

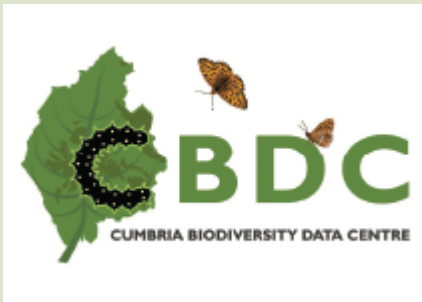
Designating Local Geological Sites In the Westmorland Dales

Sylvia Woodhead

Geological co-ordinator

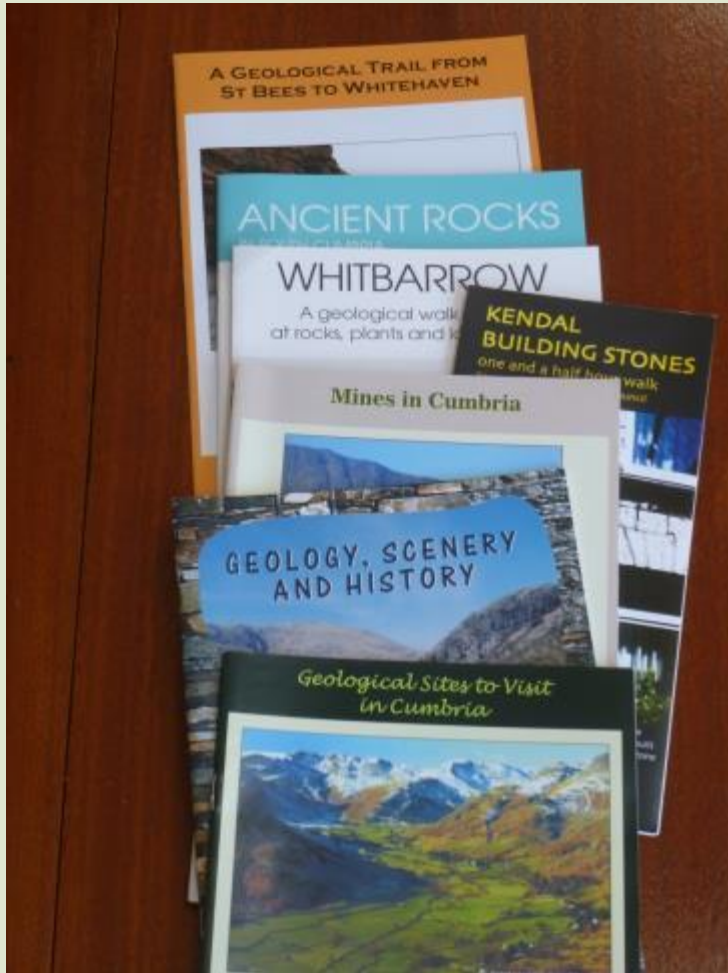
Cumbria GeoConservation

CBDC Records' Conference Feb 22

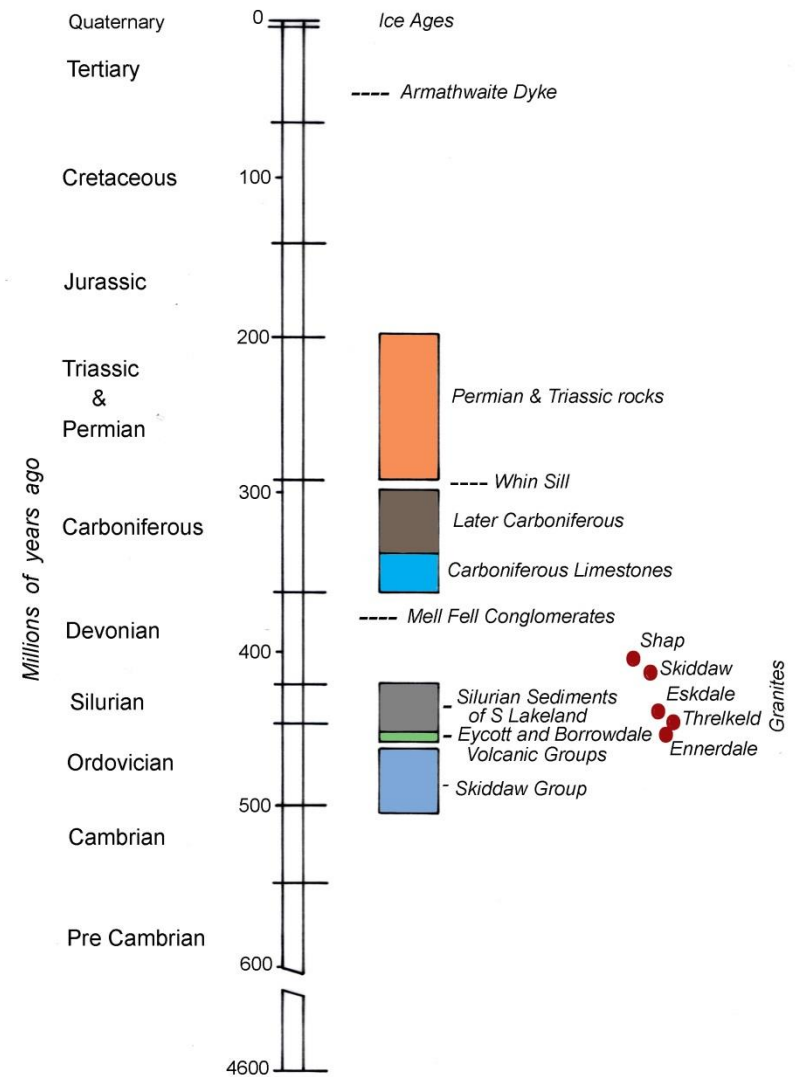
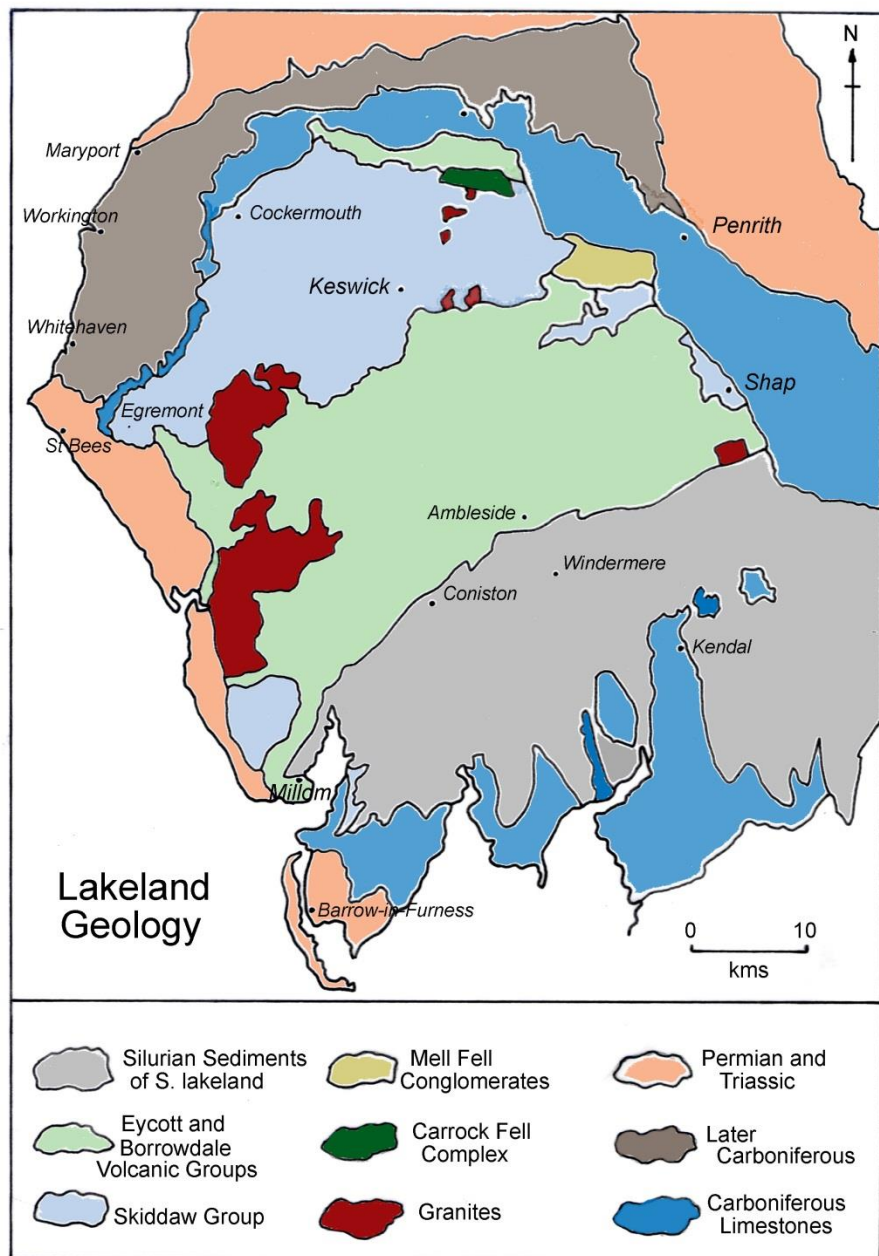


Cumbria GeoConservation Group

Many leaflets and trail guides



- Specialist group of Cumbria Wildlife Trust
- Members are volunteers
- Current aims are to modernise **recording & storage of site data**- on-going
- To ensure protection through the planning system
- To inform & educate the public about LGS & geology of Cumbria

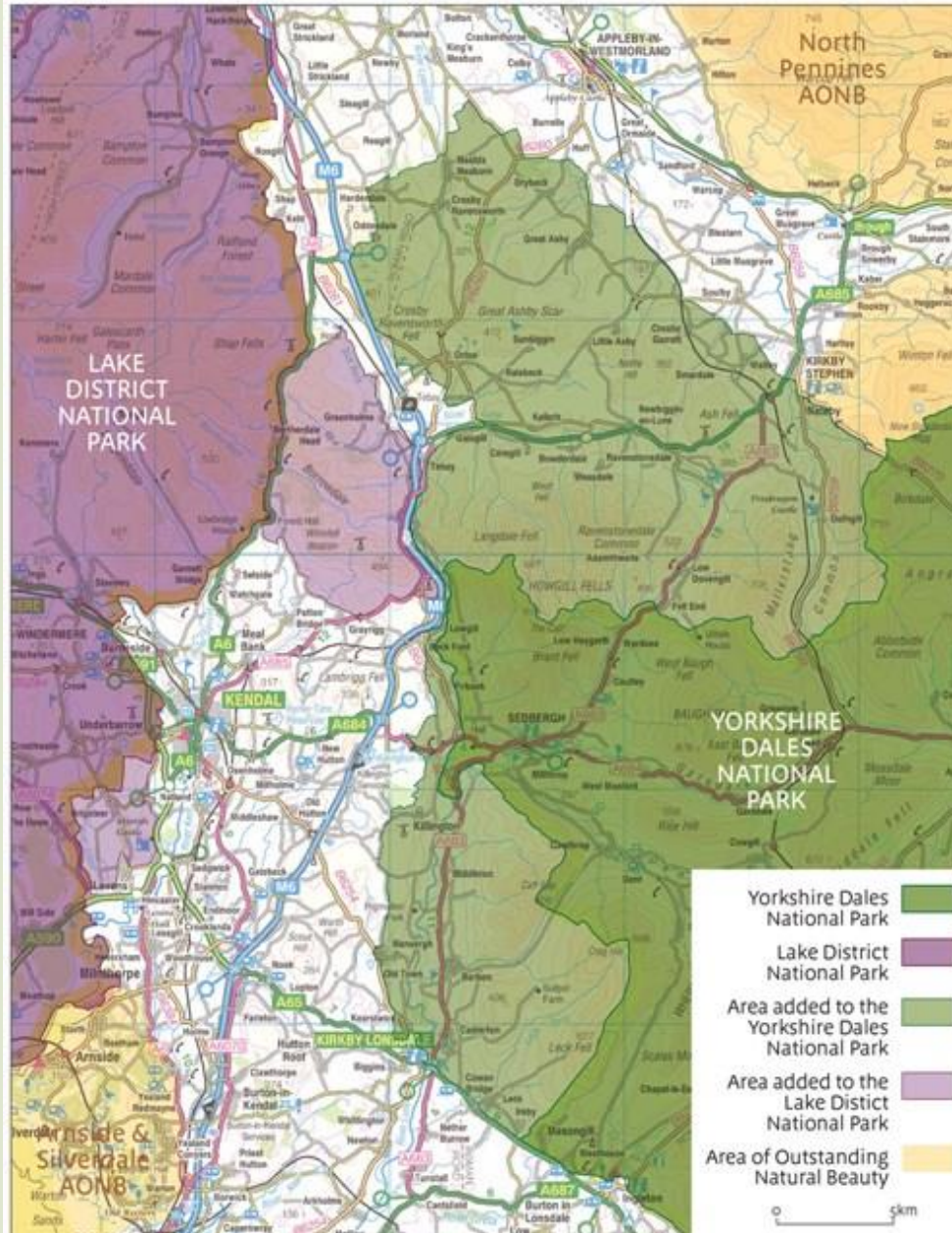


Local Geological Sites, formerly RIGS

- Defra *Local Sites* 2006- RIGS became LGS
 - Geological equivalent to Local Wildlife Sites
 - Guidelines for selection (GCUK)
 - Value for education and lifelong learning
 - Intrinsic scientific interest
 - Landscape value & promotion of public awareness
 - Historical value and context of geological thinking
- Now around 300 LGS in Cumbria- details via CBDC
- Issues- obscured by vegetation, updated knowledge*

300 sites Coded 1-8

1.	Carlisle	13	1/009 Irthing Gorge
2.	Allerdale	15	2/021 Maryport Foreshore
3.	Eden	65	3/010 High Cup Nick
4.	Copeland	44	4/042 Hodbarrow Point
5.	SLDC	43	5/022 Benson Knott
6.	Barrow	9	6/009 Walney South
7.	LDNP	176	7/002 Whitbarrow Scar
8.	YDNP	24	8/013 Carlingill, Tebay



August 2015

Extensions to National Parks confirmed

Lake District

(Borrowdale & Lyth valley)

Yorkshire Dales

Kirkby Lonsdale

& Orton Fells, Cumbria

Jan – May 2016

Preparation of HLF bid

‘Hidden Landscape’

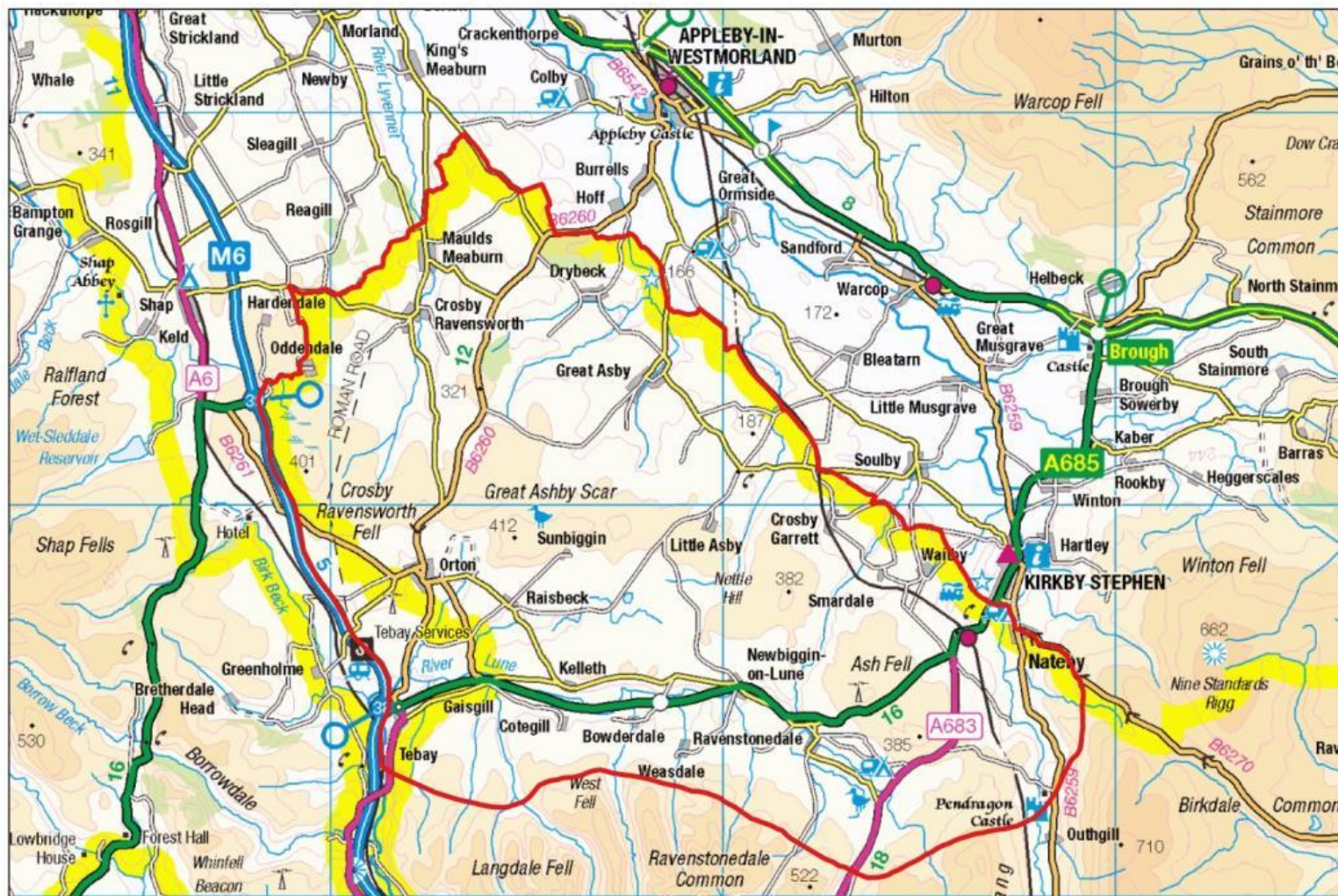
Second largest area of limestone pavement after Ingleborough



Made possible with

**Heritage
Fund**

The Westmorland Dales



Before 2016: 7 Local Geological Sites in Westmorland Dales area



Smardale Gill Quarry



Smardale Bridge



Stenkrieth Park LGS



Scale Beck, Gaythorne



Nateby brockram



Knott Quarry, Orton

Plus North Gaythorne Quarry – currently overgrown with trees

The Westmorland Dales Landscape Partnership

Geology Project 1.1 Revealing the Foundations



Cumbria
Wildlife Trust



Little Asby Scar – a new LGS

The Westmorland Dales Landscape Partnership



WESTMORLAND DALES



Timescale and Funding

Development phase:

- *February 2017 – August 2018 (Round 2 HLF bid)*
- *£317,000 including HLF, partners and volunteer time*

Delivery phase:

- Spring 2019 – Spring/ summer 2023
- £3,455,000 including HLF, partners and volunteer time

Long-term legacy:

- Benefits for heritage, people and communities as part of extended Yorkshire Dales National Park



Landscape Partnership Scheme

Aims and Objectives

- To reveal and protect the hidden heritage of the Westmorland Dales, enabling more people to connect with, enjoy and benefit from this inspirational landscape
- Four key objectives:
 - Revealing the area's hidden heritage
 - Conserving what makes the area special
 - Engaging people in enjoying and benefiting from their heritage
 - Sustaining the benefits of the scheme in the long term



Projects

21 projects across 3 broad, interlocking themes:

- Natural Heritage – 6 projects
 - **1.1 Revealing the foundations** (*geology*)
 - Conserving species-rich grasslands
 - Reconnecting woods, trees and people
 - Changing the course, slowing the flow (*natural flood management*)
 - Sustaining farming in the Westmorland Dales
 - Species monitoring in the River Lune
- Cultural Heritage – 10 projects
- Connecting Heritage – 6 projects



Geology Project –Produced a report, Feb 2018

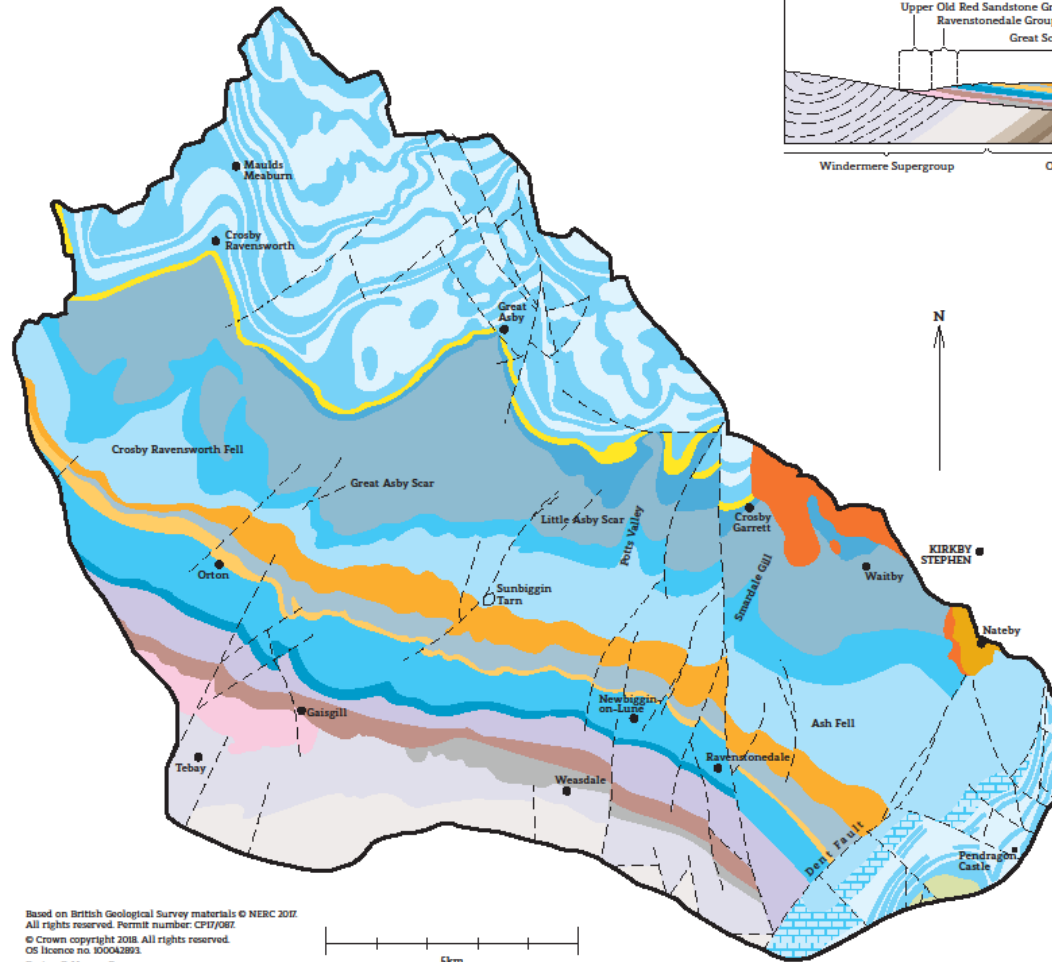
- A simplified and accessible account of the area's geology and its geological evolution.
- **Collating information on existing geological sites and to suggest potential new ones.**
- Comment on sites' geological interest, accessibility, need for conservation and potential for future interpretation.
- Highlighting links between the area's geology and its rich natural and cultural heritage.
- Providing suggestions for future interpretation of the area's geology and landscape as a whole.
- **Now working on a book**
- *Consultant Dr Elizabeth Pickett*



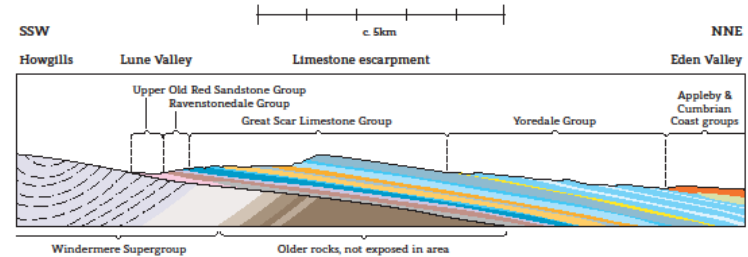
Geological map of the Westmorland Dales, by Elizabeth Pickett


Geological map of the Westmorland Dales

This simplified geological map shows the distribution of the main bedrock units that lie at or near the surface. Overlying deposits left by ice and water are not shown. The table summarises the main rock units and also serves as the key for the map. The cross-section represents a schematic slice through the area.



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Design © Marcus Byron



Age	Formation	Brief description and thickness	Group
PERMIAN	Eden Shales & Brockram	Mudstone & breccia (Stenkrith Brockram) (up to 50m)	Cumbrian Coast Group
	Farrith Sandstone & Brockram	Red sandstone with units of breccia (brockram) (c50m)	Appleby Group
	Unconformity		
CARBONIFEROUS	Stainmore	Mudstone, siltstone & sandstone with thin limestones (70-80m)	Yoredale Group
	Alston	Limestones alternating with mudstone, siltstone, sandstone & thin coals (200-250m) Base marked by yellow band (representing a sandstone)	
	Robinson Limestone	Limestone (up to 10m)	
	Knipe Scar Limestone	Limestone with mudstone, siltstone & sandstone (c90m)	Great Scar Limestone Group (Shown as  where undivided in SE of area)
	Potts Beck Limestone	Limestone with sandstone and mudstone (50-70m)	
	Ashfell Limestone	Limestone with mudstone and sandstone (25-200m)	
	Ashfell Sandstone	Cross-bedded sandstone (40-150m)	
	Brookynock Scar Limestone	Limestone with mudstone (0-150m)	
	Brownbar	Limestone & pebbly sandstone (15-60m)	
	Scandal Beck Limestone	Limestone & dolomite with siltstone (100-120m)	
	Coldbeck Limestone	Limestone, dolomite & mudstone (20-80m)	Ravenstonedale Group
	Stone Gill Limestone	Limestone & dolomite (70-115m)	
	Marslett	Conglomerate, sandstone & mudstone (up to 45m)	
	Pinskey Gill	Limestone & dolomite with mudstone & sandstone (0-50m)	
	Unconformity		
	Shap Wells Conglomerate (Red Beck Sandstone)	Sandstone (0-110m)	Upper Old Red Sandstone Group
SILURIAN DEVONIAN	Unconformity		
	Bannisdale	Siltstone & mudstone (c500m)	Kendal Group
	Undivided	Sandstone, siltstone & mudstone (c500m)	Conistone Group
Windermere Supergroup			

NOT TO SCALE

Geology Project

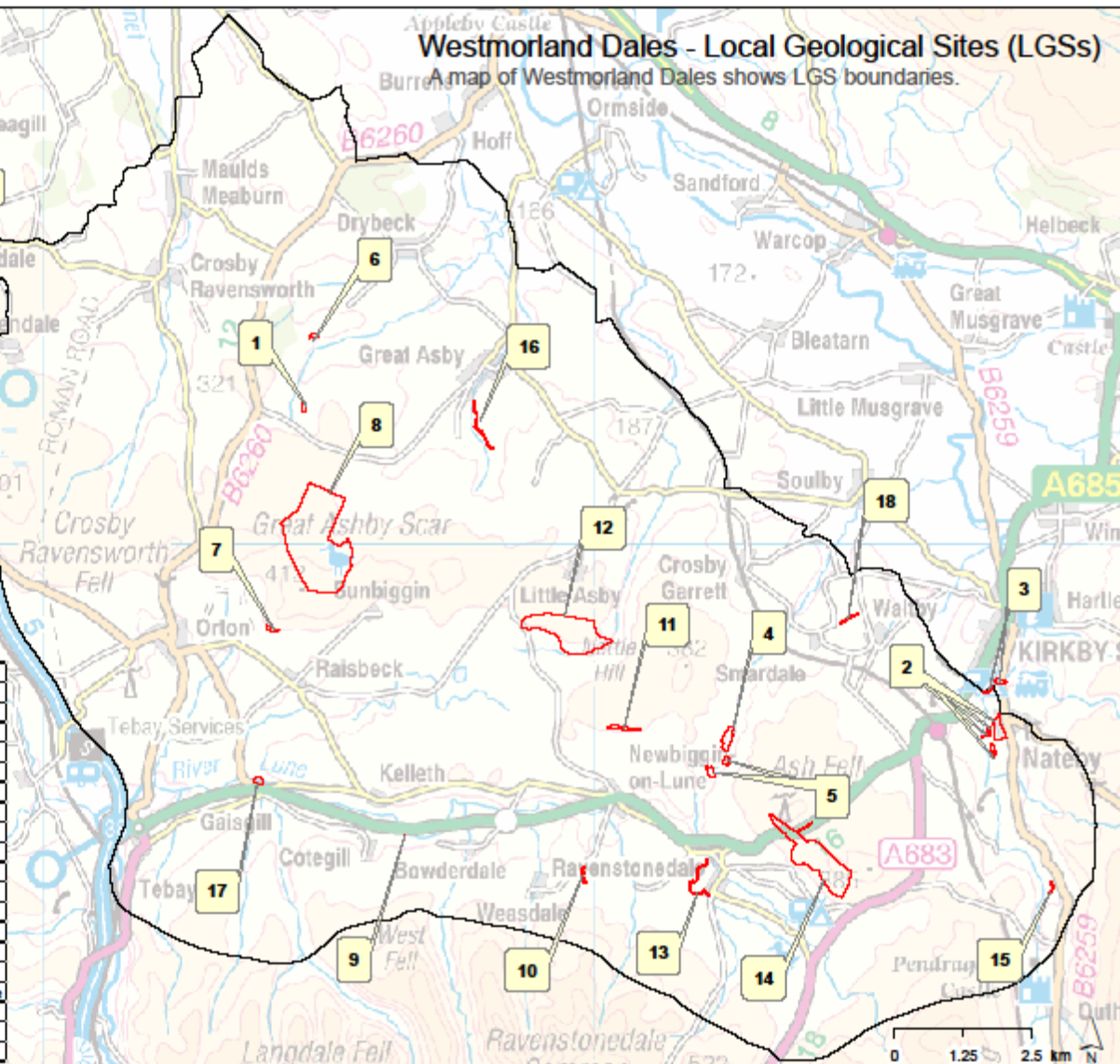
- Dr Elizabeth Pickett & designer Marcus Byron were appointed, with a view to
- Writing **CBDC data sheets** for the 7 existing & 11 new LGS
 - Flakebridge unconformity, Pinskey Gill, Bents, Potts Beck, Stone Gill, Ash Fell Edge, Marl Crag tufa breccia, Janny Wood, Waitby, Pate Hole, Trainriggs erratic www.cumbriageoconservation.org.uk
- Producing 14 public information sheets for Open sites
- 10 Earthcaches- see Westmorland Dales web site
- Webinars, geology & Ice Age, Walks, Geo-Week, May22
- 3 Geo-Trails
 - Orton
 - Smardale
 - Kirkby Stephen- Stenkrith- Nateby



Westmorland Dales - Local Geological Sites (LGSs)

A map of Westmorland Dales shows LGS boundaries.

Number	Site Name
1	Scale Beck
2	Nateby West
3	Stenkrith Park
4	Smardale Gill Limestone Quarry
5	Smardale Bridge
6	North Gaythorne Quarry
7	Knott
8	Great Asby Scar
9	Flakebridge
10	Pinskey Gill
11	Bents
12	Little Asby Scar & Potts Valley
13	Stone Gill
14	Ash Fell Edge
15	Janny Wood
16	Pate Hole Mouth and Great Kettle
17	Marl Crag
18	Waltby Cutting
19	Trainlegs Thunderstone





Basal Carboniferous
Dolomitic slt/ssts of
Pinskey Gill Fm

Bannisdale Fm

Fig 19 Track south of Flakebridge Farm showing Silurian/Carboniferous Unconformity



Pinskey Gill-Silurian – oldest Carboniferous



Bents – Carb. Ashfell Sandstone



Stone Gill- Ravenstonedale



FRIENDS OF THE
LAKE
DISTRICT

Little Asby Scar- Potts Beck LGS



Ashfell Edge sandstone to limestone

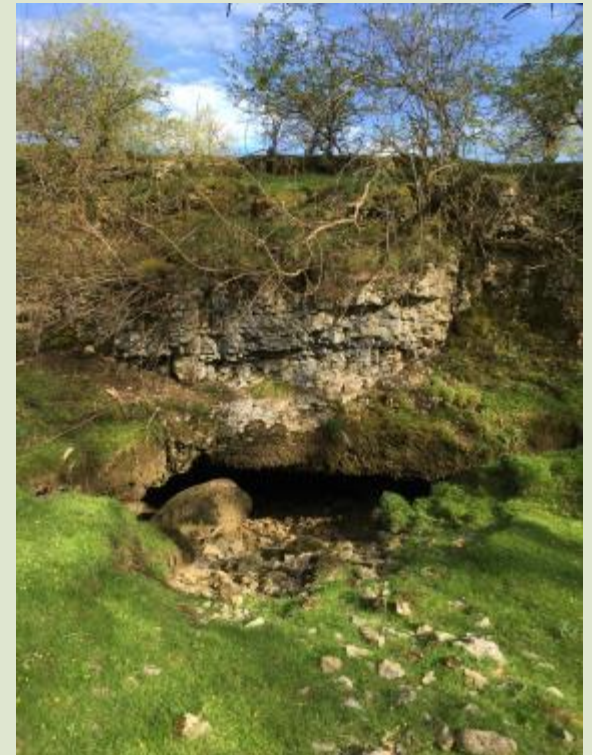


Pate Hole
Asby

Marl Crag,
Raisbeck



Janny Wood, River Eden GCR/SSSI,
Asbian –Brigantian reference section





Waitby cutting - Brockram exposure- a new LGS

Trainriggs Shap granite erratic- new LGS



Photo Alan Smith

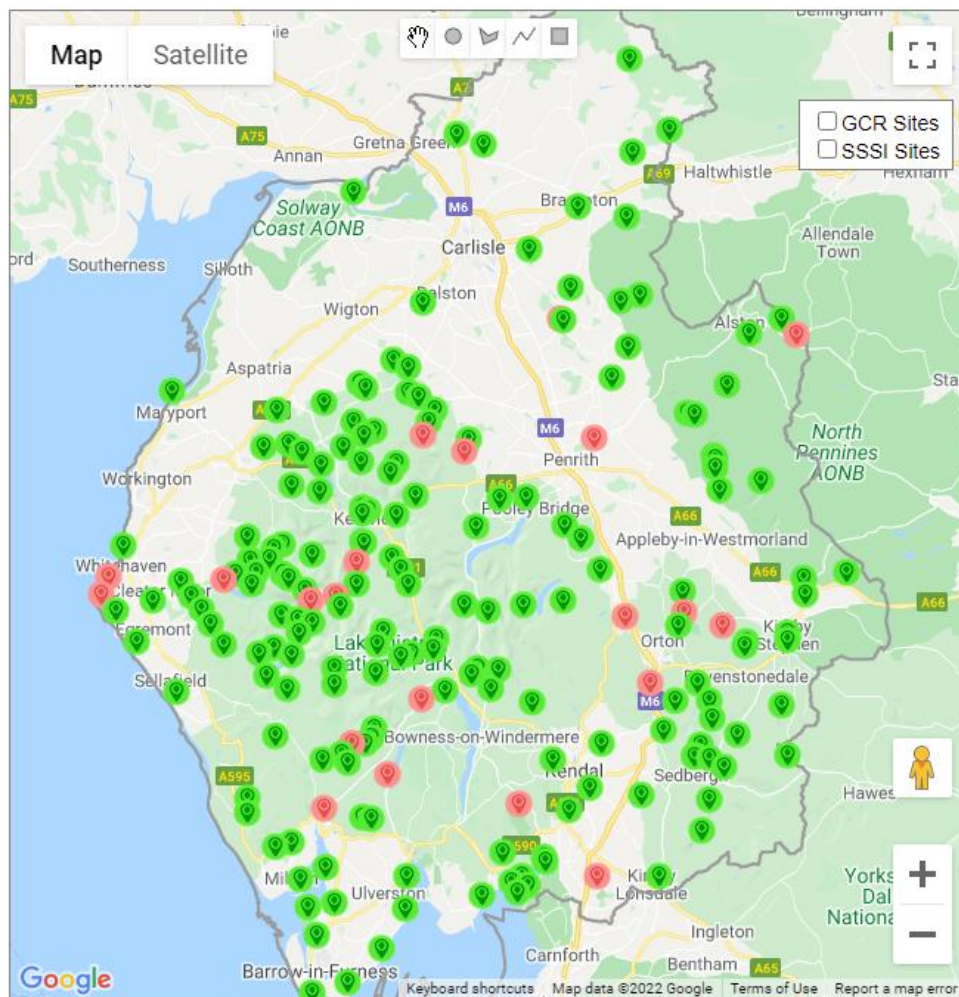


Blasterfield, meltwater channel
& erratics- LGS No 20 in
Westmorland Dales ?



CUMBRIA LGS SITES - ONLINE MAPPING TOOL

Google Map with drawing tools. Best browsed using [Google Chrome](#).



CBDC host our
web site and
LGS data

Red = 5* sites

Map


Satellite

land

National Park

☐ GCR Sites
 ☐ SSSI Sites

Smardale Bridge



General view

Site No: 3.037

Location: Newbiggon-on-Lune

Grid Reference: NY726062

Site Summary: Set in Smardale Gill, these old quarries expose red, cross-bedded Ashfell Sandstone Formation, which was used to build Smardale viaduct. The site has dramatic views which reveal many other features of interest.

Access: Several old quarries beside and above Scandal Beck. The northern part is on Access Land beside a track; the southern is near Smardale Bridge, beside a public footpath (not Access Land). The LGS is easily accessed from Smardale Gill.

Features: Ashfell Sandstone Formation, Great Scar Limestone Group, Carboniferous, cross-bedding, quarry, building stone

Data Sheet: https://www.cbdc.org.uk/CumbriaLGS/DataSheets/3_037.pdf

Leaflet: https://www.cbdc.org.uk/CumbriaLGS/Leaflets/3_037.pdf

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Example of a Data Sheet



Cumbria GeoConservation Group

Cumbria Biodiversity Data Centre

Phone: 01228 618718



Site Name:	Nateby West	Site No.:	3.013
Location:	Nateby	Area:	Eden
Grid Ref.:	NY773065	BGS Map:	40
Easting:	377315	Northing:	506568
Access Description:	Mobility Access: No The LGS comprises several areas of farmland (not Access Land) west of Nateby. Three public rights of way run through the main site, allowing good views of the exposures, but paths must be kept to. Two areas are not on footpaths so require permission.		
Exposure Type:	Disused quarry	Rating:	3 Star

Leaflet: -

Site Summary:

West of Nateby are exposures of brockram, a coarse limestone breccia that formed in desert environments in the Permian. The unconformity between Carboniferous limestone and brockram is exposed near the river.

Site Description:

The LGS comprises several areas of the distinctive local rock 'brockram', south-west of Nateby on the valley slopes and riverbanks. The west bank of the River Eden just north of Wharton Hall exposes the irregular unconformity between Carboniferous limestone and overlying Permian brockram (part of the lower Permian Penrith Sandstone Formation). East of the river, the valley slopes are covered with numerous brockram outcrops. Here, the older, Penrith brockram is overlain by upper Permian Stenkrith Brockram (part of the Eden Shales Formation of the Cumbrian Coast Group). Both these brockrams are largely composed Carboniferous limestone fragments set in red silty material, and are interpreted as desert alluvial fan deposits. In the fields west of Nateby the brockram has been quarried in the past for building stone, creating low faces. Drumlins shape much of the surrounding countryside.

Reference: Taylor, G. 2008. Vale of Eden. Walk No.6 (p53) in: Exploring Lakeland: Rocks and Landscapes by Beal



General View to east. Stenkrith Brockram in main field at Nateby West.

More Photos:

https://www.cbdc.org.uk/CumbriaLGS/Images/3_013_2.jpg

https://www.cbdc.org.uk/CumbriaLGS/Images/3_013_3.jpg

https://www.cbdc.org.uk/CumbriaLGS/Images/3_013_4.jpg

https://www.cbdc.org.uk/CumbriaLGS/Images/3_013_5.jpg

Sample Fact sheets

DISCOVER THE GEOLOGY OF THE WESTMORLAND DALES

Waitby Cutting Local Geological Site

Walking through desert rocks

What you can see here

- A short stretch of the old Stainmore railway line near Smardale
- Local rock 'brockram', which formed in desert landscapes in the Permian Period

Parking at Smardale car park

- Easy walk along the old railway (now a footpath) from north end of car park

- Please keep to path and away from the rock faces in the cutting



This railway cutting along the old Stainmore railway line exposes an impressive section of **brockram**, a distinctive local rock which formed in the **Permian Period**. It is an example of **conglomerate**, a rock made of rounded cobbles and small boulders of even older rock, in this case mainly **limestone**. The limestone formed in tropical seas in the **Carboniferous Period** (and can be seen today as limestone pavements and crags on nearby hills). By the Permian this area had become a desert and the limestone formed bare rocky hills, which eroded rapidly in flash floods. Limestone fragments and red desert sand and silt accumulated in **alluvial fans** and eventually hardened to brockram.

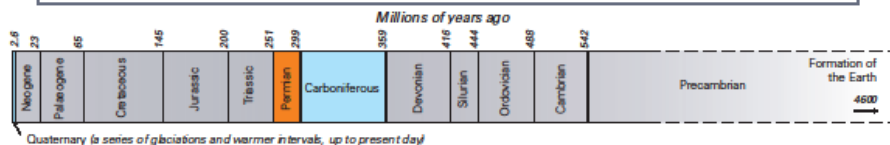
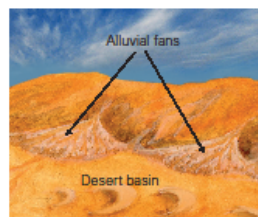
Carboniferous limestone can be seen at both ends of the cutting. This suggests that the brockram here may have formed as a localized deposit in a channel or hollow in the underlying limestone, rather than as a widespread layer.



Permitted footpath

Images

- Fractured limestone at south end of cutting (view back towards car park)
- Brockram showing cobbles and boulders of limestone (camera case for scale)
- Brockram formed in Permian desert landscapes



Quaternary (a series of glaciations and warmer intervals, up to present day)

In this geological timeline the coloured intervals indicate periods represented by rocks and features at this site

DISCOVER THE GEOLOGY OF THE WESTMORLAND DALES

LGS 3_036

Smardale Gill Local Geological Site Limestone, limekilns and wild flowers

What you can see here

- Large disused limestone quarry and limekilns, part of Smardale Gill National Nature Reserve
- Lovely views and rich industrial heritage and wildlife

Parking at Smardale car park (Cumbria Wildlife Trust)

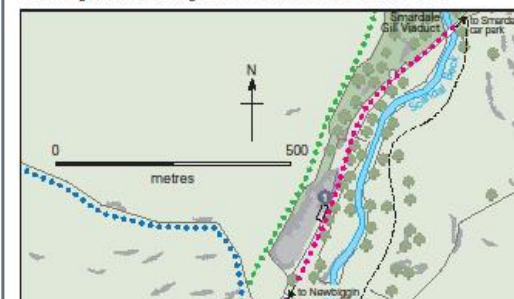
- Footpaths from Smardale car park and Newbiggin-on-Lune. The site is beside a good footpath along the old railway line
- Take care near the rock faces, steep slopes and limekilns



This large disused **quarry** in Smardale Gill is a superb place to see the local limestone and natural and industrial features linked to the geology. The quarry and **limekilns** lie beside the old Stainmore railway, now a footpath. Between 1861 and 1962 the line linked north-west and north-east England. Limestone from the quarry was burnt in the kilns and the resulting lime loaded on to trains.

The quarry is in the **Ashfell Limestone Formation**, part of the **Great Scar Limestone Group** which formed in the early **Carboniferous Period** when northern England was covered in shallow **tropical seas**. Limy mud on the sea floor hardened into layers (beds) of limestone. Some beds are rich in **fossils** of corals and brachiopod shells.

Today, the quarry is an important **limestone grassland habitat** where orchids and other rare plants thrive. The wild flowers attract **butterflies**, including the northern brown argus and Scotch argus for which Smardale Gill is well known.

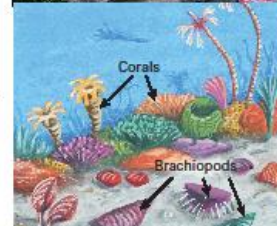


- Public right of way
- Coast to Coast Walk
- Permitted footpath
- Path on Access Land

- Limekilns beside old limestone quarry

Images

- One of the two limekilns, with the old limestone quarry beyond
- A fossil-rich layer in limestone beds close to the footpath
- A Carboniferous sea full of animals now preserved as fossils



Quaternary (a series of glaciations and warmer intervals, up to present day)

In this geological timeline the coloured intervals indicate periods represented by rocks and features at this site



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Cumbria Biodiversity Data Centre

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Cumbria GeoConservation

Cumbria GeoConservation Group (CGC) is a voluntary geological conservation group working to record and look after important geological sites. Currently there are about 280 recorded sites all of which have been evaluated by our members. Site details are logged with Cumbria Biodiversity Data Centre (CBDC) and are relayed to Cumbria County Council and planning authorities. CGC operates as a special interest group of [Cumbria Wildlife Trust](#).

Read more [about us](#) and feel free to [get in touch](#) if you have any questions. See our Facebook page [here](#).

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