

OREsome North Pennines: Site Overview

Whitesike and Bentyfield lead mines and ore works



Fig. 1: Whitesike and Bentyfield Mines viewed from the B6277 road, looking east

SAM list entry number: 1015832

Other designations: Whitesike Mine and Flinty Fell SSSI

Grid ref.: NY751425

County: Cumbria

District/Parish: Eden, Alston Moor

Altitude: 430-460m

SAM area: 3.32 hectares

Habitats: Narrow valley with sheep pasture, scrub and mine workings

Highlights

Archaeology: The dressing floors of Whitesike and Bentyfield ore works retain especially deep stratified deposits including areas that are waterlogged, which is ideal for the preservation of organic materials, such as wood and leather. Nationally important remains of 19th century ore processing equipment is considered to survive within these deposits, which will provide very valuable information about ore processing technology. The two linked mines form typical examples of mid-19th century mine complexes and as they are crossed by a footpath, they are an educational resource and public amenity.

Botany: This site includes one of the richest calaminarian grassland communities remaining on the North Pennine lead mines, with the full suite of North Pennine metallophyte plants all thriving and a rich diversity of other plants, lichens and bryophytes. Thrift is declining throughout this area and the vigorous population at Whitesike may be the largest and most healthy left in the North Pennines, so it is considered to be of at least regional importance.

Geology: There is an exposure of the sponge and coral bearing limestone at location 6 on the geological features map. This bed is widely present across the Northern Pennines, but its location here alongside a footpath makes this an important educational and interpretation resource.

Site description

These mines are part of an extensive and ancient mining landscape on the west side of Flinty Fell that includes conspicuous air and winding shafts, as well as waste dumps, dams and leats. The mines themselves are of mid-19th century age, and are close together in the narrow valley of the Garrigill Burn. They were constrained in their extent by the narrow valley, with dressing floors built up over the stream.

Whitesike mine is just east of the B6277 Alston to Middleton road, with a large tip of fines fenced off to the west of the road. The stream is culverted to pass through this tip (estimated to contain over 60,000 tons of ore-dressing waste) and the road runs over the top.

Bentyfield mine is east of Whitesike in the same valley and is accessed by the old tramway that runs up the west side of Whitesike.



Fig.2 Location of Whitesike and Bentyfield Mines in relation to other OREsome sites

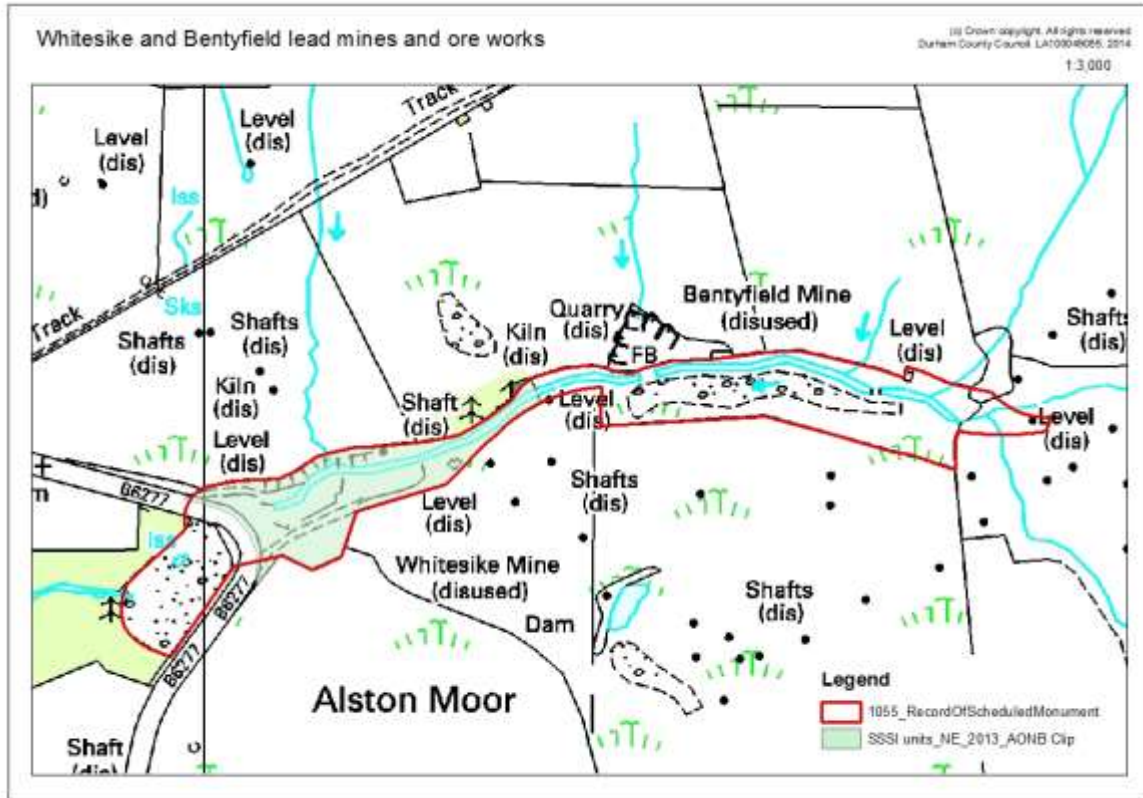


Fig. 3 Scheduled Monument boundary and area of SSSI at Whitesike and Bentyfield Mines.

Botanical interest

The metallophyte plants found in abundance here are thrift (*Armeria maritima*), alpine pennycress (*Nocca caerulea*), pyrenean scurvygrass (*Cochlearia pyrenaica*), mountain pansy (*Viola lutea*), spring sandwort (*Minuartia verna*) and pale thread-moss (*Bryum pallens*). All these have a patchy distribution within the site, determined by local conditions of shelter, soil development and heavy metal levels.

The **Whitesike** dressing floors support an interesting wet grassland community with butterwort (*Pinguicula vulgaris*), grass of parnassus (*Parnassia palustris*), and other plants of wet ground. Soft shield fern (*Polystichum setiferum*) is in the same area, and the northern edge of the dressing floor has brittle bladder fern (*Cystopteris fragilis*) and quaking grass (*Briza media*).

Bentyfield Mine has smaller areas of calaminarian, but with all the same species plus sheep-bit (*Jasione montana*), a plant that is scarce in this area but common on lead mines in Wales and Cumbria, and the clubmoss *Selaginella selaginoides*.

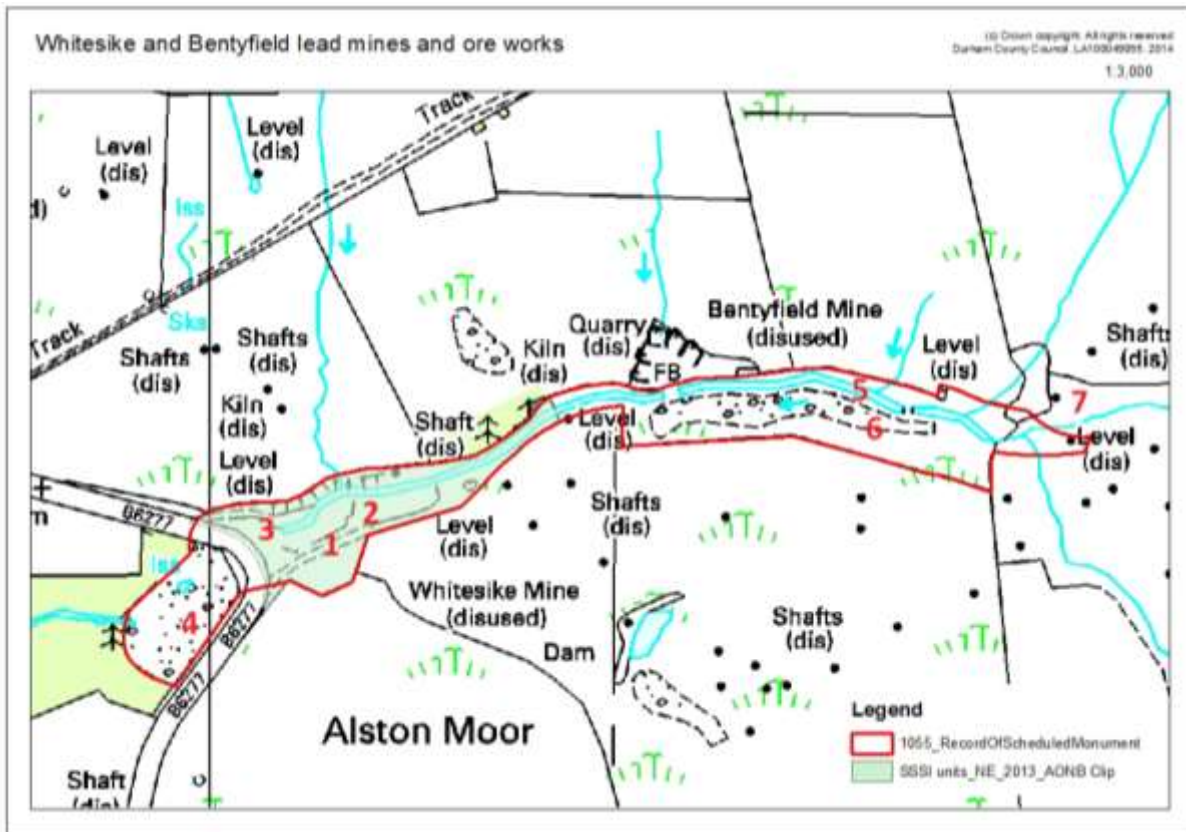


Fig. 4 Areas of botanical interest at Whitesyke and Bentyfield:

- (1) species rich calaminarian on bank and trackway, with metallophyte plants and lichens;
- (2) wet flush on dressing floor with butterwort and grass of parnassus;
- (3) calaminarian on bank with mountain pansy and thrift;
- (4) calaminarian on edge of tailings heap with abundant thrift;
- (5) calaminarian on track and stream side; (6) calaminarian on spoil;
- (7) calaminarian on spoil.

Geological interest

The ORESome geology report highlights twelve geological features of interest, marked on the map below. No features of geological interest at or in the immediate vicinity of Whitesyke and Bentyfield Mines, are covered by statutory or non-statutory protection.

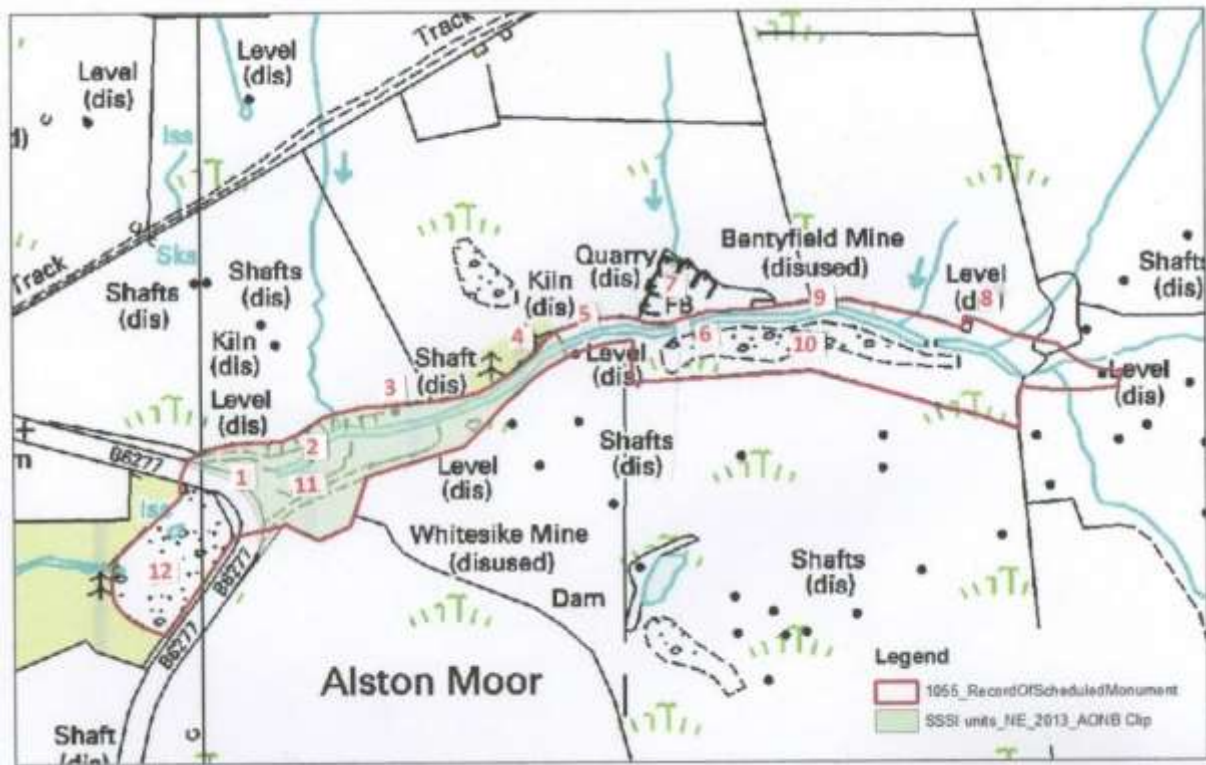


Fig. 5 Geological features of interest.

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| (1) Exposure of Four Fathom Limestone, | (7) Old limestone quarry, |
| (2) Exposure of Four Fathom Limestone, | (8) Outcrop position of a mineral vein, |
| (3) Open shaft, | (9) Spoil heaps, |
| (4) Old limekiln, | (10) Large spoil heap, |
| (5) Exposure of Tuft Sandstone | (11) Evidence of copper mineralisation, |
| (6) Coral and sponge bearing limestone | (12) Tailings dumps |

Threats

The large spoil heap to the west of the road (point 1 in fig. 6) is undergoing remediation by The Coal Authority to reduce the input of heavy metals into the Garrigill Burn (as at autumn 2018). Further remediation work is planned upstream for 2019. The information gathered through the ORESome project will be used to help mitigate against damage to features of archaeological, botanical and geological interest.

Archaeological: 25 condition assessment forms were completed. The main threats identified were weather damage, flooding, stream erosion and scrub growth. Overall, the risk level of these threats to the historic features was recorded as low/medium (minor localised problems) or medium (significant localised problems).

Following restoration works in 2011 by the North Pennines AONB Partnership, this site was removed from the Heritage at Risk register. However, the surveys undertaken as part of this project clearly highlight ongoing threats to the Scheduled Monument, mainly through erosion from the Garrigill Burn. Seventeen separate areas under threat have been recorded (see map below).

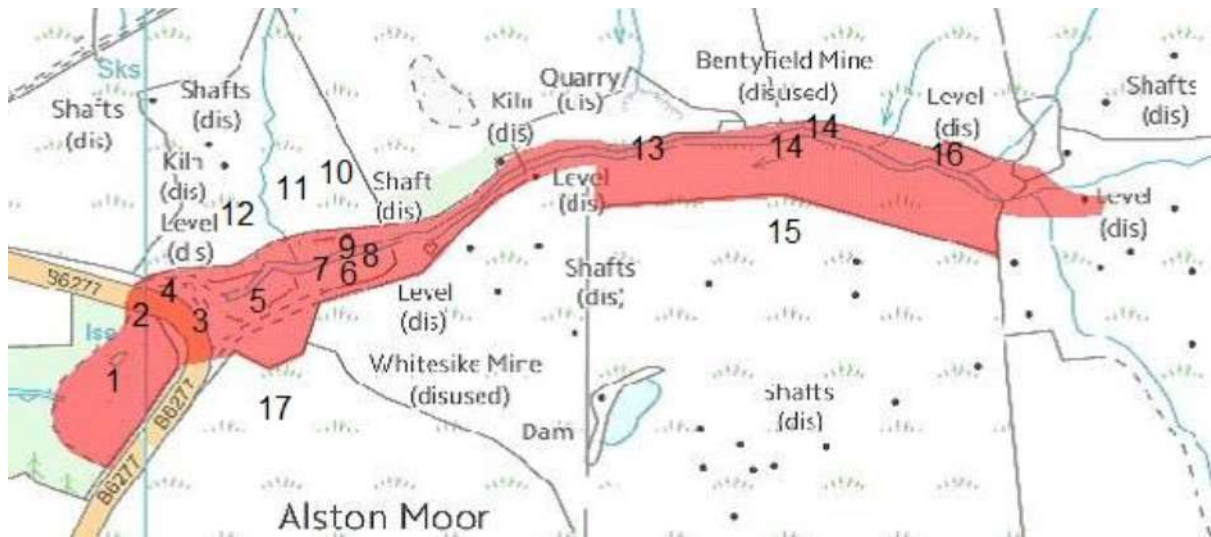


Fig. 6 Identified threats to mining features

1. Whitesike spoil heap to west of the road (NY 74980 42410) – erosion and contaminant loss.
2. Fencing needing repair between the road and Whitesike spoil heap on the west side of the road (NY 75002 42451).
3. East facing slope of spoil heap on the east side of the road (NY 75065 42456) – erosion and wall collapsing.
4. Rosebay willow herb (NY 75045 42448).
5. Contaminant loss from the lower dressing floor (NY 75084 42468).
6. Damage to upper dressing floor (NY 75133 42477) and bouse teams wall.
7. Streamwall (between NY 75132 42488 and NY 75161 42493) collapsed in two places on south side.
8. Steamwall undercut by stream (NY 75156 42494) on south side.
9. Stream wall collapse on north side of stream at Whitesike (NY 75144 42496).
10. Footbridge abutments (NY 75161 42493) at risk of collapse.
11. Shaft (NY 75133 42505) – part of protective stone surround loose and part of metal grid missing.
12. Garrigill Burn at Whitesike – erosion of stream banks on both sides and presence of large rocks in burn, flow of water from the north side into the burn and turf overhanging bank on north bank.
13. Stone missing from wall immediately upstream from arched culvert over burn in Bentyfield Mine (NY 75331 42559).
14. Dressing floors near Bentyfield waterwheel structure (NY 75456 42575 and NY 75408 42555).
15. Garrigill Burn at Bentyfield - extensive erosion of stream banks and many large rocks present in burn.

16. Cracking in south wall of Bentyfield mine shop (NY 75533 42560).
17. Other anti-social visitor activity – such as dog fouling (no ONP2) particularly along the tramway running next to the dressing floors on the south side of Whitesike and fire setting in the upper dressing floor (NY 75133 42477).

Botany: the Whitesike dressing floors have lost much of their interest over the last few years as a result of flood damage and restoration works. Thrift is declining throughout this area and the vigorous population at Whitesike may be the largest and most healthy left in the North Pennines, so it is considered to be of at least regional importance.

Geology: As with all such sites, it is essential to ensure that appropriate expert geological opinion is sought when planning remedial or conservation works related to built structures or mining features.

Opportunities

Archaeology: The current and planned metal diffuse pollution remediation works should help protect the site from erosion by the Garrigill Burn. The OREsome survey findings will be shared with the Coal Authority to help ensure features of interest are protected during remediation works.

Botany: Lichen interest on both sites includes a variety of *Cladonia*, *Cetraria* and *Peltigera* species growing on metal-rich soil, as well as metallophyte and other lichens on stone. Some of these may have been lost in recent years, due to flood damage and the consolidation works that followed, and a re-survey is needed.

Geology: The site offers significant potential for further research in at least two areas of interest.

1. Whereas supergene development of hydrozincite and other related species is common in sphalerite-rich mine spoil and vein exposures both at the surface and in abandoned underground mine workings, sites at which these processes appear to be directly associated with surface mine water discharges are less common. The spoil heaps of Bentyfield Level (Location 9, fig.3) appear to be one such location. This site may therefore offer a valuable opportunity at which to investigate the chemistry of such current supergene processes.

In addition, as the relationship of zinc mobility and precipitation in surface waters to the ecology of bryophytes and higher plants is comparatively poorly understood, sites such as this may offer ideal locations for such studies.

2. There is significant potential for multidisciplinary studies into the distribution and relationship between individual calaminarian species such as thrift, and the content and concentration of specific metals within the mine spoil and soils derived from it. The possible relationship here between thrift and concentrations of copper mineralisation may be of particular interest.