ELC_25: Seacliff-Scoughall Shore

Site information

Location and summary description:

The site comprises an ~3 km stretch of coast 5 km east of North Berwick with importance for the study of modern processes of shore platform development by storm wave action and weathering.

National Grid reference:

Mid-point: [NT 61506 84062]

North-west end: [NT 60255 84864]

South-east end: [NT 62399 82943]

Site type: Natural landform; Natural view

Site ownership: Partly Crown

Current use: Open country; agricultural land

Field surveyors: John Gordon

Current geological designations: Firth of Forth SSSI

Date visited: 24 October 2014

Other designations: Firth of Forth SPA and Ramsar site

Site map

(Figure 30) Seacliff-Scoughall Shore Location Map. The site boundary covers the landforms comprising shore platforms, backing cliffs, and postglacial raised beaches.

Site description

Background

The site comprises a ~3 km stretch of coast with a well-developed intertidal shore platform located on a macro-tidal coast exposed to high wave energy from the north-east (ELC_25_P1), (ELC_25_P4) and (ELC_25_P6). The platform has an intermittent backing cliff and there are good examples of postglacial raised beaches and a higher-level shore platform. The site has been the focus of a detailed study by Hall (2011).

Quaternary deposits and landforms

The intertidal shore platform has been developed by planation of Carboniferous sandstone, siltstone, calcareous mudstone and dolomitic limestone of the Ballagan Formation and associated volcanic intrusive rocks (Davies et al., 1986; Hall, 2011). The lithology and structure of the bedrock strongly influence the morphology of the platform, as elsewhere in East Lothian (e.g. Dunbar). The intertidal shore platform formation probably pre-dates the last glaciation.

A variety of blocks are scattered across the surface of the platform (ELC_25_P6). They include basalt and metamorphic glacial erratics washed out from till. In addition, there are quarried joint blocks sourced from the seaward edge of the platform by the force of the waves and collapsed blocks from the weathering and erosional undercutting of weaker sedimentary rock layers on the surface of the platform (ELC_25_P2), (ELC_25_P3) and (ELC_25_P5). The production and movement of these blocks illustrate the processes that are currently shaping the platform and highlight the importance of wave action and weathering. Wave currents during storms have moved the blocks away from their areas of production towards the land, as indicated by imbricated boulder trails (ELC_25_P2) and the dislodging of blocks off rock pedestals. In storms over the last 40–240 years, blocks as large as 9 m^3 have been quarried from the platform's seaward edge and boulders of >5 m^3 have been moved landward over extensive areas of the platform, suggesting that wave current velocities in storms have probably reached 3–4 ms^{-1} in many places (Hall, 2011).

The importance of differential weathering and erosion of weaker rocks on the surface of the platform is indicated by the presence of basalt and sandstone boulders resting on calcareous mudstone pedestals (ELC_25_P7). East of Scoughall, the backing cliff in red sandstone displays a good example of cavernous (taffoni) weathering forms (ELC_25_P8).

Inland, there are good examples of Holocene raised beaches at Seacliff and north of Scoughall, backed by a relict cliff. Between Seacliff and Scoughall a higher platform is present above the relict cliff.

Stratigraphy and rock types

Age: Carboniferous

Formation: Ballagan Formation

Rock type: Sandstone, siltstone, calcareous mudstone and dolomitic limestone

Age: Carboniferous

Formation: Southern Scotland Dinantian Plugs and Vents Suite

Rock type: Tuff and breccia

Assessment of site: access and safety

Road access and parking There is car parking at Seacliff Beach at the north of the site. Access is via a private road off the A198 east of North Berwick at Auldhame. There is a coin-operated entry barrier (£2.00 fee). There are toilets by the car park. Alternative access from the south is from Tyninghame Links car park.

Safety of access The site is accessed by walking along the beach from Seacliff at low tide.

Alternatively, it is possible to walk north along Ravensheugh Sands from Tyninghame, but the Peffer Burn must be crossed. Visitors should be aware of tide times when planning a visit to avoid the risk of being cut off by incoming tides.

Safety of exposure Great care is required as the rocky shore platform is extremely slippery and there are loose rocks.

Access The site is accessible from the car park at Seacliff.

Current condition Good.

Current conflicting activities None.

Restricting conditions The main features are located in the intertidal area and therefore covered at high tide.

Nature of exposure Intertidal shore platform, cliff exposures.

Assessment of site: culture, heritage & economic value

Historic, archaeological & literary associations Tantallon Castle is located to the west of the site. JMW Turner made several sketches of the cliffs and shore at Tantallon Castle, including 'Tantallon Castle and Bass Rock from the East' (1818) sketched from The Gegan.

Aesthetic landscape Coastal landscape with views of the Bass Rock and Tantallon Castle.

History of earth sciences Not known

Economic geology Not known

Assessment of site: geoscientific merit

	Rarity	Quality	Literature/collections	Primary interest
Lithostratigraphy				
Igneous/mineral/metamorphic geology				
Palaeontology				
Geomorphology	Regional/National	Excellent	Hall, 2011, 2012	X

Site geoscientific value

Seacliff-Scoughall Shore is a good example of a shore platform, with excellent examples of rock weathering, erosional undercutting and block movement across the platform. The core value of the site lies in illustrating the combined role of modern wave processes and weathering on the erosion of an intertidal shore platform cut across a variety of rock types of different resistance on an exposed, macro-tidal coast. Representative examples of raised beaches and a higher shore platform also add to the interest and value of the site.

Seacliff-Scoughall Shore provides a variety of excellent examples of features related to shore platform development and is of regional to national importance. The site has significance for the study of modern processes of erosional coastal development.

Assessment of site: current site usage

Community Seacliff is a popular beach. Most visitors probably do not proceed beyond the end of the beach.

Education The site has good educational and research potential. However, safety of access is an issue for educational use. The area around The Gegan is most accessible for educational use.

Assessment of site: fragility and potential use of the site

Fragility The features are mainly formed in bedrock and are generally robust. They are dynamic and will evolve through natural processes of weathering and coastal erosion. The raised beached would be sensitive to development, waste tipping and tree planting.

Potential use School education, research and on-line interpretation.

Geodiversity summary

Seacliff-Scoughall Shore is important for the study of modern processes of shore platform development by storm wave action and weathering. It has potential for both education and further research.

Site photos

(ELC_25_P1) Shore platform at The Gegan, Seacliff. © John Gordon.

(ELC_25_P2) Boulder train on the shore platform at The Gegan. © John Gordon.

(ELC_25_P3) Undercut collapsed blocks on the shore platform at The Gegan. © John Gordon.

(ELC_25_P4) Shore platform south of Great Scar. © John Gordon.

(ELC_25_P5) Undercut collapsed blocks on the shore platform south of Great Scar © John Gordon.

(ELC_25_P6) Shore platform with scattered boulders at Scoughall. © John Gordon.

(ELC_25_P7) Perched boulders (glacial erratics) on the shore platform at Scoughall © John Gordon.

(ELC_25_P8) Cavernous (taffoni) weathering in sandstone cliff east of Seacliff. © John Gordon.

References

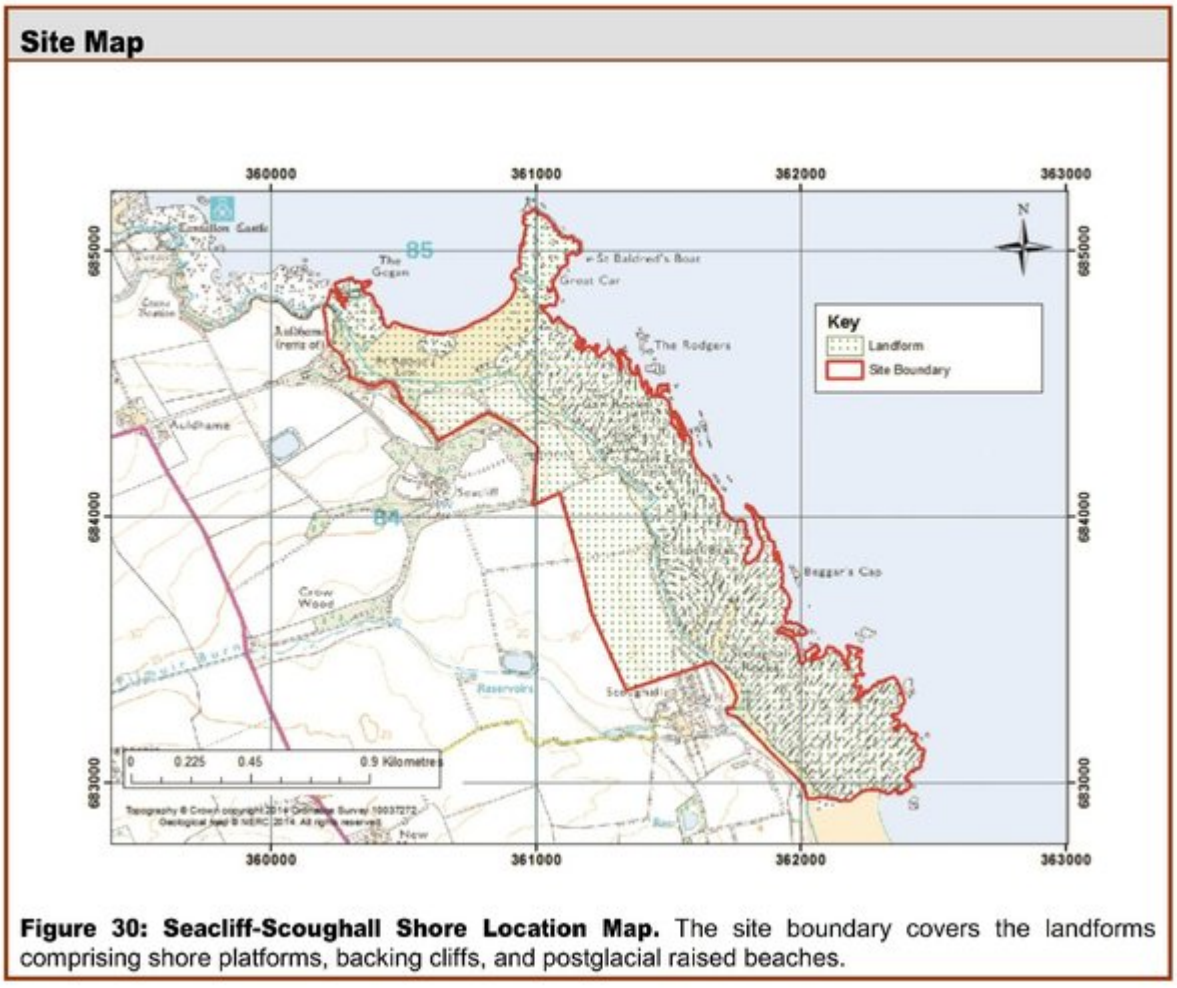

Figure 30: Seacliff-Scoughall Shore Location Map. The site boundary covers the landforms comprising shore platforms, backing cliffs, and postglacial raised beaches.

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(ELC_25_P1) Shore platform at The Gegan, Seacliff. © John Gordon.

(ELC_25_P4) Shore platform south of Great Scar. © John Gordon.

(ELC_25_P6) Shore platform with scattered boulders at Scoughall. © John Gordon.

(ELC_25_P2) Boulder train on the shore platform at The Gegan. © John Gordon.

(ELC_25_P3) Undercut collapsed blocks on the shore platform at The Gegan. © John Gordon.

(ELC_25_P5) Undercut collapsed blocks on the shore platform south of Great Scar © John Gordon.

(ELC_25_P7) Perched boulders (glacial erratics) on the shore platform at Scoughall © John Gordon.

(ELC_25_P8) Cavernous (taffoni) weathering in sandstone cliff east of Seacliff. © John Gordon.