

Location and boundaries

This Marine Character Area (MCA) comprises the drowned river estuary of Milford Haven in southern Pembrokeshire.

- It includes the tidal reaches of the Cleddau, Cresswell, Carew and Pembroke rivers.
- The MCA incorporates the marine components of the following Pembrokeshire local Seascape Character Areas; 31: Outer Milford Haven, 32: Inner Milford Haven and 33: Daugleddau.

Key Characteristics

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Drowned ria with steep red sandstone cliffs, sheltered bays and shallow creeks surrounded by rolling and occasionally steep sided hills with distinctive woodland down to the water's edge.
The sheltered tidal estuary creates an internationally and nationally important natural harbour with mudflats, sandy inlets, marshes, creeks and bays .
Strong currents and swell at mouth of the estuary becoming more sheltered the further inland travelled where tidal changes take over as the main influence factor on the character.
The ria forms a unifying theme between the two distinctly contrasting characters of the enclosed unsettled upper stretches in the east and the open developed estuary in the west
Major deep sea port , Pembroke Port and Milford Docks, with extensive industrial facilities, oil refineries, the largest oil/gas/petrochemical storage facilities in the UK and power station.
Dispersed settlement with single dwellings and some small medieval and traditional villages along the upper stretches of the river systems, with limited transport links .
Historically important quays at Milford Haven and Pembroke, along with Carew Castle and tidal mill, medieval waterside settlements and many features associated with military defence.
Popular recreation and sailing destination especially around Dale, although low key recreation including small boat moorings elsewhere. High numbers of walkers use the coastal path which hugs the coastline.
Busy ports and commercial shipping channels to the west with tanker terminals, ferry terminal and marinas contrasting to the high levels of tranquillity within the sheltered tidal estuary to the east.
Varied views within the estuary often contained and channelled by the surrounding steep hills of Pembrokeshire Coast National Park, opening up towards the wide estuary mouth.
The oil refinery and associated infrastructure dominates views into the MCA, including from the surrounding seas (MCAs 18,19, 22 and 23).

Natural Influences

This Marine Character Area (MCA) comprises the sheltered ria (drowned river valley) of Milford Haven including the upper stretches of the Daugleddau estuaries. The estuary system is approximately 30 kilometres long, taking in a series of complicated inlets, pills and embayments. The Haven system encompasses Sheep Island at its outer mouth, following the Angle Peninsula coastline to take in the bays of West Angle and Angle. It encompasses the vast mudflats at Pwllcrochan, and the enclosed Pembroke River estuaries before narrowing at Pembroke Dock where the Cleddau Bridge crosses the Daugleddau. The ria becomes more sinuous after the bridge, turning north again and splitting into the tributary rivers of the Carew, Cresswell and the Western and Eastern Cleddau.

The northern extent of the MCA follows the intricate coastline of the Dale Peninsula from St Ann's Head, taking in the small bays at Mill Bay, Watwick Bay and Castlebeach Bay and the larger sandy, rocky foreshores of Dale Roads and Sandy Haven Bay. The narrow valleys or 'Pills' of Hubberston Pill, Castle Pill and Westfield Pill punctuate the short cliffs at Milford Haven and Neyland.

The deep ria landform was formed at the confluence of Daugleddau, Cresswell, Carew and Pembroke rivers where the combined forces of these rivers eroded a band of soft limestone, cutting the deep channel. This channel was subsequently flooded as sea levels rose at the end of the last Ice Age. An east-west band of Silurian sandstone forms the opening to the Haven, with several isolated rocky outcrops and foreshores. Thin bands of Carboniferous Limestone break through the sandstone formation creating distinctively banded cliffs enclosing the MCA. The floor of the ria comprises glacially eroded sand and gravels on top of the mudstone and sandstone bedrock.

Milford Haven is one of the world's great naturally deep harbours. Large vessels can be accommodated via the West Channel at a depth of approximately 26 metres. The south-facing estuary mouth turns sharply to the east at Thorn Island, with depths reducing to approximately 18 metres. This change in profile helps protect the channel from the harsh south-westerlies and associated rough seas experienced at the outer edge of the MCA. Here, at the mouth of the Haven, the MCA is fully open to the weather coming in from the Atlantic Ocean. These create a contrasting area defined by strong tidal streams and currents, creating hazardous conditions to navigation.

The ria maintains a good depth up until the Daugleddau confluence with the Cresswell River, where it gradually becomes shallower towards Haverfordwest and Blackpool Bridge at the eastern extent of the MCA. These shallower waters when combined with the daily tides (high spring tides reach a maximum range of 7.8 metres) reduce the size of the navigable channel - making navigating 'The Secret Waterways' challenging.

The whole estuary network is one of the best examples of a ria system in Britain. It forms a significant part of the Pembrokeshire Marine SAC which is European protected for its wide variety of marine habitats and communities. Nationally rare saltmarshes, water sheltered bedrock and muddy inter-tidal areas, shingle beaches and 'pills' provide habitat for sea wormwood *Artemisia maritima* and marsh mallow *Althaea officinalis* – a nationally scarce species. Milford Haven Waterway SSSI also covers the whole of the MCA, nationally important for its geology, ancient woodland, rare and scarce maritime plants as well as nationally important numbers of migratory waterfowl and otter.



Banks of Daugleddau

Cultural/social influences

The deep natural harbour at Milford Haven has long been exploited by generations of mariners who have taken advantage of its sheltered waters and strategic position on the Welsh coast. A Viking chieftain wintered his fleet of 23 ships in the Haven in 854 AD. It was again used by Richard II (1399) and then Oliver Cromwell (1649) to launch attacks on Ireland. The waterways reach inland as far as Haverfordwest and Canaston Bridge, connecting medieval settlements along their shorelines to the sea. The waterways enabled these communities to trade commodities including limestone and coal from a network of small quays. A restored medieval tide mill sited next to the 11th century Carew Castle is the only one of its kind in Wales. The area's rich heritage is recognised with the whole of the MCA being nationally designated as Landscape of Outstanding Historic Interest.

Milford Haven, like other major South Wales ports at Swansea (MCA 26) and Cardiff (MCA 29), expanded rapidly from the 17th century with the growth of coal exportation. It was not until the late 18th century, however, that the docks were formally established. They were briefly inhabited by Nantucket Quaker Whalers before Milford Haven became a large fishing port. Fishing is still an important part of current trade, especially white fish, and until 2011, shellfish (native oyster – particularly associated with Llangwm). The major port at Milford Haven has, however, become better known as one of the largest centres for oil transport and refining in the country.

Evidence of the Haven's long-standing historic military associations and strategic value is present along the coastline where Iron Age promontory forts, Norman castles such as the fine example at Pembroke, and Palmerstonian defences occupy headlands. Later defensive structures reflect the establishment of Naval shipbuilding, at Neyland (c. 1760) and at Milford Haven in 1796 – relocated to Pembroke Dock in 1812. Pembroke Dock became one of the most important naval ship-building centres in Britain. Facilities were substantially expanded later in the 19th century to reflect changes in sea-going vessel design, but decline set in after the introduction of the dreadnoughts, with the dockyards

finally closing in 1926. Nevertheless, this past activity greatly shaped the pattern and form of today's settlement.

During World War II the Haven was used as a base for allied American troops and was involved with the D-Day embarkments; wrecks including fallen aircraft, mined patrol vessels and bombed cargo ships now lie within the estuary – further reinforcing the area's strong military and defensive past.



Views of oil refinery chimneys which are visible from some distance

Today the bustling ports of Milford and Pembroke Dock consist of several oil refineries, a power station, marinas and ferry terminals with services to Cork and Rosslare in Ireland. In 1957 work began on the Herbranston refinery; oil supplies reflected shifts in global politics, such as the nationalisation of the Suez canal, which required larger tankers to make the journey around the tip of Africa viable. At the ports, jetties and piers criss cross the deep channel creating an extensive network of platforms and pipes that can accommodate tankers up to 250,000 tonnes, providing facilities to pump hydrocarbons and petro chemicals ashore. The Port of Milford is the third largest port in the UK and handles 29% of the UK's seaborne trade in oil and gas.

All of the land surrounding the inner waterways of the Haven falls within Pembrokeshire Coast National Park – the only coastal national park in Britain. The area offers a variety of opportunities for recreation and enjoyment, including walks along the water's edge via the Pembrokeshire Coast Path. The Haven is a centre for boat hire for angling trips and wildlife tours. Yachting is a particularly popular activity, with a long history of competition sailing now mostly focused around the Cleddau Bridge and lower reaches of the waterway. Other activities include windsurfing, water skiing, jetskiing and kayaking. The sea floor can be explored via 16 established dive sites and with ten wrecks, collectively providing great interest for recreational scuba divers.

Aesthetic and perceptual qualities

The ria forms a unifying theme between the two distinctly contrasting characters of the enclosed upper stretches in the east and the open body of water in the west. Inland the intricate river systems of the upper ria are highly regarded for their scenic rural beauty – the sinuous waterways, inlets, bays and side creeks are a haven of tranquillity. As the ria widens the levels of tranquillity reduce and human activities increase. The majority of vessel movements are around Pembroke Dock and Milford Port and the marinas at Neyland and Milford – here the waterway becomes very busy as large oil tankers, jetties and dock apparatus, and industrial buildings hum with activity (and associated night-time lighting).

Artists such as Smith (see image below) and Attwood have long depicted the mix of scenic beauty and human influence in paintings such as Smith's view of 'Milford Haven' which is in the collection of the National Museum of Wales. Shakespeare also referred to the Haven in his play *Cymbeline* Act 3, Scene 2 (1611) ...*"how far it is to this same blessed Milford: and by the way tell me how Wales was made so happy as to inherit such a haven..."*.



'Milford looking to it from high ground near Hakim' by John Warwick Smith, c.1790s, (© Crown Estate, 2013).

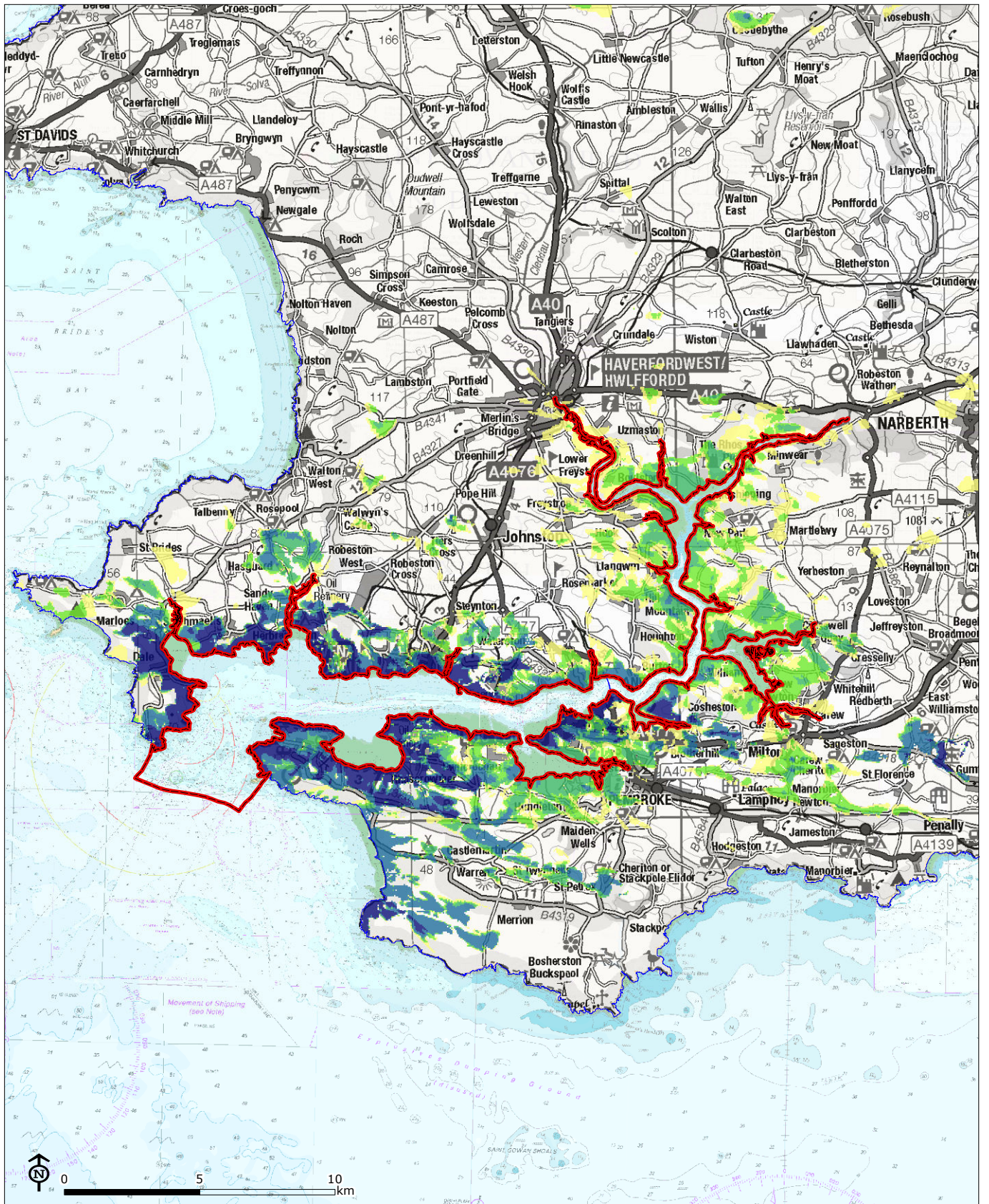
Exposure is greatest at the mouth of the estuary and on the elevated headlands. Here the full force of the prevailing south-westerlies blowing in off the Atlantic can be felt, battering the coastline on a stormy day. The doglegged feeder channels provide shelter and a contrasting feeling of calm, which increase as one travels further through their inland courses. There is a prevailing sense of shelter within the rural upper reaches of the ria with a strong sense of naturalness and tranquillity.

Visibility and views also change along with the character of the ria system; open and panoramic views can be gained from headlands across the Haven north and south, from Rat Island to St Ann's Head and out to open seas. Lighthouses, masts, industrial towers, chimneys and the network of electricity pylon lines all form features on the skyline in distant cross-estuary views; ferries and large tankers become the focus in the middle ground. Views become more contained within the upper reaches of the estuary complex, frequently enclosed by steep wooded slopes.

The Visual Resource Maps (VRM) that follow provide a more detailed spatial representation of the visibility of this MCA from the surrounding land in Wales. Please refer to the technical report for an explanation of how these maps were generated and how they should be interpreted.

The first map shows land with views to this MCA, the darker shading indicating land where from which more of this MCA is visible.

The second map shows sea visible from land, the warmer colours being areas of sea that are visible from more places on land. This comes from a national assessment of Wales so the results do not relate specifically to this MCA, whose boundary is overlaid for location only. The four individual versions show how the results vary depending on how far inland hypothetical viewers are located.



- 21: Milford Haven
 - Wales Inshore Marine Plan Area
- Land with sea views (Percentile)**
- < 20 (Lowest)
 - 21 - 40
 - 41 - 60
 - 61 - 80
 - 81 - 100 (Highest)

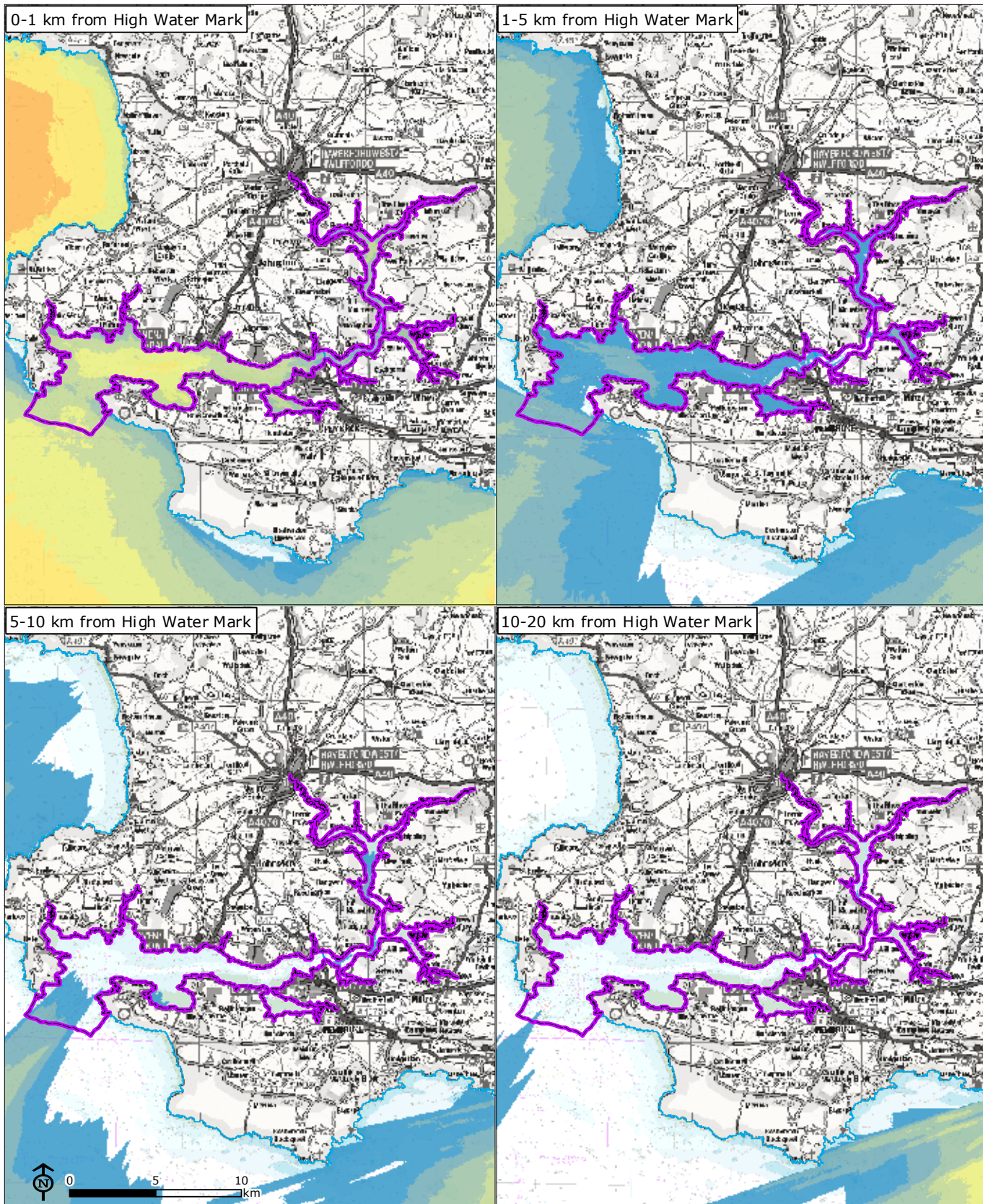


Wales National Seascape Assessment

**Land with Views of:
MCA 21: Milford Haven**

Source: LUC, NRW, OceanWise

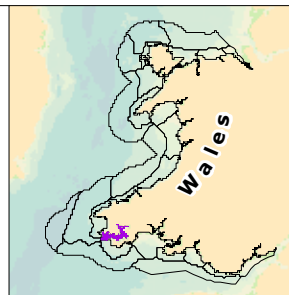
Map Scale @ A4: 1:200,000



- 21: Milford Haven
- Wales Inshore Marine Plan Area

Visibility of sea from land (percentile)

<ul style="list-style-type: none"> <10 (Lowest) 11-20 21-30 31-40 41-50 	<ul style="list-style-type: none"> 51-60 61-70 71-80 81-90 91-100 (Highest)
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Wales National Seascape Assessment

Relative Visibility of the Sea Surface from Viewers on Land
MCA 21: Milford Haven



Map Scale @ A4: 1:320,000

CB: EB:Goosen_V LUC/LON 6262-00_022_VRM_Maps_DDP_Sea_Visibility_ 27/05/2015