South-West Marine Ecosystems in 2021

(The State of South-West Seas)

Report for 2021



High abundances. The biomass of anchovies was the highest detected in recent surveys. Anchovy eggs and larvae were found in plankton samples off Plymouth: a possible first indication of breeding in the area. Image: Robin Somes.



Non-native additions. The sabellid polychaete *Bispira polyomma* was recorded from two adjacent marinas at Plymouth. Image: John Bishop/Christine Wood.



Animal welfare. Seal numbers in the south-west continued to be healthy but significant animal welfare issues persist in relation to disturbance and entanglement. Here, S524 'Legs' first found entangled in December 2019. Image: Seal Research Trust.



Water quality. According to the latest Environment Agency assessments, only 13% of estuaries are classified as having achieved good or better ecological status and 0% achieved good chemical status. Sewage treatment works outflow near Plymouth. Image: Keith Hiscock.

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South-West Marine Ecosystems Report for 2021

A collation of observations made through the year from monitoring studies, harvested from social media, publications etc. and recorded by the editors of sections.

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1. Aim and objectives of the South-West Marine Ecosystems Conferences and Reports

Bob Earll

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In preparation for the 2022 SWME programme the steering group agreed a revised and more concise aim. '*The aim of the SWME model is to enable an annual report on the state of south-west seas and to build the social capital among organisations, networks and individuals active within this region.'*

The objectives of SWME were updated for the 2021 report, and are as follows:

1. **Communication & Networking** Through the annual conferences, webinars, website and social media mailings, to build social capital to provide a networking opportunities for a wide cross section of people to meet, exchange views and build networks for the south-west's marine ecosystems.

2. **Audience** To encourage collaboration between citizen scientists, researchers, scientists, managers, policy makers and the public and to provide active support for existing networks enabling and building citizen science projects.

3. **Regional resonance** To encourage links between researchers on science projects throughout the region's seas including the English Channel, Bristol Channel, Celtic Seas and the wider Atlantic Ocean.

4. **The State of the South-West Seas** To report on the state of south-west ecosystems annually with a report covering a number of topics on **natural systems**: oceanography, plankton, seabed and seashore, fish, seals, marine and coastal birds, cetaceans, and **management topics**: MPAs, water quality, plastics, fisheries. This reporting will build on the use of a wide array of current indicators.

5. **Ecology of marine species** To promote citizen science recording and research studies that focus on the ecology of marine species, planktonic, benthic and 'mobile' species (fish, birds, mammals, turtles) and the ecosystem that supports them. To understand the status of populations of marine species in the region's seas and how they are responding to environmental and anthropogenic pressures. To enable stories to be told about the ecology of our common species, their distribution, movements and numbers, and importantly to highlight the gaps in our knowledge.

6. **Management of south-west marine ecosystems** To encourage strong relationships between policy makers and scientists; to promote science and the evidence base that underpins management of human activities in the coastal and marine environment with a view to supporting and promoting the health of south west's marine ecosystems.

7. **Marine Education and Outreach** To highlight marine education and outreach programmes in the south-west. To support the development of new programmes that promote marine management and make use of marine science. To promote good practice in environmental education, interpretation, signage and outreach.

…and to come together to celebrate being part of the South-West Marine Ecosystem.

2. Introduction to the 2021 Report

Keith Hiscock and Bob Earll

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This is the eighth in the series of annual reports on the observations of species, ecology ecosystems and management for a specific year. Collating observation for 2021 was, again, a very different task to previous years without the benefit of the annual conference. We have relied on the records kept by editors of the different sections. We have also been able also been able to draw on the inputs of a wider range of speakers presenting at the webinars as well as harvested from postings on social media, published papers and news including in CMS Marine News.

The conference that would have been held in April 2022 to report on 2021 was converted (because of Covid-19 restrictions) into a series of webinars during February and March hosted by the Marine Biological Association, Exeter University (Penrhyn campus) and the University of Plymouth. The webinars increased contacts by 500+. Those webinars can be accessed on https://www.youtube.com/channel/UCojA2OkFX0fM-oq7bVTofhQ

The past SWME annual reports (for 2014 to 2020) illustrate the above points and can be accessed from the SWME website http://swmecosystems.co.uk/annual-reports.

Section editors have organised and presented the webinars and invited additional speakers on specific topics relevant to 2021.

The report can be cited (but depending on the house style of where it is being cited) as:

Hiscock, K. & Earll, R. (eds) 2022. South-west Marine Ecosystems Report for 2021. *Marine Biological Association of the UK, Plymouth.* DOI: https://doi.org/10.17031/t98y-1806

We encourage you to cite the specific chapter/section and the editor of that section.

Thanks to the section editors and all the people who have contributed their observations, views and images. It is a fantastic collaboration.

The development of the SWME report

It is great to see the editors of the chapters bringing in a wide range of people to help and support their preparation and the webinar programme. The chapters often reflect the contributions of hundreds of recorders across the south-west many of whom have gone the extra mile to record and photograph and report their sightings. It goes to show how citizen science and professional science can work effectively together on many issues. Hopefully the SWME report will provide another source of feedback that encourages more people to take part in the overall effort. We now have a contact list for SWME of over 1250 people who will receive the links to this report. You can sign up on http://swmecosystems.co.uk/.

The 2021 Report has adopted a different emphasis and has been reframed in terms of the 'State of South-West Seas'. This has helped focus on the purpose of the report to highlight change year-on-year. The 'Conclusions' at the start of each chapters now provide highlights of the year and are also summarized in the introductory material. In some cases, reports have set a 2021 baseline that can be updated in future reports that may not need the explanatory details in this report: the Water Quality chapter edited by Steve Guilbert is an example.

Many of the observations and measurements reported give clues or conclusions on the 'state of south-west seas'. Amongst those observations and measurements, there may be existing or new 'indicators' that can be assessed and quantified each year. We are taking small steps to understand what we can use in this regard and having a SWME working group developing looking at 'indicators'.

The Covid-19 pandemic and how it affected SWME reporting

The Covid-19 Pandemic continued in 2021 which meant that the observations made during 2021 were presented by chapter editors in a series of webinars. The chapter editors took the lead in formulating the programme for each webinar and Exeter University, Plymouth University and the Marine Biological Association provided the technical support for this programme. The report chapter webinars can be accessed on the SWME YouTube channel https://www.youtube.com/channel/UCojA2OkFX0fM-oq7bVTofhQ. This webinar programme proved to be very successful and audiences ranging from 100-300 attended the different webinars.

The Impact of Covid-19 on studies/observations in the coastal and marine environment

The Covid-19 pandemic continued to have a profound effect on many areas of life during 2021 including on how we work in the marine environment and how the public were using it. Nevertheless, many researchers as well as rockpoolers, divers and casual observers did get out-and-about and did make many significant records. Many of the marine life observations were disseminated via social media and those postings continued to be important sources.

Making the links and interpreting change

The SWME report is based on a very traditional model with difference chapters covering the major subjects. A next step is to make the links within reported events in a section and between sections. We know that many of the things we are observing are very closely interlinked and those links illustrated by many points made in this and previous reports. However, there is 'detective' work to be done. Perhaps you have a view on possible links between events and species abundances or between the relative abundance of different species that may be interacting. Let us know.

Describing 'normal' patterns of events

Identifying what is 'normal' requires long-term records or personal observations. Some systematic studies (for instance of oceanography and plankton) allow patterns to be analysed and conclusions reached but so too do the observations of experienced marine ecologists and oceanographers.

Population trends – up and down

Year on year it now possible to see some major trends reported in the SWME annual reports in a variety of data on certain species:

It sometimes takes a couple of years (or so) for observers to realise that a usually regular (probably seasonal) event hasn't 'occurred' for some years – let the relevant section editor know if you come to such a conclusion.

Marking major events and their effects

Very cold winters, very hot summers and severe storms are obvious examples of events that might affect ecology. Some effects are obvious (such as wash-outs after storms) but some may be more subtle. Speculation about effects of events is welcome.

Highlighting significant ecological and population changes including:

- **Trends** e.g. the increase in seabirds on islands after rat control.
- **Good years & bad years** for species like jellyfish, basking sharks, sunfish, bottlenose dolphins.
- **Noting new records for the south-west** – most likely range extensions and non-native species.
- **Recording recovery** e.g. recruitment of spiny lobsters (crawfish) after an absence of c. 40 years.

'Stand-out' observations – new novel and exceptional events

'One swallow doesn't make a summer' is a well known saying and we report again on a number of remarkable findings and sightings. Recent changes in the populations of bluefin tuna and spiny lobsters went from being 'interesting one-off observations' to develop populations of significance in relation to fishing. In this regard it seems unlikely that the visit of 'Wally' the walrus will presage increased numbers in coming years, but there is no doubt

that we are seeing more baleen whales such as humpbacks and 2021 saw four humpbacks in south-west waters that had previously been named from sightings elsewhere.

Managing human activities in the south-west marine ecosystems

The insights we are gaining are also important in the way we view, inform and manage our activities in the marine environment to minimise adverse effects from such matters as wildlife entanglement in plastics, sustainable fisheries and the spatial allocation for developments or protected areas. With the imminent development of large-scale offshore wind development in the south-west we will continue to develop the management sections of the meetings and report.

Acting to focus interest

The annual South-West Marine Ecosystems reports inform and encourage what might be further research and observations – especially year-on-year to detect trends.

Telling stories about what we know and providing access for education and outreach

Much of what we publish will be fascinating and enlightening to those with (or, indeed, without) an interest in marine matters. They may provide and inform (newsworthy) 'stories' but also context that may help to supress some of the wilder headlines that are occasionally seen.

3. Summary of conclusions

(Brought together by Bob Earll and Keith Hiscock)

The South-West Marine Ecosystems Programme brings the marine and coastal community together annually to consider the changes that are taking place in our local seas. This is the eighth report in this series, but the first which has focused on the state of the South-Wests seas in 2021. It includes detailed chapters on oceanography, plankton, the seashore and seabed, fish and turtles, coastal birds, seals, whales and dolphins. Management chapters include fisheries, marine protected areas, water pollution and plastics pollution. The report reflects the work of both volunteer citizen scientists and professionals working in the south-west. This summary report highlights points which are covered in the chapters of the report which was published in July 2022; it includes:

- **Storms** The patterns of storms in 2021 and the winter of 2022 was normal and in many ways, unremarkable.

- **Plankton** There were no major or unusual plankton blooms in 2021. However, there was a continuation of a widespread, long-term, mainly summer decline in key elements of the food web (i.e. larger phytoplankton and copepods) during the summer months with other members of the plankton partially replacing those larger phytoplankton and copepods (i.e. of larger phytoplankton and of copepods) during the summer months, with other members of the plankton partially replacing them.

- **Shore and seabed marine life** showed some minor changes such as a likely increase in extent of seagrass, a small (one species) increase in the number of non-native species occurring in the south-west, one 'new' warm water species recorded and increasing extent of at least one other warm water species.

- **Fish** Porbeagle and thresher shark sightings maintained their recent elevated levels, but the very reduced number of sightings of the basking shark continued the pattern of recent years. The biomass of anchovies was the highest detected in recent surveys. Anchovy eggs and larvae were found in plankton samples off Plymouth, possible first indication of breeding in the area. Bluefin tuna continued to be seen routinely continuing their resurgence in south-west waters in the summer. There were interesting reports in 2021 of usually deep water species (Agentine, blue whiting and hake) in coastal waters and a growing number of records of more southern species being observed notably the silver dory and comber and rare species including *Auxis* sp., flying gurnard, two common two-banded sea bream and saddled sea bream as well as records of sturgeon.

- **Turtles** The number of turtle reports in the south-west was very low in 2021, and unusually more 'hardshell' turtles were reported than leathery turtles

- **Marine and coastal birds** Rat eradication is working on south-west islands notably on St Agnes and Gugh (Isles of Scilly) and Lundy, with the recovery of burrow (puffins and shearwaters) and cliff nesters continuing to increase in abundance and expand into unoccupied areas. 2021 was apparently a reasonably good year for seabird productivity for most pursuit-diving species. Kittiwakes continued to struggle at the few remaining colonies in Devon and Cornwall. The Dorset tern colonies also had a poor season, with predation seemingly the main reason for low productivity / colony abandonment. Notable amongst trends in coastal non-breeding birds is the steep decline of black-necked grebes in the Fal Estuary since 2012.

- **Seals** Seals in the south-west continued to be monitored closely. This work shows that the population of grey seals in south-west England are part of a wider population in the Celtic Sea and English Channel, including the coasts of France and Ireland. The highest number of dead seals were recorded by Cornwall Wildlife Trust's Marine Strandings Network (283 seals) including 170 white coated or moulted pups. Bycatch of seals is a major threat; one hundred and thirty-four unique entangled seals were recorded in 2021 with 18 being observed in a single survey. Disturbance was reported to be at chronic levels (at worst seals were

disturbed up to once every 19 minutes). The first ever walrus was recorded in the south-west in 2021. In March 2021 it became illegal to take, injure and kill a seal in the UK as the netsman's defence was removed from the Conservation of Seals Act. In November 2021 it became a legal requirement for all wild capture fisheries to report incidental bycatch of marine mammals with 48 hours of returning to port.

- **Whales & Dolphins** The four main species of large baleen whale (humpback, fin, sei and minke) continued to be recorded in south-west waters in 2021. The developing recording effort is beginning to pay-off with a clearer pattern of likely seasonality in the sightings. Notably, for the first time four named humpback whales were recorded in south-west waters based on a photo ID database of humpbacks for the Atlantic. The South-West coast is an important habitat for many species dolphins and porpoises. Sightings at sea both inshore and offshore began to recover from the effects of covid with a large number of records were submitted. Common dolphins strand most often and in 2021 stranding numbers were 111 and so continued at the high end of the 20 year levels.

- **Fisheries** The south-west is especially important for fisheries at many levels. Fisheries can adapt and develop very quickly to take advantage of new opportunities (e.g. new markets, recruitment events, or stock recovery) e.g. wrasse, sprat, cuttlefish, crawfish and bluefin tuna are all examples, but there are concerns over declines in squid and brown crab and the ongoing issues of bass management. Major changes to the way we manage our fisheries post-Brexit are under development and will be implemented over the next few years.

- **Marine Protected Areas** In the SWME area, we currently have 58 Marine Protected Areas (MPAs) across the Devon, Cornwall and Isles of Scilly marine area (coastline to 12nm), 33.9% of the marine area is covered by an MPA designation. In terms of fisheries management measures that reduce the pressure on seabed habitats from Bottom Towed Gear (BTG), the Devon and Severn Inshore Fisheries and Conservation Authority (IFCA) has the greatest proportion of the area of MPAs (85%) protected from BTG. Too many of the south-west's MPAs are still 'paper parks' and are not delivering the protection that enables recovery.

- **Water Quality** Progress towards improving water quality in our catchments and around our coasts has stalled, and in many instances, it has gone into reverse. Fewer water bodies achieved good or better ecological status in 2019 than they did in 2015. Many of our region's rivers and estuaries have significant water quality issues. Whilst the Bathing Water indicator continues to reveal reasonably encouraging results for bathing beaches, it is a poor proxy for assessing water quality as a whole and doesn't fully capture the problem of sewage pollution. In 2021 the full scale and extent of storm overflow pollution was highlighted revealing massive and long-standing issues which have not been addressed.

- **Plastic pollution** The work undertaken by Cornish Plastic Pollution Coalition volunteers in 2021 amounted to 69,291 hours and an economic value of £617,386. The total rubbish removed and recycled or disposed of was 310,839 kg or 310.8 tonnes! Total weight of marine littler removed was over six times that of 2018 and over three times that of 2019. Care is needed in interpreting amounts collected as there is a lot of variability in the data due to effort, many more charities recording effort and amounts, and increased knowledge of where the plastic washes up.

4. Oceanography background conditions – Western Channel Observatory

Tim Smyth

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Figure 4.1. Stations of the Western Channel Observatory.

The Western Channel Observatory (WCO) is an oceanographic time-series and marine biodiversity reference site in the Western English Channel. In situ measurements are undertaken weekly at coastal station L4 and fortnightly at open shelf station E1 using the research vessels of the Plymouth Marine Laboratory and the Marine Biological Association. These measurements are complemented by PML's recognised excellence in ecosystem modelling and satellite remote sensing science. By integrating these different observational disciplines, we can begin to disentangle the complexity of the marine ecosystem. The WCO measures several key parameters important to the functioning of the marine ecosystem such as light, temperature, salinity and nutrients. Station L4 has some of the longest time-series in the world for zooplankton and phytoplankton, and fish trawls have been made by the MBA for a century. Station E1 has a hydrographic series dating from 1903. These long series are complemented by hourly measurements made at autonomous buoys situated at both stations. These can elucidate changes not captured by the routine weekly sampling.

Overall conditions for the year – 2021

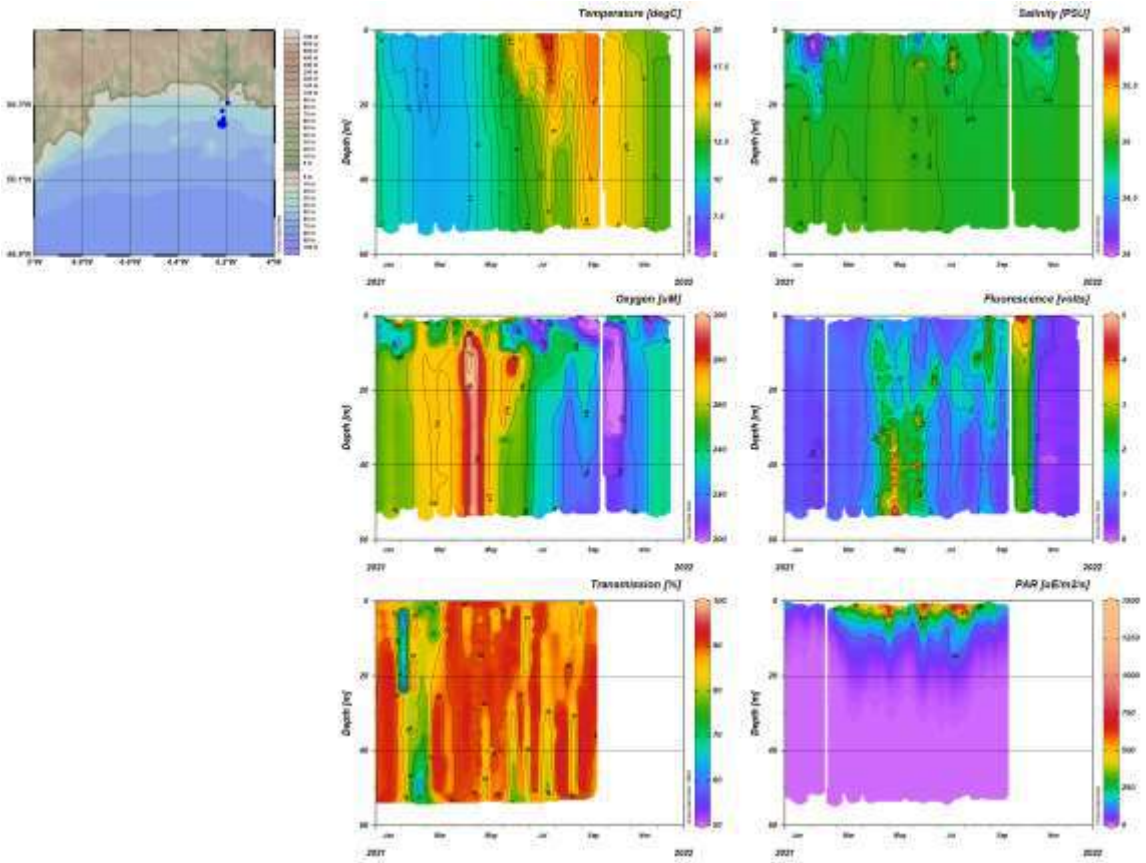


Figure 4.1. Conditions throughout the water column at station L4 during 2021 from individual profiles taken using a rosette sampler with multi-parameter “CTD" deployed from the RV Plymouth Quest, apart from period September – December where the RV MBA Sepia was used.

Vertical profiles for multiple parameters are taken using the RV Plymouth Quest sampling CTD rosette on a weekly basis at station L4 (Figure 4.1). This is at fine enough resolution to observe the start of the thermal stratification of the water column in spring (typically April) and the breakdown in autumn (typically September).

The year started with relatively warm conditions throughout the water column (well mixed, apart from fresher water intrusions at the surface) with temperatures around 10.5 °C. This cooled to the minimum recorded temperature (for 2021) in early March of <8.5 °C. Stratification became established later than usual during 2021 with frequent mixing events until early June, with the maximum stratified state in late July (briefly: surface around 18.0 °C; depths below 20 m around 14 – 16 °C).

Spring 2021 was notable for being sunny and dry, but cold – in particular April where the mean temperature in several places was colder than March; summer 2021 was relatively average, but with notable but brief warmth around 20/21 July. This was mirrored in the oceanographic conditions with a very late start to the stratified period, with the July mini-heatwave giving the warmest, short-lived surface temperatures. An unusual summer storm (Evert – 30 July) brought an abrupt end to this settled spell: wind gusts of 67 kts were recorded at the Needles. Stratification was gradually eroded after this point and the water column finally became mixed in late September / early October (15 °C throughout).

Several surface freshening events (see salinity plot) were observed in 2021 as a decrease in salinity below the background value of 35.2 PSU. These were particularly marked in January, February and November 2021 and associated with named storms Christoph (19 - 22 January), Darcy (8 February), Arwen (26 – 27 November) and Barra (7 – 8 December). These are mainly driven by inputs from the Tamar Estuary as it responds to precipitation events within its catchment. Any summer-time events are usually confined to the upper few metres (giving the appearance of a lens) whereas winter events can penetrate the top 20 m or so of the water column. This is because of a combination of stratification and likely larger river flows in the winter months.

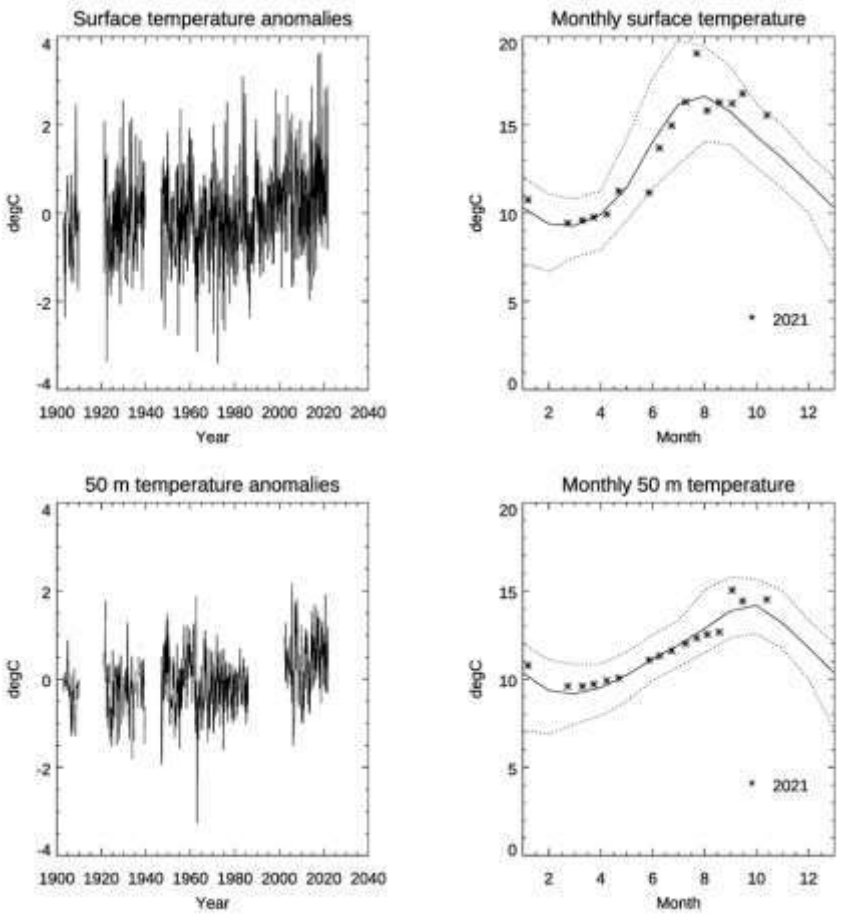


Figure 4.3. E1 temperature time-series and anomaly analysis. Solid lines show mean monthly temperatures, with dashed lines giving the standard deviation around the mean. Asterisks represent individual observations (16) made by the RV Plymouth Quest.

Figure 4.3 shows the temperature time-series anomalies made at station E1, which is one of the longest hydrographic series in the world.

At the surface, E1 started 2021 slightly above average and only reached a minimum temperature of just below 10 °C. The spring and early summer posted temperatures well below the long-term mean (at the surface) as stratification at E1, as at L4, was late in occurring. The water column on 26 May 2021 was still well mixed with temperatures around 11 °C throughout. This was in stark contrast to the conditions two months later with surface temperatures approaching 20 °C and around an 8 °C difference between the surface and below the thermocline (25 m). At 50m, temperatures were around average for the late winter - summer months until the breakdown in stratification vented warmer temperatures throughout the water column. The autumn and early winter were slightly above the long-term mean.

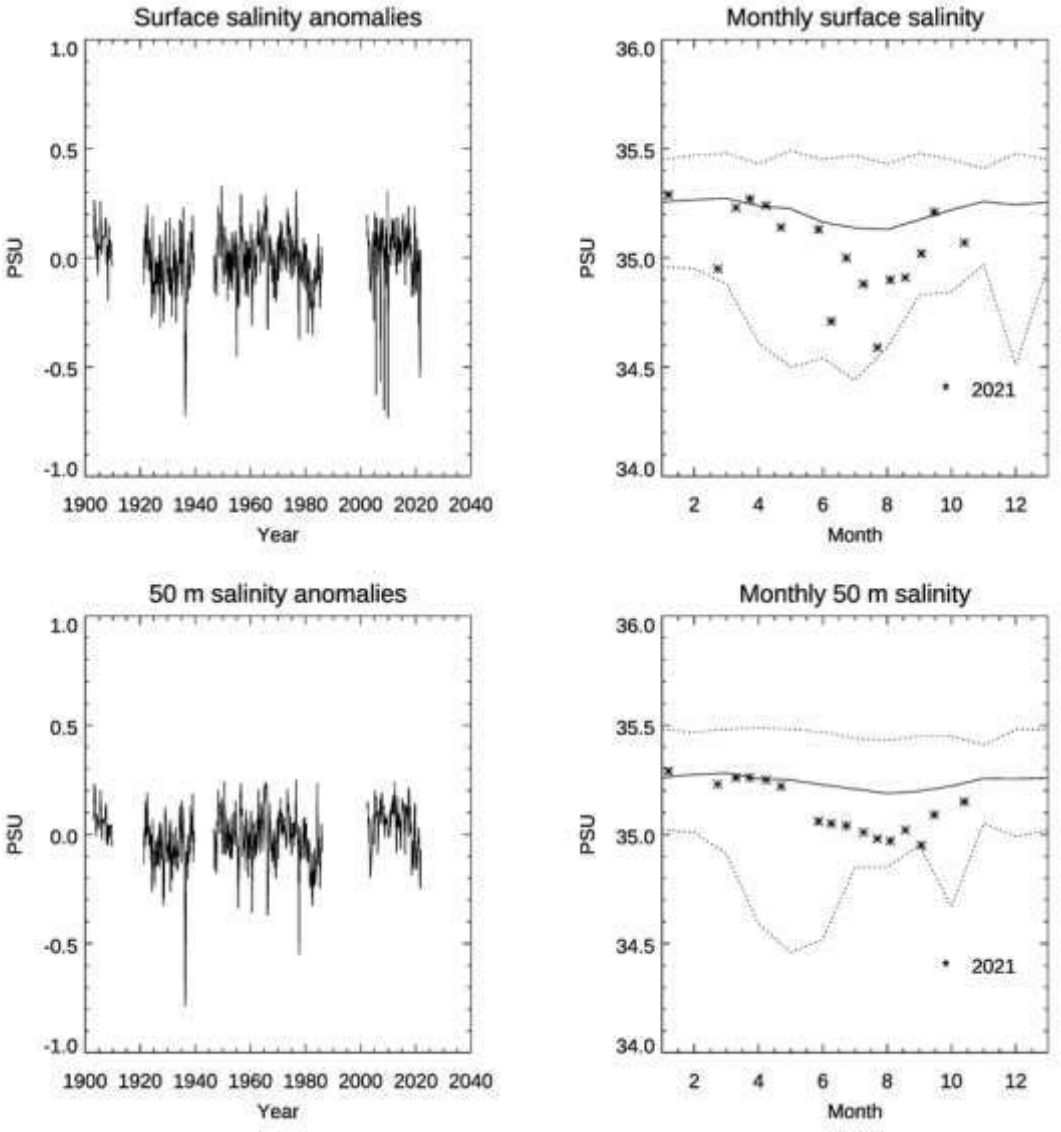


Figure 4.4. E1 salinity time-series and anomaly analysis. Solid lines show mean salinity, with dashed lines giving the standard deviation around the mean. Asterisks represent individual observations (16) made by the RV Plymouth Quest.

Figure 4.4 shows the salinity time-series made using the CTD profiler at station E1.

For almost the entire duration of 2021 the waters were below the long-term mean salinity throughout the water column apart.

['Conclusions' requested by (lost) e-mail Tues 24th]

Box 1

Storms in 2021-2022 and their impacts on the South-West marine environment

Prepared by Bob Earll, with compilations of the storm data and wave height material from Tim Smyth (PML) Channel Coastal Observatory, Keith Hiscock and Dan Jarvis

Conclusions

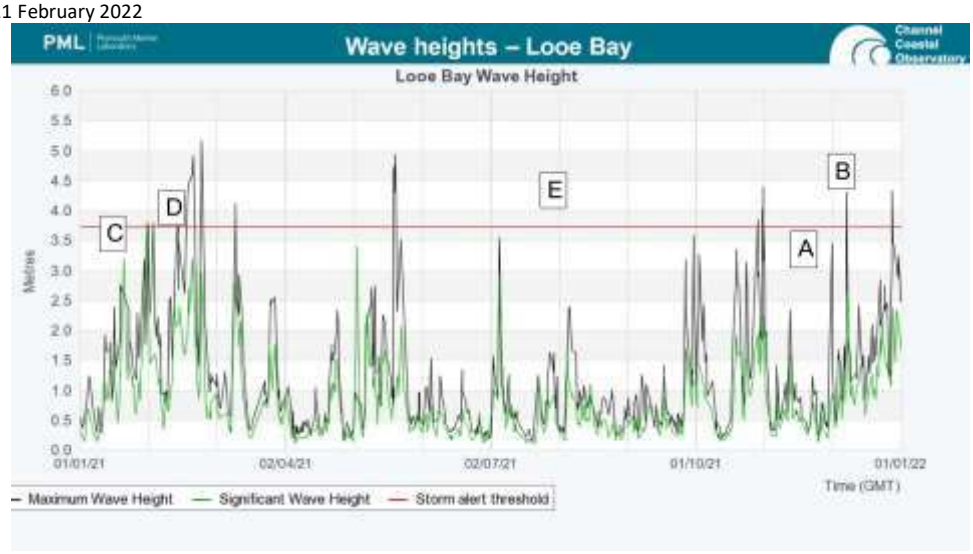
The patterns of storms in 2021 and the winter of 2022 was normal and was in many ways unremarkable. There were no storms that caused major societal impacts at the coast. Once again, the impact of easterly storms in terms of nearshore species washouts was recorded, but the impact on seals in the winter of 2021-22 was not exceptional.

Introduction

Storms are a routine part the natural pattern of events in the south-west, and we are developing a clearer understanding of their impact on the coastal and marine environment. With climate change it is predicted that storms will increase in strength. This description covers 2021 and the winter of 2021-22 because the way we view the impacts of the winter storms spans the winter months.

The patterns of storms in 2021 and the winter of 2022 was 'normal' in the sense that their impact did not reach the levels of storms in 2014. Storm naming became confusing as all the other national Met Agencies have adopted this practice. UK / Ireland storms: (https://www.metoffice.gov.uk/weather/warnings-and-advice/uk-storm-centre/index)

- Christoph 19 – 22 January 2021
- Darcy 8 February 2021 (heavy snowfall and very cold)
- Evert 30 July 2021 (Unusual, but not exceptional summer storm; Needles 67 kts)
- Arwen 26 – 27 November 2021 (Red weather warning; most damaging for a decade+ - NE England)
- Barra 7 – 8 December 2021 (Worst in EI)
- Malik (named by DMI) 29 January 2022
- Corrie 30 – 31 January 2022
- Dudley 16 – 17 February 2022
- Eunice 18 February 2022 (Red weather warning; Needles 122 mph)
- Franklin 20 – 21 February 2022



Key: C – storm Christoph; D- storm Darcy; E – storm Evert, A – storm Arwen; B- storm Barra

Figure 1. Wave heights – Looe Bay – prepared by Tim Smyth PML, Channel Coastal Observatory

Tim Smyth has pointed out and Figure 1 illustrates that there are often significant wave incidents which are not linked to named storms. This impacts on seals hauled out in the winter and can be pronounced in such events.

Key features of the storms in 2021-22 included:

- Storm Evert 30 July 2021 was unusually strong summer storm but not exceptional
- The three named storms Dudley, Eunice and Franklin which occurred over 5 days in February 2022
- Storm Darcy from the east, combined with very cold conditions, caused wash-outs of nearshore benthic species along the south Devon and Dorset coasts
- **Impacts of storms on the coastal and marine environment in the south-west**
- Storms are major incidents and their wider societal impacts are routinely noted in the media such as for storm Emma in 2018 which washed away 400m of the Slapton road and when the railway embankment was washed away at Dawlish in 2014. The listing below highlights the type of impact that these events prompt in terms of records that arise from storms.

Seashore and nearshore sediments Beach sediments are routinely moved during storms every year. 2013-2014 was notable for the scale of beach sediment veneers that were drawn-down from beaches leaving bare rocky platforms. There is a monitoring programme for the impact of storms on the coast of the south-west and the reports for 2021-22 can be found here.

The impact of storms, waves and heavy rainfall on rocky coasts, not least in terms of rock falls is important for species such as seals which can be crushed, or their breeding sites closed off.

5. Plankton Observations 2020

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Angus Atkinson (for general plankton): aat@pml.ac.uk

Jeanette Sanders (for observations of gelatinous/stranded zooplankton): sea@seadreameducation.com; South Devon Jellyfish Survey

Headline conclusions

- Unremarkable year – no major or unusual plankton blooms reported
- Normal year in relation to jellies and surface-dwelling macroplankton plankton washed in after storms – perhaps slightly more compass jellyfish than normal?
- However, this is the "new normal" – it marks the continuation of a widespread, long-term, mainly summer decline in key elements of the food web (i.e. larger phytoplankton and copepods) during the summer months
- Other members of the plankton are partially replacing the larger phytoplankton and copepods and work is ongoing to understand the causes and consequences of these changes

Introduction

This report is divided into phytoplankton and zooplankton sections, and uses data from three sources. First it describes the monthly records submitted to SWME and kindly compiled by Paul Naylor; second it describes the observations at the Western Channel Observatory south of Plymouth (see chapter 4 for physical context); and third it describes the citizen science observations from the South Devon jellyfish survey compiled, presented and analysed by author Jeanette Sanders.

Phytoplankton

Submitted observations

April

Dan Bolt reports (in relation to basking shark sightings) "lots of pink plankton around at the moment".

Lots of reports towards end of April of 'lots of snot in the water' – seems mucus but not brown (*Phaeocystis*) mucus snot in depths shallower than about 18 m.

May

The May plankton bloom (*Phaeocystis*) seemed not as dense or prolonged as in some years. Keith Hiscock reports very small brown globules off the Hilsea coast on 1 May. By end of May, the *Phaeocystis* had degraded to snotty, dirty strings. There were also gelatinous strings which could have been another species, perhaps *Coscinodiscus*, during May.

June

Zoe Wardley reports travelling overnight from Plymouth to the Helford with a trail of phosphorescence on 15th /16th June.

September

24th September – Richard Draisey and Angela Gall report bioluminescence ('sea sparkle', likely *Noctiluca scintillans*) in the Helford.

West Coast Observatory Report

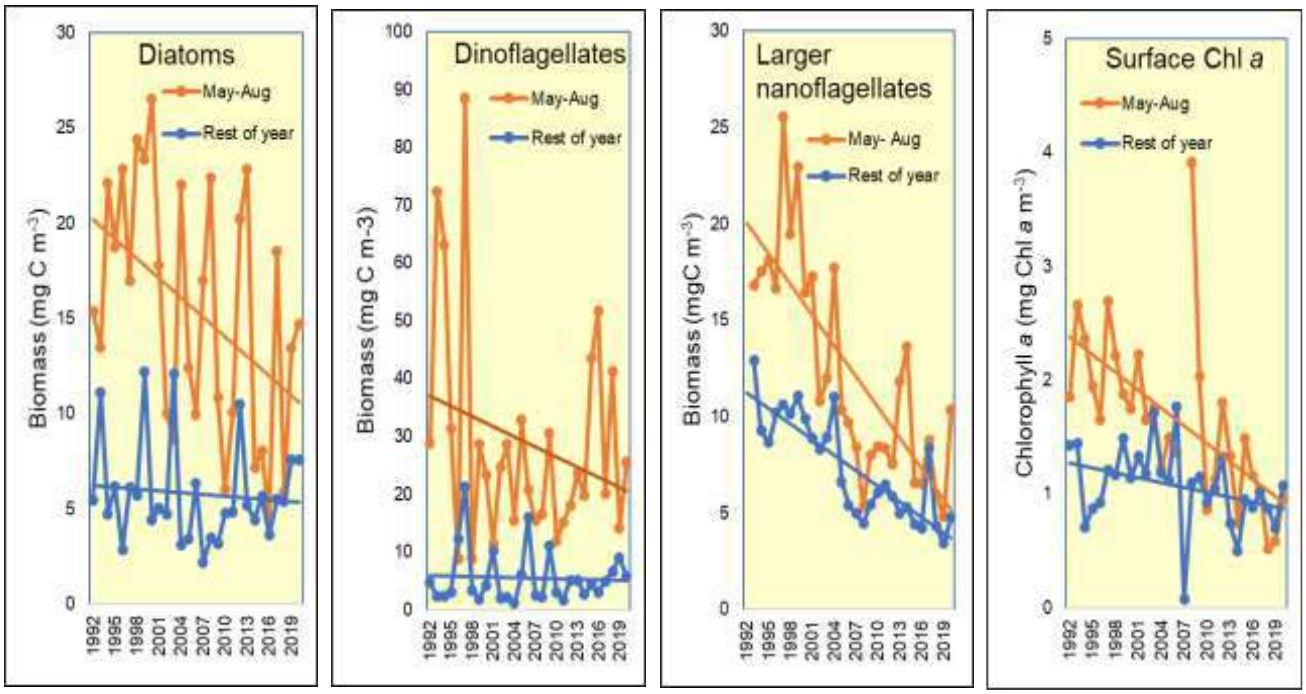

Figure 5.1. Long-term trends (1992-2020) of some key phytoplankton taxa at L4. Quality checked data for 2021 is not yet available at the time of writing and these trends are presented as context for the long-term zooplankton trends observed. Data for the diatoms, dinoflagellates and larger nanoflagellates are based on inverted microscopy analysis of settled water samples from 10m depth. These larger phytoplankton taxa suggest declining trends, particularly in the summer months. Chlorophyll *a* (Chl *a*) concentration is also assessed from surface water samples (fourth panel) and provides an independent overall assessment of total phytoplankton.

The Plymouth L4 site forming part of the Western Channel Observatory (Western Channel Observatory; see Chapter 5) is sampled at weekly resolution with samples at 10m depth examined quantitatively for phytoplankton under an inverted microscope. Author Claire Widdicombe has not yet sufficiently checked 2021 results to present plots of abundance, but the general assessment is that of a typical succession – diverse diatoms in late winter and spring, followed by short and intense *Phaeocystis* bloom in May. Dinoflagellates, including toxic species *Dinophysis, Alexandrium, Karenia* thrived during summer, with the autumn bloom containing a diverse assemblage of diatoms and dinoflagellates

A new toxic dinoflagellate species *Ceratocorys mariavidicorum* was recorded during February.

Zooplankton

Submitted observations

January

12th January. Note from author Keith Hiscock:

Colonial oceanic tunicates washed ashore in the Isles of Scilly. "It didn't smell, was like jelly but slimy to the touch, clear with orange spots & many metres in length. a *Pyrosome*, possibly *Prosoma atlanticum* spp. the second was Giant Fire Pyrosome (*Pyrostremma spinosum*). Given the amount/size I'm leaning towards Giant Fire Pyrosome for an ID but would be happy to hear from anyone who can tell me differently (Nikki Banfield).

Not seeing reports of *Physalia* or *Velella* washed-up or of gooseneck barnacles.

May

Notes from Keith Hiscock:

At the end of May there were frequent *Beroe cucumis* off the Plymouth coast with small compass jellyfish *Chrysaora hysocella* and a few blue jellyfish *Cyanea lamarkii*.

June

Note from Julie Hatcher, Dorset WT:

Quite a few moon (*Aurelia aurita*), compass and blue jellyfish around, plus the Many-ribbed jellyfish/hydromedusa *Aequorea forskalea* and comb jellies. I don't know if they are in unusual numbers as I haven't personally seen any.

October

Note from Keith Hiscock: There have been sporadic sightings of (small numbers?) of Portuguese man o'war in North Cornwall at least through the month and of goose barnacle strandings later in the month.

West Coast Observatory Reports

In common with the phytoplankton, the zooplankton caught with weekly replicate 0-50 m full depth tows with a 200 µm mesh net did not show exceptional features during 2021, based on provisional analysis. However, the year marked a continuation of some worrying long-term trends in plankton that have now been reported widely across the NW European shelf and NE Atlantic. Several of the links in the classic food chain, namely copepods and larger phytoplankton have shown substantial declines, whereas other taxa have partially replaced them (Figures 5.1 - 5.3). These declines appear to be a mainly summer phenomenon and their causes and consequences is a topic of active research.

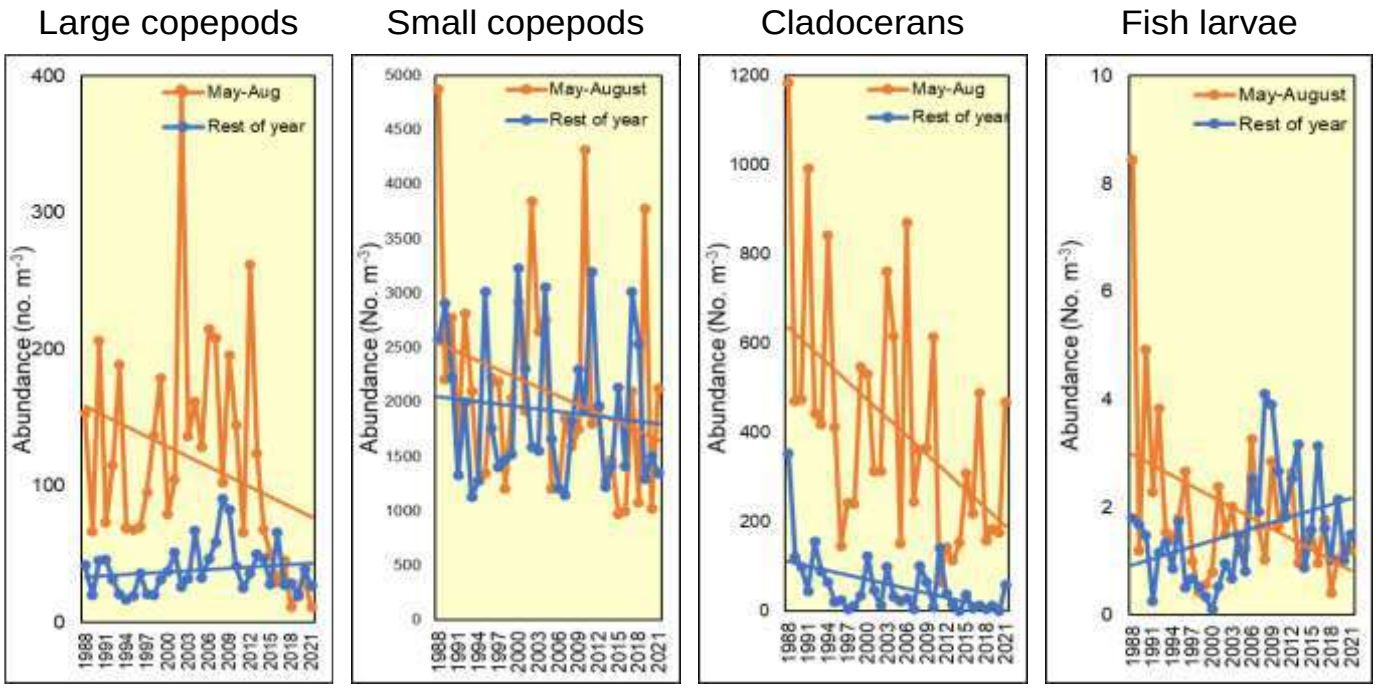

Figure 5.2. Abundance of major plankton groups during 2021 for comparison with the full time series. At the time of writing QA of both replicate samples from each timepoint for 2021 is still underway and only one of the replicates has been analysed in full, so results are indicative but still provisional. This year was unremarkable overall but showed a pattern of declines in these four major taxa. Data are divided into summer (typically corresponding to the summer stratified months at this site) and the rest of the year, when the water column is more mixed (see Chapter 5). Each data point represents a year and is the average of the component May-August or the remaining months in that year. Regression lines (least squares linear regressions) are drawn simply to show directions of trends and not to imply statistical significance.

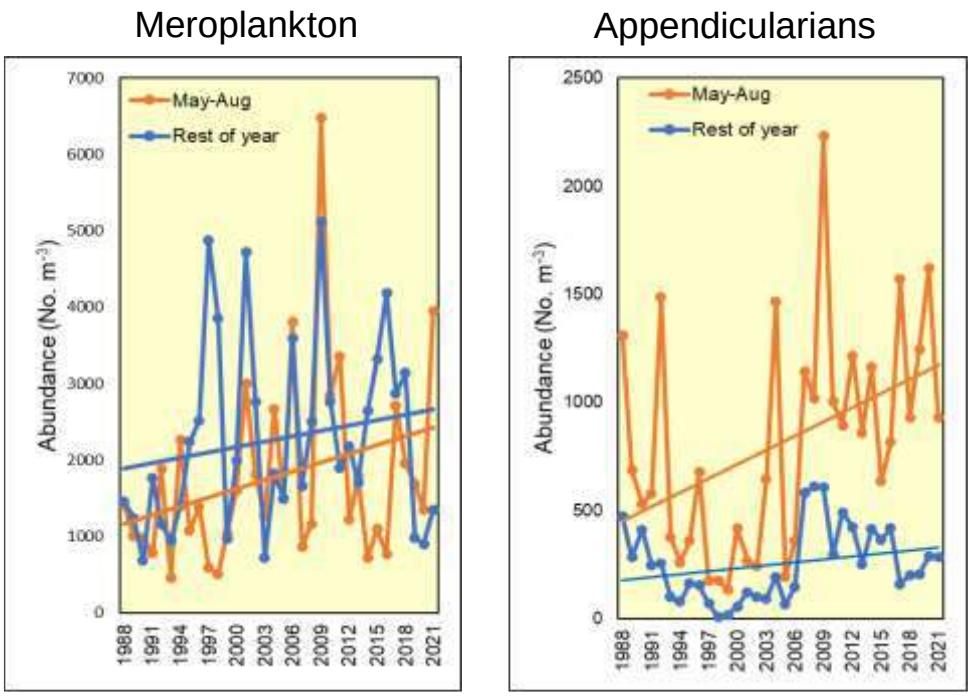

Figure 5.3. Abundance of several zooplankton groups at L4, such as the meroplankton (pelagic larvae of benthic invertebrates) and appendicularians (filter feeders of small particles) have not declined, but instead suggestions that they have increased. See caption for Fig. 5.1 for description of these data.

Based on the weekly sampling at the L4 site, author Andrea McEvoy highlight several unusual or interesting observations:

Jan/Feb: Paraeucheata hebes – carnivorous copepod. Documented as more common in Irish waters (WoRMS: www.marinespecies.org).

25 May: Cyanea lamarckii

30 March and *6 April: Pontophilus spinosus*

21 June: Chrysaora hysoscella.

26 July: Anchovy eggs found in live samples. Found more often since 2018 (late July- August)

South Devon Jellyfish Survey

A citizen science project: sightings of jellyfish / "jellies" from around SW England reported by email (sea@seadreameducation.com) or by uploading details to a Facebook page (https://www.facebook.com/SouthDevonJellyfishSurvey/posts). Sightings included in analysis if they have (i) date (ii) location and (iii) species (ideally with photo but accept expert comments).

Advantages: collects data over long time period and from a large area

Problems: data heavily skewed by strandings; may lack size of individuals and numbers seen; concentrates on larger individuals and misses many smaller hydrozoan species; lack of sightings does not infer absence of species.

Figure 5.4 illustrates abundance of observations for each of the main species or species groups through the year.

Patterns of note in 2019-2021:

- Barrel (*Rhizostoma pulmo*) – large numbers in 2019 but not since; anecdotal reports of being offshore and trawled up in autumn in Falmouth Bay by the tonne.
- Blue (*Cyanea lamarkii*), compass (*Chrysaora hysoscella*) and moon (*Aurelia aurita*) occur in same months each year with some variability according to coast.

- 'Blue' could be a mix of blue and lion's mane (*Cyanea capillata*) but since no verified sightings of adult lion's mane, most likely are blue (juveniles hard to tell apart).
- Crystal (*Aequorea* spp) shows as "rare" in most historic records but reported in large numbers in 2020 and 2021.
- Portugese man o' war (*Physalia physalis*) and by-the-wind sailors (*Velella velella*) fit expected pattern of washing ashore following large storms.
- Ctenophores - many reports in 2021 of large numbers swimming - previous reports only of strandings.
- No verified sightings of purple (mauve) stinger (*Pelagia noctiluca*) – any reports made seem to be mis-identifications of blues. There are reliable historic reports – so are we just missing them?

PROBLEMS – the dataset described here mostly relies on strandings and we do not really know: (i) how many there are, (ii) where the juvenile polyps are (iii) are numbers changing (iv) will climate change favour jellyfish, and (v) will we get invasive species? Trying to work on some of these questions by looking at eDNA and DNA testing of SETL plate fauna in marinas.

We need to verify identifications on social media – mostly are only included in our dataset there area images, unless the record is from a person with known expertise. We do not usually get accurate numbers of individuals/size. We have included 'bits' of jellyfish as well as whole 'alive' individuals.

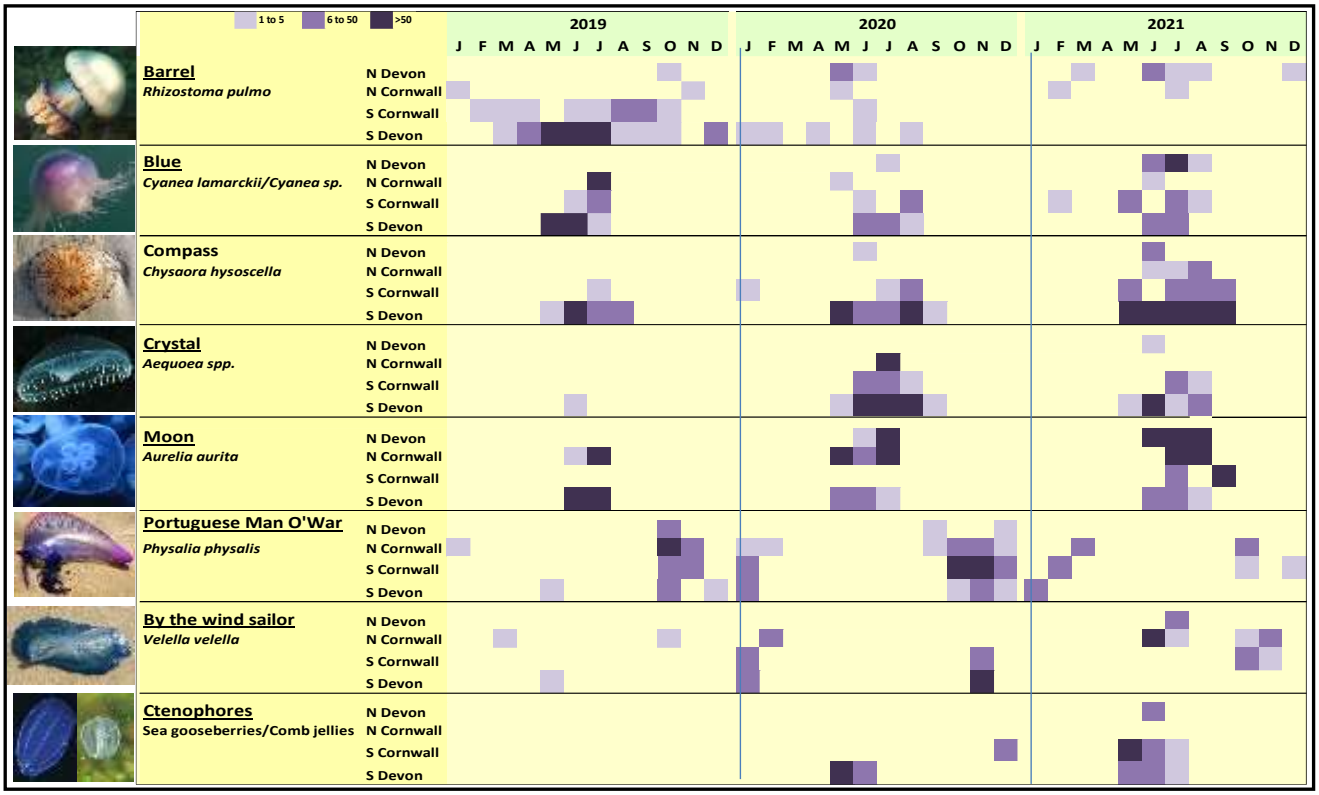

Figure 5.4. South Devon jellyfish survey results for 2019-2021 Species are shown down the left hand side. Time across the top. For each species, sightings are recorded from different areas of coast – From North Devon, travelling around coast of Cornwall and up south coast to Devon border with Dorset. Colours reflect max number reported by any one sighting in that month: lightest grey = max 5; purple = max between 6 and 50; Black = max >50.

6. The Seashore and Seabed

Edited by Keith Hiscock

Contact: khis@mba.ac.uk

Records of non-native species are included in a separate section below.

Records of fish species associated with seabed habitats are included in the section on fish.

Conclusions

- Observations through the year have recorded the 'usual' range of events such as wash-outs of species, strandings of oceanic species, a small number of NE Atlantic marine species new to Britain being found. **'Nothing unusual' for 'events'.**
- There are many observations of persistence (species that may have been recorded at specific locations decades or even more than a hundred years ago).
- There have been some (continued) increases in abundance and extent of a few readily recognized and sometimes 'valued' species: dwarf seagass *Zostera noltei* and, perhaps, *Zostera marina*. **'Slight improvement' in seagrass extent.**
- There are observations of reductions in abundance (that may be 'noise' in the system): for instance, likely lower amounts of the non-native species *Asparagopsis armata* and *Sargassum muticum* at some locations, declines in the abundance of crawfish *Palinurus elephas* inshore at least and apparent reduced occurrence of ross bryozon *Pentapora foliacea*.
- Occurrence of NE Atlantic species such as *Sabella spallanzani* and *Clibanarius erythropus* may suggest the effects of occasional strong currents bringing larvae across the Channel but, perhaps, becoming self-recruiting populations if conditions (such as warming) encourage such. There is no massive increase of warm water species that might suggest significant climate change effects. Warming is having an effect but is benign (not affecting ecosystem functioning or markedly changing composition of biota). **'Slight increase' in warm water species.**
- The number of non-native marine species in south-west waters continues to grow and the range and, sometimes, abundance of already present ones increase. Some non-native species had a 'poor' year. Some adverse impact (particularly from Pacific oysters) leads to a **'Negative assessment' for non-native species.**
- Some declines (over the past 40+ years) may be reversing – for instance, anthozoans at Lundy but **'Uncertain' for long-term fluctuations.**

Records of range extensions, species new to Britain, episodic events, 'recoveries', 'disappearances', trends etc. give context when interpreting the results of monitoring or of (often 'press-worthy') events. But, there needs to be a way of preserving the sorts of observations in SW Marine Ecosystems reports so that those observations can be found and objective interpretation can be undertaken into the distant future. DASSH, the UK archive for marine species and habitat data based at the Marine Biological Association, is actively developing a mechanism to capture species observations and integrate them into marine biodiversity data infrastructure. We need to encourage organisations that fund that sort of work to fund it.

Overview

Observations were inevitably reduced in 2021 especially during periods of lockdown – although beach strandings continued to be observed especially during storms in mid-February. The sediment-dwelling species that were stranded were typical of storm wash-outs, revealing species that are not normally seen. Most other observations were 'unremarkable'. The observation of the 'Mediterranean' fan worm *Sabella spallanzani* in Plymouth Sound was, perhaps, serendipitous but led to the observation that it had been reported (via the National Biodiversity Network Atlas) from several south coast locations. However, those records were likely a translation of 'feather duster worm' records – pointing to the importance of unusual records being validated. There were observations of usual species in strandline finds.

'Events': wash-outs in February

The strong and persistent easterly winds in the first half of February created waves that disturbed sediments at Dawlish to such an extent that both surface and deep burrowing species were washed-out and stranded (Mike Puleston, Sally Grant, Sally Landberger, Mathew F. Riley, Toby Sherwin and Simon Thurgood). By mid-February, there were reports of wash-outs from various other locations in the south-west. At Dawlish, the washouts included surface or near surface-living species such as the sea mouse *Aphrodite aculeata,* cockles *Cerastoderma edule*, scallops *Pecten maximus*, the masked crab *Corystes cassivelaunus*, starfish *Astropecten irregularis* and *Asterias rubens* and the brittle star *Ophiura ophiura.* Burrowing species washed out included otter shells *Lutraria lutraria*, razor clams *Ensis* sp(p), the burrowing holothurians *Thyone* sp. ?*Neopentadactyla mixta* or ?*Leptosynapta* sp. and the sea urchin *Echinocardium cordatum*. There was also a variety of wrasse species washed-up. Elsewhere, mantis shrimps *Rissoides desmaresti* were washed-out at Studland Bay with dozens being washed-up at Little Beach (Barney Baker). A 'common' octopus (*Octopus vulgaris)* was washed-up at Towan Beach on the Roseland Peninsula (Graeme Crowder/Laura White). Seahorses were also washed-up including a female spiny seahorse in Poole Harbour (Joanna Clark) whilst Steve Trewhella observes 'lots' of seahorses washing-up at the moment (on 19th February).



Plate 7.1. Wash-out Dawlish. Image: Sally Landberger.



Plate 6.2. *Leptosynapta inhaerens* and *Golfingia cf. elongata*. Dawlish on 16th February. Image: Toby_Sherwin.



Plate 6.3. Mantis shrimp, *Rissoides desmaresti*. Studland_Beach. Image: Barny Baker.



Plate 6.4. Fish washed-out at Dawlish on 16th February. Image: Sally Landberger.



Plate 6.5. Common octopus *Octopus* vulgaris. Towan Beach, Roseland. Mid-February. Image: Laura White.

Algae



An interesting paper on *Phymatolithon calcareum* that contributes to the debate on 'connectivity'. "*P. calcareum* maerl beds across the north-east Atlantic are generally structured geographically, a pattern likely explained by low dispersal potential and limited connectivity between regions…. we found that *P. calcareum* from the Fal Estuary, south-west England, is genetically distinct from all other *P. calcareum* sampled, even from The Manacles, a site located only 13 km away". See: https://doi.org/10.1111/eva.13219

Plate 6.6. Maerl, *Phymatolithon calcareum* in the Fal. 16th September. Image: Keith Hiscock

Worms (Polychaeta)





Plate 6.6. Marra Pool in Plymouth Sound and the worm *Poecilochaetus serpens*. Seabed image: Keith Hiscock.

As an example of 'persistence', two notable species from Marra Pool (Batten Bay) in Plymouth Sound: the rarely recorded worm *Poecilochaetus serpens* (re-found by Andy Mackie on 8th October) and patches of *Zostera marina* (known there for several recent years). In a paper published in 1904, "The local area of distribution …. is very restricted. It consists of patches of sand covered with *Zostera* … with intermediate patches on which no *Zostera* grows …. The worm lives only in these intermediate patches." *Zostera* seems much less abundant than at the beginning of the 20th century and part of the relevant area had a 'mess' of stranded fish traps and rope. Allen, E. J. (1904). The anatomy of *Poecilochaetus*, Claparède. *Quarterly Journal of Microscopical Science*, London. 48: 79-151.



The Mediterranean feather duster worm *Sabella spallanzanii* was found at Firestone Bay in Plymouth Sound on 13th November at a depth of 10 m below chart datum on the east-facing cliffs. There are several records for the English Channel coast but most/all are unlikely to be correct except that significant numbers of juveniles have been recorded in dredge samples in Southampton Water and in Gosport marinas (Teresa Darbyshire, reported by John Bishop and Christine Wood) are correct. A NE Atlantic species with nearby populations in Brittany and the Channel Isles. (Observation and image: Keith Hiscock).

Plate 6.7. *Sabella spallanzani*.

Cnidaria (hydroids, anemones, corals but not including planktonic forms – see 'Plankton')

'Outbursts' of many hydroid species occur followed by the sea slugs that feed on them in about May. 2021 was notable for no such outburst and, maybe a link, there was cold wet and often windy weather mid-May.



Plate 6.8. Part of the colony of *Leptopsammia pruvoti* photographed at the Knoll Pins on Lundy on 25th September. Image width about 15 cm. Image: Keith Hiscock.

There has been concern for many years that species of anthozoans at Lundy have been in decline – likely since the mid-1980s. Monitoring that would have properly documented their status was stopped in the late 1980s and it is informal observations and some viewpoint photography that has provided anecdotal information and counts of the nationally rare *Leptopsammia pruvoti* (sunset cup coral) populations at two sites on the Knoll Pins. On 25th September, Keith Hiscock re-photographed the sites at Lundy. The mosaic of images revealed (rough count) 68 individuals at the Knoll Pins 'cave' including small ones and 107 of which 28 were very small at the Knoll Pins East site. At the Knoll Pins cave (the most frequently censused), the numbers were about a quarter of what they were in 1983/84. On the 'up-side' there did seem to be a significant number of very small individuals (recruits). Quadrat photographs were commissioned (by Natural England) in late September 2021 but the weather closed-in before an expedition could be mounted.

Large numbers (50+ in a small area) of stalked jellyfish in Kimmeridge Bay. Three species were recorded - *Haliclystus* sp., *Craterolophus convolvulus* and *Calvadosia cruxmelitensis*. The *Haliclystus* were all large which is unusual at this time of year, the others are all quite small yet.

Crustacea (Non-native crustacean species are in the 'Non-native species' section)

Clibanarius erythropus (St Piran's hermit crab) (which was first reported in 1960, could not be found after 1985 and was found again in 2004), has continued to expand in abundance and extent along the coast with a now (in 2021) easterly known extent of Burgh Island (Steve Hawkins). There may have been continued recruitment from across the Channel or maybe larvae being produced locally (a gravid female was found in 2018, see https://doi.org/10.1186/s41200-020-00186-1) and that observers should look out for 'nurseries' where juveniles may be grouped together. One example is from East Looe from 2020 and 2021 reported by Heather Buttivant. *C. erythropus* is a warm water species.

Xantho hydrophilus (furrowed crab or Montagu's crab) showed increased numbers at Kimmeridge. Eleven were recorded in one day although, previously, only up to four or five in a year.

Cancer pagurus (brown crab). There was some discussion on-line about a decline in the abundance of brown crabs (and an increase in the abundance of furrowed crabs) during 2021 – something to look-out for.



Plate 6.9. A slipper lobster *Scyllarus arctus* caught NW of Lands End. Image: The Real Cornish Crab Company.



Plate 6.10. The shrimp *Philocheras fasciatus*. Image: David Fenwick.



Plate 6.11. The barnacle *Conchoderma virginatum* attached to a trigger fish caught on 27th July. Image: Mike Collins.

A slipper lobster, *Scyllarus arctus*, caught by the vessel HarrietEve NW of Lands End just 10 miles from where the skipper had caught one 11 years previously. Slipper lobster are rarely seen/caught in British waters but the first record was in 1758. Fishermen suggest that, in recent years, more have been turning-up in pots.

A pair of the rarely seen shrimp *Philocheras fasciatus* was found on 27th February (David Fenwick).

From about early August, there were lots of reports of the sponge crab *Dosima fascicularis* being washed-up especially in north Cornwall. Also reports of increased numbers in pots.

Spiny spider crab (*Maja brachydactyla*) moulting aggregations were reported north of Gannets' Rock on Lundy (Mark Lavington) and in Falmouth Harbour (Matt Slater). Where else and are aggregations becoming more frequent?

Crawfish (*Palinurus elephas*)

There is mixed information about crawfish recovery. It does seem that less were being seen by divers at locations where they had been recorded in significant numbers in the few years before 2021. For instance, (information from Colin Trundle, Cornwall IFCA): "The Volnay wreck in particular seems to have been deserted over the last year but it has been reported that there seems to have been a colonisation of an area of reef to east of the wreck so there may have been a migration as the animals have out grown the wreck shelters." In a very rough census from divers at Hilsea Point Rock near Plymouth in August: maybe expect to count 10 in an hour (would have been, maybe, 20+ in 2019). There were still a proportion of very small ones present. Almost all individuals seen were still smallish but there were some reports of solitary very large ones along the south coast. One was found in a rockpool at Langdon Beach during Wembury Marine Centre rockpooling on 22nd/23rd May (Coral Smith).

Deep wreck divers report a lot on those wrecks (at c. 60m depth) with (roughly) 20 seen in half-an-hour. Larger individuals may be migrating to deeper water and reports of trawlers catching them [information from Terri Portmann and Jim Portus].

Seasearch records (from Charlotte Bolton) indicate that "the last two years [2020 and 2021] were essentially similar and the overall South Devon (recorded) population, as a whole, was stable in terms of size structure and abundance over recent years. 2021 was the seventh year of the sustained recovery - this is excellent and let's hope fisheries management and diver attitude keep it so". Seasearch observations are now published: Jackson, A. C. (2022). Bayesian occupancy modelling of benthic crustacea and the recovery of the European spiny lobster, *Palinurus elephas*. https://doi.org/10.1017/ S002531542200008X.



Plate 6.12. A recent crawfish recruit photographed by Matt Slater on the Bizzies out of Falmouth in November. About 45 mm total body length.



Plate 6.13. A 'berried' hen crawfish caught in Mount's Bay in early October. Image: Gus Caslake.

Cornwall IFCA have been working with two south coast fishermen paying their time to record their entire catch of crawfish, both pre recruits and those that are retained from targeted netting and as bycatch when targeting other

species. Colin Trundle reports: "We received 1560 records in 2020 and just over 2000 records in 2021. We are yet to work up the data but there seems to be some interesting trends emerging. The fishery was slightly larger than previous years probably driven by abundance and higher than usual first sale value."

There continue to be very few records of 'berried' females. Gus Caslake comments: " The vast majority are males this is the first berried hen we have caught from I would say a couple of hundred."

Mollusca

Cephalopods (octopus, cuttlefish and squid)

Although there were no sightings of live common octopus reported, there was a dead one on the Roseland Peninsula on about the 22nd February (Laura White).

Cuttlefish were occasionally seen in winter but the main 'arrival' to mate at Babbacombe has been followed for many years by divers and is approximately in the last week of April. In 2021, Colin Garrett and Jason Brown reported their first sighting of a cuttlefish in 2021 at Chesil Cove on 25th April.

A significant paper published on squid that was focused on the Celtic Sea and western part of the English Channel and combined both research survey data and observations by recreational divers ('citizen science'). *Loligo vulgaris* was found to reproduce there in late winter – spring with the distribution of egg masses coinciding with a bottom temperature range of 8.5− 10 ◦C and bottom salinities of 35–35.5 psu. Laptikhovsky, V. *et al.* 2021. Identification of benthic egg masses and spawning grounds in commercial squid in the English Channel and Celtic Sea: *Loligo vulgaris* vs *L. forbesii*. https://doi.org/10.1016/j.fishres.2021.106004.

Other Molluscs



Plate 6.14. The nudibranch *Amphorina farrani*. Image: Darren Sutton.



Plate 6.15. *Cadlina pellucida.* Image: Jan Davies from (the Eddystone reef in 2017.)

As usual, a 'crop' of rarely seen nudibranchs including *Amphorina farrani* on the south coast of Cornwall (on 2nd May) and *Cadlina pellucida* seen at Hilsea Point Rock (Jan Davies on 31st May).

Bryozoa



Plate 7.16. A decaying colony of *Pentapora foliacea* that has grown through sea fans *Eunicella verrucosa*. Hand Deeps on 24th November 2021. Image: Keith Hiscock.

Colonies of the ross ('potato crisp') bryozoan *Pentapora foliacea* seem to have become much less abundant. This observation is anecdotal but reinforced on each open coast dive near to and offshore of Plymouth and includes abundance on ex-HMS *Scylla*. (Keith Hiscock). However, the Skomer MCZ project status report (in prep.) for 2021 indicates that at long term study sites off West Wales, *Pentapora foliacea* has increased greatly in numbers during at least 2020 and 2021 in contrast to the reported decline out of Plymouth. (Thanks to Kate Lock for providing information).

Pentapora foliacea is sometimes described as 'long-lived and slow growing' but, whilst it is very fragile, colonies likely live for about 12 years and the 'plates' grow at up to about 2 cm a year. It colonises readily and was first observed on ex-HMS Scylla (sunk end of March 2004) in March 2006.

Pycnogonids



Plate 6.17. Clusters of sea spiders were reported by Paul Pettitt on 22nd March and Steve Trewhella reports huge clusters on the 23rd March in Dorset. Julie Hatcher reports: "There are literally hundreds of them, free-swimming, on the sand and in the eelgrass, some carrying eggs". Believed to be *Nymphon* species. Image: Paul Pettitt.

Non-native species

From John Bishop and Christine Wood (https://www.mba.ac.uk/fellows/bishop-group-associate-fellow): Newly established/recorded species in south-west England are listed next. There were some range extensions of existing known species but survey work much reduced in 2021 and limited to areas in the Plymouth region.

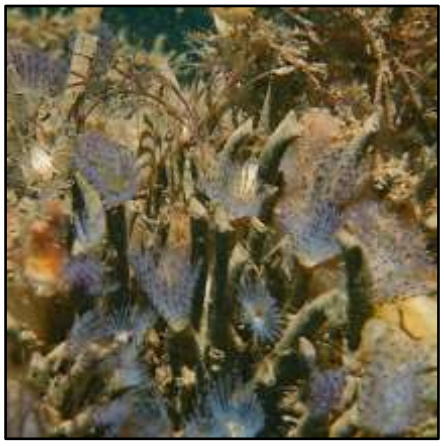

Plate 6.18. The sabellid polychaete *Bispira polyomma* was recorded from two adjacent marinas in Plymouth, SW England, in summer/autumn 2021 (John Bishop, MBA, confirmed by Teresa Darbyshire, National Museum of Wales). To date the species has been recorded, as a presumed non-native arrival, from the Netherlands and Belgium. Image: John Bishop/Christine Wood.

Cefas have identified new records for polychaete worms normally restricted to warmer Mediterranean waters, with 2019 being the first UK record of the Mediterranean polychaete *Lepidasthenia brunnea* from the Greater Haig Fras MCZ, west of Cornwall. The polychaete *Syllis garciai,* native to the Western Mediterranean was found in the Offshore Overfalls MCZ in Southeast England. Additional records of *S. garciai* were found around the Southwest Coast of England and southern Irish Sea in 2020



Plate 6.19. *Pikea californica* on the seabed at West Hoe, Plymouth Sound on 25th August 2021. Image: Francis Bunker.

There are newly recorded locations for already-established species in south-west England. The non-native alga *Pikea californica* was sampled from Bovisand Harbour and at West Hoe in Plymouth Sound at the end of August (as a part of the Darwin Tree-of-Life sampling programme). It was first collected in the Isles of Scilly in 1967 but not recognized until 1983. It was not recorded on the mainland until 2015 (when David Fenwick reported it from Newlyn). Also known from Godrevy Headland. It was also recorded in 2021 from Nanjizel Beach in SW Cornwall by Matt Slater.

From an e-mail from Mike Puleston on 3rd May: "Wakame is spreading Westwards around Torbay, from the initial recording of it in Torquay harbour, I have not so far found it past this point. It is also found Eastwards to Meadfoot Beach. It appears to be increasing in abundance at known sites year on year around Torquay".

Range extension of the red ripple bryozoan *Watersipona subatra* to Lundy – observed by Keith Hiscock on 28th May.

From Keith Hiscock. A much lower abundance of *Sargassum muticum* at Lundy and no *Asparagopsis armata* (harpoon weed stage) seen in rockpools at Lundy in August and much less than some previous years at Wembury. Also on 18th August looking for *Asparogopsis armata* (harpoon weed stage) in Bovisand Harbour – plenty of *Falkenbergia* stage but no harpoon weed seen. More systematic observations needed. More observations needed to see if a decline in recent years and any link to cold summers.

David Fenwick reports *Ammothea hilgendorfi* from the slipway south of Brunel Bridge pillar at Saltash, Cornwall on 19th November. Weed washing, from a small sample of washed *Amathia*-covered *Fucus serratus* collected subtidally on a moderately low tide. The species had previously been reported from Brownsea Island and, by David Fenwick, from Baiters Quay, Poole, Dorset.

More locations for Pacific oysters (*Magallana gigas*) continue to be found and some (in enclosed areas) where they are very dense. The results of surveys undertaken between 2017 and 2020 were published in 2021: Morgan, A. *et al*. Partnership led strategy to monitor and manage spread of Pacific oyster populations in south Devon and Cornwall. Natural England Research Reports, NERR100. http://nepubprod.appspot.com/publication/4889256448491520.

Strandings [not including free-living ocean drifters ('jellyfish' including *Physalia physalia* and *Velella velella*) but including stalked barnacles]

Comment in January: Not seeing reports of *Physalia* or *Velella* washed-up or of gooseneck barnacles. Observations by divers have dried-up and 'ordinary/expected' stuff being reported intertidally. A quiet month.

On 22nd February, sea snails *Janthina janthina* washed up on Par Beach (Dany Widerscope)



Plate 6.20. Bouy barnaces (*Dosima fascicularis*) near Marazion on 15th August. Perhaps placed in the pool. Image: Alan Fielding.

Portugese man'o war (*Physalia physalia*) washed-up at Portheras Beach on 6th October (friends of Portheras Cove)

Late Oct/early Nov – goose barnacles being washed-up in Dorset (Steve Trewhella, Julie Hatcher)

Seagrass

Zostera marina. There were significant studies in 2021 which pointed to an increase in extent (in some areas at least) and generally healthy beds. Cornwall Inshore Fisheries and Conservation Authority spent a considerable amount of time assessing the extent of sea grass in the Fal & Helford SAC with Exeter University as part of Cornwall Council's Nature Recovery Pilot project and the extent of seagrass in the Plymouth Sound & Estuaries SAC (Cornwall side). Cornwall IFCA were also involved in a broadscale survey of Mount's Bay using where seagrass extent was found to be c.290ha and (apparently) represents 3.2% of the UK total of sea grass. It seems that the extents in the Fal & Helford have increased, as has the area around Cawsand in the Plymouth Sound & Estuaries SAC. The work included using specialist acoustic equipment to carry out the surveys and ground truthing ambiguous signatures with a drop down camera. (Information from Cornwall from Colin Trundle, Cornwall IFCA.)



There were Seasearch surveys of *Z. marina* beds in Cawsand and Leekbed Bays in Plymouth Sound that documented apparently healthy beds but, notably, a high abundance of the non-native filamentous alga *Antithamnionella ternifolia* in the Leekbed Bay bed.

A seagrass planting programme was underway in Plymouth Sound during April in the region of Ramscliff Point (southern part of Jennycliff Bay, Plymouth Sound). Volunteers deployed over 16,000 seagrass seed bags and planted 2,200 seedlings from 7th April. The work was part of the EU-funded Remedies programme being undertaken by the Ocean Conservation Trust at the National Marine Aquarium. See: https://oceanconservationtrust.org/project/remedies-project/.

Plate 6.21. *Zostera marina* seed bag**.** Image: Mark Parry/Ocean Conservation Trust



Zostera noltei. There is general agreement that the extent has increased in Plymouth Sound and in Salcombe Harbour/Kingsbridge estuary. Study underway by Oliver Thomas (University of Plymouth).

Plate 6.22. *Zostera noltei* from Inswork Point , St John's Lake, Tamar on 8th September. Image: Keith Hiscock.

Otters

Otters were occasionally seen inshore including in Sutton Harbour and on a security camera inside a moored vessel, both in the Plymouth area.

7. Fish and Reptiles

Edited by Douglas Herdson and Simon Thomas

Contact: Douglas.Herdson@btinternet.com

Conclusions

- The reports of basking shark numbers were up on last few years, but fewer than 20 years ago.
- 2021 was good year for porbeagles with large fish of a size that had not been reported in this area since the mid-1990s, and adults returning to areas where they had not been encountered since the 1970s.
- An apparently good stock of bluntnose sixgill sharks was found in an area of the Western Approach.
- The biomass of anchovies was the highest detected in recent surveys. Anchovy eggs and larvae were found in plankton samples off Plymouth, possible first indication of breeding in the area.
- The number of medium sized European sturgeon encountered in the region off the south coast. suggests that there may be feeding grounds here.
- Several species of fish normally considered deep water, such as argentine, blue whiting and hake were caught in coastal waters.
- Steven's goby was thought-of as an offshore benthic species usually found at depths between 35-100 m, but now appears to have established populations in inshore areas.
- Several warmer water species are showing range extension, notably the silver dory and comber.
- Rare species seen in 2021 included *Auxis* sp., flying gurnard, two common two-banded sea bream and saddled sea bream.
- The number of turtle reports in the south-west was very low in 2021, and unusually more 'hardshell' turtles were reported than leathery turtles

Fish

Agnaths



Plate 7.1. Sea lamprey attached to a common dolphin. Image: Mike Langman.

Sea Lamprey. In January, Mike Langman photographed a small pod of short-beaked common dolphins (*Delphinus delphis*) in Torbay. On examining the photos, he found that a lamprey was attached to the flank of the very active calf. It was a fully-grown sea lamprey (*Petromyzon marinus)*.

Dave Gandy commented "Sea lamprey attachment marks on bottlenose dolphins are identifiable but appear to be rare, hard to notice, and short-lived", so this sighting on a common dolphin, whilst very unusual, was not totally unexpected.

[Mike Langman; Dave Gandy.]

Elasmobranchs

Thresher shark. Most records of common thresher sharks (*Alopias vulpinus*) came from Torbay; where, from April to August, between 15 and 20 were seen. These were mainly off Hope's Nose or Berry Head.

Two thresher sharks were caught and released from Looe during July 2021: one fish of 75 kg from Paul Woodman's Looe-based charter boat *Be Cool*, and a larger fish of around 120 kg captured on Murray Collins' boat *Swallow 2*. This latter fish had samples of mucus collected by Dr Georgia Jones of Bournemouth University for stable isotope, FAME and DNA analysis and the results of these analyses will be published shortly. Several other threshers were seen during the CHART tagging program. A private boat caught and released two other specimens from around Rame Head during August.

Additionally, a North Devon charter boat encountered seven threshers in three days during August 2021 in ICES sea area VIIf (North Cornwall and Bristol Channel), an area where these fish had not previously been reported.

A thresher seen west of Wolf Rock from the *Scillonian* on 19th August was a first record for the area around the Isles of Scilly.

[Rob Hughes/Devon Sea Safari; Isles of Scilly Bird and Natural History Review 2021; Georgia Jones; Paul Woodman; Murray Collins; Simon Thomas; Rupert Kirkwood.]

Basking Sharks. Since the relative high numbers of sightings of basking sharks (*Cetorhinus maximus)* in 2010 to 2012, there has been a significant decrease in reports of this species (Crosby and Owen, 2022). However, in 2021, there were numerous reports in April and May, mainly from West Cornwall.

The first of the year was of Falmouth on 12th April, promptly followed on 14th April by individuals in Torbay Marina, Brixham Harbour and the Lyme Bay Reserve. They were common in the following few weeks around south west Cornwall. Including one large one of around six metres, and four others, seen by Rupert Kirkwood when kayaking off Penberth.

One was seen from the *Scillonian* on 21st April, and another in early September. But the only reports in June were of two around the Isles of Scilly.

The latest of the season were one between Plymouth and the Eddystone on 31st July, and three seen in 20 minutes in the middle of the Channel south of Plymouth on 13th October.

It appears that basking shark sightings have decreased over recent years as the populations of large copepods declined.

Crosby, A. and C. Owen (2022) *Monitoring Marine Megafauna Project. Reviewing Cornwall Wildlife Trust's Seaquest Southwest Effort-Based Survey Database and Data*. Cornwall Wildlife Trust.

[Matt Slater; Charles Hood; Josh Symes; Nathan Cox; Roxy Piper/Torquay Watersports; Georgia Bardua/AK Wildlife Cruises; Duncan Jones/Marine Discovery; Mark Criddle/RNLI; V. Stratton; Debbie Shotter; Isles of Scilly Bird and Natural History Review 2021; Rupert Kirkwood; CEFAS/PELTIC 2022; Angus Atkinson.]

Shortfin Mako. No shortfin mako sharks (*Isurus oxyrinchus*) were captured in the area, the species has largely been absent from UK waters since 1980. However, two specimens were observed jumping next to boats during July 2021, one by Murray Collings from *Swallow 2* off Looe, and another in Lyme Bay by Dartmouth-based skipper Owen Malia. The species is distinctive in its jumping behaviour and these reports are given a high degree of credibility.

[Murray Collings; Owen Malia.]

Porbeagle 2021 was very much the year of the porbeagle (*Lamna nasus*) with sub-adult and adult males, and females returning to areas where they had not been encountered since the 1970s. However, there were only three year-zero fish reported from the south coast of Devon and Cornwall, including a fish seen in Sutton Harbour, Plymouth, in mid-April; which was a departure from previous years. There were 683 captures of *L. nasus* reported from ICES sea areas VIId-g (Channel and Celtic Sea) compared to 156 in 2020 (Figure 7.1). There was no discernible increase in effort,

but as the data for zero trips is incomplete, no Catch per Unit Effort (CPUE) is reported. Adult fish were seen around the Eddystone rocks, south of the Mewstone and on the drop-off south of Plymouth during June and July. One large porbeagle was filmed just outside Weymouth Harbour in October. Few fish of this size have been reported in this area since the mid-1990s.

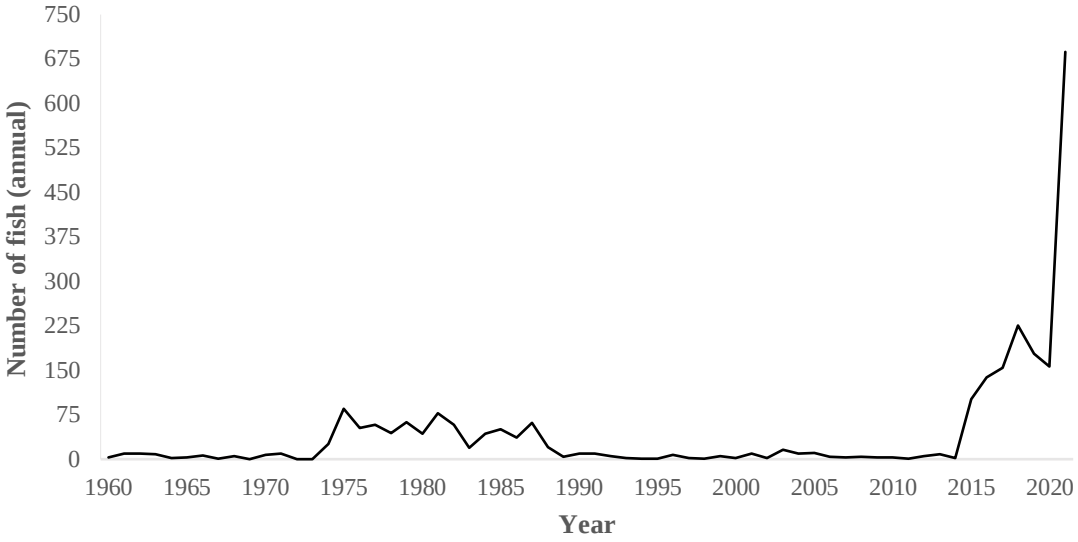

Figure 7.1. Porbeagle *(Lamna nasus)* captures by recreational anglers from 1960-2021. The fishery has been exclusively catch and release since 2000. Adapted from Jones *et al.* (2021) *Summary of data from the United Kingdom recreational Porbeagle fishery from 1960-2020*. ICCAT SCRS Collect. Sci. Pap, ICCAT, 78(2).

[Simon Thomas, Darren Trent.]

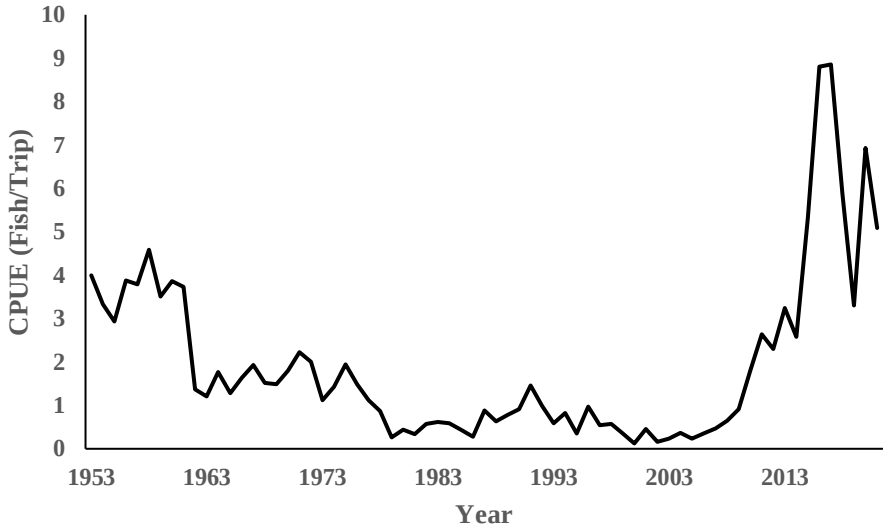

Figure 7.2. Blue Shark *(Prionace glauca*) Catch Per Unit Effort from 1953 to 2021 by recreational charter boats. From Thomas *et al*. 2022 ICCAT SCRS document (in submission)

Blue Shark. During 2021 there were 2708 blue sharks (*Prionace glauca)* caught and released by angling boats reporting to the Pat Smith database from 532 trips giving a nominal CPUE of 5.09 sharks per trip. There is still one boat whose data has not been included that will contribute approximately 800 fish from around 50 trips, so the figure will change slightly in the final analysis. This compares with a CPUE of 6.92 fish/trips from 2020 (Figure 7.2), but this figure was skewed by the absence of less productive early season trips caused by the COVID lockdown. The numbers of *P. glauca* captured to the west of the Lizard during August were depressed compared with previous years, but skippers attributed this to a persistent algal bloom in this area.

2021 saw the return of large male *P. glauca* to south-west waters including a near 10-foot (3 metre) specimen captured on Dave Uren's Plymouth-based charter boat *Mirage* (Plate 7.2), a similar specimen captured by Dan Margett's Looe-based charter boat *Sowenna*, and another slightly smaller male fish from Paul Woodman's *Be Cool*.

There were fewer year 1-3 fish released in 2021, with most fish consisting of sub-adult and young adult fish (year 4-7). 90.1% of *P. glauca* released were female, which was slightly lower than the long-term mean of 94%.

[Dave Uren; Dan Margett; Paul Woodman; Simon Thomas.]

Bluntnose Sixgill. Kevin Mckie returned for a last visit to his fishing area south-west of the Scilly Isles with his vessel *Size Matters* in early July. In the course of 21 hours, they caught and released 14 bluntnose sixgill sharks (*Hexanchus griseus*). These were 12 large sharks from more than 205 kg to 59 kg, with a mean of about 134 kg (296 lb). The two smaller sharks were 16 and 11 kg, hopefully, indicating a healthy population.

[Kevin Mckie]

Angel Shark. In March, an adult (probably female) angel shark (*Squatina squatina*) was caught and returned alive by a beam trawler working in mid-Channel south of Falmouth. Another of about 25 kg was captured approximately 3 miles to 4 miles off Seaton, south east Cornwall, in June.

This is now a rare and protected species, probably most likely to be found around Britain in Cardigan Bay, Wales. However, it was a surprise in July when a large one was landed there by a shore angler.

[Beshlie Pool]

Electric Rays. No electric rays were reported in our area in 2021.

However, on 15th August **2020** a British record (boat-caught) marbled electric ray *(Torpedo marmorata)*, of 6.125 kg was caught off the south coast of Guernsey. One was also caught by an Irish fishing vessel in English waters of the Celtic Sea south of Waterford in July **2020.**

On the other side of the Bristol Channel, a 1.2 m electric ray (*Tetronarce nobiliana*) was found on Blackpill Beach, Swansea, in September 2021.

[British Record (rod-caught) Fish Committee; Matt Green; Declan Quigley.]

Blue Skate. On 26th December a 4.5 kg blue skate (*Dipturus batis)* was caught at night by an angler on Chesil Beach. The date is interesting because another had been caught by an angler on 1st January 2020, suggesting that this rare species may be found in this area in mid-winter.

[Sam Burrows]

Stingray. The common stingray (*Dasyatis pastinaca*) is usually commoner further east in the Channel, but the one patch where they are consistently found is Chesil Beach. One was caught here at Cogden in early July.

A large stingray was seen at Ecrehous, Jersey in late September.

[Michael Asher; Nicholas Jouault.]

Pelagic Species

Large Pelagic Fish

Atlantic Bluefin Tuna. Atlantic bluefin tuna (*Thunnus thynnus*) (ABFT) were again seen in good numbers from August onwards. Some being seen in Torbay and Lyme Bay until January 2022.

A small group off Peninnis Head, Isles of Scilly, on 7th April was exceptional: few others being recorded before mid-August. From then on, they were seen almost daily, with some of the largest shoals being found in mid to late August. One of the largest aggregations was of over 300 off Dodman Point in November.

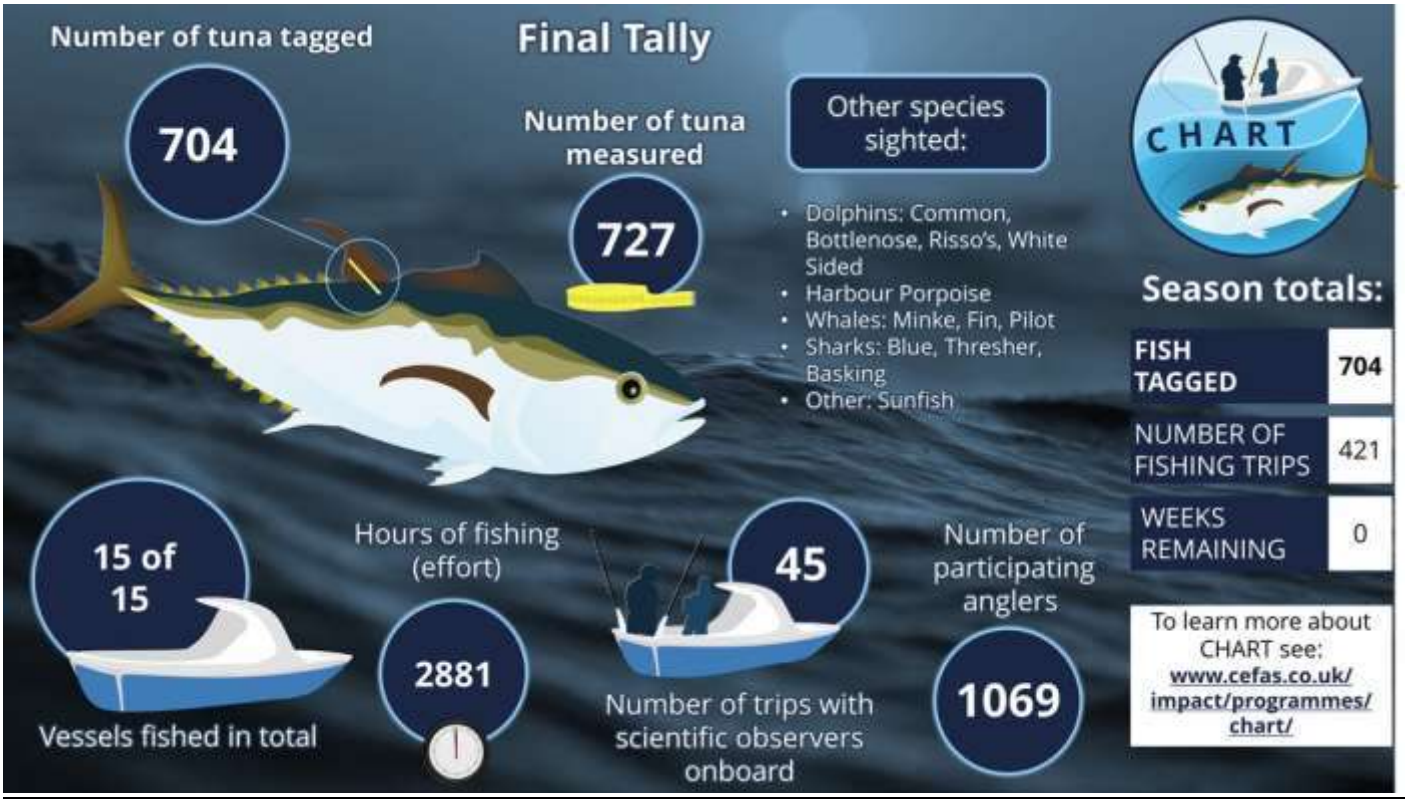

Figure 7.3. Results and Statistics from the 2021 CEFAS/CHART tagging programme for Atlantic Bluefin Tuna.

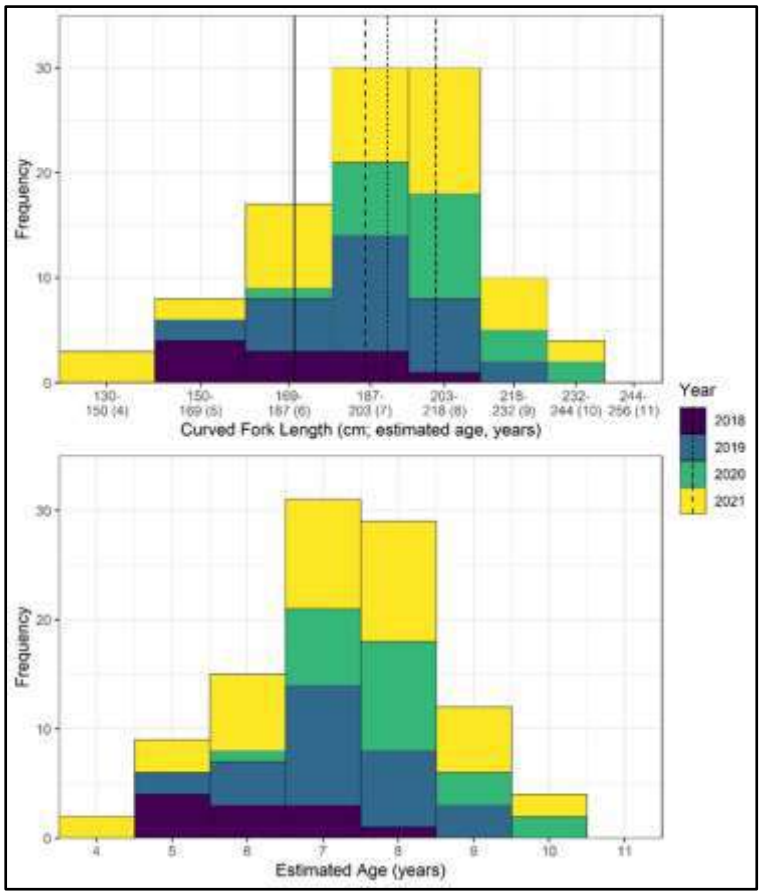

Figure 7.4. Size/Age Frequency distribution of tagged bluefin tuna. Thunnus UK.

CEFAS's CHART programme operated a successful pilot programme of 15 vessels, where 727 sharks were measured and 704 ABFT were tagged with spaghetti tags and released, as a result of 2881 hours of fishing effort (see Figure 7.4). CHART is the acronym for a recreational scientific 'CatcH And Release Tagging programme' for Atlantic bluefin tuna.

ABFT were seen from Scilly Isles to Rye in East Sussex; but the majority of sighting were from the south coast of Cornwall to Lyme Bay.

The PELTIC cruise in October recorded more sightings than in 2020 (721 compared with 118) and at that time of the year found them almost entirely east of 04°30' W; with many in the southern French sector of the Channel.

The increasing numbers of bluefin tuna in the Channel has led to the initiation of population studies. Thunnus UK/FishIntel deployed acoustic tags on 30 fish and set up passive listening stations to record the passage of these fish. These fish were measured to give a body size distribution plot for all electronically tagged animals in the southwest (Figure 7.4). A rather broader range of fish was sampled last year, including the smallest to date and near enough the largest too.

[Ross Parham; Isles of Scilly Bird and Natural History Review 2021; Rupert Kirkwood; Josh Symes; Duncan Jones/Marine Discovery; CEFAS/PELTIC 2021; Simon Thomas; Rob Hughes/Devon Sea Safari; CEFAS-CHART; Thunnus UK/FishIntel; Matt Witt.]

Other Tunas

An *Auxis* sp. was caught off Weymouth in March. Two species occur in British waters the frigate mackerel (*Auxis thazard*) and the bullet mackerel (*Auxis rochei).* They are very uncommon in our seas and rather difficult to separate, especial without the fish in hand. From a photograph it looked that this one was probably a bullet mackerel. There were said to have been several seen in the area.

Juvenile bonitos (*Sarda sarda*) were seen Bigbury Bay in September, and off Portleven in October. Another juvenile was caught in Lyme Bay during the PELTIC cruise in October. It is possible that bonitos are now overwintering in our coastal waters.

[Lee Selby; Richard Gannon; Lewis Gilbert; PELTIC 2021]

Dolphinfish. Two dolphinfish (*Coryphaena* sp.) were reported to have been captured off Salcombe in late January, but this could not be confirmed.

There are two types of *Coryphaena* dolphinfish, mahi mahi, or dorado. One common or greater (*Coryphaena hippurus*) was found on an Irish beach; and an angler caught a lesser (*Coryphaena equiselis*) off Chesil about 3 years ago. Last year there was a report of a sighting in Cornwall, but again no proof.

[Jason Upham]

Small pelagics

'Whitebait'. In October there was a mass stranding of tiny fish on Chesil Beach. They were small and from a poor photo appear to be post-larval clupeids.

CEFAS PELTIC 2021

CEFAS's tenth autumn PELTIC survey studying the pelagic ecosystem of the western English Channel and Celtic Sea took place in October.

Sprat (*Sprattus sprattus*) was more widespread and abundant (Figure 7.5) than previously observed, driven by a strong recruitment pulse of 0-group fish. Highest densities were found in the two usual areas of Lyme Bay and the Bristol Channel, and the biomass had increased to the highest recorded in the last nine years. They were also more widespread in the inner waters of the Bristol Channel. This year sprat were found further west in the Bristol Channel and more inshore along the north Cornish coast.

Sardine (*Sardina pilchardus)* was again the most abundant small pelagic fish species in the survey area with a total biomass, which was down from the previous two years but still high. They were widely distributed in the waters less than 100 m deep of the survey area, with highest densities from the Eddystone Bay to east of the Isles of Scilly, with the biggest fish further west. Sardine were again observed in the Bristol Channel being composed of both the largest and small size classes seen. Most sardine were between 0 and 2 years old with decreasing numbers at older ages (max. seven years old).

The northern anchovy (*Engraulis encrasicolus)* biomass (45,617 tonnes) in PELTIC was the highest of the timeseries for the total area. Anchovy was mainly distributed in the north-western waters of the western Channel, off the Eddystone Bay, between Land's End and the Isles of Scilly. Fish in these areas consisted of the larger specimens. Smaller numbers, consisting exclusively of smaller specimens (eight cm), were found in deeper waters of the Celtic Sea and the inner Bristol Channel. Anchovy is the shortest-lived small pelagic species in the study area and the oldest fish found during this survey were 2-year-olds; with the dominant cohort being the 1-year-olds. Two were caught in Southampton Water in early October (see the image by Robin Somes on the report title page). This fits the pattern of these fish leaving their breeding grounds in southern North Sea and coming along the south coast of England –

October - Dorset (Portland); November - Torbay and Plymouth; December - south coast of Cornwall down to Mount's Bay.

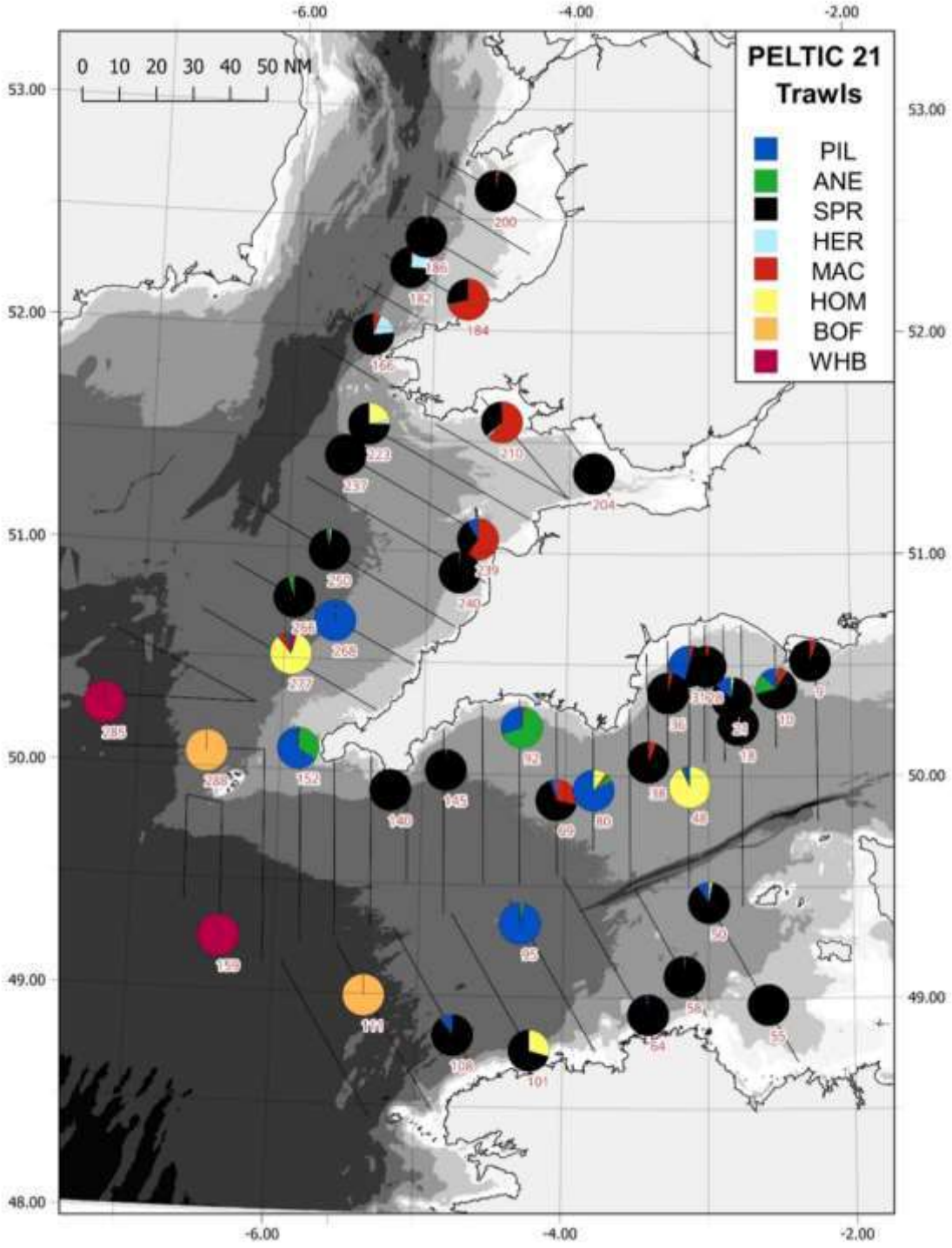

Figure 7.5. Pelagic trawl catches during the PELTIC 2021 cruise. PIL *Sardina pilchardus*; ANE *Engraulis encrasicolus*; SPR *Sprattus sprattus*; HER *Clupea harengus*; MAC *Scomber scombrus*; HOM *Trachurus trachurus*; BOF *Capros aper*; WHB *Micromesistius poutassou*.

In 2021 the Continuous Plankton Recorder team found some anchovy eggs in their Western Channel sampling this year, the very first time they have encountered anchovy eggs here. In late July, anchovy eggs and some yolk-sac larvae were found in qualitative plankton samples taken at Plymouth Marine Laboratory's L4 sampling station, south of Plymouth. In mid-August there were a few anchovy eggs with formed larvae in a sample in a creek off the Yealm Estuary at Newton Ferrers.

After the first anchovy egg sampled locally, found at the L4 station in August 2018, they were found higher numbers in August 2020 and over the following 3 weeks. Anchovy eggs were also found at the same time in 2020 in samples taken for Flowcam analysis.

These data suggest the otherwise unknown existence of a spawning stock of anchovies somewhere in the area. This then raises the question of their relationship to the known breeding populations in the southern North Sea (Dutch estuaries, Thames estuary) and those in the Bay of Biscay.

Herring (*Clupea harengus)* numbers were higher than in previous two years and were found mainly in Lyme Bay and the inner Bristol Channel, mixed in with sprat, all of which were juvenile with a mean modal length of 11 cm.

[PELTIC 2021; Angus Atkinson; Robin Somes; Andrea McEvoy; Dave Conway; Jeroen van der Kooij.]

Boarfish. The PELTIC survey found boarfish (*Capros aper*) in large numbers in the deeper waters of the western Channel, particularly off the Isles of Scilly, although also further south this year. This area appears to be at the eastern-most range of this species, which is typically associated with the deeper waters of the North-eastern Atlantic Ocean. This year, a larger range of sizes was found, from juveniles (modal length of 2 cm) to the larger specimens but with intermediate sizes as well.

In January, over 300 were found stranded on Porthcressa and Little Cressa beaches on St Mary's, Scilly. Individuals washed up at Newquay, South Devon and Kimmeridge in March and April, and a smattering along the southern beaches of Devon and Cornwall in November. These may be natural strandings or discards washed over from commercial vessels.

[PELTIC 2021; Ren Hathway; Keith Hiscock; Devon Live; Bryz Auger; Ziggy Austin.]



Plate 7.2. *Mola mola* St Aldhelm's race Dorset. Image: Matt Doggett

Sunfish. There were fewer reports of ocean sunfish (*Mola mola*) in 2021 than in the previous year. They were encountered from mid-May until early September, from Isles of Scilly to the Isle of Purbeck. Off Penzance and St Ives, they were seen most days in May, were less common after mid-July; but were reasonably abundant off Plymouth in July.

There were 10 seen off Scilly compared with 18 last year, the maximum being four around the Western Rocks in August.

Outside our area one stranded in Redcar in January, and several were seen in the Moray Firth in August.

[Isles of Scilly Bird and Natural History Review 2021; Josh Symes; Duncan Jones/Marine Discovery; Simon Thomas; Rob Hughes/Devon Sea Safari; Alan Bailey; Alex Parker; Matt Green: Cornish Birds; Matt Doggett, Christine Allen; Jamie Dickerson; Chris Rickard; Graham Hunter; Barry Paskins; Simon Thomas.]

Demersal Fish

European Sturgeon. In the autumn one medium-sized European sturgeon (*Acipenser sturio*) was caught by a commercial fishing vessel and released alive off Brixham. Another was captured off Looe about the same time, and there are reports of two more catches in that area around that time.

The European sturgeon is a critically endangered species (IUCN Red List, 2021) with a single breeding population in the Gironde River, France. Sturgeon leave France in June and some appear to feed in an area from Lyme Bay to south-east Cornwall in the autumn and early winter. Of six reports in recent years five of the fish have appeared off the English south coast (UK Sturgeon Alliance, 2021), and at least a further three subsequently.

There is evidence of a sturgeon stock, at least at some part of the year, in the area Lyme Bay to south east Cornwall. There are enough reports now from these locations and others to start to speculate on marine aggregation areas, presumably associated with suitable feeding substrata?

One complication is that of the six fish examined three were positively identified as European sturgeon (*Acipenser sturio*), and the other three as Atlantic or Baltic sturgeon (*Acipenser oxyrinchus*). It is now known that both of these very similar species can be found in local waters and great care will be needed to establish which species of sturgeon are caught, as well as to returning them safely to the water.

UK Sturgeon Alliance (2021) *The Common or European Sturgeon* Acipenser sturio *(L., 1758). An evidence report of the history and status of the species in Great Britain*.

[Madalein Bradshaw; Simon Toms; UK Sturgeon Alliance; Steve Colclough]

Clupeids

In September a shad (*Alosa* sp.) was filmed in a seagrass bed at Studland Bay. The exact species could not be determined from the film.

[Ken Collins]

Argentines

An argentine or lesser argentine (*Argentina sphyraena*) was caught in a trawl in 60 m about eight miles south of Fowey in April. These are common offshore deep water fish, but are seldom encountered in our coastal waters.

[Richard Chapman; Andy Giles; Robin Somes.]

Sea Trout

An angler caught two sea trout (*Salmo trutta*) in a Cornish estuary in January and another was caught and released by an angler at Porthkerris in April. Two of these fish were around 1.4 kg. One was found dead on Porth Beach, Newquay, in January

[Robert Burnell; Deanna Austin; Tracey Williams]

Gadoids

Blue whiting (*Micromesistius poutassou*) is a common mesopelagic fish in deeper waters of 100 to 300 m, over depths of 1000 m or more. However, in July, one was caught 6 miles south of the Scilly Isles in 89 m. At around the same time juveniles were common off Plymouth. For the first time since 2012 the PELTIC survey caught significant numbers of blue whiting at two stations in similar areas to the boarfish. The modal length of 17 cm suggests that these are predominantly juveniles.

Hake (*Merluccius merluccius*) is a common fish in the deeper water fisheries to the west of the region, but large hake in the coastal waters are extremely rare. In July anglers caught several, including one of 7.12 kg, which broke the Cornish record, 15 miles south east of Looe. These fish were full of juvenile blue whiting that they were feeding on.

The tadpole fish or lesser forkbeard (*Raniceps raninus*) is not rare, but because they live in small caves and crevices, they are seldom seen or caught. One was caught in a lobster pot off the North Cornwall coast in May.

[Paul Whittaker; CEFAS/PELTIC 2021; Simon Thomas; Dan Margetts; Ben Lowe.]

Skipper

The skipper or Atlantic saury (*Scomberesox saurus*) is a fish of the open ocean, occasionally coming into coastal waters. One of about 36 cm was caught from the Mount Batten Breakwater, Plymouth Sound, in June.

[Matthew Parry]

Dories

What were probably the fourteenth and fifteenth sailfin or silver dories (*Zenopsis conchifer*) for Britain were caught south of Gwennap Head in the first half of 2021. This is a species that has been shown to be extending its range

northwards (Quero, 1998), and this is supported by our local data; five having been recorded before 2000 and ten since. A sixteenth specimen, and probably the northernmost ever, was caught off Rockall in June 2021.

Quero J. C. (1998) *Changes in the Euro-Atlantic fish species composition resulting from fishing and ocean warming.* Ital. J. Zool., 65, Supp: 493-499

[Brackan Pearce; Solan Dodman]

Seahorses



Plate 7.3. A pair of *Hippocampus guttulatus* in Studland Bay. Image: Neil Garrick Maidment/Seahorse Trust**.**

A total of at least 77 seahorses were reported in the area, from Hampshire to west Cornwall. 44 of these were spiny or long-snouted seahorse (*Hippocampus guttulatus*) and 30 short-snouted seahorses (*Hippocampus hippocampus*); with a few not recorded to the species level. 26 were reported from Hampshire, one from the Isle of Wight, 45 from Dorset, three from Devon (one of these unusually from North Devon), and two from Cornwall. The *H. guttulatus* had a fairly even sex distribution, but the *H. hippocampus* were mainly females.

Unfortunately, there were mass strandings from February to April, mainly of short-snouted seahorses. It has been suggested that these were due low sea temperatures and stormy weather.

The first spiny seahorse was a large individual in Southampton Water in early January. They continued to occur here until late November. With the exception of one encountered in a seagrass bed near Plymouth, all these reports originate from Dorset or Hampshire. The last of the year was one found alive on Bournemouth Beach on New Year's Eve.

In June two males were observed fighting over a female in a seagrass bed in Weymouth Bay

A mature female short-snouted seahorse (*Hippocampus hippocampus*) was seen in the Solent in February, and another found dead near Sandown on the Isle of Wight. Most of the mortalities were reported from Dorset, but individuals were found in North Devon, at Wembury Point in south west Devon, and Porthcothan Bay in north Cornwall. Another was found stranded at Par Beach near St Austell in August. Live ones continued to be seen in Southampton Water until early October.

An important area for both species is the Studland Bay Marine Conservation Zone, where a Habitat Protection Strategy has now been put in place to protect the sensitive seagrass beds and seahorses. In particular, 2021 saw the introduction of a voluntary no anchor zone and the installation of Ecomoorings, which reduce the damage of mooring to the seagrass meadows. Much of this was funded by Boatfolk.

[Neil Garrick-Maidment/The Seahorse Trust; Robin Somes; Marine Strandings Network/Cornwall Wildlife Trust; Wembury Marine Centre; Mark Parry/Ocean Conservation Trust.]

Flying Gurnard



Plate 7.4. The flying gurnard caught off Plymouth. Image: Tom Pengelly.

A flying gurnard (*Dactylopterus volitans*) was trawled up from sandy ground at 80 m depth, south of Plymouth, on 6th October. The fish, which was about 33 cm, was returned alive and swam off. This was the 4th British record (and first since 2004), and the 15th for the North East Atlantic.

[Beshlie Pool; Tom Pengelly.]

Rockfish

Bluemouths (*Helicolenus dactylopterus*) are non-venomous cousins of the scorpionfish, which are normally middle to deep water fish; but a while back they were being caught in fairly shallow water off Newcastle and Norfolk. In January one was caught off Brixham, and in September one, with unusual colouration, was brought up in a crab pot from 100 m off the east side of Portland in Dorset.

[Andy Giles; Darren Trent.]

Serranids



Plate 7.5. A comber caught about 5 miles off Bigbury Bay on the East Rutts on 9th September. Image: Jeff Pearce.

The comber *(Serranus cabrilla*) is the smallest European member of the Grouper family Serranidae. There used to be one or two reports every three or four years, but lately there have been one to four records each year. This is possibly an indication of an extension of its range.

In 2021 two were caught in two days in Guernsey, and in September another about 5 miles out in Bigbury Bay on the East Rutts. This latter one was small (c.13.5 cm); if it were a 1-year class fish it could indicate that this species may now be breeding in NW Europe.

[Richard Seager; Jeff Pearce.]

Jacks and Trevallies (Carangids)

Three pilot fish (*Naucrates ductor*) were recorded this year. Two with blue sharks off Penzance in June and September, and one caught by a net fisherman in Weymouth Bay. Blue sharks are not known to occur in Weymouth Bay, but porbeagles do.

In July, a bass angler in shallow water off south Cornwall captured an amberjack (*Seriola* sp.), and subsequently released it alive. From the photos available it is clearly not an almaco jack (*Seriola rivoliana*); it was just suggested that it could be a lesser amberjack (*Seriola fasciata)*, but this species has never been recorded in Britain or on the Atlantic coast of France. Hence the most probable identification is of a greater amberjack (*Seriola dumerili*).

[Mark Deeble; Dylan Hudson; Samuel Iglesias; Blue Shark Snorkel Trips/ Josh Symes; Lo Kie Adventures /Keiren Faisey; Josh Simmonds; Bob Summerhayes.]

Sea Bream

A fairly small bogue (*Boops boops*) was caught in the Penzance area in November.

This year saw the first rod-caught common two-banded sea bream (*Diplodus vulgaris*) in both the shore and boat categories. A 680 g fish was caught off Padstow in September, and then one of 83 g from the shore of Sark in October. One of 1011g was caught by a commercial fisherman off Guernsey in January 2009.

A saddled sea bream (*Oblada melanura*) caught of Weymouth in November was the second British record (first was St Austell in July 2000).



Plate 7.6. Couch's Sea Bream at night. Falmouth on 12th November. Image: David Morgan.

Couch's sea bream (*Pagrus pagrus*) is now widespread in Devon and Cornwall in suitable areas. Two were seen on a night dive in Plymouth Sound, showing nocturnal colouration in March, a number of similar ones were photographed at night off Falmouth in November.

Gilthead sea bream (*Sparus aurata*) are similarly widespread in the area, at least for most of the year, and good numbers were caught off Cornwall from March to November with quite a few over 3 kg.

Black sea bream (*Spondyliosoma cantharus*) was commonest in Dorset, but also seen in Plymouth Sound and Cornwall, including along the north coast of Cornwall.

[Lukas Motiecius; British Record (rod-caught) Fish Committee; Mike Toogood; Shane Huxster; Richard Lord; Steve Fallaize; Peter Tinsley; Paul Burridge; David Morgan; Mike Etheredge; Mark Griffiths; Tom Collins; Keiren Faisey; David Lawry; Nicholas Tops; Matt Doggett; Tim Laws; Carl Pratt; Ian Clark.]

Wrasse

Baillon's wrasse (*Crenilabrus bailloni*) appears to be well-established in Dorset, being recorded from Portland to Poole Harbour, including in the Portland Maerl Beds, from July to October. Records of this species would be most welcome from other areas.

In June, courtship and probable mating was observed of ballan wrasse (*Labrus bergylta*) on the scuttled ex-HMS *Scylla*.

Divers reported (at least two) lice on wrasse at Hilsea Point Rock in June. It seems that their occurrence continues to be significant with more *Anilocra* lice on fish than historically, mainly on corkwing wrasse (*Symphodus melops*).

[Charlotte Bolton, Lin Baldock, Ray Scott & Tina Scott (all of Dorset Seasearch); Kim Vaudin; Chris Rickard; Keith Hiscock; Paul Naylor.]

Blennies

The butterfly blenny (*Blennius ocellaris*), with its ostentatious dorsal fin, was seen in Weymouth Bay in June and July. Concern has been expressed that this species may be declining due to the common whelk fishery removing all whelks over 40 mm in size, leaving none for these shell nesters. Some were seen off Falmouth in September using discarded bottles as shelters.

Despite first being seen in Britain in 2007, the variable or ring-necked blenny (*Parablennius pilicornis*) now appears well established from the maerl beds of Carrick Roads, Falmouth, to the Lulworth Banks, Dorset. They were seen breeding in 2021 at Lulworth and in Plymouth Sound, but presumably breed in other suitable locations throughout the area.

No reports were received during the year of the Portuguese or red blenny (*Parablennius ruber*)

The Yarrell's blenny (*Chirolophius ascanii*) is not a true blenny. It is generally a more northern species, but was recorded in July on the wreck of the *Warrior II* in Dorset, for the second time in three years.

[Roger Forster; Mike Markey; Charlotte Bolton; Lin Baldock; Hugh Waite; Ben Bassett; Holger Schuhmann; Keith Hiscock; Paul Naylor.]

Gobies

A giant goby (*Gobius cobitis*) was identified from Covean, St Agnes in Scilly in September. There were several more reported subsequently, but the identity of all of these was not confirmed.

Couch's goby (*Gobius couchi*) is a fish of shallow sheltered water and was reported from the Redcliff area of Weymouth Bay on three occasions in May. The distribution of this species is little-known.



Plate 7.7. A Steven' goby in Firestone Bay, Plymouth Sound. Image: Paul Naylor.

Steven's goby (*Gobius gasteveni*) was originally considered as an offshore species of deeper water, but recently has been found in inshore localities from Dorset to Cornwall. The easternmost record came from Weymouth Bay beyond Portland Bill, and in November and December Steven's goby were caught on two dates in St Mary's Harbour, Scilly. These are the first records of this species from the islands.

In December a small population of this goby was found in Firestone Bay, Plymouth Sound, with about ten individual fish being seen.



Plate 7.8. Guillet's goby at Portland on 15th December. Image: Lin Baldock.

With a maximum size of 25 mm, Guillet's goby (*Lebetus guilleti*) is probably the smallest marine fish in Europe. With their small size and beautiful colouration, they are perfectly camouflaged in their normal habitat of dead shells, maerl and pebbles; hence they are probably generally overlooked. They are frequently only noticed when divers review their photos on land. However, Lin Baldock's sharp eyes picked out two this year in Dorset, one in April off Worbarrow and another just outside Portland Harbour in December.

[Isles of Scilly Bird and Natural History Review 2021; Lin Baldock; Mike Markey; Holger Schuhmann; Matt Slater/Shoresearch Cornwall; Stuart Brown, Paul Naylor.]

Triggerfish

Whilst fewer sightings of grey triggerfish (*Balistes capriscus*) were reported by divers than in previous years, the overall number of fish reported was the highest of recent years, with a total of 38 sightings. Obviously, it is difficult to determine whether there was an increase in the local populations, or merely improved reporting. A spearfisherman responded that they had been plentiful in 2020.

As would be expected the first was one found dead on Porthtowan Beach, at the beginning of January. The next was most unexpected, with one seen swimming around the wreck of the *Epsilon* in Falmouth Bay on 11th April, when the sea temperature was around 10°C. It appeared lethargic and 'a bit tatty'.

From late June to September, twenty-nine sightings were reported from Bournemouth to the Lizard, especially around Plymouth and Falmouth; with two being filmed in Jersey. A further three were seen off Looe in November.

In November and December four were found dead on beaches in North Cornwall, St. Ives and the Isles of Scilly.

The sizes ranged from 40.5 cm to 20 cm and the weights from 1.51 kg to 0.58 kg. Once again, no small individuals were reported.

In August, one of these grey triggerfish was shot by a spearfisherman off Rame Head. It had a goose barnacle *Conchoderma virgatum* attached to the base of the first spine of the first dorsal fin. It has been suggested that these barnacles attach to spines because mucus prevents them from attaching to the main body of these fish. The same fisherman had found one on a *Balistes* in 2020. (The image has been included in the Seashore and Seabed chapter.)

[Cornwall Wildlife Trust/Marine Strandings Network; Matt Green; Graeme Parker; Phil Lockley; Ian Craddock/Dorset Seasearch; Nick Collins; Sammy Blampied; Emma Kenyon/UK Triggerfish Project; Isles of Scilly Bird and Natural History Review 2021.]

Pufferfish

An oceanic pufferfish (*Lagocephalus lagocephalus*) was found on the shore at Downderry, south east Cornwall in October. This is the commoner of the two species of pufferfish that have been recorded in the UK. They turn up every few years, singly or in small numbers, often in autumn: the previous one being off Brixham in September 2019.

[David Drew; Matt Slater; Andy Giles]

Lionfish

In September, two photos were posted on Facebook of an angler on Chesil beach with a Lionfish (*Pterois* sp.). From the photos the fish appears to be *Pterois volitans* or *Pterois miles* or a very similar species, but unfortunately the taxonomy and identification of species in this genus appears rather confused and confusing.

This report was widely questioned, especially as the fish appeared to lack a tail. However, there have been a number of subsequent accounts of them having been seen by spearfishermen, and unsubstantiated reports of commercial fishermen coming across them.

Should these Indo-Pacific fish continue to be found locally, it could become a serious problem. They have a voracious appetite and when they have become established in the western Atlantic and other parts of the world where they do not have predators, they have had a devastating impact on the resident marine ichthyofauna (Kleitou *et al*., 2022).

Kleitou, P., Hall-Spencer, J., Rees, S., Kletou, D. (2022). *Guide to Lionfish Management in the Mediterranean*. University of Plymouth

[Matt Green; Peter Liptrot; Matthew Kiddie, James Wright; Geoff Halls.]

Turtles



Plate 7.9. Kemp's Ridley turtle found at Appledore on 11th December. Image: James Barnett.



Plate 7.10. Young loggerhead turtle found on Buck's Mill Beach, North Devon on 25th January. Image: Mary Breeds.

After the low numbers of turtles reported in 2020, the numbers recorded generally in Britain and Ireland were much higher; the most for four years and more than double the number for 2020. However, surprisingly as the low figure of the previous year was partially attributed to reduced human activity, the records from the south-west were only slightly above those for 2020.

Table 7.1. Occurrence of Turtles 2017 to 2021.

	South West England			Britain and Ireland		
	Leatherback	Other and unidentified	Total	Leatherback	Other and unidentified	Total
2021	3	5	8	19	14	33
2020	4	1	5	9	5	14
2019	13	1	14	13	5	18
2018	17/18	2	19/20	17	2	19
2017	8	5	13	28	9	37

2021 was most unusual in the south west, in that for the first time on record, more 'hardshell' turtles (loggerhead (*Caretta caretta*), Kemp's Ridley (*Lepidochelys kempii*), green (*Chelonia mydas*), olive Ridley (*Lepidochelys olivacea*), or hawksbill (*Eretmochelys imbricata*) were reported than leathery turtles or leatherbacks (*Dermochelys coriacea*).

In our area the first of the year was a young loggerhead found recently dead in North Devon. In February a probable loggerhead of over one metre in length was seen swimming off St Ives, and in March a probable 'hardshell' in Mount's Bay.

In June leatherbacks were reported swimming at the Fleet in Dorset, South Devon and West Cornwall.

In December after Storm Arwen, several Kemp's Ridley turtles were washed ashore in Scotland and North Wales; a moribund one was stranded in North Devon and the remains of another found on the Somerset coast.

Table 7.2. Turtles in the South West in 2021.

Date (2021)	MTR Record	Species	Location	Status	Comment
25/01	T2021/01	Loggerhead	Buck's Mill, nr Clovelly, North Devon	Stranded	A juvenile. Very fresh, possibly stranded alive and then died. Mary Breeds and MTR.
12/02	T2021/02	'Hardshell'	Off the NCI Station, St Ives Island, North Cornwall	Alive swimming	Probable Loggerhead. Seen from shore at 150 metres. V. Stratton (Cornwall Birds) and Emily Cunningham (MSN)
13/03		'Probable Hardshell'	Off Marazion	Alive	Seen 40m off the beach. Dan Jarvis
9/07	T2021/21	Leatherback	Butterstreet Cove near Chickerell, The Fleet, Dorset.	Alive	Reported by MCS
15/07		Leatherback	Between Dartmouth and Start Point	Alive	Originally entangled in a pot rope, but freed and swam away. Filmed by fisherman Paul Millman.
22/07		Leatherback	Off Porthcurno, inside the reef at the Runnel Stone, Cornwall	Alive swimming slowly	Josh Symes, IDed by Josh Howells on Coast Boat Trips. Appeared to have a small amount of fishing line entangled around it.
11/12	T2021/15	Kemp's Ridley	Northam Burrows, North Devon	Cold stunned	Taken to Blue Reef Newquay by BDMLR Medics but could not be saved. Right flipper shorter than the left and possessing an additional claw
17/12	T2021/20	Kemp's Ridley	East Quantoxhead, North Somerset.	Dead decomposed	Carapace with some soft tissue kept by the finder.

BDMLR - British Divers Marine Life Rescue; ERCCIS – Environment Record Centre for Cornwall and the Isles of Scilly; IoSWT – Isles of Scilly Wildlife Trust; MCS – Marine Conservation Society; MSN – Cornwall Wildlife Trust, Marine Strandings Network; MTR - British Isles & Republic of Ireland Marine Turtle Strandings & Sightings.

(A late report was received from **2020** of a probable leatherback found dead and badly decomposed on Flushing Beach, Falmouth in September. [MSN])

[Mary Breeds; V. Stratton (Cornwall Birds); Emily Cunningham; Dan Jarvis; Marine Conservation Society; Paul Millman; Josh Symes; British Divers Marine Life Rescue; Steve Matchett/Blue Reef Aquarium; Cornwall Wildlife Trust/Marine Strandings Network; Isles of Scilly Wildlife Trust; British Isles & Republic of Ireland Marine Turtle Strandings & Sightings; James Barnett.]

8. Marine and Coastal Birds South-West

Edited by Alex Banks, with contributions from Richard Archer, Mark Grantham, Vickie Heaney, Paul St Pierre and Ruth Porter

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Conclusions

- **Rat eradication is working** on South-West seabird islands. Burrow and cliff nesters on St Agnes and Gugh (Isles of Scilly) and Lundy continued to increase in abundance and expand into unoccupied areas.
- 2021 was apparently a **reasonably good year for seabird productivity for most pursuit-diving species on Scilly** (with anecdotal reports of baitballs in June and July, the peak chick-feeding season) but **more mixed on Lundy** for those species monitored.
- However, **kittiwakes continued to struggle** at the few remaining colonies in Devon and Cornwall.
- The **Dorset tern colonies also had a poor season**, with predation seemingly the main reason for low productivity / colony abandonment.
- Patterns of **non-breeding waterbird occurrence seemed fairly typical**, though there are localized changes – e.g. the **steep decline of black-necked grebes** in the Fal Estuary since 2012.

Introduction

Regular seabird productivity monitoring at the Isles of Scilly, Lundy, Straight Point (Devon), Portreath (Cornwall), Brownsea Island, Lodmoor, Abbotsbury and Chesil Beach (all Dorset) continued in 2021. This was augmented by abundance counts along the South Devon coast, the last of the sites in the South West to be surveyed for the national seabird census, which has now concluded. (Results are being prepared for publication by JNCC). The whole island count of Lundy was also completed.

In the non-breeding season, the long-running Wetland Bird Survey 'Core Count' scheme surveying birds mainly at roost on high tides continued to cover the majority of important estuarine and coastal sites in the South West. The Helford and Kingsbridge Estuaries are surveyed at low tide annually, and in 2021 both the Fowey and Hayle Estuaries were also surveyed at low tide.

Nesting seabirds

A summary of abundance and productivity records from across the South West is shown in Tables 8.1 and 8.2. Regional experts provide a breakdown of the 2021 breeding season in the sections below. (Future SWME reports will start to provide trend information once the national seabird census, Seabirds Count, publishes its results).

Isles of Scilly

Vickie Heaney, Seabird Ecologist, Isles of Scilly Wildlife Trust

Manx shearwaters

The Manx shearwater breeding population has increased from 22 pairs in 2013 (pre- rat eradication) to at least 82 pairs in 2021 (post- rat eradication). Survey methodology testing indicates the population may be greater still.

There have been further sub-colony site expansions – e.g. at Wingletang, uphill into boulders away from grazing pressure.

Fifty-five 'star-gazing' chicks were recorded (28 St. Agnes, 27 Gugh), none recorded pre-rat eradication. No fledging recorded at sub-colony on Bryher or Peninnis, St. Mary's with rat presence.

European storm petrels

Recorded breeding successfully again on St. Agnes and Gugh (first records 2015) including a new area on St. Agnes in boulders at Pedney Brow, Wingletang.

Continued cat predation (first recoded 2019), minimum 17 adult birds predated over three sites (Troytown, St. Agnes, Burnt Island & Gugh).

Eleven calling chicks recorded (seven on Gugh, four on St. Agnes).



Plate 8.1. European storm petrel. Image: Vickie Heaney.

Lesser black-backed gulls

LBBG colony on Gugh 397 pairs (875 in 2006) but regularly around 400 since 2012.

Drone surveys trialled on Gugh (and Samson) for both breeding pairs and fledging chicks using local contractor – initial results promising, but image resolution planned to increase to allow further analysis. Behavioural reaction seen at 80 m altitude on Samson but not at 30 m on Gugh.

Productivity was relatively high (0.88 – 0.94 chicks per pair).



Plate 8.2. Lesser black-back gulls on Scilly.

Herring gulls

Sub-colonies on Samson and in Hugh Town, St. Mary's showed differing productivity: 0.41 chicks per pair on Samson (n = 32) cf. 1.65 chicks per pair at the Hugh Town rooftop sub-colony (n = 17).

Herring gull reaction to drone on Samson, similar to the lesser black-backed gull response.

Kittiwakes

Showed a brief interest on the east side of Gugh but no recorded nesting attempts meaning the colony is now effectively abandoned.

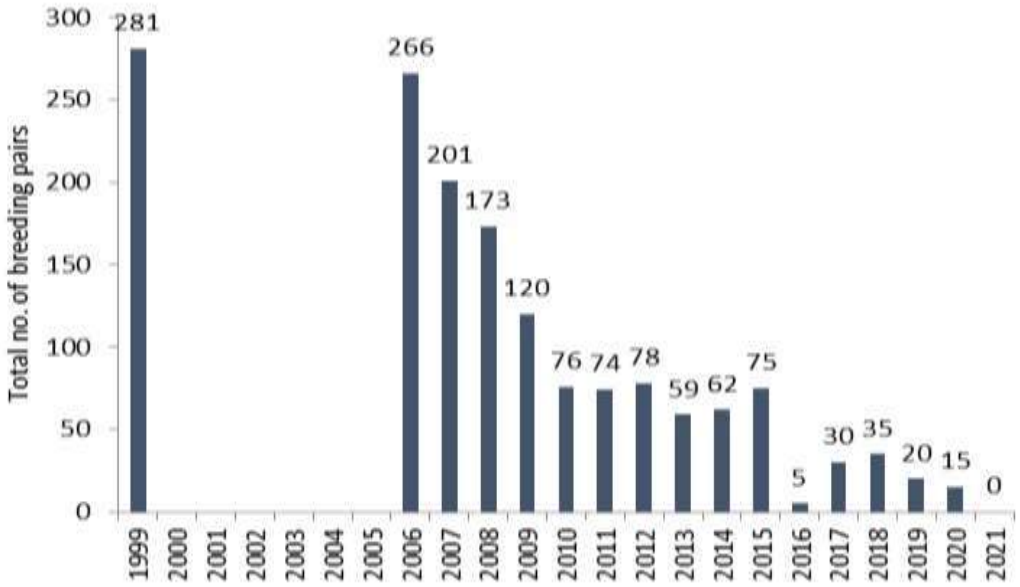

Figure 8.1. Kittiwake breeding numbers in Scilly

Fulmar

At selected sub-colonies Menawethan (n = 43) and Daymark (n = 46) productivity was reasonable, ranging from 0.40 to 0.54 chicks per pair.

Common tern

Eighteen pairs laid on the south end of Annet mid to late June (UK generally mid-May), three fledglings recorded later in mid-August (min 0.17 chicks per pair). First successful nesting since 2017.

Puffins

Forty-five birds recorded on Annet (50 in 2006, 31 in 2015, 42 in 2019) – relatively stable.

Shags

Shag numbers were relatively stable on Annet (106 pairs).

Great black-backed gulls

Numbers were relatively stable on Annet (184 pairs).

Cornwall

Mark Grantham, Chairman, Cornwall Bird Watching & Preservation Society

- Small numbers of puffins seen around The Mouls (25 v 17 in 2020) and at least one fledged puffling.
- Porthmissen kittiwake numbers comparable to 2020 (328 v 360) but no productivity data.
- Similar pattern at Portreath (250 kittiwake nests 2020, 260 2021) but poor productivity (minimum 0.28 chicks per pair).
- Third year of near-total failure at the Trewavas Head kittiwake colony, though the small numbers of pairs that did produce chicks seemed productive (perhaps 1.46 checks per pair).

- Great black-backed gull numbers stable on Looe Island (85 pairs) but productivity continuing to drop (now 0.42 chicks per pair); also thought to be a poor year for productivity on Mullion Island.
- Greatest recorded number of cormorants on Mullion Island (73 nests) and second greatest numbers on Looe Island (48 pairs).



Plate 8.2 (a & b) Kittiwakes at Porthmissen, Cornwall. Images: Mark Grantham.

Lundy

Paul St Pierre, RSPB

All island survey

Six people visited between 1st and 10th June 2021, with support from Lundy volunteer wardens. This was a repeat survey of Guillemot, Razorbill, Puffin, Kittiwake, Fulmar, Shag, Lesser black-backed Gull, Herring gull and Great black-backed gull. Table 8.1 presents results and changes since 2017 and 2000.

Table 8.1. Count data for seabirds at Lundy in 2021.

Species	Seabird 2000	Last survey 2017	2021	% Change since 2017	% Change since 2000	% National trend 2019*
Guillemot	2,348	6,198	9,880	+59%	**+320%**	**+60%**
Razorbill	950	1,735	3,533	+104%	**+272%**	**+ 37%**
Puffin	13	375	848	+126%	**+6,423%**	unknown
kittiwake	237	238	284	+19%	+20%	-44%**
Fulmar	190	227	265	+17%	+40%	-33%**
Shag	56	55	96	+75%	+71%	-34%**
Herring gull	753	229	248	+8%	-68%	-56%
Lesser black-backed gull	328	132	91	-31%	-80%	-62%
Great black-backed gull	23	46	21	-54%	-40%	-59%
All Species	5,034	9,235	16,271	76%	223%	unknown

*From JNCC website

** For 21

The west of the island, especially around Jenny's Cove, is of especial importance for cliff-nesting birds. Total numbers of breeding seabirds now exceed 27,000 and have increased at each survey since rat eradication. In the nadir of the early 1980s, seabird numbers struggled to exceed 5,000.

Breeding productivity

Guillemot and puffin productivity was similar: the former returning 0.59 chicks per pair and the latter 0.62. Fulmar productivity was above the national average but still only 0.47 chicks per pair. However, kittiwake productivity, in common with other South West sites, was again poor at 0.18 – 0.24 chicks per pair.

Mainland Devon

Ruth Porter & Alex Banks

Straight Point

It was another poor breeding season for the kittiwakes at Straight Point, Exmouth. Early season nest counts were promising, with 231 Apparently Occupied Nests in June 2021. As the season progressed, large parts of the colony had clearly failed, with abandoned nests and birds no longer incubating. The birds nesting in perhaps the least predator-accessible section of the colony fared well, producing one chick per pair, which was typical of the colony as a whole in 2018 and 2019. However, in 2021 overall productivity of 0.39 chicks per pair was much more similar to 2020 (0.43 chicks per pair). Predation, perhaps by peregrines, great-black-backed gulls and / or corvids, is thought to be the main issue.

South Devon seabird surveys

In June 2021, a small grant from the Seabird Group allowed a boat survey to take place, filling in the remaining gaps in coverage for the national seabird census, Seabirds Count. We covered the coastline, rocks and islands between Plymouth and Start Point. Full results appear in The Seabird Group newsletter (reference to be provided), but in summary most species had seen declines over the past twenty years.

Herring gull and shag numbers in particular were often greater than 50% lower, and, in some places, had disappeared completely.

Torbay

Thirty apparently occupied kittiwake nests were recorded at Berry Head, Brixham, and approx. 300 guillemots were observed on the Ore Stone.

Dorset

Richard Archer, Conservation Officer, RSPB

Brownsea Island

Luke Johns from DWT reported very low numbers of Sandwich terns in 2021 year compared to most years but some persistent great black-backed gulls (GBBG) played havoc for a while. Fifty-seven Sandwich tern pairs produced 40 fledglings, 0.7 chicks per pair.

174 Common tern pairs produced 76 fledglings, 0.4 chicks per pair (GBBG predation from same pair).

193 Black headed gull pairs produced 176 fledglings, 0.9 chicks per pair.

11 GBBG pairs produced 19 fledglings, 1.7 chicks per pair.

'Gull islands' off Holton

A Birds of Poole Harbour Team led by Paul Morton managed to visit the islands for the first time since 2018 and logged 109 pairs of Mediterranean gulls and 3,706 pairs of black-headed gulls.

This is down on the 2018 estimate of 155 Mediterranean gull AONs and 4,415 black-headed gull AONs. The reasons for this are unclear.

[N.b. these are not Giggers Island as reported in 2021.]

Coastal freshwater sites (Lodmoor & Abbotsbury)

Lodmoor

Common tern – 50 pairs produced 80 fledglings, 1.6 chicks per pair.

Black-headed gull – no figures available for 2021.

Abbotsbury

Common tern - 25 pairs produced c. 20 fledglings, approx. 0.8 chicks per pair.

Black-headed gull - 25 pairs produced c. 50 fledglings, approx. 2 chicks per pair.

Chesil Beach

Little terns - a minimum of 48 pairs made 65 nesting attempts and laid 155 eggs from which at least 102 chicks hatched. Only three young fledged due to high levels of kestrel predation.

(Ringed plover – eight pairs nested producing only two fledglings, again due to kestrel predation).



Plate 8.3. Little tern on the Fleet lagoon ringed as a chick at neighbouring Chesil Beach in 2017. Chesil Beach Little Tern Recovery Project. Image: Chesil Little Tern Recovery Project.



Plate 8.4. Urban herring gull, Brixham. Image: Kevin O'Donoghue.

<u>Urban gulls</u>

Twenty-five more 1 km^2 squares were visited in 2021 (Brixham, Exeter, Exmouth, Kenton, Plymouth, Starcross, Teignmouth). Herring gull is most commonly recorded species in these coastal towns and cities. These data are feeding into national estimates of urban nesting gulls.

Table 8.2. Count data for south west counties held by SMP database for 2021. CA: great cormorant; SA: European shag; GU: common guillemot; RA: razorbill; PU: Atlantic puffin; F.: Northern fulmar; LB: lesser black-backed gull; HG: herring gull; GB: great black-backed gull; KI: black-legged kittiwake; CA, SA, LB, HG, GB, KI – Apparently Occupied Nests; F. – Apparently Occupied Sites; GU, RA, PU – individuals.

	CA	SA	GU	RA	PU	F.	HG	LB	GB	KI	CN	TM	MX	*Total*
Cornwall	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**
Mount's Bay, Cornwall	1							1						2
Devon	**29**	**144**	**11071**	**3533**	**848**	**295**	**461**	**97**	**60**	**545**	**0**	**0**	**0**	**17083**
Berry Head to Sharkham Point SSSI	0	12	891				120			30				1053
Bigbury Bay	0	1				2	14	0	1					18
Clovelly to Hartland Quay							11		1					12
Great Mew Stone (Island)	20	16				22	9		37					104
Lundy		96	9880	3533	848	265	248	91	21	284				15266
Northern End of Torbay	9	1	300				25	6						341
Noss Mayo to Erme Estuary	0	7				4	10		0					21
Salcombe to Start Point	0	0				0	10		0					10
Sidmouth to Beer		11				2	12							25
Straight Point and Otterton Ledge to Big Picket Rock							2			231				233
Isles of Scilly	**0**	**106**	**0**	**1**	**45**	**48**	**45**	**397**	**184**	**0**	**36**	**7**	**82**	**951**
Isles of Scilly Archipelago										0	18			18
Isles of Scilly SPA		106		1	45	39	22	397	184	0	18	7	46	865
St Agnes Island		0				9	6	0	0	0			36	51
St Mary's							17							17
Grand Total	**30**	**250**	**11071**	**3534**	**893**	**343**	**506**	**495**	**244**	**545**	**36**	**7**	**82**	**18036**

Table 8.3. Productivity data (chicks per pair) for south-west counties held by SMP database for 2021. Where >1 measure from a site, average is presented. Green cells show rates exceeding national average values, red below national averages, orange at (or very near) average values (Horswill & Robinson 2015). No data for storm petrel. Abbreviations are as in Table 10.1., plus CN: common tern; TE: Sandwich tern; BH: black-headed gull.

	PU	GU	F.	KI	CN	BH	TE	GB	HG	LB	MX
Devon											
Lundy											
St Marks Stone		0.59									
Jenny's Cove	0.62										
Aztec Bay				0.18							
¾ Wall Buttress				0.24							
Gannet Rock			0.47								
Straight Point				0.39							
Dorset											
Brownsea Island					0.44	0.91	0.7	1.73			
Isles of Scilly											
Gugh										0.91	0.59
Samson									0.41		
St Agnes											0.78
St Mary's (Hugh Town)									1.65		

Noteworthy information for non-breeding birds

Devon Wetland Bird Survey (WeBS) summary

Pete Reay

In 2021, 85 species of wildfowl and waders were recorded on WeBS counts in Devon (cf. 78 in 2020), comprising 55 wildfowl and 30 waders. An additional 14 species comprised: Kingfisher (a WeBS species) and 12 gulls and terns (optional WeBS species).

There were no national rarities, after three in 2020, but 'Devon A' species comprised Green-winged Teal (Matford), Lesser Yellowlegs (Avon Est), Night Heron (Slapton) and Pectoral Sandpiper (South Huish). Site rarities are often only obvious to a site's counter, and none were flagged in 2021.

Twenty-two species were recorded at only a single site, but at the other end of the scale, Mallard was, as usual, the most widespread species, occurring at 71 sites, followed by Canada Goose at 65, four others at 50 or more, and another nine at more than 20. Among the waders, only Snipe at 25, occurred at more than 20 sites, though Common Sandpiper occurred at 20, and Dunlin and Curlew at 19. Gulls seem ubiquitous, but Herring Gulls were only recorded at 54 sites and Black-headed Gulls at 41.

The most widespread species are often not the most abundant. Thus, for example, Grey Heron occurred at 57 sites, but the maximum monthly count was only 115, whereas the maximum monthly count for Dark-bellied Brent Goose was 1,611, but it was only recorded at six sites. Six wildfowl species had monthly totals >1,000, the highest being Wigeon with 6,053 in October, as did six species of wader, the highest being 3,913 Oystercatchers in October.

However, both were eclipsed by 7,196 Black-headed Gulls in August and 5,199 Herring Gulls in November, and that excludes the Exe Estuary, where annual gull roost counts record several thousand birds.

Cornwall

Black-necked grebe numbers continue their steep decline on the Fal Estuary, with a peak of just four birds in 2021 (>250 in 2012) (via Wetland Bird Survey).

A poor year for sea-watching in Cornwall, with fewer species and smaller abundances of typical seabirds in the non-breeding season (M Grantham).

Reference

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9. Seals across the south-west

Editor: Sue Sayer

Contact: sue@cornwallsealgroup.co.uk

Authors: Sue Sayer, Kate Williams, Anthea Hawtrey Collier and James Barnett; Gareth Richards; Rosie Ellis, Lucy Mortlock, Chloe Woolfenden, Eleanor Grover and Dean Woodfin Jones; Mel Broadhurst-Allen; Sarah Hodgson.

Abbreviations: BDMLR - British Divers Marine Life Rescue; CWT - Cornwall Wildlife Trust; CWTMSN - CWT Marine Strandings Network; DEFRA - Department for Environment Food and Rural Affairs; ICES - International Council for the Exploration of the Sea; PIP/PID - Photo Identification Project; PPPP - People Protecting Precious Places; SRT - Seal Research Trust.

Conclusions

- Cornwall Seal Group Research Trust also became known as the **Seal Research Trust** but continued to sustain a high level of citizen science engagement completing an average of 14 surveys every day.
- In March 2021 it became **illegal to take, injure and kill** a seal in the UK as the netsman's defence was removed from the Conservation of Seals Act. In November 2021 it became a **legal requirement for all wild capture fisheries to report incidental bycatch of marine mammals** with 48 hours of returning to port. Throughout 2021 SRT led the **Seal Alliance campaign to make seal disturbance illegal** as it is with whales and dolphins. Campaign leaflets (64,000) and signs (106) were distributed across the UK
- **Coastal erosion** (potentially as a result of more frequent extreme weather events) continued to impact the major haul outs on the north coast of Cornwall.
- **Phenology shifts** were sustained with peak haul out continuing to be earlier and peak pupping continuing to be earlier and shorter.
- An emerging observation in 2021 was of **seals interacting with potting gear buoys**. This will need continued monitoring.
- SRT continue to **publish multiple internal and commissioned reports** (People Protecting Precious Places Report for DEFRA) as well as Marine Mammal Science publishing our collaborative partnership paper ('Post release monitoring of rehabilitated gray seal pups over large temporal and spatial scales').
- Thirty-two **Policy and planning consultations** were submitted giving seals a voice.
- Conservation actions included SRT, BDMLR and CWT Seaquest SW coordinating 49 volunteers who monitored marine activity for 365 hours during the **G7 summit** to provide daily marine disturbance mitigation advice for the security services to action.
- Some seal mothers demonstrated **site fidelity** whilst 'Ghost' who has shown the greatest site fidelity has her 18th pup in 19 years on the opposite coast.
- 13542 **individual seal identifications** were confirmed in 2021 (87% being re-IDs)
- **Life expectancy proxy monitoring**: seven seals from 2000 and four from 2001 were re-identified in 2021.

State of South-West Marine Ecosystems: Indicators

The following are suggested indicators of seal 'health' in south-west England.

- The **range or sphere of migration** of seals from Cornwall now links to the Isle of Man (450km away), Northwest Wales, Southeast Ireland, Southwest and South Wales, the Isles of Scilly, Northwest France, Northern France, North and South Devon, Dorset, Belgium and Holland (650km away).
- **Seal population** – undetermined as open population across the entire Celtic Sea.
- **Population demographics** – 65% of seals were adults and most adult seals were males (56%) and white coated pups under 3 weeks old represented 1% of all seals recorded with more pups on south coast sites than in previous years.
- **Common seal pupping -** successfully weaned in Cornwall in 2021.
- The highest number of **dead seals** were recorded by Cornwall Wildlife Trust's Marine Strandings Network (283 seals) including 170 white coated or moulted pups.

- 35 grey seals **post mortems** were completed by the James Barnett and the Cornwall Marine Pathology Team with 23 cases of infectious disease, six trauma and 'other' causes.
- **Entangled seals**: One hundred and thirty-four unique entangled seals were recorded in 2021 with 18 being observed in a single survey.
- **Bycatch**: The Special Committee on Seals Report for 2020 (released in 2021) contained a shocking statement about the state of seal bycatch. The most recent estimated bycatch of seals in UK fisheries was 474 animals (95% CI 354-911) in 2018. This was almost exclusively in gill net fisheries and 85% of the bycatch occurred in the southwest, in ICES area VII. Estimated bycatch levels in the Western Channel and Celtic Sea exceed the permitted biological removal for the combined grey seal populations of southwest England, Wales and Ireland (SCOS 2020). This implied a potential population level effect.
- **Disturbance**: In total, level 3 disturbance affected a shocking total of 1487 seals in 2021 from a minimum of one seal per incident to maximum of 79 in a single incident at West Cornwall. Disturbance has statistically significantly increased 2013 to 2021 in the summer with an average of 1106 seals seriously disturbed each year up to as often as once every 22 minutes.

What a year of major actions and achievements on top of all our routine surveys! Thanks to all our amazing and inspiring volunteers, core team, partners and funders we know we made a positive difference for our iconic and enigmatic seals in 2021! Great team effort!

Seal Research Trust seal report

Author: Sue Sayer and CSGRT volunteer survey team

Seals in the southwest UK during 2021 written and collated by Sue Sayer from Cornwall Seal Group Research Trust (CSGRT) sightings@cornwallsealgroup.co.uk

Organisation summary

In 2021 CSGRT registered a second working name with the Charity Commission - the Seal Research Trust (SRT) to be more inclusive and to better reflect the charity's work across the southwest region and nationally. SRT's Annual Report for 2021 is available online and can be downloaded by clicking this link: https://drive.google.com/file/d/1wt_6surZSd7X9R8jd0C2YXpqXu1uWbBl/view?usp=sharing .

Photo ID catalogues: By the end of 2021, the Seal Research Trust had 67 Photo ID Catalogues, maintained by dedicated volunteers, across the south-west – the main catalogue locations being shown as blue circles on the map below.

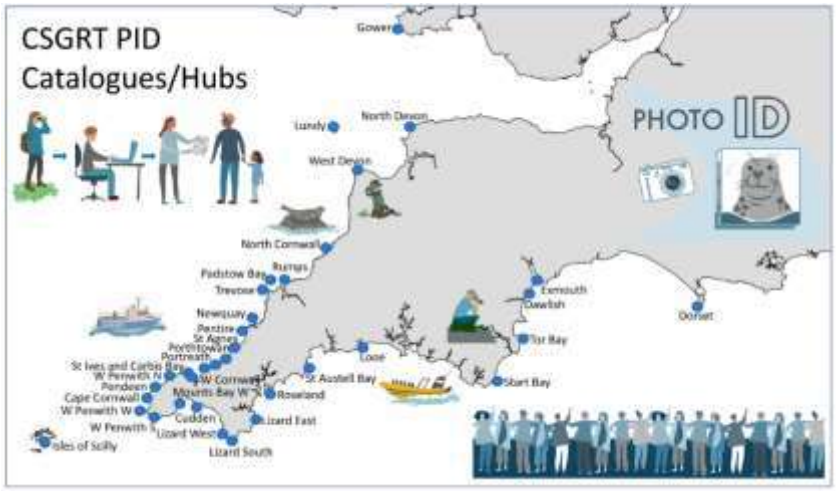

Figure 9.1. Locations for the main photo-identification catalogue hubs.

Surveys and volunteers: In 2021, we received records from 331 different volunteers, from which we were able to process 5235 discrete surveys (an average of 14 site-specific surveys every day) from 330 different locations. Our Sanctuaries at Seas Ranger, Sarah Millward, reorganised our coordination of our quarterly SW Seal Census of which

all four were completed in January, April, July and October, including ten boat based systematic Photo ID Project (PIP) surveys covering three different coastal transects 15 km in length. We were delighted to restart our Looe Island Photo ID Project and we were able to complete eight of these monthly seal, bird and butterfly surveys.

Emerging key issues

- Climate induced extreme weather events may be contributing to more rockfalls on seal haul outs and in pupping caves. This has changed site occupancy and requires continued monitoring.
- The phenology changes in site use noted in 2020 have persisted in 2021.
- There has been an increase in the number of reports of seals interacting with fishing gear – notably more hooked seals and seals playing with buoys.

Research reports and projects

Our volunteers (Jeremy Gilson, Mairi Young, Martin Gregory, Mel Broadhurst-Allen, Mike Taylor and Ross Wheeler) compiled data and reports on specific sensitive seal sites or on our census work.

Four student dissertations were completed along with eight PIP reports.

We were delighted when our SRT team finally got our 'Post release monitoring of rehabilitated gray seal pups over large temporal and spatial scales' paper published in Marine Mammal Science.

People Protecting Precious Places Project (PPPP) Report

SRT's Final PPPP Report (funded by Defra's Green Recovery Challenge Fund administered by the National Lottery Heritage Fund) was launched to government, statutory agencies and press on 06/02/22. The report contained four main sections: 2013 - 2021 Cornwall-wide data (33797 surveys); 2019 -2021 systematic surveys at four sensitive seal sites in Cornwall (190 in total), and St Ives Bay Stakeholder Group and Recommendations. The report is available here: https://drive.google.com/file/d/17O98h9khFefGYI4MD18RTFxOtBCsMaEq/view?usp=sharing.

Common seals and common seal pups

Our observations included 85 common seal sightings – most were single individuals up to a maximum of four individuals seen on 14th and 15th January in south Devon. Common seals were recorded all around the southwest coast at ten different locations from north Devon, at one site on the north Cornish coast, to the Isles of Scilly and then at six south coast locations as well as in south Devon. Most notable in 2021 was the exciting record of Cornwall's first witnessed common seal pup observed with its mother. SRT worked closely with local operators to avoid anything being posted about this historic pup online. This avoided any potential disturbance and ensured the pup thrived and was successfully weaned. We cannot be more grateful to everyone who saw this pup and avoided posting their exciting news online. This is the first surviving wild common seal pup we have recorded since 2000.

Grey seals and grey seal pups

On average, 9.54 seals were recorded across our 5235 surveys, ranging from a minimum of no seals observed to a maximum of 557 seals counted in a single survey. Of seals that we were able to classify according to their age, 65% were adults and 35% juveniles, moulted pups or white coated pups. Only adults can be reliably sexed, so of all adults that we could confidently sex, 56% were males and 44% females which is almost identical to 2020. White coated maternally dependent grey seal pups were recorded on 605 occasions at 36 different locations around the southwest. They represented just over 1% of all seals observed. The maximum number of white coated pups recorded at a single site was eight at West Cornwall East. Five or more seal pups were recorded 24 times at five different pupping sites at West Cornwall East and at three sites in the North Cornwall complex. We alerted our partners BDMLR about numerous pups and assisted in two rope-based rescues of white coats at West Cornwall. LP316 'Lucky bunting' a seal rescued in 2016 had her second pup, this time at a safe and remote site away from human activity. Our world record breaking seal mum S112 Ghost had her 18th pup in 19 years but breached her site fidelity tradition as this happened on Cornwall's south coast leaving her Beachmaster partner, DP2 'White Back C', without her on the north coast. More south coast pups were recorded than previously.

Seal sightings and notable events

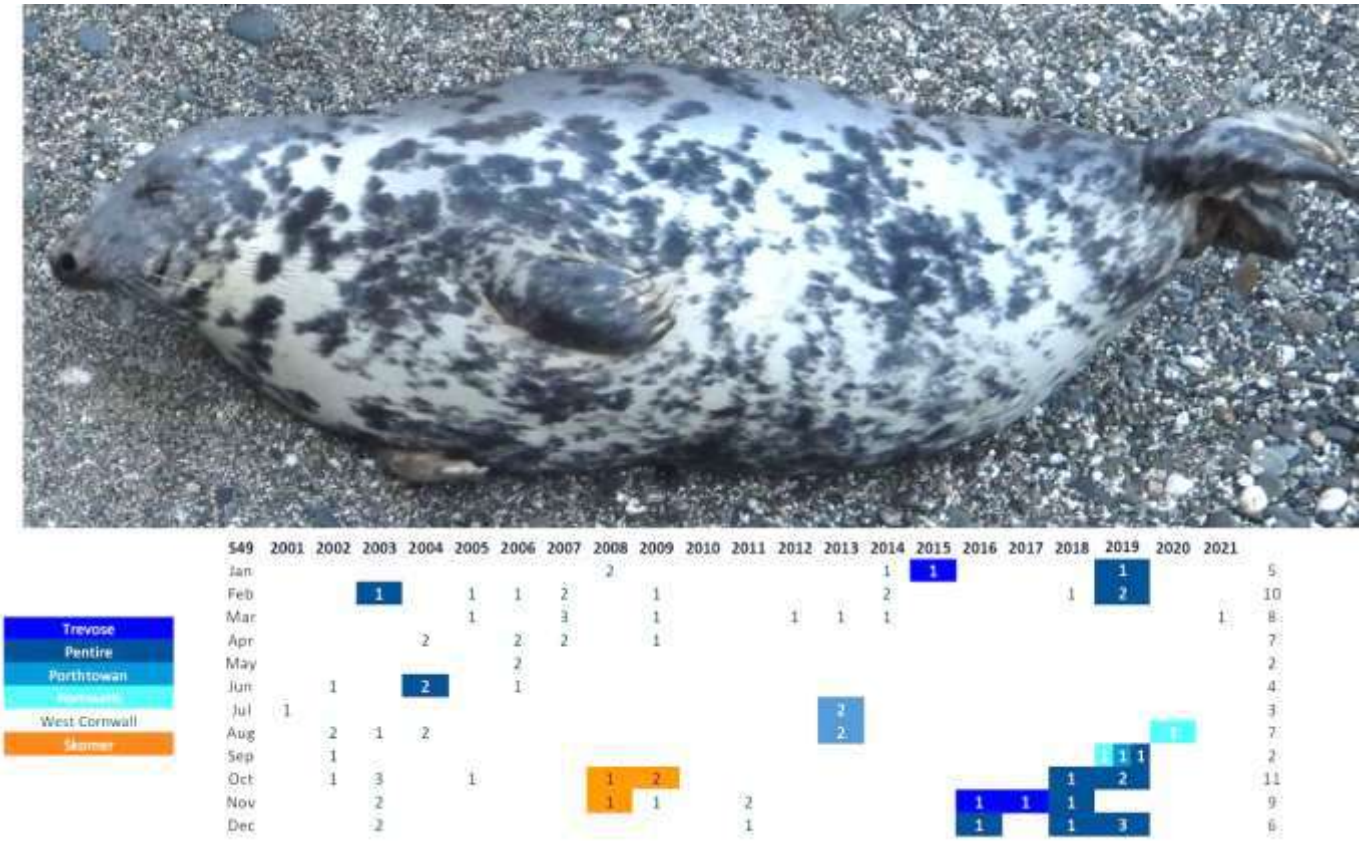

Figure 9.2. Confirmed sightings of grey seal S49 'Pliers'.

Our PID Hubs continue to be highly productive, processing 123311 photos (103467 taken in 2021 and 19844 taken in previous years) in 2021 into 3213 survey albums (2284 from 2021 and 929 from previous years). This enabled SRT to generate a total of 13542 seal identifications (up from 12162 seal identifications in 2020), of which 87% were re-identifications (compared to 86% in 2020). This included our new maximum of 142 different individual seal identifications in a single survey (20 more than our previous total in 2020) that were confirmed by two experienced volunteers. Over 100 different seals were identified on seven separate surveys all at the West Cornwall site. Of all the seals re-identified, seven were seals we first added to our catalogues back in 2000 (four males and three females) and four were seals that were first identified in 2001 (all females) including S49 Pliers shown above.

In total, 57 seals from five sites were identified 20 or more times and most of these were from the Lizard and the Roseland as a reflection of the extremely frequent survey effort at both sites (Lizard daily and Roseland multiple days every week). Seals from Cornwall have now been linked to the Isle of Man (450km away), Northwest Wales, Southeast Ireland, Southwest and South Wales, the Isles of Scilly, Northwest France, Northern France, North and South Devon, Dorset, Belgium and Holland (650km away).



Figure 10.3. Map showing range of habitat that seals in the south-west have linked up. Photos show first seals to link specific habitats.

Out-of-habitat species



Plate 9.1. 'Wally the walrus' resting on a pontoon built for his use in St Mary's Harbour, Isles of Scilly. Image: Lizzie Larbalestier.

2021 saw the first recorded walrus (*Odobenus rosmarus*) in the south-west creating substantial conservation and management issues. The walrus is not a seal but, as with seals, is a pinniped and so is mentioned here.

Dead seal strandings

In 2021, 283 dead seals were recorded by the Cornwall Wildlife Trust's Marine Strandings Network (CWTMSN) around the Cornish Coast. This is the highest number of dead seals recorded since 2000.

Table 9.1. Numbers of dead seal strandings along the Cornish coast.

Month	Adult	Juvenile	Pup	Unknown	Whitecoat	Total
Jan	2	3	25	5	0	35
Feb	1	2	23	9	0	35
Mar	4	6	23	14	0	47
Apr	3	0	17	6	0	26
May	3	6	9	5	0	23
Jun	2	2	1	2	1	8
Jul	1	0	2	0	3	6

Aug	0	0	1	0	0	1
Sep	6	0	4	4	8	22
Oct	5	1	7	4	16	33
Nov	3	1	13	5	4	26
Dec	4	1	13	3	0	21
Total	**34**	**22**	**138**	**57**	**32**	**283**

Most seal strandings occurred between Jan to May and Sep to Dec. This coincides with the seal moulting and pupping seasons. Jan to May is when moulted pups are also teaching themselves to feed and most vulnerable to disturbance with no fat reserves to spare. For them every calorie counts and can make the difference between life and death. They are also unaware of the best beaches to use and often misselect busy public beaches, where they are highly likely to be disturbed and have their critical rest and digestion time disrupted. Most deaths occurred between Jan and Mar and just after the peak pupping month in Oct. Adults are more likely to die during the moulting and pupping season which are times of high energetic cost.

Not surprisingly, most white coated or moulted pups accounted for strandings (170 in total and 60% of all dead seals recorded.) Adults accounted for 12% of the dead seals and the smallest proportion (8%) of known age seals were juveniles. It should be noted that it was not possible to age or sex 20% of the dead stranded seals.

Dead seals

CWTMSN retrieve carcasses suitable for post mortem, which are then examined by veterinary pathologist, James Barnett and volunteers of CMPT, which carries out post mortem examinations on behalf of CSIP with CWTMSN. In total in 2021, 35 grey seals were examined, three pre-moult pups, 26 moulted pups (moulters), one juvenile and five adults. The causes of death were categorised as follows:

- Infectious disease: 23
- Trauma: six
- Others: six

Of the 23 infectious disease cases, 16 were primary respiratory cases (13 moulters, two adults and one pre-moult pup), mainly cases of parasitic and bacterial bronchopneumonia. The seven cases that couldn't be classified (four moulters, two adults and one pre-moult pup) included cases of lymphadenitis, septicaemia, peritonitis, encephalitis, an umbilical abscess, a rectal prolapse and a very unusual case of widespread granulomatous inflammation possibly of viral origin.

The six cases of trauma (five moulters and one juvenile) included cases of chronic trauma with secondary infection (three cases of necrotising gingivitis, one case of maxillary osteomyelitis and one case of entanglement) and acute trauma (one moulter with a haematoma over the mandible and tongue).

The six unclassified cases (four moulters, one pre-moult pup and one adult) included four cases of starvation/ hypothermia, one anaesthetic related death and one case of hepatic amyloidosis causing malnutrition and stunting of growth in a chronically entangled adult female seal.

Entangled seals

SRT record entangled seals as currently entangled or as ex entangled – the latter based on evidence of a healed wound and no visible entangling material. This can be harder to judge than might be imagined. Seals having experienced or still experiencing entanglement were recorded 811 times on 357 surveys up to a maximum of 18 different individuals in a single survey – this was recorded on 13th December at West Cornwall by Sue Sayer and Kate Hockley. More than ten different entangled seals were recorded 12 times all at West Cornwall during the year. Eighteen unique entangled individuals were seen in a single survey, this is the fourth highest number of entangled seals since our records began. In total 134 different entangled seals were identified from our catalogues. Of these, five were identified more than 30 times in 2021.



Plate 9.2. A female seal ('Splits') with a life threatening 'flying ring' around her neck. Image: Sue Sayer.

A new entanglement issue emerged in 2021: that of seals being caught up in flying rings/dog toys used around the coast for exercise. A male (LP566 'Joy Division') and Female (LP666 'Splits') were both recorded with flying rings around their necks in March 2021. Both have since been freed.

Bycatch

Whilst bycatch is one of the causes of death recorded for seals in the southwest during post mortems by James Barnett (CMPT, CSIP and CWTMSN), the number of bycaught seals remains unknown. However, the Special Committee on Seals Report for 2020 (released in 2021) reported that the most recent estimated bycatch of seals in UK fisheries was 474 animals (95% CI 354-911) in 2018. This was almost exclusively in gill net fisheries and 85% of the bycatch occurred in the southwest, in ICES area VII. Estimated bycatch levels in the Western Channel and Celtic Sea exceed the permitted biological removal for the combined grey seal populations of southwest England, Wales and Ireland (SCOS 2020). This implied a potential population level effect.

Disturbance

From our routine data (not effort corrected) serious level 3 disturbance (seals leaving the land by tombstoning or in a stampede and entering the sea, crash diving at sea, displacement from sea areas where humans were present or seals being fed) were recorded on 241 occasions as 282 incidents (on some surveys multiple disturbance incidents were observed). In total, level 3 disturbance affected a total of 1487 seals in 2021 from a minimum of one seal in an incident to maximum of 79 in a single incident in West Cornwall.

Management and conservation

SRT share entanglement data with the Clean Catch UK National Steering Group; disturbance data with the Marine Mammal Disturbance Partnership led by Natural England and presented at the Welsh Police Coastal Wildlife and Rural Affairs Crime Conference. Evidence was submitted to 31 public consultations in 2021. Throughout 2021, SRT Chaired the Seal Alliance 'Give Seals Space' campaign: 62,000 Watching Seals Well leaflets and over 100 signs were distributed across the UK; VIP visits were hosted from the Environment Secretary George Eustice and Under Secretary for the Environment Rebecca Pow; a Parliamentary Petition had 26000 signatories from every UK constituency to raise public awareness; An Early Day Motion was used to raise MP awareness of the issues; SRT advised the Joint Nature Conservation Council Quinquennial Review who suggested seals be added to the Wildlife and Countryside Act; SRT wrote an Open Letter to Government requesting the support of the JNCCs recommendations and finally the campaign led to a 10 Minute Rule Bill being read in parliament by MP Tracey Crouch.

Legislation

In March 2021 the amended Conservation of Seals Act finally came into force, better protecting seals by making shooting an offence in addition to injuring and taking seals. This involved the important removal of the Netsman's Defence. At the end of November 2021, DEFRA issued notification that all wild capture fisheries were now legally required to report incidental bycatch of marine mammals. These events should be reported to the Marine Management Organisation within 48 hours of the end of the fishing trip.

Gower seal report

Gareth Richards: Gower Seal Group

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Site and surveys

The Gower Peninsula is situated near Swansea on the South Wales coastline. Designated as an Area of Outstanding Natural Beauty, it extends southwest into the Bristol Channel. Much of the coastline is also designated as Sites of Special Scientific Interest (SSSI) with many sensitive seal haul out sites within these areas. Unfortunately, none of these SSSI's include protection for any species of seal within its notifications. Since March 2020 and well into 2021, Welsh Government Covid restrictions severely limited human movement limiting regular surveying opportunities. However, the lifting of restrictions has allowed surveying to resume.

Photo ID

The author has conducted photographic identification at one sensitive haul out site on behalf of Gower National Trust since September 2019. Gower photographic catalogues support Seal Research Trust ongoing SW England/Celtic Sea seal survey database which is used to inform/influence relevant organisations locally and nationally. To date, Gower catalogue contains 139 North Atlantic Grey Seals with identifiable pelage markings and many more with non-discernible markings.

Grey seals

Gower's seals are primarily the Atlantic Grey Seal (AGS) species although in October 2021 a local British Divers Marine Life Rescue (BDMLR) medic tended to a Common Seal pup found alone on a local beach. The pup was assessed as healthy and released; an uncommon visitor to Gower.

Grey seal pups

Five further AGS pups were tended to by either BDMLR or RSPCA personnel with only two being successfully rehabilitated at RSPCA West Hatch, Somerset and subsequently released. The remainder either died shortly after assessment or were euthanised. Six further pups were released on Gower after rehabilitation at either RSPCA West Hatch or RSPCA Mallydams Wood rehabilitation centres.

Dead seals

One 11-year old male seal was found dead with no external trauma present. This seal was tagged and an ex-rehab. seal from RSPCA West Hatch. Unfortunately, Wales does not receive funding to carry out post mortem examinations so the cause of death remains unknown. Three further pups were found dead (3 AGS whitecoats and one AGS weaner pup). All were reported to Marine Strandings Network (CSIP)

Entanglement

Entanglement in ghost netting continues to be a particular problem with several entangled seals being observed within 2021. Gower Seal Group recently removed 141 kilos of ghost netting from a Gower cove to reduce such threats to wildlife. Several beach cleans have been carried out supported by Gower National Trust thereby reducing the high number of plastics and netting/fishing equipment blighting the coastline. These initiatives will continue and increase in frequency.

Disturbance

Covid has significantly increased footfall on Gower with many following a 'staycation' approach to their leisure and holiday times. Although a welcome addition for local economies, a rise in unintentional disturbance has been observed mainly from walkers on coastal cliffs overlooking seal haul out sites. Dog attacks continue to be a problem. A robust UK Seal Alliance 'Watching Seals Well' leaflet campaign and signage has been adopted by Gower Seal Group supported by Gower National Trust, National Coastwatch Institution, local shops, cafes and hotels. This has undoubtedly helped to increase public understanding of anthropogenic influences on seals and other local wildlife.

Lundy seal report

Authors: Rosie Ellis, Lucy Mortlock, Chloe Woolfenden, Eleanor Grover and Dean Woodfin Jones

Contact: warden@lundyisland.co.uk

Summary

2021 was a record breaking year with 244 seals counted and 62 pups born with a minimum of six white coat fatalities, in line with last year's 10%. Entanglement was recorded in at least three instances, down from last year. Issues with disturbance were of increasing concern with vastly increased water sports as Covid-19 restrictions relaxed. Six instances of disturbance were witnessed during full island surveys with kayaks from 'Bluefin' flushing four sub sites in one day, one unidentified boat disturbing but not flushing a pregnant female and a group of 10 people causing flushing at Brazen Ward, presumably guests of the island itself. Any possible ill effects from this disturbance is not currently being seen in terms of overall numbers but could be causing a shift away from Brazen Ward with reduced numbers hauled out here compared to lockdown years (24 in 2021 compared with 56 in 2020).

Grey seal counts

The highest count of seals within the survey period was on 11th August: 244 (124 females, 50 males, 31 Juveniles and 39 animals of undetermined sex). This constitutes the highest number of Atlantic Grey seals to be recorded around Lundy's shores (second record highest count was 239 animals in August 2011). This is 26 more animals than the highest count of 2020. The survey was conducted by Chloe Woolfenden, Dean Jones and Eleanor Grover, with three surveys rather than the usual one or two possibly reducing the chance of seals being missed and there may be an effect or increased survey effort. Even after taking this into account the population of Atlantic Grey seals on Lundy is thriving.

Similar to the surveys of 2020-2017, the majority of animals around the island within each survey were females with some of those, from observational notes, showing obvious signs of pregnancy in some of the popular haul out areas, especially at the start of the land-based surveys. It had been hypothesised males were possibly turning up later than the females to patrol beaches and females in order to conceive next year's pups, however this year the highest male count was 50 on 11th August, breaking the previous record count with numbers falling throughout the year.

A record breaking 62 pups were recorded this year. The first pup was sighted on White Beach on 21st August, just under a month later than the first pup of 2020 and 2019 and more in line with first sighting dates of 2018 (18th August from Ladies Beach) and 2017 (8th August at White Beach). Unfortunately there were at least six dead pups sighted, the majority spotted at the beginning and end of the season, one pup higher than the minimum pup fatalities last year but roughly in line percentage wise (9.68%). This however is still an underestimate of the overall productivity for Lundy, as there would be many more pups present hidden within the island's inaccessible sea caves throughout the season. No seal boat survey was conducted this year which enabled an extra four pups to be counted in 2019.

The last white-coat pup to be recorded was on 21st October from the Landing Bay, 24 days earlier than the last of 2019, 17 days earlier than the last of 2018 and two days later than that of 2017, giving a relatively short but productive pupping season this year.

Entanglement



Plate 9.3. A female entangled in discarded gill net next to Rat Island on 20th April. Image: Dean Woodfin Jones.

At least three records of entanglement were recorded in 2021 (8 in 2020, 3 in 2019 and six in 2018), one particularly bad gill net. Unfortunately, despite the distress caused to the seal there is nothing he conservation team can do to free seals in these circumstances.

Disturbance

Issues with disturbance were of increasing concern with vastly increased water sports as Covid-19 restrictions relaxed. Six instances of disturbance were witnessed during full island surveys with kayaks from 'Bluefin' flushing 4 sub sites in one day, one unidentified boat disturbing but not flushing a pregnant female and a group of ten people causing flushing at Brazenward, presumably guests of the island itself. Any possible ill effects from this disturbance is not currently being seen in terms of overall numbers but could be causing a shift away from Brazenward with reduced numbers here compared to lockdown years (24 in 2021 compared with 56 in 2020).

Re-habilitated animals

Two sightings of tagged seals were reported.

Photo Identification

A total of ten Lundy animals have been re-identified from photographs taken in the 2021 season so far (c110 animals were photographed by the Conservation Team in 2020), a total which includes seven breeding females and one beachmaster from previous surveys – details can be found below. Additional to this, two animals were re-sighted from areas elsewhere in the SW as well as three tagged animals (released after re-habilitation) which includes a very interesting movement of one individual photographed last year originating from Plouarzel, France. To note, more re-sightings will be added to this year's list as photo albums are reviewed throughout the year. For details and methods on seal photo identification, please refer to the Cornwall Seal Group Research Trust website (CSGRT, 2019).

Re-ID Seals, Lundy, 2021

LUN250 'Landing Bay Lady' (also LUN551 'Shoulder Stripes') 30th August Benjamin's Chair

2020: 31st August Ladies' Beach.

2019: mother of Pup 12, Lametry Bay (relocated to Landing Bay)

09/07/18

26/05/18: The Rattles

2017: mother of Pup 06, Ladies' Beach (relocated to Landing Bay)

LUN159 'Short-legged Dog Black Nose' (also LUN327 'Black Nose Parallel' and LUN338 'Black Nose') 05/09/21 White Beach [mother of Pup 11]

06/09/21 White Beach

2019: mother of Pup 16, White Beach

26/09/18 White Beach

18/09/18 Ladies' Beach

03/08/12

Acknowledgements

A huge thank you to all who submitted seal counts and disturbance records in 2021. Special thanks to for all their hard work, determination and skill to find every last pup.

Finally a massive thank you to Sue Sayer, Kate Williams, Marion Beaulieu, Rob Wells and all of the volunteers from the Cornwall Seal Group Research Trust for all their work with regards to training volunteers, taking and processing masses of photographs for the islands identification catalogue and for their general and endless kindness and passion for these wonderful marine mammals.

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Alderney seal report

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Seal sightings and notable highlights

During 2021, the Alderney Wildlife Trust (AWT) continued to complete a series of marine mammal observation surveys across Alderney (Channel Islands). For this year, it primarily comprised of monthly boat-based surveys (from April – December) to known offshore (grey seal) haul out sites; The Nannels and Renoquet Reefs. Collectively, these surveys recorded a total number of 356 sightings of grey seals at these islets, with the highest number observed in July (n = 69) and lowest in December (n = 15). The surveys are in collaboration with marine conservation bodies across the other Channel Islands and France, such as La Société Guernesiaise.

Photographs of grey seal individuals were also taken during surveys and also opportunistic sightings to help build a (basic) seal photographic identification catalogue. This is shared with UK, Channel Islands and French seal experts to identify seal movements/visits/group dynamics across the Channel.

AWT also collates sightings from members of the public, for which 26 grey seal sightings were submitted to the AWT during 2021.

Strandings

For 2021, only one live grey seal was stranded on (02/02/21, Platte Saline Bay) Alderney, which was a relief (!). The seal was a beautiful juvenile and after a couple of days left the bay.

Dorset seal report

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Seal sightings and notable highlights

The number of seal sightings along the Dorset Coast was 33% higher in 2021 than in 2020. This figure doesn't necessarily reflect an increase in seal numbers but could be due to greater observer effort or better reporting. It should be noted that these are casual sightings records rather than from effort-based surveys. Grey seals accounted for 63% of the sightings; common seals 19% and the remainder (18%) couldn't be identified to species. The majority of seal sightings were reported during April-May and July-August however seals were spotted along the Dorset coast throughout the year.

Research and projects

In August, the first Poole Harbour seal census was carried out. Dorset Wildlife Trust (DWT) teamed up with Birds of Poole Harbour (BoPH) to conduct the harbour-wide census. The BoPH volunteer surveyors had views of the entire harbour from the land with DWT observers onboard a vessel. Conditions weren't favourable with thick fog for a time which may have hampered efforts. Two common seals were observed by the team in the boat during the census however none were recorded by the land-based team. The methodology will be adapted and trialled again in the summer of 2022.

Human impacts

Disturbance continued to be an issue for seals in Dorset. There were several instances of juvenile grey seals interacting with Stand-up Paddle Boards and kayaks and occasions where people and dogs were getting close to resting seals when they were hauled out. With the launch of the new Watching Seals Well guidance from the Seal Alliance, leaflets were distributed to key areas where disturbance had been an issue. DWT has also been sharing the advice on our website and through our social media channels to reach a wider audience.

Management or conservation actions

During 2021 DWT adopted a new policy regarding the type of seal images we share. Images that show a seal looking directly at the camera will not be shared as it is possible that the seal has been disturbed. If a close-up image is used it will include a caption to say how the photo was captured; we will not share the exact location of a seal sighting or any pictures that show any human-seal interactions.

Rescues and rehabilitation

BDMLR and/or the RSPCA have been called out to check on at least 16 seals in Dorset during 2021. Most of these calls were relating to a juvenile grey seal which had become habituated resulting in people and dogs able to get close which was cause for some concern. Two common seal pups were uplifted and taken into rehabilitation centres including one from Mudeford and one from Portland. Prior to BDMLR medics arriving on site, the pup that was rescued from Portland was reportedly put back into the sea by well-intentioned members of the public. This one went on to be successfully rehabilitated and released in early 2022. One grey seal pup was taken to RSPCA West Hatch, however the severity of its injuries meant it was euthanised to prevent further suffering.

Strandings and Post Mortem Examinations

At least four dead seals were discovered along the Dorset coast in 2021. Three of these were grey seals, two adults, one juvenile whilst the other was unidentifiable due to decomposition. These strandings occurred following a periods of stormy weather, however none of the carcasses were retrieved for post-mortem examinations so the cause of death is unknown.

10. Cetaceans

Baleen whales (Mysticetes).

Edited by Dan Jarvis, British Divers Marine Life Rescue.

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Data contributed by Cornwall Wildlife Trust, Environmental Records Centre for Cornwall and the Isles of Scilly, Marine Discovery Penzance, Padstow Sea Safaris, Newquay Sea Safaris, AK Wildlife Cruises, Isles of Scilly Bird Group, Organisation Cetacea, Happywhale, Scottish Humpback ID Facebook group, ORCA Ireland, Irish Whale and Dolphin Group, South West Marine Ecosystems observations.

Conclusions

- Following on from the bumper crop of sightings of baleen whales in 2020, 2021 proved even better with record numbers of sightings of minke and fin whales logged by the largest and only comparable data collector at Cornwall Wildlife Trust/Environmental Records Centre for Cornwall and the Isles of Scilly.
- Across all data available, it was evident that tentatively identified minke whale seasonality previously mentioned in SWME reports continues to be upheld, with the same peaks in sightings in spring and late summer.
- Evidence of seasonality for fin whales is less clear as sighting reports are so low in number it is difficult to infer and strong trends, however it is noteworthy enough from the few sightings available that they tend to coincide with the late summer peak with minke whales and the winter peak with humpback whales.
- For the third year in a row there was only one sighting of a single sei whale reported, but interestingly all three sightings occurred in June or July, which could suggest there may be seasonality should more data be forthcoming to support this trend.

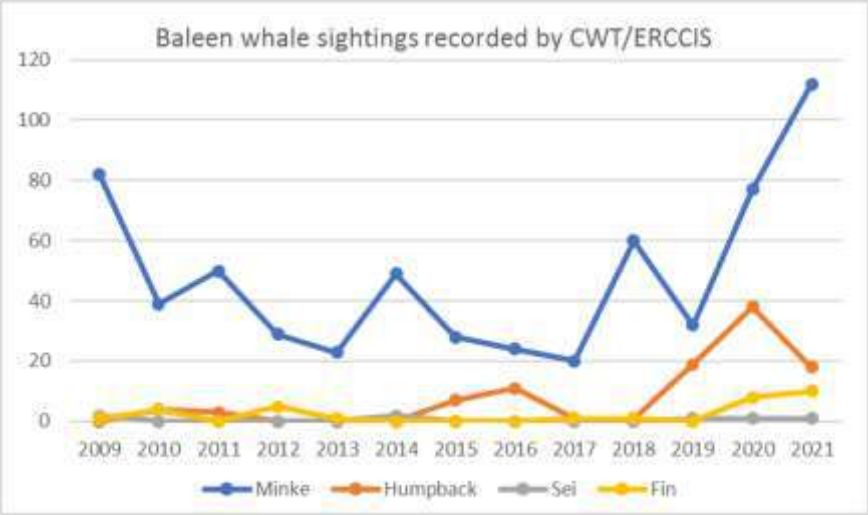

Figure 10.1. Baleen whale sightings reported to CWT/ERCCIS 2009-2021.

Distribution of sightings was influenced heavily to where reporting effort is highest, which is around Cornwall. This particularly comes from boat operators in Mount's Bay, Fal Bay and Padstow Bay, and as such is where an abundance of baleen whale activity could be perceived as high, however it must be noted that a lack of similar reporting from other areas masks the true overall picture (Figure 10.2).

2021 was exceptional for becoming the year in which the first records of individual humpback whales being photo-identified between years and other regions occurred. Five animals were matched to other catalogues while a sixth individual, a sickly animal seen over the course of four days in June between Plymouth Sound and south east Cornwall, was monitored though no photos useful for photo-identification are currently available for use to attempt matching in case it is a known individual from elsewhere. A humpback whale observed in March floating off Looe was the only deceased baleen whale recorded this year.

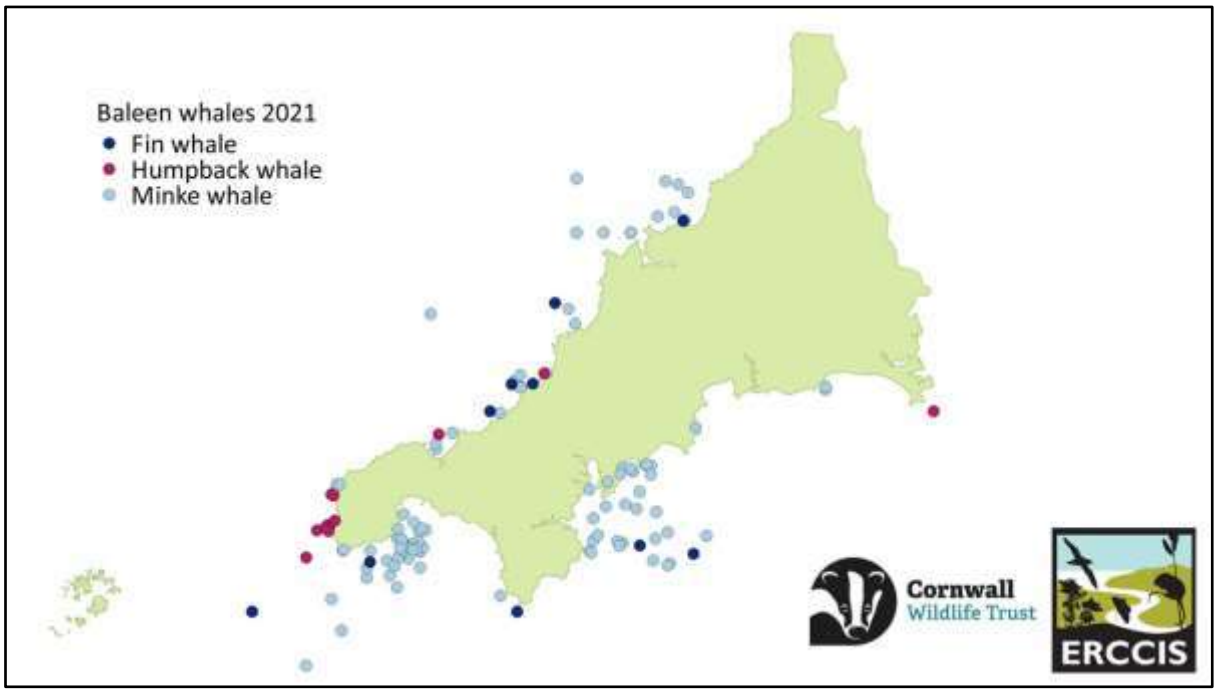

Figure 10.2. Baleen whale sightings distribution in 2021 from CWT/ERCCIS data.

During the course of data collection for the SWME webinars and report, it was very apparent that the data available is currently skewed heavily towards Cornwall and the Isles of Scilly, largely due to the long-term Seaquest Southwest public sightings and survey scheme run by CWT/ERCCIS as well as multiple boat operators reporting into it, and this year for the first time data from the Isles of Scilly Bird Group being available. None of the other counties in south west England currently have data collection schemes that are promoted in such a way as SQSW and this presents a significant gap in knowledge. Other potential sources of data from other local and national organisations are now being explored to find ways to increase collection of and share quality data more easily between organisations to build a more complete picture of cetacean distribution and abundance across the whole region in the future.

Minke whale (*Balaenoptera acutorostrata*)

There were a record 112 sightings of minke whales reported to CWT/ERCCIS in 2021, which is the only comparable dataset currently available. In combination with other sources of data, this figure increases to 136. Potential seasonality associated with spring and particularly late summer has been identified in previous SWME reports and in 2021 this trend was continued (Figure 3).



Plate 10.1. Minke whale sighted off Padstow. Image: Jenny Simpson/Padstow Sea Safaris.

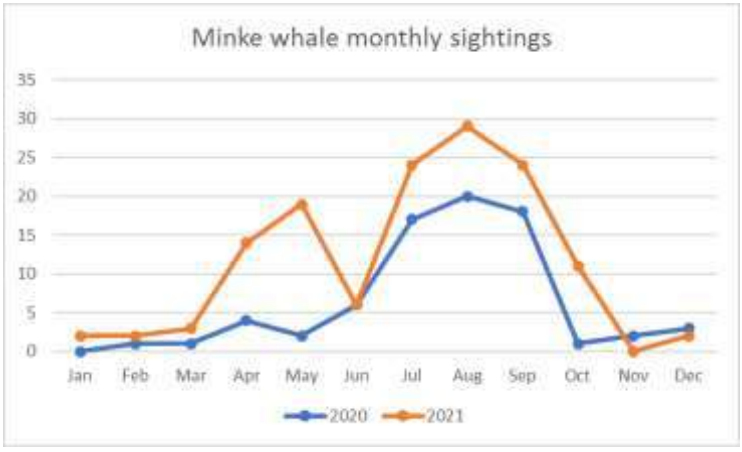

Figure 10.3. Minke whale monthly sightings 2020-2021 across all data.

Peak months for minke whale sightings across all data were August (29), September (24), July (24), May (19) and April (14). It should be noted that these months coincide with the working period for the boat trip operators that contribute data, however this does not explain why June is significantly lower in sightings (6) relative to the other months surrounding it. The peaks otherwise appear to indicate that these are productive feeding times for this species around the south-west coast.

Locations of sightings were fairly widespread around Cornwall from Tintagel in the north, around Land's End and along the south coast to Looe, with two further sightings south of Plymouth and one from Berry Head in Devon. Sightings tended to cluster mainly around Mount's Bay and Fal Bay, with smaller groupings around St Ives Bay and Padstow Bay. There were 22 sightings reported from around the Isles of Scilly, mostly along the south and east sides of St Mary's. Most sightings typically involved single animals, occasionally pairs, though one group of three was observed on the ferry crossing between Cornwall and Scilly.

Sei whale (*Balaenoptera borealis*)

There was a single sighting of a lone sei whale in July 2021, observed from a survey vessel north-east of the Isles of Scilly. Despite the very low volume of data for sei whales due to their scarcity in this region, the sighting is consistent with the previous two years, where a lone sei whale was observed off Padstow in June and July respectively. It provides the smallest possible suggestion of seasonality for this species in south-west waters, though of course much more data would be required to make that link statistically significant.

Fin whale (*Balaenoptera physalus*)

A record 10 sightings of fin whales were logged by CWT/ERCCIS in 2021, however this was surpassed by data from the Isles of Scilly Bird Group, which listed 29 additional sightings giving a combined record total of 39.

Sightings of this species were skewed heavily to January, which was a period of exceptionally high humpback whale activity in west Cornwall and Scilly that appear to have congregated due to especially good prey availability. As has been noted in previous SWME reports, another peak in sightings also occurred in late summer at the same time as minke whales, again likely due to the prevalence of food sources (Figure 10.4).



Plate 10.2. Fin whale sighted off Newquay. Image: Ian Boreham.

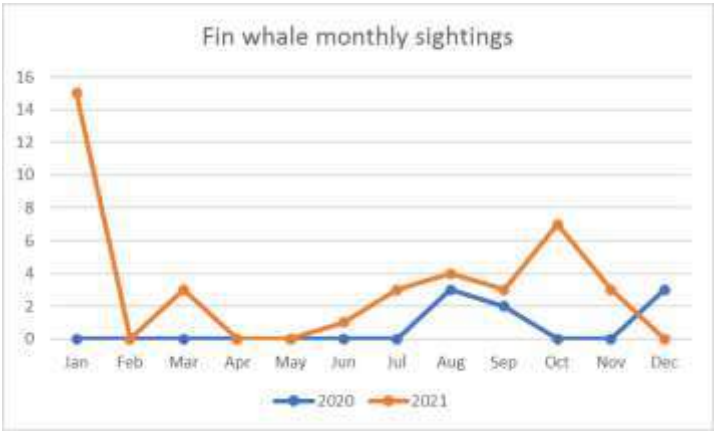

Figure 10.4. Fin whale monthly sightings 2020-2021 across all data.

Geographically, sightings in Cornwall were reported from Padstow Bay, Newquay, St Agnes and Portreath, while on the south coast they came from Penberth Cove, Mount's Bay, Lizard Point, and offshore locations between St Anthony's Head and Dodman Point. Meanwhile, most sightings at the Isles of Scilly came from the south and eastern sides of St Mary's as well as from St Agnes, Bryher, St Martin's and on the ferry crossing back to Cornwall. All sightings were of lone animals except for a group of four seen on 1st January at Scilly, and another group of four from Lizard Point in October.

Humpback whale (*Megaptera novaeangliae*)

It was also a record year for humpback whale sightings, with 64 records in total and almost doubling the previous year's haul that was the previous record. The majority of the sightings came from the ISBG, with the rest from CWT/ERCCIS, reflecting where most of the sightings were made. It should be noted that the bulk of sightings reported here are sightings of the same few animals moving between locations over a period of days as some remained around the coast for extended periods of time. Anecdotally (but not recorded in the datasets available for this report) one known individual was reputed to have been present around the Isles of Scilly for 65 consecutive days from Christmas Day 2020 through to February 2021. If this can be confirmed then it would significantly increase the dataset and analysis available here.



Plate 10.3. Humpback whale known as 'HW-MN0102260' sighted around the Land's End peninsula. Image: Terry Carne.

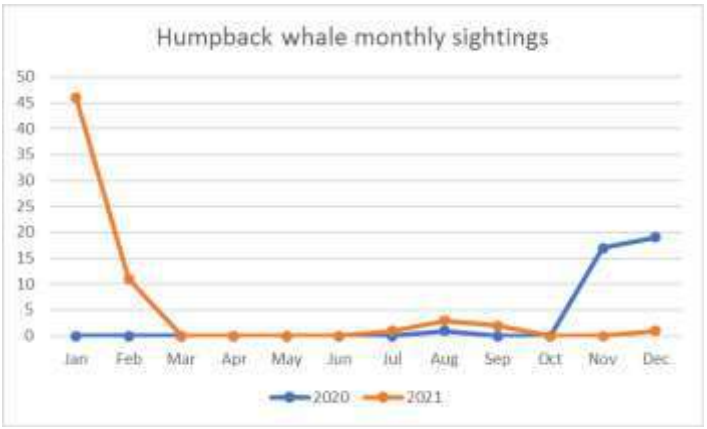

Figure 10.5. Humpback whale monthly sightings 2020-2021 across all data.

Humpback whale sightings peak during the winter, with a slight increase becoming notable in summer too. This continues the trend from the last few years since records of this species have become a regular annual occurrence. There could be a few reasons involved in explaining this, including population recovery and returning to old habitats since the whaling industry declined; and climate change affecting prey distribution and availability. The seasonality through the year would more likely be influenced by the larger migration patterns of this species (Figure 5). These data appear similar to what has happened in south-west Ireland over the last ten years, which may be being replicated here now in south west England and points to these regions being potentially interconnected as a significant large-scale habitat in the North East Atlantic.

Spatially, records almost exclusively came from west Cornwall and the Isles of Scilly, sometimes in feeding in association with fin whales. Around the Scillonian archipelago the reports came from all around St Mary's and St Agnes, as well as up towards Samson. Otherwise and exceptionally, on the 1st January a pair were sighted off Perranporth, a lone individual was observed off Land's End and anecdotally a further seven were reportedly present simultaneously around the Isles of Scilly, giving an unprecedented total of 10 humpback whales around the south west on the same day. One further exceptional sighting was an individual filmed in February at Westbury-on-Severn, south west of Gloucester, struggling to swim across the intertidal mud flats on a falling tide. It did not strand and was never seen again despite searches by British Divers Marine Life Rescue. The final exceptional case was a sickly individual observed in Plymouth Sound during July, disrupting the international Sail Grand Prix event. This animal was monitored by BDMLR ranging between Wembury in the east and Polperro in the west over the next three days until it disappeared, but video evidence clearly showed it to be in poor nutritional condition and lethargic. There were no further sightings and photos for identification purposes are not currently available – the editor would like to put a call out to anyone who may have photos of this animal to please share them in case this is a known animal from Atlantic identification catalogue, or in case it returns in the future and can be reidentified.

In March a dead humpback whale was reported south of Looe Island, Cornwall. The carcass managed to get stuck on a reef and persisted for a few days until it washed off again. This record is the only incidence of a deceased baleen whale in south-west England in 2021.

2021 was also very exciting for being the first year that a humpback whale in south-west England has been photo-identified to other regions of the world, and between years as well. Re-sightings/photo-identifications extended out to an incredible five different animals, whose identities and sightings records are shared below (note that all of these photo-identification matches were made in 2021, hence their appearance here and not in previous SWME reports even if sightings predate this):

1. 'Cream tea' / Pi / SCUK037: first sighted August 2019 off Lamorna then reidentified off south Ireland in August and October 2020. It then returned to the Isles of Scilly from Christmas Day 2020 and is reputed to have been present for 65 consecutive days thereafter, though reported data to corroborate this is not currently available (Figure 11.6).



Figure 10.6. Sightings map for 'Cream tea' / Pi / SCUK037.



Figure 10.7. Sightings map for 'NA-2705'.

2. 'NA-2705': sighted originally at the Isles of Scilly in 2008 and a photo was posted online shortly after the identification of "Cream tea" in 2021. The photo was forwarded to the Happywhale catalogue and matched to an individual sighted south of Franz Josef Land in the Arctic Circle north of Russia (Figure 11.7).
3. 'HW-MN0102260': first photographed in November 2020 and then matched to multiple sightings over the next two months from Mount's Bay to St Ives Bay (Figure 11.8).



Figure 10.8. Sightings map for 'HW-MN0102260'.



Figure 10.9. sightings map for 'HW-MN0102506 / HBIRL98 / Beag Ban'.

4. 'HW-MN0102506 / HBW2023 Beag Ban': first identified in August 2020 in south west Ireland and then in a similar region in May and June 2021. It was photographed from a research vessel north-east of the Isles of Scilly in July 2021 and then returned to Ireland in August (Figure 10.9).

5. 'HBIRL77 / SCUK061': first identified in west Ireland in August 2016 with multiple sightings between there and south west Ireland from 2016 to 2021. It was then re-identified at the Isles of Scilly in August 2021 (Figure 10.10).



Figure 10.10. Sightings map for 'HBIRL77 / SCUK061'.

Between all of the humpback sightings, three individuals link south west England to Ireland, and one to Russian Arctic Circle, while one individual provides evidence of return visits to the south west between years. Now that there is the beginning of a catalogue for this region of the UK it will be very exciting to see what further matches, site links and other data will be revealed by this newly opened avenue of information, as well as the potential opportunities for collaboration on international humpback whale research in the future.

Lundy (from the Lundy Field Society Annual Report for 2021).

There were two sightings of a minke whale near to the island compared with one in 2020.

Toothed whales and dolphins (Odontocetes).

Edited by Duncan Jones, Marine Discovery Penzance.

Contact: duncoliver@yahoo.co.uk

Data contributed by A K Wildlife Cruises, Cornwall Wildlife Trust, Environmental Records Centre for Cornwall and the Isles of Scilly, Dolphin Watch UK, Dorset Wildlife Trust, Durlston Country Park, Marine Discovery Penzance, Padstow Sealife Safaris, Isles of Scilly Bird Group, Organisation Cetacea and South West Marine Ecosystems observations.

Conclusions

- The South-West coast appears to be an important habitat for Odontocetes. The records collected in 2021 were overwhelmingly coastal, however when there were surveyors onboard ships there was a high number of records from further offshore. This high number suggests there is a presence of all the species recorded both offshore and inshore.
- All the species of Odontocetes are protected from disturbance under UK law. In order to establish whether anthropogenic activity such as fishing, engineering, vessel operations and pollution are impacting these animals it is important to better understand how they are distributed and how environmental conditions influence this distribution in both space and time.
- Unfortunately the data used in this report is unqualified by effort and extremely spatially biased and as such is not suitable for this task. The report does serve as a record of the presence of these species off the coast of the South- West and as an indication that wider surveys are necessary to build a better picture of the current situation.

Introduction

Both 2020 and 2021 were atypical years for data recording due to the Covid 19 pandemic. Both years had periods during during which movement was restricted. How these restrictions impacted people's ability and/or motivation to go out surveying is difficult to quantify. During both years there are likely to have been periods when visits to the coast and boat hours on the water were reduced. Equally during both years there are periods when coastal visits and boat hours are likely to have been increased. Taking this into consideration it is likely that comparisons made with

years prior to the Covid 19 pandemic will be misleading. Equally it is hard to make comparisons between the two years because movement trends were not comparable between 2020 and 2021.

Data availability is still extremely skewed towards Cornwall. There is a long history of cetacean data records being collected off the Cornish coast and, over the last few years, it has become increasingly structured, thanks to the work of Cornwall Wildlife Trust and the Environmental Records Centre for Cornwall. Devon, Dorset and Somerset do not have the same history or systems in place. In order to make useful comparisons between the coastal regions of the South West it would be necessary to have more spatially comparable effort or at the very least to be able to account for the extreme variations in data availability.

There is an equal lack of data for areas more than 5 miles offshore from the coastline. This is somewhat addressed by the data kindly provided by Organisation Cetacea. However their survey efforts were greatly hindered over the last two years due to the Covid pandemic. In previous years the Organisation Cetacea data has not been included in the South West Marine Ecosystems report. It is my recommendation that the Organisation Cetacea data be included in subsequent reports because it provides invaluable information about offshore areas, which are particularly difficult and costly to survey.

Sightings records for 2021 included high numbers of bottlenose dolphins *Tursiops truncatus*, common dolphins *Delphinus delphis,* harbour porpoises *Phocoena phocoena* and Risso's dolphins *Grampus griseus.* Notable unusual sightings included a pair of orcas *Orcinus orca* (Figure 1) and two striped dolphins S*tenella coeruleoalba* records

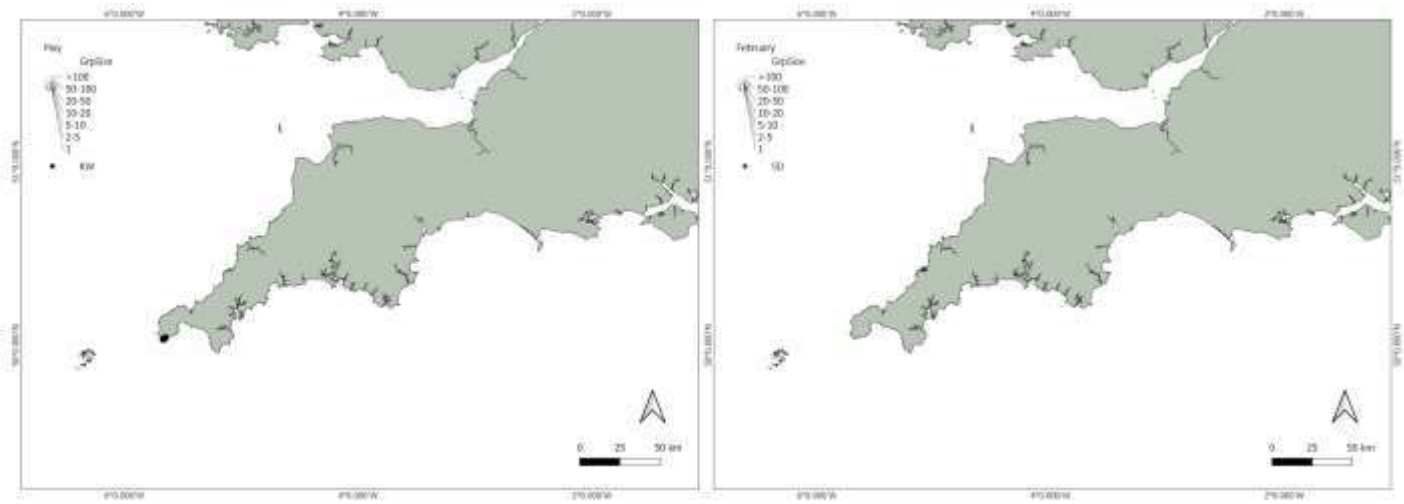

Figure 10.11. Confirmed records of orcas (left) and striped dolphins (right) off the Cornish coastline.

(Figure 10.11). The orcas were identified as being members of the West Coast Community, which is usually found in the waters around the West Coast of Scotland and North West Ireland. The orcas were two males known as John Coe and Aquarius and it appears that they circumnavigated the UK coastline. They were recorded off Porthcurno and Porthgwarra at similar times. There was a further orca sighting off The Bluff, Hayle in February but this was unverified and unsupported by photographic evidence. The striped dolphins were both single animals recorded off Newquay in February on subsequent days.

Bottlenose dolphins *Tursiops truncatus*

Bottlenose dolphin group sizes were between one and 50, with the majority being under ten (Figure 10.2). Sightings in the first three months of the year were all from Cornwall and close to the coast. The data from land watches was overwhelmingly Cornish in origin and this may explain the sightings only occurring off the Cornish coastline at the start of the year. All data before 12th April came exclusively from land watches due to boat operations being reduced by Covid 19 restrictions. From April onwards sightings of bottlenose dolphins further from the coast increased. In April, May and June the sightings were still close to the coastline with one offshore record in Mount's Bay in May and one record south of Plymouth in June. In July, August and September sightings were predominately offshore. However, there were still coastal records off Gwennap Head in July and August. There were also inshore sightings off Chesil beach in Dorset in July and August.

Offshore sightings peaked in September and appeared to be centred around the Plymouth - Roscoff ferry route to the south of Plymouth and east of Lizard Point. In October there was one record off Pendeen and in December there were three records on the North Cornish coast. The work of the South West Bottlenose Dolphin Consortium has shown us that the inshore pod of bottlenose dolphins once thought to be resident off the Cornish coast actually range as far east as Brighton and beyond. Offshore pods of bottlenose dolphins are likely to range widely over the Celtic Shelf and Western Channel with food availability influencing their spatial distribution. The uneven distribution of survey effort across the region along with the animals natural range extending beyond the region make it unwise to draw conclusions about population trends or trends in spatial distribution. An apparent decrease in pod size and/or records off Cornwall (the most surveyed area) could simply show that the animals are spending more time in other areas. Bottlenose dolphin pod sizes fluctuate widely. In areas of the world with better studied resident populations pod sizes are found to range between 1 and > 50 and the make-up of pods is related to social dynamics within populations rather than population expansion and contraction (Shane, 1990; Connor *et al.*, 2000; Speakman *et al.*, 2010; Cantor and Whitehead, 2013).



Figure 10.12. Reported sightings of bottlenose dolphins in the waters around the South West in 2021 by month of the year.

Solitary bottlenose dolphin. A solitary bottlenose dolphin that became known as 'Nick' was recorded a number of times off the South-West coast in 2021. Nick was first identified off the Isles of Scilly in June 2020, and was then sighted in Co. Cork, Waterford and Wexford in Ireland between April to 30th July 2021.



On 1st August he was back in Scilly and made occasional trips to Cornwall, visiting the Helford Estuary, Mount's Bay and St Ives Bay. He was often spotted interacting closely with boats and occasionally with swimmers. During this time, he was reported a number of times to rescue organisations as a healed scar on his beak was frequently misidentified as being plastic caught around his beak, though the scar itself may well have been caused by entanglement some time earlier in his life. He was never seen again after the incident in Hayle on 22nd August during, which he interacted closely with swimmers in Hayle harbour.

Plate 10.4. Bottlenose dolphin surfacing off the Cornish Coast. Image: Hannah Jones.

On 12th September a bottlenose dolphin carcass was reported to the Irish Whale and Dolphin Group's Strandings Scheme. It was discovered at Roaches Point in Cork Harbour. Frances Gallagher, a Stranding Network Volunteer with the group, visited the animal to collect detailed images and was able to confirm that it was an adult male measuring 2.6m and in good nutritional condition. IWDG Strandings Officer Stephanie Levesque and IWDG researcher Mags Daly reported that the images showed multiple, deep lacerations on the carcass located on the dorsal surface of the tail stock and tail flukes – injuries consistent with propeller damage. Had the injuries occurred post mortem they would be expected to be on the underside of the carcass, rather than the top of the tail stock. These photos provided the evidence needed to confirm that this was indeed the solitary dolphin known as Nick based on the distinctive scar on his beak and the unique markings on his dorsal fin.

Common dolphins *Delphinus delphis*



Common dolphins were sighted off the South West coast in every month of the year and records peaked in July, August and September (figure 3). However it is likely that survey effort also peaked during this period because there were more boats out on the water and more people visiting the coast. Therefore it is as likely that the peak in sightings during this period represents a peak in survey effort as it does a peak in presence of this species. In the first three months of the year records were all close to the coast.

Plate 10. 5. Common dolphins off the Cornish coast. Image: Hannah Jones.

During 2021, Covid 19 was restricting boat activity and sea conditions were rougher also limiting boat activity. From April the sighting records reflect the increase in boating activity and there appear to be sightings hotspots in Mount's Bay, Falmouth Bay, off Padstow, off Plymouth and Start Point. These apparent hotspots are the locations of boat tour operations and could well indicate increased boat activity and recording rather than hotspots. The offshore records increased between July and September, which coincides with the bulk of the survey effort carried out by Organisation Cetacea so once again the records are following survey effort. The reduction in records for Mount's Bay and the North Cornish coast after October indicate when boat tour operations in these areas finished for the year due to rough sea conditions. The Falmouth Bay operations continued in to November and this is indicated by continued high numbers of records in Falmouth Bay during November. In December records were reduced however it is not possible to tell if this is due to reduced survey effort or a true decrease in the presence of common dolphins. Common dolphins range widely across the Celtic Shelf and Western Channel the data available for this report is not sufficient to properly understand distribution patterns or seasonality in presence. It might be possible to understand trends in population size if it is possible to properly account for trends in effort and seasonality of effort. However the effort is extremely skewed towards specific areas of Cornwall and this level of bias would need to be managed carefully before drawing conclusions.

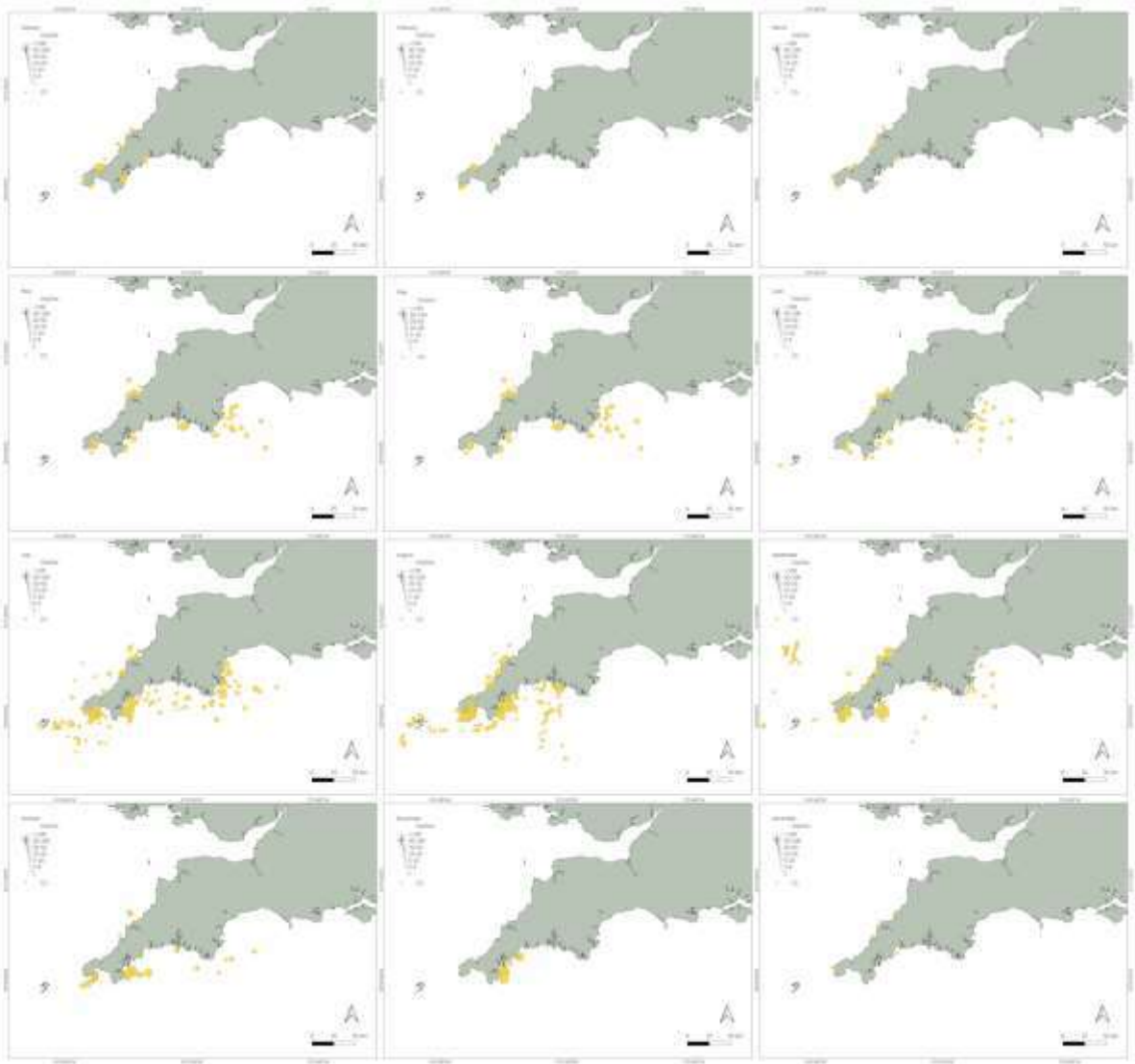

Figure 10.13. Reported sightings of common dolphins in the waters around the South West in 2021 by month of the year.

Harbour porpoise *Phocoena phocoena*

Harbour porpoises were recorded in every month of 2021 with the majority of records coming from Cornwall (Figure 10.4). Harbour porpoises are known to occur all around the coast of the UK so it is important to try to increase records from other regions of the South West in order to build up a true picture of harbour porpoise occurrence and distribution. Between January and March, sightings were predominantly along the north coast and in Mount's Bay. In April and May, records were focused on Mount's Bay, Falmouth Bay and around the Padstow Estuary. These three locations have active tour operators collecting records and it is possible that the apparent hot spots represent hot spots of effort rather than true spatial hotspots. In May and June the three areas described previously still had high numbers of records along with St. Ives Bay. The watch point on the Island at St. Ives is a popular and accessible watch point and it appears that the sightings are focused around this area of St. Ives Bay. It would be interesting to know if there was survey effort at this location during the previous four months in order to understand if the location is seasonally important to porpoises or the records are just linked to survey effort. The movement restrictions in January, February and March are likely to have had an influence in the distribution and numbers of records.

Between June and September there were records of harbour porpoises around the Isles of Scilly. The records were provided by Organisation Cetacea and this is the only period they were able to survey during 2022 so it is equally likely that porpoises occurred around the islands at other times of the year as well but were not recorded. It is interesting to note that there is only one record further from the coast on the Scillonian Ferry route used in the

Organisation Cetacea surveys. During June there were also a number records from Organisation Cetacea collected between 50 km and 100 km south of the South Devon coast. There is also a further record in this area in September. The surveyors were not on the ferries in every month of the year so it would be unwise to conclude anything from this. More data would give a better picture regarding occurrences in these offshore areas. Between July and September there were records from all around the Cornish coast. The majority of the records came from Falmouth Bay and Mount's Bay in the areas covered by tour operators. There were fewer records for the Padstow area and St. Ives Bay. If it is presumed that these areas had similar effort and sea states to the previous three months then it might suggest that between July and September Falmouth Bay and Mount's Bay have higher densities of porpoises.



Figure 10.14. Reported sightings of harbour porpoises in the waters around the South West in 2021 by month of the year.

The pattern continues to October however after October the Mount's Bay operations stopped and the records become fewer for this area. In November there were still higher records for Falmouth Bay however the operator here was still running trips so it is likely to be evidence of effort rather than an indication that there are more porpoises in this area at this time. St Ives and St. Agnes head had records sporadically across the year and it is hard to know if the ebb and flow of records relates to distribution patterns or observation effort. During the month of December all records came from the North Coast of Cornwall and it would be interesting to know if this was linked to a distribution shift at this time of year or merely an effort shift. To fully understand population and distribution

trends for harbour porpoises around the South West of the UK it is necessary to develop a consistent repeated survey approach across the region. It has been demonstrated that areas of the region have higher encounters per survey effort than regions considered to be of global importance for this species (de Boer *et al.*, 2018).



Plate 10.6. Harbour porpoises surfacing in Mount's Bay, Cornwall. Image: Hannah Jones.



Plate 10.7. Risso's dolphin mother and calf in Mount's Bay, Cornwall in 2021 photo Hannah Jones.

Risso's dolphins *Grampus griseus*

Risso's dolphins were recorded in all months between March and October (figure 5). Once again, the majority of records were from the Cornish coast, however there is a record off Start Point in April, a record off Berry Head in May and a record 50 km south of Plymouth in August. Mount's Bay has the most consistent records with animals being recorded in every month except for March. Boat tour operations were not allowed in March due to Covid restrictions so a lack of effort could explain the absence of March records. Mount's Bay has been proven as an important area for this species and it has been used as a nursery area in the past (de Boer et al., 2018). The coast between Falmouth and Lizard Point has records in April, May, June, July and August and photo identification has demonstrated that animals recorded in Mount's Bay also occur in this area. There are also consistent records off Padstow with animals recorded in June, July and September. During March there was a record in St Ives. Bay and in July there were several records off Newquay. A photo record of a Risso's Dolphin recorded in Mount's Bay has previously been matched with a photo record of a dolphin off Bardsey Island in Wales (Boer et al., 2013). This suggests the species have a wide range. In order to better understand the status of these animals and how they are using the South West coast it is necessary to develop a consistent and repetitive recording method.

Lundy (from the Lundy Field Society Annual Report for 2021).

The most frequently seen cetaceans were harbour porpoise and short-beaked common dolphin. Both species were seen through the year. There were 17 logbook entries for harbour porpoise, mostly single or two individuals. There were 16 logbook entries for common dolphin with a maximum count of about 50 offshore (west) of the Old light on 21st February. Overall, numbers reported were smaller than in 2020. There were no sightings of bottlenose dolphin (only one in 2020). There was a possible sighting of a pygmy sperm whale *Kogia breviceps* on 8th October.



Fig. 10.15. Reported sightings of Risso's dolphins in the waters around the South West in 2021 by month of the year.

Strandings

Cornwall Wildlife Trust produce a detailed strandings report for Cornwall which can be found at on their Marine Starndings Network page https://www.cornwallwildlifetrust.org.uk/what-we-do/our-conservation-work/at-sea/marine-strandings-network. Other regions have limited records for stranded cetaceans. Dorset Wildlife Trust provided some records of stranded cetaceans reported to them and these can be seen in Table 10.1. The British Divers Marine Life Rescue (BDMLR) have also provided records regarding live strandings of odontecetes in Cornwall and Devon. These are listed below.

Live strandings recorded by BDMLR in Devon and Cornwall in 2021

3rd January. Porthmeor beach, St Ives. Common dolphin poor condition, died shortly after stranding.

3rd January. Weston- Super-Mare. Common dolphin in good condition, died shortly after stranding.

10th January. Gwithian. Common dolphin filmed stranding. Pushed back in by public who noted exposed bones in one foreflipper. A fresh animal stranded dead in the same area the following day and is likely to be the same one.

21st March. Bigbury. Common dolphin in poor condition put to sleep by BDMLR and vet team.

22nd May. St George's Well, Padstow. Striped dolphin in poor condition with broken jaw. Had been found early in the morning by member of public who repeatedly put it back in water despite condition. Not reported to BDMLR for over an hour and was found dead by them.

4th October. Mylor Bridge. A pair of common dolphins briefly live stranded on the mud flats but were able to self-rescue. Monitored by BDMLR until they left a few hours later.

28th December. Place, opposite St Mawes. Pod of eight common dolphins including a calf came into shallows on outgoing tide and almost stranded. Managed to self-rescue and monitored by BDMLR for the next few hours.

Table 10.1. Stranded cetaceans reported to the Dorset Wildlife Trust

Date	Time	Species	Common name	Count	Dead?	Named Area	Lat/Long	Grid ref	Precision	Comment
20/02/21		*Phocoena phocoena*	Harbour porpoise	1	Yes	Southbourne Beach				Damage sustained to tail stock and lacerat ons in abdomen
22/02/21		*Delphinidae*	Unident f ed dolphin sp.	1	Yes	Cogden Beach				A fairly large dead dolphin just by the steps leading up from the beach to the Old Coastguard Park, to the west of Cogden Beach near Burton Bradstock. It looks to be intact at this t me.
24/02/21		*Delphinidae*	Unident f ed dolphin sp.	1	Yes	West Bay		SY 4638 9020	<100m	Coastguards have already reported to CSIP.
25/02/21		*Phocoena phocoena*	Harbour porpoise	1	Yes	Charmouth	50.733419, -2.900295		500m - 1km	Approx. 1 metre in length. HMCG reported to CSIP.
27/03/21		*Delphinidae*	Unident f ed dolphin sp.	1	Yes	Chesil Cove				Carcass f oat ng in sea near Quiddles - not washed up. Reported to CSIP.
31/07/21	11:35	*Delphinus delphis*	Short-beaked common dolphin	1	Yes	Chesil Cove Beach				Very fresh carcass. Measurements taken. 175cm long, male. Reported to CSIP and retrieved for necropsy
29/09/21		*Phocoena phocoena*	Harbour porpoise	1	Yes	Chesil Cove Beach				Reported to CSIP
05/10/21	17:30	*Grampus griseus*	Risso's dolphin	1	Yes	Chesil Cove Beach				Very badly decomposed. Reported to CSIP. Windy and rough condit ons.
17/10/21	11:30	*Phocoena phocoena*	Harbour porpoise	1	Yes	Seatown	50.722946, -2.828117		<100m	animal found lying on it's right side with side part ally buried by the beach, lef t eye missing with skin and fat torn away from the eye orbit, lower mandible part ally shown, viscera showing from large circular area behind lef t pectoral f n, skin damage to dorsal f n, caudal f n part ally buried. Fully grown adult, but not too old due to lack of scarring and raking marks. Reported to CSIP
19/10/21		*Phocoena phocoena*	Harbour porpoise	1	Yes	Cogden Beach				Approximately 4 feet long. Reported to CSIP although believed to be the same one that washed up at Seatown in 17th October.
10/11/21		*Phocoena phocoena*	Harbour porpoise	1	Yes	Cogden Beach			>1km	dead stranded. Poor condit on/bones showing
22/12/21		*Phocoena phocoena*	Harbour porpoise	1	Yes	Hengistbury Head	50.713655, -1.746126		<100m	Very fresh carcass. Looks quite thin. Reported to CSIP

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Management

11. Fisheries

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This report provides a snapshot of fisheries in the south-west in 2021, including research activities, landings, regulation and management. The complex interactions between the environment, fish stocks, fisheries and fisheries management remain a challenge for managers. The new post-Brexit fisheries framework aspires to introduce an Ecosystem Approach, resulting in World Class Fisheries Management. However, much of the implementation of the new framework is yet to be determined, and its implications for the marine environment of the southwest are not yet known.

Conclusions

- The new post-Brexit fisheries framework aims to deliver more participatory fisheries management, primarily through Fisheries Management Plans
- Stakeholders in the Southwest are informed, engaged and organized, but how the different delivery models for FMPs will ameliorate the diverse wishes of different stakeholders is yet to be determined.
- Continued changes in the ecosystem of the southwest are evident in both fish species being observed and the fisheries targeting them
- In some cases fisheries can adapt and develop very quickly to take advantage of new opportunities (e.g. new markets, recruitment events, or stock recovery). Wrasse, cuttlefish, crawfish and bluefin tuna are all examples.
- Some of the fisheries persist and become an established part of the local industry whereas others may only exist for a short time. The live wrasse fishery did not take place in the D&S IFCA District in 2021 due to the lack of a viable market.
- It remains hard to untangle the impacts of environmental drivers and fishing pressure on stocks – for example declines in squid and brown crab and increases in sprat in 2021.
- Management will need to be equally adaptive to deal the changing ecosystem of the southwest. The ability of FMPs to reflect and respond to the spatial and temporal complexity and dynamic nature of marine ecosystems and fisheries will be crucial in order to provide World Class fisheries management
- The ecosystem approach is now enshrined in the Ecosystem Objective of the Fisheries Act 2020, including directly linking the delivery of GES to fisheries management.
- There is acknowledgement that ambitious targets for offshore wind will have an impact on the marine environment and fisheries are now part of a wider conversation around Marine Spatial Prioritisation and the optimal use of the UK's seas.

The Foundations of a New Fisheries Framework – National Policy Update 2021

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2021 saw the continued development of and early implementation stages of the new post-Brexit fisheries framework; the Fisheries Act 2020, the Joint Fisheries Statement (JFS) and Fisheries Management Plans (FMPs). The JFS will set out the UK policy framework, including how the UK will deliver the eight objectives of the Fisheries Act 2020: (a) the sustainability objective; (b) the precautionary objective; (c) the ecosystem objective; (d) the scientific evidence objective; (e) the bycatch objective; (f) the equal access objective; (g) the national benefit objective, and (h) the climate change objective. A consultation draft of the Joint Fisheries Statement was published in very early 2022.

FMPs will be documents that set out a policy framework to secure the long-term sustainability of UK fish stocks. The JFS aims to increase participatory decision making, and six frontrunner FMPs were identified to be the first to

progress and test, amongst other things, different models of participation; crab & lobster, bass, king scallop, whelk, southern North Sea mixed flatfish (including plaice, sole, turbot, witch, brill, lemon sole, dab, flounder and halibut) and Channel non-quota demersal (including red gurnards, tub gurnards, cuttlefish, squid, octopus, John dory, mullet, lesser spotted dogfish and grey gurnards).

Whilst there has been a shift in ambition from marine protection to marine recovery in recent legislation and policy documents, in 2021 this was juxtaposed by the announcement of ambitious targets for offshore wind. The failure of UK seas to reach Good Environmental Status (GES) combined with an increasingly busy marine space has resulted in a Defra-led Marine Spatial Prioritisation programme. There are hopes that such an approach may facilitate a strategic assessment of the trade-offs required to deliver optimal use of the seas and deliver ecosystem recovery.

2021 saw a renewed focus on the evidence needed for effective fisheries management. Defra are developing a series of Evidence Strategies which will help to collate best available evidence to inform policy development. New insights into the fish ecology, behaviour and their role in the ecosystem have been facilitated by relatively new technologies, especially the increasing use of acoustic telemetry (for example for shad, bass and bream) and acoustic surveys of pelagic fish. In 2021 the MMO also announced that a national roll-out of iVMS would begin. This much anticipated move will revolutionise our understanding of fishing effort in the inshore environment and our ability to manage the impacts of the very abundant inshore fleet.

In summary, 2021 saw lots of positive development in the UK fisheries policy/ legislative landscape, with opportunities for real change. However in order to realise this potential, difficult decisions will need to be made as me move beyond seeking win-win scenarios and address the trade-offs required to deliver marine ecosystem recovery. There is a huge amount of work ahead for all parts of government and stakeholders.

Fish stocks and their ratings in the southwest

Cornwall Good Seafood Guide: Fisheries – Progress in 2021

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The Cornwall Wildlife Trust have been producing the Cornwall Good Seafood Guide (CGSG) in a collaboration with the Marine Conservation Society since 2015. Ratings are calculated using the Marine Conservation Society wild capture methodology and all ratings are reviewed by MCS and published on both Cornwall Good Seafood Guide website and MCS good fish guide website. Visit www.cornwallgoodseafoodguide.org.uk for more information and for a list of recommended sustainable Cornish Seafood. This note summaries ratings changes in the past year;

Reduced ratings, Summer 2021 and Winter 2021/22

- In light of continued Cetacean bycatch, seal and seabird bycatch, MCS have reduced the score of gill net ratings from 0.5 to 0.75 – this has resulted in changed ratings for many seafood species – particularly those which are data poor and those with no management. As a result the following species (when caught by gill net) are now no longer on the CGSG recommended list; black-bellied monkfish, ling, pollack, sand sole, mackerel, red gurnard.
- Concern over squid stocks led to reduced ratings for squid and concern over lack of separation of the two species landed to UK ports has also affected ratings as it makes it even harder to assess sustainability.
    - Veined squid – *Loligo forbesii*, new listing. Line caught 4, demersal trawl 5 (lack of management or stock data).
    - European squid - *Loligo vulgaris*, rating has gone up from 3 to 5 for demersal trawl and from 3 to 4 for line caught. This is in light of new evidence that stocks are declining.
- Crawfish – now downgraded to 5 for all methods due to lack of data and management.

Improved ratings, Summer 2021 and Winter 2021/22

- Plaice in Celtic sea – stocks looking more healthy (ICES), trawl caught plaice is now rated 2.
- Haddock – good ICES report so stock score has improved and all methods are now rated 3.

- Pacific oyster (wild Caught) rating improving from 2 to 1 (in light of research from NE and CWT).
- Sardine ring net from 3 to 2 due to stock now benchmarked and f below sustainable levels.

New Ratings, *Summer 2021 and Winter 2021/22*

- Atlantic bluefin tuna; gillnet 5, ring net 4, demersal trawl 4
- Herring; line caught 5 due to poor stocks in Celtic sea



Plate 11.1. Sardine fisherman Chris Blamey brailing sardines from a ring net off Mevagissey. Image: Photo Matt Slater.

PELTIC 2021: Pelagic Ecosystem Survey of the Celtic Sea and Western Channel

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The annual PELTIC survey took place again in October 2021. While the timeseries started in 2013, from 2017 its coverage extended to include the western Channel and Eastern Celtic Sea. The most notable result was the high sprat numbers found throughout the survey area. They were dominated by 0-group fish, confirming a very strong recruitment earlier in the year. Sprat biomass in a consistently sampled area used for the stock assessment (sprat in ICES area 7de), was 107,355 t which was more than three times the 2020 estimate and the highest since the start of the PELTIC timeseries in 2013. As in previous years, the highest quantities were found in Lyme Bay, showing a more offshore distribution than in 2020, although sprat was also found in the Eddystone Bay. Larger than usual numbers of sprat were also found along the northern French coast. Outside the western Channel, sprat was again also found north of the Cornish Peninsula: offshore in the deeper waters of the Celtic Sea, in the Inner Bristol Channel and, in very high numbers, in Cardigan Bay.

Sardine biomass for the survey areas was 227,117 t. This represented a reduction by one third from peak values in 2020 (and 2019), although still higher than 2017 and 2018 and a close second most abundant small pelagic fish species (after sprat). Large numbers of eggs particularly off Mounts Bay and the Eddystone suggested peak spawning time was captured by the survey. The sardine biomass estimation from the extended PELTIC coverage (from 2017) was accepted for use in a new sardine stock assessment in the area (ICES area 7), since its recent separation from sardine in the Bay of Biscay.

Anchovy biomass continued its upward trend (45,616 t) with one year old fish dominating the population. These “northern” anchovy spawn in the southern North Sea and migrate to the SW of the UK to overwinter. No mackerel abundance could be calculated but the predominantly juvenile mackerel were widely distributed throughout the

study area, consistent with previous years. For the fourth consecutive year bonito were again found in the area. Atlantic bluefin tuna were regularly observed, this time mainly around the Channel Islands.

Survey report: [CENTRE FOR ENVIROMENT, FISHERIES AND AQUACULTURE SCIENCE LOWESTOFT LABORATORY, LOWESTOFT,SUFFOLK NR33 OHT (bodc.ac.uk)]

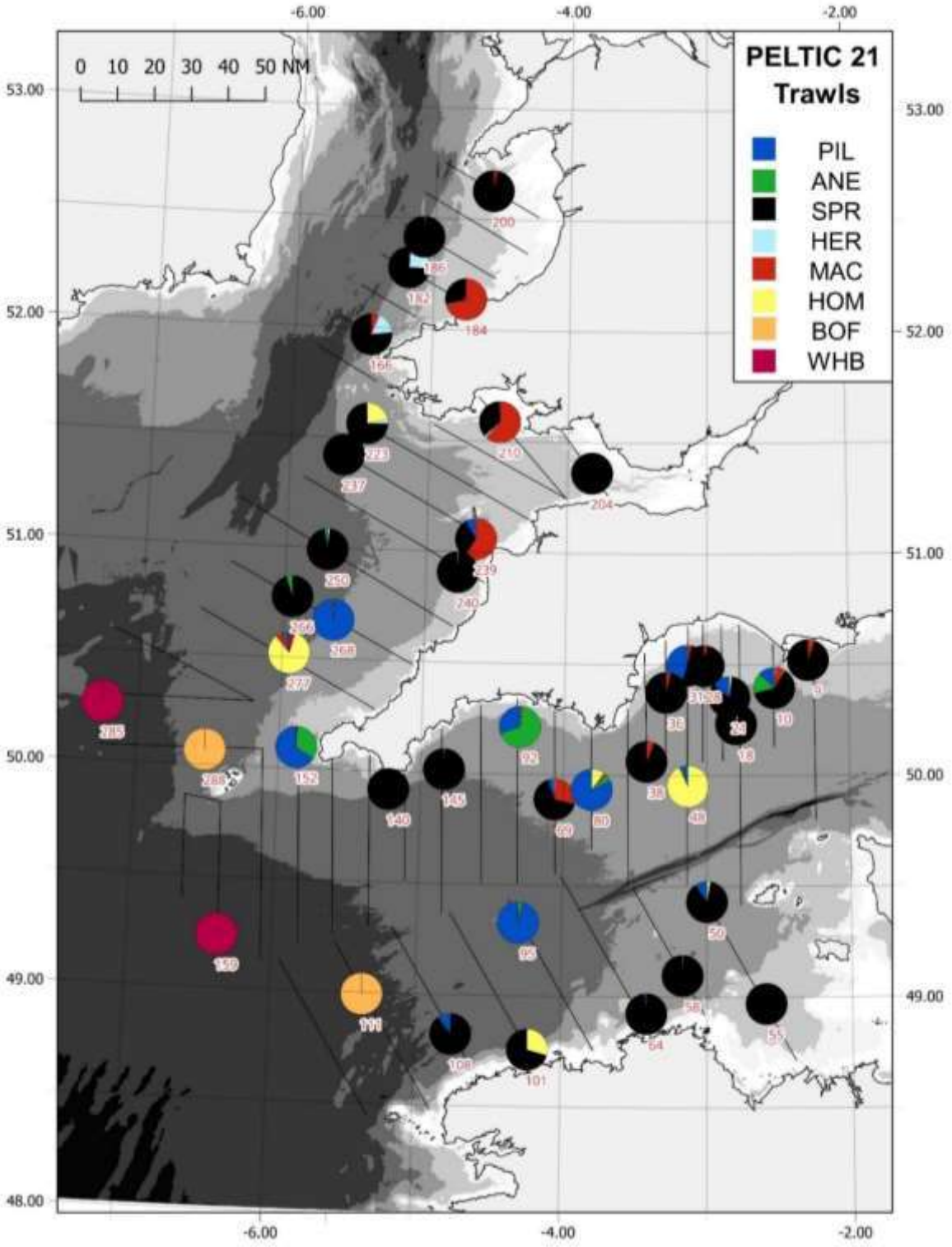

Figure 11.1. Overview map of the PELTIC21 survey area. Acoustic transects (black lines) and Trawl stations (pies) with relative catch composition by key species. Three letter codes: PIL=sardine, ANE=anchovy, SPR=sprat, HER=herring, MAC=mackerel , HOM= horse mackerel, BOF=Boarfish, WHB=Blue whiting

Fisheries stakeholder perspectives in the Southwest

The Cornwall Fishing Stakeholder Group

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The group was established in 2018, initially to get stakeholder input to Cornwall Council's position on UK Fisheries Bill. The group aims to provide an entry point for the fishing sector to raise issues of concern with Cornwall Council and to discuss future opportunities. It also provides a mechanism for Cornwall Council to get stakeholder input to policy that impacts the fishing sector. This can include establishing a Cornwall Council position on fishing issues in advance of discussions with local MPs, central government ministers and departments (Defra in particular), and other local authorities in South West England. Membership includes fishers, FPOs, processors, merchants, anglers associations, marine conservation organisations together with Cornwall Council officers involved in economic development, environmental growth, ports & harbours and environmental health.

Fishing in Cornwall and the Isles of Scilly
Catch sector

- £36m total value of fish landed in CIoS (2020)
- Fish landed in CIoS represented 19% of all landings in England
- Diverse fisheries with more than 50 species landed with sole, crabs, monks and hake being most landed species
- Diverse fleet operating out range of harbours and ports- 510 vessels and approx. 2000 fishers
- Newlyn is main port with £24.64 million landed, 68.7% of the total

Processing and wholesale

- 18 SME/483 FTEs/GVA £31.7m
- Domestic and export markets for foodservice, wholesale and retail

Links to other sectors

- Tourism
- Shared skills/workforce with wider maritime sector (FLOW, conservation, etc.)

The Fishing Stakeholder group has engaged in the following key activity during 2020/21:

- Dissemination of information about CC managed Covid19 grant support to ensure uptake among the fishing sector
- Unlocking the £300K Wave Hub Mitigation Fund investment (smalls grants fund and investment into Duchy Fish Quota company)
- Convening discussion about harbour and parking fees for Cornwall Council owned ports and harbours
- Convening discussion about impact of new UK-EU trading relationship on fish and shellfish exports and coordinating CC's input to Defra
- Convening discussion about Environmental Health Certificates following Brexit
- Unlocking LEP funding for a fishing sector strategy
- Facilitating conversation between fishing sector, environmental NGO's and other sectors on floating offshore wind (FLOW) developments

Fishing continues to be an important part of CIoS world class food & drink cluster. The industry continues to face a number of significant changes; Brexit, climate change adaptation, FLOW developments. This difficult environment increases the importance of joint working across public, private and NGO sectors to develop joint response to future challenges and opportunities.

<u>The Angling Trust</u>

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https://anglingtrust.net/

The Angling Trust are the national governing and representative body for all angling in England. Founded in 2009, it is a member organisation with 20,141 individual members, of who 4260 are sea angling members. There are also 2012 member clubs, comprising 380,000 individual members.The Angling Trust represents 250 sea angling clubs, with 34,000 individual members

Recreational Sea Angling (RSA) is hugely important economically with research detailing this in reports published in 2020. CEFAS estimated the value that sea angling contributes to the UK economy at £1.5 billion* annually as compared to the Governments own assessment of commercial fishing adding £831million^ to it.

In 2020-2021 with the pandemic our focus was very much upon getting anglers fishing again across the country as we came out of lockdowns. We persuaded Government of the huge benefits that angling offered in terms of mental health and general welfare benefits with people being able to get out into the open safely and our approach to this was recognised as best sporting practice nationally.

But what else has happened and where we have impacted positively for angling and conservation over this period?

- In the Fisheries Act (2020) RSA's were formally recognized as stakeholders with the legislation committing to the 'promotion and development of sea angling' as a direct result of Angling Trust work
- Joint Fisheries Statement (JFS) and Fisheries Management Plan (FMP) processes started to develop. As part of this co-management and co-design issues started to be considered and importantly, we in the Angling Trust want us engaged as valued partners from the onset rather than at the completion stage of these.
- We have been promoting the role of RSA's supporting citizen science – such as through the development of joint work on the Shark Hub - https://anglingtrust.net/sea/shark-hub-uk/
- We have raised the profile of RSA through virtual forums – e.g., with our IFCA virtual tour around 9 IFCA's, starting in Cornwall and Shark-related forums - https://anglingtrust.net/virtual-sea-angling-forum/
- We have driven forward other environmental stewardship work through our Anglers Against Litter https://anglingtrust.net/get-involved/anglers-against-litter/ and Anglers Against Pollution campaigns https://anglingtrust.net/get-involved/anglers-against-pollution/

We see the key issues now and moving forward in 2022 as maintaining and improving the right and access to fish (free from conflict and disruption) and protecting and improving the environment for fish and fishing, and:

- We will continue to promote RSA's as recognized stakeholders in developing future fisheries policy;
- We have concerns about the development of fisheries policy and the impact of this on stocks for species of angling concern such as Bass. We will therefore be playing our full part in ensuring anglers voices are heard as the JFS and FMP's are developed;
- We will continue to support the work of the Bluefin Tuna Campaign in expanding on the CHART programme in 2022 and lobbying for the introduction of a small recreational fisheries alongside a CHART programme. This will deliver enhanced economic benefits through a sustainable bluefin tuna fishery, potentially focused upon South-West England;
- Environmental stewardship is hugely important for angling, and we will continue to build on our work, developing an Anglers for Nature campaign in the coming year;
- Anglers are effective as the eyes and ears for our seas and should be seen as part of the solution, not the problem to reach shared goals for sustainable fisheries.

Inshore Fisheries Management Updates

Southern IFCA

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In the summer of 2021, following a period of consultation with the community, Southern IFCA introduced its new Minimum Conservation Reference Size byelaw. This byelaw was introduced due to an immediate need to re-apply minimum conservation reference sizes to all fishery participants in order to protect the sustainability of fish and

shellfish populations. This byelaw preceded a scheduled review of minimum size regulations by Southern IFCA, which is already underway. In addition to the re-application of existing species sizes in the district, the byelaw introduced new minimum sizes for four wrasse species and increases the minimum conservation reference sizes for crawfish and three grey mullet species in the District. These new grey mullet minimum sizes are significant as they represent the largest regulatory minimum size for the species in its population range.

As part of its wider review of minimum sizes, Southern IFCA has undertaken an analysis of available biological data to help identify any evidence gaps, particularly for species that are subject to greatest fishing mortality. Where evidence gaps have been identified, the Authority has introduced procedures through working with local academia to gather further data on size of maturity in a number of species, including the three grey mullet species, whelks, king scallops and gilthead bream.

Southern IFCA's review of netting regulations for harbours and estuaries concluded in 2021, culminating in the Authority making a Net Fishing byelaw in December. The District's harbour and estuarine waters are highly valuable to fish populations as Essential Fish Habitats (EFH) due to the role these areas play as nursery, feeding and refuge areas. The byelaw will support the role of these EFH by avoiding mortality through net fishing in key EFH areas, where populations are at their densest and during their most critical ecological stages. As they migrate through the District's harbours and estuaries, Atlantic salmon (*Salmo salar*) and sea trout (*Salmo trutta*) are vulnerable to the possibility of injury or mortality associated with fishing with nets. The byelaw will reduce the risk of interactions between migratory salmonids and fishing nets in these environments through the introduction of site-specific measures. The Net Fishing Byelaw is a District-wide statutory mechanism encompassing site specific management measures across forty-nine sites. The byelaw introduces a range of measures to manage net fishing in the District. These measures include the introduction of Net Prohibition Areas, Net Restricted Areas and Net Permit Areas. In addition, the byelaw introduces for the marking of nets by all fishers in the District, as well as introducing measures for the application of flexible permit conditions within the Net Permit Areas of Southampton Water, Christchurch Harbour and the River Hamble. The byelaw also outlines how these permit conditions, permit fees and the limits on the number of permits issued will be reviewed.

Pot fishing is a culturally and economically valuable activity within the Southern IFC District, but is a comparatively under-managed activity, with evidence of recent declines in the populations of target species. To better support the participants within these fisheries, together with the health of the marine environment, Southern IFCA is undertaking a review of pot fishing measures in the District. Following extensive consultation with the community, the Authority has made a Pot Fishing Byelaw. The byelaw introduces a number of measures to manage pot fishing in the District, include the introduction of a Commercial Potting Permit and a Recreational Potting Permit. In addition, the byelaw introduces the requirement for all pots or string of pots in the District to be marked and a prohibition on the removal of berried crab. The byelaw introduces the application of flexible permit conditions within Potting Permits and outlines how these permit conditions, permit fees and potential limits on the number of permits issued will be reviewed.

Both the Net Fishing Byelaw and the Pot Fishing Byelaw are undertaking a statutory quality assurance process prior to confirmation by the Secretary of State.

Following the introduction of six new Marine Conservation Zones in the District, the Authority has been undertaking assessments of fishing activities within these areas to understand whether they are compatible with the conservation objectives of these sites. Bottom Towed Fishing Gear is one activity that, in some cases, requires additional management to remove potentially damaging pressures. In order to introduce additional management the Authority is consulting the community on the introduction of new closure areas for Bottom Towed Fishing Gears in the District, both within existing MPAs but also outside of designated sites, where sensitive habitats such as seagrass beds may be found.

As part of the Authority's duty to maintain a healthy marine environment, the Authority has introduced new closure areas for the Poole Harbour clam and cockle dredge fishery around saltmarsh habitat in Poole Harbour. Whilst the

activity and habitat rarely overlap, saltmarsh in parts of Poole Harbour, much like the rest of the South Coast, has experienced gradual decline and it is important to ensure that fishing activity does not contribute further to this decline. The Authority will continue to review the potential effects of fishing activity on this important habitat.

Despite the limitations of Covid 19, the Authority was able to undertake a comprehensive monitoring programme in 2021, with an emphasis on gathering data to support the management of sustainable fisheries in the District. This included a new stock survey for an emerging king scallop fishery in the Solent. In response to data gathered the Authority has introduced a six month summer closed season for this fishery with the aim to protect the spawning population and spat settlement at its most critical stage. Further measures have also been introduced in this fishery to limit fishing effort to a total of two dredges per vessel. In a positive development, participants in this fishery have innovatively modified the dredges used to reduce their weight and impact on the seabed.

Devon and Severn IFCA

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A broad-scale survey was undertaken of mussel beds in the Taw-Torridge estuary. Building on the survey work conducted in 2020 between D&S IFCA and a local fisher, the 2021 survey also included Cornwall IFCA. This enabled the use of side scan sonar alongside grab sampling to gain a clearer understanding of the extent and health of mussel beds. Mussels are an important food source for wading birds, crabs and many fish species, are an important habitat for other marine life and provide ecosystem services as a food source for humans and role in removing bacteria and toxins from the water. There is concern on the health of mussel beds generally from commercial and recreational fishing, coastal developments and more specifically in this site from strong tidal movements and high freshwater input. D&S IFCA's research is being used to produce a management strategy for the mussel fishery in the Taw-Torridge.

Devon and Severn IFCA published the first five of its Fisheries Research and Management Plans (FRMPs) for the north of the District. These focused on bass, herring, whelk, squid and skates and rays. Building on the success of these plans, D&S IFCA also began development of similar FRMPs for the south of the District. The FRMPs collate, review and critically analyse existing data on fish and stock structure, fisheries management and marine environmental management to identify gaps in knowledge which may hinder current or future efforts to manage those stocks. They include both scientific and local anecdotal information. They identify key gaps in knowledge in terms of ecology and lead to prioritised research and identify potential partners for undertaking the work.

The live wrasse fishery was not active in D&S IFCA's District in 2021, due to the absence of a viable market for fishers to supply to. This has provided an opportunity to reflect on D&S IFCA's management decisions to date in the context of advances in the scientific literature. The Nordic Council of Ministers recently commissioned a report that collates evidence on cleaner fish fisheries in Scandinavia and the UK and provides management recommendations on how the fisheries and use of cleaner fish can become more sustainable (Halvorsen *et al*., 2021). In the report, the management measures for wrasse fisheries in Norway, Sweden, Denmark and the UK are outlined and combined with evidence of the biology and ecology of wrasse to recommend management measures to increase the sustainability of Live Wrasse Fisheries. D&S IFCA's current management measures appear to match most of the recommendations in the Halvorsen *et al.* (2021) review. These recent recommendations, which were made for the Norwegian fishery, may be more precautionary than is needed in the D&S IFCA District as the fishery in Norway is happening on a much larger scale, and has been occurring for many more years than that in D&S IFCA's District. Nevertheless, it is likely that D&S IFCA's current management is sufficient to ensure sustainability of wrasse stocks if the Live Wrasse Fishery were to begin again in the future. As shown throughout the development of the Live Wrasse Fishery in the District, D&S IFCA's permit-based management system is adaptive and agile and allows rapid responses to new evidence of fisheries as and when it becomes available. Since their implementation, the Live Wrasse Potting Permit Conditions have been adapted several times to reflect the findings from Officer's annual reports of the fishery, as well as published research (e.g. Henly et al., 2021).

12. Marine Protected Areas and management for conservation

Edited by: Siân Rees

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Contributors: Jean-Luc Solandt, Ruth Williams, Kate Sugar, Chris Laing, Alice Hall, Matt Ashley, Susan Kay

Introduction

Siân Rees, University of Plymouth

Conclusions

- In the SWME area, we currently have 58 Marine Protected Areas (MPAs) in total (20 Special Areas of Conservation (SACs), four Special Protection Areas (SPA) and 34 Marine Conservation Zones (MCZ)).
- Across the Devon, Cornwall and Isles of Scilly marine area (coastline to 12nm), 33.9% of the marine area is covered by an MPA designation. Conservation Advice has been completed for 97% of MPAs and condition assessments completed for 7%.
- There is an ambition in the south-west for effective MPAs and nature recovery.
- Within the SWME region, inshore areas (0-6nm) have greater spatial areas within MPAs (25-30%) than the offshore area.
- In terms of fisheries management measures that reduce the pressure on seabed habitats from Bottom Towed Gear (BTG), the Devon and Severn Inshore Fisheries and Conservation Authority (IFCA) has the greatest proportion of the area of MPAs (85%) protected from BTG.
- Extension of the 'whole site approach' to MPAs where sediment areas between conservation features are also protected from the pressure of BTG though a fisheries byelaw, demonstrates that the Isles of Scilly IFCA include 100% of mixed sediment area within MPAs and the Devon and Severn IFCA include 93% of mud and 79% of the sand habitats within MPAs.

In the SWME area, we currently have 58 Marine Protected Areas (MPAs) in total (20 Special Areas of Conservation (SACs), four Special Protection Areas (SPA) and 34 Marine Conservation Zones (MCZ)). Across the Devon, Cornwall and Isles of Scilly marine area (coastline to 12nm), 33.9% of the marine area is covered by an MPA designation. Conservation Advice has been completed for 97% of MPAs and condition assessments completed for 7%. There is an ambition in the south-west for effective MPAs and nature recovery. Table 13.1 (see the next section) provides metrics for the amount of seabed within MPAs (per regulator district); the amount of seabed protected by a no bottom towed gear fisheries (BTG) byelaw; the proportion of (%) MPA area that are protected via a BTG byelaw and; the % area of total areas of MPAs in that regulators district whereby closures to BTG extend to sedimentary seabed habitats (muds, mixed gravels & sands). We can see within the SWME area that the inshore areas (0-6nm) have greater spatial areas within MPAs (25-30%) than the offshore area. In terms of fisheries management measures that reduce the pressure on seabed habitats from BTG the Devon and Severn Inshore Fisheries and Conservation Authority (IFCA) has the greatest proportion of the area of MPAs (85%) protected from BTG. Extension of the 'whole site approach' to MPAs where sediment areas between conservation features are also protected from the pressure of BTG though a fisheries byelaw, demonstrates that the Isles of Scilly IFCA include 100% of mixed sediment area within MPAs and the Devon and Severn IFCA include 93% of mud and 79% of the sand habitats within MPAs. For future reference, an increase of the mixed sediment areas included within BTG byelaws provides a proxy metric for habitat areas where there are opportunities for nature recovery and restoration beyond features of conservation interest.

MPA reality check

Jean-Luc Solandt, Marine Conservation Society

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Summary / Conclusions

Measuring MPA efficacy is fraught with issues. There is little monitoring data to cover the complexity, range and size of sites. There is difficulty in providing a standardised assessment of sites in terms of communication, stakeholder buy-in and biological response. The length of time MPAs have been designated coupled with management of activity and implementation of effective science involving controls is patchy. However, there are some proxies and fundamental aspects to assessing 'well-managed' in the context of our current national and regional network. One of these is to ensure MPAs protecting seabed features are free from bottom towed fishing activities as a minimum level of protection. As such, since 2015, the MCS has helped design (with MarineMapping) and contributed to a website (MPA reality check) that illustrates such essential measures, and other attributes of MPAs (e.g. habitats, amount of fishing, carbon content). Here we reflect on its current (up until April 2022) findings:

Context and data

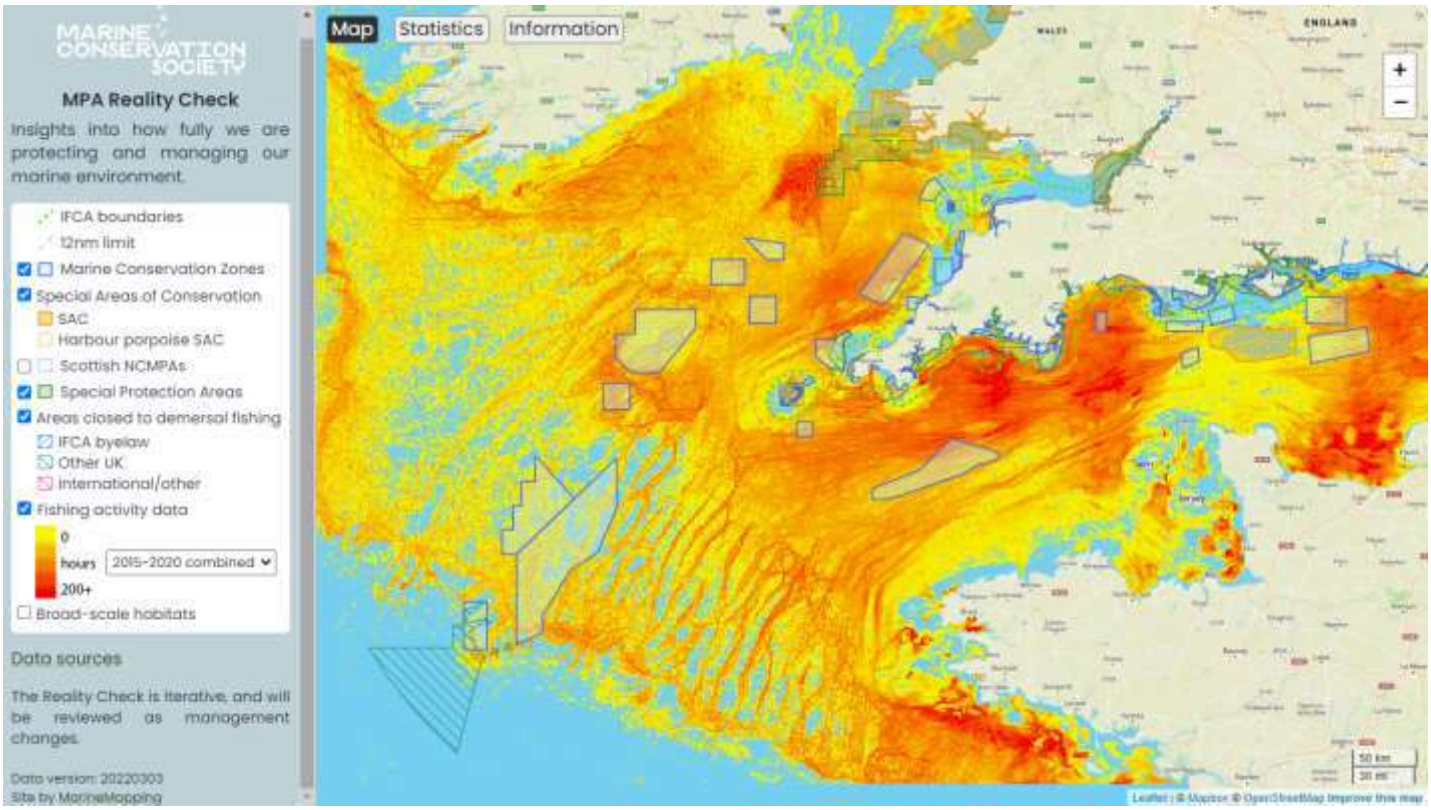

Figure 12.1. Bottom trawling activity of vessels >15m in and around UK MPAs in offshore and nearshore areas (this is an underestimate of trawling activity, as it does not take account of smaller vessel activity). Data is intensity of fishing combined for 2015-2020 data for all fleets. Image is taken from the MPA reality check (https://mpa-reality-check.org/).

The most pervasive factor influencing marine ecosystems and their function has and continues to be mobile bottom trawling, seining and dredging (Dunkley and Solandt, 2021; IPBES, 2019). These gears are widespread in the southwest, as this is a productive ground for fishing (Figure 12.1). However, there is a large amount of evidence that such activity changes benthic ecosystems, upsets food chains, reduces the sequestration abilities of seabed habitats, and selects for *r*-selected species (with short life histories, high reproductive and growth rates) (Tillin *et al.,* 2006) .

As such, understanding how well we are doing in 'conservation' terms, in many ways, starts with (not only) how we are managing MPAs, but also how the responses to areas closed to such activity respond – for the benefit of biodiversity richness and ecosystem services.

The Marine Conservation Society continues to assess areas with full bottom towed fishing closures of areas in the southwest and wider UK seas. We will do this on an annual basis from the IFCA and Marine Management Organisation (MMO) waters in the southwest area as a proxy to start considering management effectiveness.

The MCS have calculated the amount of actual protection that exists inside different jurisdiction waters (in terms of byelaws or permit conditions) to ban bottom contact fishing gears from impacting seabed habitats and associated species. We have presented data at EUNIS level 5 data on mixed, sand and mud habitats (Table 12.1) to observe how the proportion of these ubiquitous habitats that are effectively managed in MPAs. Previous research (e.g. Langton *et al.*, 2020) has been found that regulation to protect MPA area is significantly 'placed' inside MPAs where bottom towed fishing gears do not operate (e.g. over 'reef' areas of MPAs, or in MPAs very close to the coast).

Table 12.1. Amount of MPA, bottom towed fishing in MPAs (as of 1st April, 2022), and closures to bottom towed fishing, and five sediment protected in MPAs (source: https://mpa-reality-check.org/stats/).

Regulator and 'zone'	**District Area / MPA area (km²)**	**MPA proportion of district %**	**Protected seabed from BTG (km²)**	**MPA area Protected from BTG %**	**Sediment protected in MPAs %**
Devon and Severn IFCA (0-6nm)	4544 / 1326	29.2	1121	85	Mixed: 37.5 Mud: 93.5 Sand: 79
Cornwall IFCA (0-6nm)	4067 / 1036	25.5	408	39.4	Mixed: 58 Mud: 42 Sand: 16.2
Isle of Scilly IFCA (0-6nm)	973 / 294	30.2	230	78	Mixed: 100 Sand: 14.9
Offshore (MMO) (6-200nm)	68086 / 13583	20	0	0	

District Area: The area administered by that regulator in Column 1 of the table.
MPA Area: The area of MPA in that regulators district.
MPA proportion of district: The percentage area of MPAs (that protect seabed features) in that district.
Protected seabed in MPAs from BTG: The area in all MPAs combined that is protected from all forms of bottom towed gear in that regulators district.
MPA area protected from BTG: The percentage of areas within (or outside) MPAs in that regulators MPAs that are protected as a proportion of the whole area of MPAs that are designated to protect the seabed.
Sediment protected in MPAs: the percentage area of total areas of MPAs in that regulators district whereby closures to BTG extend to sedimentary seabed habitats (muds, mixed gravels & sands).

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MPAs and Marine Nature Recovery for Cornwall

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Conclusions:

1. We currently have almost 36% of Cornwall's inshore waters (between 0 and 12nm) designated as MPA, but only 8% is actually effectively managed to deliver protection from damaging activities like bottom trawling.
2. Just designating sites is not enough, they have to be effectively managed to reduce pressures and allow recovery.
3. A ban on destructive bottom-trawling of the seabed in our MPAs to protect both the seabed habitats and the carbon stored within it
4. We need HPMAs, for full whole site recovery. We need more than five pilot HPMAs and a commitment to 'level up' all MPAs towards these highest protections.
5. We need to protect and actively restore our blue carbon habitats to boost their carbon sequestration abilities and act as natural flood protection.
6. We (NGO's and Government advisors) can help to inform and influence policy but there is also a valuable role for Local action.

Marine nature recovery is needed to reverse past declines in wildlife and habitats so that they are healthy and thriving now and into the future for people, climate and nature. To rebuild the marine life-support systems that deliver the many benefits that society receives from a healthy ocean we need urgent action. In 2020, the Government committed to a target of '30 by 30' [https://www.gov.uk/government/news/pm-commits-to-protect-30-of-uk-land-in-boost-for-biodiversity[1]], to get 30% of the UK's land and sea protected for nature by 2030. But is this realistic and what do we need to do next to achieve this target?

In 2021, Cornwall Council produced a draft Local Nature Recovery Strategy (LNRS), but LNRS are defined within the Environment Act as being terrestrial only, stopping at Mean Low Water springs so the sea falls outside their statutory scope. To address some of the gaps and to progress thinking on Marine Nature Recovery, Cornwall Wildlife Trust have worked in partnership with Cornwall Council, and Natural England to look at how to progress marine nature recovery in Cornwall's MPA network and the wider seas. The report - A Marine Nature Recovery Strategy for Cornwall's Inshore Waters [2] - looks at defining what we mean by local MNR, and how existing information can best be used to prioritise opportunities for marine nature recovery, as well as to measure success, both within the existing MPA network and in the wider seas. As well as developing the thinking and methodologies to be applied to marine nature recovery work, a key part of the project has been in the evaluation of lessons learnt and recommendations for further work.

We currently have almost 36% of Cornwall's inshore waters (between 0 and 12nm) designated as MPA, but only 8% is actually effectively managed to deliver protection from damaging activities like bottom trawling. Just designating sites is not enough, they have to be effectively managed to reduce pressures and allow recovery. [Cornwall's Environmental Growth Strategy Key Performance Indicator Technical Report 2021, in press [3]]

Our current MPA network is not being managed effectively for recovery. We need to accelerate things, take some difficult decisions, ensure we have the proper secondary legislation to deliver effective and well-resourced management, and ensure regular monitoring of these sites.

MPAs are designated to protect specific features only and therefore do not offer full site protection to enable restoration of the ecosystem structure and function across all interlinked marine habitats. This whole site approach is essential for recovery, so it is crucial that the MPA network includes Highly Protected Marine Areas (HPMAs) which are sites where all extractive and destructive activities are banned.

In addition to MPAs we need to think about how recovery can happen in our wider seas too. We already have some tools that will help, things like marine planning and biodiversity net gain, licensing, fisheries management and working towards delivering Good Environmental Status (GES) through the UK Marine Strategy. But these weren't specifically designed for nature recovery and essentially we need all our national policies to be contributing to natures restoration, not just maintaining the *status quo*, or even continuing to allow our seas to be degraded further. One of the key outputs of this piece of work was to look at what indicators could be used to measure marine nature recovery success locally. Our assessment took into account existing criteria and indicators as well as the availability of data, complexity of analysis and associated costs. Data for measurable indicators need to be repeatable and ongoing, where possible with data collected through existing funded programmes and reported on annually. Our recommended list of targets and indicators therefore contains both the overarching target of 30% of our MPAs in effective management by 2030, as well as proxy indicators of health and recovery, which assess the direction of travel, whether increasing or decreasing.

There is of course the caveat that marine recovery is difficult and very different to how we manage recovery on land. We don't own the seabed as we do nature reserves or farmland where landowners can decide to manage it for recovery and easily record success against targets. Marine recovery relies on legislation, regulation and industry action so putting figures on targets is inherently difficult.

In summary, MPAs are a needed and valuable part of Marine Nature Recovery, but they must be effectively managed to help delivery on the 30x30 commitment. If we can do this, combined with wider seas management to remove pressures and undertake active restoration of marine habitats where appropriate, then we can help to reverse the long-term decline of wildlife, deliver climate benefits and set the UK on the path to recovery. A big task before 2030!

1 https://www.gov.uk/government/news/pm-commits-to-protect-30-of-uk-land-in-boost-for-biodiversity

2 Marine Nature Recovery in Cornwall's Inshore Waters 2021 Report. https://www.cornwallwildlifetrust.org.uk/sites/default/files/2021-12/Marine%20Nature%20Recovery%20in%20Cornwall%27s%20Inshore%20Waters%20%28FINAL%29%2010%20August%202021.pdf

3 Cornwall's Environmental Growth Strategy Key Performance Indicator Technical Report 2021, in press

MPAs in the South West – where are we? What's next?

Kate Sugar, Natural England

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MPA numbers in Devon, Cornwall and the Isles of Scilly (from coastline to 12nm limit) are:
10 Special Areas of Conservation (SAC)
Four Special Protection Areas (SPA)
37 Marine Conservation Zones (MCZ)
51 Marine protected areas in total.

Percentage area covered:
Devon, Cornwall and IoS Marine Area, coastline to 12nm (16,573 sq. km.)
MPA coverage within the Devon, Cornwall and IoS marine area, coastline to 12nm (6,619 sq. km.)
Percentage covered by MPAs: (34%)

Conservation Advice – completed (initial packages drafted): 97%
NE has a duty to give advice on how to further the conservation objectives for any MPA, identify the activities that are capable of affecting the qualifying features and the processes on which they are dependent. We do this by publishing Conservation Advice packages for each site. For the Devon, Cornwall and IoS marine area, we have two MPAs left to write Conservation Advice packages for.

Condition Assessment – completed (initial assessment drafted): 7%

In 2016, Natural England trialled and rolled out a new Marine Protected Area (MPA) condition assessment methodology following a standardised approach that assesses if the feature and sub feature conservation targets set for each MPA have been met. So far we have applied this to SACs – a similar process will be applied to our SPAs and MCZs in due course.

Completed: Fal & Helford SAC, Plymouth Sound and Estuaries SAC, Lyme Bay and Torbay SAC, Isles of Scilly SAC

New policy initiatives: Nature Recovery Green Paper

We are now moving from protection to recovery in our marine space. February 2022 saw the publication of Government's Nature Recovery Green Paper, which includes marine nature recovery.
Nature Recovery Green Paper: Protected Sites and Species - Defra - Citizen Space – consultation closed on the 11th May 2022. The Green Paper considered interesting possibilities like consolidating protected sites into a simpler legal structure, and recognises that the challenge is to place nature recovery at the heart of protected sites – accommodating climate change and allowing for recovery or change.

The Green Paper also discussed the 30 x 30 commitment – to have 30% of land and sea protected by 2030. The conclusion for marine presented in the Green Paper is that 38% of UK seas and 40% of England's seas are already in MPAs, and therefore the focus for marine will be on effective management for MPAs to achieve the 30 x 30 target.

New policy initiatives: Marine Spatial Prioritisation

Defra is also working on a programme of Marine Spatial Prioritisation, recognising that our marine space is very busy, and likely to get more so. Marine Planning as it stands is not strategic and doesn't prioritise activity, but there is growing recognition that a strategic and prioritised approach is going to be necessary. The work on Marine Spatial Prioritisation is trying to answer the question: what does the optimal use of our seas look like? Balancing the needs of biodiversity, fisheries, offshore wind etc. There will be changes to how we plan and manage activities at sea, and quite likely, in the future there may be changes to the way we manage our MPA network.

Fisheries management in MPAs update for 2021

The Fisheries Act 2020 introduced new powers for the MMO to introduce management, both within MPAs and across our waters. In early 2021 the MMO consulted on proposed management for four offshore MPAs (The Canyons MCZ, Dogger Bank SAC, Inner Dowsing Race Bank and North Ridge SAC and South Dorset MCZ). Byelaws for those four sites are currently being finalised.
The MMO now has an ambitious three year programme to assess and (where necessary) bring in management for all offshore sites.

Update on Highly Protected Marine Areas (HPMAs) – progress in 2021

In 2019 the Secretary of State commissioned the Benyon Review which was published in July 2020, and recommended HPMAs as an essential component of the MPA network. The Government response to the Benyon Review was published in June 2021, which welcomed the report, and committed to bringing forward some pilot sites.

HPMAs are intended to allow recovery to a more natural state, allowing biodiversity to recover to a higher level than in MPAs managed for specific features. The Government have announced their intention to take a 'whole site approach' for HPMAs – which means protection of all of the species and habitats within it, including the water column. This is a new approach to site protection, and contrasts with the feature-based approach that is taken for the rest of the MPA network, where protection is afforded for named species and habitats only.

Ecological criteria for selection of HPMAs were published in 2021, and stakeholders were encouraged to submit proposals for sites. Sites could be inshore or offshore, and within or outside of existing MPAs. Nearly 30 submissions were received. Alongside this – Natural England and the Joint Nature Conservation Committee submitted candidate locations based on our own ecological analyses.

Research Updates

The following reports are based on presentations made during the SWME webinars in early 2022.

Seagrass Blue Carbon Estimates for the Fal and Helford SAC, Cornwall

Chris Laing, University of Exeter.

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Chris is a Senior Lecturer at the University of Exeter, Cornwall campus who is interested in carbon cycling and marine habitats of the UK that store carbon and function to provide an ecosystem for marine life. Chris presented findings from his research into the distribution, productivity, carbon storage and health of seagrass beds found in the Fal and Helford SAC in 2021. His work included boat, diving and snorkelling surveys and was funded by Cornwall Council under their Environmental Growth Strategy.

Using acoustic telemetry to support SW MPAs- an update on the FISH INTEL project

Alice Hall, University of Plymouth.

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Marine protected areas (MPAs) in the UK are currently feature- or species- based. However, in the 25-year environment plan the government committed to a 'Whole site approach' for MPAs of greatest biodiversity interest. The whole site approach recognises the mosaic nature of habitats and the wider ecosystems, processes and functions. Understanding the connection between habitats and how mobile species use these habitats is vital for future marine management. The Interreg project FISH INTEL is using acoustic tracking to understand the habitat use of blue fin tuna, bass, pollock and crawfish at seven pilot sites across the French English Channel. A network of listening devices also known as acoustic receivers, is being placed across the channel to detect passing tagged individuals. The project tagging started in summer 2021 and there have already had detections from tuna and bass. This project aims to identify essential habitat for key species across the Channel and help inform the management of MPAs.

MPAs and Blue Carbon – Presentation of a method to identify opportunity and constraints for Blue Carbon habitat recovery, restoration and creation (North Devon Biosphere)

Matthew Ashley, University of Plymouth

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'Blue carbon' refers to carbon stored in marine ecosystems. Blue Carbon habitats such as saltmarsh and seagrass beds are calculated to store more carbon per unit area than terrestrial forests. These habitats not only prevent climate change, to aid achievement of climate policy goals, they protect coastal communities from its harmful impacts, such as rising seas and flooding and support provision of multiple other benefits, such as species habitat. Pressures related to human activity and environmental conditions limit health of blue carbon habitats. The destruction and degradation of natural habitats also results in the direct loss of carbon stored within them.

Extents of blue carbon habitats occur both inside and outside MPAs, where existing monitoring and management provides an opportunity to easily identify recovery and restoration opportunities and introduce management interventions. Outside MPAs, the 'footprint' of pressures related to human activities and environmental conditions that blue carbon habitats are adversely impacted by, can be overlaid on mapped extent of habitats. This process allows mapped layers of modelled 'relative' condition to be developed. We applied these approaches to map and

assess location, extent, condition and sequestration contribution of existing blue carbon habitats in the North Devon Biosphere and identified priority recovery opportunities. We also mapped potential habitat restoration and creation opportunities, based on environmental parameters, presence of conflicting pressures and costs. The method allowed actions to aid recovery in the Biosphere site to be identified. These included 1) reducing overgrazing pressure on saltmarsh habitat. 2) Improving evidence on spatial fishing activity and habitat extents interacting with fishing gears. 3) Supporting improvements to reduce agricultural run-off and contamination from water treatment infrastructure. Barriers to habitat restoration and creation, outside of reducing direct pressures were reviewed to include, cost of interventions, the poor evidence base on success of restoration and creation interventions for habitats, other than those for saltmarsh and existing social and economic use of an area, particularly near urban areas. The methods applied can be transferred to other sites, inside and outside MPAs, to map opportunities to recover or create blue carbon assets and identify constraints that increase investment risk.

Using climate change models to inform MPA planning**.**

Susan Kay and Ana Queiros, Plymouth Marine Laboratory

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Marine spatial planning (MSP) seeks to balance the multiple uses of and pressures on the sea, while ensuring sustainability. Planning needs to be resilient to climate change, but information from climate models has traditionally been difficult for managers to locate and interpret. We present an approach that summarizes climate model information in a way that is useful and accessible to support climate-ready MSP. The approach uses the statistical techniques of meta-analysis to combine the effect of multiple environmental variables in a spatially explicit way. The first step is to work with stakeholders to identify target sectors and key variables. Relevant information is then sourced from climate models, for the present day and for a future time point relevant to stakeholders. The effect size, 'Hedge's g', is calculated for each variable and combined to give the summary effect at each grid point, enabling grid points to be categorised into one of three types:

- climate refugia, where the ecosystem remains within its historical variability and the climate change signal is low;
- climate change hotspots, where there is a significant climate change signal;
- bright spots, where there is significant change but it is not in the direction expected under climate change.

Maps of summary effect can then be plotted and overlaid with relevant geographical information such as the location of fishing grounds, wind farms and protected areas, enabling future resilience to be assessed. This method has been applied to inform marine spatial planning in Ireland, including the identification of refugia and bright spots which could be used to prioritise future MPAs. In some cases these areas overlap with extractive use restrictions already in place for other sectors, such as undersea cables, so there is a win-win for conservation and human use. The analysis also identified climate resilient sites where MPAs could support key commercial fish species into the future, thus informing sustainable management of fisheries. Work under the Sustainable Management of Marine Resources programme (MSPACE project) is currently applying this method to the UK, with the ultimate aim of including climate change evidence in the planning and licensing process.

13. Water quality

Edited by: Steven Guilbert

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Summary/Conclusions

- It is useful when examining the state of marine 'water quality' in the region to adopt a broader, '**wholescape**' perspective' or approach, which also considers water quality in the region's rivers and catchments.
- **Riverine water quality** in the region continues to require considerable improvement. According to the latest Environment Agency assessments, only **20%** are classified as having achieved good or better ecological status, and **0%** achieved good chemical status.
- In terms of **estuarine water quality**, the picture looks even more dire than it does for our region's rivers. According to the latest Environment Agency assessments, only **13%** are classified as having achieved good or better ecological status and, again, **0%** achieved good chemical status.
- The main factors causing water quality issues include: agricultural pollution (from excessive use of fertiliser and pesticides); untreated sewage and wastewater released by water companies; and run-off from roads and towns.
- When it comes to **coastal water quality** the picture is a little better. According to the latest Environment Agency assessments, while **0%** of coastal water bodies achieved good chemical status, **70%** did manage to achieve good or better ecological status.
- Another indicator of the quality and cleanliness of our coastal waters is **bathing water quality**. In 2021, of the region's 164 designated bathing waters, **76% were classified as 'Excellent'**; 19% were classified as 'Good'; and 4% were classified as 'Sufficient'. There were no bathing water failures.
- On the surface, this is a water quality success story. However **bathing water is somewhat poor proxy for determining coastal water quality**. Samples are only taken during the Bathing and only at designated sites.
- To get a better sense of the state of our rivers, estuaries and coastal water quality we might also want to consider the frequency and duration of **sewage overflow discharges**. Based on EA data, a recent report found that water companies released raw sewage **25,000 times into designated bathing waters off the English coast in 2021** for a total of more than 160,000 hours. According to the same report, South West Water discharged sewage into designated bathing waters for 43,901 hours, with their longest discharge released at Ilfracombe's Wildersmouth Beach [actually Cheyne Cove – ed.], lasting 1,833 hours.
- **Progress towards improving water quality** in our catchments and around our coasts has **stalled**, and in many instances, it has **gone into reverse**. Fewer water bodies achieved good or better ecological status in 2019 than they did in 2015.

For much of the data, information and insight in this chapter I am indebted to Dr Laurence Couldrick of the West County Rivers Trust; Hugo Tagholm of Surfers Against Sewage, and Dave Trewolla of the Environment Agency.

The 'Wholescape' Approach

When it comes to talking about and understanding 'salty' water quality, by which I mean water quality in our estuaries (or transitional waters) and around our coasts, it's extremely useful to adopt a broader 'wholescape' perspective or approach. We might be particularly interested in estuary and coastal water quality, but we need to look beyond the mean high-water mark to see what's going-on upstream in our region's rivers and catchments, because often the predominant water quality pressure in our seas – whether that's in relation to sediment, to nutrients, or to plastic pollution – is coming from our land via our rivers. So I'm going to start this quick overview of the State of the water quality in our region's seas by giving you a sense of the state of water quality in our region's rivers.

Find out more about the 'Wholescape' approach here: https://catchmentbasedapproach.org/learn/wamm/

The State of the South-West's Riverine Water Quality

Before I give you some headline figures regarding the state of the region's rivers (and estuaries and coastal waters), it is useful to briefly outline how and by whom water quality is measured.

Measuring Water Quality

Under the Water Framework Directive (WFD) which was translated into UK law and retained following Brexit, river water quality, in common with other surface water bodies including estuarine and coastal waters – more of which below – is assessed in terms of two components: its **ecological** and its **chemical** status.

Ecological Status is a composite assessment of the quality of surface water ecosystems. It is based on assessing the status or quality of various biological, physico-chemical, and hydromorphological elements. The outcome of the ecological status assessment falls into one of five status classes from bad to high. (see Figure 13.1)

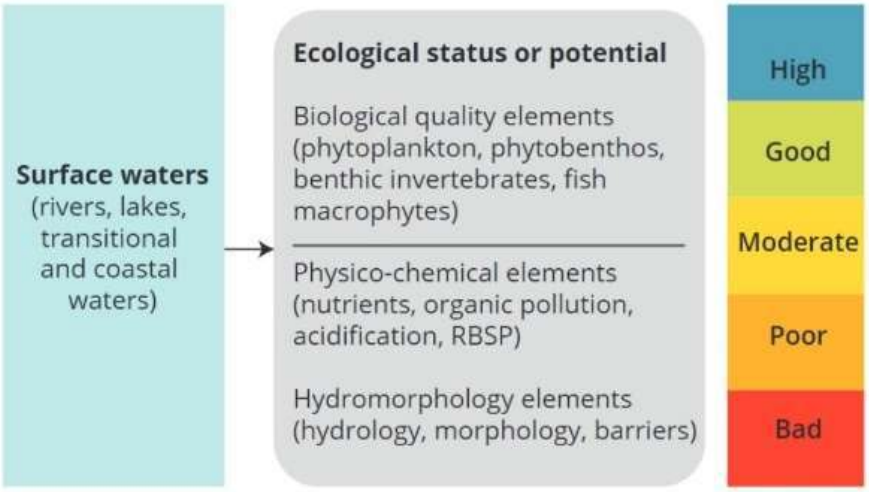


Figure 13.1. Ecological Status Classes – Bad to High. Source: https://www.eea.europa.eu/publications/state-of-water

The overall ecological status for a water body is determined according to the 'one out, all out' principle. This principle implies that a water body can only achieve good status if all biological and supporting quality elements are assessed at least as good. In other words, the quality element with the worst status determines the overall status.

Chemical Status is an assessment of the amount of priority substances in the aquatic environment. Priority substances are a list of substances viewed as the most harmful and polluting to the environment. Mercury and brominated flame retardants (pBDE), for example, are most frequently responsible for poor chemical status of surface waters. The outcome of a chemical status assessment is either good or failing. Good chemical status is only achieved when no priority substances exceed agreed standards.

So what is the state of the region's river water quality? Based on the on the most up-to-date data, data that was collected by the Environment Agency (EA) and used to inform the recent draft South West River Basin Management Plan, the picture is not altogether encouraging and requires considerable improvement.

In terms of **ecological status**, of the 590 river water bodies in the region, only **20%** are classified as good or better. Or to phrase that another way 80% of our riverine water bodies are not in a good ecological state.

In terms of **chemical status**, of the 590 river water bodies in the region, **0%**, have achieved good chemical status. Not one river met the legal water quality standards. It is important to mindful of the one fail, all fail principle, and the range of new substances that have been added to the assessment list in recent years, but the fact that 100% of the

region's rivers are polluted with synthetic chemicals related to human activity should be cause for considerable concern.

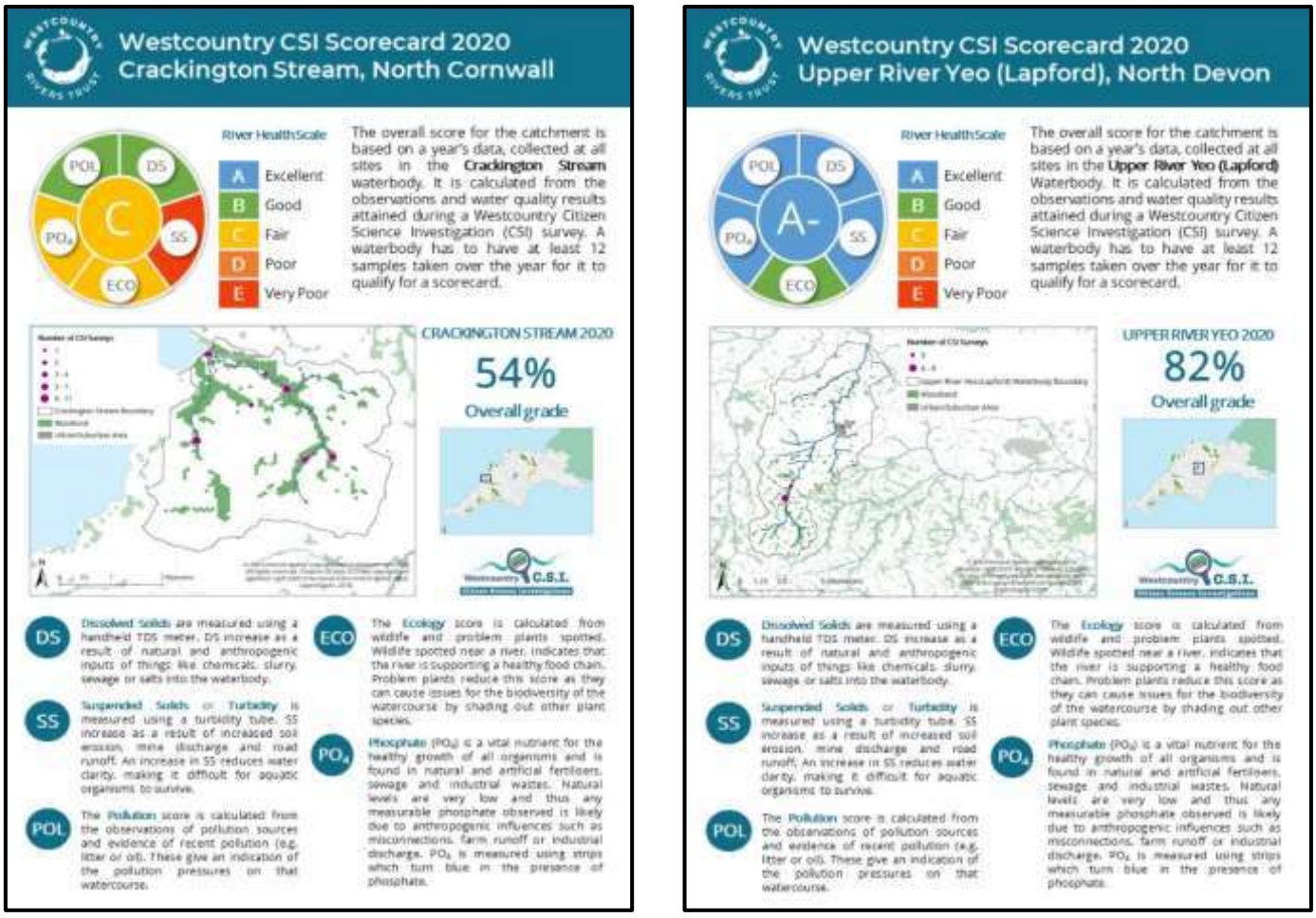
These are the just headline figures, if you want to dive into this data a little deeper, you can do so at the Environment Agency's Catchment Data Explorer.

Other Measures of Riverine Water Quality

While the Environment Agency's Catchment Data Explorer is an incredibly useful dataset, it doesn't provide us with a complete picture. Over the past 20 years or so both the total number of water quality surveys undertaken by the Agency and the number of sites surveyed has significantly reduced. In the absence of EA data though there are other emerging datasets that we can turn to to help us build up a picture of the state of water quality in the region.

In terms of river water quality, one such dataset is the West Country Rivers Trust's (WRT) Citizen Science Investigations (CSI). In the last couple of years CSI's network of volunteers have undertaken over 4000 samples and have helped produce data that can be used to target work and identify degrading water bodies. Where sufficient data (12 surveys) have been collected for a riverine water body 'Scorecards' have been produced. These give information about various water quality measures including dissolved solids, turbidity, ecology, pollution, and phosphate levels. The river, or stetch of river, is also given an overall percentage mark and grade. There 2020 Scorecards for the 25 water bodies with 12 or more samples can be viewed here: https://wrt.org.uk/westcountry-csi/

For illustration, the rivers with the best and worst Scores are shown below:



Figures 13.2 and 13.3. The WRT's CSI 'Scorecards' for the Crackington Steam and Upper River Yeo.

The State of the South-West's Estuarine Water Quality

Let's move a little bit further downstream to have a look at the state of estuarine or transitional water quality in the region. As with river water quality, estuarine water quality is assessed according to the parameters set by the WFD and so the focus is again on ecological and chemical status.

What is the state of the region's estuaries? Based again on the most recent draft South West River Basin Management Plan data, the picture looks even more dire than it does for our rivers.

In terms of **ecological status**, of the 23 estuarine water bodies in the region, only **13**% are classified as good or better. Or to put that another way, 20 of the region's 23 estuaries are not in a good ecological state. In terms of **chemical status**, of the 23 estuarine water bodies in the region, as with rivers, **0%** achieved good chemical status.

What is causing river and estuarine water quality issues?

Water quality in our rivers and estuaries (and along our coasts, see below) is under attack from multiple angles Sewage and urban pollution, agricultural pollution, and industrial pollution all contribute to the problem. According to the WRT, many water quality problems arise from multiple sources of diffuse pollution, spread across the landscape. These include: contaminated runoff in both rural and urban areas; incorrect plumbing in homes and businesses, causing sewage to run into rivers; poorly maintained septic tanks; and increased rainfall, resulting in overwhelmed sewage systems.

In its recent (Jan. 2022) report on Water Quality in Rivers the Environmental Audit Committee, drawing on Defra data, identified the **three main pressures** that cause water bodies to fail to achieve good ecological status. After the physical modification of rivers (a factor unavoidable in many urban environments), these are:

- Agricultural pollution (from excessive use of fertiliser and pesticides) in agriculture - responsible for 40% of water pollution in England;
- Untreated sewage and wastewater released by water companies - responsible for 35%;
- Run-off from roads and towns which contains pollutants such as oil - responsible for 18%

These proportions represent estimates for all inland waters in England and the balance of drivers will differ for each catchment and stretch of river. Sewage and urban diffuse pollution are likely to be the main pollutants in urban areas for example, while in rural stretches of river, agricultural practice is likely to be the dominant form of pollution. As a predominantly rural region it is likely that the percentage of pollution in our rivers and estuaries coming from agricultural sources will be above the national average of 40%.

The State of the South-West's Coastal Water Quality

Our first port of call to get a sense of the region's coastal water quality is again the Water Framework Directive (which extends out to 1 nautical mile with respect to ecological status and 12 nautical miles for chemical status) and the Environment Agency's Catchment Data Explorer

In terms of **chemical status**, of the region's 23 coastal cells or water bodies, as with rivers and estuaries, **0%** achieved good chemical status. So the same abysmal story continues when it comes to chemical pollution.

In terms **ecological status,** however, the picture looks somewhat improved compared to the region's rivers and estuaries with **70%** of the region's 23 coastal water bodies, assessed as being at good or better ecological status.

Other Measures of Marine and Coastal Water Quality

WFD might be the most comprehensive, but it is by no means the only way to measure the quality and cleanliness of our marine and coastal waters.

Bathing Waters

Probably the most well-known and often cited indicator of water quality is bathing water quality. Bathing waters are monitored for sources of pollution known to be a risk to bathers' health, with up to 20 samples taken by the Environment Agency from each site during the bathing season. Each sample is tested for bacteria, specifically *E. coli* and intestinal enterococci.

There are 164 designated bathing waters around the South West coast (from Clevedon in Somerset to Hive in Dorset). The 2021 bathing water classifications were published in early 2022 and revealed that of the regions 164 designated bath waters, **76%** were classified as 'Excellent'; 19% were classified as 'Good'; and 4% were classified as 'Sufficient' (1 Bathing Water at Watcombe was closed during the 2021 season). There were no bathing water failures.

On the surface, this is a water quality success story, if you consider that in the early 1990s, for example, just 28% of bathing waters met the highest standards in force at that time. Driven by tighter EU regulation water companies, not least of which South West Water, have invested significant resources in improving the state of the nation's bathing waters.

However, over recent years improvements have stalled, and the UK now languishes at the bottom of the European Bathing Water table. Bathing water is also a poor proxy for determining overall coastal water quality. Samples are only taken during the Bathing Season (15th May – 30th September in England and Wales), and only at designated sites.

Sewage Overflow Discharge Notifications

To get a better sense, or truer picture, of the state of our rivers, estuaries, and coastal waters we might also want to consider the frequency and duration of sewage overflow discharges. Sewer Overflows are a specific feature of sewerage infrastructure, which are designed to prevent water from backing up into homes in the event of exceptionally heavy rainfall. However, we are increasingly seeing discharge notifications issued during what many would consider to be normal rainfall events.

According to Surfers Against Sewage's 2021 Water Quality Report, over the period 1st October 2020 to 30th September 2021, for example, a total of **5,517** Sewer Overflow discharge notifications were issued nationally. Of these **3,328** were issued during the Bathing Season. These figures, however, likely grossly underestimate the scale of the problem, with many discharges not triggering notifications. More indicative of the scale of issue is the SAS reported **400,000 times** (totalling **3.1 million hours)** that water companies released sewage into our rivers, lakes, and coastlines in 2020. Likewise, the Liberal Democrats recently reported, based on EA data, that water companies released raw sewage **25,000** times into designated bathing waters off the English coast in 2021 for a total of more than **160,000** hours. As has often recently been the case Southern Water were the biggest culprit, but South West Water discharged sewage into our region's designated bathing waters for **43,901 hours**, with their longest discharge released at Ilfracombe's Wildersmouth Beach, lasting 1,833 hours (See here for more details: https://top-of-the-poops.org/)

The Direction of Travel

In terms of the 'direction of travel', at best, progress towards improving water quality in our catchments and around our coasts has stalled, but in many instances, it has gone into reverse.

In terms of ecological status, for example, in England, across all water bodies – that includes river, lakes, estuaries and the coasts – the number achieving either good or high status has actually gone down since 2015 and the publication of the first River Basin Management Plans, from 781 to 760.

Table 13.1. WFD Ecological Status assessments 2015 and 2019

Year	Bad	Poor	Moderate	Good	High
2015	135	820	2,943	774	7
2019	137	793	2,988	756	4

Water quality is an issue that has grown in public consciousness and risen up the political agenda over the past few years, and while for many it doesn't go nearly far enough, the recently published Environment Act does attend to water quality particularly in relation to the discharge of sewage into water bodies by water companies. New duties will also require the government to publish a plan to reduce sewage discharges from storm overflows by September 2022 and report to Parliament on the progress towards implementing the plan. It remains to be seen if-and-when these measure might start to have a positive impact.



Plate 13.1. Paignton Sands, Devon received a 'good' classification for its bathing waters in 2021. Image: Devon Maritime Forum archives.



Plate 13.2. Leaking sewer pipe at Cheyne Cove, Ilfracombe in July 2018. Image: Keith Hiscock.

14. Marine plastics

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Conclusions

- The work undertaken by Cornish Plastic Pollution Coalition volunteers in 2021 amounted to 69,291 hours and an economic value of £617,386.
- Total rubbish removed and recycled or disposed of was 310,839 kg or 310.8 tonnes!
- Total weight of marine littler removed was over six times that of 2018 and over three times that of 2019.
- Care is needed in interpreting amounts collected as there is a lot of variability in the data due to effort, many more charities recording effort and amounts, and increased knowledge of where the plastic washes up.

Background

The Cornish Plastic Pollution Coalition comprises over 50 environmental organisations, local marine conservation groups, beach cleaning groups and marine science experts, collectively representing tens of thousands of people in Cornwall and beyond. The main areas of work of the CPPC are:

▪ to raise awareness of the issue of marine litter and plastic pollution around our coastline by working with community groups, interested schools, and other organisations who wish to engage with the CPPC

▪ to informally improve information exchange and coordination between organisations and volunteers involved in marine litter and plastic pollution in Cornwall.

▪ to specifically highlight the issue of balloon debris in Cornwall.

▪ to raise the issue of marine litter and plastic pollution with identified businesses and organisations and try to persuade them to change their practices to more environmentally friendly methods / products.

Delia Webb and Claire Wallerstein are currently the Co-ordinators and key contacts for the CPPC: Website www.cppccornwall.org.uk.

Delia: info@cppccornwall.org.uk 01736 787191 / 07736400960

Claire: info@cppccornwall.org.uk 01752 823308 / 07815 567234

At the end of 2021, the CPPC asked members for data relating to their beach-cleaning and litter-picking activities to establish the true picture, and economic value of this type of voluntary work in the Duchy. This report details the statistical data received from those groups and individuals who keep such records of their activities but is by no means a comprehensive list as many groups do not keep formal recordings of their work.

Summary of Results

In the 12 months of 2021 a massive **69,291 hrs** were contributed to environmental work in Cornwall undertaken by **76,423** volunteers. This equates to an economic value of **£617,386.**

Economic value of total volunteer hours in 2021 based on the UK Minimum Wage (£8.91) 69291 x £8.91 = £617,386

Total rubbish removed and recycled or disposed of is **310,839 kg** or **310.8 tonnes**!

Table 14.1. Breakdown of CPPC member beach clean data.

Name	Group Total Volunteer Hours	Group Total Weight (kg)	Group Total Economic Value
2 Minute foundation	16075.00	200620.00	£143,228.25
3 Bays Wildlife Group	124.00	110.00	£1,104.84
Beach Guardian	1836.00	1080.00	£16,358.76
Bude Marine Group	17.5	180.00	£1,871.10
Clean Cornwall	4676.00	24680.00	£41,663.16
Clean Ocean Sailing	338.00	8303.94	£3,011.58
Fathoms Free	335.00	1905.00	£2,984.85
Final Straw Cornwall	217.00	890.00	£1,933.47
Fishing For Litter	6084.00	17600.00	£54,208.44
Friends of Portheras Cove	3125.00	1400.00	£27,843.75
Friends of Fowey Estuary	19.16	150.00	£170.72
Friends of Par Beach	24.00	20.00	£213.84
Friends of St Andrew's Wetlands Reserve	75.00	680.00	£668.25
Land and Sea Cornwall	151.00	1230.00	£1,345.41
Looe Marine Conservation Group	53.00	60.00	£472.23
Mounts Bay Marine Group	18.00	30.00	£160.38
Newquay Marine Group	161.00	272.00	£1,434.51
Plastic Free Falmouth	374.00	261.90	£3,332.34
PL24 Community Association	90.00	410.00	£801.90
Polzeath Marine Conservation Group	720.00	150.00	£6,415.20
Rame Peninsula BeachCare	756.00	1920.00	£6,735.96
RSPB Cornwall	253.50	750.00	£2,258.69
Saltash Environmental Action	287.00	2180.00	£2,557.17
Smartie Lids on the Beach	152.00	100.00	£1,354.32
Surfers Against Sewage	33042.00	45861.79	£294,404.22
Transition Truro	36.75	130.00	£216.00
Widemouth Task Force	59.00	Not available	£525.69

Trends

In comparison to the past couple of pre-COVID-19 years (not 2020 due to pandemic) and despite 2021 likely to also have been impacted by the pandemic, recorded volunteer hours in 2021 surpassed those of 2018, as did the equivalent economic value (Figure 1). Additionally in 2021, the total weight of marine litter removed was over six times that of 2018 and over three times that of 2019 (Figure 14.1).

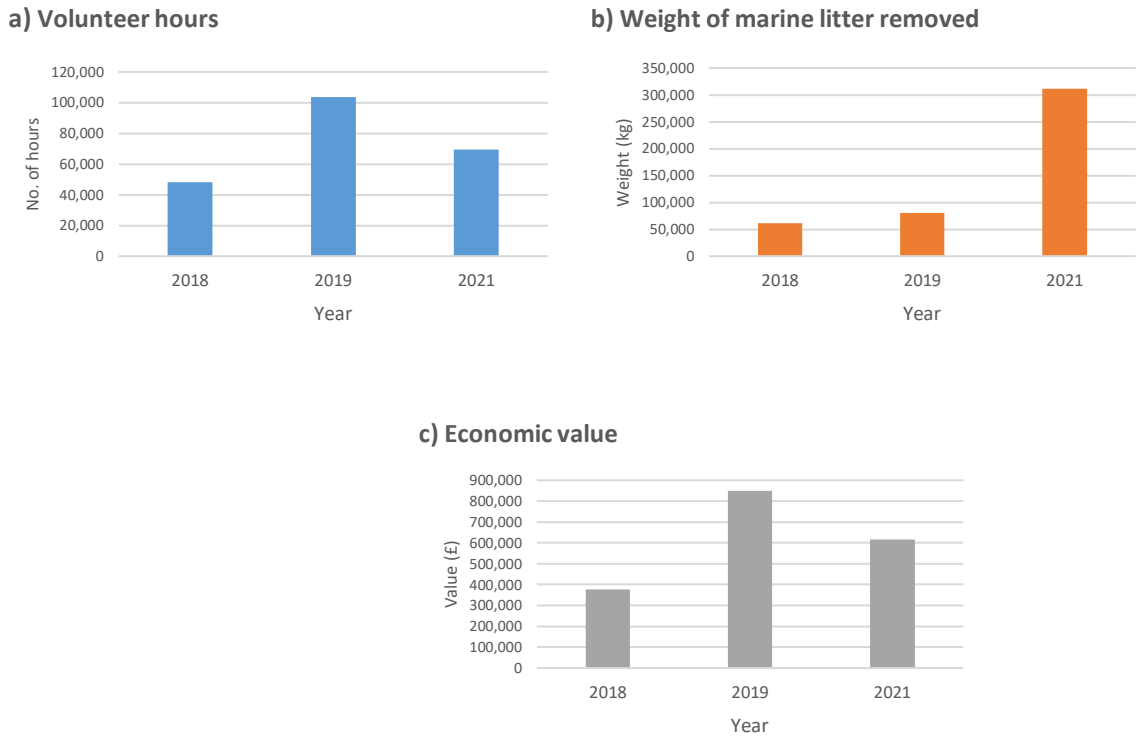

Figure 14.1. Comparison between the previous two (pre-COVID-19) years of: a) number of volunteer hours; b) weight of marine litter removed, and c) equivalent economic value.

In the news;

- Cornwall hospital recycles 'tonne' of masks and PPE each month (March 2021)
- Cornwall fishing vessel pulls 'miles' of plastic from sea (March 2021)
- Westward Ho! beach litter being turned into buckets and spades (April 2021)
- Figures published in 2021 show recycling in Cornwall during 2020 fell to lowest rate in a decade (May 2021)
- Westward Ho! offers free wooden bodyboards to fight plastic pollution (May 2021)
- G7 summit held in Cornwall (June 2021)
    - 'Mount Recyclemore' artwork of G7 leaders created in Cornwall
    - Hundreds on streets and in sea for protests
- Study by scientists at University of Exeter (Penryn campus) shows seagull eggs are contaminated with plastic additives (June 2021)
- Plymouth Marine Lab project; Mussels could clean oceans by filtering out microplastics (July 2021)
- Study by Plymouth University; Potential microplastic release from the maritime industry: Abrasion of rope (September 2021)
- Study by University of Exeter (Penryn campus); The role of citizen science in addressing plastic pollution: Challenges and opportunities (November 2021)
- Study by Plymouth University; Coastal dunes as a sink and secondary source of marine plastics: A study at Perran Beach, southwest England (December 2021)

Thanks

A big thank you to all CPPC volunteers! In 2021, **69,291 hrs** were contributed to environmental work in Cornwall undertaken by **76,423** volunteers. This equates to an economic value of **£617,386**

Research outputs 2021

The South West is a hub for plastic pollution research, below find some of the 2021 publications from our SW based research institutes and universities.

Bowley, J., Baker-Austin, C., Porter, A., Hartnell, R. and Lewis, C., 2021. Oceanic hitchhikers–assessing pathogen risks from marine microplastic. *Trends in microbiology*, *29*(2), pp.107-116. https://doi.org/10.1016/j.tim.2020.06.011

Chowdhury, G.W., Koldewey, H.J., Duncan, E., Napper, I.E., Niloy, M.N.H., Nelms, S.E., Sarker, S., Bhola, S. and Nishat, B., 2021. Plastic pollution in aquatic systems in Bangladesh: A review of current knowledge. *Science of the Total Environment*, *761*, p.143285. https://doi.org/10.1016/j.scitotenv.2020.143285

Coppock, RL; Lindeque, PK; Cole, MJ; Galloway, TS; Näkki, P; Birgani, H; Richards, S; Queiros, AM. 2021 Benthic fauna contribute to microplastic sequestration in coastal sediments. *Journal of Hazardous Materials*, 415. 125583. https://doi.org/10.1016/j.jhazmat.2021.125583

Courtene-Jones, W; Maddalene, T; James, MK; Smith, Natalie S.; Youngblood, K; Jambeck, JR; Earthrowl, S; Delvalle-Borrero, D; Penn, E; Thompson, RC. 2021 Source, sea and sink—A holistic approach to understanding plastic pollution in the Southern Caribbean. *Science of The Total Environment*, 797. 149098. https://doi.org/10.1016/j.scitotenv.2021.149098

Duncan, EM; Broderick, AC; Critchell, K; Galloway, TS; Hamann, M; Limpus, CJ; Lindeque, PK; Santillo, D; Tucker, AD; Whiting, S; Young, EJ; Godley, BJ. 2021 Plastic Pollution and Small Juvenile Marine Turtles: A Potential Evolutionary Trap. *Frontiers in Marine Science*, 8. https://doi.org/10.3389/fmars.2021.699521

Jimenez-Guri, E., Roberts, K.E., García, F.C., Tourmente, M., Longdon, B. and Godley, B.J., 2021. Transgenerational effects on development following microplastic exposure in Drosophila melanogaster. *PeerJ*, *9*, p.e11369. https://doi.org/10.7717/peerj.11369

Jones, J.S., Porter, A., Muñoz-Pérez, J.P., Alarcón-Ruales, D., Galloway, T.S., Godley, B.J., Santillo, D., Vagg, J. and Lewis, C., 2021. Plastic contamination of a Galapagos Island (Ecuador) and the relative risks to native marine species. *Science of the Total Environment*, *789*, p.147704. https://doi.org/10.1016/j.scitotenv.2021.147704

Lindeque, PK; Botterell, ZLR; Coppock, RL; Cole, MJ. 2021 Plastics and Plankton in Our Seas. *Frontiers for Young Minds*, 9. https://doi.org/10.3389/frym.2021.588638

Muller-Karanassos, C., Arundel, W., Lindeque, P.K., Vance, T., Turner, A. and Cole, M., 2021. Environmental concentrations of antifouling paint particles are toxic to sediment-dwelling invertebrates. *Environmental Pollution*, *268*, p.115754. https://doi.org/10.1016/j.envpol.2020.115754

Napper, I.E., Baroth, A., Barrett, A.C., Bhola, S., Chowdhury, G.W., Davies, B.F., Duncan, E.M., Kumar, S., Nelms, S.E., Niloy, M.N.H. and Nishat, B., 2021. The abundance and characteristics of microplastics in surface water in the transboundary Ganges River. *Environmental Pollution*, *274*, p.116348. https://doi.org/10.1016/j.envpol.2020.116348

Nelms, S.E., Duncan, E.M., Patel, S., Badola, R., Bhola, S., Chakma, S., Chowdhury, G.W., Godley, B.J., Haque, A.B., Johnson, J.A. and Khatoon, H., 2021. Riverine plastic pollution from fisheries: Insights from the Ganges River system. *Science of The Total Environment*, *756*, p.143305. https://doi.org/10.1016/j.scitotenv.2020.143305

Özden, Ö., Yıldırım, S., Fuller, W.J. and Godley, B.J., 2021. Anthropogenic marine litter on the north coast of Cyprus: Insights into marine pollution in the eastern Mediterranean. *Marine Pollution Bulletin*, *165*, p.112167. https://doi.org/10.1016/j.marpolbul.2021.112167

Parker-Jurd, F.N., Napper, I.E., Abbott, G.D., Hann, S. and Thompson, R.C., 2021. Quantifying the release of tyre wear particles to the marine environment via multiple pathways. *Marine Pollution Bulletin*, *172*, p.112897. https://doi.org/10.1016/j.marpolbul.2021.112897

Rowlands, E; Galloway, T; Cole, MJ; Lewis, C; Peck, V; Thorpe, S; Manno, C. 2021 The Effects of Combined Ocean Acidification and Nanoplastic Exposures on the Embryonic Development of Antarctic Krill. *Frontiers in Marine Science*, 8. https://doi.org/10.3389/fmars.2021.709763

Wilson, D.R., Godley, B.J., Haggar, G.L., Santillo, D. and Sheen, K.L., 2021. The influence of depositional environment on the abundance of microplastic pollution on beaches in the Bristol Channel, UK. *Marine Pollution Bulletin*, *164*, p.111997. https://doi.org/10.1016/j.marpolbul.2021.111997

Wright, L.S., Napper, I.E. and Thompson, R.C., 2021. Potential microplastic release from beached fishing gear in Great Britain's region of highest fishing litter density. *Marine pollution bulletin*, *173*, p.113115. https://doi.org/10.1016/j.marpolbul.2021.113115

Beach clean photo gallery



Plate 14.1. One week's collection of abandoned beach toys. Image: Friends of Portheras Cove.



Plate 14.2. Typical beach clean finds with unusual bottle which was a ZSL tracker bottle released during the G7 summit. Image: Friends of Portheras Cove.



Plate 14.3. Volunteers at a beach clean and the rubbish collected. Image: Three Bays Wildlife Group.



Plate 14.4. Rubbish collected from a beach clean. Image: Three Bays Wildlife Group.



Plate 14.5. Removal of a very large 'macro' plastic pollution, Image: Rame Peninsula Beach Care.



Plate 14.6. Results of a beach clean. Image: Rame Peninsula Beach Care.



Plate 14.7. Macro and microplastics in the strand line at Whitsand Bay. Image: Keith Hiscock.

15. Cornwall climate care: introduction to the videos

Claire Wallerstein

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Cornwall's Climate Stories is a series of 30-minute documentaries produced by charity Cornwall Climate Care (cornwallclimate.org).

The films aim to increase understanding of and action on climate change by highlighting what is happening here where we live – rather than the usual media representations of the climate crisis in other parts of the world.

By focusing not just on 'doom and gloom', but also on people taking action and developing solutions, the series also aims to motivate and inspire, starting community conversations that will lead to meaningful change, action and resilience-building.

The first three films are all marine focused, and can be seen here: cornwallclimate.org/films

Under the Surface focuses on our local marine environment and how – without many of us noticing – climate change is already affecting species from microscopic plankton, at the bottom of the food chain, right up to large iconic animals such as basking sharks and grey seals.

Plenty More Fish? is presented by a local fisherman. It lifts the lid on the sometimes surprising ways in which the Cornish fishing industry is being affected by climate change - and the ways in which consumers can help to make a difference.

This film listens to the stories and concerns of people who know the sea intimately - and are the first to witness changes that many of us are not yet seeing. This approach has enabled the film to reach communities that may traditionally be sceptical of 'environmental' content, and it has been watched more than 17,000 times.

Living on the Edge is presented by a passionate ultra-runner, following her as she makes her way around the Cornish coast path, finding out how seaside communities are starting to face up to threats such as sea level rise, increased storms and coastal erosion.

The film finds some proactive communities embarking on difficult conversations about what they are prepared to lose - while others are acting as if the future isn't going to happen.

Professor Gerd Masselink, the head of Plymouth University's Coastal Processes Research Group, described the film as: "Brilliant. Really the first time I have seen such a balanced account of the challenges facing coastal communities and the causes."

