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# KINCRAIG POINT

*J.E. Gordon*

*OS Grid Reference: NT465998*

## Highlights

The Lateglacial and Holocene raised shorelines at Kincaig Point are notable as erosional features formed in bedrock. They form a striking sequence of landforms that contrasts with the sedimentary evidence for coastal changes recorded elsewhere in the estuaries of eastern Scotland.

## Introduction

Kincaig Point (NT 465998) is a headland on the south coast of Fife, 2.5 km west of Elie. It is notable for its geomorphology, demonstrating a series of raised shorelines (shore platforms) cut into the western flank of the headland. The interest and striking appearance of those features has long been noted (Wood, 1887; Geikie, 1901; Geikie, 1902; MacGregor, 1973) and they have also featured frequently in book illustrations (Geikie, 1902, figure 66; MacGregor, 1973, figure 18; Forsyth and Chisholm, 1977, plate 1 (frontispiece); Price, 1983, plate 4.1B). The position of the shorelines in the wider regional pattern of Lateglacial sea-level changes in eastern Scotland has been assessed by Cullingford and Smith (1966).

## Description

Although frequently described as beaches (Wood, 1887; Geikie, 1902; MacGregor, 1973) the raised shorelines at Kincaig Point are in fact erosional features (Geikie, 1901). They consist of four raised rock benches cut into the volcanic agglomerate of the headland at approximately 4 m, 11 m, 22 m and 24 m O.D. and are veneered with sand and shells (Cullingford and Smith, 1966). Also present is an intertidal shore platform. The raised shorelines at Kincaig Point are particularly prominent when viewed from the west (see illustrations in Geikie, 1902, MacGregor, 1973, Forsyth and Chisholm, 1977 and Price, 1983).

## Interpretation

Cullingford and Smith (1966) regarded the upper three raised shorelines as Lateglacial in age, the lowest as Holocene. The two highest shorelines form part of the sequence of early Lateglacial shorelines in East Fife but were excluded by Cullingford and Smith (1966) from their detailed height analyses for the area because of uncertainty regarding the relationships of shore platforms to relative sea-level heights at the time of their formation.

Andrews and Dugdale (1970) originally calculated the ages of the East Fife shorelines to be between 18,250 and 15,100 BP, but more recent information suggests that they formed between *c.* 16,000 BP and 14,000 BP (Sutherland, 1991a). This revised estimate is more consistent with evidence that the last ice sheet was at its maximum extent *c.* 18,000–17,000 BP (*cf.* Sissons, 1976b; Cullingford and Smith, 1980).

The third highest shoreline was interpreted as part of the Main Perth Shoreline. The latter is one of the most prominent raised shorelines in eastern Scotland, sloping E17°S at 0.43 m/km, and was formed after the East Fife shorelines at a time when the last ice sheet had retreated west up the Forth valley (Sissons and Smith, 1965a; Smith *et al.*, 1969; Sissons, 1976b; Cullingford, 1977). The intertidal platform may be part of the platform that is extensively developed in eastern Scotland (see Milton Ness and Dunbar), and which Dawson (1980a) has correlated with the Low Rock Platform of western Scotland (see Northern Islay and the West Coast of Jura).

Examples of raised shorelines are widespread in eastern Scotland, but Kincaig Point provides a particularly clear example of a suite of such features which has a very striking 'staircase' appearance when seen in profile. As erosional features they are exceptional among Lateglacial

and Holocene raised shorelines in eastern Scotland (Sissons, 1967a), which typically comprise beaches or estuarine terraces. The prominence of the features at Kincaig Point probably relates to the relatively weak nature of the volcanic agglomerate into which they have been cut. As clear geomorphological features developed on an exposed headland (see also Milton Ness), the shorelines at Kincaig Point complement the interest of other sites in eastern Scotland (see Western Forth Valley, Silver Moss, Dryleys and Maryton) where the emphasis is on sedimentary and geochronological evidence for relative sea-level change in estuarine environments.

## Conclusions

Kincaig Point is important for Quaternary coastal geomorphology. It is a good example of a sequence of raised shorelines eroded in bedrock following the retreat of the Late Devensian ice sheet between about 16,000–13,000 years ago: each indicating a different sea level. The shorelines have a striking landscape appearance and complement the interest of sites selected for the sedimentary evidence they provide for sea-level changes in more estuarine situations.

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