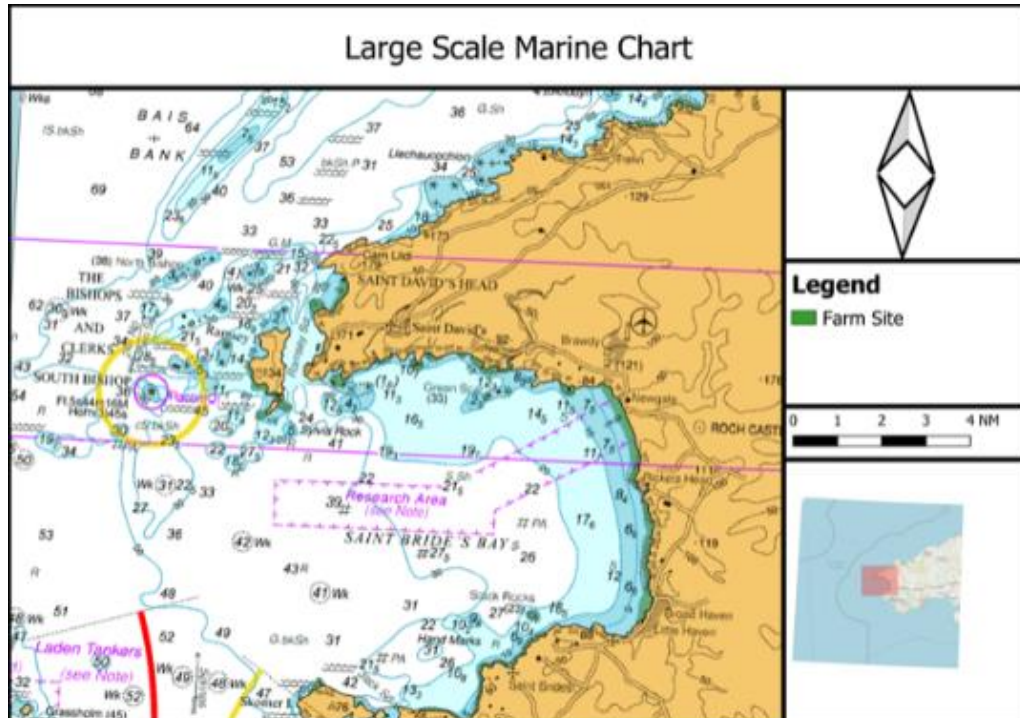


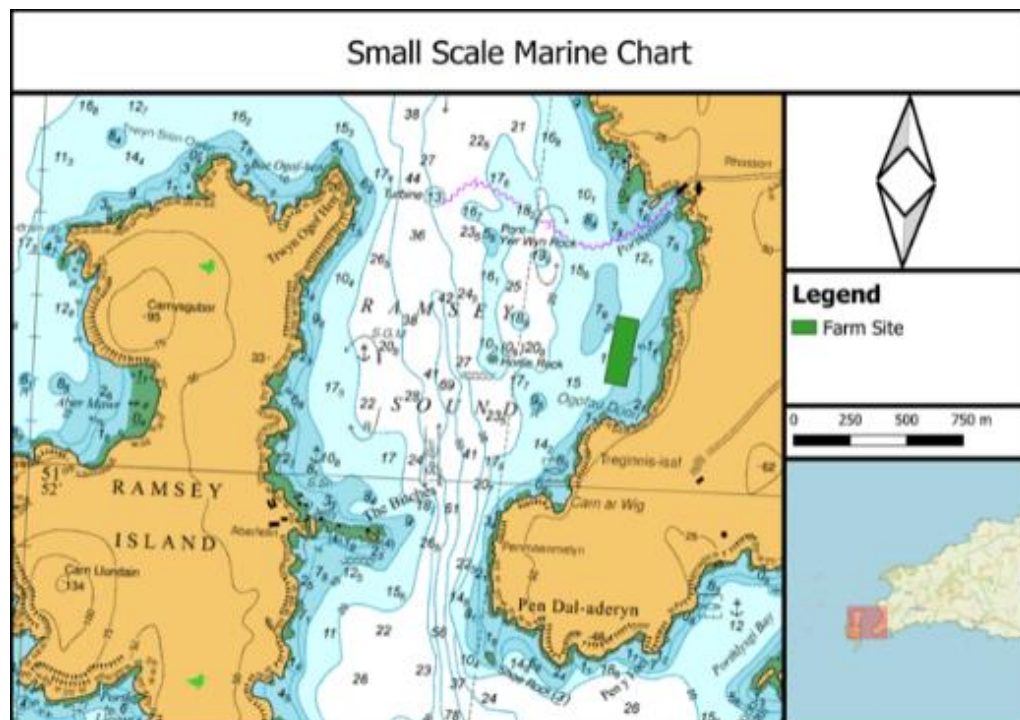
VISUAL IMPACT ASSESSMENT

Location.

1a.



1b.



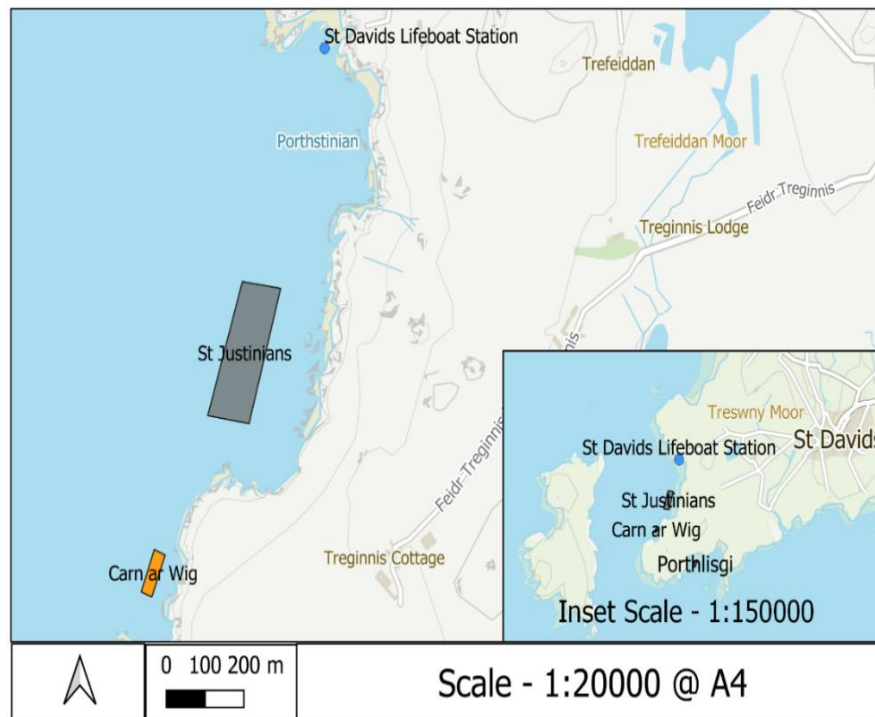


Figure 1c. Proposed location of new three hectare integrated multi-trophic ocean farm, (St Justinian's site), black outline, grey infilled box. Existing trial site, (Carn ar Wig), Black outline, orange infill.

Table 1. Longitude and latitude for the area occupied by the proposed St Justinian's ocean farm installation. WGS84 world reference system.

Longitude	Latitude
-5.312440965606686	51.87332853640763
-5.3137350082397505	51.87070162364426
-5.3121900558471715	51.87054263792684
-5.311006965606687	51.87319753571296

Photographs of area of interest

2a.



2b.



Figure 2. Images of St. Justinians Bay taken during 2021.

a/ St Davids lifeboat station is the building with a red roof. The proposed farm would be just to the bottom left of this photo about 150m out from the coast

b/ The Proposed farm would be at the top right of this photo.

DIAGRAMS OF THE SEA- FARM DESIGN PROPOSED

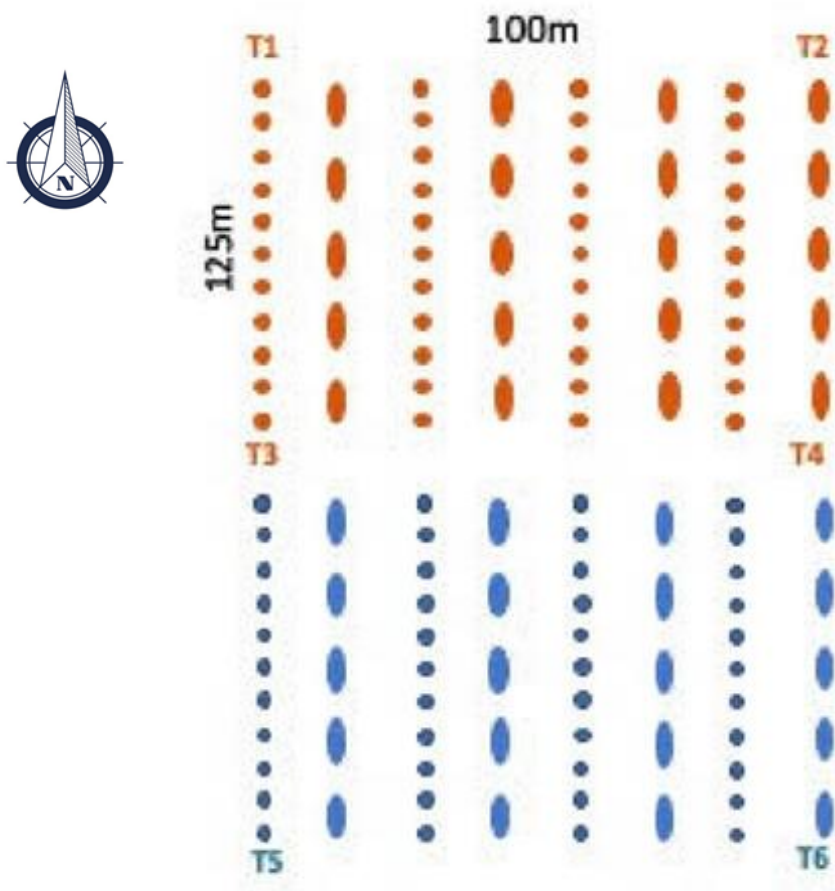


Figure 3. Plan view of sea surface.

Phase 1 four trinity house special marks buoys are represented by T1-T4.
44 orange circles represent 4 seaweed lines each with 11 fifteen-inch A floats .
20 orange shapes represent 4 shellfish lines each with 5 pencil floats (250 litre)

Phase 2 two trinity house special marks buoys are represented by T5-T6.
44 blue circles represent 4 seaweed lines each with 11 fifteen-inch A floats .
20 blue shapes represent 4 shellfish lines each with 5 pencil floats (250 litre)

Trial farm site and boat/pontoon

5a.



5b.



Figure 5 a/ Powered pontoon launching from St Justinians. b/ Carn ar Wig trial site being worked on.

SIMILAR FARM EXAMPLES FROM AROUND THE WORLD

6a.



6b.



6c.



Figure 5. a/ 'SEAWEED SOLUTIONS AS', one of Europe's largest seaweed farmers based in Norway. b/ 'KETCHIKAN'S COMMUNITY DEMONSTRATION SEAWEED FARM', Alaska c/ 'ALGOLESKO', 16-hectare sea farm in Lesconil, Brittany.

a/



b/



Figure 6. The proposed farm will be clearly marked by six yellow special mark Trinity House buoys (spherical or pillar). A yellow 'X' shaped top mark and lit at night by Fl.Y.5s yellow flashing lights.

Five of the buoys will be similar to image a/ One will be similar to image b/, this larger buoy will be fitted with monitoring equipment, (Cameras above and below surface and acoustic microphones below the surface). The surface lines between the special marker buoys, are equipped with yellow 15-inch floats and are positioned above the submerged (approximate depth of 150cm) seaweed lines. The shellfish lines will have 250 litre pencil floats supporting them.

Possible negative effects of flashing lights on wildlife

All of the published literature seems to be looking at bright steady white lights such as flood lights on shore and on boats, there has been very little research conducted on flashing yellow safety lights.

Manx Shearwaters (*Puffinus puffinus*) are amber listed in Birds of Conservation Concern 4 (2015 update). They are nocturnal and are known to live and feed in the area of the farm. Grounding is the main problem for Manx Shearwaters particularly in built-up environments and on shipping as they are attracted to bright white lights. Shearwaters can get trapped by man-made obstructions, as they need a run up to take

off. Seabirds and underwater fauna, should be less affected by a flashing yellow light than solid white light as this shouldn't be confused as the moon by them. The installation is in the water and the Shearwaters will have plenty of room to do running take offs. There may even be a benefit to them in that the seaweeds attract invertebrates, which attract sand eels etc. This should create a spill over effect, like with marine no fishing zones.

There are going to be waterproof digital cameras installed on a marker buoy (or two), above and below the surface, firstly recording, but as signal improves, Livestreaming to the Car-Y-Mor website. This data can be used to determine what effect, if any, flashing lights have on local wildlife.

References (light pollution)

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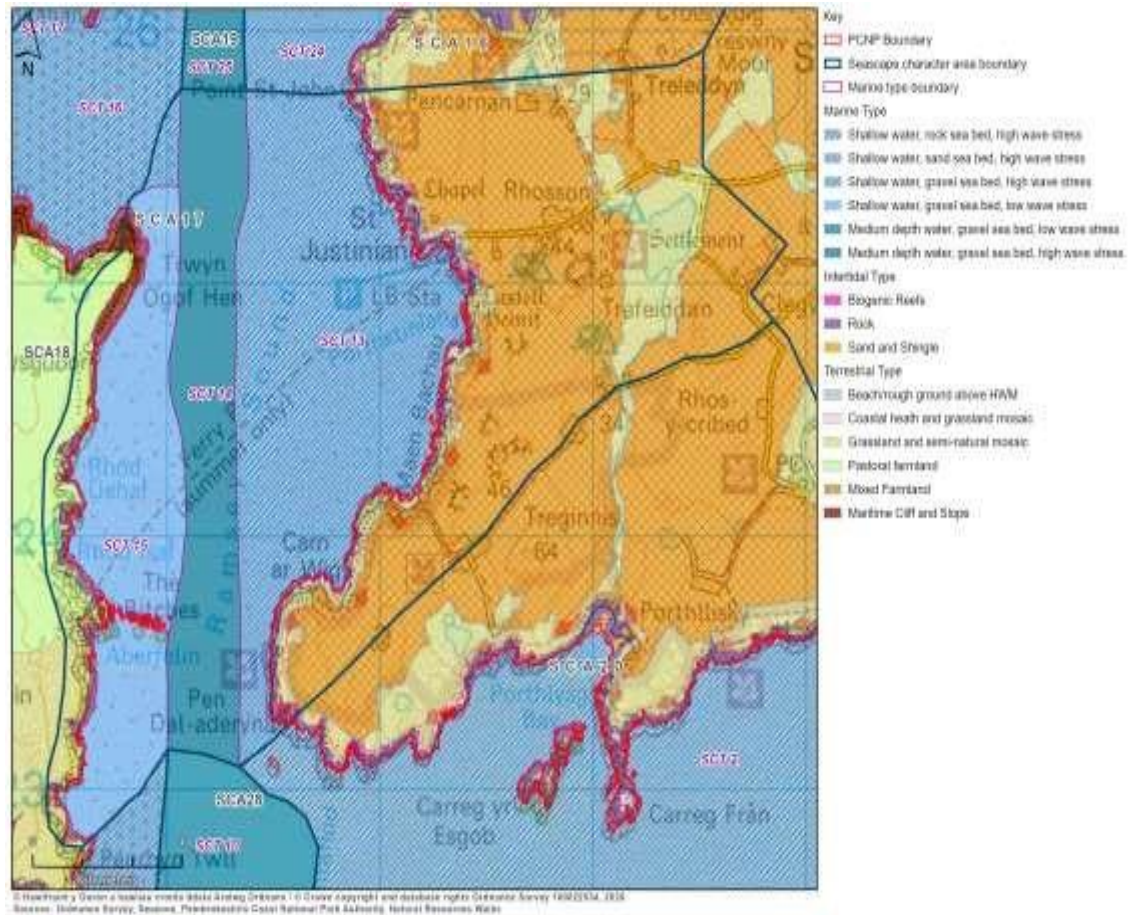
Syposz, M., Padget, O., Wynn, J., Gillies, N., Fayet, A. L., & Guilford, T. (2021). An assay to investigate factors influencing initial orientation in nocturnally fledging seabirds. *Journal of Avian Biology*, 52(1). <https://doi.org/10.1111/jav.02613>

Appendix

No: 17

Seascape Character
Area Name:

Ramsey Sound



SCA17:Ramsey Sound



Ramsay Sound viewed from Carn Rhosson



St Justinians with Lifeboat station



Mainland coast from Ramsey Sound- the lifeboat station is centrally located with Carn Llidi to the left and Carn Rhosson to the right

Summary Description
Ramsey Sound is located at the western end of St David's Peninsula between Ramsey Island and the mainland. It is a dynamic stretch of water with strong tidal currents and hazardous rocks with very limited settlement but rich in historic and wildlife features and with superb maritime views. It is very popular for wildlife trips and thrill seekers in kayaks and other craft.
Key Characteristics
• Ramsey Sound is a north-south tidal sea passage separating the island from the mainland with a central deep channel, strong tidal currents and hazardous rocks. • Indented rocky coasts on both sides with cliffs up to 20-90m high interspersed with one small anchorage on the mainland and small inaccessible sandy coves. • Coastal edge with heath and coastal grassland and bracken with a wild character. • Open pastoral landscape gently sloping to the coast with some medieval strip fields and low cut hedgebanks. • Built form limited to St Justinian's chapel which is a monument, the lifeboat station, a few dwellings and one farm on Ramsey Island. • St Justinians is the embarkation point for RHIB wildlife boat trips around Ramsey and offshore and the anchorage is popular and busy in season. • The Sound is a dynamic stretch of water used by kayakers and others for white water around the Bitches and other rocks. • There is rich wildlife using the sound and adjacent coasts including porpoises and seals. • The Coast Path runs along the length of the mainland coast. • Vehicular access to coast limited to the one location with associated car park. • Unspoilt open views out to Ramsey Island, out to sea and long views along coast to major headlands to northeast and southwest.
Physical Influences
Ramsey Sound (<500-1600m) is a north-south tidal sea passage separating the island from the mainland. The sea floor of sandy gravel, covering northeast-southwest striking bedrock, can be subdivided into three marine types: a central moderately deep channel (30-60m) is bordered by a moderate to steeply sloping (>10°) sea floor towards the east and a moderately sloping (1-10°) sea floor to the west. The sea is exposed to high wind and wave stress in the central and eastern types, but to reduced wave stress in the lee of the island. Tidal currents are strong (<6 knots), with gyres and tidal races (around the Bitches) leading to treacherous waters. Horse Rock is the main hazard which dries to 0.9m at low tide. Tidal currents split around Ramsey

Island. The tidal range is ~5.5m.

The mainland headlands (60-70m aod) are composed of a northeast-southwest striking succession of Precambrian-Cambrian tuffs, intrusions and sandstones. The Ramsey Island bedrock, which is much faulted, also includes Ordovician shales, and reaches 134m aod at Carn Llundain. The Sound is bordered by cliffs (25-90m aod), some with caves and coves. Intertidal areas are almost entirely (98%) high energy rocky shores, with minor sandy coves. Wind and wave erosion occur through abrasion, attrition and hydraulic action.

The sea and intertidal areas are covered by the Pembrokeshire Marine SAC. The cliffs, associated coastal heath and grassland are designated as the Ramsey Island and St David's Peninsula SPA and they are also an Important Bird Area as defined by RSPB. Ramsey Island is designated as a National Nature Reserve and SSSI. It is an important reserve owned by RSPB - puffins, seals, auks, razorbills, porpoises and occasional dolphins are all evident. The mainland cliffs are designated as St David's Peninsula Coast SSSI. The strong currents cause the upwelling of organisms from the deep channel which attracts fish and birds/larger predators.

The coast is a mixture of semi-natural grassland and heath along the cliff tops and on outcrops such as Carn Rhosson. The mainland hinterland is predominantly a mix of pasture with some arable use, rough grazing and wetland. Ramsey Islands east coast is mainly semi-natural grassland and heath with bracken.

Cultural influences

Historic use includes Medieval communication between Ramsey Sound and the mainland episcopal estate and pilgrimage. The hinterland's farming economy was supported by coastal trading and fishing.

Clegyr Boia to the west of St Davids was occupied in the Neolithic and Iron Age periods. Dated Neolithic settlements in Wales are extremely rare, but the discovery of crude huts and Neolithic round-bottomed pottery confirms occupation of this rock 5-6,000 years ago. St Justinian's Chapel a place of pilgrimage for medieval travellers to St David's and gathered donations which were passed to the cathedral. The present 16th century stone building may obscure an earlier structure, possibly dating to the early Christian period. The tidal race in Ramsey Sound is fierce. Four recorded shipwrecks all lie on the eastern side of the Sound including the coastal cargo ship, Count d'Aspremont's whose boiler still stands proud of the seabed (sunk in 1903). The Magella, a small fishing boat, was sunk as recently as 1991, even though the lifeboat station is located nearby.

Scheduled monuments include:

- PE014 (St Justinian's chapel): community: St David's
- PE109 (Clegyr Boia hillfort): community: St David's
- PE295 (Castell Heinif promontory fort): community: St David's
- PE421 (chambered tomb): community: St David's

This area lies entirely within the St David's Peninsula and Ramsey Island Landscape of Outstanding Historic Interest.

Clegyr Boia is associated with the 6th century Irish pirate Boia although is of Neolithic origin. There is place-name evidence for other Irish settlement. The area as a whole is associated with the sea-borne nature of early Medieval Christianity.

Settlement is limited to a few dwellings around St Justinians, vernacular farmsteads further inland and the one farm complex on Ramsey, close to the landing place and now used by the RSPB. There is a Lifeboat Station at St Justinians. The current facility is located on columns with a slipway in front of the old station which is a small stone built shed set back against the cliffs. A further modern lifeboat station is proposed which indicates the changing requirements of life saving around Pembrokeshire's waters.

St Justinians is a major centre for wildlife boat trip operators taking visitors out and around Ramsey Island, Ramsey Sound and The Bitches which are known as a wild water phenomenon. There is pontoon access to the water, swinging moorings for operators' boats and a well-used car park both close to the Station and inland in a discreet location. Motor and sail cruisers are active throughout this area as well as day boats, kayaks, sailing dinghies and jet-skis. The Sound

is used as a coastal cruising route linking Milford and Solva to North Wales/Cardigan Bay. Sea angling also takes place both from boats and the rocks. Coasteering is a popular activity around this coast. Walking the Coast Path affords spectacular views across the Sound to Ramsey Island in addition to wildlife watching from cliffs.

Fishing in the area comprises of lobster and crab potting and potential for light otter trawling.

The area has previously had a Round 24 licence for oil and gas and future applications may be made.

Aesthetic, perceptual and experiential qualities

The scale of the Sound is large and open but with enclosure from Ramsey Island and the mainland cliffs running south from St John's Head backed by outcrops back from the coast. These landforms focus views out to sea north to St David's Head and the Bishops and Clerks rocks and south to St Bride's Bay and Skomer in the distance. The rough textures of the cliffs and rocks are complemented by qualities of the water which, apart from around 20 minutes slack, clearly moves swiftly north or south on the flood and ebb tides respectively, creating standing waves and turbulence over rocks such as the Bitches. On the water these create drama and excitement and attract sightseers and thrill seekers on powerful RHIBs and kayakers who surf the waves in optimum conditions. The indented cliffs which provide interest and superb changing vistas onshore from the Coast Path appear to be two dimensional when halfway across the Sound [around 500m] and man-made structures such as the lifeboat station are hardly apparent. This gives a strong sense of tranquillity, wildness and remoteness which is reinforced by sightings of grey seals and, occasionally, porpoises. Tranquillity is reduced to an extent by the RHIBs and other boats which frequently ply the Sound, emanating from St Justinians which is a busy and colourful little harbour in season. However, this use does not significantly diminish the natural beauty, unity and balanced composition of this stretch of water and coast, rather providing further animation of the water, with sweeping wash. Detractors include the few isolated mid-20th century houses and bungalows in prominent locations, the caravan and camping sites and ad hoc WCs adjacent to the car park at St Justinians.

Cultural benefits and services

The area contributes significantly towards leisure and recreational services in the form of marine recreation including wildlife trips, to natural heritage in the form of the sound with the strong tidal streams and rocks, and mainly unspoilt coast, and to cultural and spiritual services in respect of its national historic interest and features related to St David's including the chapel at St Justinian's.

Forces for change								
Summary		Key forces for change						
Slow coastal erosion of rocky cliffs, more in back of bays. The shoreline management plan states ‘do nothing’. <u>A second, more modern lifeboat station was opened in 2016 indicating the changing requirements of life saving around Pembrokeshire’s waters.</u> Increasing use by boat trip operators and other boat users, emanating mainly from St Justinians- with effects on tranquillity and potentially on wildlife and habitats. Coast Path increasing use by walkers. Increasing use of car park and access.	Special Qualities	Natural processes/ climate change	Visitor pressure	Marine use- commercial and fishing	Offshore energy or minerals	Development pressure	Land management changes	MOD use
	Coastal Splendour							
	Islands							
	Diversity of Landscape							
	Remoteness, Tranquillity and Wilderness							
	Diverse Geology							
	Richness of Habitats and Biodiversity							
	Rich Archaeology							
	Distinctive Settlement Character							
	Cultural Heritage							
	Accessing the Park							
	Space to Breathe							
	Key	Change occurring in the area affecting the selected special quality						
Key sensitivities								
Factors that contribute to sensitivity				Factors that detract from sensitivity				

Unspoilt Sound with strong tidal currents and hazardous rocks. Indented, natural rocky coasts and small inaccessible sandy coves with strong natural and wild character. Nature conservation value including coastal habitats. Rich wildlife using the sound and adjacent coasts including porpoises, seals and chough. Historic rural pastoral character of the hinterland, and hill backcloth. Historic features and very limited settlement. Prominence of small hillsides and intervisibility of the coast. Superb, virtually unspoilt views across the Sound and along the coast. Pembrokeshire Coast Path as a sensitive receptor. Boat trips users as sensitive receptors.	Lifeboat station is a functional structure. St Justinians is the embarkation point for RHIB wildlife boat trips around Ramsey and offshore and the anchorage is popular and busy in season. Presence of scattered 20c dwellings.
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