

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

SITE OF SPECIAL SCIENTIFIC INTEREST CITATION

GWYNEDD

PORTH DINLLAEN I BORTH PISTYLL

Date of Notification: 1 January 1981, 14 March 2002

National Grid Reference: SH296411

O.S. Maps: 1:50,000 Sheet number: 123
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Site Area: 106.5 ha

Description:

Porth Dinllaen i Borth Pistyll is designated for its geological, botanical, entomological and marine biological interest. It is situated near Nefyn, on the north coast of Pen Llŷn and stretches for 9 km from Borth Wen, in the west, to Penrhyn Glas, in the east. The foreshore section at Penrhyn Nefyn provides accessible exposures through the Precambrian Mona Complex, while the headland at Penrhyn Bodeilas provides excellent exposures of a sub-volcanic intrusion from the late Ordovician era. Habitats present are Atlantic vegetated sea cliffs, sheltered and exposed rocky shore, and sheltered sandy shore. Associated with the diverse geology of the cliffs are a range of plant communities including maritime heathland, maritime grassland, scrub, sand dune and perched saltmarsh, as well as a diverse intertidal seaweed community and eelgrass *Zostera marina* bed. Special features also include the weevil *Sitona gemellatus* and golden hair lichen *Telochistes flavicans*.

Geology:

The foreshore section at Penrhyn Nefyn is the only known locality in the Precambrian Mona Complex of North Wales where the stratigraphical and structural relationships between the Sarn Complex, Pen Llŷn Shear Zone and Gwna Group are preserved; in addition it is the only locality on mainland Wales from which blue amphibole-bearing rocks have been described. Several authors have examined the section and each has introduced a different interpretation. With the recent flurry of renewed interest in North Wales geology, Penrhyn Nefyn has become one of the most crucial sections in the Monian. Specifically, the recognition that the shear-zone lithologies are mylonites has undermined a long-held belief in Shackleton's 'prograde metamorphic transition' hypothesis and proved that the Pen Llŷn Shear Zone is younger than the Sarn Complex. Also, the discovery of high-pressure/low-temperature, amphibole-bearing mineral assemblages in the Gwna Group has severely weakened the recent claim that parts of the Gwna Group lie unconformably upon other members of the Monian Supergroup. Finally, recent radiometric dating of the Sarn Complex tonalite has indicated a late Precambrian age for these rocks. These and other data suggest that the juxtaposition of the Sarn Complex and Gwna Group along the Pen Llŷn Shear Zone took place between latest Precambrian and earliest Ordovician times.

Penrhyn Bodeilas is of special scientific interest because it represents a fine, well-exposed example of a high-level, sub-volcanic intrusion which is related to the second of four phases of magmatic

activity that occurred on Llŷn during mid-Caradoc (late Ordovician) times. The intrusion is of particular interest owing to the presence of an abundant, compositionally variable, suite of co-magmatic enclaves (xenoliths), and a well-developed swarm of steeply inclined, cross-cutting, aplite dykes. The rock cliffs at Penrhyn Bodeilas have been quarried in the past; but there has been no active quarrying for a number of years. The Llŷn Volcanic Complex, of Caradoc age, consists of predominantly silicic volcanic rocks and genetically related sub-volcanic granitoid intrusions. The rocks can be subdivided, on the basis of their geochemistry, into subalkaline and peralkaline types, the latter being especially significant as they indicate magma generation in a tensional tectonic setting. The Penrhyn Bodeilas intrusion is a coarse-grained tonalite which is notable for the abundance of rounded xenoliths. Geochemical studies indicate that the xenoliths are cognate in origin. Although the overall composition of the intrusion is subalkaline, the presence of minor amounts of alkali amphibole indicates a partially peralkaline character.

Biology:

The varied geology and different soil types result in a diverse assemblage of plant communities. The west coast of Trwyn Porth Dinllaen consists of hard rock cliff sequences with rock crevice communities, including rock samphire *Crithmum maritimum* and rock sea-spurrey *Spergularia rupicola* and also maritime grassland vegetation containing red fescue *Festuca rubra*, thrift *Armeria maritima*, and spring squill *Scilla verna*, grading to relicts of maritime heath. This sequence is particularly well-developed at the northern end of the headland.

Unusual perched saltmarsh vegetation occurs at the base of the soft cliff at Borth Wen to the west of the headland, including red fescue, sea plantain *Plantago maritima* and sea rush *Juncus maritimus*. The sheltered eastern side of the headland, in contrast, supports mainly scrub communities. An example of this is the bracken/bramble *Pteridium aquilinum*/*Rubus fruticosus* scrub, in which common reed *Phragmites australis* features prominently with hemp agrimony *Eupatorium cannabinum* and great horsetail *Equisetum telmateia*. In some places, the common reed forms almost pure stands that often grade into more typical coastal scrub. Coarse grasslands containing common nettle *Urtica dioica* and false oat grass, *Arrhenatherum elatius* are also found at the west end of the bay.

The soft cliffs at Porth Dinllaen are less stable and support mosaics of maritime grassland, sand dune and scrub plant communities, the pattern of distribution depending on the rate of natural erosion. Erosion is more active at the eastern end of the bay, especially at Cerrig Gleison, where an area of landslip supports rosebay willowherb *Epilobium angustifolium* grading into coltsfoot *Tussilago farfara* and creeping bent *Agrostis stolonifera*. A similar plant assemblage is found at Porth Nefyn and Porth Pistyll, where there are also a large number of small areas of flushed vegetation around springs which originate on the cliff faces. This part of the site also supports relatively large stands of great horsetail.

The rare golden hair lichen *Teloschistes flavicans* is present at the northern end of the headland around Trwyn Porth Dinllaen. Porth Nefyn and Porth Pistyll support a number of locally uncommon species, including the knotted pearlwort *Sagina nodosa*, mosses *Bryum pseudotriquetrum*, *Dicranella varia*, and *Gymnostomum aeruginosum* and the liverwort *Leiocolea turbinata*.

Entomologically, the soft cliffs with springs and flushes provide ideal habitat for a range of specialist wetland insect species. The cliffs on the east side of Trwyn Porth Dinllaen, around the bay of Porth Dinllaen and at Porth Pistyll are important for a number of species including the nationally endangered weevil *Sitona gemellatus*, occurring here at its only known locality in Wales and one of

only two known localities in Britain, and the nationally scarce soldier fly *Oxycera morrisii*.

Porth Dinllaen has some of the most diverse intertidal habitats on Llŷn. Trwyn Porth Dinllaen and Borth Wen exhibit rocky shore habitats ranging from very exposed to very sheltered, the latter being very rare on Llŷn. The large rock pools at Borth Wen support a high diversity of seaweeds and are the best examples of this habitat type on Llŷn, species present include, *Bonmasonia asparagoides*, *Halurus equisetifolius* and *Callophyllis laciniata*. The burrowing anemone *Cereus pedunculatus* is also found here. This site supports very good examples of under boulder communities, poorly represented elsewhere on Llŷn. These include a wide range of encrusting bryozoans, sponges and sea squirts.

Important beds of eelgrass, *Zostera marina*, a marine flowering plant, are present on the western side of Porth Dinllaen. Elsewhere in the bay diverse and abundant seaweed populations are associated with the reef, rocks and sand covered shore. These include large specimens of the seaweeds *Gracilaria verrucosa* and *Cystoseira baccata* growing at the northern limit of its range.

Areas of bedrock on Trwyn Porth Dinllaen display clear zonation with a wide grey and yellow lichen zone, including sea ivory *Ramalina sp.*, *Caloplaca sp.* and *Xanthoria parietina*, below which there is also a wide band of the black tar lichen *Verrucaria maura*. Species-rich rockpool communities with encrusting coralline seaweed and the red seaweed *Corallina officinalis* are found on the headland. Other rock pool types, dominated either by green seaweeds or by fucoids and kelp, are also found on the rocky coast here.

Upper shore seaweeds, spiral wrack *Fucus spiralis* and channel wrack *Pelvetia canaliculata* are very common on upper shore bedrock in this area. Below on the mid-shore, these seaweeds, the barnacles *Semibalanus balanoides* and *Chthamalus montagui* form a distinct band, which is sparsely covered by the bladder wrack *Fucus vesiculosus*. Serrated wrack *Fucus serratus* covers bedrock on the lower shore, overlying red seaweeds such as dulse *Palmaria palmata*, *Mastocarpus stellatus* and *Lomentaria articulata*. The lower shore/sublittoral fringe is dominated by oarweed *Laminaria digitata*, and overlies red seaweed.

Small sandy bays around the lifeboat slip to the north of Trwyn Porth Dinllaen contain coarse mobile sands. South of these sandy bays an area of boulders has the same zonation as the bedrock; but a patch of sand between the boulders is colonised by eelgrass *Zostera marina*. The sediment in this area is much finer and more stable than the other sandy bays. Mermaids tresses *Chorda filum* is common here and large flat worms are present.

South of Trwyn Llwyd at the base of the Trwyn Porth Dinllaen, the site is mostly sand, with a large area dominated by a thick growth of eelgrass. Blow lug worm *Arenicola marina* and sand mason worm *Lanice conchilega* are both very common, with the peacock worm *Sabella pavonina* found occasionally. Snakelock anemone *Anemonia viridis* is often attached to the base of the eelgrass stalks. South of the eelgrass bed, the sand mason worm, blow lug and the ragworm *Hediste diversicolor* dominate the fine sediments.

South east of the eelgrass bed the sediment is again colonised by abundant blow lug, with the bivalves, baltic tellin *Macoma balthica*, thin tellin *Angulus tenuis*, and razor shell *Ensis siliqua*. Sand mason worms are common from the lower to mid shore. From mid-shore to the upper shore, the coarse sand is colonised by the amphipods *Bathyporeia sp.* and *Haustorius arenarius* with the isopod *Eurydice pulchra*. The rocky outcrop at Penrhyn Nefyn is colonised by a similar array of species as found on Trwyn Porth Dinllaen. The black tar lichen forms a wide band, below which are

channel wrack and spiral wrack. Bladder wrack with barnacles lies below the spiral wrack zone. Serrated wrack overlies red seaweeds such as dulse, pepper dulse *Osmundea pinnatifida*, *Corallina officinalis* and *Ceramium sp.* is found on the lower shore. Oarweed is found in the sublittoral fringe.

Remarks:

1. Parts of this site support vegetation assignable to 'Vegetated Sea Cliffs of the Atlantic and Baltic coasts', a habitat listed on Annex 1 of the EC Habitats Directive (Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna) and have been included within the Clogwyni Pen Llŷn / Sea cliffs of Lley Peninsula Special Area of Conservation (SAC).
2. Under the EC Habitats Directive, the rock pools present in the intertidal section of this site qualify the site as the feature of reefs (biogenic) and this part of the site has been included within the Pen Llŷn a'r Sarnau / Lley Peninsula and the Sarnau SAC.
3. The site is within the Lley Peninsula, Heritage Coast and Area of Outstanding Natural Beauty.
4. The lichen *Telochistes flavicans* is listed on schedule 8 of the Wildlife and Countryside Act 1981 (as amended).
5. The weevil *Sitona gemellatus* is listed as endangered (Category 1) in the Red Data Book.
6. Sea-grass beds are a Biodiversity Action Plan habitat and are listed in Annex 1 of the EC Habitats Directive.
7. This site supports the Biodiversity Action Plan species song thrush and skylark.
8. The National Trust has covenants over the land occupied by the Nefyn Golf Course.

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