Farnley Haughs, River Tyne

[NZ 004 633]

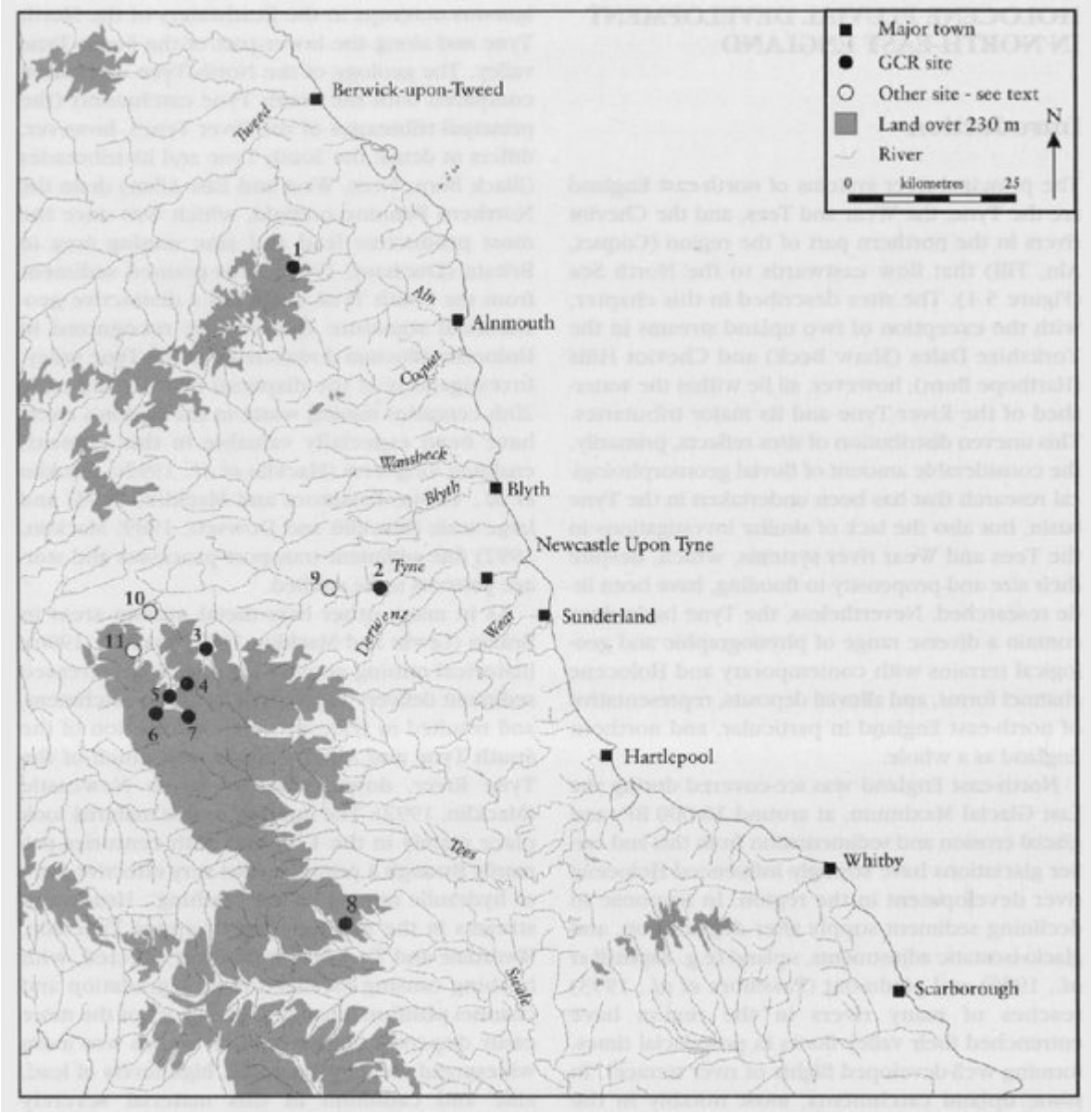
Farnley Haughs [NZ 004 633], Northumberland, in the middle Tyne valley (Figure 5.1) is the only sand and gravel pit in the Tyne basin in which Holocene age alluvial deposits are currently being worked. Farnley Haughs pit is located at the eastern end of a large alluvial basin centred on Hexham.

Excavations have exposed a 300 m long and up to 6 m high section running across the terraced Holocene valley floor, from its junction with Late Pleistocene coarse-grained alluvium on the south side of the valley, northwards to within 50 m of the present channel (Figure 5.31).

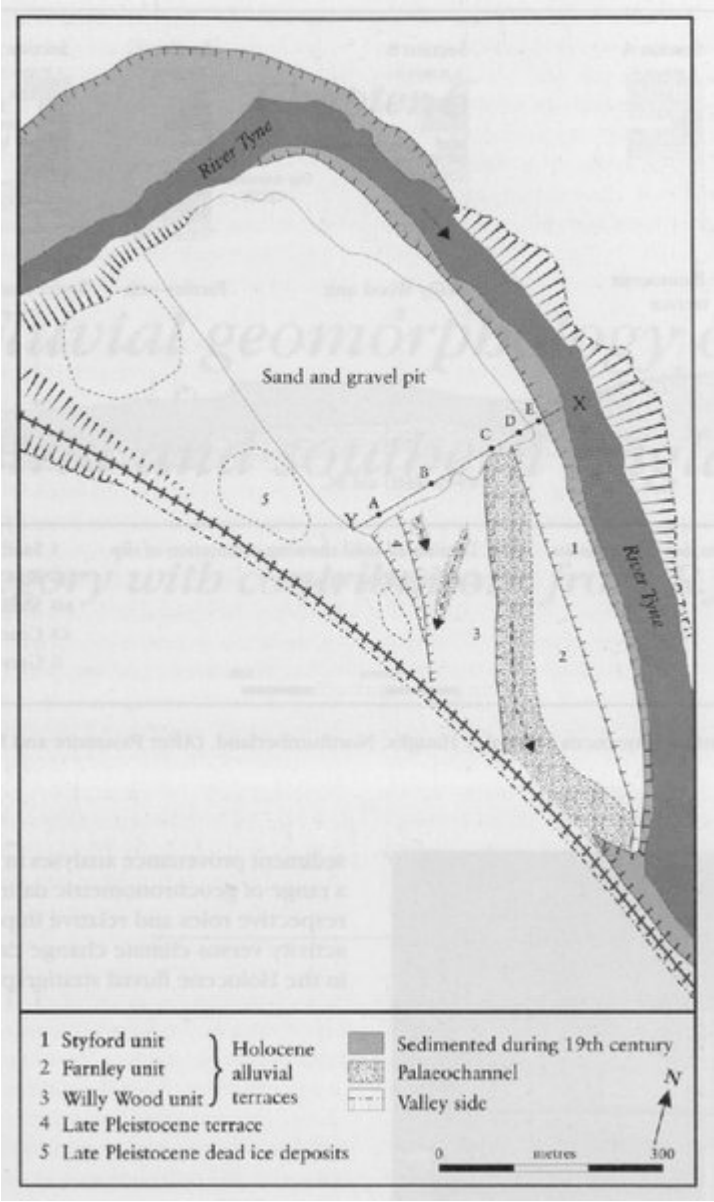
Farnley Haughs pit presently provides the most extensive and accessible exposure of Holocene river sediments in the Tyne basin, and constitutes one of the best dated Holocene alluvial sequences in the Tyne valley (Macklin *et al.,* 1992a; Passmore, 1994). Detailed sediment provenance studies have also been carried out at this site, and have employed geochemical analytical techniques to establish links between valley-floor alluviation and accelerated catchment erosion caused by late prehistoric deforestation and land-use change (Passmore and Macklin, 1994). Progressive channel bed incision during the Holocene at Farnley Haughs has resulted in the formation of a staircase of river terraces, with both lateral- and vertical-age sequencing on each of the terrace treads (Figure 5.32). Architecturally, this alluvial sequence is very similar to 'row terraces' described by Schirmer (1983) in German river valleys, produced by lateral channel shift and accretion separated by shorter periods of river incision. Palaeochannels preserved on the surface of several terrace units at Farnley have a morphology similar to that of the current channel, indicating that long-term valley-floor development in this reach has been associated with the down-valley translation of a confined meander bend. Holocene fluvial terrace units at Farnley Haughs comprise imbricated sandy cobble-gravels overlain by fine-grained sands and silts that are either flat-bedded or display lateral accretion elements (Figure 5.33) (cf. Miall, 1985). The lower coarser member represents river bed and bar material, and the finer-grained upper member bar top, floodplain or channel-fill sediments resulting from overbank or slackwater deposition. Four major Holocene alluvial units have been identified and their ages determined using ^{14}C, palaeomagnetic, luminescence, geochemical and cartographic analyses. These units date to: between 4940–4600 and 1350–550 cal BC; around 510 BC; between the late Medieval period and the late 18th century; and the 19th and early part of the 20th century (Macklin *et al.,* 1992a; Passmore, 1994). Dating evidence suggests that sedimentation of the fine member of each alluvial fill occurred over a relatively short period (several decades to a few hundred years), which is consistent with the well-preserved flood-related sedimentary structures, low organic content and the absence of buried soils. The principal features of the Holocene alluvial record at Farnley Haughs are an episode of major valley floor entrenchment between 1350 and 550 cal BC, coinciding with a significant deterioration in climate (Barber *et al.,* 1994), followed by accelerated fine-grained sedimentation, beginning around 500 cal BC. On the basis of sediment provenance studies, this period of alluviation can be connected to erosion in the River North Tyne catchment resulting from Iron Age agricultural practices (Passmore and Macklin, 1994).

In Britain, a very active on-going debate concerns anthropogenic and climatic controls of Holocene river alluviation and erosion (see Ballantyne, 1991; Macklin and Lewin, 1993). Investigations at Farnley Haughs are very pertinent to this debate, as they illustrate how, by using sediment provenance analyses in combination with a range of geochronometric dating techniques, the respective roles and relative importance of human activity versus climate change can be disentangled in the Holocene fluvial stratigraphic record.

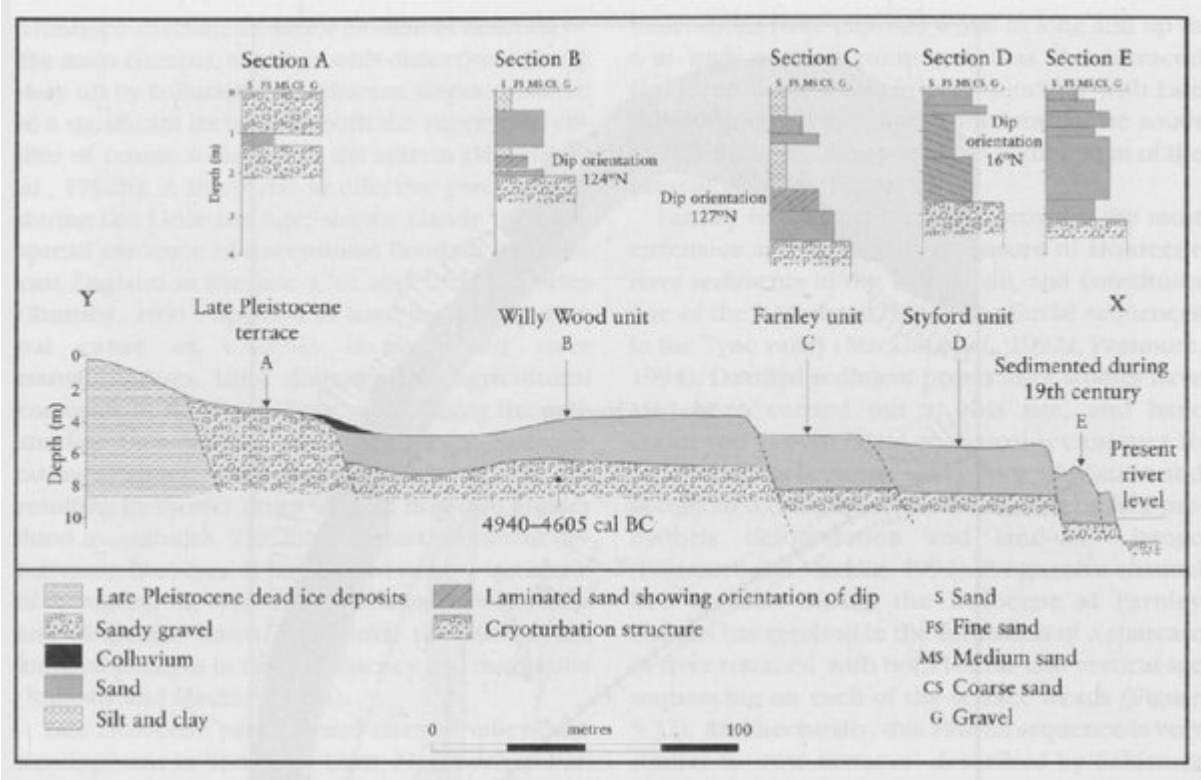
References



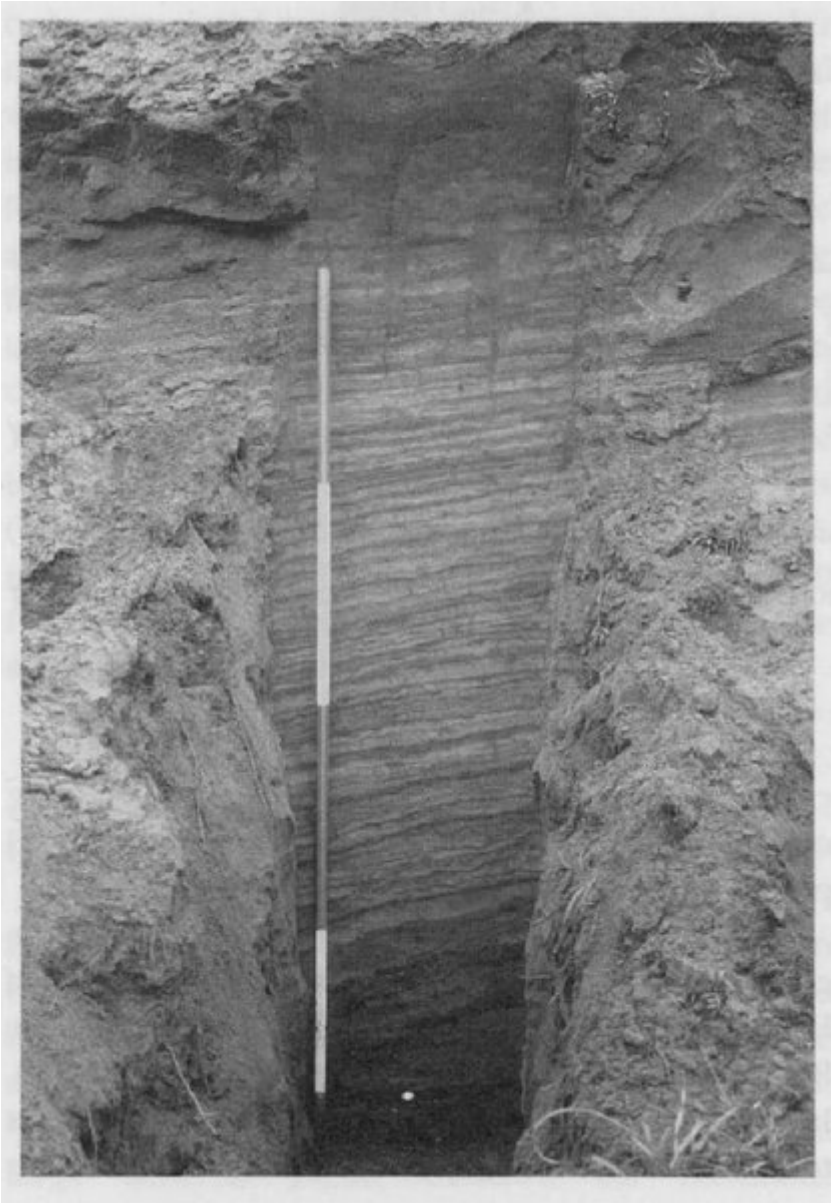
(Figure 5.1) The major river systems and relief of north-east England. GCR Sites: 1 Harthope Bum; 2 Low Prudhoe; 3 Blackett Bridge; 4 Blagill; 5 The Islands, (Alston Shingles); 6 Black Burn; 7 Garrigill; 8 Shaw Beck. Other sites descibed in the text: 9 Farnley Haughs; 10 Lambley; 11 Thinhope Burn.



(Figure 5.31) Late Pleistocene and Holocene river terrace morphologies at Farnley Haughs, Northumberland. (After Passmore and Macklin, 1994.)



(Figure 5.32) Sedimentary sequences at Farnley Haughs, Northumberland. (After Passmore and Macklin, 1994.)



(Figure 5.33) Farnley Haughs, River Tyne: fine-grained alluvium in Styford unit, showing lateral accretion features. Scale: 2 m. (Photo: D.G. Passmore.)