

Seasearch East Report 2022

This report summarises the activities of Seasearch in East Anglia during 2022



A first English record – *Trinchesia cuanensis* – seen off The Iron Road in Norfolk

Estuary exploration and documenting ongoing serious reef damage

A moderate increase in form numbers over 2021 has been accompanied by a further spread into Essex and Suffolk estuaries and a more structured investigation of chalk reef damage at Overstrand and Sheringham, where pot fishing impacts are turning dense 2m high gullies into flat plains.

Once again we have a big rise in species numbers recorded for Norfolk and Suffolk compared to 2021 – Norfolk up from 367 to 413, mainly due to investigating a wider range of habitat types and the addition of plankton records from Elizabeth Beston.

Suffolk is up to 178 from 157! Species numbers for Essex were down to 96 from 121, mainly because our surveys were all intertidal this year. Unfortunately, we have no records at all for Lincolnshire after a plan to join forces with a local club in 2022 didn't get sorted out in time – better luck in 2023! The overall total of species for East Anglia was 462, a modest 20 higher than 2021.

Our a grand total of forms for the year was 172, made up of 84 (49%) Observation forms and 88 (51%) survey forms, a percentage split that remains steady year on year.

Our first record of the year was from an intertidal survey at West Runton on the 3rd of January and the last was a plankton sample from Cromer pier on the 26th of December, both from Elizabeth Beston! Mark Crame bravely made the first dive record from Lowestoft on the 16th of June. Records then came in steadily throughout the year.



Fishing litter remains a problem – this common lobster had been cooked before being dumped back in the sea at Cley

We ran our first face to face Observer course since the start of lockdown with 12 attendees from all over the UK, including 2 refreshers. Most managed to come along to an all-day shore event at West Runton the next day and others were also able to dive or snorkel with us over the summer months to complete their qualification. Our keenest student endured a 7 hour moped ride to and from the course and still managed to complete her homework assignments before anyone else, then went on to snorkel off the South coast to complete her qualification very quickly!



A rather lovely little spiral bryozoan, *Bugulina flabellata*, was recorded off Salthouse

Several exciting new initiatives were undertaken beyond recording this year, including seagrass mapping in Suffolk and Essex, a face-to-face

conservation conference focussing on the Norfolk coast and GPS mapping potting damage to chalk reef features; all are expanded on later in this report.

Many of the new species recorded this year were identified by Elizabeth Beston using microscopic techniques on seaweed and water samples brought back from surveys and confirming her results by sharing the resultant photos in online expert ID fora.



One of Elizabeth's diatoms *Coscinodiscus wailessi*

The following pages explore each of the survey sites in more detail, working roughly from North to South.

N and NE Norfolk

This section covers all Seasearch records between Cley and Overstrand in North Norfolk, and several wreck and seabed sites accessed from Sea Palling in East Norfolk. All records from Weybourne onwards were within or adjacent to the Cromer Shoal Chalk Beds MCZ.

Cley



A lost lobster pot at Cley, still roped to others

Ten forms were received for Cley this year, 7 Surveyor and 3 Observation. This is a very diverse site including a wave affected cobble plain, a popular WW1 wreck, vast Sandmason (*Lanice conchilega*) beds, an ice age forest reef and flint boulder plains.



A juvenile Grey gurnard, *Eutriglia gurnardus* wonders whether it can manage a whole finger at Cley



Rope collected off Cley made a nice jellyfish after measuring

Unfortunately, large numbers of lost pots, rope, anchors and angling tackle were found on all dives at

this site. A massive part-buried, part-free-floating tangle of rope which represented a real danger to divers and boat propellers was gathered up and removed.

West Bank

With a 900m walk from the car park to the sea, this site only generated 2 Surveyor forms in 2022, but they were well worth doing! Fine inshore sand gives way at depth to a low chalk reef with very large flint boulders, covered in a very diverse turf that changes from bryozoan to cnidarian dominated. Species recorded included Pennant's swimming crab (*Portumnus latipes*), Grey gurnard juveniles (*Eutriglia gurnardus*) and Red mullet (*Mullus surmuletus*). Unfortunately, the site also contained a string of 20 abandoned lobster pots which had been ghost fishing for quite some time. Part of the string was inundated with sand while the rest was seen to be damaging the chalk. It was reported to the EIFCA immediately after the first survey. The owner declined to retrieve them and they were still in place at the end of the diving season, despite the operation of a voluntary code of best practice designed to reduce the impacts of gear loss.



***Mullus surmuletus*, Red mullet at West Bank**

The Iron Road



Alloteuthis subulata juveniles almost ready to hatch at The Iron Road dive site

Ten Surveyor forms were received for The Iron Road (also confusingly known as East West Bank), a very varied site with reefs of rugged exposed clay, wood and chalk and varying amounts of flint and carstone boulders. The 650m walk from the parking to the sea is a little off-putting, but worth the effort! A shoal of 12 *Alloteuthis subulata* squid were encountered here in the middle of the day, as well as the nudibranch *Trinchesia cuanensis* (see title page for image) a new record for England!

Salthouse

Salthouse offers something for everyone, though finding it needs some determination! The site includes reefs of clay, chalk, wood, carstone and compressed peat, as well as scattered wreckage and huge amounts of fine mobile sand which constantly covers and reveals the other features. 7 Surveyor forms were received for this site, a slight increase on previous years.

The locally rare nudibranch *Lomanotus marmoratus* was spotted grazing on *Nemertesia antenina* hydroids along with *Duvaucelia plebeia* on Dead men's fingers, a first record for East Anglia. The usual *Doto spp* and the tiny *Palio nothus* were occasional on nearby *Amathia spp* bryozoans.



Duvaucelia plebeia nudibranch at Salthouse...



...and in context on its Dead man's fingers soft coral food

Weybourne

Weybourne was our most popular dive site this year, with 39 forms received, its popularity as a training site reflected in the split of 32 Observation to 7 Surveyor forms. The WW1 wreck of the Rosalie continued to be popular with trainees and visiting divers, while more experienced surveyors preferred to explore the chalk reef directly under the cliffs and the disused telegraph cable which attracts many hydroids and bryozoans.

The single Spiny spider crab – *Maja brachydactyla* – seen in previous years has been joined by at least one other individual and several have been reported in lobster pots around the East Anglian coast.



Dual-purpose photo showing a Spiny spider crab – *Maja brachydactyla* and the vast amounts of lost rope caught on the Rosalie wreck

Large amounts of fishing waste, including lost pots trapped in the wreckage, lost rope, anchors, angling tackle and cooked crab carcasses were observed on every survey. Recreational pots were also set inside the wreck and the unfortunate lockdown hobby of spearfishing was seen to be ongoing, with individuals mixing with other snorkellers and divers in poor visibility, causing dives to be sensibly cut short.

Sheringham

Twenty-six forms were received for Sheringham, 19 Observation and 7 Surveyor. This is a significant drop compared to 2021, reflecting active attempts to spread effort over a wider range of sites. For the first time in several years, Sheringham lost its spot as most popular dive site to Weybourne. The Sheringham snorkel trail remained popular amongst our non-diving volunteers, the owners of The Offshore cafe have taken an interest in the snorkel trail and have sponsored a seasonal marker buoy (cut off by persons unknown within a few weeks) each summer, in addition to hosting two information boards.



Typical 'top down' pot strike damage at Sheringham

Much to our distress, it has become apparent during 2022 that Sheringham, which had the most rugged chalk seen off Norfolk, with gullies and outcrops up to 3m high, has suffered very badly from human impacts to the reef.



Typical rope cut damage – the position of the rope is reset on every tide

We had been aware for some years that specific features were 'disappearing' from gully ends and that those ends seemed to take less time and effort to reach, while the chalk we passed through had increasing numbers of bright white scars from strikes by lobster pots and cuts by taut plastic ropes.

The real extent of the damage was brought home by comparing a GPS track from a dive in October 2022 with CEFAS bathymetry from 2017 – the closely packed, 2m high gullies had all gone, with only very low chalk hummocks remaining, surrounded by angular chalk gravel and freed flint boulders. A string of pots followed during the dive was actively damaging the remaining chalk, with each pot next to its own selection of fresh scars and some either suspended vertically from tight ropes, or sitting next to whole sections of chalk that had been lifted away from the reef while freeing up trapped pots.



Podweed, *Halidrys siliquosa*. This wrack seems to be at its limit of survival off East Anglia and only appears occasionally

The rarely recorded intertidal hydroid *Orthopyxis integra* was found at the West end of town by Elizabeth Beston. The invasive algae species *Grateloupia turuturu* and *Grateloupia subpectinata* were seen on all dives off Sheringham, with *G. turuturu* becoming one of the dominant species, especially towards the end of the season. The rarely seen brown alga *Halidrys siliquosa* was spotted a couple of times, it seems to be a favourite base for stalked jellyfish. *Ctenolabrus rupestris*, the Goldsinny wrasse, was seen living with a shoal of Corkwing wrasse at the east end of Sheringham.

West Runton



Goldsinny wrasse – *Ctenolabrus rupestris*

Nine forms were generated for West Runton, 6 Observation and 3 Surveyor. This significant drop is mainly due to our main recorder here moving onto deliver records via a different method through the Wildlife Trust, so just as many species records are reaching the NBN Atlas each year.

The intertidal chalk platform at West Runton contrasts nicely with the gently undulating subtidal reef, which eventually leads to deeply undercut gullies and outcrops. Interesting species recorded this year include the first Norfolk record of the invasive Brush clawed crab, *Hemigrapsus takanoi*, spotted by Will Nash, the algae *Petalonia fascia* and *Scytosiphon lomentaria* and the crustacean *Jaera albifrons*. The previously under-recorded green algae *Cladophora hutchinsae* was found to be frequent on the intertidal chalk.



Very angry tiny *Hemigrapsus takanoi* – Brush clawed crab, an invasive species thought to be displacing Shore crabs

East Runton



The invasive algae *Grateloupia turuturu* (centre)

Nine forms were received for East Runton, 2 Observation and 7 Surveyor. The site is not very popular due to the area directly off the beach being damaged by frequent boat traffic. The seabed is much healthier and more diverse to the west of the entry point and a NW transect eventually leads to a large chalk 'amphitheatre'.

The invasive worm *Pileolaria berkleyana* has become abundant here and is now completely outcompeting other species on chalk and flint vertical surfaces, becoming a monoculture.

The freshwater springs bubbling through the chalk provide a range of salinities and temperatures not seen elsewhere. Because of this, East Runton remains the site with the highest number of algae species recorded, which increases all the time.



Calvadosia campanulata, a stalked jellyfish at East Runton

A more welcome sight due to the early start to the season was frequent Corkwing wrasse nests, very common here due to the large number of big hollow flints for the fish to stuff with snipped-off pieces of algae. The unusual crustacean *Pagurus cuanensis* was found at depth. Many *Calvadosia campanulata* stalked jellies were found in the diverse algae, making a good comeback from the single individual seen in 2021.



Little cuttlefish, *Sepioloidea atlantica*, from a night dive



Cooked crab waste



Grey topshells, *Steromphala cineraria*, one wearing a fetching but worrying fascinator of *Pileolaria berkleyana* worms

For some reason, this site is particularly popular for the dumping of cooked crab waste – the boiled shells of crabs and lobsters and often empty whelk shells and filleted freshwater and marine fish. These are seen as a bonus by local scavengers and could be a harmless

addition to the ecosystem, if not for the fact that they're dropped in dense piles which smother the seabed beneath, leaving dead, anoxic patches.

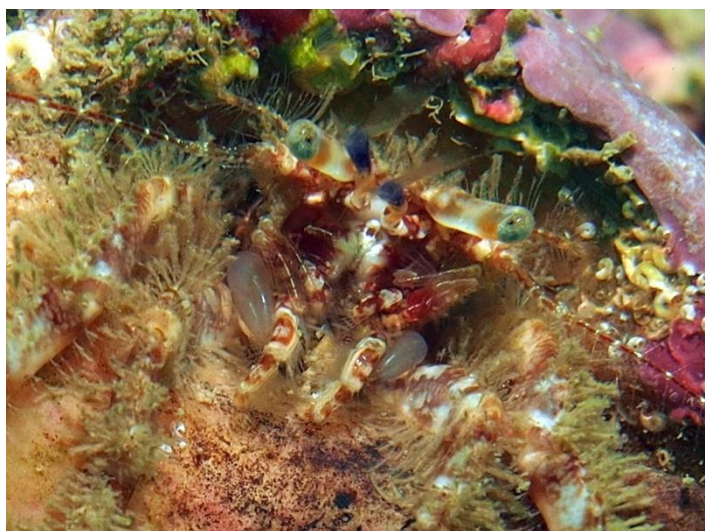
Cromer

Nine forms were received for Cromer, 5 Observation and 4 Surveyor, including the first four plankton collection forms taken from the pier.

Happy Valley at the far East of the town is now the site of the second most damaged chalk seen so far (nearby Overstrand is the worst), undulating bedrock with over 70% of the surface damaged by pot strikes at depth and almost no growth of algae or animal turf seen on the horizontal surfaces.



Repeated pot strike damage to chalk reef at Cromer



Pagurus cuanensis, the Hairy hermit crab, displaying the reason for his common name!

Despite this horrendous damage, the much tougher very large flint boulders were found to be home to a very shy Rock goby (*Gobius paganellus*), as well as several sponge species not seen elsewhere off North Norfolk. The Hairy hermit crab, *Pagurus cuanensis*, was seen at only 4m deep, much closer into shore than at other sites.

Overstrand

Six Surveyor forms were received for Overstrand, one from the isolated very tall chalk bedrock reefs off the East boat slip and the rest from the recently discovered chalk reef just below the car park at the West end of town. Overstrand continues to be one of the most diverse and unusual sites off Norfolk, mainly due to the strong currents generated by the strangely shaped seabed, which forms a basin 17m deep inshore, before an offshore chalk reef only 7.5m deep.



Small square-cut islands of rugged chalk at Overstrand

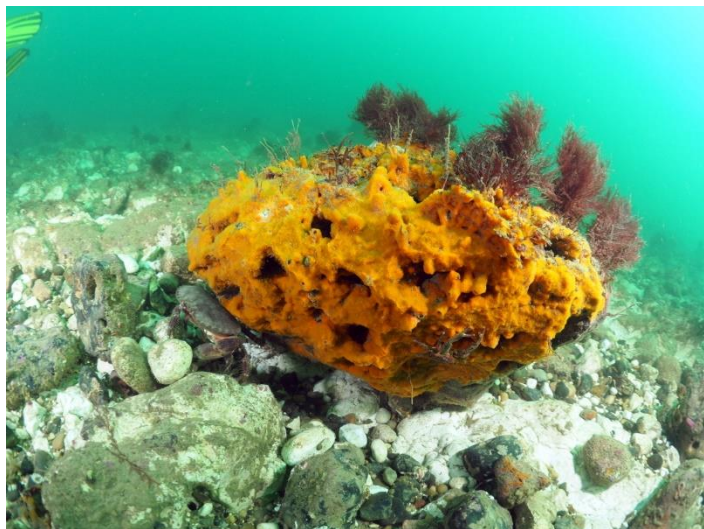
The isolated chalk reefs at the East end of town are largely undamaged, apart from a couple of deep rope cuts to their top surfaces. In awful contrast, the chalk reef running from 6 to 12m deep directly below the town car park has been so seriously damaged by pot and rope interactions that only tiny areas of the original rugged reef remain as square-cut shrinking islands in a sea of recent angular chalk gravel and pebbles. Life is only present on very large flint boulders, whose incredibly diverse algae and animal turf hint at what has been lost.



A Tompot blenny, *Parablennius gattorugine*, peers out of the relative safety of a flint boulder

The boulders are unusually full of tunnels and holes that house numerous territorial fish, including Tompot blennies *Parablennius gattorugine*, Norway bullhead

Micrenophrys lillejorgii, Butterfish *Pholis gunnellus* and Common gobies (*Pomatoschistus microps*), the latter in fierce, brightly coloured combat not previously encountered.



Typical large flint boulder covered in life, surrounded by barren smashed chalk



Norway Bullhead, *Micrenophrys lillejorgii*, at Overstrand

All of the boulders were dominated by large sponges, including the species *Raspailia ramosa*, *Haliclona cineraria*, *Haliclona viscosa* and *Dysidia pallescens*; their growth is probably encouraged by the high currents at this site.

Further Southeast – Sea Palling area

Eleven forms were received for dives and shore surveys around Sea Palling, 9 Surveyor forms from club wreck dives from Lucy Johnson and Inge Smith, 1 Observer plankton sampling form from Elizabeth Beston at Gorleston and 1 Observation form from an intertidal record of *Alloteuthis subulata* squid trapped in a rock pool. Our best local surveyors in this area have unfortunately had to temporarily step down, due to ill health.

Areas of chalk bedrock were recorded around the wreck of the Ethel, 7km North of Happisburgh, a site that was previously only recorded as mobile sand.

Two Tompot blennies were seen on the wreck of the Galathea, 23km NE of Sea Palling. Both were large adults, so had probably been present for more than one year.



Alloteuthis subulata squid

Suffolk

Suffolk is the most difficult of the East Anglian counties to record in, with several large rivers emptying into a seabed of mostly mud and clay, visibility is rarely adequate. We are forced to use imaginative methods of recording, including snorkelling in tidal estuaries, asking for angling records, intertidal seagrass surveys and diving in shingle lagoons.

Lowestoft

Eleven forms were received from Lowestoft, mainly Observation intertidal and angling records from Mark Crame and one snorkelling Surveyor from Dawn Watson and Emily Swan. The angling records included a Spiny spider crab, *Maja brachydactyla*. Starry smoothounds and Thornback rays

Shingle Street

Four forms were received for Shingle Street, 2 Observation and 2 Surveyor. The temporary marine lagoons separated from the sea by a very narrow strip of shingle follow the tides, and are a snapshot of the community that was trapped when each were formed, some have matured and been moved further from the sea by shingle movements, others are still settling. The vascular plant *Ruppia maritima* was recorded in two lagoons, while adult European eels were found to be frequent in a newer pool very popular with cold water swimmers.



Anguilla anguilla, European eel peering out from one of many burrows amongst the feet of swimmers

It was interesting to follow the maturation of the newer pool, with *Ostreopsis sp* dinoflagellates and *Beggiatoa* bacterial mats being replaced by marine algae as the dominant species and *Cylista ornata* anemones beginning to appear in the shallows.



Cylista ornata – a small anemone seen at many Suffolk sites

River Deben – Martlesham Creek, Waldringfield and Bawdsey Quay

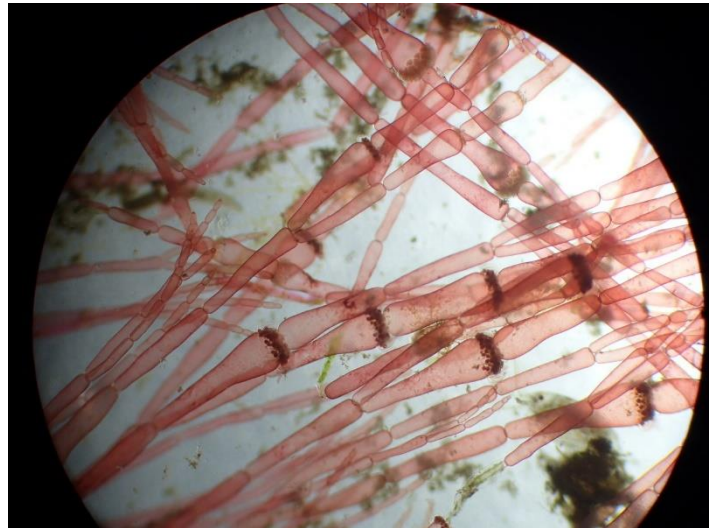
Five forms were received for the tidal stretch of the River Deben, 3 Surveyor and two Observation forms, covering the intertidal at Martlesham creek to Kyson Point, snorkelling at Waldringfield and intertidal at Bawdsey Quay from the saltings to the sea.

Martlesham Creek to Kyson point was surveyed for *Zostera noltei*, as historic records exist for the area, but none was found. A Kingfisher was seen several times.



Haminoea navicula slug at Waldringfield

At Waldringfield, a snorkelling event yielded 3 forms and records of vast numbers of the slug *Haminoea navicula* with its bright yellow quaver shaped egg masses. The site also contained the algae *Griffithsia devoniensis* and *Chondria coerulescens*, rarely recorded on the East coast.



Griffithsia devoniensis under the microscope



Louise Heinemann really 'enjoying' the estuary snorkelling

The area around Bawdsey Quay also proved negative for *Zostera noltei*, although it may still be present in the very difficult to get to area of saltings between

Bawdsey and Ramsholt; a kayak survey will take place in 2023. A single cobble with the kelp *Laminaria digitata* attached was found near the point, as well as the invasive alga *Sargassum muticum*.

Felixtowe

A single Observation form was received from an intertidal survey on a spring low by David Swain. This area contains some of the best *Sabellaria spinulosa* reef in East Anglia and it just breaks the surface on a very low tide. Previous dive surveys found that it supported the nudibranch *Thecacera pennigera* and the sponge *Clathrina lacunosa*.

River Orwell – Orwell bridge, Nacton shores and Levington marina



Example of Seagrass mapping using a GPS near Nacton

Six forms were received for the tidal stretch of the River Orwell estuary, 1 Observation and 5 Surveyor. The Observation form was from Harry Sparkes, one of this year's students who found the scheduled dives in Norfolk difficult to get to and decided to invest in his local area. His form from the Orwell bridge observation point nicely complements those from seagrass mapping and pontoon surveys between Nacton picnic area and Suffolk yacht harbour.



Zostera noltii and remarkably similar *Ulva sp* alga

The most notable species on this stretch is the intertidal seagrass *Zostera noltii*, whose presence has

now been GPS mapped over an area of habitat approx. 3km wide. Several invasive alien species were recorded, although no sign was found of the Brush clawed crab *Hemigrapsus takanoi*, which had been almost frequent in 2021.



Haminoea navicula eggs attached to the tubes of Peacock fanworms, *Sabella pavonina*

The egg masses of the slug *Haminoea navicula* were attached to ropes from the seabed in the yacht harbour and empty shells were in the strandline at Nacton, suggesting a breeding population in the area.



Bait digging holes. The furthest away are over 24 hours old without being filled in and they are 1m across.

Unfortunately, there had been a very large amount of bait digging in the area, which had destroyed large

tracts of seagrass and had not been filled in, making walking on the mud fairly hazardous. It was reported to Natural England via the local AONB office, but no reply was received.

Essex

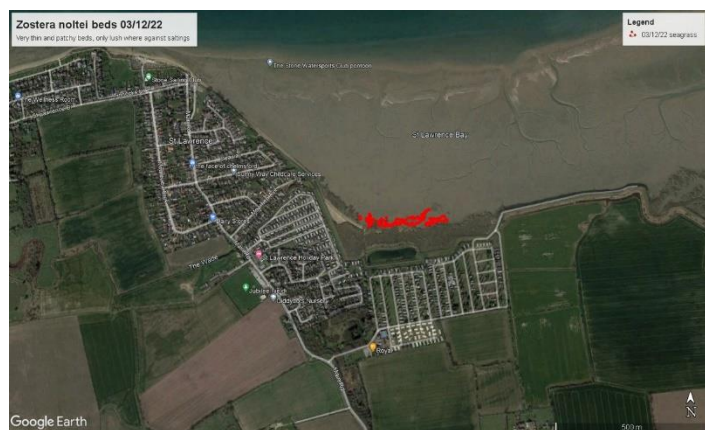
Essex is also a difficult county to survey, though some of the estuaries are a bit clearer than those of Suffolk! A real effort was made in 2022 to start to GPS map seagrass beds in Essex and make general intertidal surveys at the same time, this has greatly improved our records for this year!

Walton on the Naze

A single species record was received from this beach from a dog walker who had found some live stranded *Ophiura ophiura* brittlestars washed up on the sand. This is a very useful record which hints at the kind of habitats that are present just off the shore.

Blackwater estuary – St Lawrence

Two Surveyor forms for intertidal seagrass mapping were produced for St Lawrence Bay on the South bank of the Blackwater estuary. *Zostera noltei* beds here were smaller and sparser than those in Suffolk, but an area approximately 400m across was eventually mapped out.



Entire Seagrass bed at St Lawrence – it really isn't very big.

Some small areas of bait digging were noted, but they were between the seagrass beds and had largely been refilled.

Crouch estuary

Two surveyor forms were received from the river Crouch, 1 from a dive survey of a test reef ball assembly at the mouth of the estuary and one from Burnham yacht harbour pontoons.

The reef ball test site was found to have been flipped upside down on deployment with only a selection of hydroids and algae able to gain purchase on the

smooth flat underside, but the yacht harbour pontoons were a rich source of species records, including the invasive skeleton shrimp *Caprella mutica* and the unusual sight of the anemones *Metridium dianthus* and *Diadumene cincta* in very shallow water – a tall shed built on the pontoons provided deep shade.



Plumose anemones *Metridium dianthus* almost level with the water surface at Burnham on Crouch



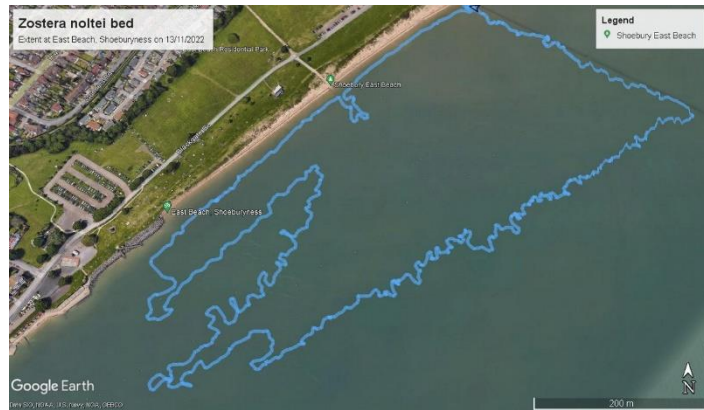
This fender gives an idea of the dense and diverse life present in the yacht harbour

Shoeburyness

Two Surveyor forms were produced from a day of intertidal surveying at Shoeburyness, 1 from some extensive seagrass mapping in thick fog and the other from wading through a tidal paddling pool on the beach.

GPS mapping of *Zostera noltei* had an enforced Northern boundary imposed by an army firing range,

but an area of approximately 500m across was GPS mapped, being careful to avoid disturbance to huge flocks of Brent geese feeding on it.



Extent of *Zostera noltei* mapping at Shoeburyness. This is a small part of massive beds stretching into the Thames estuary



Brent geese flying over *Zostera noltei* beds at Shoeburyness



The solar powered slug *Elysia viridis* from the tidal pool

The tidal pool was surprisingly diverse with the Solar powered seaslug *Elysia viridis* and Long clawed porcelain crabs amongst its many inhabitants; not bad for November!

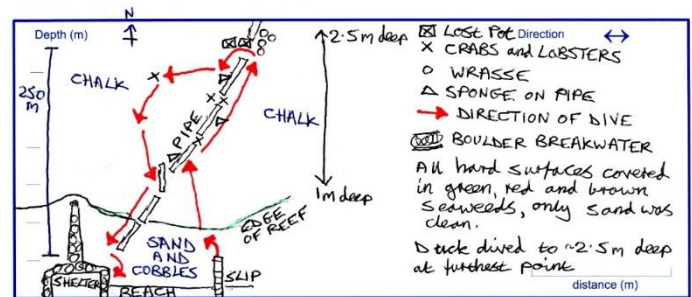


Excitable small woman refusing to leave tidal pool until all boulders have been examined

Other activities

East Anglian Observer Course

Our first face-to-face Observer course since the beginning of lockdown took place on the weekend of July 23rd and 24th – a little later in the year than usual, in the hope of getting a weekend with stable weather – we did not! There were 12 attendees including 2 refreshers from as far afield as Gloucestershire and Kent. They survived a long hot day of classroom theory and all managed to come along to a shore event at West Runton on the second day to put their new skills into practice with a group of other keen local volunteers. We had hoped to fit in 3 dive and snorkel sessions, but the weather had other ideas and we were reduced to hardcore rockpooling. Most were also able to dive or snorkel with us or their own local coordinators over the summer months to complete their qualification.



Snorkelling form diagram from Observer course

Courselets and evening talks

A series of evening talks on various subjects, including looking more closely at particular phyla, site guides, seabed mapping techniques and Seasearch ID photography took place via Zoom during May to help everyone prepare for the season ahead. Each talk was free to attend and lasted between one and two hours on weekday evenings. Howard Wood from Arran COAST gave a very moving talk about the struggles of being a voice for conservation which put our own small problems into perspective. Other subjects included a seaweed identification short course which was biased towards Scottish habitats but featured species known from around the UK, photography for Seasearch and a planning meeting for the year ahead.

Dive weeks

Four official dive weeks were planned for 2022. Unpredictable weather meant that although 4 weeks happened, none of them were at the dates first planned! Instead, we made announcements on the Facebook groups whenever it was possible for tutors to be available, or for small groups to dive together over the season. All of our official dives were shore

based, but some volunteers were also able to undertake surveys on club boat events.



Trisopterus luscus Bib shoaling round a chalk gully end on a group dive at East Sheringham

Zostera mapping

As part of the EU LIFE Recreation ReMEDIES project, we were asked to locate and map seagrass beds in Essex. This proved surprisingly difficult, mainly due to a complete lack of the subtidal species *Zostera marina* in all the places we looked. This could be due to the estuaries becoming much more turbid in recent years, or because it was misidentified in the first place; the number of species present in the UK have been reorganised several times over the years.

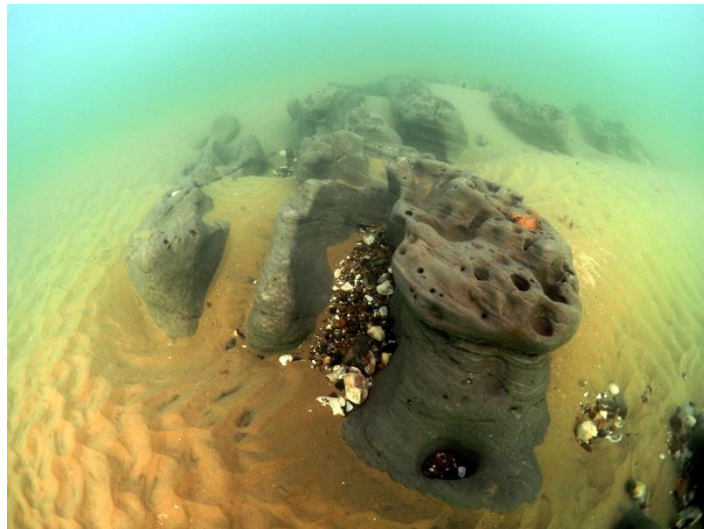


Nice healthy *Zostera noltei* at Shoeburyness

The intertidal species *Zostera noltei* was found and mapped in the Blackwater estuary and at Shoeburyness. In addition, the areas already mapped in the Orwell estuary in Suffolk were consolidated and expanded and several other sites of historic records in Suffolk were surveyed, but no further evidence was found.

Marine conservation advocacy group

Seasearch is not a campaigning project, but there is no effective voice for marine conservation in Norfolk, where there are a lot of problems related to commercial and recreational fishing. Several groups including beach cleaners, surfers, wild swimmers, snorkellers, divers, birdwatchers and marine mammal rescue groups have decided to combine forces to form a coherent community interest group called Marine Conservation For Norfolk Action Group, - MCNAG which can collect and collate relevant data to provide evidence and potential solutions to government agencies and other local bodies where necessary.



MCNAG supports all seabed types around the Norfolk coast, like this clay reef off Cley

The group has now become a community interest company, which means it has a named bank account for managing grants. A website describing the group's activities and some of the marine wildlife of Norfolk can be found here: MCNAG.org

2022 Conference

MCNAG ran a physical conference 'Making Waves' on August the 6th at the NWT centre at Cley to present existing datasets, newly established evidence gathering activities and augment and enhance recording going forward. The keynote speaker was Howard Wood of Arran COAST who spoke live via a Zoom link. Other speakers included Seasearch, EIFCA, Exo (makers of eco rock shielding and reef balls), RSPB, the Wash Waders group, East Winch seal rescue, Seawatch, Beach cleaners, Surfers against Sewage, British Divers Marine Life Rescue and Plastics Coalition. Talks were collected into related topics followed by panel discussions with Q&A sessions and it was very well attended.

The conference day was followed on the Sunday by a day of family-friendly activities in conjunction with NWT. Children were encouraged to take part in marine

wildlife fun and games, and they and their parents had a go at some seaweed pressing and looked at microscopic animals in real time on the big screen.



Nick Acheson giving his all at the conference during a panel discussion

Art made from beach litter was displayed over both days and was used as a conversation starter with people taking part in the activities and members of the public passing through.



The conference day was followed by a day of family-friendly activities

A third, in-person conference will take place on 5th and 6th of August 2023 in partnership with the Norfolk Wildlife Trust at their Cley centre.



MCNAG members take a cake break on Cley beach

Snorkel trail

The Sheringham snorkel trail, based around a disused Edwardian sewer pipe, has continued to grow in popularity, with its own Facebook group of 595 members exchanging tips and photographs. A pair of white buoys, donated by Mr Barker of Yarmouth, was put in place at the start of the trail on July 1st.

Unfortunately, amateur spear fishing became very popular during lockdown and people new to the hobby were attracted to the easy conditions of the snorkel trail. Hopefully this is just a passing fad and nobody will get hurt.



**You never know who you might meet on the snorkel trail!
Juvenile Shanny, Lipophrys pholis**

Potting related damage mapping

Current work involves developing a more detailed method for assessing and classifying habitat damage in the field from the review of Seasearch East's video archive. Two videos are now available on YouTube, showing the extent of the damage at Overstrand and Sheringham. The Sheringham video is accompanied by a GPS track in real time and includes the CEFAS bathymetry which indicates how much reef has already been lost.



Typical chalk damage caused by lobster pots at Overstrand

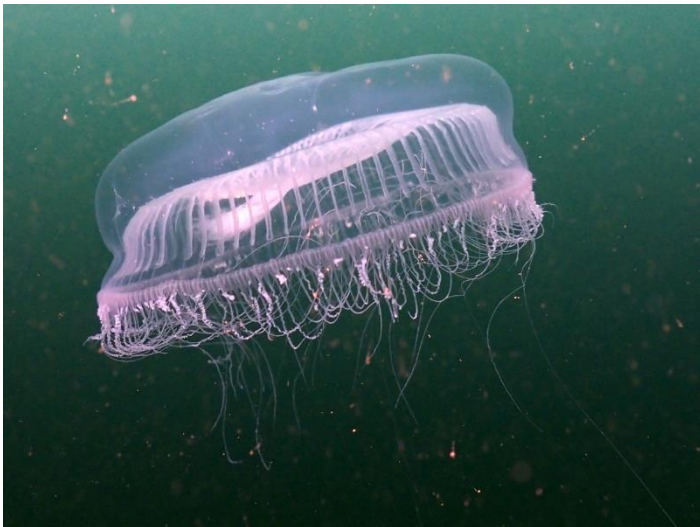
Species lists

Species lists for Norfolk, Suffolk, Essex and East Anglia as a whole are presented below. As mentioned earlier, there are large increases in Norfolk, Suffolk and East Anglia as a whole, Essex numbers have fallen slightly and Lincolnshire unfortunately had no records in 2022.

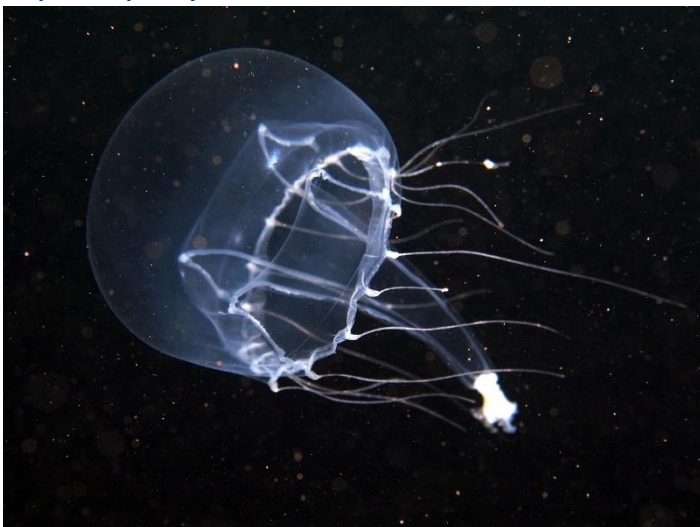
Here's a selection of water column animals seen off Norfolk in 2022:



Compass jellyfish – *Chrysaora hysoscella* with juvenile gadoids



Aequorea sp, a hydroid medusa



Tima bairdii a hydroid medusa

Species lists

| Scientific name | Common name/description | Norfolk | Suffolk | Essex | East Anglia |
|---------------------------------|--------------------------|----------------|---------|-------|-------------|
| Porifera | | Sponges | | | |
| <i>Halichondria bowerbankii</i> | a sponge | O-C | O | | O-C |
| <i>Halichondria panicea</i> | Breadcrumb sponge | R-C | O-F | O | R-F |
| <i>Oscarella sp</i> | a sponge | R-O | | | R-O |
| <i>Sycon ciliatum</i> | Vase sponge | R-C | O-F | O | R-F |
| <i>Grantia compressa</i> | Purse sponge | R-O | | R | R-O |
| <i>Steligera rigida</i> | a sponge | R | | | R |
| <i>Haliclona oculata</i> | Mermaid's glove | R-O | O | | R-O |
| <i>Haliclona cinerea</i> | a sponge | R-F | | | R-F |
| <i>Haliclona viscosa</i> | a sponge | R-F | | | R-F |
| <i>Halisarca dujardini</i> | a sponge | R-O | | | R-O |
| <i>Raspallia ramosa</i> | Chocolate fingers sponge | R-O | | | R-O |
| <i>Cliona sp</i> | Boring sponge | R-C | | | R-C |
| <i>Amphilectus fucorum</i> | Shredded carrot sponge | R-C | | | R-C |
| <i>Porifera sp</i> | blue shredded carrot | R | | | R |
| <i>Porifera sp</i> | yellow shredded carrot | O | | | O |
| <i>Porifera sp</i> | Massive orange sponge | R-F | | | R-F |
| <i>Porifera sp</i> | Massive yellow sponge | R | | | R |
| <i>Porifera sp</i> | Massive white sponge | R | | | R |
| <i>Leucosolenia sp</i> | Spiky lace sponge | R-F | | | R-F |
| <i>Porifera ind</i> | White sponge crust | R | | | R |
| <i>Porifera ind</i> | Beige sponge crust | F | | R | R-F |
| <i>Porifera ind</i> | Orange sponge crust | R-F | | R | R-F |
| <i>Porifera ind</i> | Pink sponge crust | O | | R | R-O |
| <i>Myxilla incrustans</i> | yellow sponge crust | O-F | | | O-F |
| <i>Dysidea fragilis</i> | Goosebump sponge | R-C | | | R-C |
| <i>Dysidia pallescens</i> | Pink goosebump | R-O | | | R-O |
| <i>Aplysilla sulfurea</i> | a sponge | O | | | O |
| <i>Aplysilla rosea</i> | a sponge | R | | | R |
| <i>Hymedesmia sp</i> | Norfolk purple sponge | R-F | | | R-F |
| <i>Polymastia penicillus</i> | Chimney sponge | R | | | R |
| <i>Polymastia boletiformis</i> | Hedgehog sponge | | R | | R |
| <i>Hymeniacion perlevis</i> | Crumb of bread sponge | R-O | | | R-O |
| <i>Suberites massa</i> | a sponge | O | O | | O |
| <i>Suberites ficus/carnosus</i> | a sponge | R-F | | | R-F |
| Cnidaria | | | | | |
| <i>Alcyonium digitatum</i> | Dead mens fingers | R-C | R | | R-C |
| <i>Actinia equina</i> | Beadlet anemone | R-C | O-C | | R-C |
| <i>Metridium dianthus</i> | Plumose anemone | R-C | O | O | R-C |
| <i>Diadumene cincta</i> | an anemone | | | O | O |
| <i>Cylista elegans</i> | Elegant anemone | R-C | O | | R-C |
| <i>Cylista troglodytes</i> | an anemone | R-C | R | | R-C |
| <i>Cylista ornata</i> | an anemone | | R-F | R-F | R-F |
| <i>Urticina felina</i> | Dahlia anemone | R-F | O | | R-F |

| Scientific name | Common name/description | Norfolk | Suffolk | Essex | East Anglia |
|--------------------------------|--------------------------|---------|---------|-------|-------------|
| <i>Urticina eques</i> | Horseman anemone | R-O | | | R-O |
| <i>Tubularia indivisa</i> | Oaten pipes | R-A | R | R | R-A |
| <i>Hydractinia echinata</i> | Hermit fur | R-F | | | R-F |
| <i>Sertularia cupressina</i> | White weed | R-C | O | R | R-C |
| <i>Eudendrium sp</i> | a hydroid | R-F | | F | R-F |
| <i>Amphisbetia opercularis</i> | a hydroid | R-O | | | R-O |
| <i>Halecium halecinum</i> | a hydroid | R-F | R | | R-F |
| <i>Hydrallmania falcata</i> | Helter skelter hydroid | R-O | | | R-O |
| <i>Clytia hemisphaerica</i> | a hydroid | O-A | O | | O-A |
| <i>Orthopyxis inegra</i> | a hydroid | R | | | R |
| <i>Garveia nutans</i> | a hydroid | R-C | | | R-C |
| <i>Halopteris catharina</i> | a hydroid | O-A | R-O | | R-A |
| <i>Plumularia setacea</i> | a feathery hydroid | R-F | | | R-F |
| <i>Obelia sp</i> | a hydroid | O | F | | O-F |
| <i>Obelia dichotoma</i> | a hydroid | F | | | F |
| <i>Hydrozoa sp</i> | a feathery hydroid | O-F | | | O-F |
| <i>Kirchenpaueria pinnata</i> | a feathery hydroid | F | | | F |
| <i>Coryne eximia</i> | a hydroid | R-F | | | R-F |
| <i>Dynamena pumila</i> | a hydroid | F-C | O-F | | O-F |
| <i>Nemertesia antennina</i> | Antenna hydroid | R-O | | | R-O |
| <i>Nemertesia ramosa</i> | Branched antenna hydroid | R | | | R |
| <i>Sertularella rugosa</i> | a hydroid | R-C | | | R-C |
| <i>Tima bairdii</i> | a hydroid medusa | R | | | R |
| <i>Aequorea sp</i> | a hydroid medusa | R | R | | R |
| <i>Auralia aurita</i> | Moon jelly | R-O | O | | R-O |
| <i>Chrysaora hysoscella</i> | Compass jelly | R-O | | | R-O |
| <i>Cyanea capillata</i> | Lion's mane jelly | R | | | R |
| <i>Cyanea lamarckii</i> | Blue jelly | R | | | R |
| <i>Calvadosia campanulata</i> | a stalked jelly | R-F | | | R-F |

| Annelida | | Segmented worms | | | | |
|------------------------------|-------------------|------------------------|-----|-----|-----|--|
| <i>Arenicola sp</i> | Lugworm | O | O-A | O-F | O-A | |
| <i>Arenicola marina</i> | Lugworm | R-F | O | R-F | R-F | |
| <i>Arenicola defodiens</i> | Black lugworm | R-C | | | R-C | |
| <i>Phyllodoce sp</i> | a Phyllodoce worm | R | | | R | |
| <i>Goniadidae sp</i> | a Phyllodoce worm | R | | | R | |
| <i>Syllida sp</i> | A Syllid worm | | R | R-O | R-O | |
| <i>Hediste diversicolour</i> | a polychaete | | O | | O | |
| <i>Alentia gelatinosa</i> | a scaleworm | R | | | R | |
| <i>Sabella pavonina</i> | Peacock fanworm | R-C | F-C | O | R-C | |
| <i>Sabellaria spinulosa</i> | Ross worm | R-C | C | O | R-C | |
| <i>Lanice conchilega</i> | Sandmason worm | R-S | R | R | R-S | |
| <i>Cirratulus sp</i> | a worm | O | R | | R-O | |
| <i>Polydora ciliata</i> | a tubeworm | O-S | | | O-S | |
| <i>Salmacina dysteri</i> | Coral worm | R-F | | | R-F | |
| <i>Spirobranchus</i> | Keel worms | O-F | R-F | F | R-F | |
| <i>Janua heterostropha</i> | a spiral worm | R | | | R | |
| <i>Pileolaria berkleyana</i> | a spiral worm | R-S | | | R-S | |

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|-------------------------------|-------------------------|---------|---------|-------|-------------|
| <i>Terebellid sp</i> | a tubeworm | R | | | R |
| <i>Nemertea sp</i> | a nemertean worm | | R-O | | R-O |
| <i>Cerebratulid sp</i> | a nemertean worm | | R | | R |
| <i>Nematoda sp</i> | a nematode worm | R | | | R |
| <i>Tubulanus annulatus</i> | Football jersey worm | R | | | R |
| <i>Leptoplana tremellaris</i> | a flatworm | | R-F | R | R-F |

Crustacea

| | | | | | |
|-------------------------------|----------------------------|-----|-----|-----|-----|
| <i>Cirripedia</i> | a barnacle | R-A | O-S | O-C | R-S |
| <i>Austrominius modestus</i> | a barnacle | O-S | R-A | O-A | R-S |
| <i>Semibalanus balanoides</i> | a barnacle | R | R-A | | R-S |
| <i>Balanus crenatus</i> | a barnacle | A | | | A |
| <i>Verruca stroemia</i> | a barnacle | R | | | R |
| <i>Decapoda sp</i> | Crab naupli | P | | | P |
| <i>Cancer pagurus</i> | Edible crab | R-F | R-O | | R-F |
| <i>Carcinus maenas</i> | Shore crab | R-C | R-C | R-O | R-C |
| <i>Hemigrapsus takanoi</i> | Brush clawed crab | R | | | R |
| <i>Necora puber</i> | Velvet swimming crab | R-F | O | | R-F |
| <i>Pilumnus hirtellus</i> | Hairy crab | R | | | R |
| <i>Portumnus latipes</i> | Pennant's swimming crab | R-O | | | R-O |
| <i>Liocarcinus holsatus</i> | Flying crab | R-O | | | R-O |
| <i>Corystes cassivelaunus</i> | Masked crab | R | | | R |
| <i>Maja brachydactyla</i> | Spiny spider crab | R | R | | R |
| <i>Hyas araneus</i> | Sea toad | R | | | R |
| <i>Inachus sp</i> | Sponge spider crab | R-F | | | R-F |
| <i>Macropodia sp</i> | Long legged spider crab | R-F | R | | R-F |
| <i>Pisidia longicornis</i> | Long clawed porcelain crab | R-O | | O | R-O |
| <i>Ebalia sp</i> | a nut crab | R | | | R |
| <i>Anapagurus sp</i> | a hermit crab | R | | | R |
| <i>Pagurus bernhardus</i> | Common hermit crab | R-F | | | R-F |
| <i>Pagurus cuanensis</i> | Hairy hermit crab | R | | | R |
| <i>Paguridae</i> | a hermit crab | O-C | R-C | | R-C |
| <i>Galathea squamifera</i> | Brown squat lobster | R-F | | | R-F |
| <i>Galathea intermedia</i> | a squat lobster | R-O | | | R-O |
| <i>Homarus gammarus</i> | Common lobster | R-F | F | | R-F |
| <i>Palaemon serratus</i> | Common prawn | R-F | O | | R-F |
| <i>Palaemon elegans</i> | Rockpool prawn | R-F | | | R-F |
| <i>Palaemon sp</i> | a prawn | R | R | R | R |
| <i>Crangon crangon</i> | Brown shrimp | R-O | | | R-O |
| <i>Pandalus montagui</i> | Northern prawn | R-F | | | R-F |
| <i>Eualus sp</i> | a prawn | R-O | | | R-O |
| <i>Hippolytes varians</i> | Chameleon prawn | R-O | | | R-O |
| <i>Athanas nitescens</i> | Hooded shrimp | R | | | R |
| <i>Caprella sp</i> | a skeleton shrimp | R-O | O | R | R-O |
| <i>Caprella mutica</i> | Invasive skeleton shrimp | | | F | F |
| <i>Mysida sp</i> | a mysid shrimp | R-O | O-F | | R-F |
| <i>Talitridae sp</i> | a shrimp | | F | O-F | O-F |
| <i>Gammarus locusta</i> | a shrimp | R | R | | R |

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|---------------------------------|---------------------------------|---------|---------|-------|-------------|
| <i>Amphipoda sp</i> | an amphipod indet | O-F | O | | O-F |
| <i>Amphipoda sp</i> | an amphipod on <i>Tubularia</i> | O | | | O |
| <i>Iphimedia obesa</i> | an amphipod | O | | | O |
| <i>Corophium sp</i> | an amphipod | | O | | O |
| <i>Calliopius laeviusculus</i> | an amphipod | R | | | R |
| <i>Echinogammarus obtusatus</i> | an amphipod | R | | | R |
| <i>Dyopedos sp</i> | Whip amphipods | F | | | F |
| <i>Jassa sp</i> | an amphipod | O-A | | R-S | R-S |
| <i>Microdeutopus anomalus</i> | an amphipod | | O | | O |
| <i>Idotea sp</i> | an isopod | R-O | | R | R-O |
| <i>Idotea baltica</i> | an isopod | | | R | R |
| <i>Idotea Chelipes</i> | an isopod | | O-F | | O-F |
| <i>Idotea granulosa</i> | an isopod | R | | | R |
| <i>Idotea linearis</i> | an isopod | R | | | R |
| <i>Jaera albifrons</i> | an isopod | R | | | R |
| <i>Ligia oceanica</i> | Sea slater | | R | | R |
| <i>Copepoda sp</i> | a copepod | R | | | R |
| <i>Cyclopidae</i> | a copepod | | F | | F |
| <i>Harpacticoida sp</i> | a copepod | P | | | P |
| <i>Calanoida sp</i> | a copepod | P | | | P |
| <i>Ostracoda sp</i> | an Ostracod | | O | R | R-O |

| Mollusca | Molluscs | | | | |
|--------------------------------|--------------------|-----|-----|---|-----|
| <i>Polyplacophora</i> | a chiton | R-O | | R | R-O |
| <i>Lepidochitona cineraria</i> | a chiton | R-O | R-O | F | R-F |
| <i>Haminoea navicula</i> | a sea slug | | O-F | | O-F |
| <i>Elysia viridis</i> | Solar powered slug | | | F | F |
| <i>Aplysia punctata</i> | Sea hare | R | | | R |
| <i>Nudibranchia sp</i> | nudibranch eggs | R-O | | | R-O |
| <i>Doto sp</i> | a nudibranch | O-F | | | O-F |
| <i>Doto pinnatafidita</i> | a nudibranch | O | | | O |
| <i>Doto coronata</i> | a nudibranch | O | | | O |
| <i>Doto millbayana</i> | a nudibranch | O | | | O |
| <i>Lomanotus marmoratus</i> | a nudibranch | O | | | O |
| <i>Duvaucelia plebeia</i> | a nudibranch | R | | | R |
| <i>Onchidoris bilamellata</i> | a nudibranch | O | | | O |
| <i>Acanthodoris pilosa</i> | a nudibranch | R | | | R |
| <i>Doris pseudoargus</i> | Sea lemon | R | | | R |
| <i>Goniodoris nodosa</i> | a nudibranch | R | | | R |
| <i>Edmundsella pedata</i> | Violet sea slug | R-O | | | R-O |
| <i>Ancula gibbosa</i> | a nudibranch | R | | | R |
| <i>Antiopella cristata</i> | Crystal slug | R-C | | | R-C |
| <i>Facelina auriculata</i> | a nudibranch | R | | | R |
| <i>Palio nothus</i> | a nudibranch | R-O | | | R-O |
| <i>Amphorina pallida</i> | a nudibranch | R | | | R |
| <i>Catriona aurantia</i> | a nudibranch | R | | | R |
| <i>Trinchesia cuanensis</i> | a nudibranch | R | | | R |
| <i>Aeolidia filomenae</i> | a nudibranch | R | | | R |

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| <i>Crepidula fornicata</i> | Slipper limpet | R-O | O-F | O | R-F |
| <i>Steromphala cineraria</i> | Grey topshell | R-F | O | | R-F |
| <i>Calliostoma zizyphinum</i> | Painted topshell | R-F | | | R-F |
| <i>Buccinum undatum</i> | Common whelk | R-O | | | R-O |
| <i>Nucella lapillus</i> | Dog whelk | R-F | | | R-F |
| <i>Littorina saxatilis</i> | Rough periwinkle | | R-C | R-C | R-C |
| <i>Littorina littorea</i> | Common periwinkle | O-F | R-F | O-C | O-C |
| <i>Littorina fabialis/obtusata</i> | a flat periwinkle | R-O | | | R-O |
| <i>Lacuna pallidula</i> | a periwinkle | R | | | R |
| <i>Rissoa sp</i> | a gastropod | R-S | | | R-S |
| <i>Peringia ulvae</i> | a gastropod | | O-C | F-A | O-A |
| <i>Patella vulgata</i> | Common limpet | R-O | R-F | | R-F |
| <i>Tectura virginea</i> | White tortoiseshell limpet | R-O | | | R-O |
| <i>Mytilus edulis</i> | Edible mussel | F | O | O-F | O-F |
| <i>Scobicularia plana</i> | Peppery furrow shell | | F | | F |
| <i>Mya truncata</i> | Gaper shell | | | O | O |
| <i>Ruditapes phillipinarium</i> | Manila clam | | O-C | F | O-C |
| <i>Cerastoderma edule</i> | Common cockle | | R-C | F-C | R-C |
| <i>Cerastoderma glaucum</i> | Lagoon cockle | | R-F | | R-F |
| <i>Magallana gigas</i> | Pacific oyster | | R-C | R-C | R-C |
| <i>Barnea candida</i> | White piddock | R-C | | | R-C |
| <i>Teredo sp</i> | Shipworm | | C | | C |
| <i>Ensis magnus</i> | a razor shell | O-A | | R | R-A |
| <i>Sepiolo atlantica</i> | Little cuttlefish | R-O | | | R-O |
| <i>Alloteuthis subulata</i> | small squid | R-O | | | R-O |
| <i>Loligo sp</i> | Common squid eggs | R | | | R |

Bryozoa

| | | | | | |
|-----------------------------------|---------------------------|-----|-----|-----|-----|
| <i>Indet Cyphonautes</i> | Planktonic juveniles | P | | | P |
| <i>Bryozoa</i> | encrusting bryozoan indet | R-F | R | | R-F |
| <i>Conopeum reticulatum</i> | encrusting bryozoan | R-C | F | F | R-C |
| <i>Electra pilosa</i> | Frosty sea mat | R-C | F-C | O-F | R-C |
| <i>Schizomavella linearis</i> | encrusting bryozoan | R-F | | | R-F |
| <i>Schizoporella unicornis</i> | encrusting bryozoan | O | | | O |
| <i>Cryptosula pallasiana</i> | encrusting bryozoan | R-F | | | R-F |
| <i>Amathia citrina</i> | a bryozoan | R-C | | | R-C |
| <i>Amathia pustulosa</i> | a bryozoan | F-C | | | F-C |
| <i>Bicellariella ciliata</i> | a bryozoan | O-F | | | O-F |
| <i>Flustra foliacea</i> | Hornwrack | R-C | | | R-C |
| <i>Alcyonidium sp</i> | a bryozoan | O | | R | R-O |
| <i>Alcyonidium diaphanum</i> | Finger bryozoan | R-O | | R-O | R-O |
| <i>Alcyonidium hydrocoailitum</i> | A bryozoan | | | R | R |
| <i>Flustrellidra hispida</i> | a bryozoan | R | | | R |
| <i>Scrupocellaria sp</i> | a bryozoan | O-F | | F | O-F |
| <i>Scrupocellaria scruposa</i> | a bryozoan | R-O | | | R-O |
| <i>Vesicularis spinulosa</i> | a bryozoan | O | | | O |
| <i>Bugula neritina</i> | an invasive bryozoan | | F | F | F |
| <i>Crisularia plumosa</i> | Spiral bryozoan | R-C | R | | R-C |

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|------------------------------|-------------------------|---------|---------|-------|-------------|
| <i>Bugulina flabellata</i> | a spiral bryozoan | R | | | R |
| <i>Bugulina turbinata</i> | a spiral bryozoan | R | | | R |
| <i>Caberea boryi</i> | a bryozoan | R-F | | | R-F |
| <i>Crisia sp</i> | a bryozoan | R-O | O-F | | R-F |
| <i>Tricellaria inopinata</i> | an invasive bryozoan | | O | F | O-F |
| <i>Celleporina sp</i> | a bryozoan | | R | | R |
| <i>Nolella stipata</i> | a bryozoan | R-O | | | R-O |
| <i>Anguinella palmata</i> | a bryozoan | O-F | | | O-F |
| <i>Aetea anguinella</i> | Snakeshead bryozoan | R-O | | | R-O |
| <i>Disporella hispida</i> | a disc bryozoan | R-F | | | R-F |
| <i>Plageocia patina</i> | a disc bryozoan | O | | | O |

Echinodermata

| | | | | | |
|------------------------------|--------------------|-----|-----|---|-----|
| <i>Ophiura ophiura</i> | Sand brittlestar | R | R | R | R |
| <i>Ophiura sp</i> | Sand brittlestar | R | | | R |
| <i>Amphipholis squamata</i> | a brittlestar | R | R | O | R-O |
| <i>Ophiothrix fragilis</i> | Common brittlestar | R | | | R |
| <i>Asterias rubens</i> | Common starfish | R-C | R-C | R | R-C |
| <i>Henricia sp</i> | Bloody henry | R-O | | | R-O |
| <i>Crossaster papposus</i> | Common sunstar | R-O | | | R-O |
| <i>Psammechinus miliaris</i> | Shore urchin | | | R | R |

Tunicata

Sea squirts

| | | | | | |
|---|----------------------|-----|-----|-----|-----|
| <i>Perophora listeri</i> | a tunicate | R-C | | | R-C |
| <i>Perophora japonica</i> | an invasive tunicate | O-F | | | O-F |
| <i>Asciidiella aspersa</i> | a tunicate | | F-C | R-C | R-C |
| <i>Molgula complanata</i> | a tunicate | O-F | | | O-F |
| <i>Molgula sp</i> | a tunicate | O-A | R | R-F | R-A |
| <i>Styela clava</i> | Leathery squirt | | O-C | O | O-C |
| <i>Styela coriacea</i> | a tunicate | R-F | | | R-F |
| <i>Ciona intestinalis</i> | Yellow ringed squirt | | O-C | C | O-C |
| <i>Polycarpa scuba</i> | a tunicate | R | | | R |
| <i>Diplosoma spongiforme</i> | Sponge squirt | R-A | | | R-A |
| <i>Diplosoma listerianum</i> | a tunicate | R-F | | | R-F |
| <i>Botrylloides sp</i> | a tunicate | R-O | | | R-O |
| <i>Botrylloides leachii</i> | a tunicate | R-F | O | | R-F |
| <i>Botrylloides leachii var radiata</i> | a tunicate | R-O | | | R-O |
| <i>Botrylloides diagensis</i> | an invasive tunicate | | F | F | F |
| <i>Botrylloides violaceus</i> | an invasive tunicate | | F | | F |
| <i>Botryllus schlosseri</i> | Star squirt | R-O | O | O | R-O |
| <i>Didemnum maculosum</i> | Snowflake squirt | R-C | | | R-C |
| <i>Trididemnum cereum</i> | a tunicate | O-F | | | O-F |
| <i>Lissoclinum perforatum</i> | a tunicate | R-O | | | R-O |
| <i>Polyclinum aurantium</i> | a tunicate | R-O | | | R-O |
| <i>Clavelina lepadiformis</i> | Lightbulb sea squirt | R-A | F | R | R-F |
| <i>Pycnoclavella stolonialis</i> | Pinhead tunicate | R | | | R |
| <i>Corella eumyota</i> | an invasive tunicate | R | O | O | R-O |
| <i>Archidostoma aggregatum</i> | a tunicate | O-C | | | O-C |
| <i>Polysincraton bilobatum</i> | a tunicate | R-F | | | R-F |

| Scientific name | Common name/description | Norfolk | Suffolk | Essex | East Anglia |
|----------------------------------|---------------------------|---------|---------|-------|-------------|
| <i>Morchellium argus</i> | a club squirt | R-F | | | R-F |
| <i>Aplidium turbinatum</i> | a tunicate | R-F | | | R-F |
| <i>Aplidium glabrum</i> | a tunicate | R | | | R |
| <i>Aplidium pallidum</i> | a tunicate | R | | | R |
| <i>Aplidium sp</i> | a tunicate no spots | R | | | R |
| <i>Distaplia rosea</i> | a tunicate | R-O | | | R-O |
| Pisces | Fishes | | | | |
| <i>Scyliorhinus canicula</i> | Lesser spotted catshark | R | R-O | | R-O |
| <i>Mustelus mustelus</i> | Common smoothound | | R | | R |
| <i>Raja clavata</i> | Thornback ray | | R | | R |
| <i>Anguilla anguilla</i> | European eel | R | R-F | | R-F |
| <i>Syngnathus sp</i> | a pipefish sp | R-O | | | R-O |
| <i>Syngnathus acus</i> | Greater pipefish | R-O | R | | R-O |
| <i>Syngnathus rostellatus</i> | Lesser pipefish | R | | | R |
| <i>Callionymus sp</i> | a dragonet | R-O | | | R-O |
| <i>Callionymus reticulatus</i> | Reticulated dragonet | R-F | | | R-F |
| <i>Callionymus lyra</i> | Common dragonet | R | | | R |
| <i>Pomatoschistus sp</i> | a sand goby | R-F | R-O | F | R-F |
| <i>Pomatoschistus minutus</i> | Sand goby | R-F | | | R-F |
| <i>Pomatoschistus pictus</i> | Painted goby | O-F | F-C | | O-C |
| <i>Pomatoschistus microps</i> | Common goby | O | O-C | | O-C |
| <i>Gobiusculus flavescens</i> | Two spot goby | O-F | | | O-F |
| <i>Gobius paganellus</i> | Rock goby | R | R-O | | R-O |
| <i>Gobius niger</i> | Black goby | | O | | O |
| <i>Lipophrys pholis</i> | Shanny | R-F | O-F | | R-F |
| <i>Mullus surmuletus</i> | Red mullet | R-F | | | R-F |
| <i>Chelon sp</i> | Mullet | R | | | R |
| <i>Parablennius gatorrugine</i> | Tompot blenny | R | R | | R |
| <i>Liparis sp</i> | Sea snail | R | | | R |
| <i>Aphia minuta</i> | Transparent goby | R-F | | | R-F |
| <i>Ciliata mustela</i> | 5 bearded rockling | R | | | R |
| <i>Raninus raniceps</i> | Tadpole fish | R | | | R |
| <i>Echiichthys vipera</i> | Lesser weever | R-O | | | R-O |
| <i>Micrenophrys lillejborgii</i> | a Sea scorpion | R | | | R |
| <i>Taurulus bubalis</i> | Long spined sea scorpion | R-O | | | R-O |
| <i>Myoxocephalus scorpius</i> | Short spined sea scorpion | R | | | R |
| <i>Eutriglia gurnardus</i> | Grey gurnard | R-O | | | R-O |
| <i>Engraulis encrasicolus</i> | Anchovy | | R | | R |
| <i>Clupea harengus</i> | Herring | | O | | O |
| <i>Atherina presbyter</i> | Sand smelt | O-C | | | O-C |
| <i>Sprattus sprattus</i> | Sprat | R-F | | | R-F |
| <i>Scomber scombrus</i> | Mackerel | R | | | R |
| <i>Trachurus trachurus</i> | Horse mackerel | R | | | R |
| <i>Pollachius pollachius</i> | Pollack | R | | | R |
| <i>Dicentrarchus labrax</i> | Sea bass | R-F | R-C | | R-C |
| <i>Trisopterus luscus</i> | Bib | R-A | C | | R-A |
| <i>Gadus morhua</i> | Cod | R-O | O | | R-O |

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|-------------------------------|-------------------------|---------|---------|-------|-------------|
| <i>Merlangius merlangus</i> | Whiting | | O-F | | O-F |
| <i>Pholus gunnellus</i> | Butterfish | R-O | | | R-O |
| <i>Symphodus melops</i> | Corkwing wrasse + nests | R-C | O-F | | R-C |
| <i>Ctenolabrus rupestris</i> | Goldsinney | R | | | R |
| <i>Labrus bergylta</i> | Ballan wrasse | R-F | R-O | | R-F |
| <i>Ammodytes sp</i> | a sand eel | R-F | | | R-F |
| <i>Hyperoplus lanceolatus</i> | Greater sandeel | R-O | | | R-O |
| <i>Pisces sp</i> | Fry indet | | O | O | O |
| <i>Platichthys flesus</i> | Flounder | R-O | R | | R-O |
| <i>Pleuronectes platessa</i> | Plaice | R | | | R |
| <i>Limanda limanda</i> | Dab | R-O | O | | R-O |
| <i>Solea solea</i> | Common sole | R | | | R |

| Algae | Seaweeds | | | | |
|-----------------------------------|------------------------------|-----|-----|-----|-----|
| <i>Algae</i> | mixed algae | R-A | A | | R-A |
| <i>Chlorophyta sp</i> | encrusting green algae | R | | | R |
| <i>Chlorophyta sp</i> | Tiny green branching indet | | O | | O |
| <i>Chlorophyta sp</i> | Algal mat on mud | | C | | C |
| <i>Ulva sp</i> | a sea lettuce | R-F | O-A | R-A | R-A |
| <i>Ulva lactuca</i> | Sea lettuce | R-C | O-C | O | R-C |
| <i>Ulva rigida</i> | a sea lettuce | | R-C | O | R-C |
| <i>Ulva clathrata</i> | a sea lettuce | | O-F | R-F | R-F |
| <i>Ulva intestinalis</i> | Gutweed | F-S | F-S | R-O | R-S |
| <i>Ulva linza</i> | Gutweed | F | | | F |
| <i>Ulva prolifera</i> | a sea lettuce | R | F-C | | R-C |
| <i>Ulva compressa</i> | a sea lettuce | | F | | F |
| <i>Chaetomorpha linum</i> | Brick weed | R-O | O-A | R-F | R-A |
| <i>Derbesia tenuissima</i> | a green algae | R-C | | | R-C |
| <i>Cladophora sp</i> | a green algae | R-C | O-F | R | R-C |
| <i>Cladophora rupestris</i> | Rope weed | R-C | | | R-C |
| <i>Cladophora hutchinsae</i> | a rope weed | R-F | | | R-F |
| <i>Lychaete battersii</i> | Batter's green branched weed | | O | | O |
| <i>Bryopsis plumosa</i> | Mossy feather weed | R-F | R-F | | R-F |
| <i>Bryopsis hypnoides</i> | Mossy feather weed | O | O | | O |
| <i>Rhizoclonium riparium</i> | a green algae | | | O-A | O-A |
| <i>Phaeocystis globosa</i> | a single celled algae | P | | | P |
| <i>Diatoms</i> | diatoms | F-S | C | | F-S |
| <i>Diatoms</i> | Indet centric | P | | | P |
| <i>Diatoms</i> | Indet pennate | P | | | P |
| <i>Achnanthes sp</i> | a diatom | | P | | P |
| <i>Actinoptychus senarius</i> | a diatom | P | | | P |
| <i>Actinoptychus splendens</i> | a diatom | P | | | P |
| <i>Asterionellopsis sp</i> | a diatom | P | | | P |
| <i>Asterionellopsis glacialis</i> | a diatom | P | | | P |
| <i>Attheya armata</i> | a diatom | P | | | P |
| <i>Bacillaria paxilliferea</i> | a diatom | P | | | P |
| <i>Chaetoceros sp</i> | a diatom | P | | | P |
| <i>Chaetoceros densus</i> | a diatom | P | | | P |

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|------------------------------------|-------------------------|---------|---------|-------|-------------|
| <i>Chaetoceros eibenii</i> | a diatom | P | | | P |
| <i>Cocconeis sp</i> | a diatom | P | | | P |
| <i>Cocconeis radiatus</i> | a diatom | P | | | P |
| <i>Coscinodiscus wailesii</i> | a diatom | P | P | | P |
| <i>Coscinodiscus sp</i> | a diatom | P | P | | P |
| <i>Dactyliosolen fragilissimus</i> | a diatom | P | | | P |
| <i>Ditylum brightwellii</i> | a diatom | P | | | P |
| <i>Grammatophora sp</i> | a diatom | P | P | | P |
| <i>Guinardia flaccida</i> | a diatom | P | | | P |
| <i>Guinardia striata</i> | a diatom | P | | | P |
| <i>Gyrosigma sp</i> | a diatom | | P | | P |
| <i>Gyrosigma balticum</i> | a diatom | P | | | P |
| <i>Helicotheca tamesis</i> | a diatom | P | | | P |
| <i>Lauderia annulata</i> | a diatom | P | | | P |
| <i>Licmophora sp</i> | a diatom | P | P | | P |
| <i>Meuniera membranacea</i> | a diatom | P | | | P |
| <i>Navicula sp</i> | a diatom | P | | | P |
| <i>Neocalyptrella robusta</i> | a diatom | P | | | P |
| <i>Nitzschia longissima</i> | a diatom | P | | | P |
| <i>Odontella sp</i> | a diatom | P | | | P |
| <i>Odontella aurita</i> | a diatom | P | | | P |
| <i>Odontella mobiliensis</i> | a diatom | P | | | P |
| <i>Odontella regia</i> | a diatom | P | | | P |
| <i>Odontella rhombus</i> | a diatom | P | | | P |
| <i>Odontella sinensis</i> | a diatom | P | | | P |
| <i>Paralia sulcata</i> | a diatom | P | | | P |
| <i>Parlibellus sp</i> | a diatom | P | | | P |
| <i>Podosira stelligera</i> | a diatom | P | | | P |
| <i>Pseudo-nitzschia seriata</i> | a diatom | P | | | P |
| <i>Rhizosolenia sp</i> | a diatom | P | | | P |
| <i>Rhizosolenia imbricata</i> | a diatom | P | | | P |
| <i>Rhizosolenia setigera</i> | a diatom | P | | | P |
| <i>Rhizosolenia styliformis</i> | a diatom | P | | | P |
| <i>Striatella sp</i> | a diatom | | P | | P |
| <i>Thalassionema nitzschooides</i> | a diatom | P | | | P |
| <i>Ulnaria sp</i> | a diatom | P | P | | P |
| <i>Phaeophyta</i> | brown encrusting algae | R-O | | | R-O |
| <i>Phaeophyta</i> | brown algae | C | | | C |
| <i>Undaria pinnatifida</i> | Wakame | | C | C | C |
| <i>Laminaria digitata</i> | Oarweed | | R | | R |
| <i>Sargassum muticum</i> | Wireweed | | R | R-O | R-O |
| <i>Ectocarpus sp</i> | a brown algae | R | C | | C |
| <i>Dictyota dichotoma</i> | Brown fanweed | O-F | | O-F | O-F |
| <i>Taonia atomaria</i> | Dotted peacock weed | R-A | | | R-A |
| <i>Desmarestia sp</i> | Desmarest's weed | R | | | R |
| <i>Desmarestia viridis</i> | Desmarest's green weed | R | | | R |
| <i>Petalonia fascia</i> | Broad leaf weed | R | | | R |

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|--------------------------------------|------------------------------|---------|---------|-------|-------------|
| <i>Cladostephus hirsutus</i> | Hairy sand weed | R-F | O | | R-F |
| <i>Pylaiella littoralis</i> | a filamentous brown | | F | | F |
| <i>Scytosiphon lomentaria</i> | Sausage weed | R | O | | R-O |
| <i>Pelvetia caniculata</i> | Channelled wrack | | O | | O |
| <i>Fucus vesiculosus</i> | Bladderwrack | O-A | O-C | O-A | O-A |
| <i>Fucus serratus</i> | Serrated wrack | R-A | F | | R-A |
| <i>Fucus spiralis</i> | Spiral wrack | | R | | R |
| <i>Fucus sp</i> | a wrack | R-O | | | R-O |
| <i>Ascophyllum nodosum</i> | Egg wrack | | O-C | O-A | O-A |
| <i>Halidrys siliquosa</i> | Podweed | R | | | R |
| <i>Rhodophyta</i> | red algae | O-A | | | O-A |
| <i>Rhodophyta ind crust</i> | red encrusting algae | R-F | | F | R-F |
| <i>Rhodophyta</i> | 'red fluff' | O-F | | | O-F |
| <i>Corallinaceae crusts</i> | pink encrusting algae | O-A | | | O-A |
| <i>Corallina officianalis</i> | Common coral weed | R-C | O | | R-C |
| <i>Gracilaria gracilis</i> | Slender wartweed | R-C | | R | R-C |
| <i>Gracilaria sp</i> | a wartweed | R | | | R |
| <i>Gracilariopsis longissima</i> | a red algae | | O | | O |
| <i>Chondria dasyphylla</i> | Diamond cartilage weed | O-C | | | O-C |
| <i>Chondria coerulescens</i> | Iridescent cartilage weed | | C | | C |
| <i>Halurus flosculosus</i> | Mrs Griffith's little flower | R-O | | | R-O |
| <i>Halurus equisetifolius</i> | Sea Horsetail | R-F | | | R-F |
| <i>Chondrus crispus</i> | Irish moss | R-C | F | O-F | R-C |
| <i>Ceramium deslongchampsii</i> | a pincer weed | R-O | | R-F | R-F |
| <i>Ceramium pallidum</i> | a pincer weed | R | | | R |
| <i>Ceramium virgatum</i> | Red hornweed | R | | | R |
| <i>Ceramium sp</i> | a pincer weed | R-C | R-C | R-F | R-C |
| <i>Vertebrata fucoides</i> | Black siphon weed | R | R | | R |
| <i>Vertebrata byssoides</i> | Brongniart's threadweed | O-C | | | O-C |
| <i>Carradoriella elongata</i> | Siphon weed | R-F | | | R-F |
| <i>Polysiphonia stricta</i> | Pitcher siphon weed | F | | | F |
| <i>Polysiphonia sp</i> | a Siphon weed | O | R-O | R-O | R-O |
| <i>Cryptopleura ramosa</i> | Fine-veined crinkle weed | R-F | | O | R-F |
| <i>Phyllophora pseudoceranooides</i> | Stalked leaf bearer | O | | | O |
| <i>Erythrogloussum laciniatum</i> | a red algae | | F | | F |
| <i>Rhodophyllis divaricata</i> | a red algae | O | | | O |
| <i>Grateloupia subpectinata</i> | Grateloup's | R-O | | | R-O |
| <i>Grateloupia turuturu</i> | Devil's tongue weed | R-F | | | R-F |
| <i>Plocamium sp</i> | Comb weed | R-A | O-C | | R-A |
| <i>Plumaria plumosa</i> | Soft feather weed | | | O | O |
| <i>Hypoglossum hypoglossoides</i> | Under tongue weed | R-O | R | | R-O |
| <i>Scinaia furcellata</i> | Scina's weed | R-F | | | R-F |
| <i>Rhodymenia holmesii</i> | Holme's rose weed | O-C | | | O-C |
| <i>Rhodymenia ardissoni</i> | Spikey rose weed | R-O | | | R-O |
| <i>Heterosiphonia plumosa</i> | Siphoned feather weed | R-F | | | R-F |
| <i>Drachiella heterocarpa</i> | Callused Drachiella | R-F | | | R-F |
| <i>Calliblepharis ciliata</i> | Eyelash weed | R-C | | | R-C |

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|---------------------------------|-------------------------|------------|------------|-----------|-------------|
| <i>Osmundea sp</i> | a fern weed | R-O | | | R-O |
| <i>Osmundea hybrida</i> | a fern weed | R | | | R |
| <i>Gastroclonium reflexum</i> | Reflexed grape weed | O-C | | | O-C |
| <i>Porphyra sp</i> | Lava | C | R-O | R-O | R-C |
| <i>Halarachnion ligulatum</i> | Sea spider weed | O-F | | | O-F |
| <i>Polyides rotunda</i> | Discoid fork weed | O-F | | | O-F |
| <i>Ahnfeltia plicata</i> | Black scour weed | R-F | | F | R-F |
| <i>Mastocarpus stellatus</i> | Grape pip weed | R-C | C | | R-C |
| <i>Dumontia contorta</i> | a red algae | R | R-F | O | R-F |
| <i>Griffithsia devoniensis</i> | Mrs Griffiths' weed | | O | R | R-O |
| <i>Pterothamnion plumula</i> | a red algae | | R | | R |
| Others | Other phyla | | | | |
| <i>Pedicellina sp</i> | entoprocts | R-F | | | R-F |
| <i>Ceratium fusus</i> | a dinoflagellate | P | | | P |
| <i>Noctiluca scintillans</i> | a dinoflagellate | P | | | P |
| <i>Prorocentrum sp</i> | a dinoflagellate | P | | | P |
| <i>Metacinetia sp</i> | a protist | P | | | P |
| <i>Beggiatoa</i> | a bacterial mat | | O | | O |
| <i>Cyanobacteria sp</i> | a blue-green algae | P | | | P |
| <i>Verrucaria maura</i> | a lichen | R | | | R |
| <i>Pycnogonidae</i> | a white sea spider | R | R | R | R |
| <i>Endeis spinosa</i> | a sea spider | R | O | | R-O |
| <i>Foraminifera indet</i> | a foraminiferan | P | | | P |
| <i>Halyphysema tumanowiczii</i> | a foraminiferan | R-O | | | R-O |
| <i>Pleurobrachia pileus</i> | Sea gooseberry | | F | | F |
| <i>Beroe sp</i> | A ctenophore | | R | | R |
| <i>Phragmites australis</i> | Reeds | | F | O-F | O-F |
| <i>Salicornia europaea</i> | Samphire | | R | | R |
| <i>Zostera noltei</i> | Seagrass | | C-A | F-A | F-A |
| <i>Ruppia maritima</i> | Tassleweed | | O-C | | O-C |
| <i>Halichoerus grypus</i> | Grey seal | R | R | | R |
| <i>Branta bernicla</i> | Brent goose | | | F | F |
| Total | | 413 | 178 | 96 | 462 |

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