
2 Introduction

This report combines the results of two programmes of archaeological fieldwork. The first took place in 1992 and involved the cleaning back, sampling and recording of a midden section inside Smoo Cave prior to the erection of a protective wall (Illus 1). This remedial work was necessitated by erosion of the midden face by the river, known as the Allt Smoo, which flows down through the cave into the inlet and the sea. The project was sponsored by Caithness and Sutherland Enterprise and facilitated by Highland Council's Archaeology Service. The second, and more extensive, programme of work was funded by Historic Scotland and took place outside Smoo Cave proper in 1995, in a pair of adjoining caves in the western wall of the inlet some 80m to the north of Smoo Cave and in a fourth cave in the eastern wall (Illus 1).

2.1 Site location and description

Smoo Cave (NGR: NC 4138 6714) is situated at the head of a narrow inlet (Geodha Smoo) that runs inland for about 600m from the northern coast of Durness, Sutherland (see Illus 1). The main cave, which is of impressive dimensions (approx 35m wide by 50m deep), has been carved into the Cambrian Limestone by successive episodes of high sea level over the past several hundred thousand years. The main cavern is connected to several smaller fresh water chambers, eroded by the Allt Smoo as it cut its way to the sea.

Smoo Cave was carved along the line of a weak fault in the limestone, both by the river which today flows through it and by the sea which at times of very high tide laps the back wall of the cave. The inlet itself was created as the cave roof progressively collapsed with the deepening of the cavern over hundreds of thousands of years (Gleed-Owen 1992).

Still a popular tourist attraction on Sutherland's north coast, Smoo Cave has drawn visitors and comment since at least the 18th century, as illustrated by this early reference, dating from between 1720 and 1745 and cited in Macfarlane's *Geographical Collections*:

Betwixt the two Sangoes at the shore, there is a cave stretching pretty far under ground with a naturall [sic] vault above; Its called Smoa [sic], at the mouth of it is a harbour for big boats, on the floor of the cave there is room enough for 500 men to exercise their arms, there is a burn comes out of the earth in one side of the said cave and forms a large and deep pool there where trouts are caught

and then runs out of the pond to the sea; there is also a spring of excellent water in the other side of the said cave (Mitchell 1906, 192).

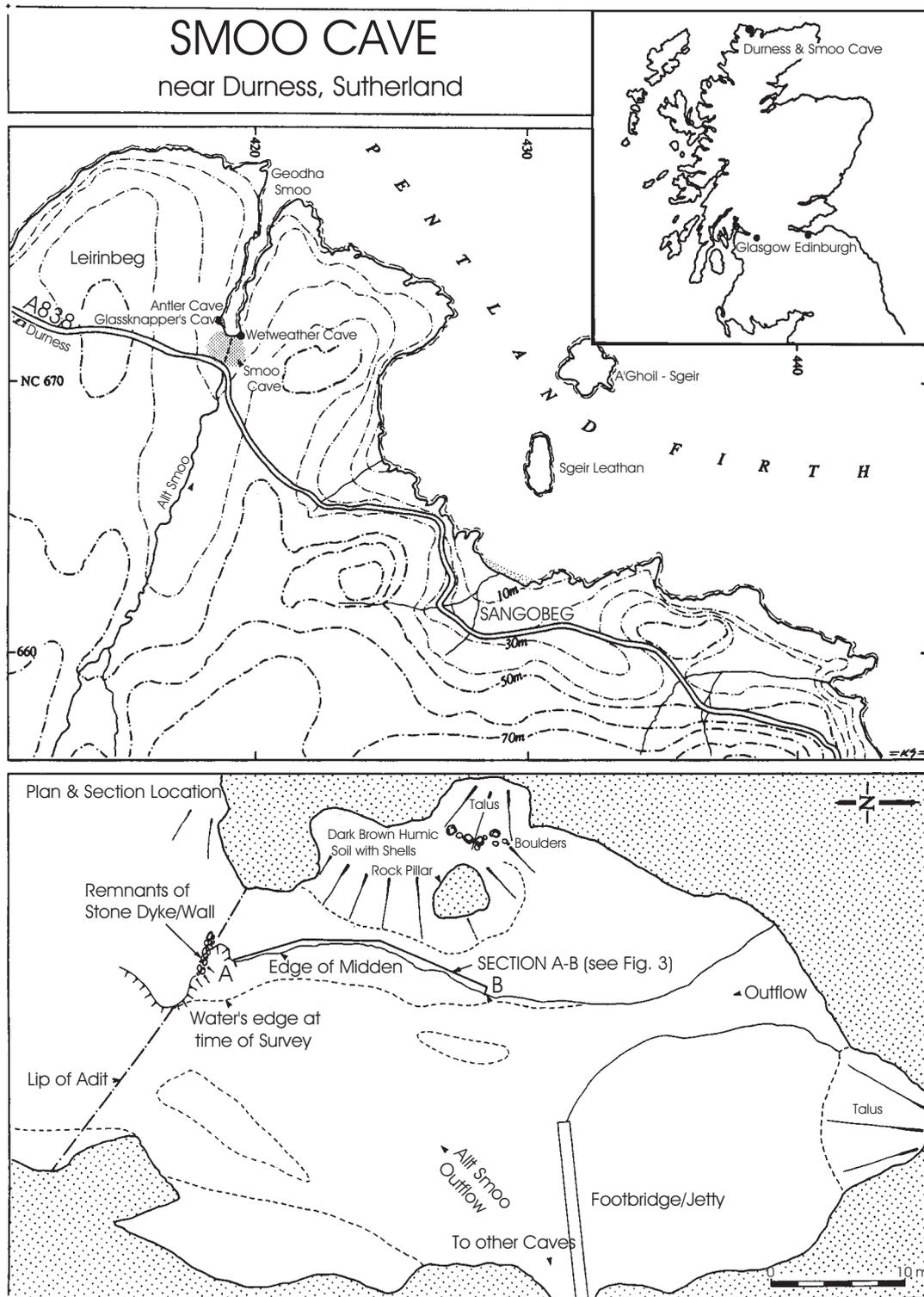
The investigation of Smoo Cave reported here, though limited in extent, represented the first systematic archaeological work to be carried out inside it. The deposits are thought to have been 'turned over' in 1904, with bone pins recovered (Johnston 1981). No evidence for this earlier disturbance was noted during the 1992 investigation. Very little was previously known about the age of the deposits, although it has been suggested (Keiller 1972) that recovered bone and stone artefacts resembled Mesolithic tools recovered from the so-called Obanian cave sites on the west coast.

As noted above, several smaller caves lead off the Geodha Smoo. The most obvious of these are two shallow caves situated side by side in the western wall of the inlet, some 80m to the north of the main cave: Glassknapper's Cave to the south and Antler Cave to the north. The cave mouths open directly onto a narrow shingle beach, which here occupies a shallow concavity in the inlet wall.

The caves that today exist outside the main cavern may, in the distant past, have been side chambers leading off the main cavern now represented by Smoo Cave. With the southward retreat of the main cavern, these side chambers were left behind as separate caves opening out from the walls of the Geodha. It is likely that further cave systems exist in the vicinity; work on one of the caves discussed in this report (Wetweather Cave) brought to light a partially collapsed passage at its rear (see below).

The formation of cave deposits is a dynamic and complex interaction between anthropogenic and biogenic agencies. The type of sediment inside a cave depends on access to external sediment carriers such as wind, water, people and animals. Endogenous sediment sources such as roof-fall (rock fragments and fine particles), re-precipitated limestones (speleothems, crusts, flowstone, stalagmites, stalactites, tufas/traverine), residual minerals left over after solution of carbonates (silicas, metal compounds and clays) and fluvial deposits. The importance of human activities in the formation of such deposits has been underlined (Butzer 1977, 79–85). External sources of sediment can be represented by aeolian materials, drainage into fissures, slope wash and colluvium, and particles deposited by the high water reaching the cave mouth.

Secondary complexities arise from post-depositional alteration (diagenesis) of deposits such as translocation of solid particles, bioturbation and chemical weathering, in addition to the larger-scale

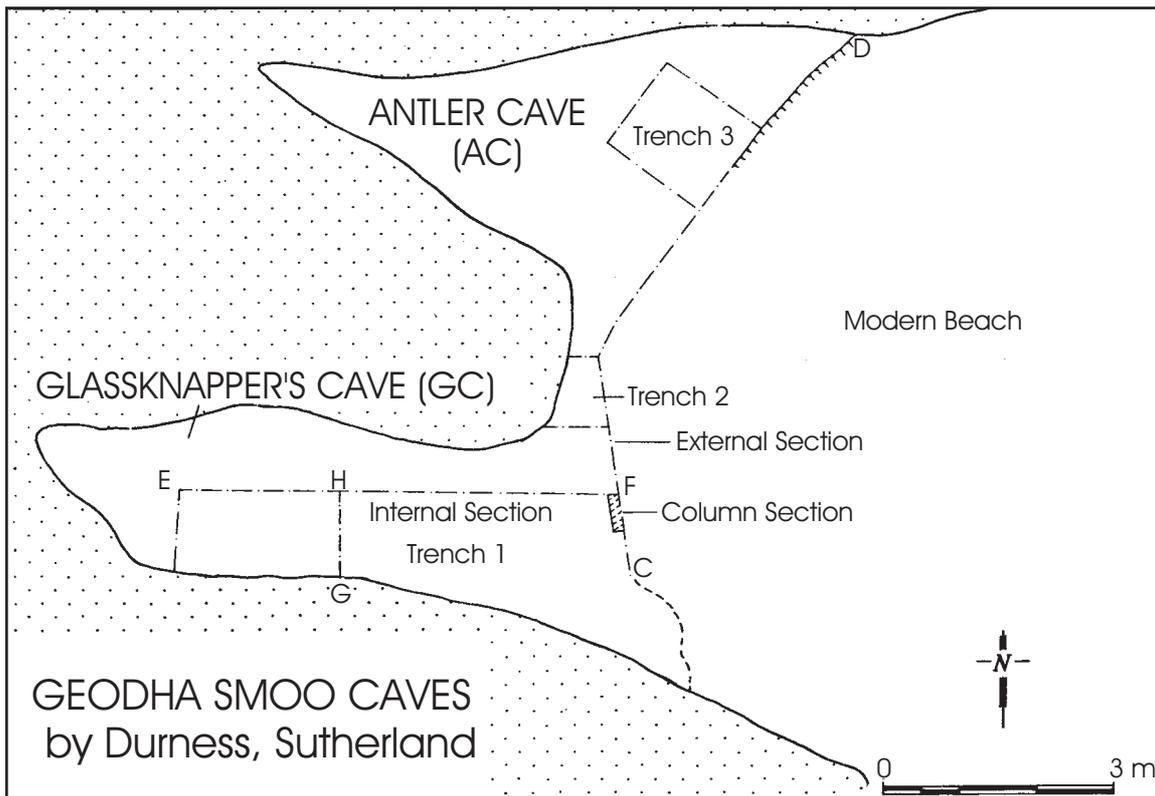


Illus 1 Site location

problems of erosion and collapse of the cave structure (Courty et al 1989). Gleed-Owen identifies the complexities in his attempt to reconstruct the marine history of Smoo Cave including the issues of, for example, small-scale fluctuations of sea level, which even over a relatively short period of time can lead to the repeated reworking of the marine sands present (Gleed-Owen 1992).

2.2 Project background

When Smoo Cave was investigated in 1992 at the behest of Highland Council, both Glassknapper's Cave and Antler Cave were observed to contain deeply stratified archaeological deposits. In order to avoid confusion with the better known cavern, long ago named Smoo Cave (from the Old Norse *smuga*,



Illus 2 Site plan of Glassknapper's Cave and Antler Cave

meaning 'rift', 'cleft' or 'cave'; Fraser 1995), the two smaller caves were given names of their own during the excavation. The presence of fragments of modern glass, which at first appeared to have been knapped like flint, in the upper deposits of the southern cave provided the inspiration for the name Glassknapper's Cave. The discovery, again early on in the excavation, of antler tines in the deposits in the northern cave earned it the title Antler Cave. Bad weather at the time of the excavation made work in both of these caves dangerous, as the trenches were deep and the sections easily weakened by rain water and melted snow draining into the caves. In order to maximize working time during these periods of wet weather, attention turned to a fourth cave on the opposite side of the inlet, where conditions were less hazardous; hence its name, Wetweather Cave.

The mouths of both Glassknapper's and Antler Caves, which open onto a shingle beach, were partially blocked by midden-rich archaeological deposits, in places over 2m deep (Illus 2). These deposits were vulnerable to erosion by breaking waves at times of high tide, with quantities of collapsed material, including animal bones, sitting on the beach at the base of the exposed archaeological deposits. These caves, like the parent cave, appear to have undergone considerable collapse through time, attested by fragments of limestone in the eroding deposits. The presence of collapsed midden material on the beach below the cave mouths attested to more recent erosion. As in Smoo Cave,

these deposits were suffering from active erosion, but here caused by wave action at times of especially high tide as opposed to the action of the river.

The fourth of the caves (Wetweather Cave) is in the eastern wall of the inlet, where it curves to the south-west to meet the entrance of Smoo Cave (Illus 1). The cave is at the top of a steep, grass-covered slope, which may itself have resulted from cave roof collapse, where it meets the present cliff face around 15m above sea level.

Wetweather Cave differs from the other caves not only in its elevated position, but also in its dimensions and appearance. Where the other caves have high ceilings and are longer than they are wide, Wetweather Cave has a relatively low ceiling (c 2.5m) and is much wider than it is deep. It is perhaps better described as an overhang or rock-shelter than a cave. However, closer inspection proved that there was much more to the Wetweather Cave than first appeared; at its eastern edge the back wall gives way to a calcified fan of talus, above which is a small, circular chamber. Further to the east, a narrow gap allows access to a long, narrow chamber filled with collapsed rock to the extent that it is not possible to stand up once inside. It is possible that this passage was at some time joined to a complex series of chambers and tunnels like those known to exist elsewhere in north-western Sutherland (Lawson 1988). The successive collapse of the cave roof has concealed any further continuation of the passage.

Wetweather Cave also differs from its neighbours in that archaeological deposits were not obvious from the outset. The floor of the cave was covered by a carpet of sheep dung and, in the absence of erosion by either river or sea, there was no exposed anthropogenic material. The site was initially investigated because of its proximity to caves known to contain archaeological deposits and also because its higher position and appearance as a sheltered overhang struck the excavation team, correctly as it happened, as a likely place for prehistoric activity.

From the outset it was obvious that the deposits in Smoo Cave and its neighbours had high archaeological potential. Shell midden deposits are well known for promoting good preservation and this factor, along with the apparent complexity of the deposits, suggested that excavation would provide a valuable insight into past lifeways in this part of coastal Scotland. This research potential aside, it was also obvious that the deposits were suffering badly from marine and riverine erosion. It was in recognition of this last factor that a programme of rescue excavation was developed, with the investigation and recording of the archaeological deposits prior to their total destruction being the highest priority.

As no formal archaeological recording or investigation of the Smoo Caves had taken place prior to the work reported here it was essential that a survey of the caves and their deposits took place before excavation commenced. All of the caves were subject to instrument survey and the apparent extent of the archaeological deposits was mapped as part of this exercise.

The first programme of work, in 1992, involved the cutting back and recording of the deposits in Smoo Cave, in advance of the revetting work which would, it was hoped, protect the deposits from further erosion. This work was carried out to a brief provided by the Highland Archaeology Service and involved minimal intervention rewarded with informative results. The protection of the Smoo deposits is also a cause of public interest, as the site is visited by thousands of people every year and is an important tourist attraction in north-western Scotland. The impact of visitors walking over the deposits as they enter the cave is a further cause of erosion, with

walkers exposing deposits on the footpath surface and the pressure exerted through their body weight pushing the deposits outward through the exposed erosion face and thus speeding up the process of section collapse. It was hoped that this additional problem would be at least temporarily circumvented through the construction of the revetment and the laying of gravel over the portion of midden surface used as a footpath.

In the case of Glassknapper's Cave and Antler Cave, it was recognized that protective measures such as those adopted in Smoo Cave were inappropriate. Here the main priority was to investigate and record the deposits prior to their total and imminent destruction through marine erosion. The main aims and objectives were set out in a brief provided by Historic Scotland. It was hoped that intensive excavation of these caves would provide a more detailed insight into the history of human use of the caves than that afforded by the limited programme of recording carried out in Smoo Cave, though this exercise did result in the recovery of an important set of data. Excavation was geared to the recovery of information on the economic function of the caves and the period over which activities took place. The excavation of deposits in the cave interiors, away from the exterior exposed face, would also allow an understanding of depositional process and patterning not possible in the more limited cutting back of the Smoo Cave section.

The investigation of the Wetweather Cave was not part of the Historic Scotland brief and is best understood as an assessment of archaeological potential of a site discovered during the survey of the other caves and their environs and carried out at times when work in these other sites was prevented by dangerous weather conditions.

More specific objectives and the methodologies adopted in order to achieve them are discussed in the relevant sections of the report.

Terminology for the chronological periods represented by the excavated remains follows that set out previously (Batey & Graham-Campbell 1998, 2): Viking and/or Norse are used interchangeably to refer to the period from the late eighth to 11th centuries, while Late Norse is understood to have begun around AD 1050.