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## ELC\_19: North Berwick Law

### Site information

#### Location and summary description:

Located on the southern outskirts of North Berwick, North Berwick Law is a fine example of a crag and tail landform shaped by differential glacial erosion of a phonolitic trachyte plug. It forms a distinctive and characteristic landmark in East Lothian.

#### National Grid reference:

Mid-point: [NT 55847 84235]

West end: [NT 55295 84150]

East end: [NT 56397 84386]

**Site type:** Natural landform; Natural view; Artificial quarry works

**Site ownership:** Part council, part private

**Current use:** Open country, agricultural land

**Field surveyors:** Rachael Ellen, Eileen Callaghan, Sarah Arkley and John Gordon

**Current geological designations:** None (Formerly designated as a geological SSSI but denotified)

**Date visited:** 25th April, 20th Aug, 4th October 2014

**Other designations:** SSSI for Lowland calcareous grassland

### Site map

(Figure 24) North Berwick Law Location Map. The site boundary includes the crag and tail feature of North Berwick Law and related bedrock exposures, only the proximal part of the landform 'tail' to the east is included. The site boundary coincides in part with that of the lowland calcareous grassland SSSI.

### Site description

#### Background

The site is a prominent landmark on the southern outskirts of North Berwick (ELC\_19\_P1) and widely visible from across the region and parts of Edinburgh and Fife. The summit of the Law provides an excellent viewpoint to appreciate the geology and landscape of East Lothian. Historically, the trachyte was quarried on the south side of North Berwick Law for building stones of many of the dwellings within North Berwick.

#### Igneous rocks

North Berwick Law, the remnants of a Carboniferous volcanic plug, is composed of a medium-grained feldspathic phonolitic trachyte. The volcanic plug was probably exposed by weathering and erosion of the original volcanic structure over millions of years during pre-glacial times. The hard volcanic plug is more resistant than the adjacent Carboniferous basaltic lavas, tuffs and sedimentary rocks through which it was intruded. A disused quarry to the south of the site

provides fresh exposures of the trachyte (ELC\_19\_P2), whilst there are plenty of weathered and glacially smoothed exposures to examine adjacent to the many paths leading to the summit of the Law.

### **Quaternary deposits and landforms**

North Berwick Law rises some 120 m above the adjacent land surface. During the course of repeated Quaternary glaciations, it has been moulded by the passage of ice sheets from a westerly direction, forming a classic 'crag and tail' landform. Differential glacial erosion has enhanced the form of the 'crag', leaving a streamlined 'tail' of rock and glacial till over 1 km long on the more protected lee side to the east (ELC\_19\_P1, (ELC\_19\_P3). Outcrops of ice-moulded rock occur on the upper slopes of the Law (ELC\_19\_P4). Overdeepened depressions are present to the north and south of the Law, due to the scouring of ice diverted around the base of the crag. This is most clearly seen on the south side; the northern depression being infilled by postglacial sediment. A glacial drainage channel occurs immediately to south west of the Law.

### **Access and additional information**

The Law itself is easily accessible from North Berwick.

### **Stratigraphy and rock types**

**Age:** Carboniferous

**Formation:** Southern Scotland Dinantian Plugs and Vents Suite

**Rock type:** Phonolitic trachyte

**Age:** Carboniferous

**Formation:** Garleton Hills Volcanic Formation

**Rock type:** Basaltic tuff

### **Assessment of site: access and safety**

**Road access and parking** North Berwick Law is probably best viewed from various locations in and around North Berwick. There is a free car park on the west side of the Law. North Berwick is accessible by train from Edinburgh and it is a short walk from the station to the Law. The town also has bus links with Dunbar, Haddington and Edinburgh. The John Muir Way passes along the west side of the Law.

**Safety of access** Care is required if climbing to the summit of North Berwick Law due to the steep, rough path.

**Safety of exposure** Care should be taken if visiting the quarry, the floor of which is becoming overgrown

**Access** Access by footpath.

**Current condition** Access to, and visibility of, the overall landform and quarry exposures are good. However, the floor of the quarry is becoming overgrown by vegetation.

**Current conflicting activities** Rock climbing in the quarry may restrict access at times.

**Restricting conditions** Rock climbing in the quarry may restrict access at times.

**Nature of exposure** Disused artificial quarry works, hill with panoramic views and natural exposures.

## Assessment of site: culture, heritage & economic value

**Historic, archaeological & literary associations** An Iron Age hill fort and hut circles are present on the Law. There are also the remains of buildings that were used as lookouts in the Napoleonic Wars and the Second World War.

North Berwick Law also formed a backdrop to sketches by J.M.W. Turner of Tantallon Castle.

**Aesthetic landscape** Coastal landscape; hill

**History of earth sciences** The John Muir Way passes through the site.

**Economic geology** Red phonolite was extracted from the former quarry on the south-west side of the Law to build many of the distinctive historic buildings of North Berwick.

## Assessment of site: geoscientific merit

	Rarity	Quality	Literature/collections	Primary interest
<b>Lithostratigraphy</b>				
<b>Sedimentology</b>				
<b>Igneous/mineral/metamorphic geology</b>	Regional	Good		
<b>Structural geology</b>				
<b>Palaeontology</b>				
<b>Geomorphology</b>	Regional	Good		X

## Site geoscientific value

North Berwick Law is a good example of a crag and tail landform associated with resistant volcanic outcrops in lowland glaciated terrain. The phonolitic trachyte rock of the Law is rare in the Midland Valley of Scotland.

North Berwick Law is regionally significant for both its bedrock and geomorphological aspects. It is a particularly good example of a distinctive glacial landform that occurs commonly in the Midland Valley, and a good example of a phonolite volcanic plug.

## Assessment of site: current site usage

**Community** The Law is a popular local walk. It is managed as a Countryside Site by East Lothian Council.

**Education** The site is a good educational example of a crag and tail landform, and of a volcanic plug.

## Assessment of site: fragility and potential use of the site

**Fragility** Weathering/erosion, natural overgrowth, likelihood of development.

**Potential use** School education, on-site interpretation linking geology and archaeology interests, link to coastal geological walks and the John Muir Way.

The site could also be incorporated into existing interpretation materials, such as those provided by the Scottish Earth Science Education Forum and Lothian and Borders RIGS Group.

## Geodiversity summary

North Berwick Law is a good example of a Carboniferous volcanic plug, and an excellent example of a crag and tail landform indicative of the lowland glaciation of East Lothian. The site is easily accessible and there is good potential for improving the interpretation and educational use of the site.

## Site photos

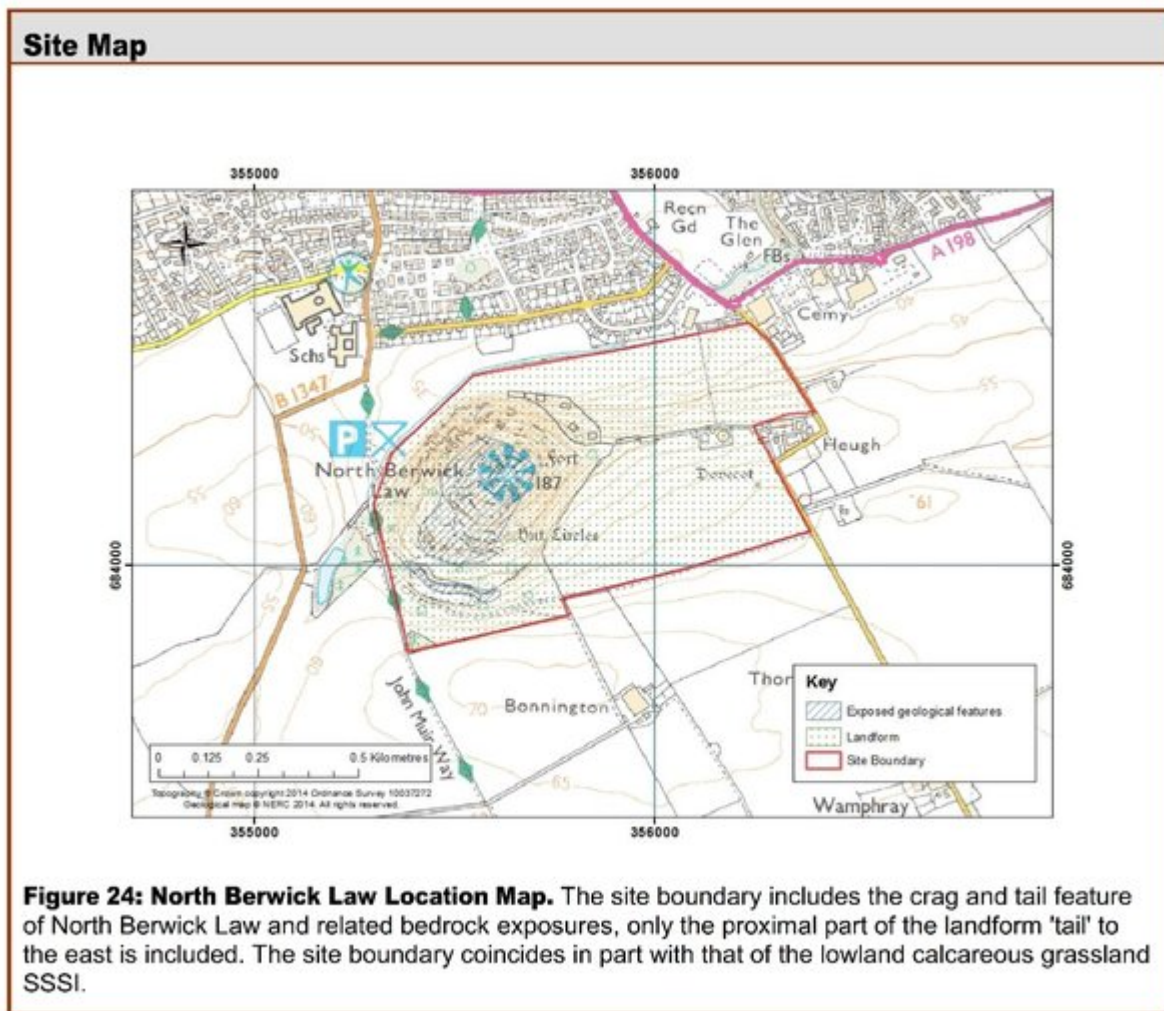
(ELC\_19\_P1) North Berwick Law crag and tail viewed from the south-east. © John Gordon.

(ELC\_19\_P2) Former quarry on the south-west side of North Berwick Law showing exposures of phonolitic trachyte. The quarry floor and faces are becoming overgrown in places. © John Gordon.

(ELC\_19\_P3) North Berwick Law crag and tail: view looking down on the 'tail' from near the summit of the Law. © John Gordon.

(ELC\_19\_P4) Ice-moulded bedrock near the summit of North Berwick Law © John Gordon.

## References



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*(ELC\_19\_P1) North Berwick Law crag and tail viewed from the south-east. © John Gordon.*



*(ELC\_19\_P2) Former quarry on the south-west side of North Berwick Law showing exposures of phonolitic trachyte. The quarry floor and faces are becoming overgrown in places. © John Gordon.*



*(ELC\_19\_P3) North Berwick Law crag and tail: view looking down on the 'tail' from near the summit of the Law. © John Gordon.*



*(ELC\_19\_P4) Ice-moulded bedrock near the summit of North Berwick Law © John Gordon.*