Seasearch Annual Report 2018

Photo courtesy of Maja Stankovski

Foreword

The role of the Seasearch Ireland coordinator is an interesting combination of roles organising formal Seasearch courses, more informal workshops & organising some Seasearch Surveys.

The overall goal is to educate divers so that know what they are seeing on their dives and then get them to record what they are seeing. We seem to be constantly teaching people but the number of people recording doesn't seem to be growing. This is a continuous challenge and you can see in this report that we are trying to give people more options in how they are recording.

But fundamentally for me the key point is to make people aware that recording is one of the fundamental ways that we can have an input into how the marine environment will be treated. The main professional surveys are handled through the Department of the Agriculture, Food and Marine and National Parks & Wildlife Service (NPWS) and these tend to be focussed on how the marine can be exploited rather than how it can be conserver. Seasearch & the records we are producing are some of the only records for a number of inshore sites.

As we slowly move forward with the process of designating areas to be protected we need to redouble our efforts to provide base data so that there is enough impartial information there to support the key decisions.

Tony O'Callaghan, National Coordinator Seasearch Ireland

Table of contents

1. Introduction

Executive Summary

In 2017 Seasearch ran a fish specialist workshop, 2 Observer courses and 5 Adopt a Site workshops. From the existing schemes 53 Seasearch forms were submitted from 31 sites by 10 recorders broken down into 1 Crayfish form, 24 Observer and 28 Surveyor forms. The National Marine Monitoring Scheme received 100 forms from 13 sites contributing 2652 records of 209 distinct species. We hope by continuing with our existing work program and promoting all levels of Seasearch recording to aim to increase the number of National Marine Monitoring Scheme sites in 2018 and to help individual recorders to transition from novice to Observer to Surveyor by tailoring our programs to diver's needs.

Seasearch mission statement

Seasearch Ireland is a citizen science initiative to encourage divers to document details of species seen during marine dives to help build the knowledge base on the distribution of marine species in Ireland's in-shore waters. It has been established since 2009 under the auspices of the Irish Underwater Council (IUC) though marine recording has been promoted and courses run since 2003, under the auspices of Seasearch Northern Ireland. The objective of Seasearch Ireland is to build capacity within the network of divers to collect data on marine biology, as a contribution to better understanding our marine environment and how it is responding to changing environmental conditions. Since 2003 Seasearch Ireland and Seasearch NI have demonstrated that there is capacity within the diving community to generate valuable, high quality citizen science data on marine species distribution in Ireland's marine waters. This initiative has delivered survey information from 1,196 sites around the Irish coast. This comprises a total of 53,231 species observations of 1,183 species. Seasearch Ireland operates an open-data policy, so these data have been provided to the National Biodiversity Data Centre and are freely available on the Data Centre's mapping portal, Biodiversity Maps (www. maps.biodiversityireland.ie).

Going forward the objective is to increase the capacity within the diver community in Ireland to deliver a more ambitious citizen science initiative to improve both the quantitative and qualitative information generated by training more people and by providing more specialist courses to improve the depth of knowledge. This will be done by encouraging existing recorders through the provision of specialist training, by introducing new schemes to encourage recorders to take ownership of their local biodiversity (e.g. the National Marine Monitoring Scheme) and to encourage casual recording of marine species.

2. Seasearch Ireland Schedule for 2018

April
21 Marine Algae Identification, Galway
22 Seasearch dive TBA

May
Start of National Marine Monitoring Scheme recording season
12/13th Observer course , Dundalk & Dives in Carlingford Lough

June
16 General Marine Identification Course, Galway
17 Seasearch Dive Leitir Caladh

July
14 National Marine Monitoring Scheme Workshop, Donegal
15 Seasearch recording rally North West, Donegal

August
Seasearch Dive Rally Dublin – To be confirmed

September
8-15th Seasearch / Procupine Surveys in Belmullet

October
6th Bioblitz in Carlingford in conjunction with Seasearch NI

3. Identification tools

Species of the week

As part of our on-going efforts to support Seasearchers in their recording effort we've been producing identification sheets on individual species through our Species of the Week on the Seasearch Ireland Facebook page. These are available by emailing nmmsirl@gmail.com or through the Seasearch Identification and Recording Group.

Figure 1An example of an Identification sheet for a common species the Tompot Blenny

Figure 2 An example of an Identification sheet for an under-recorded species the Cloak Anemone Hermit Crab

Seasearch Identification and Recording Group

During the year we ran several surveys to help inform our actions for 2018. Falling out from this was the idea that a more convenient method for recording and uploading records would help facilitate more divers in recording marine life. While various suggestions such as mobile apps and a bespoke website for recording that might perhaps be more effective were made, budgetary constraints (i.e. that we don't have an ICT budget) make these impractical for the foreseeable future. As the majority of responses favoured Facebook as medium we proceeded with that option. As a result, in November we launched the Seasearch Identification and Recording Group. The rules of the group are intended to facilitate sharing of records: people uploading records are asked to identify location, date, whether the species was recorded through another format, and the species name, if known. However, it is hoped that the group can also draw on the experience of existing Seasearchers, particularly those gifted photographers, to facilitate peer-based learning and promotion of recording among those taking photographs but who don't currently record.

Further developments

We hope to continue to produce useful resources for marine based recording in the New Year and welcome any suggestions on to what format would be most helpful. Anyone wishing to offer support in the form of photographs or expertise in producing Seasearch training materials should email SeasearchIreland@gmail.com or contact us on Facebook.

4. Courses

While we have introduced the Adopt a Site scheme to encourage clubs (the club that dives together should record together) to get involved, and ran courses in 2018 with Dalkey SAC, UCD SAC, NUIG SAC, Grainne Uaile SAC and Nenagh SAC, traditionally a Seasearch Observer course is the entry point into Seasearch diving & recording.

This year we ran 2 Observer courses the first in Waterville & Derrynane Co Kerry in May with 7 students and was hosted by Lucy Hunt of Sea Synergy in her Waterville workshop which is a fascinating place full of interesting knickknacks like a leatherback turtle. The class was taught by Rory O'Callaghan with Charlotte Bolton of Seasearch UK in attendance to sign him off as a fully-fledged SS Observer tutor. A lively classroom session on the Saturday followed by 2 lovely dives off Derrynane beach where Vincent Hyland had helped organise some Seasearch dives on the Sunday.

Figure 3 Enjoying the local hospitality with a well earned lunch after two amazing dives.

We were joined for these by Colm Doyle of Cork SAC who had done his Observer course in Cork a couple of year previously also taught by Rory.

Figure 4 Divers in the water in Derrynane, photograph by Vincent Hyland

The 2nd Observer course was run in Dundalk with the Dundalk SAC hosting the event. This organised after some folks from there had ventured North to do some Seasearch dives with Charmaine of SS NI and had gotten bitten by the recording bug. After a few attempts to schedule something over the summer it was finally arranged for the beginning of September which did mean people could attend and we had a lovely day in the Dundalk SAC clubhouse with excellent facilities and even nicer food supplied by Frances Lambe & Co. But the September date did mean that we were more likely to be exposed to the weather and it did turn quite nasty on the Sunday which meant that the diving had to be postponed. However, we'll be returning to Dundalk in February 2018 to get everyone signed off and hopefully a nab a few more sandwiches.

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5. Fish Id workshop Galway Oct 2017

It took a while but after some coaxing with promises of Baillon's wrasse and dives in Killary we managed to convince Lin Baldock to come to Galway to run a Fish ID workshop for us. We had a full room with a good mix of levels of knowledge from the NI Seasearch Coordinator to Noreen one of the fishy people at the aquarium to some snorkelers & some people just interested in fishes. The workshop was run at the Aquarium in Salthill which provided live models for Lin and she delivered as promised with more information about Gobies & Blennies than I could absorb. Lin gave some very interesting presentations with lots of ID information followed by a session of trying to sketch some of the flitting fish in the Aquarium.

Figure 5Classroom session as part of Fish Identification workshop

Specialist courses, such as the one run by Lin, focus on a specific group of species. Whereas a Generalist Marine Identification course, an Observer course or the National Marine Monitoring scheme training aim to teach basic identification skills on species that are clearly distinguishable in the field at a glance or have a prominent identification feature, specialist courses focus on minute details that require detailed examination of the individual or an excellent eye for photography. For example to successfully distinguish the two *Trisopterus* species (Poor cod and Bib/Pouting) as juveniles requires examining the relative positions of the anal fin in relation to the dorsal fin (in Poor cod the front of the anal fin lines up with the back edge of the dorsal fin, while in Bib/Pouting the anal fin starts further back in relation to the dorsal fin). Similarly, the extent of the scales is an important feature in distinguishing the various sand goby (*Pomatoschistus* spp) from each other.

Specialist courses are an integral part of building the knowledge base for marine recording in Ireland and are a real eye opener on the diversity of life in commonly seen groups. We typically aim to organise at least 1 a year and these are organised on request or where an opportunity presents itself (i.e. an expert on a group is visiting Ireland). If you are interested in Specialist course or would like to see one organised on a group please contact NMMSIrl@gmail.com.

6. Serpula Reefs - June in Scotland & October in Killary

If you have dived Killary then you have seen Serpula Reefs - with Killary having some of the best examples of these reef systems in Ireland.

As this iconic species is confined to a small number of sites in Ireland and a number of these (particularly the Salt Lake are unusual in other ways) one of the questions that occasionally puzzles us is how comparable are the reefs in Killary to some of the Scottish sea loch ones? So, after a little prompting Seasearch Scotland arranged a joint set of surveys by scheduling a weekend of dives in Loch Creran for June 2017. Initially we had a number of SS Ireland folks going to Scotland, but the numbers dwindled so that eventually it was just Rory & Tony O'Callaghan who made the trip across to Oban for 4 dives across 2 days.

The local Scottish Seasearch Coordinators Owen Paisley & Natalie West had arranged 2 boats with lots of volunteers from around the UK, like Lucy Kaye from SS Wales who travelled North. Owen had selected sites based on historical records of sites with Serpula. There were some limitations on locations as there had been reports of some invasive sea squirts in the Loch & some areas were under quarantine, but it still left lots of Loch Creran to dive.

Figure 6 Serpula reef in Killary Harbour, Co Galway

My initial impression was that there was very little live serpula present at the sites selected and very little dead shell except for one site where there was a lot of dead casings with quite a low percentage of live animals.
Overall, we were quite shocked at the limited amount of live reef present on our dives and we await with interested the report from Seasearch Scotland.

October saw us move our attention to the Reefs in Killary again we hoped to get lots of folks involved in this but eventually, while we had some folks around for the Sunday, the midweek diving was primarily down to some visitors from the UK - so Lucy & Paul Kaye from SS Wales, Lin Baldock & Richard Yorke from SS Dorset & Tony O'Callaghan.

We started off with some reasonable weather on the Sunday with lots of diving in at Rusheen point & Inis Bearna but Ophelia soon came calling with meant battening down the hatches for Monday, Tuesday allowed us to get back in the water where we checked out some of the sites we had surveyed previously, with Wednesday & Thursday being a mix of revisits and one new site. With storm Brian making an appearance on Friday/Saturday we moved our attentions to the Salt Lake & Rosmuc to look at other sites.

There is lots of work to do on correlating the data from these dives with previous records and trying to look at the 2 sets of records from Scotland & Killary so hopefully we can pull all this together over the coming months to allow us to get a clearer picture of the differences between the two areas.

7. Bantry Bay by Jack Trá.

Mechanical Kelp Harvesting
Dive site - North Atlantic Ocean 51.695338, -9.596121

“A licence to Industrially Extract 1860 acres of Native Kelp in Bantry Bay has been issued to BioAtlantis, Tralee”. These are the words of the people of Bantry in their valiant attempt to seek justice against the issuing of “the largest industrial scale native kelp harvest licence ever issued in Irish or British waters”. BioAtlantis intends on using the wild kelps to create fertilisers and growth promoters for intensive pig farming. Both of these create grave environmental threats of their own. The people of Bantry are backing their coastal heritage and feel hard done by, on the inadequate consultation and advertising of the proposal to the public, and the fact that the government had signed off on an industrial harvest where no environmental impact assessment would be necessary.

The fight for Bantry Bay quickly gained traction in local and national news agencies, however the group are still being left waiting at the offices of government officials after travelling to the capital for scheduled meetings. Bantry Bay is famous the world over for its scenery, seafood, wildlife and fishing. Many local jobs revolve around the health of the bountiful bay and have sustainably done so for generations. It is no wonder the local community have raised concern regarding the extraction of 80% of targeted kelp species from the people, animals and environment that rely on them. We the people speak for the sea and the land and urge everybody to holdfast and build strength against the privatisation of the wild.

Mechanical kelp harvesting on an industrial scale has caused controversy the world over. France, Norway, Western United States and South Africa have been mechanically harvesting for many years now. Opening the boundaries of a kelp forest allows for the entry of invasive species which have been seen in France. Other non-commercially viable kelp species from warmer tropical waters are beginning to take hold. These species are of no interest to harvesting companies, and greatly alter the composition of the native kelp forests. In the licence application by BioAtlantis it is said that full recovery of harvest sites will take 5 years. This on an environmental scale is not all that long, although when growth is analysed in the lab and teamed with results from limited current study, how sure can we be? In a paper by Smale et al. 2013, compiling and analysing 60 years of research on kelp and kelp forests, it has been shown to take between 7-10 years on average for kelp forest communities to fully recover from perturbation. Recovery however is at the mercy of one inevitable natural phenomenon, trophic cascade.

A trophic cascade is the knock-on effect felt by an ecosystem, that influences all of its members when one member is removed, or a new member added. Imagine removing all the trees of one particular species from a forest, well the forest may survive, but any animal that relied specifically on that tree species will leave, or cause disruption in another part of the forest to try to survive. These interactions will continue throughout a web of interconnected members in the forest and in the end the ecosystem becomes unbalanced and begins to rapidly slope in a particular direction, ultimately downwards. Kelp forest ecosystems are no different. With the removal of particular kelp species, we see an opening for new species, a common opportunistic culprit in kelp forest degradation being, the Sea urchin.

Figure 7 Photo of Kelp at the North Wall, Co Dublin courtesy of Lucinda Keogh

Sea urchins prey predominantly on kelp. Research from over 30 years ago, a paper by Harrold and Reed 1985, shows how barren zones adjacent to kelp forests are characterised by grazing pressures from sea urchins. The Sea urchins graze the periphery, while the inner kelp forest thrives as usual and the balance allows for both to survive. If enough of the kelp in places is removed and the Sea urchins gain entrance to the inner circles of the kelp forest, then the Sea Urchins gain the advantage.

I have witnessed this very phenomenon on a recent research expedition to a remote sound system in northern British Columbia. In Caamano Sound a kelp disease has caused desolation of the kelp forest communities. The kelp is recovering in places, although on closer inspection while snorkelling, one quickly notices that each new strand of kelp is being attacked from all angles by green, red and purple sea urchins. Here the population of Sea urchins has grown so large that there is no certainty for the future of the kelps here, or those who rely on them. New friends of mine, from indigenous First Nations communities rely on the kelp forests for food. Abalone were for tens of thousands of years, a staple in the seasonal diet of these native people. Due to over industrial harvesting the species is now classified as endangered and a zero-take policy implemented. With the rise in Sea urchin numbers, the kelp suffers and the endangered Abalone, outcompeted. Only when the Sea Urchins completely exhaust their food source or began to once again become predated upon by Sea Otters (which have been hunted to local extinction in many areas), and decline in numbers, will the kelp forests have the chance once again to sway high into the intertidal zone and carry with it the fishes, crabs and molluscs, familiar to the coastal waters of BC. And thus, the battle for balance begins.

Photo courtesy of Ian McAllister: https://pacificwild.org/visual-media/photography/underwater-world

Now don't get me wrong, I have seen colour like I never could have imagined in some of the coastal waters and seamounts of Northern British Columbia. Sea lions and seals flourish in large colonies, Humpbacks, Fin whales and Orca (whom I was there to study) flock inland to the nutrient rich deep-water fjord lands to feast on Krill, small fishes and the seasonal wild Pacific Salmon. Here, life lifts the seas to bubbling heights, much like it does in Bantry. If the situation as it stands does not change, then Bantry Bay may never in our lifetimes be the same.

In October 2017, I approached Sea Search Ireland in relation to conducting a series of surveys in the Bantry Bay area, as to provide the kelp protection group with some unbiased scientific data. A response was received almost immediately, and action followed suit soon after. Until now, due to limited budget, resources and technical knowledge, no independent surveys had been carried out for the Bantry Bay kelp protection group. Thankfully the Sea Search Adopt a Site Scheme lended itself enormously to the cause. Two 30-metre line transects were conducted along the edge of the kelp bed. One documenting fauna and one for flora. The results were compiled, and video footage consulted, and the information handed to the people of Bantry. I am a graduate biologist and am new to diving, however my passion grows daily to explore the blue world that rises with the tides. I completed an observer course with Sea Search Ireland in early 2017, and after a dive with them I now feel competent in completing surveys of my own. Gathering data on Irish coast lines and the subtidal region is imperative if mechanical harvesting or other marine exploitation is to occur. There are large gaps in our baseline knowledge of marine species distribution around Ireland, but if the Adopt a Site Scheme continues to be employed by local divers and clubs, then we stand a far greater chance in the preservation and sustainable management of our coastal ecosystems.

So, ask yourself. Have you ever enjoyed Irish sea food? Do you often take trips to the beach? If so, then you are an ambassador for the ocean. Even if you have no interest in the oceans whatsoever,

well you still breathe oxygen, right? Over 50% of the Earth's oxygen is produced by the ocean, so basically you owe every second breath to the big blue sea.

Divers, fishers, kayakers, swimmers, boaters and anyone who is enchanted at the brilliance of the coastal waters of the Island of Ireland, it is your voices that need to be heard. It is you who must be conscious and pass on the knowledge in the pledge to protect our seas. So, from food, to sport, to nature, to business, to tourism, to flood defences, I think our kelps are due a little more credit than we have given them.

Follow the efforts of the Bantry Bay Kelp Group online, www.bantrybaykelpforest.com

Help the kelp!

8. Kelp Monitoring with Kate Schoenrock

We have been supporting a project being run out of NUIG by Dr Katherine Schoenrock
The project is an Irish Research Council postdoctoral fellowship titled "Closing the knowledge gap on Irish kelp forest ecology". The aim of the project is to describe the productivity and biodiversity of *Laminaria hyperborea* forests across the west of Ireland.

Biodiversity of *L. hyperborea* habitats is assessed at multiple scales using SCUBA surveys, kelp dissections, and measuring species 'recruitment' to each location. Productivity is assessed by looking at kelp recruitment, age distribution, biomass, and growth of individual kelps in *L. hyperborea* habitats. This data gives an insight into the role of kelp as a habitat and resource in the marine environment.

Dr Schoenrock has been monitoring a number of sites in Clare & Galway using temperature & salinity monitored & by doing repeatable transects at these sites. As reference points she has also done surveys at other sites e.g. Rossroe & Leitir Callow.

9. Seaweed Harvesting

Seaweed harvesting is likely to be an area that garners more attention in the coming years as it is regarded by the Irish Seaweed Research Group and the Joint Oireachtas Committee on Environment, Culture and Gaeltacht as a highly valuable natural resource that is not being fully exploited. In addition to the concerns that Jack raised in relation to Bantry Bay there is a danger that decisions on seaweed harvesting but particularly that of kelp will be done without an understanding of the impacts this will have on coastal ecosystems. Therefore, projects like Kate's Kelp Monitoring, Seasearch recording and the National Marine Monitoring Scheme are vital to collect baseline data so that decisions on licencing of seaweed harvesting are made to maximise local economic and environmental interests. Other than maerl (which should not be harvested under any circumstances as it is a non-renewable resource) Seasearch Ireland is of the view that seaweed harvesting should be done on a small scale by traditional harvesters and that large scale mechanical harvesting such as that proposed in Bantry Bay is the marine equivalent of clear cutting. 30% of the value of the seaweed harvest of 40,00 tonnes, the majority of which is manually cut, comes from 1% of the volume which is used in high value products such as foods and cosmetics. This largely manual industry, worth €18 million provides 185 full time equivalents and is far more valuable than intensive industrial harvesting which will benefit large companies rather than local communities. However, it should be acknowledged that the current policy in relation to seaweed harvesting is to issue large scale licences to individual companies as has happened in Bantry Bay, and Galway and Mayo.

10. Lough Hyne

With Kate Schoenrock getting involved with Seasearch Ireland and with her interest in seaweeds a trip to Lough Hyne was organised for July 2017 with access to the Research Centre. After early start on Friday, a long drive down to Lough Hyne was soon forgotten when you get on the water and get to appreciate the fantastic scenery on view. An evening dive off the Pontoon at the research centre was a superb end to a lovely evening with Tony,

Kate, Tom & Thomas all settling in nicely.

Figure 8 Lough Hyne, Co Cork

Figure 9 John Dory (Zeus faber) at the Whirlpool Cliffs spotted by Joe Fitz

An early start the next day & the arrival of a bubbly Joe Fitz was a nice start to Saturday, followed by some nice dives around the Lough with Joe overdosing on Jewel Anemones at the Whirlpool cliffs and having a visit from a friendly John Dory. Problems with the research centre compressor restricted our dives on the Sunday but confirmed that the variety of live in Lough Hyne is well worth the travel down.

A return trip to the Lough was scheduled for October and we lucked out with another nice weekend with a slightly different crew so Tony, Kate, Tom, Rory & John Breen. It was interesting to have John come along and, as usual, he had a shopping list of Red Lipped Gobies and *Alycyonium hibernicum* which was described in Lough Hyne. Dives were across most of the main sites:
Whirlpool cliffs, Goleen, Labra, Pontoon @ research centre.

Figure 10 Red mouth goby (Gobius cruentatus), a rare species found in Lough Hyne

Note on Permits: In order to dive in Lough Hyne a permit from the National Parks and Wildlife Service is required due to the sites unique and sensitive flora and fauna and status as a Nature Reserve (you also require a permit to dive in Glendalough). A quota system is in place limiting the number of person dives is continuously reviewed by NPWS with preference given to diving for research rather than for recreational purposes. Similarly, a permit is required to use a boat with an engine with more than 10hp.

11 National Marine Monitoring Scheme Update

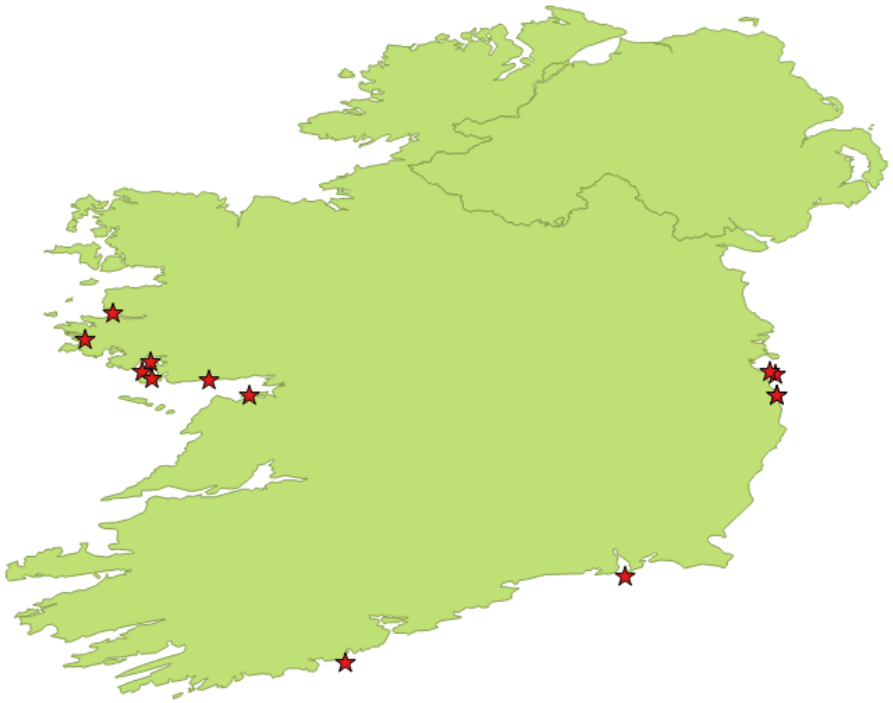

Figure 11 Map of sites surveyed as part of the National Marine Monitoring Scheme

Summary

The National Marine Monitoring Scheme began on a pilot basis in 2016 and after completion of the successful pilot program in Galway and Wicklow was launched to a wider audience in 2017. Initially confined to Dublin, Galway and Wicklow there are now sites 13 sites in 7 counties and hopes to expand the scheme further in 2018. To date 159 monitoring scheme surveys have been conducted and over 4,000 records of more than 200 species submitted and logged with the National Biodiversity Data Centre. Though certainly, the highlight of the monitoring scheme in 2017 was a first record of a crayfish (*Palinurus elephas*) on the east coast from the Curragh Sub Aqua club who monitor the Muglins. Another record of note, Noel Black recorded a boarfish (*Capros aper*) at Black Head. The description of each site below is to illustrate that continuous recording at a site highlights the unique characteristics of that site.

Figure 12 Photo of Boarfish (Capros aper) courtesy of Noel Black

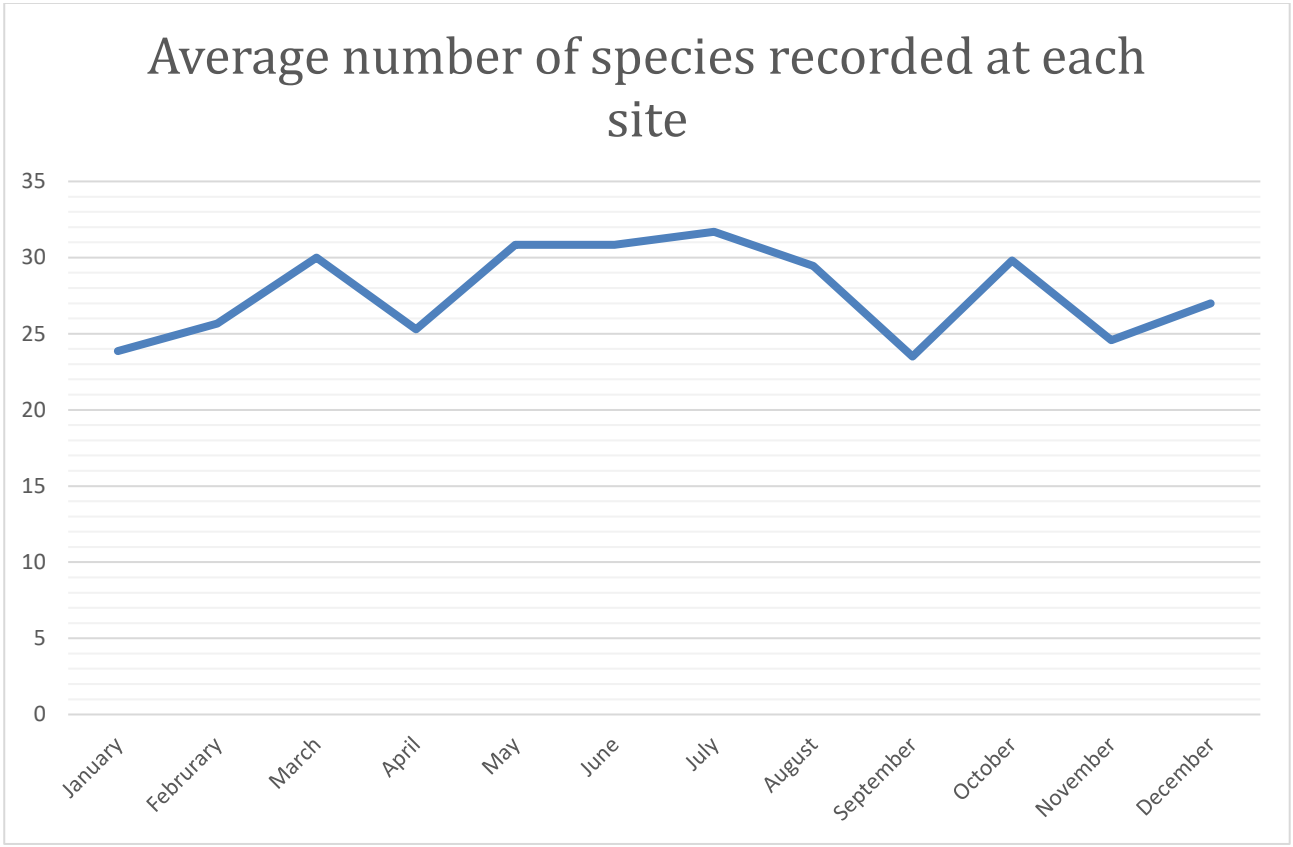

Figure 13 Graph showing the average number of species recorded based on the month.

As the graph above shows despite the lack of seaweed to record during winter months this does not lead to a significant decrease in the average number of species recorded at each site. As part of the NMMS a number of species (particularly molluscs) that are only recorded in spring and summer have now been recorded all year round at sites.

10.1. **Ali Bui**

Ali Bui is one of the original pilot sites and is monitored by Tony and Rory O'Callaghan, Joe Fitzgibbon, Brendan Derrane and Kathryn Schoenrock. An unusual site it is only of 3 sites in Ireland at which Firework Anemones (*Pachycerianthus multiplicatus*) are present. Seasearch would hope in the longer term that this site can be designated a marine conservation zone with activities that might damage this rare and delicate species, such as dredging, would be prohibited. The knotted wrack (*Ascophyllum nodosum)* is manually harvested at this site and piles of harvested seaweed regularly have to be sidestepped to enter the water.

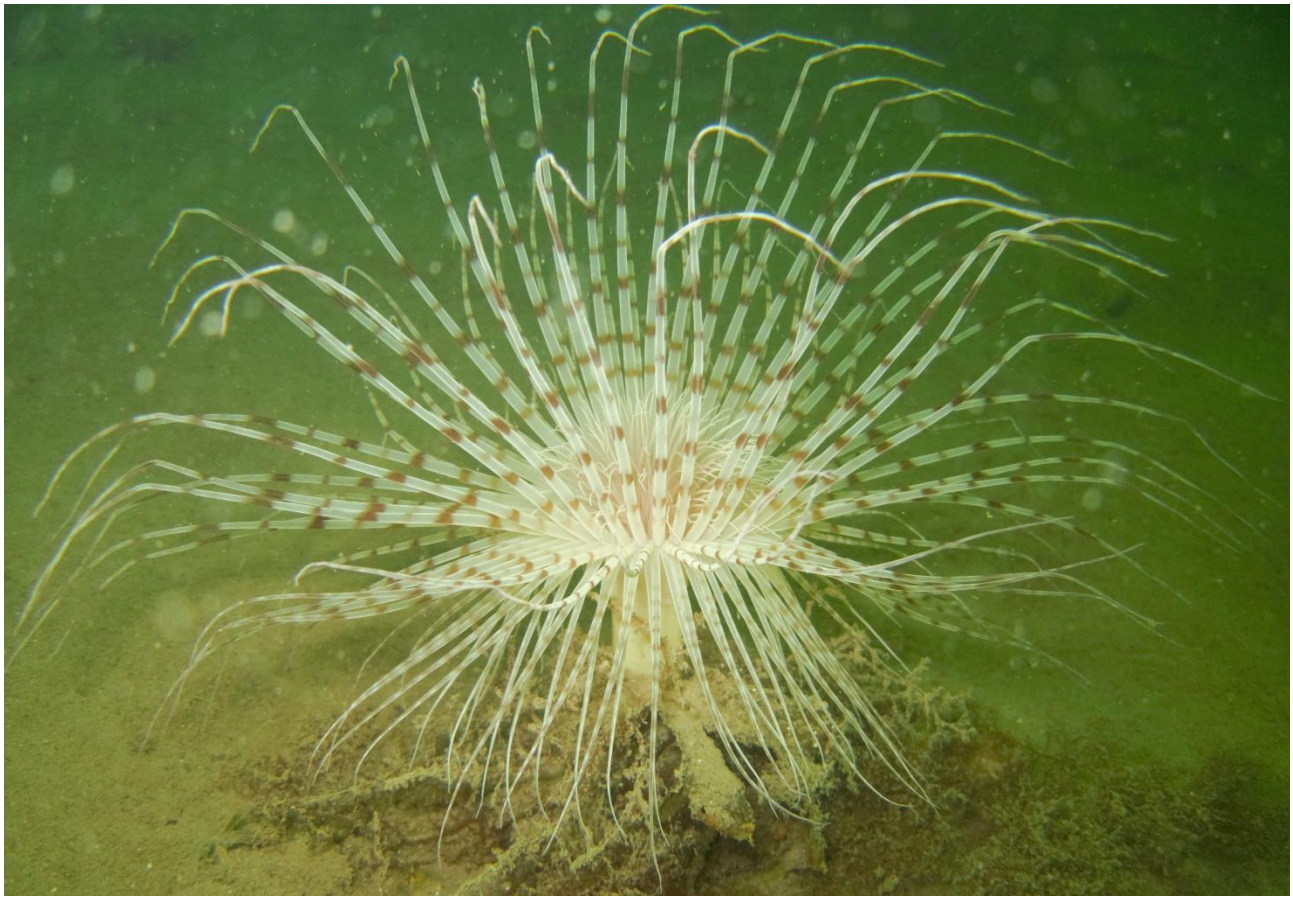

Figure 14 Firework anemone (Pachycerianthus multiplicatus) courtesy of Tony O'Callaghan

10.2. **Leitir Calladh**

Leitir Calladh is one of 3 species in the west of Ireland where significant areas of *Serpula vermicularis* reefs are present, while not as large as those found in Killary Fjord. The rocks in this area are home to large numbers of double spiral worms (*Bispira volutacornis*), sticklebacks and juvenile rays are a regular sight at Leitir Calladh and a juvenile John Dory was recorded here in 2016. The sighting of rays at various stages of development in this area could suggest that the area either functions as a breeding site or an area for growth of juvenile Thornyback rays (*Raja clavata*).

10.3. **Rossroe Pier**

Rossroe Pier in Killary Fjord is a well-known site for divers and is home to a wide variety of species and habitats. In recent years there has been a notable increase in the recording of the curled octopus (*Eledone cirrhosa*). However, this must be offset by the noticeable decline in the area dominated by *Serpula vermicularis* reefs. Previously large sections of reef up to 1m in height and 2m in diameter were abundant to the east of the pier. Dredging in the area has removed the majority of the reefs (Fig 16).

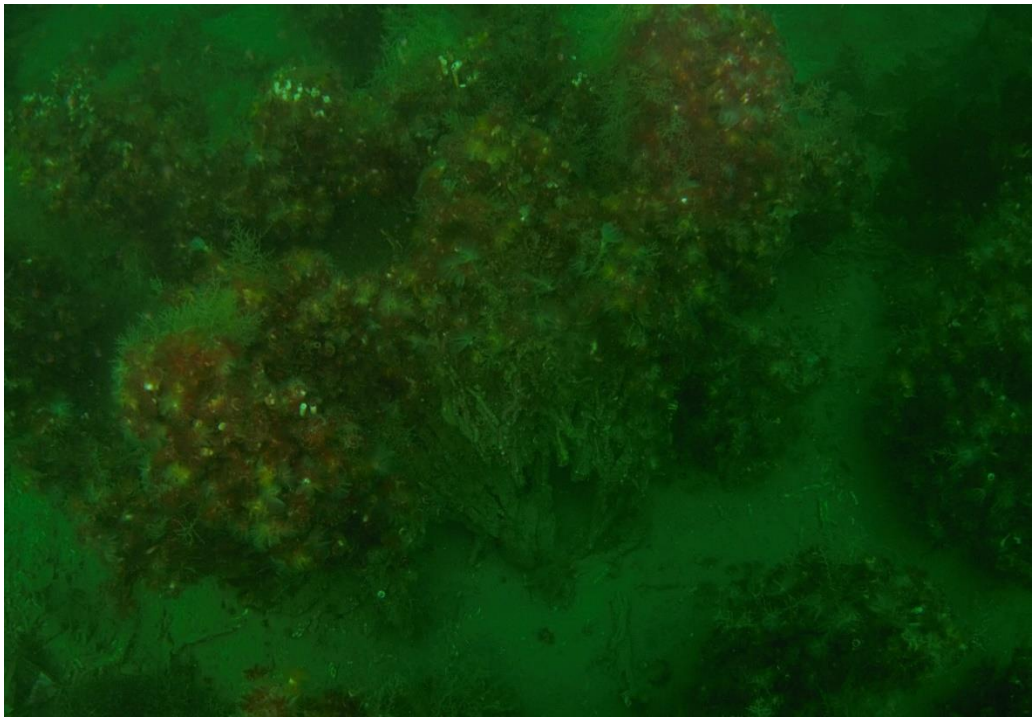

Figure 15 Serpula vermicularis reef in Killlary Harour 2015

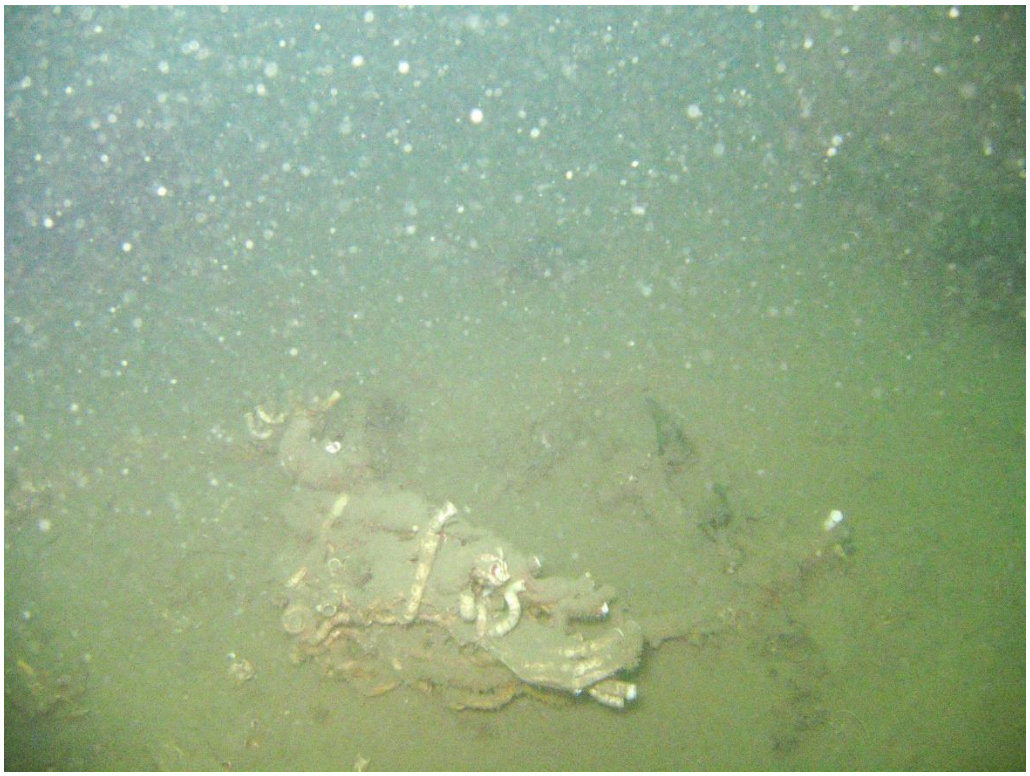

Figure 16 Remains of Serpula reefs in Killary Harbour January 2017

10.4. **Salt Lake**

Ard Bear or the Salt Lake near Clifden is possibly the most unique dive site in Ireland. A semi-natural lagoon the tidal range in the lake means that tidal flow into the lake is significantly less than the tidal flow out of the lake. This affects the species that colonise the lake and can lead to large aggregations of moon jellyfish (*Aurelia aurita*) that can extend from the shallows to depths of 20m. Due to the freshwater input from the local bogs the sediment in the lake is quite dark and the lake can be quite dark and some of the species that occur in the lake appear to be darker in colour than their con-specifics at other sites.

Figure 17 Leopard spotted goby in the Salt Lake

10.5. **Coral Strand**

The Coral Strand in Carraroe is monitored by the NUIG/GMIT Sub Aqua Club (below) and is one of the sites in Ireland with the highest density of Seasearch records due to numerous Seasearch course qualifying dives being conducted at the site for a number of years and we're grateful that this proud tradition is being continued. The Coral Strand is a shallow dive as there is quite a tidal flow in the channel at depths greater than 8m. However, this unique site has a relatively high biodiversity as well as functioning maerl beds and eel grass habitats.

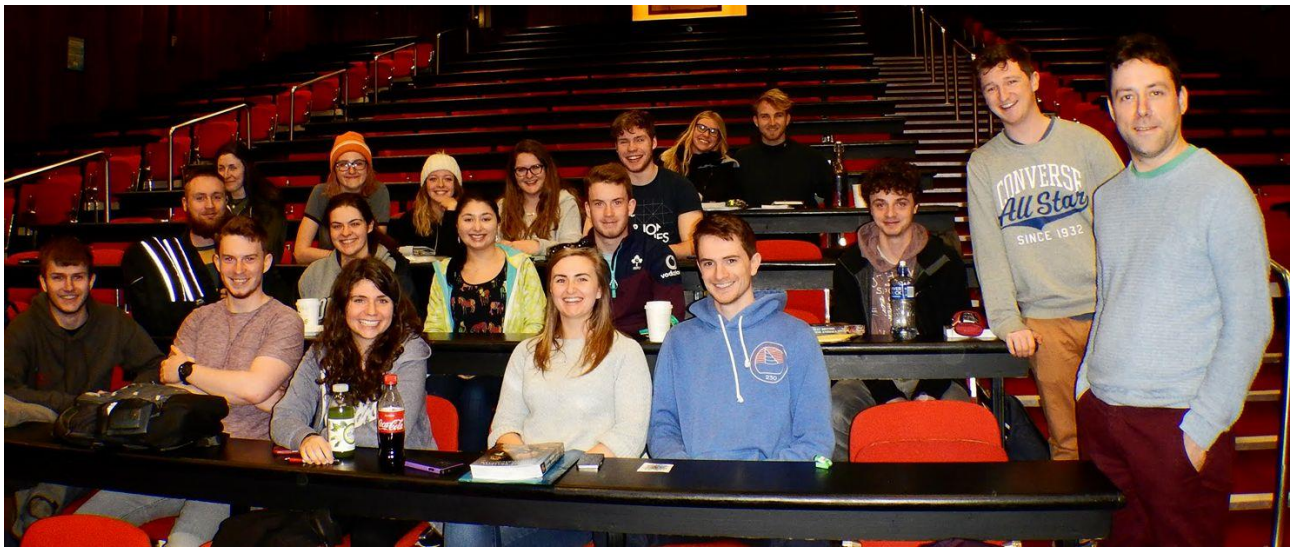

Figure 18 NUIG/GMIT Sub Aqua Club attending their Adopt a Site training

10.6. **Greystones Harbour**

Greystones Harbour was completed in 2013 but has rapidly expanded in recent years. A major component of the recording in the area is the ability to spot new species colonising the area and Ann McAvoy, Albert Kerr and Brendan Moran record at this site all year round. In recent years numerous new species have been recorded at this site and the nearby Carraig Eden. *Sargassum muticum* has been recorded at the site for the first time in the last two years and the site represents a unique opportunity to study the species interactions that occur when *S. muticum* occurs at a site.

Figure 19 Greystones Harbour

Figure 20 Albert Kerr, Ann McAvoy and Bernard Moran, who record at both Greystones Harbour and Carraig Eden

10.7. **Carraig Eden**

The storms of winter 2016 caused a significant change to this site with sand covering previous rocky areas and large changes to the habitats present. Shortly after this only 4 species were recorded at this site and the numbers gradually increased over the course of the year, peaking at 20 in June. However, as the photo below shows this exposed site has again been heavily impacted by storms in winter 2017 and this may represent a pattern that only longer term recording can elucidate.

Figure 21 Carraig Eden in February 2018

10.8. **Muglins**

The Curragh Sub Aqua Club began recording at the Muglins in 2016 and were the first Dublin club to join the scheme. The Muglins is an exposed site with large aggregations of feather stars present on the rocks and numerous crevices for lobsters and fish, such as congers to hide. Indeed, the Muglins is the only site (other than Black Head) at which lobsters (*Homarus gammarus*) were recorded as common in 2017. As stated in the summary the Curragh Sub Aqua club recorded a Crayfish (*Palinurus elephas*) at this site in 2017 which is the first record of this species on the east coast.

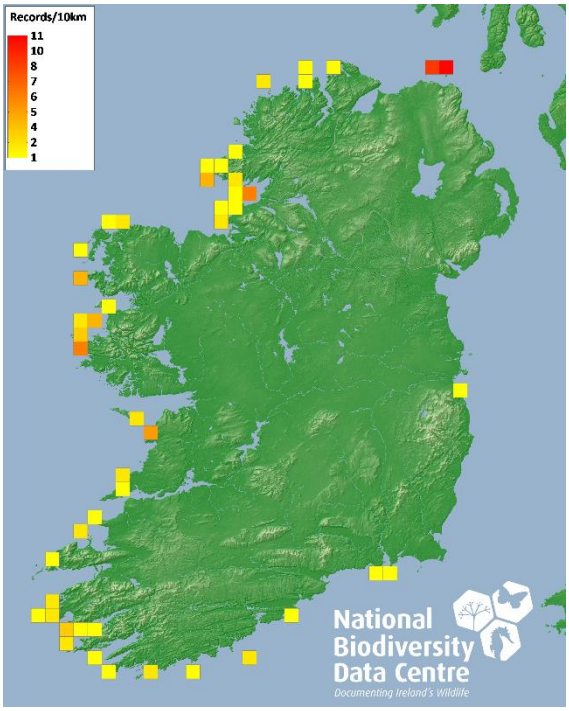

Figure 22 Distribution of records of Crayfish (Palinurus elephas)

Figure 23 The Curragh Sub Aqua club preparing to embark on their monitoring scheme dive

10.9. **Pilot View**

Pilot view which is at the northern end of Dalkey Sound on the mainland side near Bullock Harbour and was chosen as in addition to a wide variety of life it provides an interesting counterpoint to the nearby site at the Muglins. Dalkey Sub Aqua Club have been monitoring this site since 2017 and in addition to the monitoring scheme species at this site a number of unique nudibranch species (*Doto spp*), for which there are very few records in Ireland, have been recorded at this site.

Figure 24 Dalkey Sub Aqua club preparing for their monitoring scheme dive

10.10. **Black Head**

Black Head in Co Cork is monitored by Anne Ferguson of Ocean Addicts and as an experienced Seasearch recorder Anne regularly contributes one of the longest species list for her site each month. While the Boarfish at this site was an especially unusual site in addition to this there is unusual behaviour at the site. During the summer months, a number of lesser spotted dogfish/catsharks (*Scyliorhinus canicular*), between 5 and 7, were recorded sheltering in the same crevice in the area. While difficult to be certain of any marine behaviour it is thought that these may have been breeding females sheltering together to avoid males. While during breeding season dogfish are regularly seen in pairs (or occasionally 3) they tend to move to shallow water to mate and lay eggs.

Note: Ocean Addicts launch from Kinsale and are a Live abroad dive centre. www.oceanaddicts.ie/

Figure 25 Anne Ferguson of Ocean Addicts

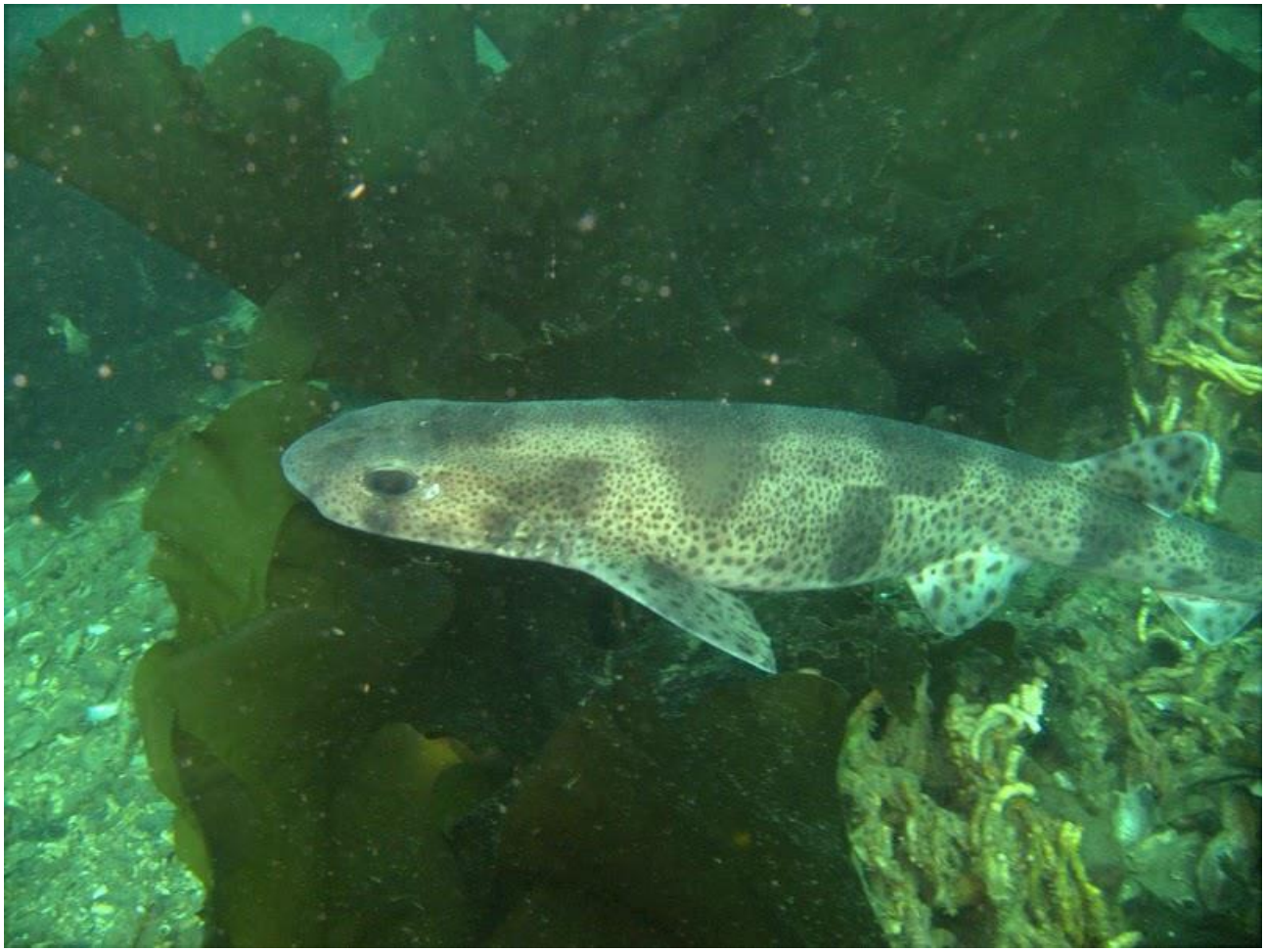

Figure 26 Lesser spotted catshark at the Coral Strand

10.11. **Tower Hole**

Tower Hole at Hook Head Lighthouse in Co Wexford is monitored by Ken Maye and Lorcan Scott. Ken is one of the earliest Seasearchers and has contributed over a thousand marine recorders since 2003. Hook Lighthouse is an unusual site as due to its popularity as a dive site the area has been extensively surveyed by Seasearch over the years and as such has a high level of biodiversity in terms of species recorded at the site. Interestingly due to the paucity of recording in Wexford often the distribution of key Seasearch species jumps from Carlingford to Hook Head and it is not known in most cases is this of biological significance (the species does not occur in the Irish Sea) or is simply an artefact of recording effort. Having a consistent recording effort at Hook Head will allow us to see is the biodiversity recorded here indicative of biological reality or simply that it's a lovely dive.

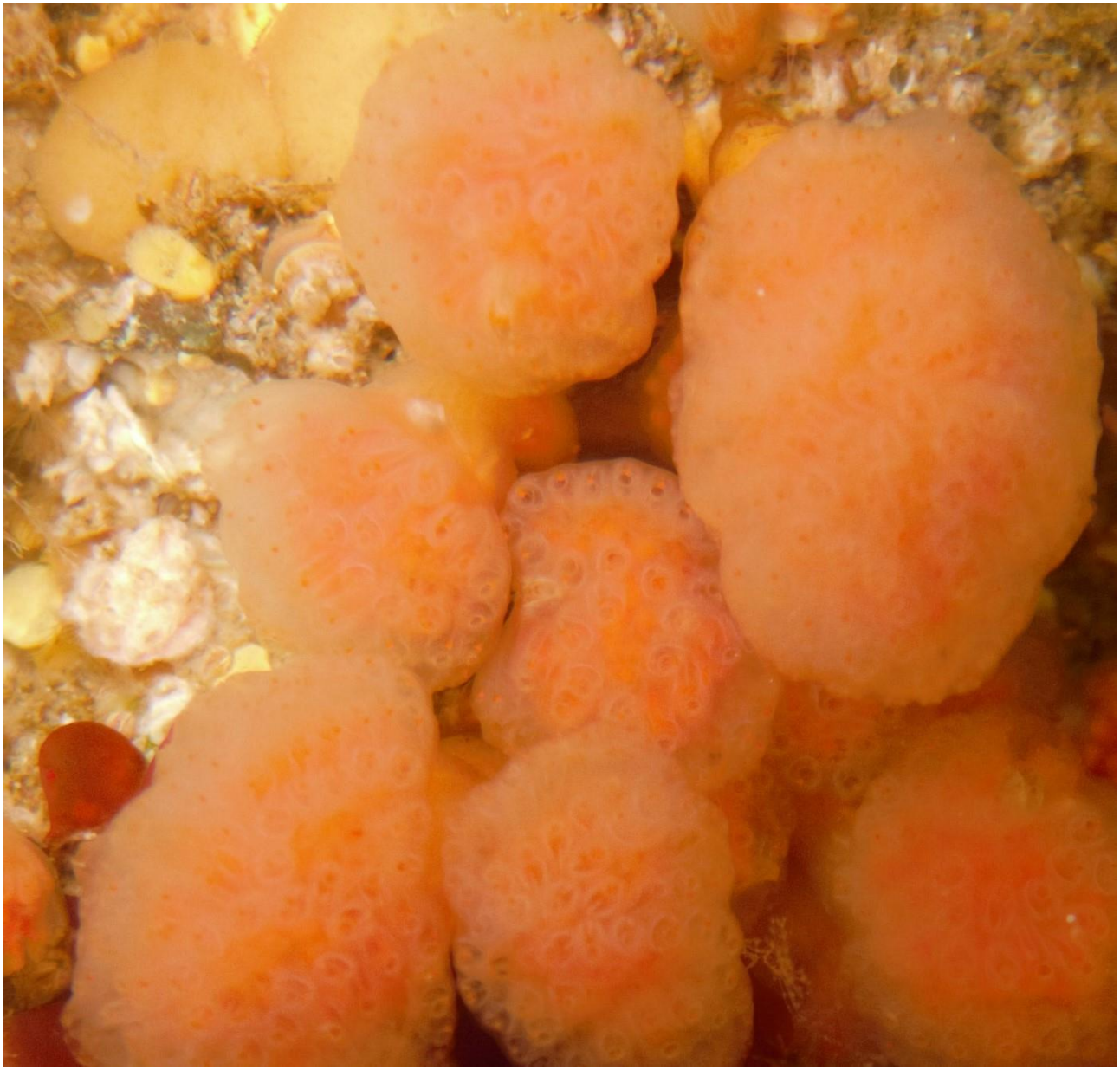

Figure 27 Orange club sea squirt (Aplidium punctum) one of the species recorded at this site

10.12. **Kilcummin Pier**

Kilcummin Pier is recorded by Grainne Uaile Sub Aqua club since 2017 and have already recorded a wide variety of species at the site including curled octopus (*Eledone cirrhosa*) and snakepipefish (*Entelurus aequoreus)*. In addition to the contribution to the wider scheme Kilcummin Pier is a vital site in a largely under recorded part of the country. North Mayo is an area that has traditionally been under surveyed by Seasearch divers due to a combination of factors (Fig 26). Kilcummin Pier will provide baseline data for species found in the general area, which can be supplemented with targeted recording to build up a clearer picture of any biological differences in species distribution on the west coast.

Figure 28 Map showing sites that have been surveyed by Seasearch in north Galway and Mayo

10.13. **New Quay**

The most biodiverse site (48 species) in 2017 New Quay is a favourite dive of Seasearch recorders due to the wide variety of marine life both large and small. In terms of the larger life 30 species of fish* have been recorded at this site (across all databases) and the area is home to a number of resident conger eels (*Conger conger*), lobster (*Homarus gammarus*) and even the occasional Grey triggerfish (*Ballistes capriscus)*. However, the real joy of New Quay lies in the macro life present in the form of a wide variety of marine molluscs, particularly nudibranchs. In addition to *Edmunsella pedate* (formerly *Flabellina pedata*), which is present all year, the oaten pipe hydroids (*Tubularia spp*), *Bugula* species and many other hydroids and bryzoans are host to a wide variety of nudibranch species. Common species including *Fjordia browni* and *F. lineata* (formerly *Coryphella*), *Lamicia clavigera, Polycera faorensis* and *Polycera quadralineata* are regularly seen at this site and these represent just a tiny portion of the over 450 marine species* that have been recorded at this site.

*Note this relates to all records for this site rather than all Seasearch records and many include the large Seaweeds of Ireland database.

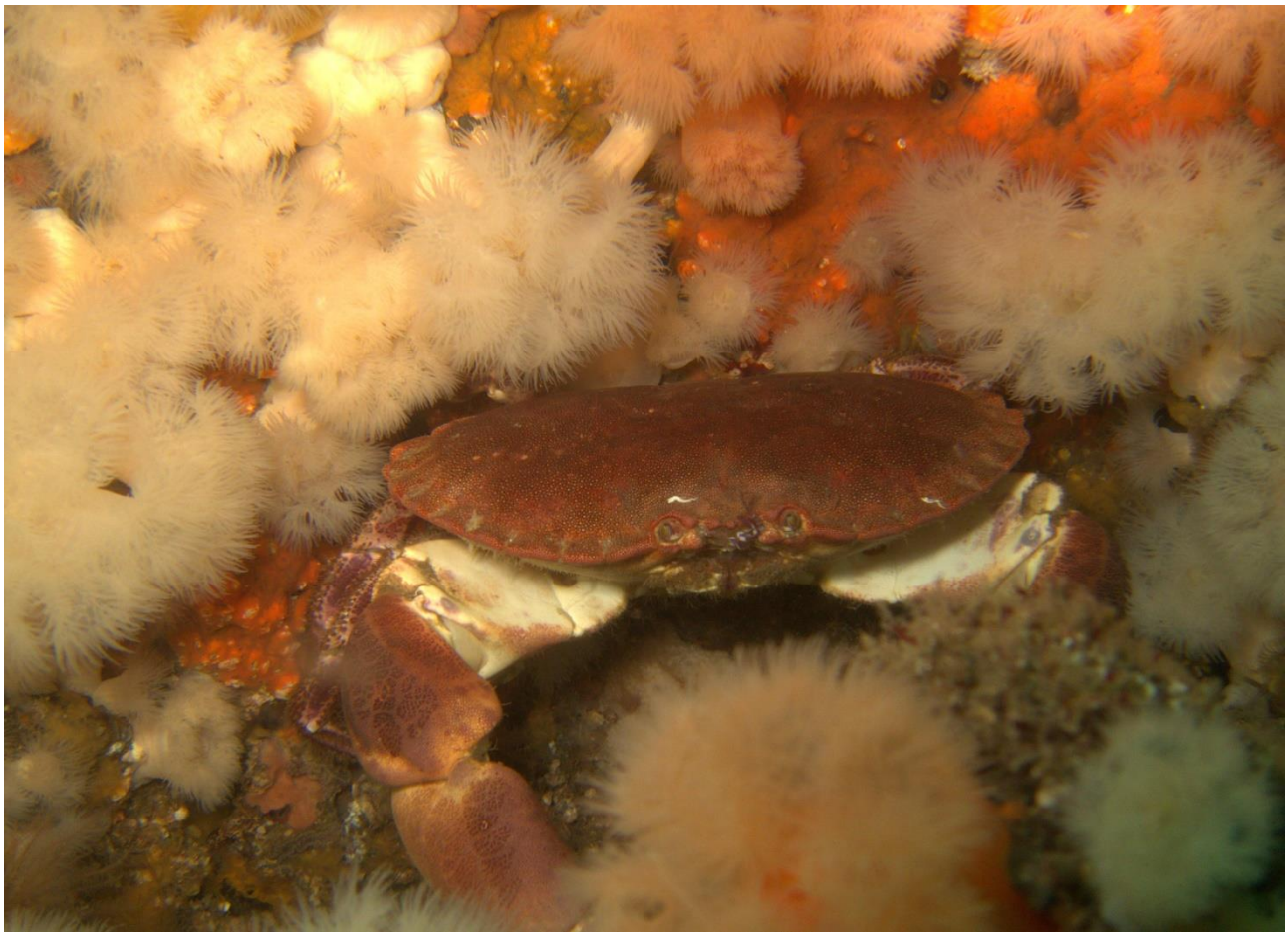

Figure 29 Edible crab (Cancer pagurus) nestling in amongst the Plumose anemone (Metridium senile) in New Quay

Acknowledgements

We'd like to thank all those who support Seasearch Ireland in their activities, particularly the staff of the National Biodiversity Data Centre without whom the data would sit gathering dust and the Marine Conservation Society and Charlotte Bolton in particular who provide financial support and advice.