



Scottish Natural Heritage

**SOUTH THREAVE
SITE OF SPECIAL SCIENTIFIC INTEREST**

19 Wellington Square
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SITE MANAGEMENT STATEMENT

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Site code: 1457

Purpose



This is a public statement prepared by SNH for owners and occupiers of the SSSI. It outlines the reasons it is designated as an SSSI and provides guidance on how its special natural features should be conserved or enhanced. This Statement does not affect or form part of the statutory notification and does not remove the need to apply for consent for operations requiring consent.

We welcome your views on this statement.

Description of the site

The South Threave Site of Special Scientific Interest (SSSI) lies 3km north west of Dailly and is of international importance for the wide range of fossil marine creatures which occur within a sequence of sedimentary rocks that were formed during the Ordovician geological time period, around 435 million years ago. Sedimentary rocks are formed from organic material and material derived from pre-existing rocks by processes of 'denudation' (weathering, transportation and erosion).

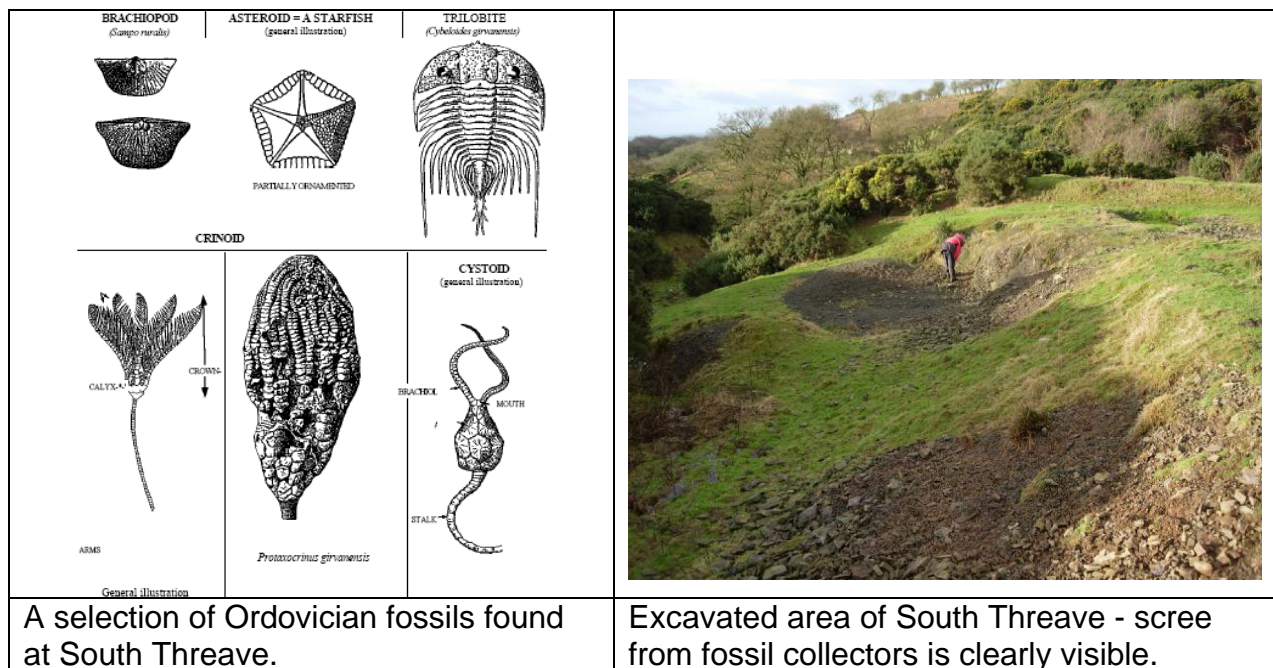
During the Ordovician, the geography of Britain was very different from present. England and Scotland were on different continents, separated by a large ocean called the Iapetus Ocean. Scotland was on the edge of a continental land mass which also included Greenland and North America. It was in the marginal ocean environment on the southern fringes of this 'supercontinent', that the sedimentary rocks were deposited. Sea creatures lived within this ancient marine environment and on death their remains were incorporated into the accumulating sediment. The rocks of the Girvan-Ballantrae area have been the focus for research because they document the progressive closure of the Iapetus Ocean. Through time the shallow sea or 'basin' separating the two continents ceased to exist, as the two continental landmasses drifted together and collided. The collision compressed, contorted and deformed the sediment.

The Ordovician rocks at South Threave occur within an area known as the 'Craighead Inlier'. An inlier is an area of older rocks surrounded by younger rocks. The rocks represent a sequence known as the 'South Threave Formation', which has three divisions called the 'Farden', 'Cliff' and 'Waterfall' members. The Farden member is the oldest division consisting of mudstones and sandstone, and at the top of the member there are beds or layers of particularly fossil rich sandstones known as the 'Lady Burn Starfish Beds'. Detailed information from the three members suggests that they were deposited in a deep marine environment; the sediments represent the deposits of ocean floor mud flows. Flows of sediment across the floor of the Iapetus Ocean were the result of instability in the Earth's crust. The mud flows swept up living and dead sea creatures from a variety of sea floor habitats and transported them into deeper water.

The site is of national and international importance for yielding the only known outcrop of the Lady Burn Starfish Beds. These sedimentary rocks have yielded a huge range of marine fossils (including a variety of primitive sea urchins) that represent several different sea floor habitats. South Threave is the 'type locality' for many fossils, i.e. the place where they were first found and described. The site is noted for containing the most diverse crinoid (sea lily) fossils of any British Ordovician age rocks. The Starfish Beds and the sedimentary rocks of the site as a whole is a vital indicator not only of the environment of the late Ordovician sea floor but also of the processes in operation at the northern margin of the Iapetus Ocean during its closure.

Unfortunately the site is considered to be in an unfavourable condition as the extent, composition and structure of the fossil-bearing rock exposures have been damaged due to fossil collecting in the past. Continued exploitation of the fossil resource will eventually lead to its complete removal, as it is of limited extent. The starfish beds are under the greatest threat. In order for the site to achieve favourable condition at the next monitoring visit the Scottish Fossil Code must be enforced; any future collection must be multi-disciplinary to avoid waste and damage and any future collection must also have approved methodologies in place (however a low level of 'recreational' collecting is considered acceptable). Future consents for agricultural based operations must not damage the feature.

Natural features of South Threave SSSI	Condition of feature (date monitored)
Caradoc – Ashgill	Unfavourable, declining (June 2000)



Past and present management

The site comprises wooded river valley and adjacent grassland, the primary use of which is farming, specifically livestock grazing however the site is also of major international importance for research and teaching purposes.

There has clearly been small scale quarrying by both amateur collectors and research workers in the vicinity of the Starfish Beds and beside the burn at the exposures of the Cliff Member. This quarrying, over many years has resulted in the removal of tonnes of rock. Recent exposures produced by the Hunterian Museum for use in scientific study of the rock sequence have been damaged by collectors.

Objectives for Management (and key factors influencing the condition of natural features)

We wish to work with the owners and occupier to protect the site and to maintain and where necessary enhance its features of special interest. SNH aims to carry out site survey, monitoring and research as appropriate to increase our knowledge and understanding of the site and its natural features and monitor the effectiveness of management.

- To maintain the extent, composition and structure of the fossil-bearing rock exposure** by ensuring protection from damaging impacts, in particular ensuring only responsible collecting is carried out in accordance with the Geological Code and the Scottish Fossil Code (SNH, 2008 or later editions).

This site yields a spectacular fossil fauna that is vulnerable to attack by collectors. Fossil collecting over the years has resulted in the removal of tonnes of rock leaving evidence of hammering and chiselling on rock faces. Unauthorised collecting can and most likely has already resulted in fossil

evidence being destroyed. Large-scale, irresponsible collecting is the principal immediate and ongoing threat to the scientific value of the site. Efforts should be made to deter irresponsible collectors. This could be achieved by erecting notice boards discouraging indiscriminate collecting and highlighting the geological significance of the site.

The implementation of a responsible collection policy following the Scottish Fossil Code is imperative. The Scottish Fossil Code provides advice on best practice in the collection, identification, conservation and storage of fossil specimens found in Scotland. The Code encourages fossil collectors to collect responsibly and to manage collections in such a way that they will be useful to future generations.

- 2. To maintain the visibility and access to the fossil-bearing rock exposures and key geological outcrops** by ensuring access routes do not become overgrown or blocked by obstacles.

For educational and research purposes, access to the site should be maintained by keeping access routes to the main rock exposures clear of impeding vegetation, fallen branches and trees.

The disposal of agricultural, domestic and other waste within the site could damage the scientific value of the site as waste material is likely to obscure the fossil outcrops and would represent a hazard to access.

Front page photograph: View of the site looking towards the main excavation at the Starfish Beds.

Date last reviewed: 13 April 2010