

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

SITE OF SPECIAL SCIENTIFIC INTEREST CITATION

PEMBROKESHIRE

CASTLEMARTIN RANGE

Date of Notification: 1954, 1959, 1977, 1993 and March 2011

National Grid Reference: SR926959

O.S. Maps: 1: 50, 000 Sheet number: 158
1: 25, 000 Sheet number: SR89 & SR 99

Site Area: 2089 ha

Description:

Castlemartin Range is of special interest for its geology, marine biology, sand dunes, wetland habitats, calcareous grassland, cliff and coastal grassland and heath, together with the most extensive area of species-rich neutral grassland in Wales. Also of special interest are rare and scarce plants and invertebrates, breeding seabirds, greater and lesser horseshoe bats *Rhinolophus ferrumequinum* and *R. hipposideros*, otter *Lutra lutra* and grey seal *Halichoerus grypus*. The site encompasses extensive tracts of the Ministry of Defence (MOD) Castlemartin Firing Range, a coastal plateau fringed by fourteen kilometres of Carboniferous Limestone cliffs with a spectacular series of caves, rock arches, sea stacks and folds. At the north western end of the site the cliffs become lower and eventually give way to an extensive calcareous dune system, including a natural transition to fen.

Biology:

The shore communities on this limestone coast are amongst the finest in Britain and are typically very exposed and clearly zoned. Much of the site has near vertical cliffs which face south-westerly into the open ocean. Grey seals breed in the open bays, gullies and sea caves and otters are present along the coastline. The uppermost extent of these rocky shores and boulder beaches is often marked by communities of maritime lichens that form prominent grey, orange and black bands. The black lichen *Verrucaria maura* dominates toward the cliff bases whilst the other splash zone lichens extend well up the cliff faces and inshore. Below these lichens, dense barnacle and limpet communities occur whilst still lower down the shore coral weed *Corallina officinalis* and a variety other red seaweeds form a narrow band. The lower shore fringe is dominated by dabberlocks *Alaria esculenta* and kelp *Laminaria digitata* communities with a mixed under-storey of various coralline and red algal species. The nationally scarce seaweed *Gigartina pistillata* is also present here.

The limestone shores have a complex eroded structure with many caves, gullies, overhangs and pools, providing numerous specialist foreshore habitats that support a diverse range of species. The damp, shaded caves and gullies are of particular note for their habitat specialists and the

presence of more typically subtidal species. The wave-cut platforms, which are wide in places, support extensive rock pools that are rich in coralline algae, serrated wrack *Fucus serratus* and kelp, or else floored with sediments and sand-tolerant algae. The numerous surge gullies are colourful, dominated by a variety of abundant filter feeding species. Rock boring species such as piddocks and sponges burrow into the soft rock. These numerous holes remain wet whilst the tide is low, thus reducing desiccation effects and increasing floral and faunal diversity and abundance.

The exposed limestone sea-cliffs of the Castlemartin Range are of European importance for their maritime vegetation. Numerous plants occur, including the nationally rare goldilocks aster *Aster linosyris* and small restharrow *Ononis reclinata*. Salt-laden, south-westerly winds have long maintained open conditions on the flat, marine erosion surface above the 30 - 50 metre high limestone cliffs. There is a long tradition of rough grazing on these cliff-top "downs" and the practice of winter grazing by sheep and cattle continues. Limited agricultural use of the range since World War II has ensured that the wide and continuous zones of sea-cliff vegetation that reflect different levels of exposure and salt deposition have been conserved. The tops of the most exposed headlands such as Linney Head are virtually bare of vegetation. Only plants of thrift *Armeria maritima*, rock samphire *Crithmum maritimum*, sea aster *Aster tripolium*, and the nationally scarce species golden-samphire (*Inula crithmoides*) and rock sea-lavender *Limonium binervosum* agg. can grow in the crevices. Other nationally scarce cliff plants include the hoary rock-rose *Helianthemum canum* at its only known locality in west Wales, curved hard-grass *Parapholis incurva*, Portland spurge *Euphorbia portlandica* and pale dog-violet *Viola lactea*. Chaffweed *Anagallis minima* grows locally in open bare ground. The nationally rare scrambled-egg lichen *Fulgensia fulgens* grows on open stony areas in the dunes as well as on the cliff tops which also support important assemblages of other lichens and bryophytes, including the largest Welsh populations of entire threadwort *Cephaloziella calyculata*, a nationally rare liverwort, and the lichens *Collema fragile* and *Leptogium diffractum*. Back from the cliff edges, species-rich maritime grassland fronts a zone of maritime heath, which grades into gorse *Ulex* sp. scrub in the most sheltered sections. Spring squill *Scilla verna* is especially abundant in the cliff grassland and heath and there are large populations of green-winged orchid *Orchis morio*, along with two gentians - the field gentian *Gentianella campestris* and autumn gentian *G. amarella*.

The sand dune systems at Linney and Brownslade Burrows are amongst the least disturbed in west Wales. Extensive dune meadows behind the seaward high dunes have a sward characterised by red fescue *Festuca rubra* and lady's bedstraw *Galium verum* and are rich in species typical of calcareous substrates. These fixed dune grasslands are of particular interest, supporting uncommon plants such as autumn lady's-tresses *Spiranthes spiralis* and large populations of autumn gentian. Two small ferns, adder's-tongue *Ophioglossum vulgatum* and moonwort *Botrychium lunaria* at its only known Pembrokeshire location also occur in the dune grassland. In the wetter parts, there is a large population of marsh helleborine *Epipactis palustris* along with several different species of marsh orchid. In places, the dune slacks, which hold large populations of the nationally scarce liverwort petalwort *Petalophyllum ralfsii*, grade into rich fen vegetation. In these areas, there is an abundance of blunt-flowered rush *Juncus subnodulosus*, lesser pond-sedge *Carex acutiformis* and bulrush *Typha latifolia*. The nationally scarce variegated horsetail *Equisetum variegatum* is locally abundant in the slacks along with the nationally rare fen pondweed *Potamogeton coloratus* in dune slack pools. The base rich flush systems on both Brownslade and Linney Burrows are also of considerable interest. The dune systems also support a rich invertebrate fauna and good populations of the nationally rare shield bug *Odontoscelis fuliginosa* and seed bug *Pionosomus varius*. The strand line at Frainslake beach has Pembrokeshire's only known colony of the scarce strand-line beetle *Eurynebria complanata*.

Castlemartin Range is also of particular importance for its grasslands, supporting the largest areas of neutral grassland in Wales. A range of grassland communities occur here, often forming complex mosaics. The neutral grasslands are characterised by species such as bird's-foot trefoil *Lotus corniculatus*, black knapweed *Centaurea nigra*, rough hawkbit *Leontodon hispidus* and yellow rattle *Rhinanthus minor*. The more species-rich stands are generally herb-rich, supporting a wide range of plants typical of old hay meadows. Populations of over seven hundred species of invertebrates, twenty seven of which are nationally rare or scarce, have been found across the Castlemartin Ranges. These extensive, nectar-rich grasslands support significant populations of the nationally rare shrill carder bee *Bombus sylvarum*, as well as a range of other bumblebees and solitary bees including the nationally rare *Andrena hattorfiana*, the scarce long-horned bee *Eucera longicornis* and the brown-banded carder bee *Bombus humilis*. Breeding butterflies include numerous colonies of the vulnerable silver-studded blue *Plebejus argus*, which occur along the more sheltered parts of the coastal limestone heath and dunes. These butterflies benefit from extensive areas of lightly disturbed, open calcareous herb-rich grassland and heathland with associated ant populations. The largest population of the 'near threatened' marsh fritillary butterfly *Euphydryas aurinia* in Pembrokeshire also occurs here. The Castlemartin population is unique in Pembrokeshire, being associated with dry, cliff top grasslands, unlike marsh fritillary populations elsewhere in west Wales, which are more typically found on wet heaths and grasslands or "rhos pastures". Other butterflies of interest include large numbers of dark green fritillary *Argynnis aglaja*, small pearl-bordered fritillary *Boloria selene*, brown argus *Aricia agestis* and grayling *Hipparchia semele*. The great green bush-cricket *Tettigonia viridissima* is particularly abundant amongst the grasslands, cliff scrub and on the dunes. Accumulations of large piles of driftwood such as at Crow Back and coastal soft cliffs at Crow Back, Great Furzenip and Little Furzenip support a suite of rare and scarce invertebrates. The varied habitats within the Range also provide ideal conditions for populations of reptiles and amphibians.

Heavy winter grazing by sheep, supported in places by rabbits and cattle, produces a short, open cliff top sward that provides the necessary quantity and variety of accessible invertebrates to support good breeding populations of about 15 - 20 pairs of chough *Pyrrhocorax pyrrhocorax* at one of its main breeding locations in west Wales. The coastal cliffs support the largest concentration of breeding seabirds on the Pembrokeshire mainland, with about 12,000 - 16,000 individual guillemots *Uria aalge*, and 800 - 1,100 razorbills *Alca torda*, mainly nesting at Stack Rocks. The Stacks, known as Elegug Stacks, (elegug being a local word for guillemot), have long been famous for their seabirds. Other smaller colonies are scattered along the cliffs opposite the Stacks, and elsewhere on the Range, at locations such as Mewsford Point. A small (currently declining) number of kittiwakes *Rissa tridactyla* also breed, along with a few puffins *Fratercula arctica*. Other breeding seabirds include fulmar (*Fulmarus glacialis*), lesser black-backed gull *Larus fuscus*, herring gull *L. argentatus* and shag *Phalacrocorax aristotelis*. Raven *Corvus corax*, peregrine *Falco peregrinus*, kestrel *Falco tinnunculus*, swift *Apus apus*, house martin *Delichon urbica* and rock pipit *Anthus petrosus* also nest on the cliffs. Buzzards *Buteo buteo* nest in wooded areas within the Range. Stonechat *Saxicola rubicola*, wheatear *Oenanthe oenanthe*, meadow pipit *Anthus pratensis*, whitethroat *Sylvia communis* and skylark *Alauda arvensis* nest amongst the cliff-top grassland and heath and, in one particular stony location, ringed plovers breed at currently their only known breeding location in Pembrokeshire. Dartford warblers *S. undata* have recently colonised the coastal heath, and barn owls *Tyto alba*, nesting in former farmsteads within the range, frequently hunt over the rough grassland and heath. Outside the breeding season, significant numbers of waders and gulls roost and feed in the sandy bays at Frainslake and Bluckspool. These often include up to several hundred lesser black-backed gulls, and smaller

flocks of oystercatcher *Haematopus ostralegus*, curlew *Numenius arquata*, dunlin *Calidris alpina* and grey plover *Pluvialis squatarola*. Migratory flocks of whimbrel *N. phaeopus* and other wader species regularly occur along the coast and, in winter, large numbers of lapwing *Vanellus vanellus* and golden plover *P. apricaria* feed and roost within the Range.

Large numbers of greater horseshoe bat and smaller numbers of lesser horseshoe bat have important winter roosts in caves along the coast. Both species are known to regularly feed over the Range and also to roost in some of the military bunkers and other buildings.

Geology:

(a) Dinantian - This extensive Carboniferous Limestone site contains a succession which runs from the Old Red Sandstone through the entire Dinantian (Courceyan - Brigantian), affording long sections through seven local formations and totalling approximately 1400 metres in thickness. These strata show the most distal of the shelf/ramp carbonate facies in the "South-West Province" of the Carboniferous Limestone. The section includes the type section for the Arundian Stage. A number of carbonate facies and environments occur, including Waulsortian reef mounds in the Linney Head Limestone and storm deposits in the Pen-y-Holt Limestone. Invertebrate fossils are widely distributed with particularly well preserved specimens present at several localities. The fossil assemblages allow detailed biostratigraphical correlation and palaeoenvironmental interpretation.

(b) Variscan Structures - The area of rock platform at Little Furzenip and Great Furzenip provides excellent exposures of steeply tilted Ordovician, Silurian and Devonian strata. The steep inclination of the beds results from compression and buckling of the crust during the Variscan mountain building episode (orogeny) at the end of the Carboniferous. The chief interest of this site lies in the major and minor structures developed principally in the Devonian rocks. Numerous examples of faults, joints, shears and small kinks can be seen and have been studied in considerable detail. These structures provide a wealth of information about the extent and character of the stresses and strains imposed during the Variscan Orogeny, and have been used to subdivide the orogenic belt in Pembrokeshire into a series of distinctive zones. The structures found at this locality are diagnostic of Zone 1a of Pembrokeshire, but contrast significantly with structures in the same zone at Freshwater East, for example. Freshwater West also provides excellent exposures of a major dislocation, the Flimston Bay Fault, cutting obliquely across strata.

(c) Coastal Geomorphology - Some of the best examples of coastal rock cliff forms in Britain occur between the Wash and St Govan's Head. Formed mainly in massive Carboniferous Limestone, the cliffs include exceptional examples of the development of geo, stack, cave and arch features. Faults and other weaknesses have been exploited to produce such well-known features as the Green Bridge of Wales, Elegug Stacks and the Huntsman's Leap. The importance of this site is enhanced by the retreat of the coastline into an area of karstic landforms. Thus, the combined effects of solution, collapse and marine erosion have produced an intricate and geomorphologically important assemblage of landforms.

(d) Old Red Sandstone - This site provides a magnificent, continuous section through the entire Old Red Sandstone succession, including an unconformable contact with underlying marine Silurian strata of Wenlock age and an overlying conformable transition into marine Dinantian strata. The Lower Old Red Sandstone Milford Haven Group (of Pridoli-Lockovian age), displays a range of lithologies, including mudstones, calcrete, sandstones, intra- and extraformational

conglomerates and airfall tuffs, that record deposition in fluvial, floodplain and alluvial coastal-plain environments. The site contains evidence in the Conigar Pit Sandstone Member of possible climate variation in the Anglo-Welsh Basin. The youngest Lower Old Red Sandstone unit, the Ridgeway Conglomerate Formation, comprises coarse polymict conglomerates, sandstones and siltstones with calcretes, deposited from a northward-prograding alluvial fan system sourced by emergent Precambrian and Lower Palaeozoic basement to the south. The latter is important in demonstrating Lower Devonian tectonism in the Anglo-Welsh Basin. It also contains calcretes that were formed by non-pedogenic processes that contrast with Vertisol palaeosols developed within other formations in the basin. These beds are overlain with regional unconformity by the Upper Devonian Skrinkle Sandstone Group which includes mature sandstones, conglomerates, mudstones and calcretes that accumulated as a syn-rift succession of alluvial fan, alluvial plain and lacustrine deposits in the hangingwall of the Ritec Fault. Palynological studies have added to the stratigraphical importance of the site by yielding an early Devonian plant spore assemblage, whilst an exceptionally well-preserved ichnofauna provides evidence for some of the earliest known terrestrial animals.

Remarks:

The features of geological interest within the site have been selected as a result of the former Nature Conservancy Council's Geological Conservation Review - a national survey and evaluation of sites of geological and physiographical interest.

The site is nationally important and most of it is listed and described in 'A Nature Conservation Review', edited by D A Ratcliffe 1977), Cambridge University Press.

The site adjoins Broomhill Burrows SSSI and Stackpole SSSI. It was formerly part of Stackpole to Castlemartin Cliffs and Bosherton Lake SSSI & Castlemartin Cliffs and Dunes SSSI.

The site lies within the MOD Castlemartin Range.

The site lies within the Pembrokeshire Coast National Park.

The site lies partly within the Limestone Coast of South West Wales Special Area of Conservation (SAC). The adjoining sub-littoral habitats are of marine biological importance and form part of the Pembrokeshire Marine SAC.

This document is **NOT** a definitive legal version and has been formatted for use on the CCW Web site. This document should not be used in any legal proceedings, public enquiry or any other hearing or appeal. If you require a full legal copy of the document please contact CCW in writing.