

**CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES**

SITE OF SPECIAL SCIENTIFIC INTEREST CITATION

PEMBROKESHIRE

DALE AND SOUTH MARLOES COAST

Date of Notification 2002

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Site Area: 287.5 ha (approx)

Description:

The site is of special interest for its rocky and sandy shore marine communities, including rock pool and overhang communities, a nationally scarce green algal community on the upper shore fringes and a nationally scarce red alga *Gigartina pistillata*, grey seals *Halichoerus grypus*, maritime grassland and maritime heath, maritime cliff crevice and ledge vegetation, coastal scrub, its assemblage of nationally rare and scarce lichens, the golden hair lichen *Teloschistes flavicans*, the scaly cricket *Pseudomogoplistes vicentae*, as an important feeding and roosting area for chough *Pyrrhocorax pyrrhocorax*, for the nationally rare shore dock *Rumex rupestris*, the rare prostrate broom *Cytisus scoparius* ssp *maritimus*, an assemblage of nationally rare and scarce plants, and its geology.

This site stretches for approximately 12 km from Martin's Haven in the west, to Dale Point in the east, and is located approximately 8 km west of the town of Milford Haven. This indented coastline encompasses steep vertical cliffs ranging in height from 30 to 55 metres, interspersed with bays and beaches consisting of boulders, cobbles, gravel and/or sand.

There are spectacular exposures of Silurian rocks around the Marloes Peninsula, including lavas and highly fossiliferous sedimentary rocks which are unique to this area. The lower part of the Old Red Sandstone sequence is exposed around the Dale Peninsula and at Gateholm. Folds, faults and associated structural interest are also clearly evident. Soils are variable, mainly developed on glacial/fluvioglacial deposits including stony clays and sandy gravels

GEOLOGY

Llandovery: This site shows a Llandovery (lower Silurian) rock sequence, made up of the Skomer Volcanic Group (which includes rocks formerly assigned to the Conglomerate 'Series'), and Coralliferous Group, the last-named spanning the Llandovery-Wenlock Series boundary on the evidence of its contained conodonts. Llandovery strata here also yield an abundant shelly fauna, notably brachiopods and corals, and exhibit well-developed sedimentary structures (cross-bedding, ripples and scours) indicating near-shore environments not recorded in rocks of this age elsewhere in the Welsh Basin. Marloes Sands possesses the most important Silurian section in west Wales and this is one of a series of GCR sites that cover this interest.

Variscan structures:

(Marloes Sands to Albion Sands) The Silurian rocks exposed within this site contain a suite of structural features, formed during the Variscan mountain building episode (orogeny), which have been the subject of international attention in recent years. Of particular importance are the complex arrays of shears, veins and cleavage planes exposed around Horse Neck. The form and microstructure of these have been intensively studied and this work has made an important contribution to understanding of the processes of rock deformation during orogenies. Elliptical 'reduction' spots occurring nearby have been used to assess the nature and extent of distortion of the strata during the Variscan orogenic episode. Cleavage planes cutting the strata are variably developed and reflect the differing effects of deformation on contrasting rock types. Near Three Chimneys, cleavage shows an abnormal relationship to the sedimentary layering, a feature often observed in orogenic belts. This has attracted detailed examination at this site leading to an important new interpretation of this widely occurring phenomenon. A great variety of major and minor structural features are abundant at this site, making it an outstanding locality for the study and interpretation of the structural characteristics of part of the Variscan orogenic belt in Pembrokeshire.

(St. Ann's Head) The cliffs around Cobbler's Hole, St Ann's Head, provide excellent exposures of Lower Devonian sandstones and mudstones, of the Milford Haven Group, contorted by fold structures formed during the Variscan mountain building episode (orogeny) in late Carboniferous times. On the north-western side of the inlet a large, inclined S-fold is magnificently displayed. A number of associated minor structures such as faults, cleavage planes and veins are developed and can be seen with exceptional clarity. Elsewhere in the site, faults are displayed with related minor and microstructural features of considerable interest. This site provides important examples of structural features characteristic of one of the major zones of the Variscan orogenic belt in Pembrokeshire.

Wenlock: This superbly exposed, fossiliferous shore section has been of outstanding geological interest for students of the Silurian since the classic reviews of Murchison and particularly De la Beche. However, correlation of the sandy clastic facies of the Dyfed Silurian with the standard carbonate and shaley successions of the Welsh Borderland remained uncertain until very recently. Marloes, together with the adjacent Renney Slip - Gateholm area, is a key section in establishing a Llandovery - Wenlock age for the Coralliferous Group - Gray Sandstone sequence. Marloes (and Renney Slip to Gateholm) shows the fullest development of the Silurian rocks of west Wales with which all others in the county and those farther afield are correlated. This site provides a section of national importance for mid-Silurian stratigraphic studies.

Non-marine Devonian: This site shows a well-exposed section through the Milford Haven Group of the Old Red Sandstone, including the Red Cliff, Albion Sands and Sandy Haven formations. The nature of the junction between the Old Red Sandstone and the Ludlow Gray Sandstone Group is controversial, and this section is the most important one for deciding whether or not parts of the Milford Haven Group are pre-Downtonian. Pembrokeshire shows two distinct and different Old Red Sandstone sequences, those to the north and those to the south of the Ritec Fault. This is the critical section for the outcrop north of the Ritec Fault. The Albion Sands Formation includes interbedded conglomerates and mudstones, indicating a local sediment source not present in rocks of the same age further east (e.g. at Sawdde Gorge).

Caledonian Igneous: The Skomer Volcanic Group, of Llandovery age, is significant amongst the Lower Palaeozoic rocks of the southern Caledonides for two reasons. Firstly, it post-dates the

bulk of the volcanism which was largely confined to the Ordovician. Secondly, the volcanic products are mildly alkaline in composition and contrast with the tholeiitic to mildly transitional character of the Ordovician volcanics.

An important ignimbrite marker horizon, which can be traced westwards on Midland Island and Skomer Island, is exposed at Jeffrey's Haven. Further south along the coast at Middle Jamb, The Anvil, Limpet Rocks and Renney Slip is exposed a series of basaltic flows interbedded with sediments of the upper part of the Skomer Volcanic Group which is absent on Skomer Island.

BIOLOGY

The majority of this shoreline has a south-westerly or westerly aspect and is exposed to considerable wind and wave action. The eastern-most part of the site has a generally south-easterly aspect and is subject to slightly less exposure. The sublittoral fringe along much of the rocky element of this shoreline is dominated by kelp species such as *Laminaria digitata*, dabberlocks *Alaria esculenta*, occasionally with an understory of encrusting coralline algae and filamentous or foliose red algae. The lower to mid-shore tends to be dominated by red algae such as pepper dulse *Osmundea pinnatifida*, dulse *Palmaria palmata*, carragheen *Mastocarpus stellatus*, and the brown alga thong weed *Himanthalia elongata*. On shores where bedrock slopes more gently or forms a platform, species such as serrated wrack *Fucus serratus* or bladder wrack *Fucus vesiculosus* occur, with the non-vesiculate form of bladder wrack, *Fucus vesiculosus* (var.) *linearis* in more sheltered areas. Above this algal zone, barnacles, especially *Chathamalus* (sp.) and *Semibalanus balanoides*, and limpets *Patella* (sp.) dominate. The pygmy lichen *Lichina pygmaea* occurs above the barnacles and limpets, in particular where conditions are more exposed. The black tar lichen *Verrucaria maura* grows on the rocks and boulders at the upper end of the shore, above which a zone of yellow and grey lichens can be found.

The bays that punctuate this coastline exhibit a variety of shore types from bedrock platforms to boulders and cobbles to fine sand. The zonation exhibited on many of the boulders mirrors that found on the mid to lower rocky shore as above, but where boulders or rock platforms are scoured or freshly exposed, ephemeral algae such as *Enteromorpha* (sp.) and laver bread *Porphyra* (sp.), or the red alga *Rhodothamniolla floridula* can be found. The sublittoral fringe on these cobble/boulder beaches is dominated by the kelp *Laminaria hyperborea*, which can have a rich understory of sponges, sea squirts and epiphytic red algae, particularly in areas subject to less exposure. Rockpools occur on the bedrock platforms and in between boulders, including deep pools with species such as the brown algae *Halidrys siliquosa*, *Cystoseira* sp. and kelp, the red alga *Dumontia contorta*, encrusting bryozoans, the beadlet anemone *Actinia equina* and sponges. Some pools support the brown alga *Bifucaria bifurcata*. Shaded boulders support lush carpets of red algae such as *Plumaria elegans*, *Lomentaria elegans* and *Membranoptera alata*, together with the sponges *Hymeniacidon perleve* and breadcrumb sponge *Halichondria panicea*. A high abundance of the gooseberry sea squirts *Dendrodoa grossularia* and the star ascidian *Botryllus schlosseri* occur on overhangs, together with a variety of sponges, including *Esperiopsis fucorum* where wave surges occur. A nationally scarce community supporting the green alga *Ulothrix flacca* occurs on the littoral fringe at Little Castle Bay, and the nationally scarce red alga *Gigartina pistillata* has been recorded near West Dale Bay. On sandy shores, the small crustaceans *Bathyporeia* sp and *Eurydice pulchra* are found throughout, and in more sheltered sandy areas, cat worms *Nephtys* sp and *Scololepsis squamata* are also common. Fucoids typical of sheltered areas such as channel wrack *Pelvetia canaliculata*, spiral wrack *Fucus spiralis* and bladder wrack *F. vesiculosus* occur on the upper shores of these beaches.

Crevice communities with rock samphire *Crithmum maritimum* and rock sea-spurrey *Spergularia rupicola* are frequent along the cliff edges, which are unstable in places. Maritime grassland occurs in a fringe along the coastline in most places, but is more extensive in areas such as the Deer Park, on Gateholm, and St Anne's Head. Thrift *Armeria maritima* and red fescue *Festuca rubra* dominate, with abundant kidney vetch *Anthyllis vulneraria* and locally common wild carrot *Daucus carota* ssp. *gummifer*. Yorkshire fog *Dactylis glomerata* becomes more dominant in areas where grazing is less intense. Inland of this maritime grassland, scattered relict areas of maritime heath occur with heather *Calluna vulgaris*, bell heather *Erica cinerea* and wild thyme *Thymus polytrichus*. The sheltered, south-facing cliffs above Marloes Sands support well developed coastal scrub with much privet *Ligustrum vulgare* and blackthorn *Prunus spinosa*, and occasional wild madder *Rubia peregrina*. Bracken *Pteridium aquilinum* occurs on deeper soils, and gorse *Ulex europaeus* replaces the coastal scrub on less precipitous slopes.

Notable higher plants include the only extant Pembrokeshire population of the nationally rare shore dock *Rumex rupestris* and the largest population in Pembrokeshire of the prostrate broom *Cytisus scoparius* ssp. *maritimus*. The prostrate broom favours the cliffs but can be found amongst the maritime heath, particularly at the western-most end of the site. Nationally scarce plants on the cliffs include rock sea-lavender *Limonium procerum* ssp. *procerum*, Portland spurge *Euphorbia portlandica* and chamomile *Chamaemelum nobile*. An assemblage of nationally rare and scarce lichens occurs along the cliffs of this coastline, including the golden hair lichen *Teloschistes flavicans* and nationally rare and scarce species such as *Degelia ligulata*, *Ramalina polymorpha*, *R. portuensis*, *Rinodina interpolata*, *Syncesia myrticola* and *Rocella fuciformis*.

Chough breed, feed and roost along this stretch of coastline. Two pairs breed regularly at the western end of the site, and there are a number of roosts where up to 15 choughs regularly congregate. The short, grazed maritime grassland turf which occurs in places along this coastline provides good feeding areas for these choughs. There is regular interchange with chough from the neighbouring islands of Skomer and Skokholm, as well as with chough from the Angle peninsula and Castlemartin Coast.

The nationally rare scaly cricket has been found at Marloes Sands at its only location in Wales, inhabiting a shingle area at the base of a sloping cliff, with a freshwater seepage nearby. Other species of interest include the nationally rare weevils *Trachyphloeus rectus* and *Sibinia sodalis*, the scarce grey bush cricket *Platycelus albopunctata* and the hairy sand wasp *Podalonia hirsuta*.

Caves occur throughout this stretch of coast, both in the upper shore and lower down. These, along with some of the foreshore areas that are less accessible from land, are often used by grey seals *Halichoerus grypus* for breeding during autumn. This coastline produces approximately 3% of the West Wales grey seal pup population annually. Otters have been observed on the foreshore.

Remarks:

The site lies entirely within the Pembrokeshire Coast National Park.

Much of the site is owned by the National Trust.

Otters are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and on Annex IIa of the Habitats Directive (Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora). Grey seals are also listed on Annex IIa of the Directive.

Golden hair lichen and shore dock are listed on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended).

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