

7 Vegetation History

The archaeological programme was supported by palaeoenvironmental studies. A deep peat basin was identified during the initial archaeological survey of the roadline at Allt Dail an Dubh-asaidh (Illus 2). A peat core was extracted from this site and analysed to provide a high-resolution record (both spatial and temporal) of the vegetation of that area. A summary of the results and full consideration of their implications for the archaeology of Arisaig is included in this report. For a more detailed consideration of the data (see Section 9 – Palynological Analysis)

7.1 Peat core from Allt Dail an Dubh-asaidh

A 6.67m peat core was extracted and analysed for pollen and charcoal at intervals of 4cm, giving a total of 160 samples. Radiocarbon dating of pollen zones throughout the core has indicated a date range from 8000 BC to the present day for the sediments. Analysis of the core at a resolution of approximately 50 years has illustrated a continuous Holocene vegetation sequence from open water prior to 8000 BC up to the present-day mix of acid heath and birch-hazel-oak woodland.

The pollen derives from both local vegetation (that is, within the small basin that the peat was accumulating) and from extra-local and regional vegetation. The pollen sequence can be divided into six zones that primarily reflect changes in the local vegetation as the original lochan gradually filled with peat (summarized in Table 4). Changes in the extra-local and regional pollen are much less clear-cut and must be isolated from the more obvious local changes in order to identify change in the wider landscape.

Within the basin, the original open-water lochan was progressively colonized by willow carr which, after an open marsh phase from 6100 BC with grasses, sedges and some fen species, was in turn

colonized by alder carr at about 4950 BC. Alder declined at about 3200 BC to give way to a ling-dominated heath; this was replaced by a bog myrtle heath about 400 BC, which persists to the present day. The open marsh phase from 6100 to 4950 BC coincides with increased charcoal concentrations. This is likely (at least in part) to be a result of the temporary widening of the woodland canopy, also reflected in increased concentrations of airborne pollen, like pine. However, the presence of large charcoal particles (>75µm), between 524 and 544cm in the core (dating roughly to 5900–5550 BC) is likely to be the product of burning close to the core site. The cause of this burning cannot be determined from the pollen core but may reflect activity by Mesolithic people in the immediate area.

In the wider landscape, the vegetation was birch-hazel-oak woodland with some pine and elm throughout the early prehistoric period. High percentages for tree pollen, alongside continued but low levels of disturbance, suggest some kind of woodland use between 3200 and 400 BC. Woodland cover is maintained until 3200 BC when it starts to decline gradually, associated with elevated levels of charcoal. Large charcoal particles (>75µm) probably reflect burning events close to the pollen core site between 236 and 256cm (roughly 1350–1520 BC). From 3200 BC there is evidence for low levels of vegetation disturbance relating to human activity with ruderal pollen types (like ribwort plantain, nettle and goosefoot) indicating disturbance, consistently recorded. The sequence is interpreted as reflecting extensive grazing impacts which, particularly from about 600 BC, maintained a regionally open vegetation with discrete pockets of woodland. After 600 BC, while the decline in woodland pollen continues, along with sustained curves for ruderal pollen types, while charcoal frequencies decline. This suggests sustained but low levels of disturbance with human activity throughout the area but with less impact

Table 4 Pollen zones, identifying main local and extra-local and regional vegetation types

Zone	Depth (cm)	Calibrated date (approx)	Local (on site) vegetation	Extra-local and regional vegetation
1F	0–176	400 BC to present day	Sedge-ling-bog myrtle heath	Birch-hazel-oak woodland
1E	176–368	3200–400 BC	Ling heath	Birch-hazel-oak woodland
1D	368–480	4950–3200 BC	Alder carr	Birch-hazel-oak woodland with elm and pine
1C	480–544	6100–4950 BC	Open marsh with sedges and grasses	Birch-hazel-oak woodland with elm and pine
1B	544–640	8000–6100 BC	Willow carr with sedges and grasses	Birch-hazel-elm woodland with pine
1A	640–base (666)	Before 8000 BC	Open water	Willow carr

from burning activity. The sustained disturbance that causes continued declines in tree pollen and an increase in open vegetation is likely to be livestock grazing.

7.2 Other evidence for vegetation history of the Arisaig area

The results from Allt Dail an Dubh-asaidh provide detailed data on only one small part of the Arisaig landscape. Fortunately, there are pollen diagrams available from four other locations in or very close to Arisaig that can be used to assess variations in landscape history across this area (Illus 2). Of the four pollen diagrams available, all of them are dated, although some are incomplete sequences. There is a complete Holocene sequence from Lochan Doilead in North Morar (Williams 1977), partial diagrams from the Mointeach Mhór and Loch nan Eala in Arisaig (Shennan *et al.* 1994; Shennan *et al.* 1995) and a later Holocene sequence from Polish, east of Borrodale (Clarke 2000). The changes in tree pollen percentages from Lochan Doilead, Allt Dail an Dubh-asaidh and Polish are summarized in Illus 20.

Williams demonstrates an elm decline at 3550 BC, marking the start of woodland decline in North Morar, which is steady and progressive from here to the top of the diagram (Williams 1977). Later, at 2150 BC, the start of continuous curves for ruderal pollen types reflects continuous, although low, levels of disturbance accompanied by more marked woodland decline. Woodland recovers at about 500 BC and fluctuates from the Iron Age to the present day, although there is an overall sustained decline. It is only at about AD 600 that heath pollen types start to increase, most notably with the start of the increase in ling (*Calluna vulgaris*) pollen. Overall, the history of gradual but progressive woodland decline at Lochan Doilead from 3550 BC is very similar to that obtained from Allt Dail an Dubh-asaidh.

Just to the south of the pollen site at Allt Dail an

Dubh-asaidh, pollen and diatom records were used to look at sea-level change in the area (Shennan *et al.* 1995). Entire pollen sequences were not analysed and most sections from Mointeach Mhór dated to 1250 BC to just after 780 BC (Shennan *et al.* 1995). This period is characterized by a sharp decline in woodland pollen at 780 BC with a slight increase in ribwort plantain, indicating levels of disturbance with grasses and ling. This, with similar evidence from Allt Dail an Dubh-asaidh, appears to reflect regional woodland decline between about 3200 and 650 BC. Pollen analyses from Loch nan Eala were also undertaken for information on sea-level changes. This core has ten stratigraphically distinct sections that were dated to between 10,500 and 7050 BC, and at *c* 7150, 5500, 2520, 2140, 1930 and 1730 BC. From about 2500 BC at this site, ruderal pollens, including ribwort plantain, are present, accompanied by lower values for woodland pollen types. The core, again, seems to reflect the wider regional decline in woodland from about 2500 BC, although interpretation of the data in terms of vegetation history is difficult given the short and separate sections analysed. This is particularly unfortunate as Loch nan Eala lies within the potential 'core' settlement area of Arisaig and could contain evidence for a different landscape history over the past 5000 years.

Further to the east, a short core from a woodland hollow has been dated and analysed (Clarke 2000) and provides a vegetation record from about 1850 BC to the present. Decline in woodland pollen is much less apparent in this core and this may reflect its location in an area of steep slopes that is wooded at present. High total tree pollen values are maintained for 2900 years from 1850 BC but the proportion of birch and oak pollen varies, with an increase in birch possibly reflecting exploitation of oak during this period. Charcoal increases from about AD 1020 to the top of the core and is likely to be reflecting increased human activity and burning. Increased grazing at the top of the sequence has also been inferred (Clarke 2000).