages 33 to 37

Hyperiid amphipod named after Frank: http://www.bemon.loven.gu.se/petymol.ef.html

"The amphipod name Primno evansi *Sheader, 1986 is honouring Dr. Frank Evans, (Dove Marine Laboratory, Cullercoats, N. Shields, Tyneside), who was Martin Sheader's Ph.D. supervisor of his studies on hyperiid amphipods. Frank Evans was a plankton expert (now retired), who also wrote the interesting 'Voyage of the Petula' and a little-known paper on coastal fogs in Northumberland."* (Prof. Geoff Moore, University Marine Biological Station Millport, Isle of Cumbrae, kindly provided this information in Nov. 2004).

SunInfo: http://www.ppowers.com/sun.htm See links from there to obituary and his article on 'How I Became a Marine Biologist'

Plankton video: https://www.youtube.com/watch?v=m5D3UfTT4UE

Another side to Frank

Peter Barfield

I mentioned to people at the last Autumn Council meeting something I had read about Frank... it's slightly 'left field' but, he corresponded with Philip Larkin about one of Larkins poems...

This is the poem Frank wrote to Larkin about:

Absences
Rain patters on a sea that tilts and sighs.
Fast-running floors, collapsing into hollows,
Tower suddenly, spray-haired. Contrariwise,
A wave drops like a wall: another follows,
Wilting and scrambling, tirelessly at play
Where there are no ships and no shallows.

Above the sea, the yet more shoreless day,
Riddled by wind, trails lit-up galleries:
They shift to giant ribbing, sift away.

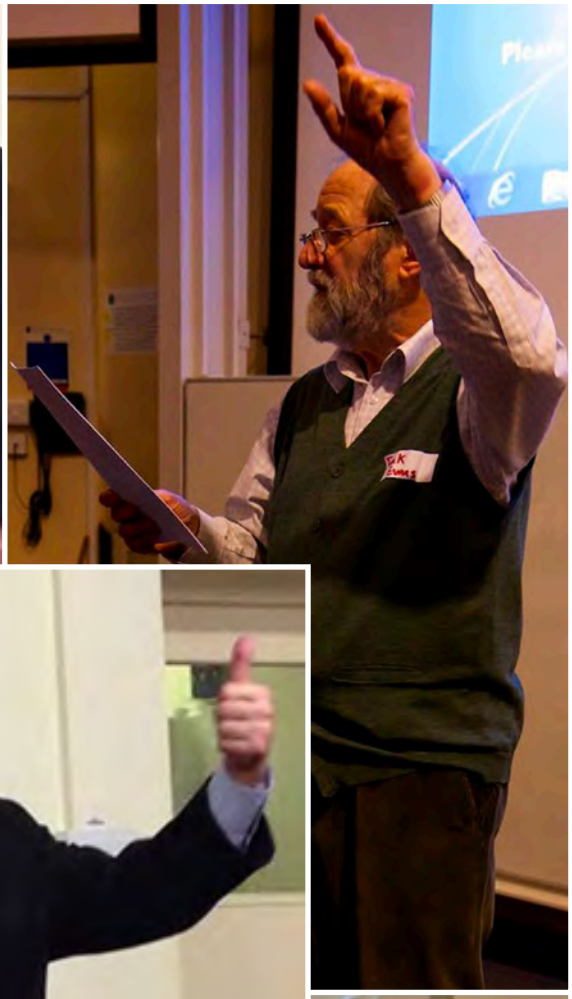
Such attics cleared of me! Such absences!

And here's a link to where I read about the correspondence:

https://books.google.co.uk/books?id=lIGtjGRYI-0C&lpg=PA56&ots=id2vG1T96X&dq=frank%20evans%20marine%20biologist&pg=PA56#v=onepage&q=frank%20evans%20marine%20biologist&f=false

Like I said, bit left field maybe but gave me an unexpected 'wow' moment.

Image montage (right): Memories of Frank from the Porcupine Conferences



Rockpooling for cats and dogs or *"Tyger tyger, burning bright, In the rockpools at first light"*

Becky Hitchin

This is the story of three pets I have had the pleasure to live alongside, two dogs and one very remarkable cat. I shall first introduce the stars of the tale, and I promise there will be some marine biology after that.

The first is a black working cocker spaniel called Holly. She sadly is no longer with us, but was my constant intertidal survey companion for many years. She did everything too enthusiastically and too bouncily, resulting in incidents you'd never imagine, such as jumping off the cliffs of Dover and skidding around oyster farm trestles chasing eels at night. In her older years she was known for turning back half way through a walk, heading to the local pub and settling herself in front of the fire, with treats and water immediately provided. The second is another cocker spaniel, a blue roan called Loki. He's currently 4 years old, very beautiful, and not very smart. He can't walk through doors that are already open, and often gets stuck behind the sofa for no actual physical reason whatsoever. The lady who owns his parents despairs of me constantly – all Loki's littermates are beautifully presented and end up at Crufts. Loki is generally shaggy, wet and muddy (and joyously happy). When every other dog on a beach is nicely playing with balls or chew-toys, mine will be parading round with a rotting dead salmon in his mouth, showing off his prize to all the others.

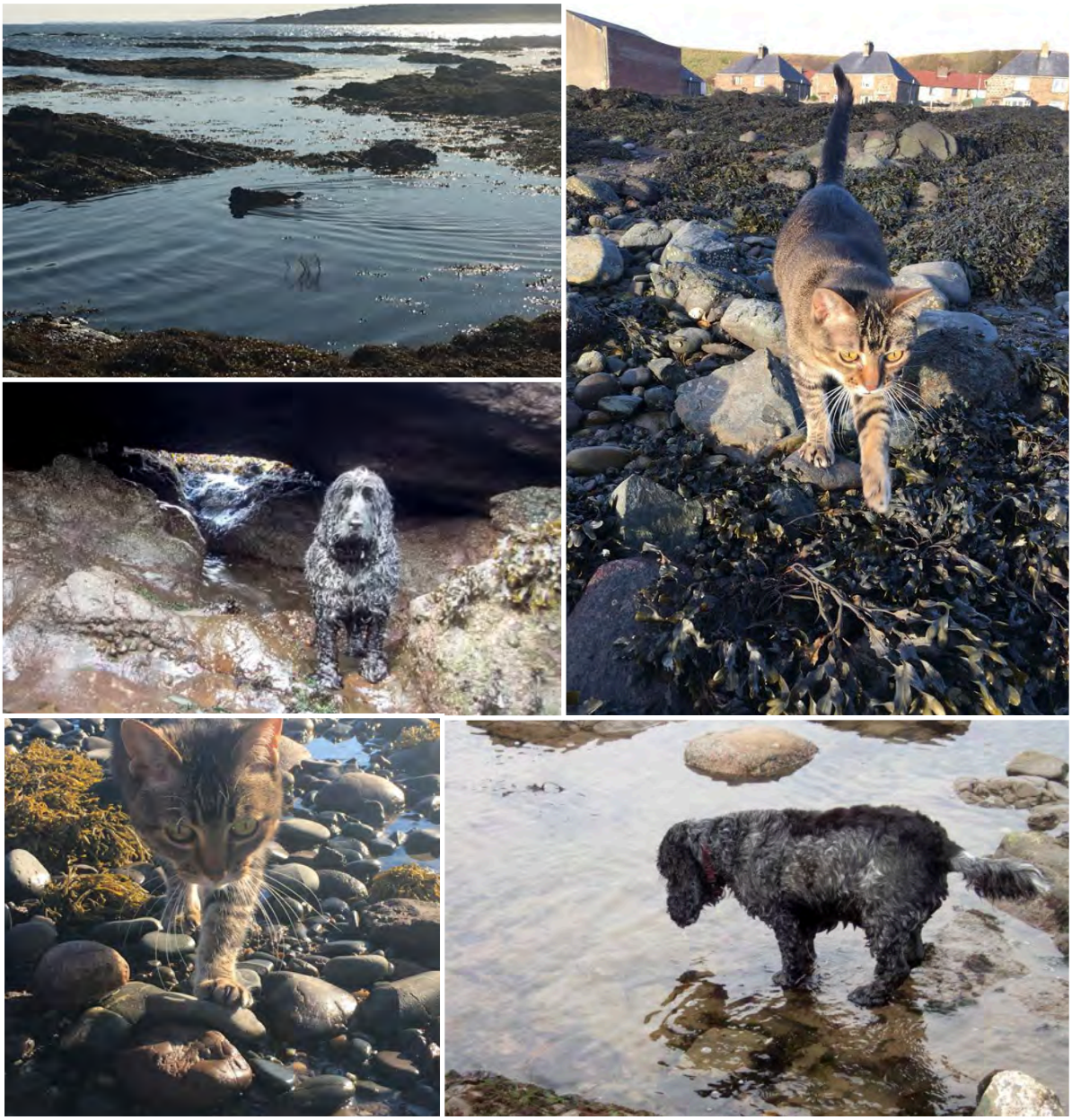
The third is my cat, Silverclaw. She is the result of a chance meeting between my next door neighbour's beautiful black Burmese called – wait for it – Coco Chanel – and the local tabby farm cat. She decided she would be my cat by falling through my skylight onto my bed while I was asleep and settling on my head. She's now 12 and should be settling down to sit in front of the fire and doze. But no. Silverclaw – Sily for short – has had a life of several parts. When I lived in Kent, she was an indoor cat. The M20 ran within metres of my house. She was petite, beautiful and elegant as only a Burmese or Siamese cat can be, and sat upright in pools of sunlight, poised as if she was an Egyptian goddess waiting for worshippers to acknowledge her perfection. She rarely made a noise and was interested in little apart from elegance and the occasional piece of fish for dinner, cut up in small pieces that a cat could eat daintily. She once ran away from the smallest field mouse I've ever seen.

Then I moved to Aberdeen, by the sea. She was allowed outside and found new smells, met other cats and came across strange concepts like rose bushes (prickly!), catmint (wow!), rain / snow (ew!) and wind (unacceptable to have one's fur ruffled the wrong way). Slowly each of these obstacles was overcome and she started to love roaming round the garden. Then one day she decided to join in when I took Loki to the beach. I still don't know why, whether she liked the smells on Loki's coat when he came back from the shore or if she was just determined that whatever Loki got to do, she was going to do too. I suspect the latter.

Within a week, she was heading to the beach nearly everyday, and when there, heading straight out over the reef as far as she could go before hitting the sea. Since then, she's got herself stuck on tiny seaweed-covered islands due to the tide rising when she wasn't looking, fallen in rockpools, and even ventured out in the pouring rain. And she tells me all about it. Every walk is accompanied by a constant monologue of meows and chirps. I wish I knew what she was saying.

So with that background, I present the wisdom I have learnt about rockpooling with cats and dogs.

Firstly, as it should be, taxonomy is important. While this rule is universal, it also applies to wandering the intertidal with a dog. The intertidal area both around Aberdeen and in Kent has a huge population of *Carcinus maenas* (Linnaeus, 1758), as well as fewer numbers of *Cancer pagurus* (Linnaeus, 1758) and *Necora puber* (Linnaeus, 1767). Both Holly and Loki definitely saw crabs as something to vanquish at best, and dinner at worst. And both quickly learned how to identify at least these three types of crab. Discoveries of *Cancer pagarus*



Exploring the Gourdon rocky intertidal

were usually accompanied by my yells of "don't you dare eat that, you horrid dog!", followed by the dog dropping the crab and glaring at me for spoiling their fun. Sustainable potting practices have to be encouraged, even by dogs. It was *Necora puber*, though, that both dogs soon learned to avoid, to the point where each of them would glare at the discovered crab and then slink away, tail between legs. The lesson? Enough pinches on noses to discourage further interest.

Secondly, walking a cat takes time. I can walk Loki to the sea's edge and back in ten minutes, less on a very cold day. Ten minutes in cat time is just enough to survey the foreshore and decide which part of the shore will be graced with her presence that day. Then she has to pick her way daintily through the seaweed, tail held high with an inquisitive kink at the end. She has to eye up how to cross every tiny bit of water in her way, and also stop every few metres to loudly voice her opinion on the chosen route. It does get quicker when we get past the swathes of *Pelvetia*, *Fucus* and *Ascophyllum* and the rock becomes barer as we head down to the sea. Then she can start paying less attention to her feet and more to the smells and sights around her. She jumps between

ledges, sniffs everything around her and even splashes through rockpools on occasion (I'm still not sure why some rockpools are fair game and some are to be avoided). Everything must be looked at, checked out, sniffed, patted with a paw, tasted, assessed, discussed. It's always over an hour later that we head back up the shore, Sily often in my arms when she otherwise refuses to head towards home.

Thirdly, the beach is an enormous litter tray. I realise that people may not want to know the details of cat bodily functions, but I find this fascinating, and I'll gloss over the acts themselves. Silverclaw has a litter tray at home, with clumping cat litter. At least ten minutes of each beach walk is taken up by the cat walking studiously along the beach trying to find the exact match of particle size as her cat litter. Only then will she - perform. It goes without saying, of course, that the exact particle size distribution for ideal back scratching is slightly different, and different areas of the beach need to be investigated for the perfect massage. So while dogs need to understand taxonomy, cats clearly need to understand particle size analysis and distribution.

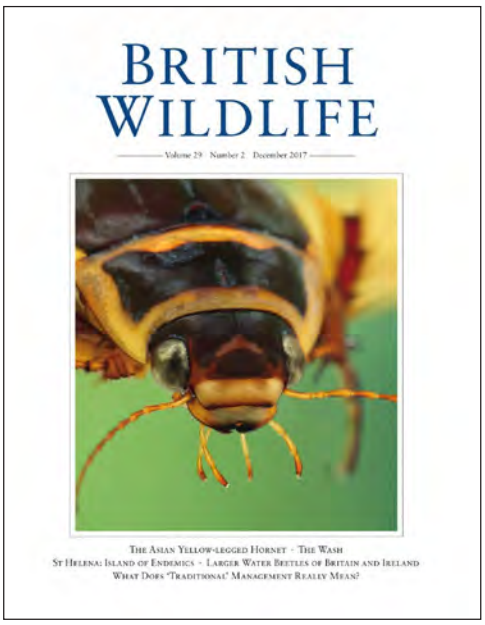
Fourthly, it is absolutely impossible to take photos with either dog or cat present. About 30% of all my photos taken with Holly, Loki or Sily present end up being dominated by an out-of-focus nose.

Fifthly, it's amazing what wants to befriend your dog or cat. While I have been told several times by ornithologists that I'm being sentimental and anthropomorphising, I am still convinced that this summer, Loki made friends with a juvenile razorbill. This small razorbill turned up on the beach a few weeks after most of the local razorbills had set off to sea. It looked a bit bedraggled, but healthy, and was hopping around the rocks looking for food. A day or two later, Loki and I were investigating a deep rockpool about 10m long when whoosh! down plops the razorbill right in front of Loki, huge feet waggling as it landed. Loki was startled, especially when the bird dived underwater, headed to the other end of the pool, and turned round, laughing at him. I mean, cawing raspily at him. Loki ran round to the other end, whereupon the razorbill flashed underwater again and swam back to the starting point. Spaniel, of course, continued to chase bird – or did bird start to chase spaniel - as they did this again and again for about an hour. The razorbill could have easily escaped to another rock pool at any point, there were a lot of nooks and crannies that a somewhat podgy spaniel could not have accessed.

The razorbill was around for a few weeks before vanishing. My best memory was going for a snorkel and seeing this small bird on a tiny hummock sticking out of the water. By engaging super stealthy snorkelling mode, I made it to within touching distance of him, then just floated in the water watching him preen and fluff.

Sixthly, and to finish, beware of what you start. While the beach used to be all Silverclaw's, now some of the neighbourhood cats follow. There is Oscar, a ginger tom, and Missy, his shy fluffy tortoiseshell sister. There's a pale ginger cat from I know not where, and they all watch from the edges of the shore as Silverclaw parades along her beach. I am sure that when the warmth of spring creeps back to eastern Scotland, there will be more than one feline presence on the beach, investigating and sunbathing.

British Wildlife (and Porcupine)



Review by Frances Dipper

This excellent publication describes itself as "The magazine for the modern naturalist". Published bi-monthly, it has articles covering particular species, groups, habitats, wildlife areas, management and conservation. At the moment, most articles are land-based but they are more than happy to publish suitable marine articles. I hope to persuade them to do so more often – so start thinking whether you could contribute. A new and interesting section called "Classic Wildlife Sites" started in Volume 29, No.2 (December 2017) with a fascinating account of The Wash. I found this particularly interesting as it is in my local patch i.e. East Anglia.

As well as this, in the December 2017 issue, there were four major articles covering the Asian yellow-legged hornet (a non-native killer of bees), endemic species in St Helena, British and Irish water beetles, and traditional management. There are also regular shorter pieces on: 'Habitat Management News'(RSPB); 'Through a Naturalist's Eyes' (Robert Burton); 'A view from …..' (which was Michael Scott 'A view from beneath the Highlands' in the October 2017 issue, highlighting the dredger damage to flame shells in Loch Carron); and others as the editor sees fit. It is a nicely flexible format. Two other regular parts of the publication are 'Conservation news' (compiled by Sue Everett) and 'Wildlife reports' (compiled by Guy Freeman). This is where Porcupine comes in ……

I am now writing the 'Marine Life' report for each issue featuring interesting species and events that have been recorded or occurred in the months just prior to each publication. So in the December (2017) issue I included the spectacular stranding of Portuguese Man-of-war and other species and reported on our field trip to Northumberland in September last year. Previously in the October (2017) issue I covered the field trip to the Staffa Archipelago. Other wildlife reports include freshwater life, birds, insects, reptiles etc. Some require dedicated reading (of spotted bird rarities for example), whilst others include recently published and fascinating aspects of ecology or behaviour. Letters, book reviews and obituaries complete the publication.

Even if the marine content is currently outweighed by land-based natural history, I still love this publication. After all, we spend most of our time above rather than below water (well most of us) and I want to know what is happening all around in Britain.

At only £25 for an individual subscription, it is excellent value. Try it.

Available by annual subscription from: Subscriptions Dept, British Wildlife, 1-6 The Stables, Ford Rd, Totnes TQ9 5LE or via https://www.britishwildlife.com/

Anne Bunker

How I became a marine biologist....

Or, my long and winding path to becoming an amateur squidge geek!

[skwij: noun: small soft object of a biological nature encountered whilst diving]

Charlotte Bolton

Me (age 2) and Dad on the beach at Swanage, Dorset (Photo: Angela Bolton)

My early life in the depths of the East Midlands, about as far from the sea as you can get, weren't auspicious in terms of signalling where I was eventually to end up, but did instil in me a deep love of nature and collecting 'treasures' in matchboxes. I grew up on a farm in South Leicestershire and spent my days out and about enjoying the freedom of the countryside. We had traditional family holidays at the seaside and I clearly remember my fear of the lurking worms in the casts at Lepe on the Solent (some things haven't changed; I'm still not at all keen on worms, eels and snakes and am guaranteed to use up my air very quickly diving a wreck with lurking congers…)

School wasn't particularly high on my list of favourite things but I was a quietly rebellious bookish nerd even at a young age and found the arcane rules and regulations of lessons restrictive and boring. Fast-forward to secondary school, now slightly further south in Northamptonshire and the same applied – I can't do three science 'O' levels? Really?! How ridiculous is that? Fortunately I had a supportive biology teacher who gave me the material to work on at home, though eventually I chose to read chemistry at university – it all came very easily to me, apart from the lab work which mostly resulted in a lot of broken test tubes! I simply couldn't translate the clean and tidy world of the theory into the mess that were my experiments… King's College London came to my rescue in offering a degree in Theoretical and Computational Chemistry – perfect! My final year undergrad project "Application of Lie Groups and Clifford Algebras to the Valence Bond Method" (no, it makes less sense to me now too!) led on to a PhD in radiation chemistry, looking at the theory of spin effects and lots of quantum mechanics – Professor Brian Cox without the stars, if you like. But it gave me the opportunity to travel and work in the United States and I spent two summers at the Radiation Laboratory of the University of Notre Dame, home of the famous Fighting Irish college football team.

I still wasn't entirely sure what I wanted to do as a career but enjoyed exercising my brain (and people seemed prepared to pay me to do so…) and continued in research at the Medical Research Council Harwell Lab near Oxford, modelling the effects of radiation on biomolecules such as DNA. Three years later and I was forced to conclude that I was not really cut out for a research career so took

Diving the Blue Hole, Dwejra, Gozo (with the now-collapsed Azure Window in the background) in 2008 (Photo: Joe Townsend)

a sideways move into IT support 100 miles further east in the Fens – the Unilever Centre for Molecular Science Informatics at the University of Cambridge to be precise. Here I was responsible for all aspects of IT in this newly-built research centre – well-remunerated but very stressful… Fortunately around this time I decided that I needed more water in my life, and learned to dive with Gozo Aqua Sports in Marsalforn, Gozo in 2002. Hindsight is wonderful – how I wished I'd done this years ago! Diving and Gozo have been central to my life ever since.

A summer sabbatical of sailing in the north-east US hit another chord, but was ultimately a break from the reality of my parents both passing in quick succession and prompting a radical re-think on life…and a move to Southampton to indulge my love of the sea at last with a Masters in Ocean Sciences. All the jobs I had looked at either wanted a year of unpaid work in lieu of experience, or a Masters degree – no contest!

And so began a return to studenthood – a fabulous period not only for being based in the

Top: Dolphins off the port bow! Massachusetts Bay, 2006 (Phot: Charlotte Bolton); Bottom: Sailing into Boston, Massachusetts 2006 (Photo: Paul Smith)

Intertidal surveying at dusk in the Solent , 2010 (Photo: Sam Adams)

wonderful National Oceanography Centre, but all the extra-curricular activities that took over all my spare time and more. A project based on habitat mapping in the West Solent introduced me to the 'joys' of GIS and the marine habitat classification, EUNIS biotope codes and broad-scale habitats, but even more importantly I was so fortunate to meet the people who have mentored me in my current incarnation as squidge geek, and continue as friends to this day – Ken Collins and Jenny Mallinson from the NOC, Lin Baldock (professional marine biologist and now Dorset Seasearch co-ordinator) and Mike Markey (now retired but then owner of the dive boat *Peveril Myth* on which so many adventures took place). I think the finest hour of dedicated survey effort for Jenny and I was measuring Pacific oysters (*Crassostrea gigas*) at Weston Point in the snow one December…

My overseas diving was somewhat curtailed by no longer being employed so I quickly learned to use a drysuit and got used to the cooler, greener waters of home. I now do most of my diving in the UK and Seasearch has been an integral part of that transition. I can't remember exactly where or when I first heard about the program (probably at the Dive Show in Birmingham?). What a brilliant idea! As the one buried in the ID books at the dive centre straight after every dive, this was just what

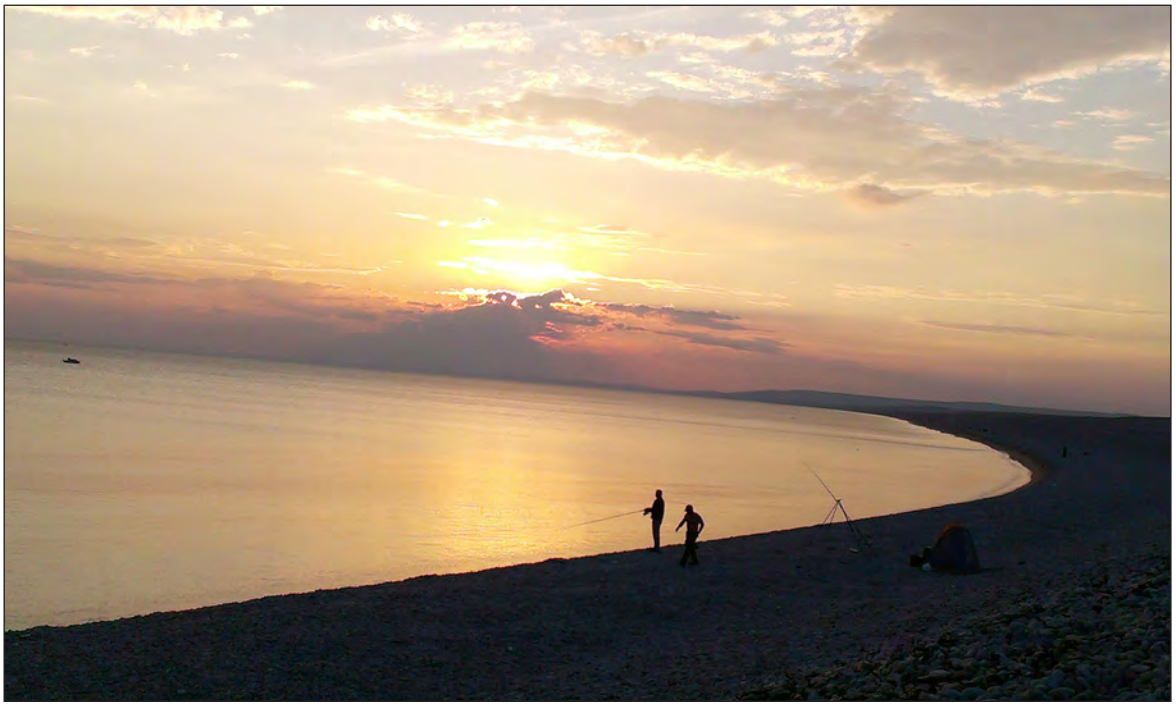
First UK sea dives, Pembrokeshire 2008 (Photo: Ray Reeves)

I was looking for! Nice slow bimbles followed by geeky discussions about what you'd seen on the dive… This is the thing I really love about Seasearch trips (though I admit we do sometimes come across as being a bit 'anorak-y'…perhaps it's the bags of collected seaweed or pots of unidentified 'turf'?!)

An advert for Data and Survey Officer at Dorset Wildlife Trust, with part of the job being to co-ordinate Dorset Seasearch activities, convinced me to make the move from Cambridge in 2012. Sometimes you just have to up sticks and make the leap of faith. We used to holiday at Chesil Cove in the 1980s, and in many ways Portland hasn't changed very much at all.

Now I live 30m from the sea and even the storms of February 2014 were not a deterrent – it's fascinating watching the beach change shape with every tide and listening to the waves crash onto the shingle.

And so to the present… I took over from Chris Wood as National Co-ordinator last year and now spend too much time with budget spreadsheets and grant proposals, but with the added bonus of travelling round to meet all the co-ordinators and find out what's going on in their patch (I'm currently in Galway discovering the delights of diving in the West of Ireland). Next year we celebrate 30 years of Seasearch surveys under that name, which is a magnificent achievement and grand testimony to the dedication of all the people who've been involved in the program since then (and earlier – back to the 1970s and the Year of Underwater Conservation). I am exceedingly proud to be part of the ongoing Seasearch story…



The tranquil side of Chesil Cove (Photo: Charlotte Bolton)

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Title, Author(s) & Address(es)

Title should be concise, informative and in bold type. Include author(s) names each with one full Christian name. In multiauthored contributions, the last name is separated by an ampersand, e.g., John Smith, David G. Jones & Susan White.

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- Reference tables & figures in the text as Figure 1, Table 1 etc. and in legends as Table 1: , Fig. 1: (individual parts A, B etc should be described also).
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References

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Brown, M.T. & Lamare, M.D. 1994. The distribution of *Undaria pinnatifida* (Harvey) Suringar within Timaru Harbour, New Zealand. *Japanese Journal of Phycology* **42**: 63–70.

Dipper, F.A. 2001. *Extraordinary Fish*. BBC Worldwide Ltd, London. 96pp.

Ellis, J.R., Lancaster, J.E., Cadman, P.S. & Rogers, S.I. 2002. The marine fauna of the Celtic Sea. In J.D. Nunn (Ed) *Marine Biodiversity in Ireland and adjacent waters*. *Proceedings of the ECSA Conference, 26-27 April 2001*. Ulster Museum, Belfast. pp. 83-82.

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