ELC_21: Cheese Bay

Site information

Location and summary description:

Cheese Bay is a small, 70 m wide bay, situated 2.5 km to the north-west of Dirleton. The site is well known within the geological community for its palaeontological links. Historically, a wealth of fossilised shrimp, fish and other fossils from the Carboniferous were found in situ here. Today there is little left of the fossiliferous bed in situ, due to erosion and vandalism, but fossiliferous pebbles can be found on the adjacent beach.

National Grid reference:

Mid-point: [NT 49242 85684]

Site type: Natural section/exposure; Natural landform

Site ownership: unknown

Current use: Open country

Field surveyors: The site was not surveyed in the field. Information was derived from desk study.

Current geological designations: Cheese Bay GCR (GCR ID: 2916); part of Firth of Forth SSSI

Date visited: N/A

Other designations: Firth of Forth SPA and Ramsar.

Site map

(Figure 26) Cheese Bay Location Map. The site boundary has been drawn to include the bedrock exposure containing the Shrimp Bed for which Cheese Bay is known. The adjacent intertidal zone and is also included due to its potential for containing fossiliferous mudstone pebbles, derived from the Shrimp Bed. The adjacent Yellowcraigs ELC site (ELC_6) is shown for reference (shaded grey area).

Site description

Background

Cheese Bay, so called due to a ship laden with cheese which was historically wrecked nearby, is a small bay 1 km to the west of Archerfield Golf Course. This site is a GCR site due to its palaeontological importance, as it is the type locality for *Rhadinichthys formosus* (Traquair, 1904), a Lower Carboniferous fish.

Sedimentary rocks

The rocks at Cheese Bay belong to the Gullane Formation, and comprise a sequence of cementstones, dolomites, mudstones and black shales. The rocks have been deformed and altered by an intrusive dolerite sill nearby. The black shale layers in particular yield a rich and diverse assemblage of Lower Carboniferous marine fossils, including ostracods, fish scales, pyritised plants, fish fauna, shrimp fauna (such as *Tealliocaris woodwardi*, see (ELC_21_P1) and one recorded find of the tetrapod *Casineria kiddi* (Paton et al., 1999). Up until recently, this tetrapod represented the earliest terrestrial vertebrate discovered during the Carboniferous (see (ELC_3), Gin Head). Dineley & Metcalf (1999) recorded

10 genera of fossilised fish at this site. A list of fossils recorded at this site can be found within the GCR Document (GCR ID: 2916). An interpretation of this site provided by Briggs and Clarkson (1983) suggested that during the Lower Carboniferous, the rocks of Cheese Bay were originally formed in an environment dominated by tidal flats in nearshore intertidal conditions with dried-out pools.

Access and additional information

The fossil bearing beds are only occasionally exposed at low tide, but pebbles from the adjacent beach are known to contain fossils from the site. Removal of fossil finds is discouraged. The in-situ fossil beds are fragile due to erosion, and have already been subject to destruction and vandalism due to fossil collection.

Stratigraphy and rock types

Age: Carboniferous

Formation: Gullane Formation, Strathclyde Group

Rock type: Dolomite, sandstone, siltstone and mudstone

Assessment of site: access and safety

Road access and parking Public access is best achieved by parking in the Yellowcraig Plantation car park to the east, and walking westward along the coastal path to get to Cheese Bay. It may be possible (with permission) to access the site via Archerfield Golf Course.

Safety of access The walk to the site is just under 3 km from the Yellowcraig Plantation, mostly along a coastal path. However, the site itself is only exposed at low tide, and therefore all visitors should be aware of the tide times when planning a visit.

Safety of exposure Stout footwear is recommended for coastal path and the weather forecast should be checked before visits.

Access Access along the foreshore/beach and dune area.

Current condition The rocks can be covered in barnacles and seaweed, and erosion/vandalism has removed a lot of the exposure.

Current conflicting activities None known

Restricting conditions The site is only accessible at low tide

Nature of exposure Intertidal exposure

Assessment of site: culture, heritage & economic value

Historic, archaeological & literary associations Cheese Bay is the site of a ship wreck reputed to have been carrying cheese.

Aesthetic landscape Coastal

History of earth sciences Type locality of fish fossil *Rhadinichthys formosus* (Traquair, 1904)

Economic geology No known association

Assessment of site: geoscientific merit

	Rarity	Quality	Literature/collections	Primary interest
Lithostratigraphy	Local	Moderately good		
Sedimentology	Local	Moderately good		
Igneous/mineral/metamorphic geology				
Structural geology				
Palaeontology	International	Excellent	Traquair, 1904, 1907; Clough et al., 1910; Briggs and Clarkson 1983; Dineley & Metcalf, 1999; Paton et al., 1999.	X
Geomorphology				

Site geoscientific value

The exceptional range of fossils, in particular shrimps, fish and tetrapod, found historically within this site merits a designation of ‘international’ in rarity. The site is also the type locality for *Rhadinichthys formosus* (Traquair, 1904). However, the site is only occasionally exposed at low tide, and the site has suffered vandalism in the past, rendering actual in-situ localities of fossils extremely rare. There are however pebbles of shale on the beach which are known to contain fossils from this nearby outcrop.

Cheese Bay is of international importance due to its exceptional and diverse range of fossils from the Lower Carboniferous.

Assessment of site: current site usage

Community Rarely visited, although passed regularly by golfers and coastal path walkers.

Education The site has significant importance in understanding the diverse fauna that existed during the Lower Carboniferous. The site is therefore an excellent locality for educational fieldwork and research. The geodiversity of the site could be further promoted by a geo trail linking this site with the nearby Yellowcraigs site (ELC_6).

Assessment of site: fragility and potential use of the site

Fragility Weathering/erosion, fossil collecting

Potential use On site geo-trail, school and higher education, research.

Geodiversity summary

Cheese Bay preserves a wealth of fossils, ranging from ostracods and shrimps, to fish and tetrapods and as such is extremely important in understanding Lower Carboniferous environments and how fauna existed within those environments. The site is already designated as a GCR, but is an at risk site due to fossil collection and coastal erosion.

Site photos

(ELC_21_P1) *Tealliocaris woodwardi* is a crustacean that lived during the Carboniferous. This specimen was collected at Cheese Bay, and lived during a period of fluvio-deltaic conditions with short-lived marine incursions. This fossilised shrimp has three sections: a head with eye on stalks and antennae, a thorax, and an abdomen.

[References](#)

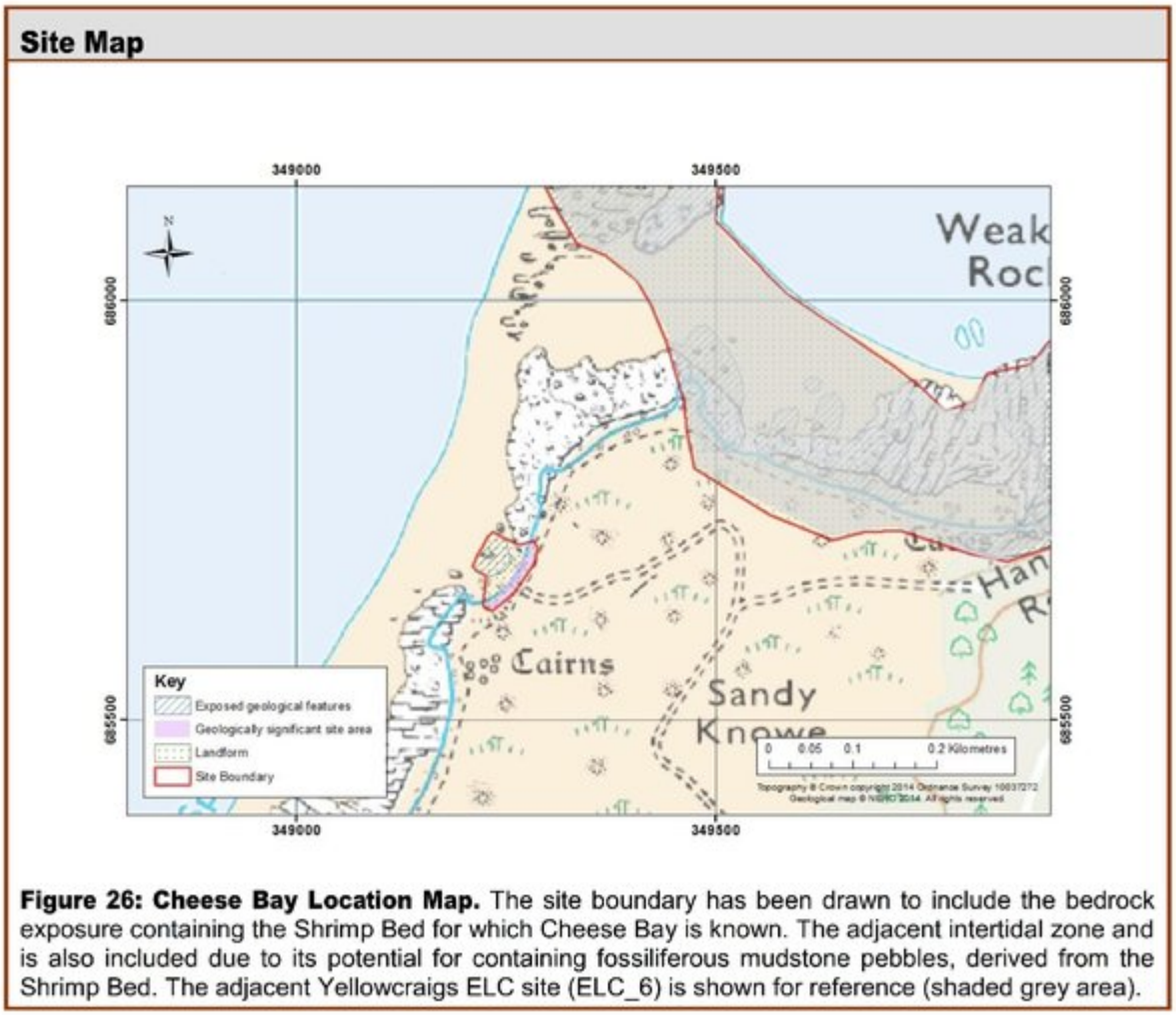

Figure 26: Cheese Bay Location Map. The site boundary has been drawn to include the bedrock exposure containing the Shrimp Bed for which Cheese Bay is known. The adjacent intertidal zone and is also included due to its potential for containing fossiliferous mudstone pebbles, derived from the Shrimp Bed. The adjacent Yellowcraigs ELC site (ELC_6) is shown for reference (shaded grey area).

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(ELC_21_P1) Tealliocaris woodwardi is a crustacean that lived during the Carboniferous. This specimen was collected at Cheese Bay, and lived during a period of fluvio-deltaic conditions with short-lived marine incursions. This fossilised shrimp has three sections: a head with eye on stalks and antennae, a thorax, and an abdomen. © BGS, NERC.