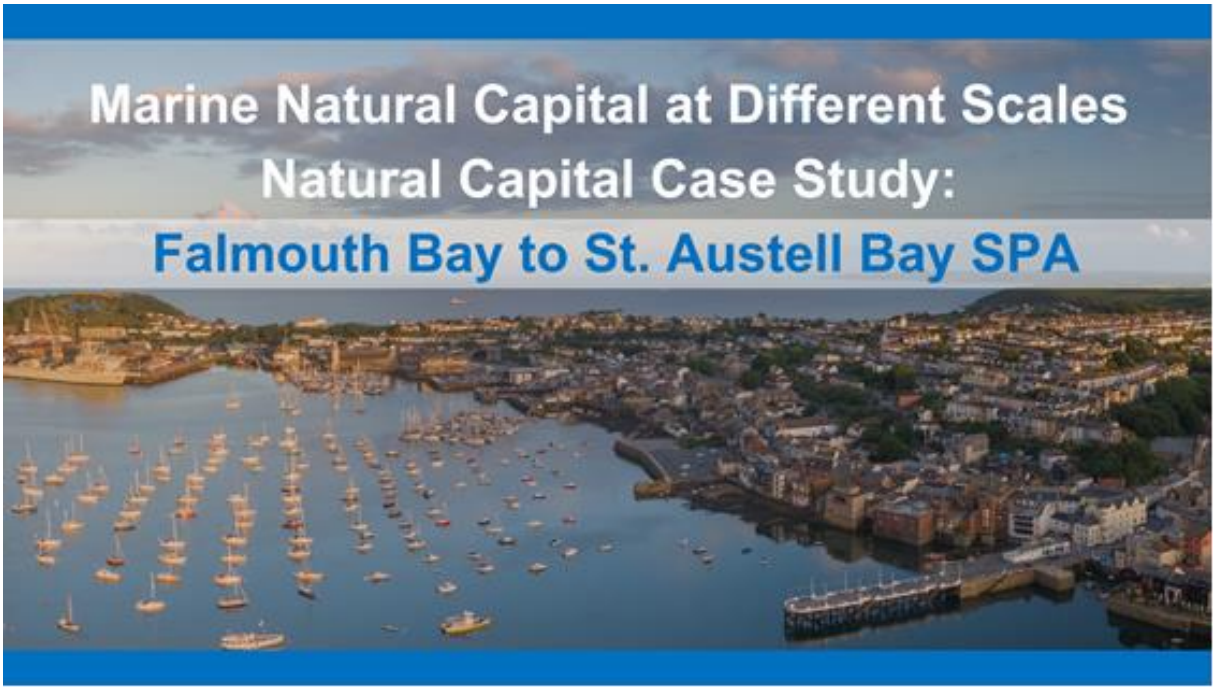

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Data sources are referenced in Appendix C. This also refers to the Marine Natural Capital Search tool, a repository which holds over 220 separate sources of data on marine Natural Capital. The search tool is available at: https://nc.avsdev.uk/f6b175654a709483a43a2a25c3a7b467/nc-search/

Data sources are cited throughout where these reflect published reports and datasets but, in some places, additional expert knowledge obtained through communication is used. It was not possible to list the sources for this information.

Marine Natural Capital Case Study 2: Falmouth to St. Austell Bay Special Protection Area (SPA)

1. Introduction

This report sets out a summary of the findings of a preliminary natural capital assessment of the coastal waters around the Falmouth to St. Austell Bay Special Protection Area (SPA). The objective of the report is to summarise the following key aspects of a natural capital assessment:

- The context of an area (including existing conservation areas, key industries and landowners);
- The habitats, species, geology and heritage that exist within the coastal waters;
- Mapping from the habitats, species, geology and heritage to ecosystem services;
- Valuation of those ecosystem services;
- An overview of the Natural Capital condition of those areas.

This document is provided as an example to validate the accompanying marine Natural Capital Guidance. The guidance sets out a staircase approach to generating natural capital assessments encompassing Introductory, Intermediate and Advanced options (otherwise known as 'Basic', 'Better' and 'Best'). This document aims to demonstrate what is possible in a 'Basic' assessment.

2. Site Context

The assessment of the Falmouth to St. Austell Bay SPA is bounded by the SPA area and the adjacent coastline (Figure 1). The vast majority of the seabed within the 12nm territorial boundary of the UK waters is owned by the Crown Estate. Specific licensing agreements are negotiated between the Crown Estate and commercial entities for activities including anchorages, aggregate extraction, cable laying and offshore wind farm installations.

Figure 1 shows the area covered by this assessment and the key landowners within this area. Within the Crown Estates landholding [1] there is a licence for seabed mining of lithium to the northeast edge of the SPA issued to Cornish Lithium Ltd and a test site for wave power testing to the south of the entrance to Falmouth Harbour.

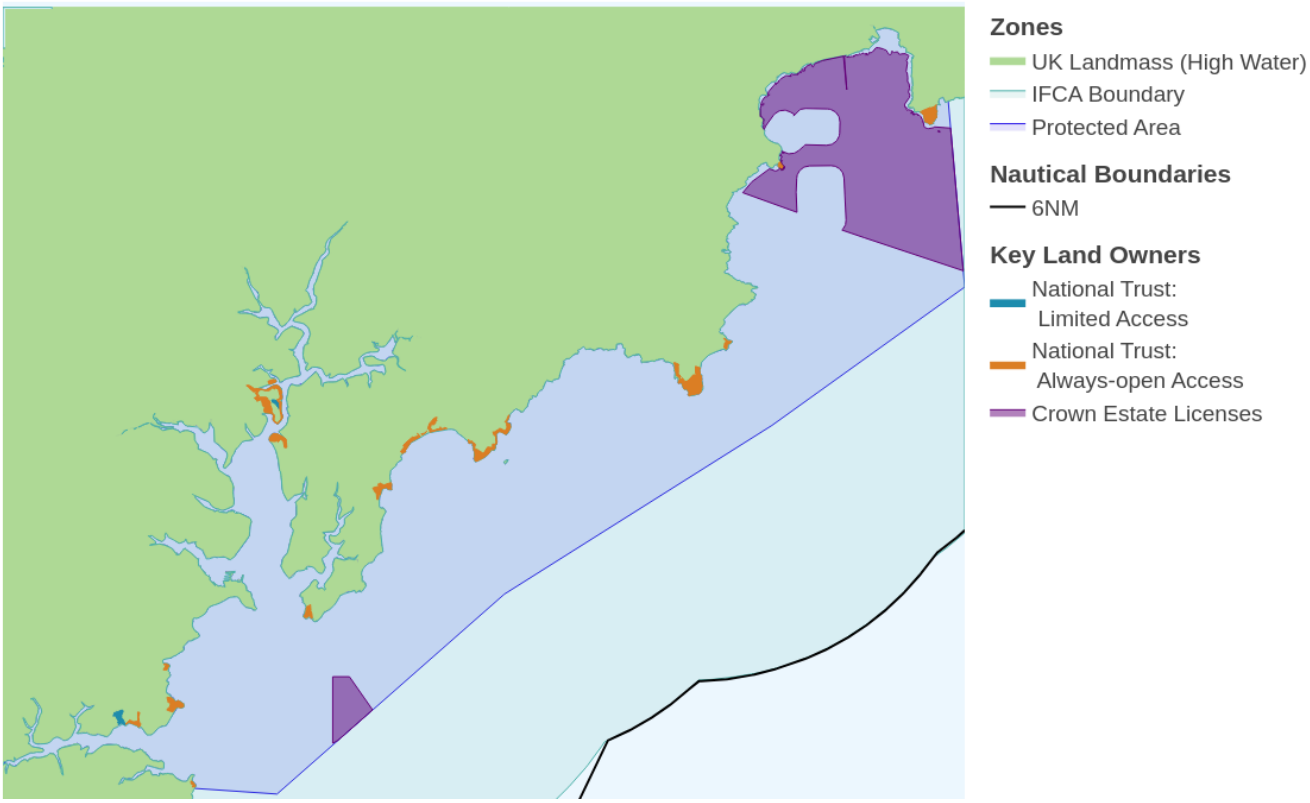

Figure 1. Regions used in the natural capital assessment and key land owners

2.1 Jurisdictions

Jurisdiction and responsibilities across the marine domain are complex. The following defines the major stakeholders involved in the SPA.

Organisation	Organisation & Remit
Local Authority	Cornwall Council
Inshore Fisheries & Conservation Authority	The respective Inshore Fisheries & Conservation Authorities (IFCA) provide local regulation of commercial and recreational fishing activity. They are responsible for the development, monitoring and enforcement of fishing regulations by their use of local bye laws. Cornwall Inshore Fishing Conservation Authority governs the balance between fishing activity between the Cornish coast and the 6nm fishing limit.
Harbour Authorities	Cornwall Council Maritime Service is responsible for the operation of all of the municipal ports and harbours in Cornwall which includes Prince of Wales Pier (Falmouth), Penryn, Truro, Portscatho. Harbour Authorities are established for the major harbours in the area including Fowey, Falmouth and Hayle. Mevagissey Harbour Trust owns Mevagissey harbour. St Mawes Harbour is a statutory harbour designated under an Act of Parliament. Par Docks is owned by Imerys (China Clay Extraction Business) but is no longer used for the movement of china clay.
Marine Management Organisation	The Marine Management Organisation (MMO) is responsible for licencing and regulation of activities within the marine region

	including commercial fishing, construction activities beyond the low tide mark including harbours and coastal protection. The South West Inshore marine plan sets out the vision, objectives and processes for review and monitoring of activities that impact upon the inshore marine environment

2.2 Key coastal landowners

Key landowners	Description
The Crown Estate	The Crown Estate is responsible for the leasing of seabed activities within UK territorial waters. This includes resources for oil & gas, offshore wind farms, tidal energy (where appropriate) as well as aggregate and mineral extraction, and seabed dredging for navigation.
National Trust	The National Trust maintains 278.8 ha of coastal area [2] (i.e. within 500m of the shoreline) including the nationally important South West Coast Path, which it is estimated to draws 9 million visitors each year along its entire length [3]. Additionally, the National Trust maintains 17.7 ha of limited access land in the coastal region comprising many important historic and cultural assets which contribute to the region's tourism industry. Locations of National Trust sites include: • The Dodman and St Austell Bay • Gerrans and Veryan Bays • Trelissick • Fowey • The Roseland • Rosemullion Head • North Helford • Lanledra Maenease Point Gorran • Black Head • South Helford
The Duchy of Cornwall	The Duchy of Cornwall owns parts of the coastal foreshore within the Falmouth to St. Austell Bay SPA between the mean high water mark and the low water mark (lowest astronomical tide).

2.3 Conservation Areas and their designations

Designated marine protected areas relevant to the SPA are shown in Figure 2 and covered in the table below. These are based upon spatial definition of protected areas provided by JNCC [4].

Designation type	Locations, features and management measures

Marine Conservation Zones (MCZs). For feature information see JNCC.	512 ha | 1.88 % of sea area • Helford Estuary (512 ha): designated for the protection of native oysters.
Special Protection Area (SPAs)	25803 ha | 94.65 % of sea area • Falmouth Bay to St Austell Bay (25803 ha): designated for its non-breeding populations of Black-throated diver, Great northern diver and Slavonian grebe.
Special Areas of Conservation (SACs). For feature information see JNCC.	5855 ha | 21.48 % of sea area • Fal and Helford (5855.4 ha): designated for its sandbanks which are slightly covered by sea water all the time, mudflats and sandflats not covered by seawater at low tide, large and shallow inlets and bays, and Atlantic salt meadows. Also designated for its population of shore duck.
Voluntary Marine Conservation Area (VMCA)	The Helford VMCA was designated in 1987 to protect marine life in the Fal and Helford Estuaries. To the east of the area, the Friends of Fowey Estuary VMCA was established in 1999 and includes the cliffs and beaches to the east of Gribbin Head

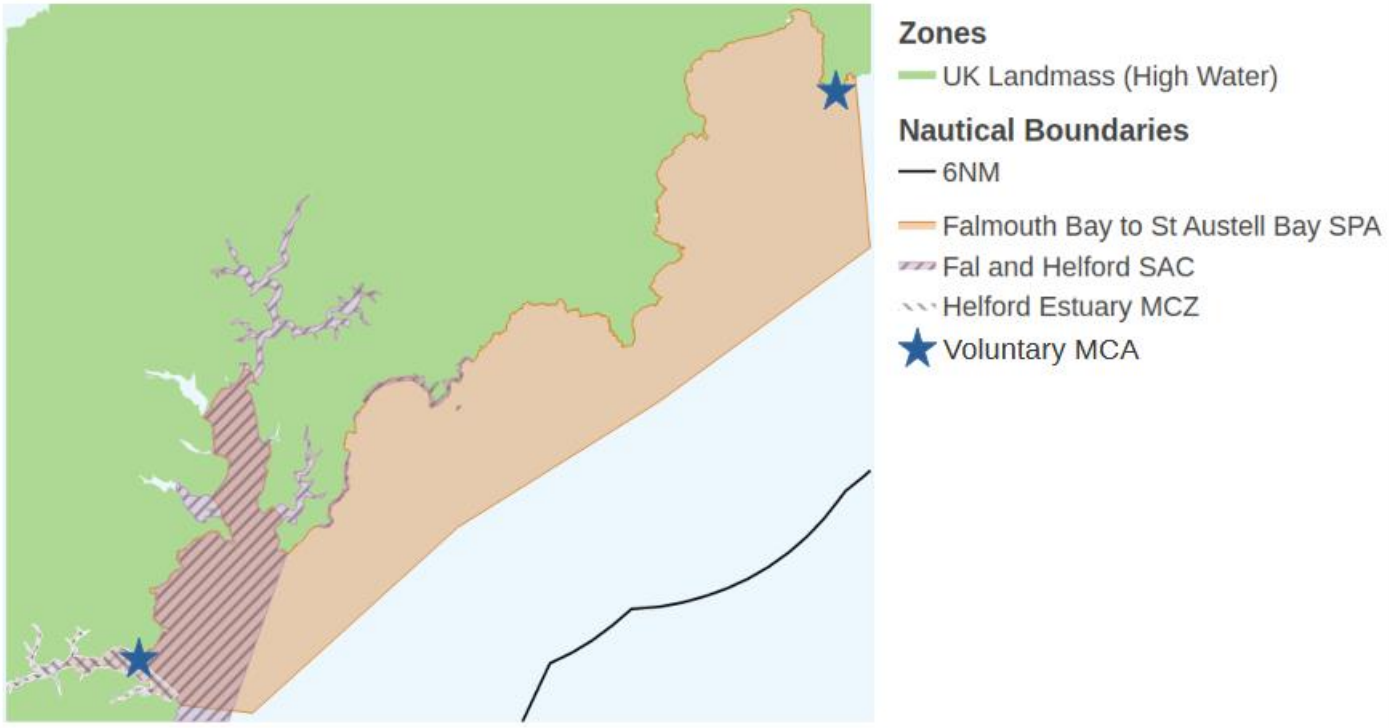

Figure 2. Spatial distribution of the conservation areas

2.4 Important maritime sectors

2.4.1 Fishing Metiers, Ports & Processing Industries

Characteristic	Description
Species landed	Highest value landed species by gear (2018-2023) (top 3) [5]: • Trawling: lemon sole, monkfish, whiting • Netting: pollack, sole, pilchards • Dredging: scallops, sole, monkfish

	• Lining: mackerel, bass, pollack • Potting: crabs & lobsters
Fishing ports (by value)	Top 10 seafood landing locations within the case study area (2018-2023) with mean year landings value above £10,000:[5] • Mevagissey (£2.0m) • River Fal - Falmouth (£1.1m) • Mylor (£450K) • Helford River (£170K) • St Mawes (£110K) • Charlestown (£60K) • Par (£40K) • Portloe (£30K) • Penryn (£22K) • Portscatho (£17K)
Aquaculture	All of Cornwall's aquaculture activity is found within the study site, producing mussels and until recently oysters.
Employment in fishing and aquaculture (Census 2021) [6]	72 people are employed in fishing and aquaculture in areas bordering the SPA, 11% of those employed in fishing and aquaculture in Cornwall.

2.4.2 Recreational and Cultural Assets

Key recreational and cultural heritage assets and designations are described below and summarised spatially in Figure 3:

Characteristic	Description
Bathing water sites	There are 16 designated bathing water sites in the SPA, all but 2 classified as excellent or good [7].
Recreational angling	There are 11 fishing tackle/sea angling shops within 500m of the coast [8].
Outdoor activity centres	There are 6 outdoor activity centres within 500m of the coast [8].
Walking trails	92.5 km (57.5 miles) of the South West Coast Path runs along the coastline of the SPA [3].
Heritage Coastline	74.1 km of heritage coastline [9]: • Gribbin Head – Polperro • The Roseland
UNESCO World Heritage Sites	Part of Cornwall and West Devon Mining Landscape designation is found adjacent to the SPA (i.e. Charlestown) [10].

Slipways and access	There are 6 recorded public slipways with direct access to the SPA area within the spatial boundary of the Case Study [8].

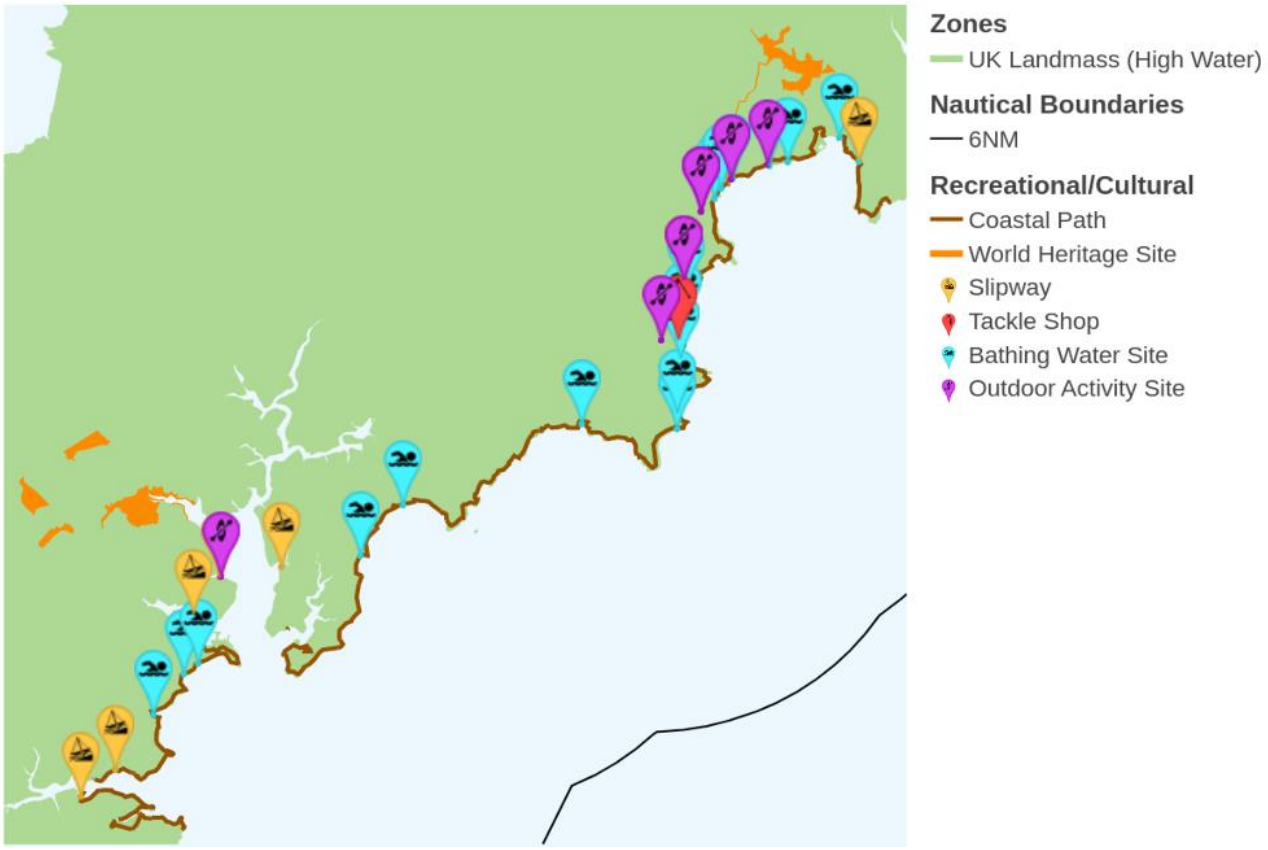

Figure 3. Overview of recreational and cultural assets

2.4.3 Maritime industries

Other maritime sectors are illustrated in Figure 4 and include:

Characteristic	Description
Ship Refit and Maintenance Services	Falmouth Harbour is home to a major ship repair and refit centre employing over 650 staff [11]. The harbour is capable of receiving large ships including the Royal Fleet Auxiliary ships and Bay Class ships (exceeding 16,000 tonne displacement). It is recognised as the third deepest natural Harbour in the world.
Ferry services	There are 9 ferry routes including the Fowey – Mevagissey ferry which cross through the SPA area and another 8 ferry routes within the Fal estuary [8].
Bunker Anchorage	Falmouth Bay is a designated Bunker Anchorage (i.e. an anchorage for oil tankers).
Marine energy	The Falmouth Bay Test Site (FaBTEST) is located within the SPA. It is a pre-consented site for the development and testing of marine energy convertors (250.2 ha) [1].
Aggregates and mineral extraction	There are no licensed aggregate extraction sites in operation. 3806 ha have been licensed for offshore mineral exploration (lithium and other battery metals) [1].
Telecommunications	There is one telecommunications cable (UK to France) which lands in Pentewan [1].

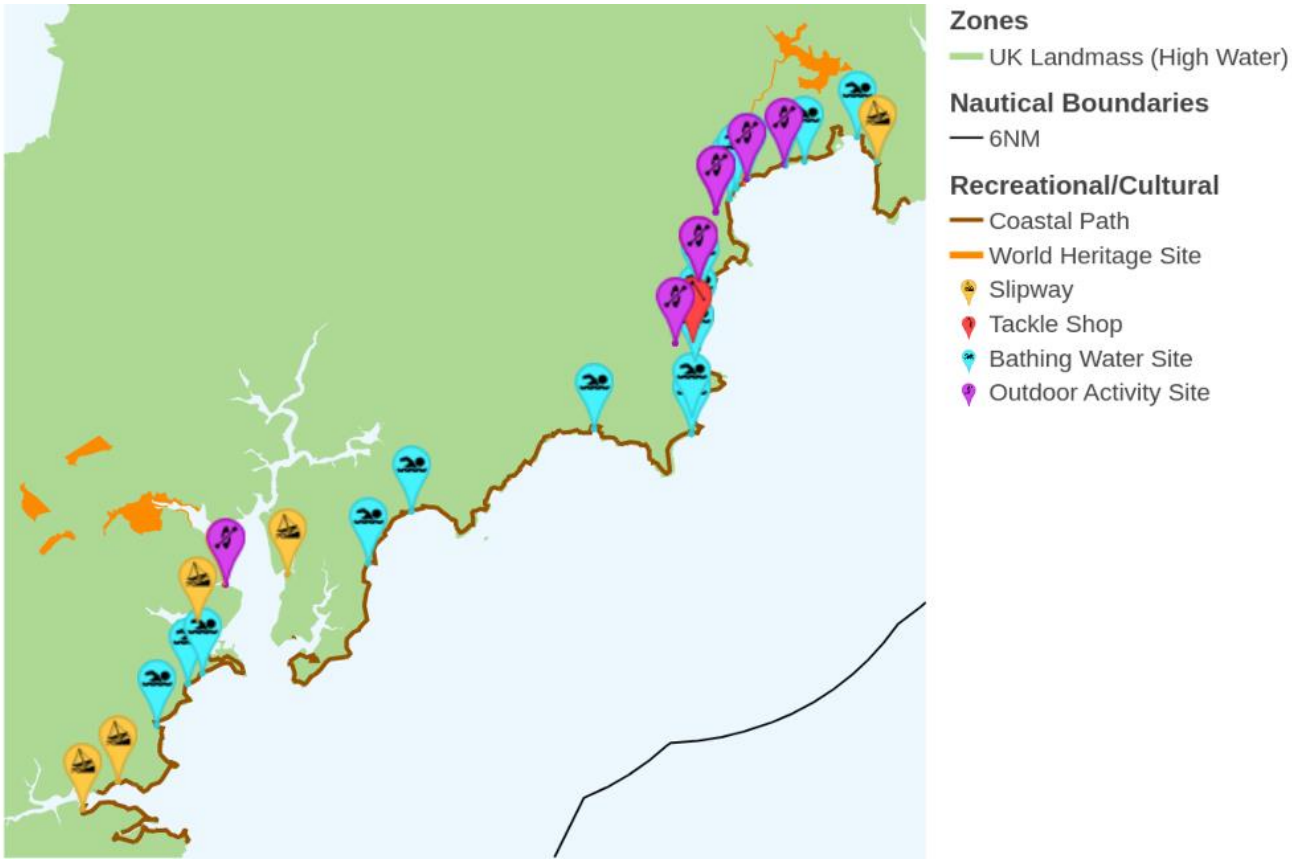

Figure 4. Locations of marine industries

3. Current Natural Capital Assets and Ecosystem Services

3.1 Benthic habitats

A table showing the area (in hectares) of each substrate and the relative contribution to SPA waters is attached in Appendix 1. Figure 5 displays the EUNIS substrate designations from the EUNIS 2021 Broad Scale Habitat Map [12]. The majority of the substrate is sand with rocky outcrops from the headlands.

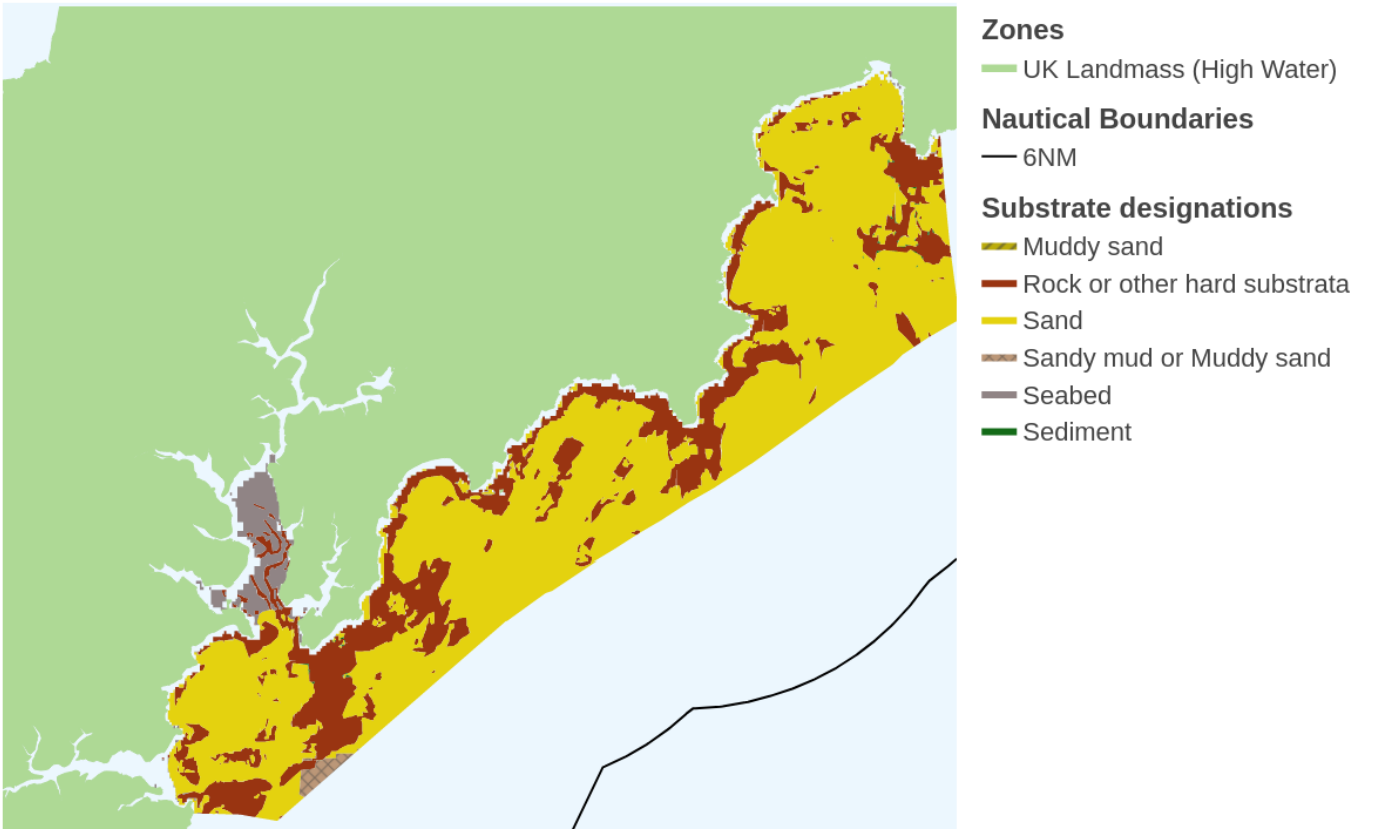

Figure 5. Substrate map of the Falmouth - St Austell Bay SPA region

The area marked 'seabed' is a designation of unknown substrate, mainly due to lack of access for survey vessels to access.

There is a very small amount (0.13 ha) of saltmarsh within the bounds of the SPA. However, there is 78ha of coastal saltmarsh within the coastal area surrounding the SPA and another 9ha of Coastal floodplain and grazing marsh within the Fal and Helford estuarine area [12].

The Helford river estuary is also recorded as containing a sizeable seagrass bed. In the sandy substrate there are a number of scattered survey recordings of kelp (Figure 6). Maerl beds are also present within the SPA.

Using the JNCC universal Asset Service Matrix [13], the habitats within the Falmouth to St. Austell Bay SPA have been mapped to Ecosystem Services in the table below. This mapping provides a qualitative assessment of the contribution which a habitat can make to an ecosystem service.

Habitat	Seafood	Water quality	Erosion control	Coastal protection	Flood protection	Coastal protection	Refuge, nursery and feeding habitat	Pest and disease control	Climate regulation (carbon sequestration)	Recreation & Tourism	Research	Aesthetics

Intertidal sand	Low	Med	Low		Med	High		High			High	
Intertidal mud	Med	Low	Med	High	Low	High		Med	High	High	Med	Low
Saltmarsh	High	Med	High		Med	High	Med	Med	High		High	Med
Seagrass beds	High	Med	Med		Med	High	Med	Med	Low			Med
Reef	High	Med			Med	High			Med			Low
Kelp beds		High	High			High	High		High			
Subtidal sand	Med	Low			Med	Med			Med			Low
Maerl	Med			Med	Med	High		Low	Med	Med	Med	Low
Ross worm reefs	High	Med	Med		Med	High			Med			Low

Table 1. Importance of habitats present to ecosystem services

3.2 Threatened or declining habitats

There are several threatened or declining habitats, as defined by Figure 6, within the boundary of SPA. The presence in surveys is recorded in the DASSH species records, managed by the Marine Biological Association of the UK [14]. These include seagrass, maerl, kelp and rossworm reef. Presence of habitats is provided as area in hectares in Table 2 where available.

Recent surveys during 2023 and 2024 have revealed larger beds of maerl than originally believed. Mapping data for these recent discoveries are not currently available. Maerl beds on the south coast of Cornwall are some of the largest known in England, offering biodiversity value and carbon storage benefits.

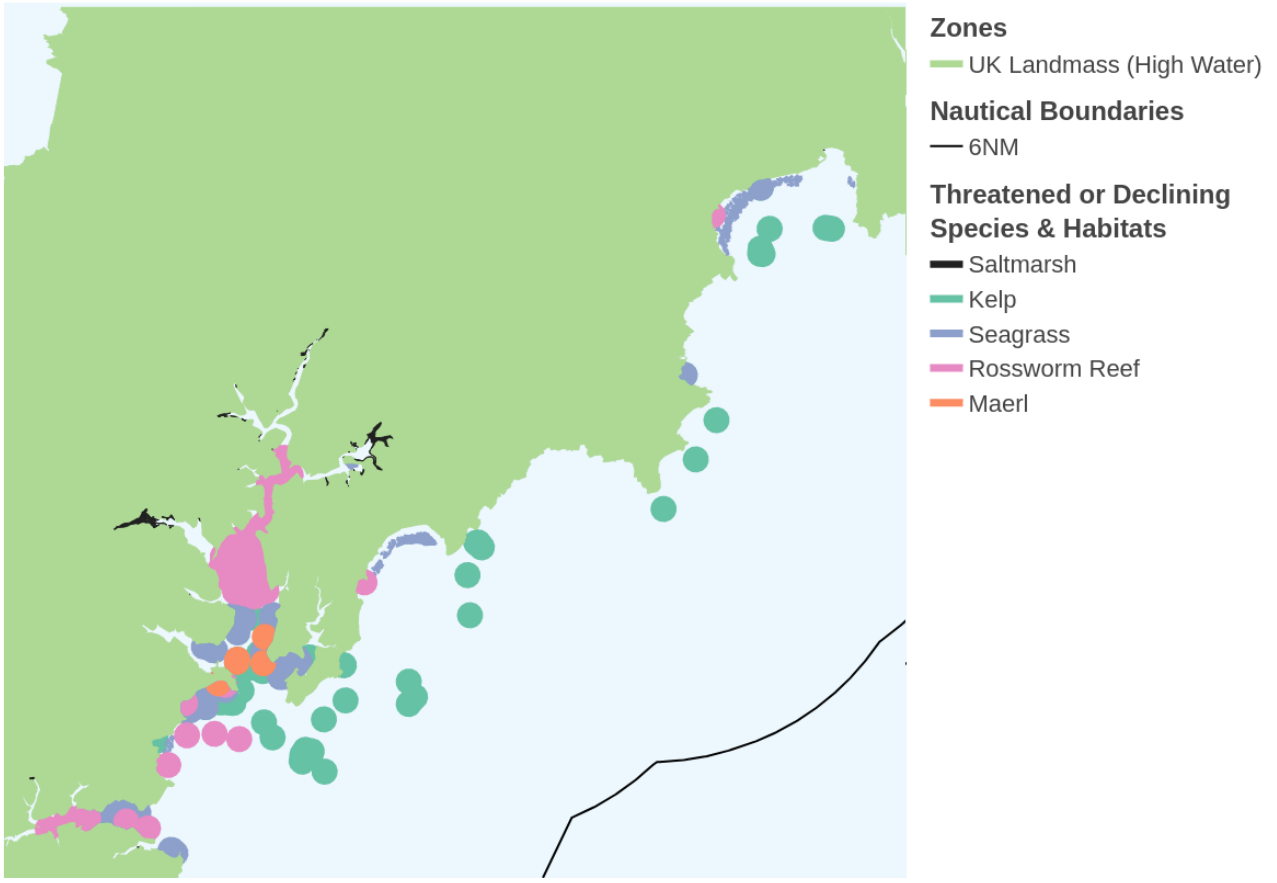

Figure 6. Survey locations containing threatened or declining species/habitats

Species group	Species Name	Presence (i.e. sightings or instances) in surveys within the SPA area	Within the locale (as per zone information presented in Figure 1)
Brown seaweed	Litosiphon laminariae	1	1
Kelp	Laminaria	12	12
Kelp	Laminaria digitata	9	9
Kelp	Laminaria hyperborea	14	14
Kelp	Laminaria ochroleuca	10	10
Kelp	Laminariales	2	2
Kelp	Saccharina latissima	25	27
Kelp	Saccorhiza polyschides	28	28
Maerl	Phymatolithon calcareum	4	4
Saltmarsh	Coastal Saltmarsh	0.1 ha	150 (78.1 ha)
Sea grass (DASSH surveys)	Zostera marina	12	13
Sea grass (as per National Sea Grass Layer)	Zostera marina	263.5 ha in 14 separate areas	271 ha in 16 separate areas
Worm reefs	Sabellaria alveolata	5	5
Worm reefs	Sabellaria spinulosa	28	34

Table 2. Survey results for threatened or declining habitats [14]

3.3 Species assets

This section provides an overview of the key species which are present within the coastal waters.

3.3.1 Sea mammal species

Sea mammals are regular visitors to Cornish waters. Their activity is monitored by a number of conservation groups including the Cornwall Seal Group Research Trust and Cornwall Wildlife Trust. The Cornwall Wildlife Trust run the Seaquest Southwest Project, a citizen science marine recording project which maintains sightings records of cetaceans since 1960.

The contribution of these species to ecosystem services, as defined by the JNCC universal Asset Service Matrix [13], is summarised below.

Species	Wildlife watching	Research	Aesthetics
Bottlenose dolphin	High	High	High
Short-beaked common dolphin	High		
Grey seal	High	High	High
Atlantic grey seals	High	High	High
Harbour porpoise	High	Medium	High

Table 3. Contribution of sea mammal species to ecosystem services

The observed sightings of cetaceans, as recorded by the Cornwall Wildlife Trust is illustrated in Figure 7. It is difficult to assign an effort level to these sightings and therefore conclusions on the size of population or its potential growth should not be made.

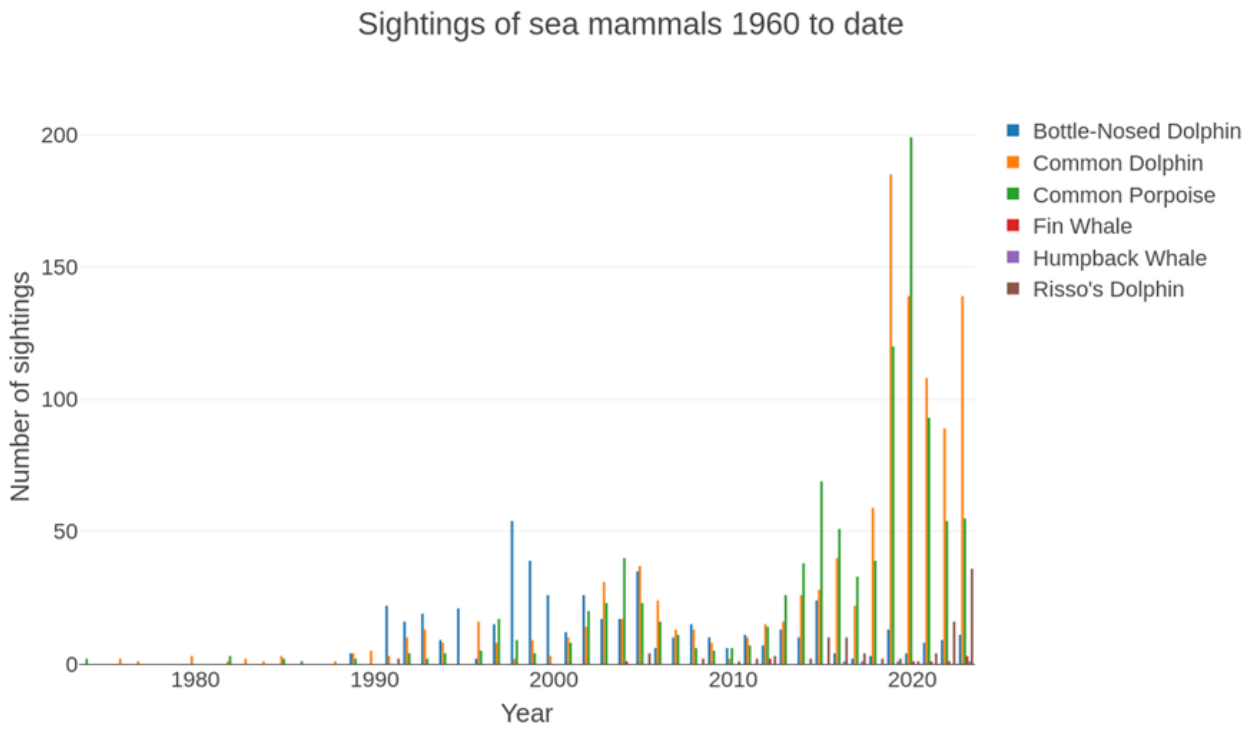

Figure 7. Sightings per annum for regularly seen sea mammal species in the SPA (courtesy of Cornwall Wildlife Trust)

3.3.2 Fresh water migrating (diadromous) fish species

There is very little observational data regarding the migrating fish species in UK waters. The majority of the data is supplied as by-catch reports from the fishing industry and commentary observations from benthic surveys. This is despite the obligation of estuarine SPA's designated to monitor species levels. The contribution of migrating fish species to ecosystem services, as defined by the JNCC universal Asset Service Matrix [13], is summarised below.

Freshwater migrating fish species	Wildlife watching	Research	Natural beauty
Allis shad		Med	
Twaite shad		Med	
European eel		Low	High
European river lamprey, river lamprey		Med	
Smelt, sparling		Low	
Sea lamprey		Med	
Atlantic salmon	Low	Med	High
Sea trout	Low		

Table 4. Contribution of protected fish species to ecosystem services

Catch records of protected fish species, particular fresh water migratory species, have been kept by the Cornwall Wildlife Trust and date back to 1960. The number of reported catches per year for these species is reproduced in Figure 8 below. The reported presence of these species is sporadic. This coupled with other evidence including river surveys for these species indicate that populations of these species continue to decline.

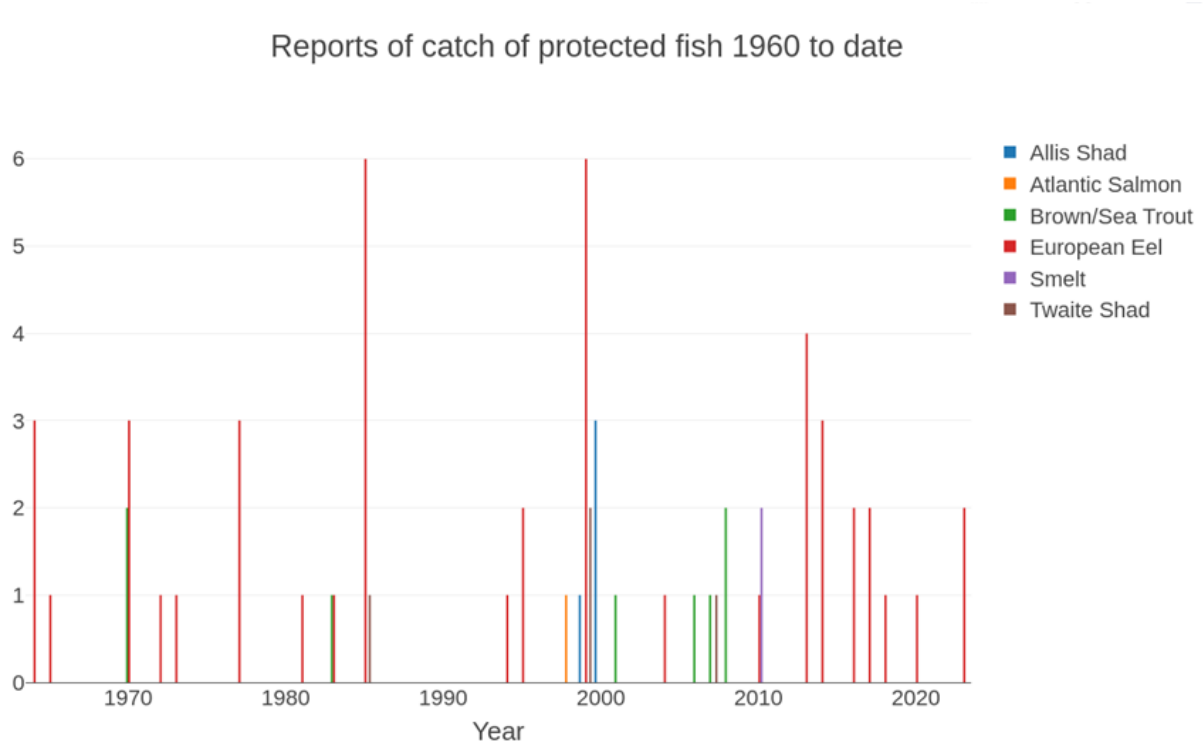

Figure 8. Catch per annum for protected fish species in the SPA (courtesy of Cornwall Wildlife Trust)

3.3.3 Sea bird surveys

The SPA has been designated for its non-breeding populations of black-throated diver, great northern diver and Slavonian grebe. The most recent estimates (winter 2021) suggest populations of 27 black-throated divers, 395 great northern divers and 12 Slavonian grebe / black-necked grebe [15]. The site is also home to a number of other seabirds including the common eider, kittiwakes, guillemots, razorbills, gull species, gannets, cormorants and shags. This survey was a joint task involving Natural England and the British Trust for Ornithology.

The contribution of these species to ecosystem services, as defined by the JNCC universal Asset Service Matrix [13], is summarised below.

Birds	Wildlife watching	Research	Natural beauty
Razorbill	Low	High	Medium
Black-throated diver	Low		
Great northern diver	Low		
Great cormorant, cormorant	Medium	High	Medium
Slavonian grebe	Medium		
Black-legged kittiwake	Medium	High	Medium
Common guillemot	High	High	Medium

Table 5. Contribution of key bird species to Ecosystem Services

Sighting records of birds have been kept by the Cornwall Wildlife Trust and date back to 1960. It is difficult to assign an effort level to these sightings and therefore conclusions on the size of population or its potential growth should not be made.

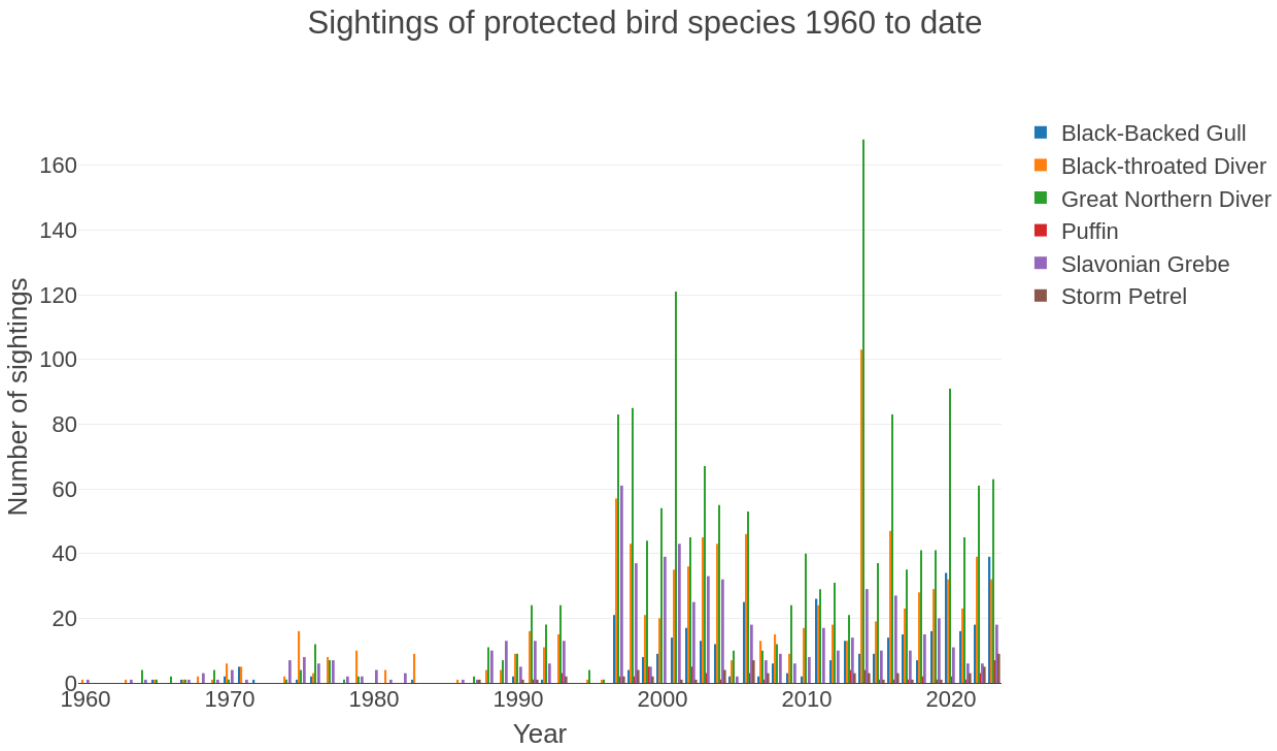

Figure 9. Sightings per annum for protected sea birds in the SPA (courtesy of Cornwall Wildlife Trust)

4. Valuation

Details of the methods used to calculate the values presented in this section can be found in the accompanying guidance document.

4.1 Provisioning services

The only provisioning service that can be valued in monetary terms is the provision of wild seafood, see Appendix B for detail of trends in landings volume, value and price per tonne.

Service	Indicative value	Confidence	Value trend	Comment
Wild seafood	In 2023, landings values (sales) were: Pelagic fish: £260, 053 Demersal fish: £873,321 Shellfish: £411,163 [5]	High in the data. Low confidence as a complete value estimate.		Fisheries landings and values are demand driven. Value trend does not reflect decreasing volume of landings. The landings value does not account for the costs associated with fishing (e.g. wages, boat running costs etc.) and are therefore an overestimate of the value of the ecosystem service. Without stock assessments it is not possible to understand if the decrease in landings reflects the state of the natural capital assets (i.e. fish stocks). Recreational angling is not accounted for.
Cultivated seafood	Insufficient data - not possible to value			There are two licensed aquaculture sites within the SPA but there are no accessible data to support monetary valuation
Non-food products from non-living resources	Not currently producing, but being explored			One sites has been licensed for the exploration of minerals (lithium and other battery minerals) but there is no extraction as yet [1].
Energy	Not currently producing, but potential identified			The Falmouth Bay Test Site is located within the area, but it is not currently producing electricity and is not connected to the grid [1].

Table 6. Contribution of the SPA to provisioning services

4.2 Regulation and maintenance services

Table 7 below provides a summary of the analysis of regulation and maintenance services within the SPA. Carbon Sequestration rates are taken from ONS marine natural capital accounts [16] and carbon values from data table 3 of the Treasury Green Book supplementary appraisal guidance on valuing energy use and greenhouse gas (GHG) emissions [17].

Service	Indicative value	Confidence	Value trend	Comment
Refuge, nursery and feeding habitats	Insufficient data - not possible to value			Marine habitats in the SPA are important for the provision of refuge, nursery and feeding habitats for many commercial, non-commercial and iconic species. Without information on residency of species within these habitats, it is not possible to value this contribution in monetary terms.
Erosion control	Insufficient data - not possible to value			These ecosystem services are challenging to value. The habitats implicated in these services are primarily saltmarsh, seagrass meadows and kelp forests, which are typically found in sheltered locations. Valuation requires data on the type and value of property being protected, understanding of the ability of the habitat to attenuate wave energy or store water, and details of habitat extent and height.
Flood protection	Insufficient data - not possible to value			
Storm protection	Insufficient data - not possible to value			

Climate regulation (carbon sequestration)	1686 ha of sand sequesters 488.94 tonnes C annually, valued at £69,909. 256 ha of mud sequesters 112.64 tonnes C annually, valued at £16,105. (2024 prices).	Low confidence in the value estimate.	Unknown	Value estimates do not consider the condition of the habitat and should therefore be assumed an overestimate. If habitat extent remains the same, value will increase due to increased £/tonne of carbon.

Table 7. Contribution of the SPA to Regulation and Maintenance Services

4.3 Cultural services

Service	Indicative value	Confidence	Value trend	Comment
Recreation and tourism	The South West Coast Path (SWCP): 9.1% of the SWCP (92.5km) runs adjacent to the SPA, worth £19,759,133 - £54million in visitor spend.	Confidence in the data: low. Confidence in the value estimate as representative of coastal recreation: low	Unknown	The Great Britain Tourism Survey [18] data are not disaggregated below the unitary authority level. A range of value estimates is provided for the section of the SWCP passing adjacent to the SPA, however, these values are not directly comparable. The lower value is taken from modelled data using the ORVal tool [19] based on travel costs while the £54 million figure takes the total value estimated for the SWCP (£600 million, inflated to 2024 prices) and assumes an equal value per km of the coast path [3]
Aesthetics	Insufficient data - not possible to value			Challenging to value. Requires data on e.g. house prices and a calculation of the uplift in value

				that can be attributed to a sea view. Approximately half of participant groups at the Marine Conservation Society's CVM workshops in St Austell Bay identified the importance of aesthetic cultural ecosystem services. More specifically, the natural and aesthetic beauty of the sea and coast were identified as key components of the local 'feel good factor.' It was highlighted that these elements are important to the local economy, and their absence would lessen the area's appeal.
Heritage	Insufficient data - not possible to value			No national data sets exist. Local valuation may be possible where studies exist. Approximately half of participant groups at the Marine Conservation Society's CVM workshops in St Austell Bay identified the importance of heritage-related cultural ecosystem services. In these workshops, participants appreciated that St Austell Bay still feels like a working place, with its history contributing to a sense of Cornish identity. However, it was noted that this is under threat due to the loss of local historic industries.

Table 8. Contribution of the SPA to Cultural Services

4.4 The non-monetary value of ecosystem services

Even when monetary values are available for a range of ecosystem services, these values do not represent the total value of these services. Value can also be interpreted in a relative sense. For example:

- Fish catches by the under 10m fleet landing in the site represent 17.5% of the total catch by the under 10m fleet landing into ports in Cornwall [5].
- 54.2km of the SPA coastline (approximately 80% of the coastline) is defined as heritage coast, established to conserve the best stretches of undeveloped coast in England and represents 20% of all heritage coast in Cornwall [9].

Social and cultural values are created through the experiences that individuals and communities have linked to the coast and sea. Often these types of values are difficult to monetise and are experienced across multiple dimensions, both on the individual and shared level.

One way to try to capture these types of values in marine natural capital assessments is through participatory research methodologies such as the Community Voice Method (CVM). This method involves the filming of semi-structured interviews with a representative sample of stakeholders which are coded and analysed to develop a documentary. This film is then shared in community workshops with often underrepresented local stakeholders to provide a platform to elicit and record their opinions. This can be a useful approach to better understanding how communities use and value their marine environment.

As part of their Valued Seas Project, the Marine Conservation Society engaged stakeholders in St Austell Bay using CVM. The interview stage of the CVM in St Austell Bay involved semi-structured interviews with 28 stakeholders identified from a Stakeholder Mapping exercise, including: (i) business and industry; (ii) activism; (iii) students; (iv) government and regulation; (v) NGOs; (vi) community and users; (vii) culture and heritage; and (viii) education. The coding and analysis of these interviews was used to produce a 30-minute documentary representing the views, opinions and values of interviewees.

Five participatory workshops were then held as part of the CVM for St Austell Bay. Two of these were specific to particular stakeholders (Cornwall Council and the Megavissey fishing community), whilst three were community workshops open to a wider range of participants. The aim of these workshops was to collect information from the community about the value of the coast and sea to them, as well as to provide them with information about the project and wider relevant information. This was achieved in part through five information stations, one of which shared and collected information on the value of ecosystem services, whilst another shared and collected information on the social and cultural values held about the local marine environment.

A range of values were expressed by interviewees and workshop participants, including:

- **Wellbeing and therapeutic values**

These were discussed by most interviewees and mentioned by all groups participating in the information stations. For instance, whilst not directly referenced in the Mevagissey fishing community workshop, participants described the benefit of the fishing community looking after each other, and that the closure of fishing would have a negative impact on wellbeing.

- **Social relations**

This was discussed by many interviewees and also mentioned by many of the workshop participant groups. For example, participants in the Mevagissey fishing community workshop described learning fishing from ‘old timers’ and the importance of passing on fishing knowledge to the next generation. More widely, these participants also discussed the importance of fishing for their community.

"When you look out there, and you see how beautiful it is, it's hard not to just want to be here, and spending all of your time here really. And sharing that with other people, whether they're tourists or people that may live close by but have not really seen this area. Just sharing that with them, and showing them, is a real honour, to be honest with you." (CVM interviewee from the St Austell Bay area)

- **Care and stewardship,** which was discussed by many interviewees.

"We look after the beach in terms of how we clean it up. And I feel that does make a positive change when you approach people when they've littered. And you can be like come on guys. And you try and educate them. Hopefully then they can take that on, and they can pass that onto other people." (CVM interviewee from the St Austell Bay area)

- **Sense of place,** which was discussed by about half of interviewees.

"I've always wanted to live by the sea. And I still get a buzz when I walk out of my house and go over Tywardreath hill. And suddenly I can see the sea in front of me. And it gives me a buzz every time I do it, without fail. I just think, wow, I am so lucky to be living this close to the sea." (CVM interviewee from the St Austell Bay area)

- **Aesthetic values,** which were mentioned by several interviewees.

"We face due south and when the moon is going over and there's that line of silver all the way across the bay. That has to reach out to you and just talking about it I can feel the hairs in the back of my neck going up. That has to have an emotional impact on you, surely. Yes, incredibly privileged to live in a place like this where one can see things like that." (CVM interviewee from the St Austell Bay area)

- **Personal and cultural identity**

This was mentioned by a few interviewees and by many of the workshop participant groups, with participants in the Mevagissey fishing community workshop describing feeling a total connection to the sea.

Approximately half of workshop participant groups also mentioned the **spiritual value** and **the intrinsic value** of St Austell Bay, reiterating the fact that the marine environment is associated with a range of overlapping and coexisting values.

As additional data collection, a participatory mapping exercise was also completed by both interviewees and workshop participants in which individuals were asked to identify and annotate areas of a map of St Austell Bay that were important to them. The aim of this exercise is to represent cultural and social values on a spatial scale. The geospatial summary data is presented in Figure 10 below. This graphic summarises the thematic groupings of participant mapping and comments. The groupings covered recreation and leisure, work, heritage, environment, work (including commercial use and travel), cultural and social experiences and finally general use of the beach (e.g. where the beach was recognised as a valuable natural asset without further detail). However, it should be noted that this activity was more focused on understanding *what* is important to participants and does not necessarily reflect the actual location of identified themes.

Figure 10 shows that the use of the marine environment (including beaches) for leisure and recreation was the most popular activity in the St Austell Bay area. Cultural and social themes were identified by 31 participants, whilst environmental themes were identified by 37 individuals including seagrass (identified by 12 participants) and maerl (identified by 8 participants). The sub-

theme of beauty and scenery, closely related to the cultural ecosystem service of aesthetic experience, were also identified by 22 participants.

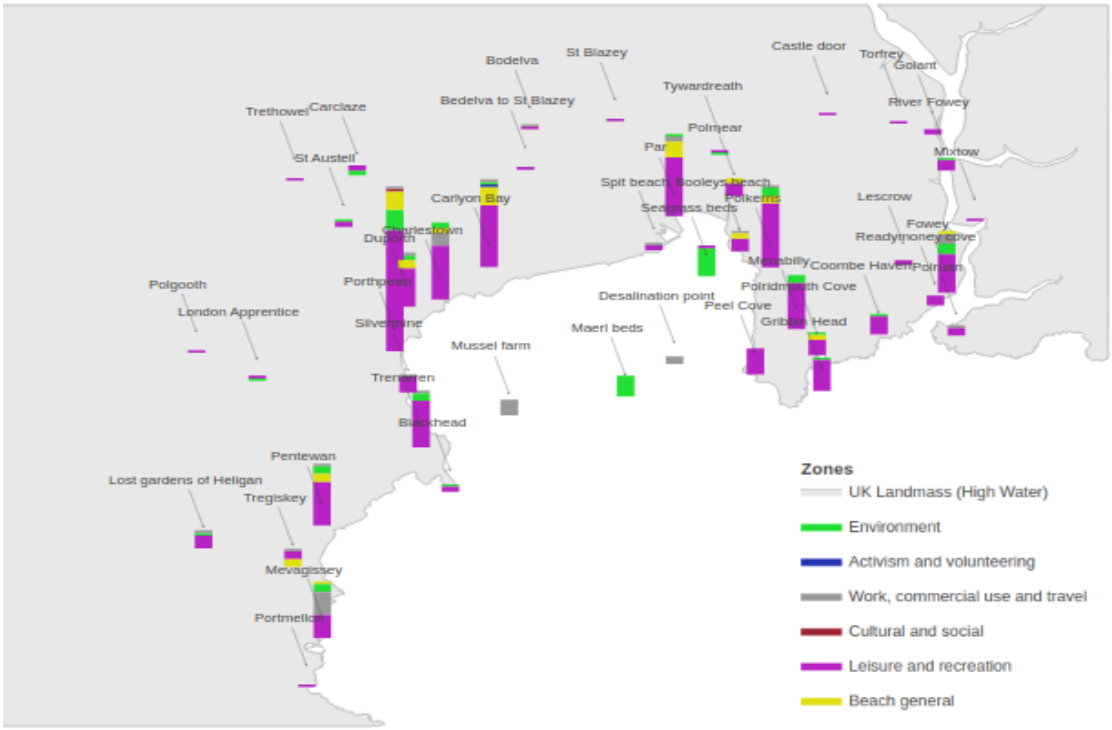

Figure 10. Spatial distribution of community feedback on the relevance of the marine environment (courtesy of the Marine Conservation Society)

5. Pressures on Natural Capital

5.1 Pressures in the case study site

Pressure on natural capital assets come from many sources, including but not limited to:

- Commercial and Recreational Fishing
- Water borne pollution
- Water borne noise
- Recreation and tourism
- Shipping
- Energy infrastructure
- Cables
- Aquaculture

Data are not readily available from all these pressures, however, where data are available (commercial and recreational fishing, water-borne pollution and marine noise) these have been discussed below.

5.2 Commercial Fishing

Figure 11 shows the potential area of high impact fishing gears (dredging and bottom trawling) within the SPA. A significant proportion of the landings into Mevagissey are from bottom trawls and the majority of the landings from dredging are recorded in Falmouth [5].

This map does not represent where actual fishing activity takes place. Further data, from systems such as inshore Vessel Monitoring Systems (iVMS) would be needed to understand the actual level and location of fishing effort using these gears.

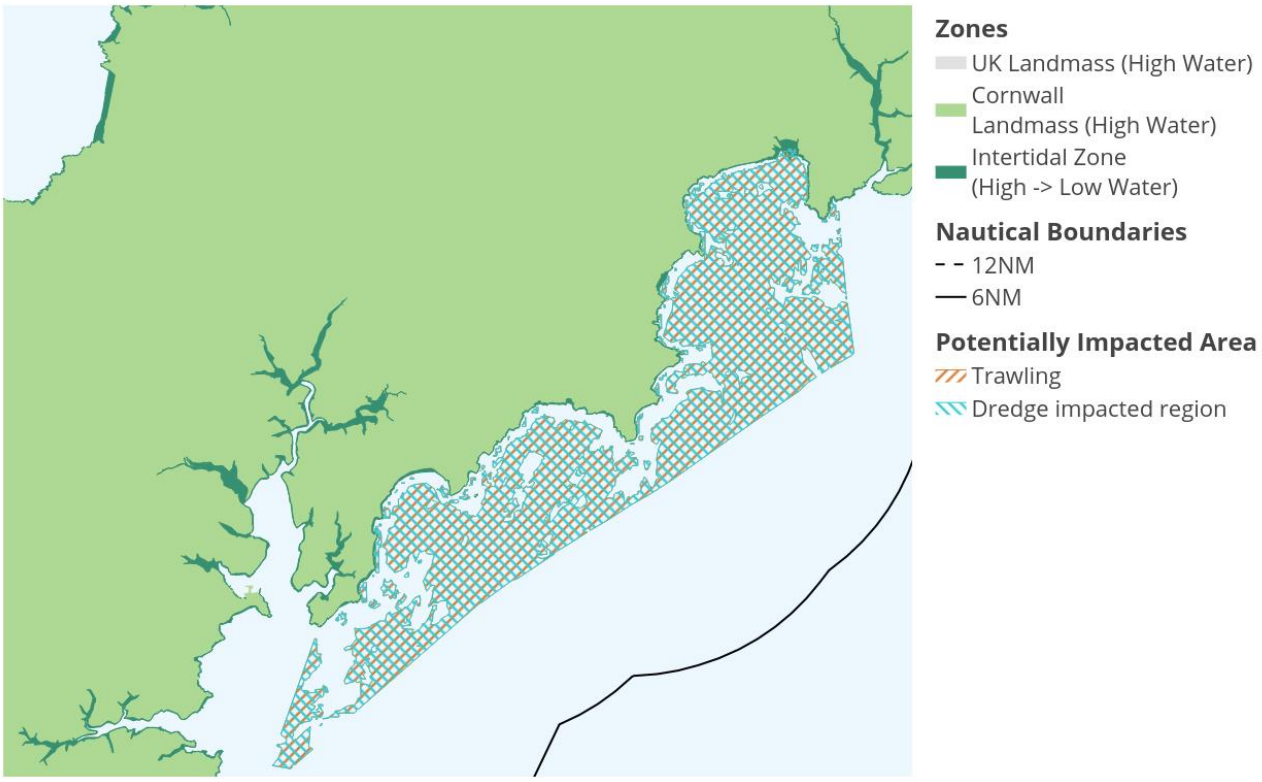

Figure 11. Pressure map of potential mobile bottom contacting fishing gear (based on habitats, activity and fishing gear utilised) in the Falmouth – St Austell SPA

5.3 Sensitivity to scallop dredging in the SPA

The designated SPA area contains ecologically important threatened and declining habitats, as identified by OSPAR (although these only receive protection if they are considered to be supporting the bird features for which the SPA is designated). These include maerl, native oysters, kelp and rossworm reefs.

Pressure from scallop dredges within the SPA places the recovery of these habitats at risk. The area of the SPA accessible to scallop dredging is estimated to be 15,000 ha. The total area accessible to the inshore scallop dredge fleet is estimated to be approximately 36,500 ha stretching from the south of Gribbin Head, west to the Lizard and out to the 6nm limit. Therefore 40% of the suitable grounds for scallop dredging is within the SPA.

The value of catch from dredges which is landed within the bounds of the case study is shown in the table below (based on mean weight and value of landings since 2021 with value>£1K per annum) [5].

Port	Weight (tonnes)	Sales value (£)	Price per tonne (£K per tonne)
Fowey	3	£4,000	£1,560
Mevagissey	79	£69,000	£870
Mylor	9	£16,000	£1,760
River Fal	141	£278,000	£1,970
Total	232	£367,000	

Table 9. Value of scallop dredging by port (2021 data)

Seafish estimate that the fuel cost of this activity is approximately 20% of revenue for the <15m dredge fleet [20]. At a carbon price of £130 per tonne, the carbon capture cost of the activity is an additional £75K.

Dredging causes damage to the epifauna and epiflora inhabiting the benthic layer, through both surface abrasion and substrate penetration. This in turn reduces the delivery of ecosystem services including waste remediation, nutrient cycling and seafood generation. The exact impacts of surface abrasion and penetration on seabed habitats and the services they provide remains uncertain, but any reduction in condition has wider implications, many of which cannot be directly costed.

The latest available Stock Assessment of Scallops published in 2024 [21], indicate that the Southern Cornwall area's overall scallop landings are below an estimated level of Maximum Sustainable Yield, however the large variation in reported annual landings and estimated harvestable biomass suggests that the populations in these assessment areas are not at equilibrium. It should be noted from the report that the moving average of declared international landings show a decline over the last 6 years.

Research and development is underway to find methods of sustainable harvesting of scallops. Techniques currently being evaluated include the deployment of remotely operated vehicles exploiting passive sensing techniques such as imagery and ultrasound to locate harvestable stock, with a precision water flow pump to collect the target species without impacting on the seabed [22].

Scallop aquaculture has been widely adopted in China and Japan (making up 90% of the global aquaculture industry) and trials are in progress in the UK. Sustainable, low impact harvesting methods such as hand diving or exploiting technologies mentioned above offer premium sales prices over dredges, higher levels of selectivity with near zero bycatch and greater opportunities for co-location with other activities including netting. Comparison with Lyme Bay can provide insight into the growth, benefits and beneficiaries of hand dived scallops.

5.4 Recreational Angling

CEFAS report published July 2024 [23] provides recent insight into recreational activity in the period before, during and after COVID. This identifies approximately 4000 recreational anglers in the southwest, including Somerset, Dorset, Devon and Cornwall. The number who fish in the St Austell Bay area is not known below this level.

The number of tackle shops in the area (currently 2) is an indicator of economic activity and hence number of fishing trips are made per year. Breakdown between shore angling, charter boat use, and own boat use (including sea kayak) is not provided.

5.5 Waterborne Pollution

The water pollution data provided by the Environment Agency [24], Figure 12, illustrates where discharges have occurred from combined stormwater overflows within 10km of the sea. This provides an indicator of where volumes of contaminants from sewage are likely to have entered the marine environment. In total for the calendar year 2023, there were recorded 17,863 hours of spillage from combined sewer overflows in 2578 separate recorded events.

The red markers indicate sewer discharge with the size of the marker proportional to the natural log of the estimated hours of the discharge. The purple markers provide an indication of other pollution event, typically discharge of chemical and nutrients. Bathing water quality and designated areas of shellfish areas are overlaid on the chart to demonstrate the sensitivity of the environment and its natural capital on these pollution events.

Significant further work is required to understand how the species and habitats of the coastline are impacted by the frequency, timing, volume and category of the pollution.

There are eighteen designated bathing water sites on the coastline, all are designated good or excellent except Par Sands (classified as Sufficient in 2023 and 2024) and Porthluney (classified as Poor in 2023 and 2024)[7].

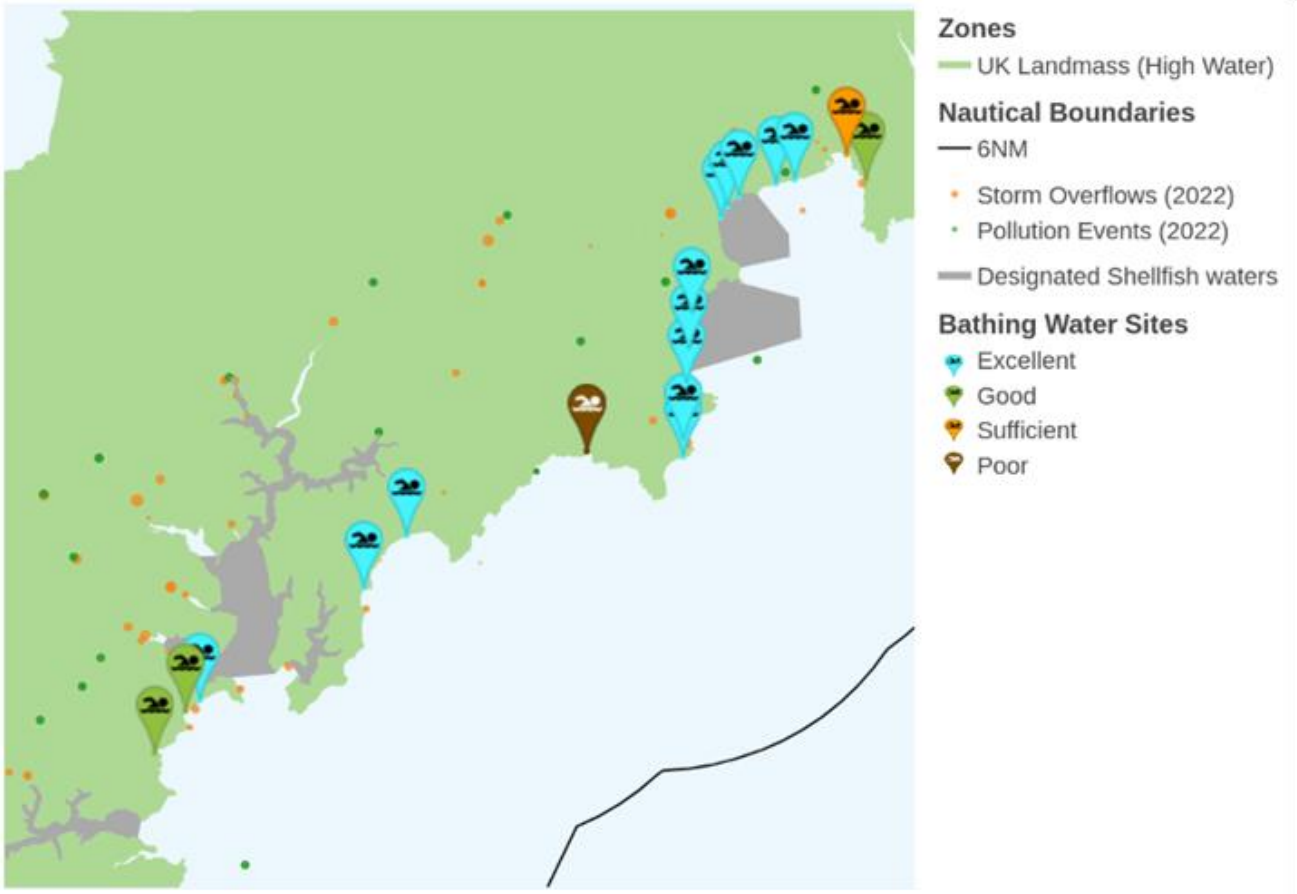

Figure 12. Water borne pollution as measured by Environment Agency in 2022 compared with distribution of bathing sites

5.6 Waterborne Noise

Noise pollution, as recorded by organisations who have reported marine noise activity either as a result of a licensing condition provided by MMO or by the requirements of The Crown Estate, is recorded in the Marine Noise Registry [25]. This covers impulsive noise (e.g. from piling, seismic and explosives) and high-power sonar (either from military use or acoustic surveys).

Noise is recorded in a format known as 'Pulse Block Days' to indicate the number of days within the period in which low frequency noise sources (in the range 10Hz to 10KHz) were known to be operating in a block. The block sizes are approximately 16km in latitude (Northing) and 10km in longitude (Easting). Currently, in this area there are limited geolocation of noise sources and the number of occurrences is relatively low. JNCC is working on improving both the reporting and analysis of the disturbance caused by underwater noise.

Research into the impacts of marine noise on a range of species including cetaceans, sharks, rays and commercial fish is ongoing.

6. Summary of Potential & Next Steps

6.1 Summary of potential for enhancement of natural capital and ecosystem services

This Case Study sets out the context for, and habitats and species that are prevalent within, the Falmouth to St. Austell Bay SPA. Mapping of those habitats to ecosystem services helps to identify where there is potential for improvement in the delivery in ecosystem services through action to protect and restore natural capital. Ideally valuation would help to present a case for such action. Valuation data are limited, however, so a logical step would be to prioritise the importance of different ecosystem services to the local area and the local population. There are many ways that this can be achieved, for example, through exploration of Cornwall Council's Local Nature Recovery Strategy survey or the Marine Nature Recovery Framework. This would help to provide a ranking of areas from which improvement in ecosystem services will have most effect.

Examples of action plans which could be delivered include:

- Natural recovery of key habitats through conservation. Examples include native oysters, seagrasses, kelp beds, maerl, mussel beds, rossworm beds. All these habitats exist in Cornish Waters and have the capability to be conserved, recovered and allowed to expand (as demonstrated through, for example, the REMEDIES seagrass project).
- Restocking of species where appropriate. This is already conducted at the National Lobster hatchery in Padstow and this programme could be expanded geographically and to cover more species.
- Introducing codes of conduct (such as Cornwall Wildlife Trust's Marine and Coastal code) or licensing to help manage disturbance of wildlife & ensure a sustainable ecotourism industry

6.2 Summary of challenges involved in delivering potential enhancement

Two major challenges exist in delivering potential enhancement:

1. Securing the backing of the community: requires participatory workshops, communication plans and beneficiary mapping;
2. Securing necessary finance to deliver and maintain the improvement: requires robust costing, thorough risk management, investment analysis and benefits realisation.

6.3 Next steps

The case study process completed to date has been performed as a feasibility study to demonstrate what can be achieved for a local scale assessment at a preliminary or basic level following the guidance developed, which provides a baseline prior to considering where action is most needed and is best applied.

A "Lessons Learnt" report has been prepared in parallel with this Case Study identifying where improvements would be beneficial. Additionally, processes, tools and methods have been developed as part of this Case Study which would make further such studies quicker and less resource intensive.

An output summarising the findings of this case study has been produced to show how the findings from natural capital assessments can be presented in an easily digestible format.

Appendix A: EUNIS Habitats, Descriptions and areas within the SPA

EUNIS Code	EUNIS Description[12]	Habitat Area [ha]	Area as % of Sea Area
A3	A3: Infralittoral rock and other hard substrata	181.65	0.67
A3.1	A3.1: Atlantic and Mediterranean high energy infralittoral rock	748.99	2.75
A3.2	A3.2: Atlantic and Mediterranean moderate energy infralittoral rock	1755.74	6.44
A3.3	A3.3: Atlantic and Mediterranean low energy infralittoral rock	1261.01	4.63
A4	A4: Circalittoral rock and other hard substrata	0.08	0.00
A4.1	A4.1: Atlantic and Mediterranean high energy circalittoral rock	366.56	1.34
A4.2	A4.2: Atlantic and Mediterranean moderate energy circalittoral rock	1449.32	5.32
A4.3	A4.3: Atlantic and Mediterranean low energy circalittoral rock	338.92	1.24
A5	A5: Sublittoral sediment	24.01	0.09
A5.23 or A5.24	A5.23 or A5.24: Infralittoral fine sand or Infralittoral muddy sand	4106.08	15.06
A5.25 or A5.26	A5.25 or A5.26: Circalittoral fine sand or Circalittoral muddy sand	12995.58	47.67
A5.33	A5.33: Infralittoral sandy mud	2.42	0.01
A5.35	A5.35: Circalittoral sandy mud	147.94	0.54
Na	Not known or not available	773.47	2.84

Appendix B – Trends in fish landings (volume and value)

Figure B1 shows the downward trend of the landings of demersal and pelagic finfish and shellfish by weight (tonnes) into ports adjacent to the SPA by UK registered boats under 10m. Vessels under 10m are more likely to fish close to their home port and so can be assumed to fish in local waters [5].

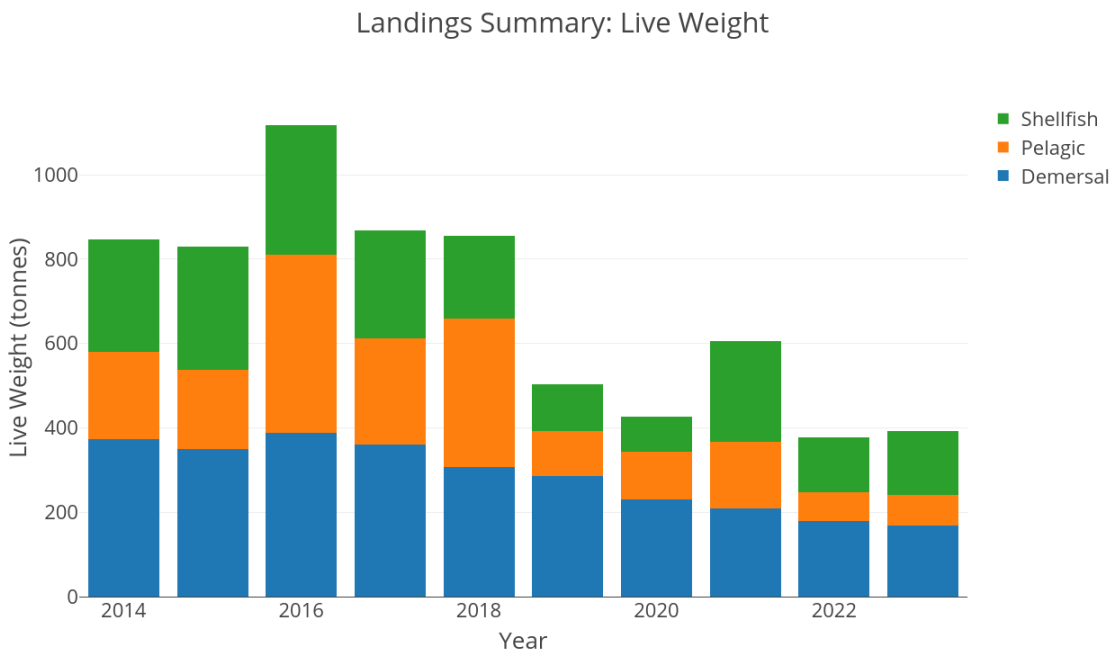

Figure B1. Landings from boats into ports within 3nm of the SPA area

Figure B2 shows the sales value at the point of first sale for the same categories of fish into SPA ports by inshore boats. While landings have decreased, total sales values have fluctuated but stayed stable.

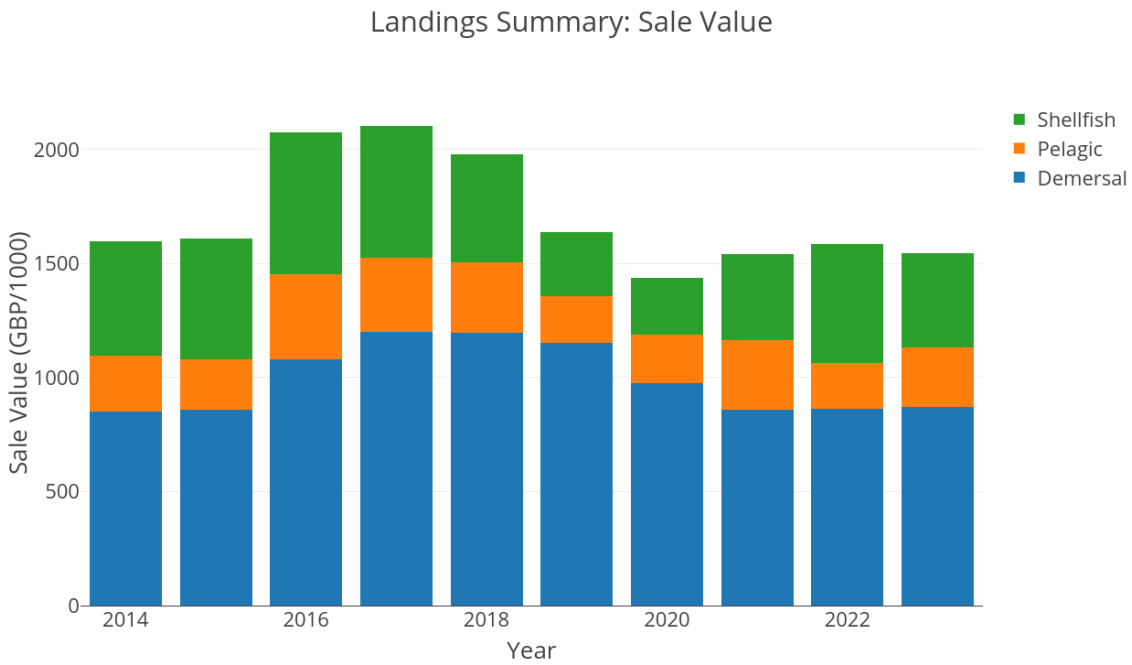

Figure B2. Sales Value (£K) from boats landing into ports within 3nm of the SPA area

Despite this, the economic price per tonne of fish and shellfish has increased over the same time period (Figure B3).

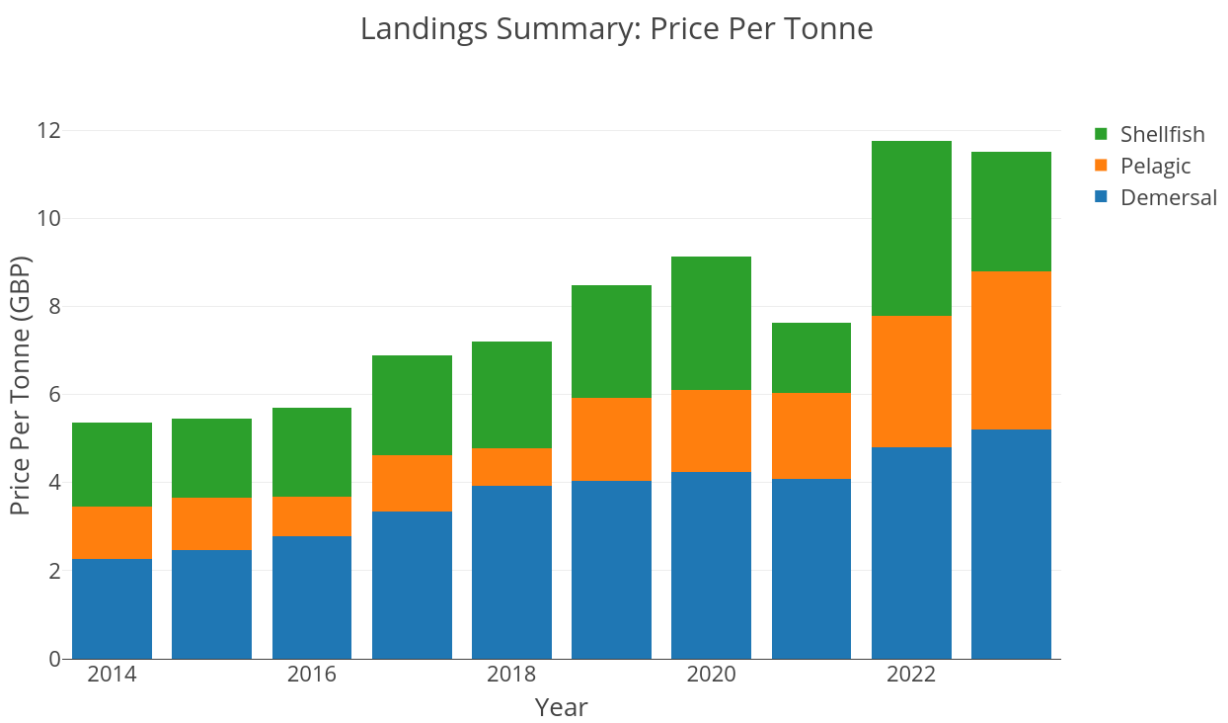

Figure B3. Sales price per tonne for boats landing into ports within 3nm of the SPA area

These three graphs illustrate that the value of fresh wild seafish has increased since 2014. In recent years, the fishing industry has had to deal with the impacts of Brexit, the Covid-19 pandemic and the war in Ukraine. These had significant impacts on market demand, the regulatory environment and input costs (especially diesel).

Appendix C – Reference list

Referenced Datasets

Document Reference []	Description	Included in Natural Capital search tool	Access method
1	The Crown Estate	Yes	https://opendata-thecrownestate.opendata.arcgis.com/
2	National trust spatial boundaries data	Yes	https://open-data-national-trust.hub.arcgis.com/
3	South West Coast Path visitors	Yes	https://www.southwestcoastpath.org.uk/love-the-coast-path/everymilematters/economy/
4	JNCC Marine Protected Areas – Designated Marine Sites		https://jncc.gov.uk/our-work/marine-protected-area-mapper/
5	Marine Management Organisation - fisheries landings data	Yes	https://www.gov.uk/government/publications/2023-uk-and-foreign-vessels-landings-by-uk-port-and-uk-vessel-landings-abroad-provisional-data
6	UK Government Census 2021	Yes	https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/adhocs/2661ct210369census2021
7	Environment Agency Bathing Water designations	Yes	https://environment.data.gov.uk/bwq/profiles/help-understanding-data.html
8	General outlets including Tackle shops, Outdoor Activity Centres	No	Google API (Open source) - "Outdoor Activity Centre"
9	Heritage Coast	Yes	https://naturalengland-defra.opendata.arcgis.com/datasets/heritage-coasts-england/explore
10	UNESCO World Heritage Sites	Yes	https://unesco.org.uk/our-sites/world-heritage-sites
11	Falmouth Ship Repair employment	No	https://www.ap-group.co.uk/
12	EUNIS Broadscale designation of habitats	Yes	https://emodnet.ec.europa.eu/en/euseamap-2021-emodnet-broad-scale-seabed-habitat-map-europe
13	Joint Nature Conservation Committee - universal Asset Service Matrix	Yes	https://www.marlin.ac.uk/asm
14	UK Centre for Marine Species & Habitats Data - DASSH	Yes	https://www.dassh.ac.uk/
15	Surveys of Falmouth Bay to St Austell Bay Special Protection Area (SPA) Winter 2020/21 (NERR111)	Yes	https://publications.naturalengland.org.uk/publication/6453589349498880
16	Office for National Statistics Marine Natural Capital Assets	Yes	https://cy.ons.gov.uk/economy/environmentalaccounts/methodologies/marinenaturalcapitalaccountsukmethodologyguide

17	Her Majesty Treasury Green Book - supplementary advice	Yes	https://www.gov.uk/government/collections/the-green-book-and-accompanying-guidance-and-documents#supplementary-guidance:-subject
18	Great Britain Tourist Survey	Yes	https://www.gov.uk/government/statistics/announcements/great-britain-tourism-survey-overnights-2022-and-2023-revision
19	Outdoor Recreation Valuation Tool	Yes	https://leep.exeter.ac.uk/orval
20	Seafish Survey of Commercial Fishing	Yes	https://www.seafish.org/document?id=8913bc5c-3ca3-48c5-be40-d300a2340736
21	Assessment of king scallop stock status around the English coast	Yes	https://www.gov.uk/government/publications/assessment-of-king-scallop-stock-status-around-the-english-coast
22	Research into Sustainable Scallop Harvesting	Yes	https://www.seafoodsource.com/news/supply-trade/ava-ocean-pioneering-precision-scallop-harvesting-technology
23	Recreational Fishing in UK 2020-2023	Yes	https://www.cefas.co.uk/news-and-resources/news/new-citizen-science-data-reveals-trends-in-uk-sea-angling-participation-and-catches-from-2016-to-2021/
24	Environment Agency Challenges Report	Yes	https://www.gov.uk/government/publications/river-basin-management-plans-updated-2022-challenges-for-the-water-environment
25	JNCC Marine Noise Registry	Yes	https://mnr.jncc.gov.uk/public-app/activity-outputs