ELC_26: Thorntonloch Coast

Site information

Location and summary description:

The site comprises a 1 km stretch of coast 1 km south-east of Thorntonloch, including the intertidal shore platform and backing cliff. Good examples of natural arches are found in the more resistant sandstone headlands in the cliffs and the shore platform displays excellent 'karst-like' weathering features in calcareous sandstone.

National Grid reference:

Mid-point: [NT 76110 73220]

North-west end: [NT 75711 73651]

South-east end: [NT 76579 72892]

Site type: Natural landform; Natural view

Site ownership: Crown?

Current use: Open country

Field surveyors: John Gordon

Current geological designations: None

Date visited: 2 October 2014

Other designations: None

Site map

(Figure 31) Thorntonloch Coast Location Map. The site boundary has been drawn to include the rock cliffs and intertidal shore platform.

Site description

Background

The site lies c. 1 km to the south-east of Thorntonloch, and c. 400 m to the north-east of Bilsdean Bridge. The site includes both the rock cliffs and the adjacent intertidal shore platform along a 1 km stretch of coast, (ELC_26_P1).

Quaternary deposits and landforms

The rock coast landforms described in this section are developed across a sequence of Carboniferous sedimentary rocks, belonging to the Ballagan Formation (sandstone, siltstone and dolomitic limestone) and the Aberlady Formation (limestone). The site has two principal interests. The first is the presence of two natural arches eroded by the sea through two sandstone headlands (ELC_26_P2). The latter stand out into the sea since they are formed of more resistant red sandstone than the adjacent bedrock. Adjacent to the southern headland is a large former blowhole, now partly collapsed (ELC_26_P3).

The second interest is the range of weathering features present in the calcareous rocks composing the shore platform. These comprise a variety of solutional forms, similar to karst weathering, and include rinnenkarren, runnels, channels, pits and pedestals (ELC_26_P4), (ELC_26_P5), (ELC_26_P6), (ELC_26_P7). The latter are particularly well developed on the seaward part of the platform (ELC_26_P8).

The weathering forms complement those developed in the limestone at Chapel Point in the nearby Barns Ness Coast SSSI.

Stratigraphy and rock types

Age: Carboniferous

Formation: Aberlady Formation

Rock type: Sandstones, siltstones, dolomitic limestones

Age: Carboniferous

Formation: Ballagan Formation

Rock type: Limestone

Assessment of site: access and safety

Road access and parking Access is from the car park at Thorntonloch approximately 1 km north of the site. Toilet facilities are available at the car park during the summer season (April- October). The John Muir Way passes along the top of the cliffs above the site.

Safety of access The site is accessed by walking along the beach from Thorntonloch at low tide. 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. The adjacent cliffs are unstable and visitors should not walk or stand underneath them, nor walk close to or under the arches.

Access The site is accessible from the public car park at Thorntonloch. The John Muir Way passes through the site along the top of the cliffs.

Current condition The cliffs and arches are clearly visible. Some of the weathering features are covered in algae, seaweed and barnacles.

Current conflicting activities None known.

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

Nature of exposure Vertical cliffs and intertidal shore platform.

Assessment of site: culture, heritage & economic value

Historic, archaeological & literary associations No known association

Aesthetic landscape Coastal landscape (notwithstanding the presence of Torness Nuclear Power Station to the north).

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

Economic geology No known association

Assessment of site: geoscientific merit

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

Site geoscientific value

Thorntonloch Coast is a very good example of rock coast landforms in sedimentary rocks, including natural arches, a former blowhole and excellent weathering forms. The site has significant potential for research on rock coast weathering processes.

Thorntonloch Coast provides a very good example of distinctive rock coast landforms formed in calcareous sedimentary rocks and is of regional significance.

Assessment of site: current site usage

Community Current usage is limited and most visitors probably do not proceed beyond the end of the sandy beach. The arches are visible from the John Muir Way which passes above the site. The larger weathering features on the seaward part of the shore platform are also visible from the footpath at low tide.

Education The site has good educational and potential research potential for its weathering features. However, safety of access is an issue for educational use.

Assessment of site: fragility and potential use of the site

Fragility The features are formed in bedrock and are generally robust. They are dynamic and will evolve through natural processes of weathering and coastal erosion.

Potential use Research, possible interpretation linked to the John Muir Way, but note safety issues.

Geodiversity summary

The site displays good examples of natural arches and an excellent suite of weathering forms developed in calcareous sedimentary rocks. The latter have potential for research on the processes of coastal weathering and erosion.

Site photos

(ELC_26_P1) Thorntonloch Coast showing northern-most red sandstone headland with natural arch (1) and shore platform with main area of weathering features (2). View looking south-east from the John Muir Way © John Gordon.

(ELC_26_P2) Natural arch and stack in sandstone, northern headland. Photo looking to the north. © John Gordon.

(ELC_26_P3) Former partly collapsed blowhole and arch, southern headland. Photo looking north. © John Gordon.

(ELC_26_P4) Solutional channels on the shore platform. © John Gordon.

(ELC_26_P5) Solutional weathering pits on intertidal platform, with beige rounded concretions in the upper part of the image (these are more resistant to weathering than the rock surrounding them). © John Gordon.

(ELC_26_P6) Runnels and solutional weathering near the seaward edge of the intertidal rock platform. © John Gordon.

(ELC_26_P7) Differential weathering under a 'caprock' calcretion in the sandstone. © John Gordon.

References

Site Map

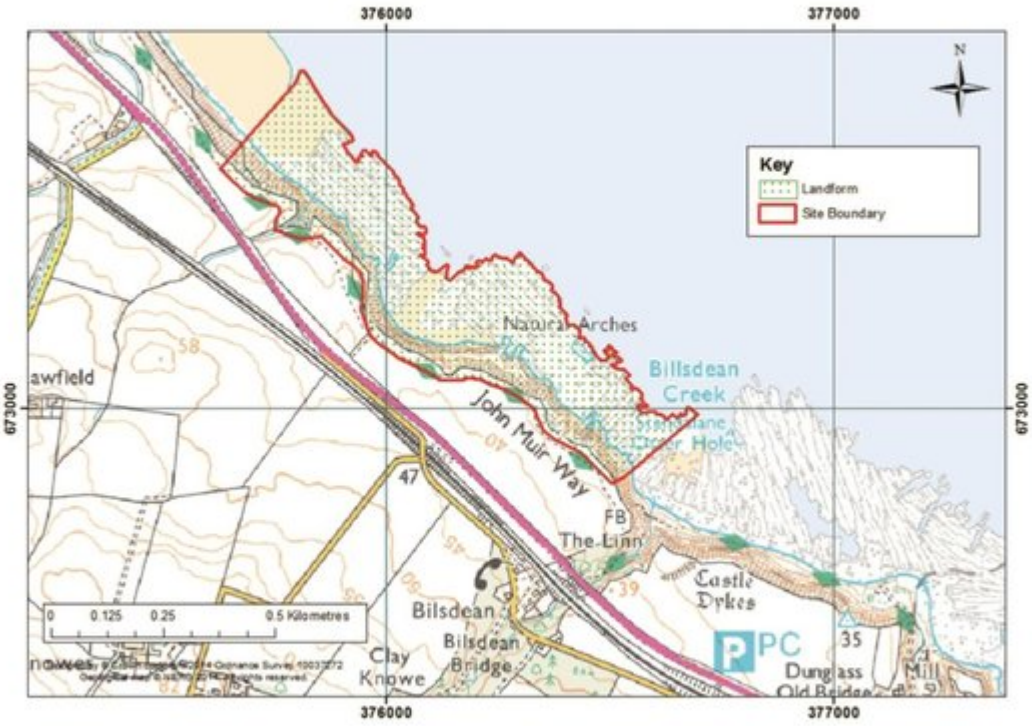

Figure 31: Thorntonloch Coast Location Map. The site boundary has been drawn to include the rock cliffs and intertidal shore platform.

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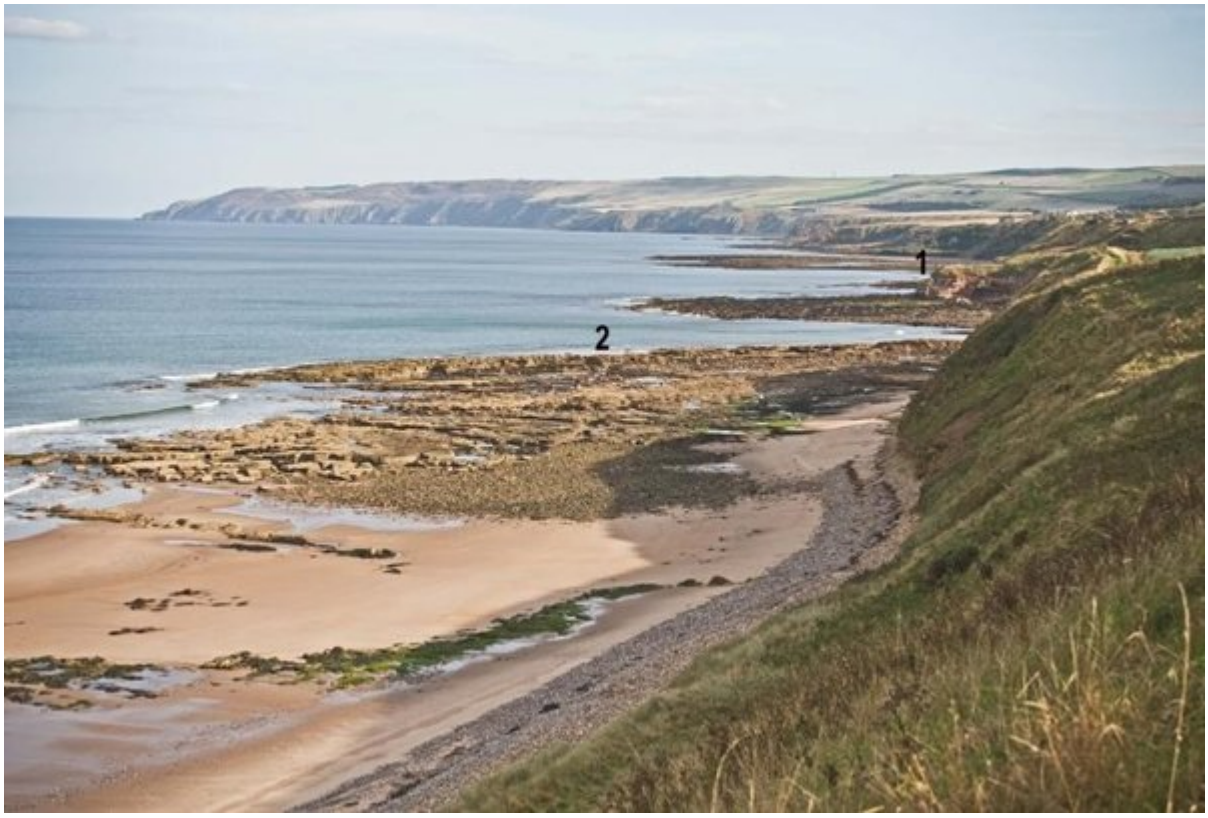
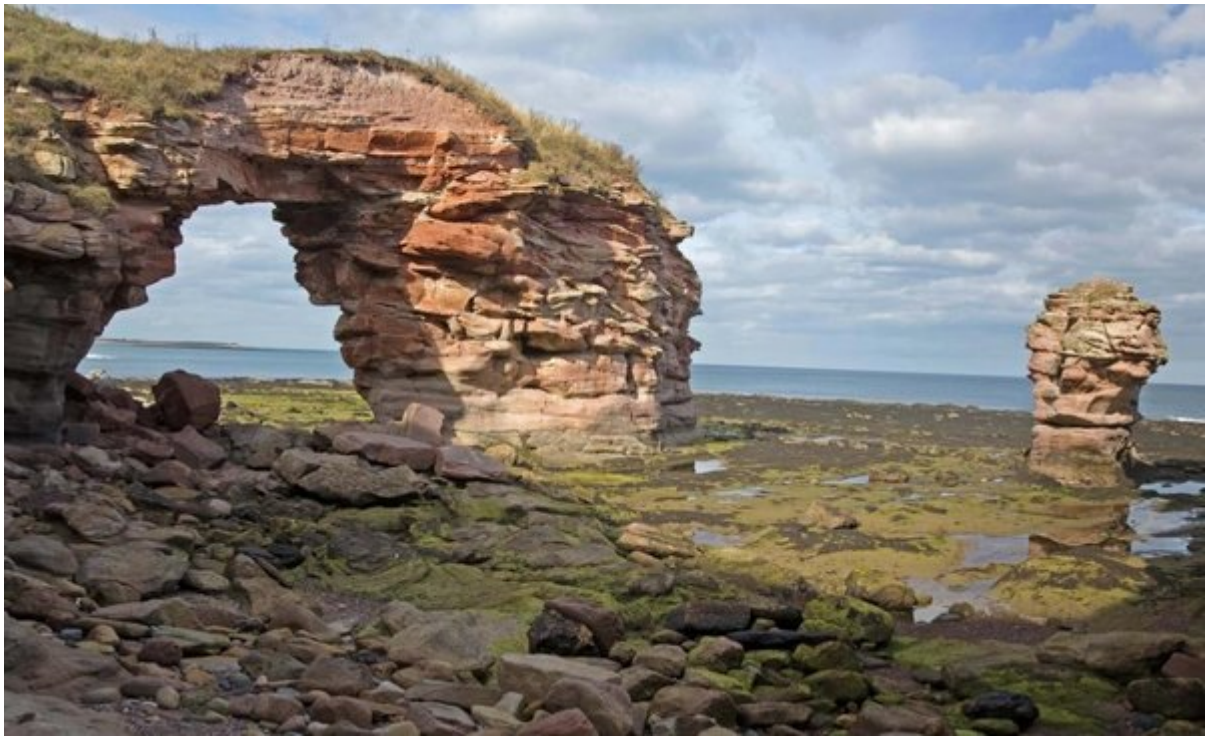
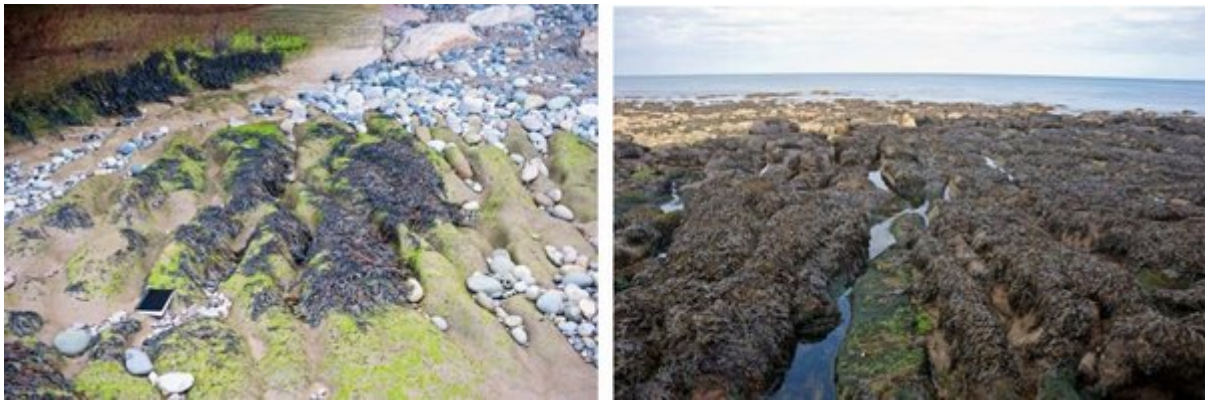


(ELC_26_P1) Thorntonloch Coast showing northern-most red sandstone headland with natural arch (1) and shore platform with main area of weathering features (2). View looking south-east from the John Muir Way © John Gordon.

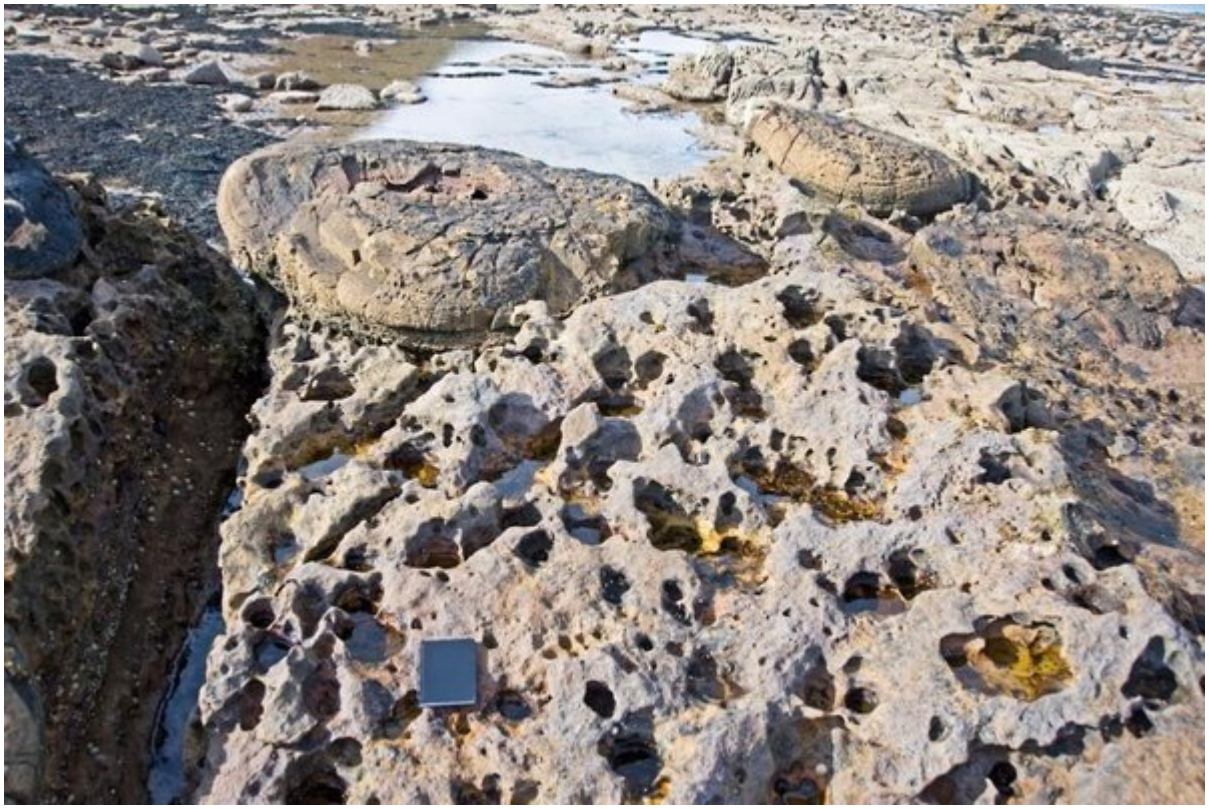


(ELC_26_P2) Natural arch and stack in sandstone, northern headland. Photo looking to the north. © John Gordon.

(ELC_26_P3) Former partly collapsed blowhole and arch, southern headland. Photo looking north. © John Gordon.

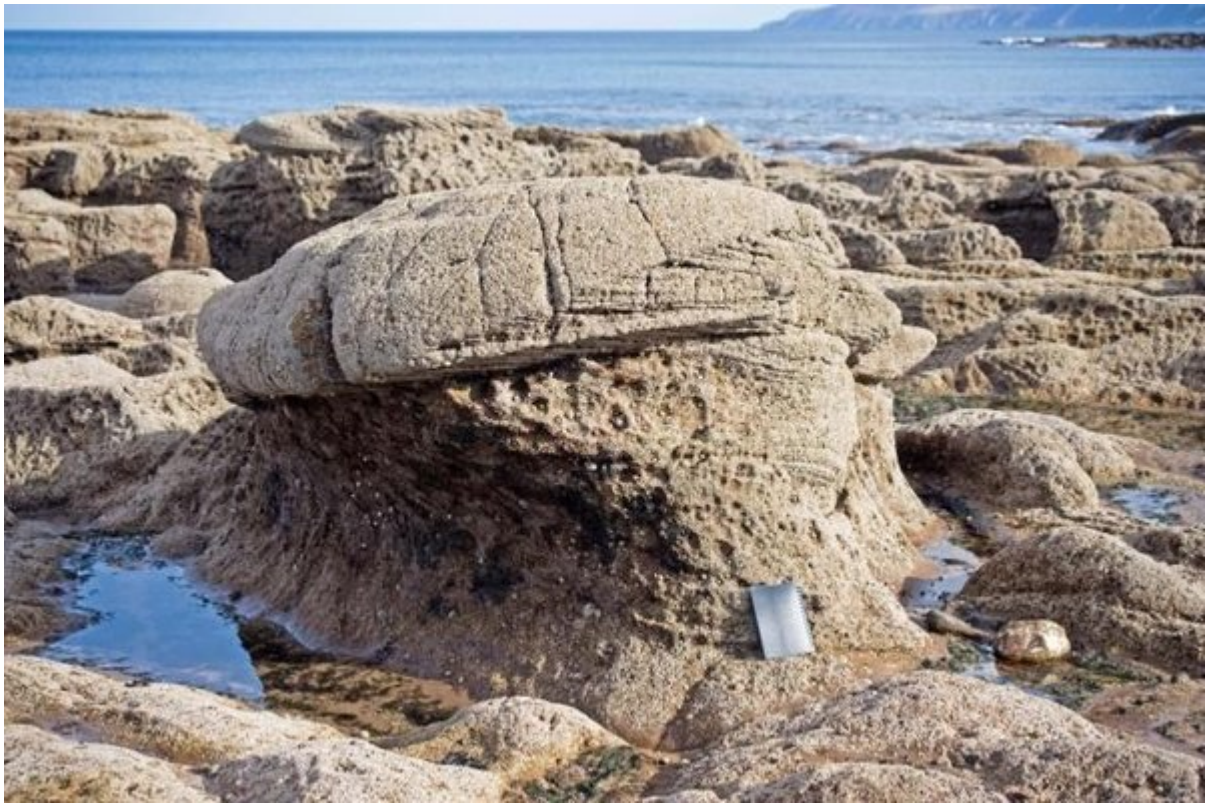


(ELC_26_P4) Solutional channels on the shore platform. © John Gordon.



(ELC_26_P5) Solutional weathering pits on intertidal platform, with beige rounded concretions in the upper part of the image (these are more resistant to weathering than the rock surrounding them). © John Gordon.

(ELC_26_P6) Runnels and solutional weathering near the seaward edge of the intertidal rock platform. © John Gordon.



(ELC_26_P7) Differential weathering under a 'caprock' calcretion in the sandstone. © John Gordon.