Part 1

Setting the Scene

1 Introduction

Clive Waddington and David G. Passmore

> It would be difficult to find any other part of Britain in which we can see at one view the characteristic monuments of Celtic Britons and Roman legions, of Saxons, Scandinavians and Normans
>
> From William Sydney Gibson's *An Historical Memoir on Northumberland* (1862, ix).

SETTING THE SCENE

In 1862, William Gibson wrote a very accessible historical narrative of Northumberland, dedicated to the Duke of Northumberland, but with the expressed intention of the work being "condensed into an inexpensive handbook, (which) might be made acceptable to every class of inhabitants and form good secular reading" (Gibson 1862, v). Needless to say William Gibson evidently prized the virtue of study and self-betterment for all at a time when the Liberal movement was in full flow, though he sadly died in the same year that the book was published and was therefore not able to observe the fruits of his endeavour. We hope to emulate this aim 150 years on in this synthetic work, although the thrust of this study is unashamedly more academic than popular. That said, a deliberate attempt has been made to write in a clear and accessible way, and with comprehensive referencing of sources, so that the study can be accessed by specialists and non-specialists alike.

The genesis of this work has been the two research projects undertaken by the authors on part of North Northumberland known widely as the Milfield Basin and the catchments of the Till and lower Tweed rivers upstream and downstream of the Milfield Basin (Figs 1.1 and 1.2). The first 'Till-Tweed Studies' volume (Passmore and Waddington 2009a) presented much of the body of field data and was focused towards the provision of a geoarchaeology-based management framework for the archaeology of the region. Following on from this, the present volume aims to draw on past as well as present information, including some of the latest results from commercial archaeological investigations, to provide an archaeological and historical narrative for the region, set within its wider geographical and national context. Because the study was undertaken as two projects with different funding streams, separate outputs were required and this division seemed the least awkward. Nevertheless, certain anomalies remain, such as the splitting of the aerial photographic discussion across the two volumes, but it is hoped this does not detract from the overall narrative.

Writing a synthetic history of North Northumberland from its earliest prehistory up to the beginning of the Middle Ages is certainly ambitious, probably quite brave, and possibly foolhardy. Given the plethora of information now available it is a considerable challenge for archaeologists to develop sufficient expertise across multiple periods so that they are able to synthesise existing information, present new information, articulate informed arguments and identify new questions and avenues for future research. We are certainly not expert in every period covered by this volume and neither is it possible to be expert in all the sub-disciplines and specialisms that support the study of the past. We have, nonetheless, made a concerted effort at bringing together an informed and up-to-date narrative that we hope will inform, challenge and encourage others. To this end we hope that the reader will find the following account stimulating and enjoyable. Perhaps the single most important benefit of undertaking this study is the provision of an up-to-date historical narrative for a geographically discrete region that provides a consistent flow and approach to all periods so as to produce, we hope, an engaging multi-period synthesis that can be read as a narrative or delved into for reference. In addition, the depth of research underpinning this volume has brought much specialist and disparate information together. We hope that this will not only provide new and useful insights, but that it will also assist current researchers, and encourage a new generation, in accessing the archaeology of the region without having to spend several years chasing arcane references and unpublished reports in order to get to grips with the state of current knowledge and understanding. With such a broad scope this volume should also complement the recently produced regional research framework for the North-East (Petts and Gerrard 2006) and the popular synthesis recently

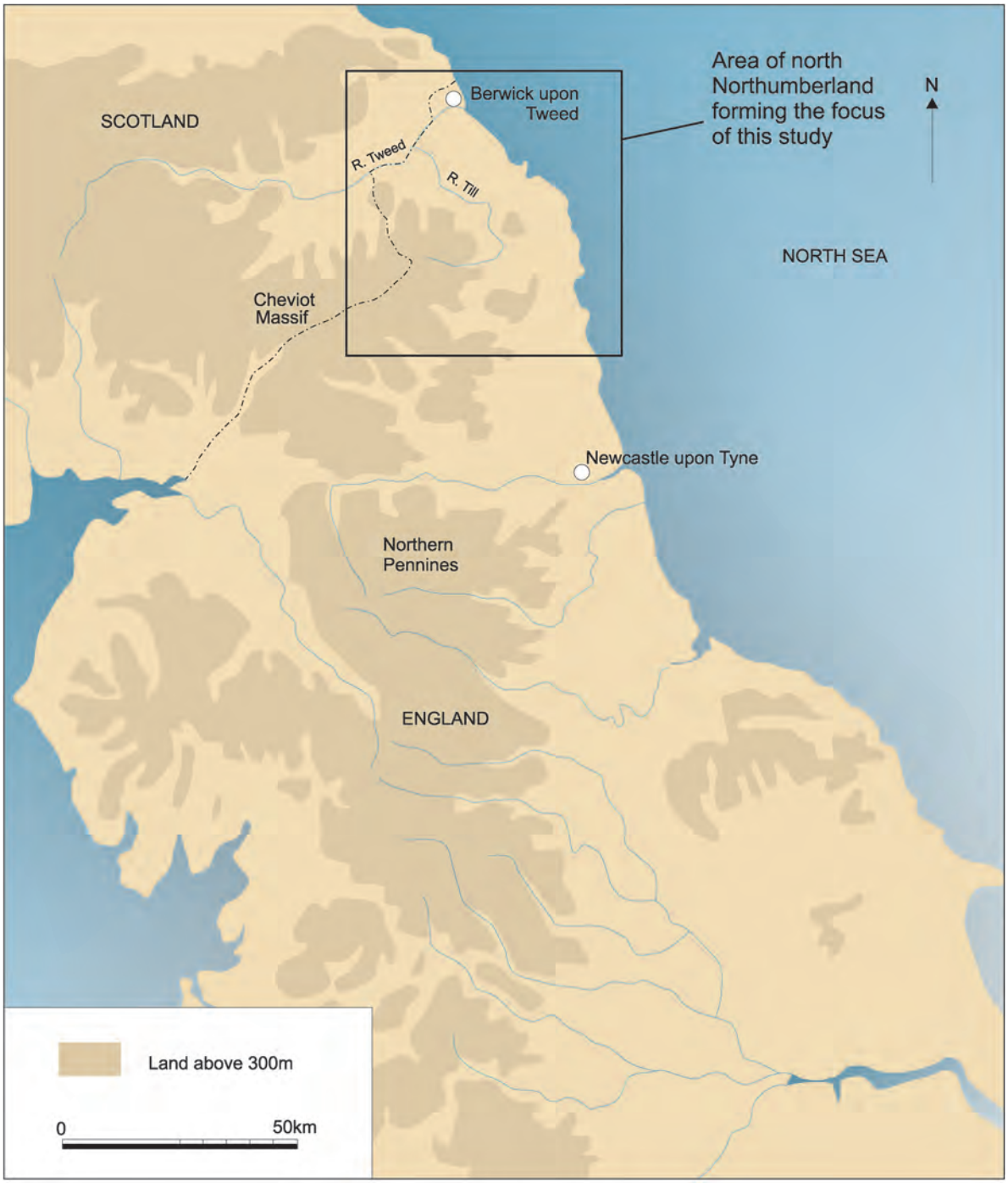

Figure 1.1. Location of the Till-Tweed study area in North-East England.

undertaken for the Northumberland National Park (Frodsham 2004).

At a time when knowledge and academic endeavour is becoming ever more fragmented, we think it is pertinent that a work of academic synthesis is produced for the region. Moreover, there has been a huge amount of new information acquired as a result of commercial archaeological investigations and fieldwork by the voluntary sector and it is timely that this is brought together. In recent years there has also been a trend in archaeological interpretation to emphasise the particular over the general, as can be seen by the focus on 'biographies' of individual monuments for example. Although such detailed insights can be instructive, this attempt at overview supplies a necessary counterpart to such studies. A concerted effort has been made to marshal all new information that has come to light up to the beginning of 2010. This includes not only a comprehensive synthesis, recalibration and modelling, where

Figure 1.2. The Till-Tweed Study Area.

appropriate, of the reliable radiocarbon dates for the region, but also reference to and results from several recent, commercially funded, archaeological excavations whose impact is significant and the results of which will feed into the wider milieu of archaeological research. It is hoped that this volume provides something to stir the curiosity of most archaeologists, as not only does it cover a huge time period, but the North Northumberland story has resonance for other regions, both neighbouring and beyond. To this end we have related our study area to wider regional and national contexts throughout. This

should ensure that not only is Northumberland better embedded into broader narratives and that future studies accommodate the Northumbrian evidence as a matter of course, but also that experts in other geographical areas will have access to useful regional comparanda and a work of reference.

The following chapters are arranged in two sections: the first consists of those chapters that set the scene and the second comprises those chapters that form the synthetic narrative arranged in chronological order. In the final chapter we have developed a short discussion of certain themes that grew out of the study and pursue these themes across different time periods. The volume extends across the prehistoric and historical divide so that the period chapters commence with earliest prehistory where we are solely reliant on objects, structures and environmental evidence to construct our understanding. For the latest periods, however, the archaeology can be considered alongside a small number of historical events and individuals, our knowledge of which comes from quarrying some classical and early medieval texts, which of course come with all their attendant caveats. The early text sources have been read only in their translated, published form and not in the original Latin, Welsh or Old English.

The most recent academic syntheses that have dealt with Northumberland are those of Burgess (1984) and Higham (1986), although the former only covered the prehistoric period and the latter covered all of northern England. Since then, there have been attempts to draw information together for the wider North-East region as part of strategic assessments (Clack and Gosling 1976; Brooks *et al.* 2002), the most recent being the regional research framework for the North-East (Petts and Gerrard 2006). In addition to these multi-period syntheses, period-specific syntheses have also been produced, which are referred to in the various chapters that form Part 2 of the volume. These early works were of considerable use in their time and were regularly referred to in subsequent research. Since the early 1980s, however, there has been a considerable increase in the amount of data available. In particular, from the 25 radiocarbon dates from specifically archaeological contexts (as opposed to those derived from palaeoenvironmental investigations) dating to the prehistoric and Roman Iron Age periods within Northumberland listed by Burgess in his 1984 article, this volume presents more than 230 radiocarbon dates for the same periods and types of contexts. To this can be added a further 33 dates from the Mesolithic house at Howick which are not included here as they have already been published in full elsewhere (see Waddington 2007a), bringing the current total to around 270. Although in some ways a crude measure, this vast increase in dates provides a sense of the scale of increase in artefacts, structures and scientific data now available for the archaeologist to study since the publication of these earlier synthetic works. As a result the need for synthesis has now become acute.

The approach adopted for this study follows on from that outlined in Volume 1 with the focus placed on human-landscape interactions. This is not to deny the importance of contextual study, social theory and so forth but, rather, to place centre stage throughout this sweep of human history the sense of how people have interacted with their environment. Though it cannot be denied that landscape and environment, at certain levels, provide a backdrop for human action (the inexorable rise in sea levels and the drowning of the North Sea basin being a case in point; see Gaffney *et al*. 2009), landscape and environment in other contexts formed an arena of interaction where both landscape and human actions became agents, promoting either change or continuity in the other. Over short timescales human action in relation to the environment is often, though not always, a culturally mediated set of behaviours. When viewed over long time scales, however, the trajectory of human interactions and adaptations can sometimes be seen as a reaction to, or consequence of, environmental change. In the case of the drowning of Doggerland by the North Sea, the displacement of human groups inhabiting this area was undoubtedly a consequence of environmental change, although the way it was conceived at the time would have been very much through a set of culturally mediated beliefs.

Throughout this study we have attempted to draw together a sound evidence base, accommodating results from various scientific disciplines and adopting an inclusive approach to archaeological data so as to avoid the selective use of evidence. Although interpretive leaps are made it is hoped that this open approach will provide a clear insight into how various interpretations have been arrived at, leaving the readers to assess for themselves the merits, or otherwise, of the argument. The use of assertion has been avoided and we have sought to use plain and clear language where at all possible. If this synthesis can still be of use to researchers in 25 years time then we will be satisfied that we have succeeded in our efforts, but in any case, as more results of archaeological endeavour are forthcoming, much of what is contained in this work will be modified, changed and, undoubtedly, rejected.

AIMS AND RESEARCH THEMES

The overarching aim of this study has not been merely to document and describe the data sets available for North Northumberland, but to combine the available information into a historical narrative that engages with debates and offers interpretation and insight where appropriate. Furthermore, this account seeks throughout to place North Northumberland into the

context of its adjoining areas, and occasionally further afield, so as to view Northumbrian history within a broader historical frame, though always being aware of the regional character of the Northumbrian evidence. Particular themes that run throughout much of the narrative include:

- the establishment of a more detailed chronological framework for the region
- assessing the character and chronology of environmental change, its impact on human groups and the impact of humans on their environment
- understanding settlement across the region in terms of the structures people inhabited, and also the temporality/duration of settlement and its patterning across the landscape
- understanding the impact of the sea and rivers on the settlement pattern at different periods and how these arteries were utilised during different periods
- characterising the surviving material culture from each period and what we can learn from this
- observing the ways in which people disposed of their dead and undertook ritual observance
- exploring issues of social interaction and social change

SCOPE OF THE STUDY

The area of study covered by this volume is for the most part focused upon what can best be described as North Northumberland, that is Northumberland north of the Coquet-Aln interfluves (Figs 1.1 and 1.2). We venture out from this area as the availability of evidence and the need to provide a wider context for discussion occasionally necessitates, as for example in the Roman and Anglo-Saxon periods. The span of time encompassed by this work extends from the first modern humans present in the region to the arrival of the Normans and the beginning of the Middle Ages. This time bracket has allowed us to map out the human story and changing complexion of the landscape from the end of the last glacial period to a specific point in time when a real dislocation occurred in the course of both the region's and the nation's history: the Norman conquest.

As part of this synthesis we have assembled information through the analysis of a digital geographic information system (GIS) which has included not only the information contained on the county's historic environment record (HER), but also all the new digital mapping of archaeological features from aerial photographs (see Volume 1 and Chapter 3 this volume). We have also assembled an exhaustive compendium of radiocarbon dates for the region from archaeological contexts. Those dates that are of poor or uncertain reliability, on account of their poor archaeological associations or sample type, have been rejected. Dates have been grouped into particular category types within each chapter so as to aid analysis and inform discussion, and as a result some dates will occur in more than one table. Where it has been deemed appropriate, some of the dates have been combined and mathematically modelled so as to gain a more precise estimate of their age and the time-span of certain phenomena. The details of the methods used and conventions employed are outlined below.

After this introductory chapter, the second chapter of this volume presents an overview of the Late Glacial and Holocene environmental history of the Till-Tweed study area and the wider region. Building on the datasets described in Volume 1, the focus here is on the character and chronology of landscape development, Holocene climate change and palaeoecological records of vegetation change and human land use activities. This chapter is augmented by new data acquired since Volume 1 went to press, including a new pollen sequence from a peat core taken from Ford Moss, a 61ha raised bog on the Fell Sandstone escarpment on the north-east side of the Milfield Basin near the village of Ford. The third chapter synthesises the information resulting from aerial photographic survey and analysis within the Milfield Basin, and documents the various types of evidence available from the Neolithic through to the early medieval period. After these scene-setting chapters, each of the chronological narrative chapters forming the second part of the volume is set out in such a way as to provide some introduction and background, followed by the dating framework, a discussion of the evidence for the environment and land use, and by a consideration of settlement during the period. After this, however, the various period chapters pursue a more independent path, picking up on themes more applicable to that period of study.

RADIOCARBON CONVENTIONS AND CHRONOLOGY

Peter Marshall and Clive Waddington

In order to allow for comparison with other periods from the Holocene, the dates quoted for the Mesolithic and subsequent periods are given in calibrated radiocarbon years BC and AD. Traditionally, earth scientists and archaeologists who deal with the Mesolithic use uncalibrated radiocarbon years before present (i.e. 1950), whereas scholars dealing with the Neolithic and later periods use calibrated, or 'calendar', years BC and AD. This creates confusion when dealing with the Early and Middle Holocene, as two different dating schemes are in use that are not immediately comparable. The reason for using calibrated years here is that uncalibrated years BP refer to dates measured from 1950 and not 'before present'; this gap will increase as time goes on as the

present is constantly moving. The advantage of using calendar dates BC and AD is that they refer to any given year in time from a fixed point that is widely recognised. As calibration now extends back as far as 22,000 years ago there is no need to continue without calibration for the period covered by the Holocene.

The radiocarbon results are quoted in accordance with the international standard known as the Trondheim convention (Stuiver and Kra 1986). They are conventional radiocarbon ages (Stuiver and Polach 1977). All dates have been recalibrated and, where appropriate, subjected to Bayesian modelling to allow a more precise estimation of the chronological question being asked (see below). The results of calibrations, relating the radiocarbon measurements directly to calendar dates, are given in the various tables and accompanying figures throughout the second part of the volume. All have been calculated using the calibration curve of Reimer *et al*. (2004) and the computer program OxCal v4.0.5 (Bronk Ramsey 1995; 1998; 2001; 2009). The calibrated date ranges cited in the text are those for 95% confidence unless otherwise stated. They are quoted in the form recommended by Mook (1986), with the end points rounded outwards to 10 years. The ranges quoted in italics are posterior density estimates derived from mathematical modelling of archaeological problems (see below). The ranges in plain type in the tables have been calculated according to the maximum intercept method (Stuiver and Reimer 1986). All other ranges are derived from the probability method (Stuiver and Reimer 1993).

A Bayesian approach has been adopted for the interpretation of the chronology from the area (Buck *et al*. 1996). Although the simple calibrated dates are accurate estimates of the dates of the samples, this is usually not what archaeologists really wish to know. It is the dates of the archaeological events represented by those samples which are of interest. Absolute dating information, in the form of radiocarbon measurements, can be combined with the relative information provided by archaeological stratigraphy and associations, to provide estimates of the dates of the activities.

Fortunately, methodology is now available that allows the explicit combination of these different types of information to produce realistic estimates of the dates of archaeological interest. It should be emphasised that the posterior density estimates produced by this modelling are not absolute. They are interpretative estimates, which can and will change as further data become available and as other researchers choose to model the existing data from different perspectives. The technique used is a form of Markov Chain Monte Carlo sampling, and has been applied using the program OxCal v4.0.5 (http://c14.arch.ox.ac.uk/). Details of the algorithms employed by this program are available from the online manual or in Bronk Ramsey (1995; 1998; 2001; 2009). The algorithm used in the models described below can be derived from the structures shown in Figs 5.1–2 and 5.4.

CHARACTER OF THE DATASET: LANDSCAPE AND ARCHAEOLOGICAL ASSOCIATIONS

David G. Passmore and Clive Waddington

One of the key aims of the Till-Tweed project has been the development of a heritage management framework for the region that incorporates an enhanced HER database and situates the archaeological record within its landscape context. This has required a multi-disciplinary geoarchaeological methodology that is built around a core GIS that incorporates or links to the following datasets:

- Geomorphological mapping of 560 km^2 of the Till-Tweed landscape using a combination of British Geological Survey superficial geology maps, Ordnance Survey maps (including historic maps), online aerial photograph imagery, LiDAR (Light Detection and Ranging) data covering 64% of the study area and a programme of field visits (Volume 1, Chapter 2).
- Sediment coring of over 150 alluvial terrace, floodplain, palaeochannel and floodbasin sites in the Milfield Basin and selected reaches of the Breamish/Till and Lower Tweed valleys (Volume 1, Chapter 2).
- Palaeoecological analysis (pollen, plant macrofossils and insect remains) and/or radiocarbon dating (35 samples) from 23 sediment cores in Late Devensian and Holocene palaeochannel or floodbasin sediments (Volume 1, Chapter 2).
- Radiocarbon dating (7 samples) of four sediment cores/exposures in alluvial sequences in the Rivers Glen and Till (this volume, Chapter 2).
- Pollen analysis and radiocarbon dating (4 samples) of a peat core from Ford Moss, a 61ha raised bog at *c*. 105 m OD on the Fell Sandstone escarpment 3km east of the River Till at Ford (this volume, Chapter 2 and Appendix A).
- 3436 surface finds from fieldwalking of 964.3 ha of the Till-Tweed landscape, comprising 3340 (97.2%) lithics, 92 (2.7%) pottery sherds, two pieces of slag, one coin and one button (Volume 1, Chapter 3).
- 24 test pits excavated in glaciodeltaic and Holocene alluvial terrace surfaces in the Milfield Basin (Volume 1, Chapter 3).
- New (254), or enhanced (218), HER records from a programme of aerial photograph transcription (to NMP standards) of over 4700 oblique and vertical photographs sourced from the NMR, the Unit for Landscape Modelling (formerly CUCAP) and Newcastle University's Museum of Antiquities (Volume 1, Chapter 4), giving an overall total of HER sites within the Till-Tweed study area of 51 isolated finds, 571 cropmark sites, 564 earthworks and monuments and 409 field systems (this volume, all chapters).
- Eight excavations of cropmark sites (including a henge-

type monument, a boundary feature, a ring-ditch, two curvilinear palisaded enclosures, a rectilinear enclosure, a pit alignment and a field system and building) with analysis of palaeoenvironmental remains and a programme of radiocarbon dating (Volume 1, Chapter 5).

- Assimilation of data from large-scale, open-area, commercial excavations at Cheviot Quarry (Johnson and Waddington 2008) and Lanton Quarry (Waddington 2009), as well as the recently published Neolithic remains from Thirlings (Miket *et al.* 2008) and other commercial excavations throughout Northumberland.

Central to the development of an integrated heritage management framework for the Till-Tweed study area has been the identification of 'landform elements' and their associated sedimentary sequences and archaeological associations. The development and application of this geoarchaeological approach has been explored and illustrated in Passmore *et al*. (2002; 2006) and is fully explained in Volume 1 of the project (Passmore and Waddington 2009a). For the Till-Tweed study blocks (Fig. 1.2) this has necessitated classifying nearly 560 km^2 of the landscape as one of fifteen geomorphologically defined landform elements that range in scale from comparatively small features, such as kettle holes or palaeochannels, to much larger expanses of drift-mantled hill slopes and alluvial valley floors (Table 1.1). By addressing the correspondence between particular types of landforms and their archaeological and palaeoecological associations, the potential of landscapes and their associated archaeology to experience modification, burial and/or transformation over time is demonstrated. This approach is intended to facilitate the prediction of the potential age range and context of archaeology and palaeoenvironmental deposits lying on or beneath modern land surfaces. In addition to providing a platform and context for heritage management purposes, the integration of geomorphological and archaeological data within a GIS environment also permits interrogation of the relationships between landscape setting and the character of the archaeological record. Therefore, and with specific regard to the study blocks delimited in Figure 1.2, our analysis in the following chapters of this volume has been informed by consideration of the number and density of all recorded archaeological monuments, features and findspots located in the landform elements described in Table 1.1.

Table 1.1. Landform, sediment and archaeological associations for the Till-Tweed catchment (after Passmore and Waddington 2009a).

Landform element		Sediment type	Holocene geomorphic activity	Archaeological associations
1a	Bedrock with discontinuous shallow drift cover (Late Devensian)	Bedrock, till, some poorly sorted slope deposits	Generally stable, some localised colluvial activity	Mixed-age assemblages of earthworks and artefacts at or within the soil surface
1b	Undifferentiated Late Devensian glacial and glaciofluvial drift	Till, sand and gravel, some poorly sorted slope deposits	Generally stable, some localised colluvial activity	Mixed-age assemblages of cropmarks, earthworks and artefacts. Can occur as upstanding features, features in underlying deposits or as artefacts in ploughsoils
1c	Late Devensian ice-contact meltwater deposits	Sand and gravel, some localised thin till deposits	Generally stable, some localised colluvial activity	Mixed-age assemblages of cropmarks, earthworks and artefacts. Can occur as upstanding features, features in underlying deposits or as artefacts in ploughsoils. Particularly common are Mesolithic flint scatters, Neolithic pits and ceremonial monuments and Early Bronze Age and Anglo-Saxon settlement sites
1d	Late Devensian glaciofluvial and glaciodeltaic terraces	Sand and gravel, some localised sand, silt and clay	Generally stable	Mixed-age assemblages of cropmarks, earthworks and artefacts. Can occur as upstanding features, features in underlying deposits or as artefacts in ploughsoils. Particularly common are Mesolithic flint scatters, Neolithic pits and ceremonial monuments and Early Bronze Age and Anglo-Saxon settlement sites
1e	Late Devensian and/or Holocene palaeochannel deposits and enclosed basins inset within 1b, 1c and 1d	Sand and gravel, variable depth of fine sediment overburden	Generally stable, but possibility of local sediment accumulation	As (1b), but with potential for burial of LateGlacial and Holocene land surfaces, sediments and archaeological remains
1f	Late Devensian kettle holes inset within 1b, 1c and 1d	Peat, organic-rich and inorganic fine sediment	High probability for Late Glacial and Holocene sedimentation	As (1b), but with high probability for burial of Late Glacial and Holocene land surfaces and/or organic deposits
1g	Late Devensian glaciolacustrine deposits	Laminated sand, silt and clay	Landform stability over Holocene	Mixed-age assemblages of cropmarks, earthworks and artefacts. Can occur as upstanding features, features in underlying deposits or as artefacts in ploughsoils
1h	Late Devensian alluvial fans	Sand and gravel, some fine sediment	Landform stability over Holocene	Mixed-age assemblages of cropmarks, earthworks and artefacts. Can occur as upstanding features, features in underlying deposits or as artefacts in ploughsoils
2a	Holocene alluvial fans and colluvial spreads	Mainly sand silt and clay, some gravel	Possible Holocene alluviation/colluviation	Possible mixedage assemblages of cropmarks, earthworks and artefacts, but high probability of buried *in situ* landsurfaces, local reworking and truncation of older Holocene surfaces
2b	Holocene alluvial terraces and floodplain deposits (pre-19th century)	Mainly sand and silt overlying sandy gravel	Alluviation and local fluvial erosion	Mixed age assemblages of cropmarks (rare), earthworks (rare) and artefacts within ploughzone, high potential for buried Holocene landsurfaces and organic deposits, local reworking and truncation of older Holocene surfaces

Table 1.1. continued.

Landform element		Sediment type	Holocene geomorphic activity	Archaeological associations
2c	Holocene alluvial palaeochannels and floodbasins developed on 2b surfaces	Alluvial sand, silt and clay with variable organic content, peat	Alluviation and local fluvial erosion	Limited or no surface archaeology, but proven (or high probability of) buried *in situ* landsurfaces and organic deposits
2d	Nineteenth century and later river channel and floodplain deposits; modern channel and floodplain environments	Mainly sand and silt overlying sandy gravel	Alluviation and local fluvial erosion	No intact pre-19th C. archaeology on or beneath surface
2e	Holocene peat bogs/ mires	Peat, some less organic inwash	Accumulation of peat and organic-rich deposits	Limited or no surface archaeology, but proven (or high probability of) buried *in situ* landsurfaces and organic deposits

Table 1.2. Physical extent and numerical summary of archaeological associations for landform elements delimited in the Till-Tweed study blocks.

				Archaeological associations									
Landform element classification		Landform area km² (%)		Lithic findspots (%)		Isolated finds (%)		Cropmarks (%)		Earthworks / monuments (%)		Fieldsystems (%)	
Hilltop and hillslope environments (pre-Quaternary–Devensian) (*c.* 30–315m OD)													
1a	Bedrock with discontinuous shallow drift cover	145	*26*	226	*5.5*	12	*23.5*	52	*9.1*	276	*48.9*	142	*34.7*
1b	Undifferentiated glacial and glaciofluvial drift	217	*39*	1976	*48.1*	12	*23.5*	207	*36.3*	165	*29.3*	69	*16.9*
	total	362	*65*	2202	*53.6*	24	*47.1*	259	*45.4*	441	*78.2*	211	*51.6*
Late Devensian hummocky terrain (lower valley sides and floors) and alluvial fans (*c.* 30–150m OD)													
1c	Ice-contact meltwater deposits	81	*15*	350	*8.5*	6	*11.8*	95	*16.6*	57	*10.1*	34	*8.3*
1h	Alluvial fans	1	*<1*	8	*<1*	--	--	4	*<1*	1	*<1*	1	*<1*
	total	82	*15*	358	*8.7*	6	*11.8*	99	*17.3*	58	*10.3*	35	*8.6*
Late Devensian valley floors (*c.* 10–120m OD)													
1d	Glaciofluvial and glaciodeltaic terraces	50	*9*	1167	*28.4*	12	*23.5*	156	*27.3*	44	*7.8*	45	*11.0*
1e	Palaeochannels and enclosed basins inset within 1b–d	7	*1*	95	*2.3*	--	--	25	*4.4*	2	*0.4*	6	*1.5*
1f	Kettle holes inset within 1b–d	1	*<1*	1	*<1*	--	--	1	*<1*	--	--	2	*<1*
1g	Glaciolacustrine deposits	3	*1*	6	*<1*	2	*3.9*	1	*<1*	--	--	2	*<1*
	total	61	*11*	1269	*30.9*	14	*27.5*	183	*32.0*	46	*8.2*	55	*13.4*
Holocene valley floors (*c.* 2–130 m OD)													
2a	Alluvial fans and colluvial spreads	1	*<1*	14	*0.3*	--	--	--	--	1	*0.2*	10	*2.4*
2b	Alluvial terraces and floodplain deposits (pre-nineteenth century)	34	*6*	233	*5.7*	5	*9.8*	22	*3.9*	12	*2.1*	53	*13.0*
2c	Alluvial palaeochannels and floodbasins developed on 2b surfaces	3	*<1*	27	*0.7*	--	---	2	*0.4*	--	--	19	*4.6*
2d	19th C. and later river channel and floodplain deposits	10	*2*	2	*<1*	2	*3.9*	2	*0.4*	2	*0.4*	21	*5.1*
	total	47	*8*	276	*6.7*	7	*13.7*	26	*4.6*	15	*2.7*	103	*25.2*
2e	Holocene peat bogs / mires	4	*1*	--	--	--	--	2	*0.4*	3	*0.5*	2	*0.5*
3	Modern ponds / reservoirs	--	--	--	--	--	--	--	---	--	---	--	--
3	Modern quarry workings / airfield	2	*<1*	--	--	--	--	2	*0.4*	1	*0.2*	3	*0.7*
	total	6	*1*	--	--	--	--	4	*0.7*	4	*0.7*	5	*1.2*

Table 1.3. Archaeological feature density (averaged per km²) for discrete cropmarks, earthworks and field systems in landform elements classified for the Till-Tweed study blocks. Note that landform element categories with a total area extent of less than 10 km² have been grouped in order to avoid distorting density values.

		Landform area		**Archaeological feature / monument density (per km²)**		
Landform element classification		km²	%	cropmarks	earth/mon	fieldsystems
Hilltop and hillslope environments						
1a	Bedrock with discontinuous shallow drift cover	145	*26*	0.36	1.90	0.98
1b	Undifferentiated glacial and glaciofluvial drift	217	*39*	0.96	0.76	0.32
Late Devensian hummocky terrain (lower valley sides and floors)						
1c/1h	Ice-contact meltwater deposits and alluvial fans	82	*15*	1.21	0.71	0.43
Late Devensian valley floors (low relief)						
1d	Glaciofluvial and glaciodeltaic terraces	50	*9*	3.10	0.88	0.89
1e/1f/1g	Kettle holes, glaciolacustrine deposits and palaeochannels/enclosed basins	11	*11*	2.45	0.18	0.91
Holocene valley floors						
2a–c	Alluvial fans, terraces, floodbasins and palaeochannels (pre-nineteenth century)	38	*6*	0.63	0.34	1.41
2d	19th C. and later river channel and floodplain deposits	10	*2*	0.20	0.20	2.10
2e/3	Holocene peat bogs and mires, modern quarrys and airfields	6	*1*	0.68	0.68	0.85