

Site Name: Mid Cornwall Moors SSSI **Unitary Authority:** Cornwall

Status: Site of Special Scientific Interest (SSSI) notified under section 28C of the Wildlife and Countryside Act 1981

Local Planning Authority: Cornwall Council

National Grid reference: SW948598 **Area:** 1,653.02 ha

Ordnance Survey Sheets: **1:50,000:** 200 **1:10,000:** SW95, SW96, SX05, SX06

Notification date: 23 February 2017

Reasons for notification:

The Mid Cornwall Moors SSSI supports a diverse mosaic of semi-natural habitats, including heaths, fens, grasslands, woodlands, scrub and species-rich hedgerows, with ponds and waterways. It is of special interest for the following nationally important features that occur within and are supported by the wider habitat mosaic:

- wet and dry lowland heathland;
- lowland fens (including habitats often referred to as mires, swamps and bogs);
- wet and dry broad-leaved woodlands;
- species-rich neutral grasslands;
- an assemblage of nationally rare and nationally scarce flowering plants and ferns;
- populations of Cornish eyebright *Euphrasia vigursii*, coral-necklace *Illecebrum verticillatum*, chamomile *Chamaemelum nobile*, lesser butterfly-orchid *Platanthera bifolia*, chaffweed *Centunculus minimus*, lesser water-plantain *Baldellia ranunculoides* and allseed *Radiola linoides*;
- marsh fritillary butterfly *Euphydryas aurinia*;
- assemblage of invertebrates chiefly associated with scrub heath and moorland;
- populations of the water beetle *Hydrochus nitidicollis* and the mud snail *Omphiscola glabra*;
- breeding willow tit *Poecile montanus*; and
- geological features that demonstrate the mineralisation which occurs at the latest stage of granitic emplacement.

General description:

The Mid Cornwall Moors SSSI is a network of 14 areas of semi-natural habitat, all within close proximity to one another, extending for 17 km from Quoit Farm in the west to Chark Moor in the east. The site is underlain predominantly by calcareous slate, grits, shales and thin limestones of the Lower Devonian Mead-foot beds. This bedrock is overlain by extensive granite gravels with well drained, gritty loam soils rich in organic matter on higher ground and alluvial deposits along stream valleys giving rise to peaty acidic soil.

Much of the site has been subject to past disturbance as a result of extensive tin streaming, gravel extraction and peat cutting. Evidence of this can be seen in the hummock-hollow complex, series of ditches and other workings found throughout the site, which has a markedly undulating micro-topography. Past soil disturbance and the influence of calcareous bedrock has resulted in a diverse range of wetland areas on low-lying ground with extensive tracts of wet woodland, ponds in various stages of succession, acid bog communities, valley mire and fen communities and, on higher ground, large tracts of dry and wet heath, acid grassland and drier woodland communities.

The landscape scale of the network is enhanced by the location of individual areas which provide ecological linkages for mobile species populations of national and European importance. This applies especially to the marsh fritillary butterfly *Euphydryas aurinia*, which requires a network of suitable habitat patches sufficiently close to one another to allow re-colonisation.

Wet and dry lowland heath

On higher ground and drier slopes the heathland is characterised by western gorse *Ulex gallii*, bristle bent *Agrostis curtisii*, heather *Calluna vulgaris* and bell heather *Erica cinerea*. Cross-leaved heath *Erica tetralix* and purple moor-grass *Molinia caerulea* can be frequent and plants typically associated with this heathland include tormentil *Potentilla erecta*, heath milkwort *Polygala serpyllifolia*, wood sage *Teucrium scorodonia* and the locally notable slender eyebright *Euphrasia micrantha*.

Species associated with areas of wet heath include cross-leaved heath, deergrass *Trichophorum germanicum*, heather, bog moss *Sphagnum* species, purple moor-grass and the locally notable white beak-sedge *Rhynchospora alba*. Species such as bog asphodel *Narthecium ossifragum*, devils'-bit scabious *Succisa pratensis*, common cotton-grass *Eriophorum angustifolium* and carnation sedge *Carex panicea* occur frequently. Creeping willow *Salix repens* and mat-grass *Nardus stricta* are common in some areas.

Heathland and scrub habitats support a range of breeding birds including cuckoo *Cuculus canorus*, nightjar *Caprimulgus europaeus*, tree pipit *Anthus trivialis*, stonechat *Saxicola torquata*, Dartford warbler *Sylvia undata* and grasshopper warbler *Locustella naevia*.

Fens (including habitats often referred to as mire, swamps and bogs)

Wetter parts of each site, that receive much of their water from groundwater seepage and springs often support taller tussocky fen vegetation in complex mosaics with important transitions to wet heath, marshy grassland, woodland and open water. The transition mires demonstrate a range of successional stages, from fringing margins of floating plants at the edge of the many pools present, through to waterlogged fen peats with no open water.

One of the main fen types is characterised by tall tussocks of purple moor-grass with black bog rush *Schoenus nigricans* and bog myrtle *Myrica gale*. Tormentil, cross-leaved heath, western gorse and other species requiring drier conditions occur frequently in the tussocks. In the water filled hollows between the tussocks bog mosses, bog asphodel, common cotton grass and sharp flowered rush *Juncus acutiflorus* are locally abundant. Other species of note include bog pimpernel *Anagallis tenella*, pale butterwort *Pinguicula lusitanica*, heath spotted-orchid *Dactylorhiza maculata* ssp. *ericetorum*, round-leaved sundew *Drosera rotundifolia*, lesser skullcap *Scutellaria minor* and tawny sedge *Carex hostiana*, flea sedge *C. pulicaris*, star sedge *C. echinata* and the locally notable white sedge *C. canescens*.

Another fen type is dominated by tussocks of purple moor-grass with tormentil and cross-leaved heath. Bog asphodel, bog mosses, creeping willow, devils'-bit scabious, heather, saw-wort *Serratula tinctoria* and the uncommon royal fern *Osmunda regalis*, are commonly associated with this fen type.

In valley bottoms, permanently waterlogged conditions with more nutrient poor water have favoured the abundant growth of bog mosses and the formation of a rare type of valley mire. This is characterised by bog asphodel and bog mosses, particularly *Sphagnum papillosum*, common cotton grass, round-leaved sundew and the locally notable bladderwort *Utricularia australis* and lesser bladderwort *U. minor*. Other species which occur include oblong-leaved sundew *Drosera intermedia*, pale butterwort, lesser water-plantain *Baldellia ranunculoides* and a locally notable sub-species of early marsh-orchid *Dactylorhiza incarnata* ssp. *pulchella*.

Very wet mires characterised by an unstable 'quaking' surface also occur in waterlogged situations where they receive water from the surrounding catchment as well as from rainfall. The vegetation is typically dominated by tall sedges and rushes mixed with a wide range of herbs, over a ground layer of bog mosses or brown mosses, including *Calliergon* species.

Bog pool communities are generally recognised by smaller stands of wetter vegetation, where shallow water overlies mats of sphagnum and sedge species. These stands tend to pick out lower lying areas where water levels remain at or near the surface for much of the year, some of which possibly represent previous areas of open water.

Woodland

Extensive willow *Salix* carr or wet woodland has developed over many parts of the site, in particular along stream courses and in the central parts of Goss Moor and Criggan Moor. The canopy is dominated by grey willow *Salix cinerea* ssp. *oleifolia* with ash *Fraxinus excelsior*, alder *Alnus glutinosa* and downy birch *Betula pubescens* locally common. The ground is waterlogged and supports a rich flora of herb species including water mint *Mentha aquatica*, the nationally scarce marsh violet *Viola palustris* ssp. *juressii*, marsh pennywort, round-leaved water crowfoot *Ranunculus omiophyllus*, water horsetail *Equisetum fluviatile*, shore horsetail *E. x litorale*, leafy rush *Juncus foliosus*, smooth stalked sedge *Carex laevigata*, bogbean *Menyanthes trifoliata*, ragged robin *Lychnis flos-cuculi*, yellow pimpernel *Lysimachia nemorum*, bog mosses, greater tussock-sedge *Carex paniculata* and the locally notable corky-fruited water-dropwort *Oenanthe pimpinelloides*. These wet woodlands exhibit transitions to standing water, aquatic vegetation, drier woodland and associated fen and heath vegetation. Abundant ferns include broad buckler-fern *Dryopteris dilatata*, lady fern *Athyrium filix-femina* and royal fern which grows extensively in some places where it forms an understorey.

Drier woodland fringes the boundaries in places and is dominated by pedunculate oak *Quercus robur*, with holly *Ilex aquifolium* and coppiced hazel *Corylus avellana*, Guelder-rose *Viburnum opulus*, ivy *Hedera helix*, bramble *Rubus fruticosus*, and honeysuckle *Lonicera periclymenum*. Wood anemone *Anemone nemorosa*, bluebell *Hyacinthoides non-scripta*, the locally notable southern wood-rush *Luzula forsteri* and the 'near-threatened' greater butterfly-orchid *Platanthera chlorantha* are often locally common in the ground flora which is rich in ferns and frequent bog moss species where wet hollows occur. More acid conditions are indicated by the presence of bilberry *Vaccinium myrtillus*. Dormouse *Muscardinus avellanarius* occurs in a range of habitats throughout the site but is particularly associated with woodland (and ancient species-rich hedgerows), especially where hazel *Corylus avellana* is common and there is a good diversity of flowering and fruiting shrubs that are not intensively managed.

Species-rich neutral grassland

A damp, heathy form of species-rich neutral grassland occurs within the site at Retire Common, Criggan Moor and Carbis Moor where it occurs as small patches contiguous with or surrounded by heath and fen. The grass composition includes frequent common bent *Agrostis capillaris*, creeping bent *Agrostis stolonifera*, Yorkshire fog *Holcus lanatus* and cock's-foot *Dactylis glomerata*, with crested dog's-tail, sweet vernal grass *Anthoxanthum odoratum*, red fescue *Festuca rubra* and heath-grass *Danthonia decumbens*. Ribwort plantain *Plantago lanceolata*, cat's ear *Hypochaeris radicata*, bird's foot trefoil *Lotus corniculatus*, creeping cinquefoil *Potentilla reptans*, marsh thistle *Cirsium palustre*, red clover *Trifolium pratense* and selfheal *Prunella vulgaris* are frequent associates. Tormentil *Potentilla erecta*, heath wood-rush *Luzula multiflora* and heather add a heathy element, while meadowsweet *Filipendula ulmaria* occurs in areas adjacent to heathland.

Flowering plants and fens

The extensive mosaic of semi-natural habitats supports an outstanding assemblage of at least 12 nationally rare and nationally scarce flowering plant and fern species. Populations of two nationally rare species are of national importance in their own right: Cornish eyebright *Euphrasia vigursii*, an 'endangered' species endemic to England, and coral-necklace *Illecebrum verticillatum*, listed as 'vulnerable' to extinction in Great Britain. The assemblage also includes ten nationally scarce species: yellow centaury *Cicendia filiformis*, marsh clubmoss *Lycopodiella inundata*, pale dog-violet *Viola lactea*, pillwort *Pilularia globulifera*, three-lobed crowfoot *Ranunculus tripartitus*, wavy St John's-wort *Hypericum undulatum*, round-leaved mint *Mentha suaveolens*, Cornish moneywort *Sibthorpia europaea*, marsh fern *Thelypteris palustris* and the south-western form of marsh violet *Viola palustris* subsp. *juressi*.

The site also supports nationally important populations of five species that are more widespread but nevertheless declining and threatened with extinction in England or more widely in Great Britain: chamomile *Chamaemelum nobile*, lesser butterfly-orchid *Platanthera bifolia*, chaffweed *Centunculus minimus*, lesser water-plantain *Baldellia ranunculoides* and allseed *Radiola linoides*.

Other notable plant species on the site include shepherd's cress *Teesdalia nudicaulis*, bog orchid *Hammarbya paludosa* and ivy-leaved bellflower *Wahlenbergia hederacea*.

Invertebrates

The complex network of semi-natural habitats in the Mid Cornwall Moors supports a diverse range of invertebrates, including threatened and range-restricted species. Foremost amongst these is the marsh fritillary butterfly *Euphydryas aurinia*, for which the site is of national and European importance. Marsh fritillaries in the Mid Cornwall Moors breed primarily in damp acidic grassland where the larval food plant, devil's-bit scabious *Succisa pratensis*, can be abundant. Optimal breeding areas are typically a patchwork of short vegetation and long tussock grasses dominated by cattle-grazed purple moor-grass *Molinia caerulea*. Adult marsh fritillary butterflies survive in 'meta-populations' formed by a number of linked sub-populations or colonies which may frequently die out and re-establish through re-colonisation. Connected habitats, within a 1-2 km radius of one another support fluctuating meta-populations, which support more distant dispersal and robustness of the population overall.

The Mid Cornwall Moors also supports a nationally important assemblage of invertebrates chiefly associated with scrub heath and moorland. The assemblage is typical of low nutrient, humid heathy soils and is characterised by beetle, fly, spider, true bug, butterfly and moth species which demonstrate a high fidelity to this habitat type. The following are examples of the many scrub heath and moorland invertebrates recorded in sampling from wet heath and transition mire in the Mid Cornwall Moors: a spider *Agroeca proxima*, the ground beetles *Bembidion mannerheimii*, *Notiophilus germinyi* and *Pterostichus rhaeticus*, heather fly *Bibio pomonae*, heath bumble bee *Bombus jonellus*, a snail *Columella aspera*, small heather weevil *Micrelus ericae*, a rove beetle *Olophrum piceum*, a ground bug *Scolopostethus decorates*, the beetles *Sitona regensteinensis* and *Sitona striatellus*, and ground crab spider *Xysticus audax*.

In addition, there are nationally important populations of two species representative of water's edge habitats: the vulnerable water beetle *Hydrochus nitidicollis* and the nationally scarce mud snail *Omphiscola glabra*.

Willow tit *Poecile montanus*

The SSSI is important for breeding willow tits, which occur in the wet woodland and scrub habitats across the site.

Geology

At Belowda Beacon, a partially collapsed shallow mine adit (used by early prospectors searching for mineral veins) includes exposures of a granitic rock with many fine crystals of topaz, tourmaline and quartz. Small dumps at the mouth of the adit also contain large pieces of topaz-bearing rock. These granites were formed 280 million years ago from molten rock that pushed its way up from great depths in the earth. Along with the molten rock were other hot liquids and gases enriched in chemicals including boron and fluorine. This rich chemical cocktail cooled and solidified to form a diverse suite of rare and interesting minerals; in this case the topaz-tourmaline-quartz rock at Belowda Beacon. The occurrence is very unusual and the site is of national importance for research and teaching purposes because it clearly demonstrates the mineralisation which occurs at the latest stage of granitic emplacement. It also helps scientists to understand the processes that have formed Cornwall's present landscape.