

COUNTY: DERBYSHIRE

SITE NAME: THE WYE VALLEY

DISTRICT: DERBYSHIRE DALES, HIGH PEAK

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife & Countryside Act 1981 as amended

Local Planning Authority: PEAK PARK JOINT PLANNING BOARD, Derbyshire County Council, Derbyshire Dales District Council, High Peak Borough Council

National Grid Reference: SK 154722

Ordnance Survey Sheet 1:50,000: 119 1:10,000: SK 17 SW, SK 17 SE, SK 07 SE

Area: 593.2 (ha.) 1465 (ac.)

Date Notified (Under 1949 Act):	Wye Dale –	Date of Last Revision:	1972
	Monsal Dale 1954		
	Taddington Wood 1959		1972

Date Notified (Under 1981 Act):	Wye Dale –	Date of Last Revision:	1997
	Monsal Dale 1987		
	Taddington Wood 1986		
	Cunning Dale 1985		

Other Information:

Part of the site is listed in 'A Nature Conservation Review' edited by D A Ratcliffe, Cambridge University Press, 1977. Site incorporates the former SSSIs known as: Wye Dale – Monsal Dale; Cunning Dale; Taddington Wood. Site includes new Geological Conservation Review site known as: Tideswell Dale. Site boundary has been modified by major extension.

Description and Reasons for Notification:

The White Peak of Derbyshire and Staffordshire is one of the most important areas of carboniferous limestone in Britain. The limestone is cut by valleys, the 'dales', which both expose areas of high geological and geomorphological interest and support a range of important semi-natural woodland, scrub, grassland and stream habitats. Of particular importance is the variety of daleside grasslands, which show similarities to those found in other notable limestone areas such as the lower hills of the Somerset Mendips and the higher Craven area of Yorkshire. This gives rise to a distinctive assemblage of calcicolous grasslands, with a number of communities and species typical of either more northerly or southerly limestone grasslands, here being found together.

The dales vary widely in their orientation and this, together with differences in slope, affects the development of soil types and plant communities. South facing slopes are warm and dry in contrast to north facing slopes which are cool and moist, whilst the east facing slopes are slightly cooler than those which face west. The most common soils of the steeper dalesides are shallow nutrient-poor, well-drained rendzinas, high in calcium carbonate. Toward the plateau, downwash of loessic material combined with surface-leaching has reduced the calcium carbonate and resulted in soils which are more acidic, and which tend to grade into deeper brown earths. Richer, moister soils cover the more variable deposits on the floor of the dales and these areas tend to support neutral rather than calcareous plant communities.

The Wye Valley SSSI covers an extensive part of the upper Wye Valley extending, from Cunning Dale 1 km east of Buxton for a distance of approximately 15 km to its easterly limit 4 km west of Bakewell. A number of dry side dales are included within the site including parts of Deep Dale (Taddington), Hay Dale, Tideswell Dale, Blackwell Dale,

Flagg Dale, and Woo Dale. A wide variety of habitats are encompassed within a complete 'dale system' which, unusually for the area, includes permanent running water. The upper end of the main dale is chiefly wooded and has impressive limestone cliffs with local areas of open scree and tall-herb grassland below. The remainder of the dale, whilst less precipitous, has extensive steep slopes with important areas of scree grassland, 'retrogressive' scrub and woodland. Large areas of calcicolous grassland occur on the dalesides, often with acid grassland and heath on leached soils along the top edges. A specialised flora has developed on lead spoil from the old mines scattered across the site. Unmanaged slopes hold stands of herb-rich mesotrophic grassland.

The Wye Valley contains some of the most flower-rich habitats that remain in the White Peak. It is important its large areas of species-rich calcicolous, mesotrophic and acidic grassland, which support a significant assemblage of nationally rare or scarce plant species and large populations of several plant species at the southern or northern limits of their geographical ranges in Britain. Large areas of woodland, developed on cliffs and steep, often scree-covered slopes, encompass the full range of structure and floristic composition of tree canopy and subsidiary layers. The presence of additional rock, spoil, flush and river habitats increase the wildlife value of the site and helps support a number of nationally scarce lower plants and invertebrates. The Wye Valley is also of major geological interest for the important exposures in the Carboniferous Limestone throughout the site, the landslip formation at Hob's House and examples of Permian-Carboniferous igneous activity.

Biology

The ancient ash *Fraxinus excelsior* and wych elm *Ulmus glabra* woodlands contain a wide range of tree and shrub species with a rich ground flora. Their structure and species composition varies greatly with topography and soils. The precipitous gorges of Chee Dale are characterised by the occurrence of yew *Taxus baccata* and rock whitebeam *Sorbus rupicola* on the rock outcrops. Both here and on the steep scree-covered slopes, the ground flora includes species such as wood melick *Melica uniflora*, false brome *Brachypodium sylvaticum*, wood sage *Teucrium scorodonia* and dog's mercury *Mercurialis perennis*. Much of the rock and scree-covered ground of the north-facing moist woodlands is dominated by mosses, particularly *Eurynchium praelongum*. A species-rich 'retrogressive' scrub occurs where the canopy thins at the edges of such stands, such as on the north-facing slopes of Priestcliffe Lee. This is dominated by hazel *Corylus avellana* with a flora including columbine *Aquilegia vulgaris*, stone bramble *Rubus saxatilis* and dark red helleborine *Epipactis atrorubens*. An area on the east side of Monsal Dale is unusual in having extensive scree slopes dominated by privet *Ligustrum vulgare*. On the less steep slopes, where soils tend to be heavier, bluebell *Hyacinthoides non-scripta* and tufted hair-grass *Deschampsia cespitosa* tend to dominate, with enchanter's nightshade *Circaea lutetiana*, wood anemone *Anemone nemoralis* and wood avens *Geum urbanum*. Taddington Wood is unusual amongst the ash-wych elm woodlands on the Carboniferous Limestone in Derbyshire in having an abundance of field maple *Acer campestre* in the canopy.

Most of the range of grassland types that occur in the Dales are found in this extensive and varied site. The shallow lime-rich soils of the daleside slopes are typified by a rich and attractive mixture of grasses, sedges and herbs, dominated by meadow oat-grass *Avenula pratensis* and sheep's fescue *Festuca ovina*, with quaking grass *Briza media*, glaucous sedge *Carex flacca* and spring sedge *C. caryophyllea* common throughout. Herbs are abundant with all the characteristic species of this grassland type, including salad burnet *Sanguisorba minor*, bird's foot trefoil *Lotus corniculatus*, small scabious *Scabiosa columbaria*, thyme *Thymus praecox* and mouse-ear hawkweed *Hieracium pilosella*.

Variations in the species-composition of these swards reflect changes in aspect. The sunny, south-facing slopes hold southern species uncommon in Derbyshire. Slack Side has abundant dropwort *Filipendula vulgaris*, whilst stemless thistle *Cirsium acaule* is frequent in the grassland of upper Hay Dale and the slopes east of Cowlow have locally abundant horseshoe vetch *Hippocrepis comosa* and kidney vetch *Anthyllis vulneraria*. North-facing

slopes show a different range of species including limestone bedstraw *Galium sternerii*, a plant with a northerly distribution. Some of these swards are rich in sedges including carnation sedge *Carex panicea* and flea sedge *C. pulicaris*. Small areas of exceptionally dry, mainly south-facing slopes have a rudimentary grassland community in which mouse-ear hawkweed and crested hair-grass *Koeleria macrantha* form the bulk of the vegetation.

Where grazing is relaxed, as on the steep slopes of east Monsal Dale and parts of Slack Side, a coarser sward has developed in which meadow oat-grass is replaced by downy oat-grass *Avenula pubescens*. The lightly-grazed slopes of Cuning Dale are unusual for large amounts of saw-wort *Serratula tinctoria*.

Barely-grazed steep scree slopes have a sparse cover of tall grasses dominated by false oat-grass *Arrhenatherum elatius* with quaking-grass, false brome, mountain melick *Melica nutans* and woodland herbs including dog's mercury, lily-of-the-valley *Convallaria majalis* and wood sage. They are often herb-rich with abundant burnet-saxifrage *Pimpinella saxifraga* and marjoram *Origanum vulgare*.

Ungrazed slopes on deeper soils have colourful stands of tall-herb grassland. These are mainly dominated by false oat-grass, although stands at the entrance to Great Rocks Dale have areas dominated by tall fescue *Festuca arundinacea* and tor-grass *Brachypodium pinnatum*. The drier slopes are characterised by common knapweed *Centaurea nigra*, greater knapweed *C. scabiosa* and saw-wort and some stands with rocky outcrops contain bloody cranesbill *Geranium sanguineum* and the nationally scarce Nottingham catchfly *Silene nutans*. Damper, usually north-facing slopes have frequent meadowsweet *Filipendula ulmaria*, wild angelica *Angelica sylvestris*, and the regionally scarce globeflower *Trollius europaeus* and melancholy thistle *Cirsium heterophyllum*. The nationally rare Jacob's ladder *Polemonium caeruleum* can be found at several locations amongst such tall grassland.

Grazed grassland on the richer soils, as in western Taddington Dale, are dominated by fine-leaved grasses including red fescue *Festuca rubra*, common bent *Agrostis capillaris* and crested dog's-tail *Cynosurus cristatus*.

Herbs are abundant and typically include lady's bedstraw *Galium verum*, bird's-foot trefoil, ox-eye daisy *Leucanthemum vulgare* and cowslip *Primula veris*. Additional interest is provided by large populations of common spotted-orchid *Dactylorhiza fuchsii* and grass of Parnassus *Parnassia palustris*, a species at the southern edge of its range in Derbyshire.

The leached soils on the upper daleside slopes often have areas of acidic grassland dominated by common bent and sheep's fescue with tormentil *Potentilla erecta*, heath bedstraw *Galium saxatile* and large populations of the northern mountain pansy *Viola lutea*. In parts of Upper Dale, Hay Dale and Tideswell Dale this community includes a heathy element with abundant bilberry *Vaccinium myrtillus* and scattered heather *Calluna vulgaris*. Wavy hair-grass *Deschampsia flexuosa* is dominant over some of these areas.

On the short-grazed slopes such as west Monsal Dale, the nationally scarce spring cinquefoil *Potentilla neumanniana* is locally abundant and elsewhere on very poor, well-drained soil the nationally rare bird's-foot sedge *Carex ornithopoda* and fingered sedge *C. digitata* occur. The nationally scarce limestone fern *Gymnocarpium robertianum* occurs on scree slopes at the entrance to Great Rocks Dale. Nationally scarce cresses *Cruciferae*, notably hutchinsia *Hornungia petraea* and wall whitlowgrass *Draba muralis* occur elsewhere. In several locations spoil from old lead workings has colonised with a specialist flora which includes the nationally scarce leadwort *Minuartia verna*.

Geology

Hob's House consists of about seven large blocks of Carboniferous Limestone standing on a shelf halfway down the otherwise steep northern slope of Fin Cop on the southern side of the Wye Valley in Monsal Dale.

The blocks, up to 8 m high, 20 m in length and breadth lie on a boulder strewn shelf about 300 m long and with an overall angle of about 33°, are backed by an 18 m high cliff in limestone bedrock. The blocks have moved valleyward from this cliff through bedding plane slip. The cliff contains an accessible fissure, which has been penetrated for 24 m, indicating that it is in a shattered condition, and has itself suffered some movement.

The cliff and boulders are part of the Dinantian Monsal Dale Limestone. This rests upon the Shacklow Wood Lava. Both the Monsal Dale Limestone and the Shacklow Wood Lava dip slightly northwards. The upper surface of the lava is clay rich and impervious to water, forming a plane of weakness in which slippage can take place.

Water passing down fractures in the limestone lubricated the surface of the lava, allowing fractures to open up in the limestone as the blocks slipped on the wet surface. This process has produced a block slide, resulting in a large back scar above and a broad talus slope below the slip.

Midland Railway – Wye Valley consists of a strip of land approximately 8 kilometres long, which largely follows the disused railway track in the River Wye valley, and extends from Little Longstone to Wye Dale in the west. Exposures occur as disused railway cuttings, natural exposures on valley sides, and two large disused quarries near Millers Dale and Great Rocks Dale junction.

The sections represent Dinantian carbonate shelf successions and range through the Holverian Woo Dale Limestones, the Asbian Bee Low Limestones and the overlying (Brigantian) Monsal Dale and Eyam Limestones; these provide an extensive succession through the upper Dinantian. These sediments were deposited on the platform area known as the Derbyshire High which was surrounded by deep basins in which thick successions of shales accumulated. Study of the sediments and structures, and fossil faunas all help to interpret the environmental conditions and palaeogeography of the Derbyshire High.

The carbonate sediments consist of micrites, crinoidal biosparites, oolites, cherts, stromatolites and dolomites. Where preserved, the fauna consists predominantly of corals, brachiopods and crinoids. Many of the fossil bands contain distinctive faunas which act as marker bands for correlation; These faunas, combined with fossil calcareous algae indicate that warm shallow water marine conditions within the photic zone existed on the shelf.

Palaeokarstic surfaces, fossil soil horizons, thin coals, and subaerially erupted volcanic lava's indicate that the platform completely or partially emerged above sea-level a number of times during the Dinantian. The slumping of sediments seen in parts of the succession may indicate that this uplift was tectonically induced and could be related to rising bodies of magma which were eventually erupted as lavas and tuffs.

This part of the Derbyshire High contains successions that differ markedly from those at the shelf margins and is a prime site for the study of Dinantian carbonate successions and their environments.

Litton Mill Railway Cutting, a disused railway cutting just south of Litton Mill in Millers Dale, contains a series of exposures of the Dinantian, Upper Millers Dale Lava. This is in contact with and overlain by thinly bedded limestones.

During the Dinantian, volcanic activity took place at a number of localised centres in Derbyshire where it was characterised by lava flows and ash falls interbedded with the limestones which make up the bulk of the succession. Karstic surfaces within the limestone successions and soil horizons developed on lava flows and tuff horizons indicate that this part of the English Midlands and the Peak District were periodically uplifted and subjected to sub-aerial erosion. Evidence in the form of lava-filled palaeo-karstic hollows elsewhere

indicate that the Upper Millers Dale Lava was erupted sub-aerially. At Litton Mill Railway Cutting this lava shows none of the general characters of a sub-aerial flow, but instead exhibits flow banding dipping to the east, rounded masses of harder material interpreted as degraded lava blocks and finely brecciated and palagonitised material. Such characters are typical of a lava flowing under water and the lava at Litton Mill is interpreted as a flow front which entered a flooded embayment where it shattered and brecciated when it came into contact with the water.

The lavas are of tholeiitic composition and contrast markedly with those erupted in South West England, both in their chemistry and in their mode of occurrence. Lavas erupted in South West England are tholeiitic to alkaline in composition while associated with arc-volcanism above a subducting oceanic slab within a generally compressional regime. The lavas of Derbyshire and the east midlands originated in an extensional environment behind the arc, where thinning of the crust resulted in the partial melting of the mantle and the production of tholeiitic lavas.

Rocks of interest are exposed in several disused quarries and natural outcrops within an area stretching for about one kilometre on the eastern side of **Tideswell Dale** starting one kilometre south of the village of Tideswell. This sill, dated at 287 ± 13 mya, is of earliest Permian or latest Carboniferous age having been injected into the Dinantian (early Carboniferous) Lower Miller's Dale Lava and limestones of the same age. The sill shows transgressive contacts, rapid thinning northwards, chilled and commonly amygdaloidal margins, baking of the host rocks, and occasional incorporation of the host rocks.

The sill consists of an heterogeneous textured dolerite of alkali tholeiitic composition. Texturally, much of the sill is an ophitic-clinopyroxene-plagioclase dolerite.

Although intruded at a similar stratigraphic level to the Waterswallows Sill to the north, and possibly of a similar magmatic origin, the Tideswell Dale Sill differs in two aspects. It is apparently younger than Waterswallows Sill by approximately 24 million years and contains a dominant ophitic variety of dolerite not found at Waterswallows and indicative of differences in the magma composition. This sill, together with Waterswallows represents one of the main phases of igneous activity associated with crustal stretching during the latter part of the Carboniferous period.