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COUNTRYSIDE COUNCIL FOR WALES**

**SITE OF SPECIAL SCIENTIFIC INTEREST CITATION**

**CARMARTHENSHIRE**

**RHOSYDD LLANPUMSAINT**

<b><u>Date of Notification:</u></b>	12 February 2010
<b><u>National Grid Reference:</u></b>	SN423276
<b><u>O.S. Maps:</u></b>	1:50,000 Sheet number: 146 1:25,000 Sheet number: 185 1:10,000 Sheet number: SN 42 NW
<b><u>Site Area:</u></b>	39.4 ha

**Description:**

This site is of special interest for its geomorphological and biological features. It supports an excellent example of a complex of ramparted ground-ice depressions that hold a very varied range of fen communities. The site supports the only known Carmarthenshire colony of the liverwort *Pallavicinia lyellii*.

Rhosydd Llanpumsaint comprises 17 gently sloping fields with a predominantly northerly aspect around the headwaters of the Nant Cerwyni and extends eastwards to a block of peatland on the watershed with a tributary of the Nant Corrwg. It is bisected by a minor road leading north from the B4301 to the village of Llanpumsaint, c. 1.4km north of the site. The fields lie between 125 and 150 m above sea level.

The Llanpumsaint Geological Conservation Review (GCR) site is situated within the SSSI boundary in the vicinity of Helfa Hall and lies at the lower end (c. 125m OD) of a broad vale extending 1km east towards Bryn Meillion. This marshy depression is surrounded by hills with heights ranging from 161-207m OD and is drained by numerous streams which join to form a small river flowing north through Allt Cwmcerwyn to the Afon Gwili at Llanpumsaint. Within the area around Helfa Hall, there are numerous oval, crater-like, ground-ice depression landforms of up to 70m diameter with marshy interiors. It is likely that the gorge at Allt Cwmcerwyn was enlarged by meltwater flowing out of the basin in which the ground-ice depressions occur.

Peat has developed in each of the ramparted ground-ice depressions and is up to 4 metres deep. This supports moss- and sedge-rich fen (basin mire) vegetation, some of which has developed into patches of bog. Each basin has its own characteristic array of plants and almost the full range of Carmarthenshire's fen and bog vegetation types are represented here in a rich microcosm that is of high conservation value. The ramparts surrounding the basins hold dry grassland and the ramparted depressions sit in a matrix of flushes, marshy grassland and wet heath. The whole intimate mixture of 'rhos pasture' communities is of special interest. There is a discrete block of bog at the site's eastern end, which was extensively cut for peat in the 19<sup>th</sup> century and is now becoming re-vegetated. This holds further fen vegetation of scientific interest.

## **Geology:**

Llanpumsaint is important because it contains an impressive array of ramparted ground-ice depressions. These unusual geomorphological features provide valuable information concerning the nature of climatic and environmental conditions in Wales towards the end of the last ice-sheet glaciation. The landforms comprise a series of peat-filled, crater-like basins surrounded by better-drained, grassy ramparts. The detailed form and nature of the features at Llanpumsaint have been studied from borehole and trench sections and by using various geophysical and sedimentological techniques. The features are interpreted provisionally as the remains of lithalsas (mineral palsas) and open-system pingos developed in a tundra-like terrain. It is proposed that ice masses, some possibly fed by underground springs in a permafrost environment, heaved the ground surface into large mounds which collapsed when the ice masses melted. This process left prominent, probably water-filled, depressions which became partly infilled with sediment and peat in late- and post-glacial times. In a comprehensive Wales-wide study of visually comparable landforms, the features at Llanpumsaint are regarded as the best-preserved examples in Wales, together with the classic and much-studied features at Nant Cledlyn. Their respective modes of formation may, however, not be the same. The features at Llanpumsaint are also exceptional on a Great Britain scale, rivalling the form, density and outstanding state of preservation of classic features at East Walton Common, Cambridgeshire. They have significant potential for further research.

## **Biology:**

The primary biological interest of Rhosydd Llanpumsaint lies in the basin mires that have developed in the ramparted ground-ice depressions. These are very variable because of subtle differences in water flows and management history. The most intact examples have developed tiny rain-fed (ombrogenous) bogs, with patches of the red bog moss *Sphagnum capillifolium* among hare's-tail cotton-grass *Eriophorum vaginatum*, cross-leaved heath *Erica tetralix* and heather *Calluna vulgaris*. Inflows from the margins encourage a few rushes *Juncus* spp. to grow with the mosses, and lines of rush indicate regular water tracks across the fen surfaces. Areas fed by these flows (topogenous) hold typical fen plants, such as bogbean *Menyanthes trifoliata*, bottle sedge *Carex rostrata*, white sedge *Carex curta*, wild cranberry *Vaccinium oxycoccos* and marsh willowherb *Epilobium palustre*.

Tall purple moor-grass *Molinia caerulea* dominates some basins. These usually have wild angelica *Angelica sylvestris*, marsh willowherb and marsh bedstraw *Galium palustre* growing among the purple moor-grass tussocks. The westernmost mire has neutral water, so the moss *Calliergonella cuspidata* replaces *Sphagnum*, and the flora includes water horse-tail *Equisetum fluviatile*, bog-bean and marsh cinquefoil *Potentilla palustris*. Impoverished examples of basin mire vegetation, with soft rush *Juncus effusus* above bog-moss *Sphagnum fallax*, demonstrate the fragility of this habitat; they are primarily of geomorphological interest but may be restorable to good fen vegetation.

The basin mires sit within a matrix of habitats typical of the 'rhos pastures' of west Wales. The best-defined mires are surrounded by tall ramparts on which devil's-bit scabious *Succisa pratensis* is locally very abundant. The sward here includes common bent *Agrostis capillaris*, heath grass *Danthonia decumbens* and sheep's fescue *Festuca ovina*, and the herbs black knapweed *Centaurea nigra*, tormentil *Potentilla erecta* and greater bird's-foot trefoil *Lotus pedunculatus*.

The typical 'rhos pasture' mixture of habitats at Rhosydd Llanpumsaint includes low ridges of wet heath, blanket bog and purple moor-grass pasture separated by runnels of wetter rush-pasture and acid flush. The complex patterning indicates the site's natural water flows and the variation in the glacial soils that underlie it. Small bushes of heather and cross-leaved heath, patches of mat-grass *Nardus stricta* and heath-rush *Juncus squarrosus*, and lawns of short-grazed purple moor-grass are characteristic of the drier ridges.

Sharp-flowered rush *Juncus acutiflorus* and soft rush mark wetter runnels in the 'rhos pasture'. Flowers such as marsh willowherb, marsh bedstraw, ragged-robin *Lychnis flos-cuculi* and lesser spearwort *Ranunculus flammula* are abundant among the rushes in areas with neutral water, joined by tall wild angelica and a hybrid mint *Mentha x verticillata* in the wettest places. More acidic water encourages bog-moss *Sphagnum fallax*, hair-cap moss *Polytrichum commune* and velvet bent *Agrostis canina* to grow below the rushes in narrow runnels of acid flush.

A lowland bog at the east end of the site has been extensively cut for peat in the past. Its western half is regularly grazed and has an open cover of deer-grass *Trichophorum cespitosum* and hare's-tail cotton-grass, set with abundant heather, cross-leaved heath and bilberry *Vaccinium myrtillus*, and frequent bog mosses *Sphagnum capillifolium* and *S. papillosum*, and its cuttings hold soft rush and bog mosses *Sphagnum*. The eastern half has been ungrazed in recent years and is dominated by species-poor purple moor-grass, and leggy heather and bilberry. Deep cuttings in the eastern half have developed a dense mixed cover of hare's-tail cotton-grass, bilberry, heather, and the mosses *Polytrichum commune*, *Aulacomnium palustre*, *Pleurozium schreberi* and *Sphagnum fallax*, with locally abundant narrow buckler-fern *Dryopteris carthusiana*, broad buckler-fern *D. dilatata* and royal fern *Osmunda regalis*. The rare liverwort *Pallavicinia lyellii* grows on the shaded sides of some of the peat cuttings.

Rhosydd Llanpumsaint includes several other habitats that add to the biodiversity of the area. Most fields are surrounded by tall, mature hedgerows of oak *Quercus* sp., with blocks of grey willow *Salix cinerea* scrub in wetter areas. There are patches of reed-mace *Typha latifolia* swamp and standing water in one basin mire.

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