About Tarn Hows

Tarn Hows is one of the gems of the Lake District and one of the most visited places in the National Park.

Lying just north of the villages of Coniston and Hawkshead, this tranquil lake is nestled between low fells and has fantastic views of the Cumbrian Mountains.

First time visitors may be surprised to learn that Tarn Hows is not a natural feature. In the early 1800's, landowner James Garth Marshall MP constructed a small dam, resulting in three small tarns being merged into the one lake we see today. In 1930, the estate was purchased by Beatrix Potter and handed over to the National Trust shortly after.

Tarn Hows is designated as a Local Geological Site for its variety of geological exposures and outstanding landscape. It is also a Site of Special Scientific Interest (SSSI) for its unique ecology associated with the acidic soils that overlie the volcanic rocks, and with the calcareous soils that overlie the lime rich rocks (calcareous siltstones) of the Dent Group.

Hammering of the rocks is strictly prohibited.

Wetherlam forming the western backdrop to Tarn Hows.

About the trail

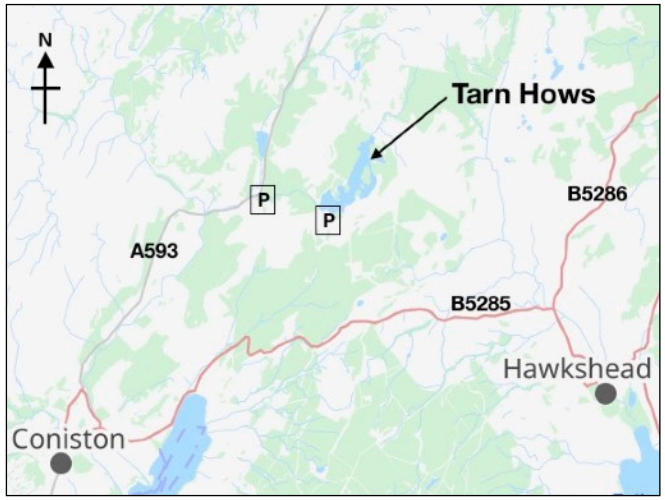
Walking length / time: 3.1 Km (1.9 miles) / 1.5 to 2 hours (allowing time for stops), following a circular route, in a clockwise direction around the lake.

Start Location: Tarn Hows is easily reached by car, bicycle or on foot. The start of the trail is near to the National Trust car park at SD 326 995. Walkers can also approach the lake from a second NT car park just off the A593 (SD 321 998) and walk up the steep path, following the stream with waterfalls to the lake.

Terrain: Two thirds of the trail is on the gently undulating well surfaced path around the lake's perimeter. The remainder follows footpaths onto the higher fell east of the lake which is steep and rough in places. The overall ascent is 110m.

If the steeper sections of this route are too much, why not follow our other guide that just takes in the perimeter footpath around the lake entitled, 'Tarn Hows - A Geology and Landscape Trail - *suitable for wheelchair users*'.

OS map: OL 7 (1:25,000)
British Geological Survey map: No. 38 (1:50,000)



Written by Carolina Goodship and members of Cumbria GeoConservation, with support from the National Trust and Westmorland Geological Society, 2022.

www.nationaltrust.org.uk
www.cumbriageoconservation.org.uk
www.westmorlandgeolsoc.co.uk

Tarn Hows

A Geology and Landscape Trail

A circular walk around Tarn Hows taking in geological features and panoramic views

(Suitable for adults and older children)

National Trust

Cumbria GeoConservation

Westmorland Geological Society

Explosive Volcanoes

Around 450 million years ago, during a geological period known as the Ordovician, the area that is now the Lake District was dominated by large volcanoes erupting lava and vast quantities of pyroclastic material (ash and rock fragments). At that time, England was part of a small continent called Avalonia, lying south of the equator, with an ocean, called Iapetus, to the north of it. The volcanic activity was associated with plate tectonics and the subduction of the ocean floor under Avalonia's northern margin. A comparable event is happening in the Philippines today, where subduction is generating similar volcanoes to those that once dominated the Lake District area.

Ash plume rising from Mayon Volcano in the Philippines, 1984. It's one of the country's most active volcanoes where explosive eruptions eject vast quantities of ash and rock fragments. Photo Credit: USGS

The rocks we now see in the high fells of the central Lake District that were formed by this volcanic activity are known as the Borrowdale Volcanic Group (BVG). The BVG rocks here at Tarn Hows can be seen at Stops 1 to 4. They are formed from compressed ash and are called 'tuff'. They often contain rock fragments called 'lapilli'.

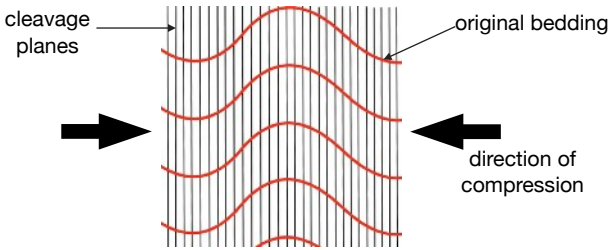
Ancient Sea

Eventually the volcanic activity ceased. Over the next 5 million years, the volcanoes were gradually eroded away and their remains were submerged by the sea. Sand, silt and mud accumulated on the sea floor. These sediments have now hardened into the rocks that we call the Windermere Supergroup (WSG), formed in the Silurian Period. Examples of these sedimentary rocks can be seen at Stops 5 to 9.

Mountain Building

By late Silurian times, the sea floor of the Iapetus Ocean had all but disappeared, causing to Avalonia collide with the continent to the north, called Laurentia. This collision occurred over many millions of years and crumpled up the Ordovician and Silurian rocks to produce a mountain chain that extended from what is now Scandinavia, though northern Britain, Ireland and the east coast of North America. Our Lake District rocks show many signs of this squeezing, folding, cracking (fractures), and movement along fracture planes (faulting).

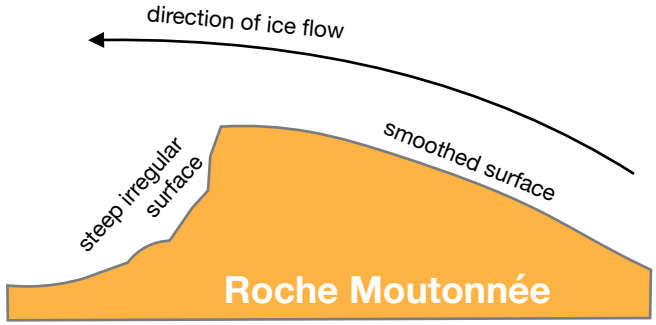
When rocks made of small particles, like ash or silt, are squeezed deep in the Earth during mountain building episodes, tiny flat minerals breakdown and recrystallise perpendicular to the direction of compression, forming lines of weakness along which the rock splits. These lines of weaknesses are known as cleavage planes and if they penetrate the rock well enough, it can be split neatly along these planes to form thin slates that can be used for roofing. Cleavage planes are often at a completely different angle to the original bedding, as shown in the diagram below. Examples of slaty cleavage can be seen at Stops 5, 7 and 9.



Glaciers

The final major event to leave its mark on this landscape was during the last Ice Age, less than one million years ago. The Lake District was buried beneath a huge ice sheet. Glaciers carved their way through the valleys leaving behind the landforms we see today.

One such landform that can be seen at Tarn Hows is a roche moutonnée. Several small roches moutonnées occur close to the path around the lake. These are outcrops of rocks whose surfaces have been smoothed by the glacier on the upstream side but are jagged on the downstream side where the glacier tore off bits of rock as it moved. Examples can be seen at Stop 2, near to the path just beyond Stop 4, and on the lakeside footpath west of Stop 9 (see photo below).



A roche moutonneé close to the lakeside path on the east side of the lake at SD 3298 9964.

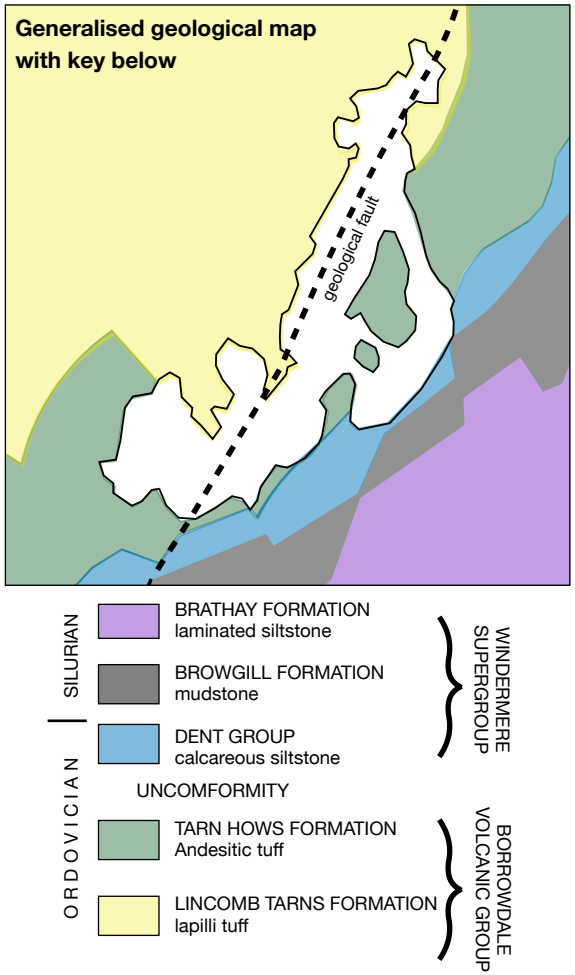
The trail starts at the southern end of the lake, by a small rocky outcrop.

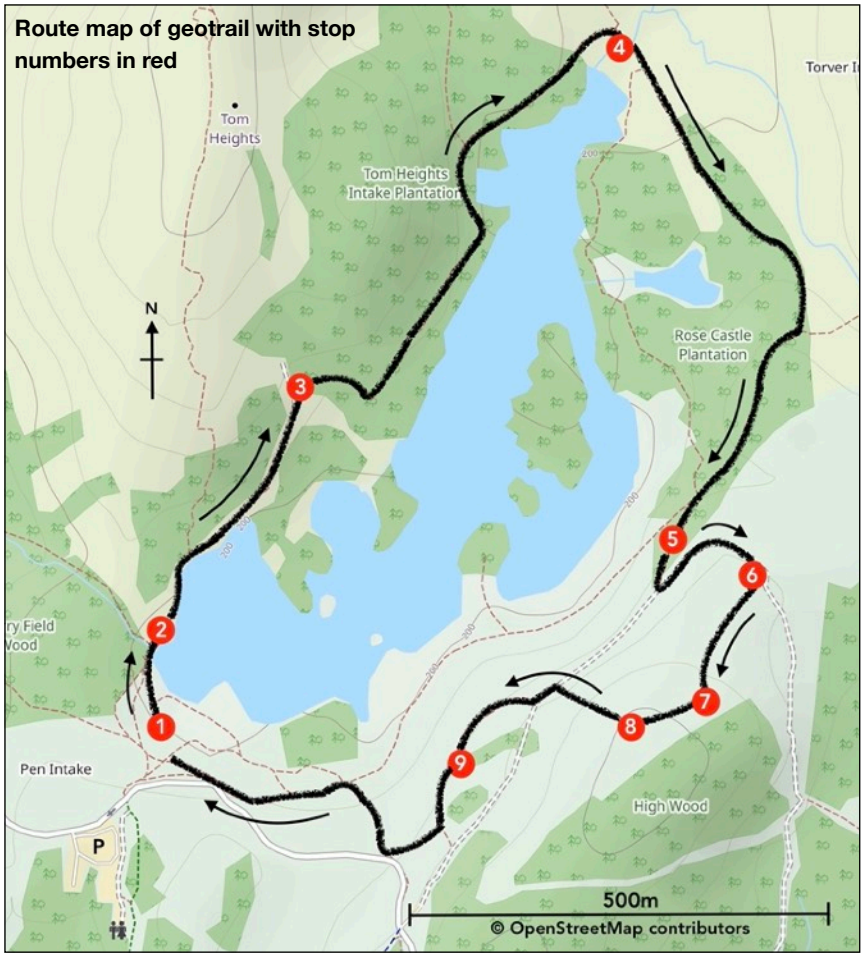
Stop 1 (SD 3273 9967) Tarn Hows Formation

Tarn Hows sits on the junction between the two major rock types described earlier. The land on the west (left) side of the lake is of hard volcanic rock from the Borrowdale Volcanic Group (BVG). On the east (right) side of the lake, the landscape is formed of softer sedimentary rock from the Windermere Supergroup (WSG).

The BVG outcrop close to you (photo below) is composed of hardened volcanic ash (tuff). Notice the fractures, many of which are infilled with white mineral quartz. These were formed under intense pressure deep within the Earth during the mountain building event. On the east side of the outcrop, is a smooth surface with parallel striations. These are called slickensides and they are lines of friction where fractured rock has moved along a fault plane.

Walk down to the lake and pick up the footpath along the shore. Head west, in a clockwise direction. Go through the gate and cross the dam.





Stop 2 (SD 3271 9978) Tarn Hows Formation

Just beyond the dam, outcrops on either side of the path show some of the variety of BVG rocks in the Tarn Hows Formation. On the left is a small roche moutonnée, shaped by the action of a glacier. The parallel grooves on the surface are made by fragments of rocks in the base of the glacier being dragged along over the outcrop. The lines can be used to indicate the direction in which the glacier moved. The rock itself is dark grey-green and formed by the settling of a pyroclastic flow, a dense mass of very hot ash and rock fragments ejected from a volcano.

On the opposite side of the path, close to the lake shore, is a very different rock type. It is formed of coarse grained rock weathered to an orange-brown colour. It is composed of ash and rock fragments that fell onto land during a volcanic eruption.

Outcrop of BVG ash fall deposit at Stop 2.

Stop 3 (NY 3289 0008) Lincomb Tarns Formation

This lighter coloured rock has a mixture of lots of differently sized rock fragments (called lapilli), and ash. It also originates from a pyroclastic flow that surged across the landscape, eventually settling and welding into this rock type. A similar type of eruption from Mt Vesuvius, southern Italy, in AD79 buried the towns of Pompeii and Herculaneum. As you walk on to Stop 4, look out for small outcrops of similar rock type close to the path.

Outcrop of lighter coloured BVG at Stop 3.

Stop 4 (NY 3327 0048) Fault Line

At the head of the lake is an outcrop of BVG rock with several white quartz veins. You are very close to the line of a major fault (as shown on the geological map) that extends the full length of the valley and beyond the southern end of the lake, close to Stop 1. During an earthquake (probably during the mountain building event), the BVG rock fractured and the rock east of the fault slipped down. The fault forms a line of weakness along which surface water has eroded the land to form a valley.

Continue along the path around the lake. At an obvious crossroad turn left through the gate, signposted 'Hawkshead'. Follow this path for about 100m uphill.

Stop 5 (SD 3330 9985) Browgill Formation

In the footpath here you will see the jagged edges of rock that belongs to the Windermere Supergroup (WSG). This rock was originally mud deposited at the bottom of an ancient sea. It has been squeezed and folded, developing a slaty cleavage, which forms the sharp edges. It is around 5 million years younger than the volcanic BVG rocks seen in Stops 1 to 4.

Continue a short distance up the hill until you meet another footpath. Turn left and follow the signposted footpath to 'Rose Castle'.

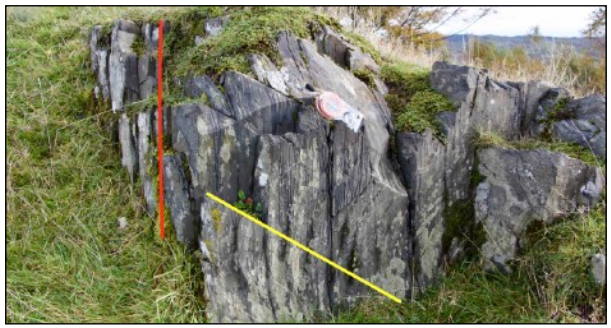
Stop 6 (SD 3343 9984) Rose Castle

This beautiful nineteenth century cottage is owned by the National Trust and used for holiday accommodation. The house has many fine architectural features. Its stone walls are made from the BVG rock and the roof is from Brathay slate which you will see in Stop 7.

Immediately after the cottage, turn right and head up the grassy hill. The path may be indistinct but make for the brow of the hill and cross the remains of a dry stone wall.

Stop 7 (SD 3336 9971) Brathay Formation

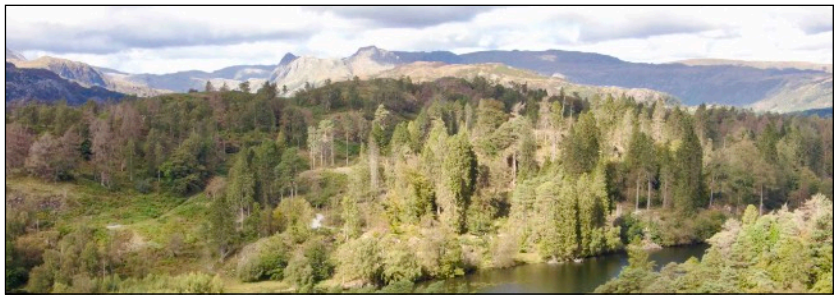
Near the top of the hill are three small disused quarries. It is likely that the slate extracted from these quarries was used to build the nearby dry stone walls and the roof of Rose Castle. The quarry faces show a dark grey rock (a siltstone) with grains too small to see with the naked eye. If you look carefully, you can see the original bedding (lamination), each layer having slightly different sized grains, and so being slightly lighter or darker than those above and below. The bedding dips into the hillside to the SE (*yellow line on photo*). More obvious is the cleavage, which is vertical here (*red line on photo*).



Head west to the crest of the hill and admire the 360° panoramic view.

Stop 8 (SD 3324 9968) View Point

To the west and north are the high fells of the Lake District, composed of rocks of the Borrowdale Volcanic Group (BVG). These are the jagged remains of an ancient volcanic landscape. To the east are the gentler lowland fells of south Lakeland, formed of younger sedimentary rocks from the Windermere Supergroup (WSG). Less than one million years ago the Lake District was buried beneath a huge ice sheet. Glaciers carved their way through this landscape leaving behind the rugged peaks and deep valleys of the Cumbrian Mountains. The sedimentary rocks east of Tarn Hows were more susceptible to glacier erosion than the volcanic rocks and formed a landscape with a gentler relief.

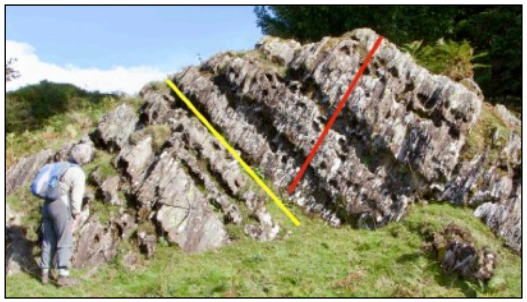


Head down towards the lake, zigzagging your way down the slope till you meet the path. Bear left and just before the footpath goes through a line of pine trees, pick up a grassy path that heads towards a knoll with a memorial boulder on top (SD 3313 9971). Continue on the path down the slope and then SW to Stop 9.

Stop 9 (SD 3306 9964) Dent Group

There are several exposures of the Dent Group rocks around Tarn Hows, but the best is found here. This is a sedimentary rock formed from mud and silt laid down on the bed of a shallow sea. Bands of dark grey mud and silt, showing well-defined cleavage, alternate with layers of light grey lime-rich nodules. Because of their lime content, the nodules have weathered away more rapidly than the surrounding sediments, producing this distinctive line of pits on the rock surface. The beds dip into the hillside (*yellow line on photo below*) while the cleavage dips towards the lake *(red line on the photo).*

This rock formed when the sea first submerged the volcanic landscape. Over time, as the sea got deeper, the sediments which eventually formed the rocks seen at Stops 5 and 7 were deposited. The sequence of rocks in chronological order is shown in the key below the geological map.



Continue walking on the footpath in a SW direction until you meet a footpath on your right that leads you back to the main path around the lake. Once you've rejoined this path, continue walking back to the car park.