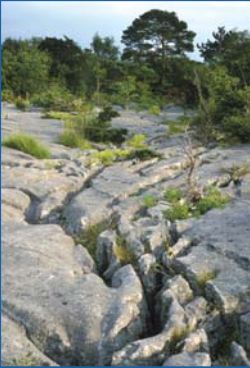




Clints & Grykes

The Limestone Heritage of the Arnside/Silverdale Area of Outstanding Natural Beauty



This is a pleasant circular self-guided walk starting from the Silverdale Railway Station. The walk is approximately 10km along paths, tracks and occasionally rough terrain.

It is advisable to take food and drink. Wear strong and comfortable footwear and take waterproofing clothing. Take care underfoot.

Follow the Countryside Code: Protect plants and animals, leave gates and property as you find them and take your litter home.



NO dogs on this stretch of route

Gait Barrows National Nature Reserve

Trowbarrow Local Nature Reserve

Cringlebarrow Wood

Deepdale Pond

Hawes Water

Leighton Moss Nature Reserve

Station

Moss House Farm

Leighton Hall

Leighton Park

Challan Hall Allotment

Yealand Hall Allotment

Thrang Moss

Waterslack

Yealand Storrs

Red Bridge Farm

Brackenthwaite

Thrang End Wood

Bowk Stone

Thrang End Farm

Challan Hall

Thrang Coppice

Far Waterslack

Thrang Moss

Osscliffe Hill

BS

Waterslack Springs

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1 Silverdale Station (rail & bus stop)

As you leave the station turn left along the road. After 150m turn left into Storrs Lane. To your right is RSPB Leighton Moss Nature Reserve visitor centre.

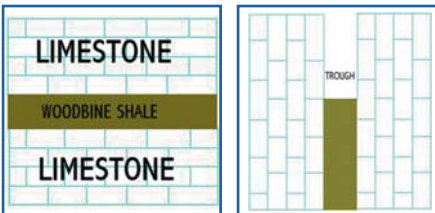
50m past the visitor centre go through a field gate on your right and follow the path that runs parallel with the road.

At the end of the path turn right, past the causeway entrance and 100m on your left is a footpath sign. Follow the permissive path towards Trowbarrow Local Nature Reserve (LNR).

This route known as **'The Trough'** follows a linear gorge 5-10 metres wide, with vertical rock walls on either side.

The Carboniferous Limestone that constitutes the bedrock of the whole of the Area was formed over 300 million years ago from the calcareous skeletons of billions of creatures, shells and corals deposited at the bottom of a shallow, warm tropical sea – this part of the British Isles was then close to the equator, having since drifted north with the movement of tectonic plates. Periods of lime sediment deposition alternated with periods of mud deposition. Water containing fine grains of eroded rock flowed far out into this sea, and the particles settled to the bottom forming muds, which in the course of time became layers of mudstone or shale between the limestone strata.

Trough Formation



Shale is a softer rock and more readily weathered than limestone when it is exposed at the surface leading to the formation of the eroded notch known as The Trough.



The Trough

Running about one quarter of the way up in the Urswick Limestone, the rock unit which predominates in the south-east of the Area, is a major bed of mudstone (Woodbine Shale). It may represent around 1,000 years' worth of deposits.

At the end of the Carboniferous period, which lasted for 65 million years (between 345 and 280 million years ago), the earth's surface underwent a series of dramatic earth movements. All this movement of the earth's crustal (tectonic) plates resulted in folding, buckling and faulting of the bedding planes often being upturned vertically, as in the case of the limestone on either side of the trough.

2 Trowbarrow LNR. Passing through the John Mabson Memorial gate (designed in the shape of a climber's karabiner) you enter Trowbarrow LNR that was formerly a quarry.

Derived from two words, 'Trow' meaning 'trough' and 'barrow', the Anglo-Saxon word for hill.



John Mabson Memorial gate

The quarrying activity between 1857 and 1959 reveals a glimpse into the 300 million-year geological history of the site.

A more detailed leaflet about Trowbarrow – the history, geology, wildlife and rock climbs - is available from the AONB Office.

Exit the quarry following the track down to Moss Lane. ③

You are now walking down a slight incline following an old tramway, which transported limestone from the quarry to the limeworks. The weight of the full wagons transporting the quarried limestone by gravity down the incline would haul the empty ones back to the top.

On reaching the road turn right and carry on past the cottages for 600m until you reach a low gate across the road. You are now entering Gait Barrows National Nature Reserve (NNR). Follow the track straight on, until you reach the boardwalk. The stretch of water on your left is **Hawes Water**, ④ with Challan Hall on the far side.



About 2 million years ago the world climate cooled dramatically, heralding the start of a series of ice ages.

Intermittent milder periods (inter-glacial) resulted in torrential melt water. The action of both ice and melt water moulded much of the landscape we see today.

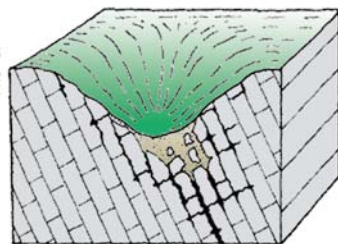
The Hawes Water basin was formed by solutional activity removing the limestone, which is both permeable and soluble.



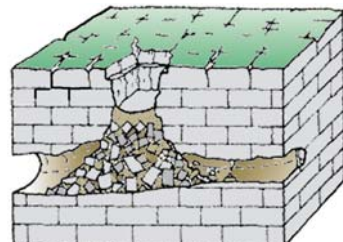
The process is accelerated by carbonic acid (formed from dissolved atmospheric carbon dioxide) and organic acids (a by-product of decaying vegetation).

The limestone is slowly 'dissolved' over millions of years, as the water picks out the vertical lines of weakness in the rock below the surface resulting in a series of underground streams and caverns. Over millions of years the cavern walls/ceilings weaken and eventually collapse. The debris is gouged out by subsequent glaciers. Sometimes several 'dolines', often referred to as 'sink-holes', down which concentrated surface waters proceed underground, can coalesce and form a 'uvala' of which Hawes Water basin is a good example.

Solution Doline



Collapsed Doline



The basin is filled with sediments, clay and chalk marl (a very pure calcareous deposit) with fen peat, derived from the non-decomposed remnants of the reed beds, on top. The edges of the lake are almost vertical cliffs, cut in the sediments. The maximum depth of the lake is about 12.5m.

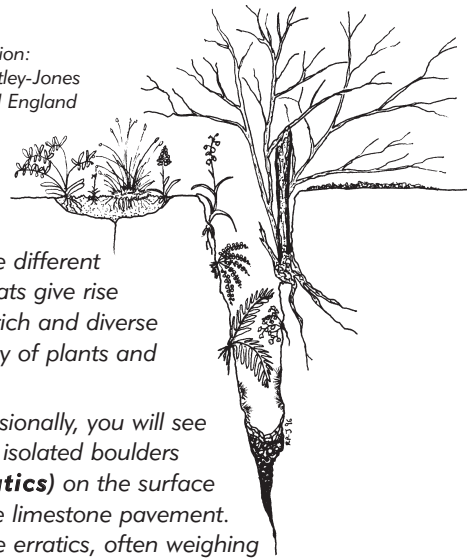
5 Follow the boardwalk to the end and at the gate turn left (turning right takes you to Yealand Hall Allotment missing out Gait Barrows where **dogs are not allowed**). Follow this path for 250m and as the track bears to the left, turn right and follow the path up a slight incline for 200m. On reaching the public road turn right. **Be careful, this is a narrow and fast stretch of road.** Follow the road over the brow of the hill and continue for a further 250m, before turning right onto a hardcore track through a low walled gateway. 6 Follow the track for 100m to a metal barrier-gate and a sign 'Welcome to Gait Barrows'.



Gait Barrows NNR

Gait Barrows NNR is the best example of lowland limestone pavement in Britain. During the last ice age much of northern Britain lay beneath a vast ice sheet which scoured the land back to the bare rock. The last glacial ice sheets retreated about 12,000 years ago to expose the underlying and gently rounded limestone hills. The most characteristic surface features of limestone pavement are the flat blocks (**clints**) and a variety of solution features including deep fissures (**grykes**), shallow 'runnels' and pan-like 'solution cups'.

Illustration:
Rob Petley-Jones
Natural England

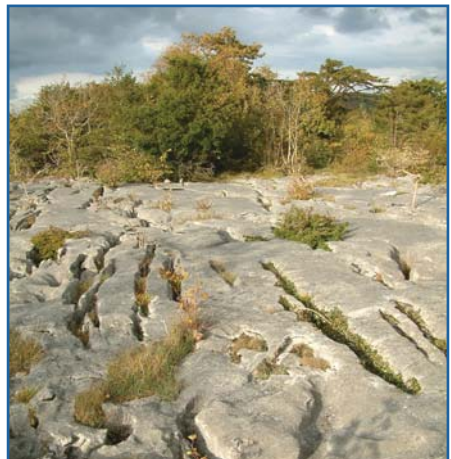


These different habitats give rise to a rich and diverse variety of plants and ferns.

Occasionally, you will see large isolated boulders (**erratics**) on the surface of the limestone pavement. These erratics, often weighing several tonnes, were transported in or on the frozen ice sheet and deposited as the glaciers slowly melted. The type of bedrock of which they are comprised indicates where they travelled from, frozen in the ice. Deep grooves (**striations**) gouged out by the erratics in the underlying rock indicates the directional movement of the ice sheet.



An erratic - a spectacular limestone boulder



Gait Barrows limestone pavement

Bear left and follow the track for 250m to a marker post and then turn right following the 'Limestone Trail' (white arrows). Here you have a beautiful example of limestone pavement. **7**

After a few hundred metres the trail leads down a slope to a field gate on your right.



Just into the field you will find a natural spring fed by water from the underlying limestone.

Keep to the left in the field and continue through the next gate, passing a small derelict stone hut (behind the wall) to a further gate with a squeeze stile to the left. Follow a muddy track for 150m and then bear right following the hardcore track through the gate.

8 Yealand Hall Allotment

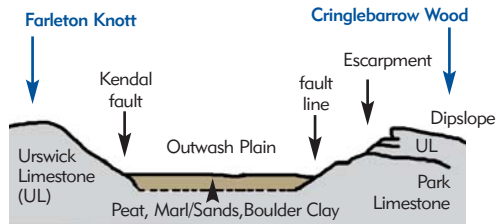
An extensive area of limestone pavement with a thin covering of soil dominated by hazel trees.

Follow the main track for 700m, until you reach a road junction. Go straight across the road towards **Yealand Storr**s. Follow the road for 300m and as you pass the property 'Temple Court' take the public footpath on the right towards '**Cringlebarrow Wood**'. **9**

On the left you will see a small enclosure 'Yealand Pound' where, in the past, stray cattle and sheep were kept until their owners recovered them. It is also possible that there was originally a spring here and this was a watering hole.

Follow the path through an avenue of conifer trees and continue on the track up the hill and through the wood. **10** These rock outcrops are Limestone '**Escarments**'.

They were formed over a period of time between 280 and 65 million years ago, when tectonic plate movement created this fault defined escarpment as a result of a line of weakness in the bed rock.



*Looking down into the M6 corridor envisage the Lake District glacial melt waters flowing into this '**outwash plain**' and out to Morecambe Bay. Beyond lie the limestone hills of Farleton Knott, Hutton Roof & Dalton Crags.*

The area around Hale Moss was once a shallow lake with water worn 'wave undercut' limestone on its edges as found along the road between Thrang End and Hale.

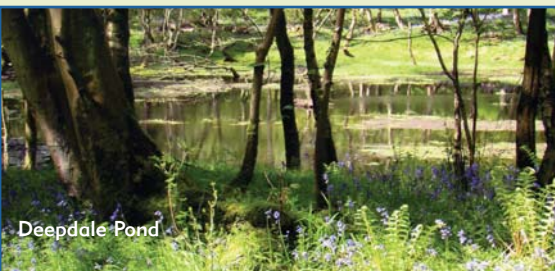
*Further north, around Sedgwick and down to Borwick, glacial '**till**' comprising clay, sand and gravel transported in the ice sheets has been deposited to form streamlined hillocks known as '**drumlins**' (often referred to as a 'basket of eggs' in appearance).*



Beetham Hall with drumlins in the background

On reaching the field, turn right by the gate. Follow the fence round the edge of the field, then up the small limestone cliffs (escarpment), turning left at a small junction and continue through the woodland. At the second finger post follow the sign towards '**Deepdale**'. After climbing the stone steps, go through the gate in the wall.

Below you, resting in an almost natural amphitheatre is a glistening jewel of a pond. In the mid-19th century it was known as the 'Lily Pond'.



The pond sits in the bottom of a deep depression in the limestone, formed by the collapse of a cavern roof in the water-worn cave systems that underlie the AONB. Such depressions are called '**dolines**'. These ubiquitous features are more colloquially known as '**sink-holes**' and characteristically pepper the landscape in all areas of limestone ('**karst**') scenery. Massive underground erosion takes place as the limestone dissolves in the flow of subterranean water, which exploits the fracture and fissures of the rock, thus creating the cave systems so beloved of pot-holers.

In the summer months the pond is frequently dry and in danger of vanishing for good as the processes of silting and soil formation take over the aquatic habitat.

Descend steadily down to the pond and bearing left continue to the main track. Turn left and follow the track to the fields.

Throughout the woodland the tree roots cling to the limestone pavement taking advantage of the natural grykes.



Follow the track across the fields towards **Leighton Hall**.

The historic home of the world-renowned Gillow furniture making family. The earliest records of Leighton Hall go back 760 years to 1246, when it is known that Adam D'Avranches had a fortified manor here, probably due to the existence of a natural spring - St Catherine's Well. Since then there have been 26 owners of the property and only twice has the ownership passed by sale. Even now, the current owner is a descendant of that first recorded resident.

Little remains of the earlier buildings for in 1715 the house was sacked and burned by Government troops. In 1763 the house was rebuilt as a classical Georgian house and in 1822 the Gothic façade was superimposed on this earlier building.

As a small child, the current owner remembers Deepdale pond being referred to as an extinct volcano!

After the White Lund munitions explosion of 1917 in Morecambe, the Hall's water supply from the spring became unreliable (perhaps because of a 'new fissure' in the limestone).

13 Upon reaching the tarmac drive turn right and continue downhill for 400m to Grisedale Farm. Continue past the farm through the gates to the reed beds of **Leighton Moss**.

After the last ice age, the Leighton Moss valley floor, known as a '*polje*', would have been lower and would have experienced periodic flooding of the sea depositing a layer of impervious clay over the limestone valley floor. At the same time, water flowing into the valley from the surrounding land was unable to drain away and a large area of marsh developed similar to salt marsh and mudflats.

The gradual rise of the land since the last ice age and the intervention of man have produced the landscape you see today. Perhaps the most dramatic change to

Leighton Moss occurred in 1830.

A substantial embankment (1km in length) was constructed across the valley from the foot of Heald Brow to the base of Warton Crag. The Gillow family of Leighton Hall installed

an engine with a paddle wheel pump near Crag Foot.

This pump drained water from behind the embankment to provide land for growing crops.



Marsh Harrier
Photo: David Mower

Whilst the pump was in operation, the soil proved to be exceptionally fertile and large quantities of crops were produced. The valley earned the title, 'Golden Vale'. The tall chimney of Crag Foot is the only surviving landmark. The pump became redundant in 1917 because of difficulties in finding fuel supplies. In the past 2 years the moss has undergone dredging work of a different nature to deepen the lagoons and channels to benefit wildlife, in particular the bittern.



Crag Foot Chimney



Reed Bunting
Photo: Mike Richards
rspsb-images.com



Bittern © RSPB

14 After 800m 'the causeway' joins the road once again. Bear left and head back towards RSPB visitor centre and the railway station.

Supported by the Heritage Lottery Fund



This leaflet has been produced by the:
Arnsdale/Silverdale Area of Outstanding Natural Beauty
The Old Station Building, Arnsdale, Carnforth LA5 0HG
Tel: 01524 761034

email: info@arnsidesilverdaleaonb.org.uk
www.arnsidesilverdaleaonb.org.uk

