

SITE NOTIFIED TO THE SECRETARY OF STATE ON 27 APRIL 1990

COUNTY: DURHAM

SITE NAME: UPPER TEESDALE

Status: Site of Special Scientific Interest notified under Section 28 of the Wildlife and Countryside Act, 1981, as amended. Part of this site is a National Nature Reserve (NNR) declared in 1963 under Section 19 of the National Parks and Access to the Countryside Act, 1949.

Local Planning Authority: TEESDALE DISTRICT COUNCIL, Wear Valley District Council

National Grid Reference: NY 830320

Ordnance Survey Sheets 1:50,000: 91, 92 1:25,000: NY 72, NY 73, NY 82, NY 83, NY 92

Area: 13723.6 (ha.) 33911.0 (ac.) (Teesdale)
312.0 (ha.) 770.9 (ac.) (Wear Valley)
14035.6 (ha.) 34681.9 (ac.) (Total)

First Notified: 1951

Date of this Revision: 1990

Description:

Upper Teesdale is an extensive upland area within the North pennines which contains a number of nationally rare habitat types as well as a rich variety of representative habitats and associated plant and animal communities. The site includes enclosed hay meadows and pastures in the dale bottom as well as large tracts of moorland and mountain and ranges from 265 metres AOD at Wynch Bridge to 790 metres AOD on Mickle Fell. Upper Teesdale is one of the most important botanical sites in Britain supporting a flora exceptionally rich in nationally rare species and including a relict arctic-alpine element. There is a diverse avifauna with internationally important breeding populations of wading birds and a number of rare invertebrate species are present. The site also includes a series of locations of national geological importance.

The grasslands communities associated with outcrops of 'sugar' limestone on Cronkley and Widdybank Fells are particularly well known. This rock type, known from only one other locality in Britain, supports both dry grassland and calcareous flush plant communities which include a range of nationally or locally rare species. The dry grasslands are dominated by sheep's-fescue *Festuca ovina* and blue moor-grass *Sesleria caerulea* with spring gentian *Gentiana verna*, Teesdale violet *Viola rupestris*, hoary rock-rose *Helianthemum canum*, mountain avens *Dryas octopetala*, hair sedge *Carex capillaris*, rare spring-sedge *C. ericetorum*, alpine cinquefoil *Potentilla crantzii*, horseshoe vetch *Hippocrepis comosa*, hoary whitlowgrass *Draba incana*, alpine bistort *Polygonum viviparum*, dark-red helleborine *Epipactis atrorubens* and the moss *Rhytidium rugosum*. The flushes have open plant communities dominated by mosses including *Cratoneuron commutatum*, *Catocopium nigrum*, *Amblyodon dealbatus*, *Gymnostomum aeruginosum*, *G. recurvirostrum* and *Meesia uliginosa*. These also include a wealth of rare plants including Teesdale sandwort *Minuartia stricta*, for which this is the only British locality, alpine bartsia *Bartsia alpina*, alpine rush *Juncus alpinus*, threeflowered rush *J. triglumis*, false sedge *Kobresia simpliciuscula*, variegated horsetail *Equisetum variegatum*, scottish asphodel *Tofieldia pusilla* yellow saxifrage *Saxifraga aizoides* and dwarf milkwort *Polygala amarella*.

Outcropping carboniferous limestone on Mickle Fell also supports species-rich grassland communities including some of the Teesdale rarities such as spring gentian, together with alpine forget-me-not *Myosotis alpestris*, spring sandwort *Minuartia verna*, limestone bedstraw *Galium sternerii* and mossy saxifrage *Saxifraga hypnoides*.

A range of open moorland vegetation types occur reflecting ecological, geological and management differences. Where management for sheep predominates a range of acid grassland types with mat-grass *Nardus stricta*, sheep's-fescue, heath rush *Juncus squarrosus* and purple moor-grass *Molinia caerulea* have developed. There are large areas of dry heather moor including on Widdybank Fell, an unusual community at the transitional zone between acid and limestone derived soils in which both heather *Calluna vulgaris* and a range of herbs which favour calcareous conditions such as mountain everlasting *Antennaria dioica*, alpine meadow-rue *Thalictrum alpinum*, wild thyme *Thymus praecox* and spring gentian occur.

Blanket bog with heather and hare's-tail cottongrass *Eriophorum vaginatum* occupies much of the gently sloping hill land whilst locally valley mire, often characterised by the presence of cross-leaved heath *Erica tetralix*, has developed. In places, these mires are rich in bog mosses *Sphagnum* spp. including *S. papillosum* with some *S. fuscum*, *S. imbricatum* and *S. capillifolium*. Cloudberry *Rubus chamaemorus* is locally abundant, and dwarf birch *Betula nana* occurs here at its most southerly British locality. Bog moss lawns and acid flushes at the margins of the blanket bog have marsh saxifrage *Saxifraga hirculus*, tall bog-sedge *Carex magellanica* and a rare saprophytic moss *Aplodon wormskjoldii*. A widespread feature of Upper Teesdale are sedge-dominated flush systems with dioecious sedge *Carex dioica*, flea sedge *C. pulicaris*, carnation sedge *C. panicea*, broadleaved cottongrass *Eriophorum latifolium*, flat-sedge *Blysmus compressus* lesser clubmoss *Selaginella selaginoides*, grass-of-Parnassus *Parnassia palustris*, bird's-eye primrose *Primula farinosa*, hairy stonecrop *Sedum villosum*, a rare moss, *Cinclidium stygium*, and at high levels alpine foxtail *Alopecurus alpinus*.

On the lower lying in-by land there is a range of calcicolous, neutral and acidic grasslands, the latter similar to those of the open fells. Traditional hay cropping has resulted in the development of a characteristic plant community which is particularly well represented in Teesdale and these examples are of national importance. The swards include a range of grasses including sweet vernal-grass *Anthoxanthum odoratum*, red fescue *Festuca rubra*, common bent *Agrostis capillaris*, Yorkshire-fog *Holcus lanatus*, downy oat-grass *Avenula pubescens* and rough meadow-grass *Poa trivialis*. They also support a diverse assemblage of herbs, including globeflower *Trollius europaeus*, melancholy thistle *Cirsium helenioides*, marsh-marigold *Caltha palustris*, wood crane's bill *Geranium sylvaticum*, pignut *Conopodium majus*, an eyebright *Euphrasia arctica* ssp *borealis* and a number of rare species of lady's-mantle *Alchemilla monticola*, *A. glomerulans*, *A. acutiloba*, *A. subcrenata* and *A. wichurae*.

Other areas rich in plant species are along the River Tees and the Harwood Beck where there are short grass communities and ungrazed ledges as well as unstable rock and shingle habitats. A number of the alpinines found on the high fell such as alpine bistort and northern bedstraw *Galium boreale*, and tall herbs such as globeflower occur here. There are also extensive stands of the rare shrubby cinquefoil *Potentilla fruticosa* along the river, while rock whitebeam *Sorbus rupicola* and dark-leaved willow *Salix myrsinifolia* occur on riverside rocks.

Tarn Dub on Cronkley Fell is important as an example of an impermanent upland pool. Its shallower margins support shoreweed *Littorella uniflora* while in deeper parts there are stonewort *Chara* sp., the moss *Fontinalis antipyretica*, common water-crowfoot *Ranunculus aquatilis* and tubular water-dropwort *Oenanthe fistulosa*.

There are a number of exposures of whin sill, gritstones and limestones which form cliffs and screes in places. The latter support fern-rich communities with parsley fern *Cryptogramma crispa*, on acid substrates, and holly fern *Polystichum lonchitis* and green spleenwort *Asplenium viride* in basic areas. These rocky habitats also support bearberry *Arctostaphylos uva-ursi*, goldenrod *Solidago virgaurea*, and great wood-rush *Luzula sylvatica*. Juniper *Juniperus communis* also occurs on crags and along the riversides as

well as forming substantial stands of scrub, which are among the largest in Northern England, on Cronkley and Holwick Fells.

In small wooded areas mainly of downy birch *Betula pubescens* or more locally, hazel *Corylus avellana* and alder *Alnus glutinosa*, the ground flora contains species more characteristic of hay meadows such as globeflower and melancholy thistle, with marsh hawk's-beard *Crepis paludosa*, northern hawk's-beard *C. Mollis* and shady horsetail *Equisetum pratense*. On acid soil the woodland ground flora tends to be dominated by ferns such as lemon-scented fern *Oreopteris limbosperma*, broad buckler-fern *Dryopteris dilatata*, beech fern *Phegopteris connectilis* and oak fern *Gymnocarpium dryopteris*.

Over 50 species of birds breed in Upper Teesdale with typical communities of moorland, upland grassland, woodland and streamside being represented. Of greatest importance are the populations of wading birds and birds of prey. Particularly high densities of golden plover, dunlin, redshank, snipe, lapwing and curlew are recorded. The site is important for merlin, peregrine and short-eared owl and there is a strong population of black grouse. Other more local species occurring here include, ring ouzel, raven, twite and stonechat.

Some 10 nationally rare and endangered or vulnerable invertebrate species are known from Upper Teesdale as well as over 60 nationally scarce species, including the northern dart and slender striped rustic moths. The mollusc *Vertigo genesii*, an arctic species, was discovered there in 1970 and is otherwise unknown from Britain.

Mining, during the 18th and 19th centuries, has left spoil mounds which are heavily contaminated with lead, zinc and other minerals and these support a sparse but unusual vegetation including spring sandwort, alpine penny-cress *Thlaspi alpestre*, moonwort *Botrychium lunaria* and Pyrenean scurvygrass *Cochlearia pyrenaica*.

Three of these mine sites have been identified as being of special interest for the geological features they demonstrate. Exposures of whin sill at Cauldron Snout, Falcon Clints, Cronkley Fell and at High Force are also of geological interest and peat deposits at Red Sike Moss contain important sub-fossil remains. These sites of geological importance are described below.

Lady's Rake Mine and Trial Shaft

The dumps at Lady's Rake Mine contain areas of magnetite-rich ore in which Nickel-Antimony minerals have been identified. The magnetite is associated with white calcite and phyllosilicate minerals (talc, chlorite, smectite) and the magnetite has been shown to be replacing algal limestone in some specimens. The nickel minerals include niccolite, gersdorffite and ullmannite, but both pyrrhotite and pyrite are nickeliferous. At the Trial Shaft the magnetite-calcite rock contains galena, but no nickel minerals, while at a working further up the valley, ugrandite garnet is associated with the magnetite and the same dump contains dolerite blocks.

It is believed the Whin Sill lies immediately below the workings at Lady's Rake Mine and the mine plans record that the major Teesdale Fault in the mine is occupied by a 4 m wide 'Whin dyke'. The unusual magnetite rock with nickel minerals is regarded as a skarn resulting from the metamorphism of the Jew Limestone by the Whin Sill and thus predating the main North Pennine Lead-Zinc-Flourine mineralisation. However, the presence of abundant galena within magnetite-veined rock at Trial Shaft, strongly suggests that the two events were almost contemporaneous and also casts doubts on the accepted low temperature for the main mineralisation, at least in this part of the orefield.

Material from these dumps is therefore of the utmost importance in genetical studies of the North Pennine Orefield.

Willyhole Mine

Dumps from workings on the Reddycombe and Willyhole Veins show, by the abundance of smithsonite, that supergene alteration of the ore was more intense here than elsewhere in Teesdale. Both the 'dry bone' variety and botryoidal crusts of smithsonite are present, often coated by vivid yellow crusts of greenockite. Mineralisation is otherwise fairly typical of the outer (barium) zone of the orefield, although sphalerite seems to have been particularly abundant. Most sphalerite on the dumps is partly oxidised to smithsonite, but the cadmium content of fresh sphalerite is not unusual for the orefield as a whole and there is no obvious reason for the abundance of greenockite. The situation is very similar to that in the Shipham (Mendip) zinc orefield, but at Willyhole greenockite is certainly more abundant than at any other British locality. This is an important site for the study of the supergene alteration of sphalerite.

Pike's Law Mines

Deep opencast workings on the Pikes Law Old Vein trending roughly East West, are dominantly in the Great Limestone. Apart from the presence of good crystals of colourless, purple and amber fluorite, there are excellent surface outcrops of mineralisation, from which oxidised lead-vein material has yielded good specimens of crystalline anglesite and cerussite. This is probably the best locality for these lead minerals at present available in Britain; and a typical example of oxidised inner (fluorite) zone mineralisation within the North Pennine Orefield.

Whin Sill Exposures in Upper Teesdale

The upper valley of the Tees contains a number of outcrops which, taken together, provide classic exposures of the Whin Sill and demonstrate to text-book standard most of the features associated with sill intrusion. These include the occurrence of baked sediments both above and below the igneous rock, the occurrence of such sediments as 'rafts' within the sill, variations in grain-size of the sill rock related to position within the intrusion, the occurrence of veins of unusual compositions and textures formed from the last fraction of the magma to remain liquid, transgressions where the sill changes horizon within the surrounding sediments and the deposition, at a very late stage, of minerals which crystallise at low temperature along joints or cracks cutting the newly solidified sill-rock. The site also exhibits the decomposition and bleaching of the sill rock by later mineralising fluids with the production of 'White Whin', thus demonstrating the age relations of the intrusion and the mineral veins.

Red Sike Moss

Red Sike Moss is important for reconstructing Flandrian vegetation history in upper Teesdale, an area of outstanding botanical importance. The pollen stratigraphy supported by radiocarbon dating, demonstrates that many relict species survived from the Late-glacial and during the Flandrian. It also demonstrates the development of open woodland and their subsequent replacement by blanket bog on the drift soils and later by grassland on the limestone.

Other Information:

1. Much of this site was formerly known as, and part of, Upper Teesdale and Appleby Fells SSSI*. Following revision that site is now divided into Upper Teesdale SSSI (Durham), Appleby Fells SSSI (Cumbria) and parts amalgamated with Moorhouse NNR to form Moorhouse and Cross Fell SSSI (Cumbria and Durham), three separate but contiguous SSSI.
2. This site incorporates part of the former Mill Beck Wood SSSI* and Moking Hurth Cave SSSI*.
3. During this revision the previous boundaries have been amended to exclude some areas of land* and include further areas within the SSSI.
4. Upper Teesdale NNR has been declared a 'Biosphere Reserve' by the United Nations Educational, Scientific and Cultural Organisation (UNESCO).
5. Upper Teesdale fulfils the criteria for listing as a Special Protection Area under the EEC Directive 79/409/EEC on the Conservation of Wild Birds, and part is proposed

for inclusion in the list of Wetlands of International Importance under the Ramsar Convention.

6. Parts of the site are listed in 'A Nature Conservation Review' edited by D A Ratcliffe (1977), Cambridge University Press.
7. Parts of the site are identified as of national importance in the Geological Conservation Review.
8. This site lies within the North Pennines Area of Outstanding Natural Beauty (AONB).

* Previously notified under Section 23 of the National Parks & Access to the Countryside Act 1949.