Early Urbanism in the Northern Fertile Crescent: A Comparison of Regional Settlement Trajectories and Millennial Landscape Change

LAWRENCE, DAN

Abstract

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Daniel Elias Lawrence

This thesis investigates the development of urban centres in the Northern Fertile Crescent during the Late Chalcolithic and Early Bronze Age and seeks to place this development in a wider context of landscape transformation over time. Settlement data from eight archaeological surveys covering a range of landscape types and environments are brought into a single interpretive framework, organised through a Geographical Information System (GIS). These surveys are enhanced through the use of satellite imagery, particularly Corona spy photography, to discover new sites both within and outside the boundaries of their original areas. Methods for the incorporation of this wide range of data are developed, including the use of concepts such as ‘certainty’ and ‘precision’ and techniques for the comparison of multiple chronological systems.

These new methods are used to undertake a multi-scalar examination of settlement trajectories from the 5th to the 3rd millennium. Two phases of urban development are evident, first in the Late Chalcolithic and then during the ‘second urban revolution’ (Akkermans and Schwartz 2003) in the later Early Bronze Age. Whilst the Late Chalcolithic centres emerged within dense landscapes of small settlements, urbanisation in the later Early Bronze Age was accompanied by the widespread incursion of settlement into a ‘zone of uncertainty’ on the margins of the steppe. It is argued that a combination of factors, including the shift from flax to wool as the raw material in textile production and the development of social institutions capable of bearing risks at a large scale, provided the incentive and the means for this expansion, and that this transformed the societies of the region as a whole. This phenomenon is then placed in the wider context of long-term landscape change. It is argued that differences in settlement histories across the region can account for variations in the preservation of the archaeological record.

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List of Abbreviations

AVRP	Amuq Valley Research Project
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
AS	Amuq Survey
BRB	Bevelled Rim Bowl(s)
CFSW	Chaff Faced Simple Ware
EBA	Early Bronze Age
EEBA	Early Early Bronze Age
EJ	Early Jazira (Phases)
ETC	Early Transcaucasian Culture
ETM	Early Third Millennium
FCP	Fragile Crescent Project
GIS	Geographical Information System(s)
GE	Google Earth
IA	Iron Age
KKW	Khirbet Kerak Ware
KHS	Kurban Höyük Survey
LCP	Land of Carchemish Project
LC	Late Chalcolithic
LEBA	Late Early Bronze Age
LTM	Later Third Millennium
LCCM	Leilan Climate Change Model
MBA	Middle Bronze Age
MEBA	Middle Early Bronze Age
NIR	Near Infrared
NJS	North Jazira Survey
OJ	Old Jazira (Phases)
PSW	Plain Simple Ware
RBBW	Red Black Burnished Ware
SRTM	Shuttle Radar Topography Mission
SHR	Sites and Monuments in the Homs Region (Project)
SS	Sweyhat Survey
TBS	Tell Beydar Survey
THS	Tell Hamoukar Survey
TS	Titriş Survey
ULT	Upper Lake Tabqa (Survey)
VL	Vanishing Landscapes (Project)
WST	World Systems Theory

The work contained in this thesis has not been submitted elsewhere for any other degree or qualification and unless otherwise referenced is the author's own work.

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Chapter 1: Introduction

Thus, at the outset of the 21st century, we are faced with an influx of regionally based archaeological data of unprecedented quantity, quality, and diversity from hundreds of individual survey projects – but no widely agreed procedures for juxtaposing, combining or synthesizing individual survey datasets. This is disappointing. (Alcock and Cherry 2004; 4)

Introduction

The above quotation from Alcock and Cherry sets out one of the central problems in modern archaeological analysis. Archaeological research over the past few decades, and in the Near East stretching back to the 19th century (see, for example, Kuklick 1996), provides a vast wealth of data in various forms. Whilst some of this has been used to construct interpretations at a regional scale, most notably in Southern Mesopotamia and Mesoamerica (Adams 1966; 1981; Blanton et al. 1981; see also Falconer and Savage 1995; Wilkinson 2000a; Stein 2004 for comparisons between Northern and Southern Mesopotamia), more recent studies have tended to focus on investigations of single sites or surveys[1]. At the same time, technological innovations, particularly developments in computers and computer software, allow for the storage, rapid manipulation and display of vast bodies of information at previously unprecedented scales (Feinman 2012; 23). Despite this simultaneous development of large datasets with the technology and techniques capable of dealing with them, broad scale comparative studies across large regions have been slow to develop (Alcock and Cherry 2004), although some are beginning to emerge for parts of the Greek Mediterranean (Gkiasta 2008; Farinetti 2011). This may be related to two separate impediments, one methodological and one theoretical. The methodological issue is simple to explain but difficult to circumvent, and stems from the very different methods employed within archaeological projects themselves, such as sampling techniques, collection strategies and chronology construction, and the problems of creating equivalence between the resulting datasets (see Chapter 3 for a discussion of this in relation to survey data). The theoretical issue relates to what Sabloff has called the 'pernicious postmodern influence' in archaeological thought which 'does not see the utility or legitimacy of large-scale comparison' (Sabloff 2012; xvii). The post-processual emphasis on the local, contextual and subjective aspects of human existences and their material traces, although a necessary corrective to overtly ahistorical comparative approaches developed by the Neo-evolutionary and 'New' archaeologists of the 1960s and 70s (see Yoffee 2005, especially Chapter 1), may have gone too far. It seems intuitively appropriate that certain types of social phenomena such as long distance trade networks, and the patterns of material traces which they leave behind, might become far clearer when data are brought together from a wide area. At the very least, decisions as to the validity of such approaches should be based on empirical analysis of the data, rather than *a priori* assumptions regarding the

[1] An exception to this are studies utilising grand narrative theoretical concepts such as World Systems Theory (for example Kohl 1979; Algaze 1989; 2005 [1993]). These will be discussed below.

scale at which human action occurs. There is a place in archaeology for large scale and long term comparative analyses, if only to assess whether regional patterns are visible at all.

This study attempts such an analysis of the northern part of the Fertile Crescent during the Late 5th, 4th and 3rd millennium B.C., primarily using settlement and landscape data derived from archaeological surveys. Survey data is particularly amenable to regional comparison for two interrelated reasons. Firstly, the study of settlement patterns and landscape use by definition already takes place over larger areal scales and longer temporal spans than most investigations of individual sites. Second, coverage of larger areas and longer time spans generally comes at the expense of the sorts of detailed data available through excavation; essentially, archaeological survey tells us a (relative) little about a (relative) lot[2]. Decreasing the number of variables involved in the discussion can lead to interpretations which are fundamentally reductive, but if appropriate precautions are taken allows for the analysis of far larger samples. Archaeological surveyors have also been at the forefront of incorporating recent methodological and technological advances in the use of satellite imagery and geographical information systems (GIS) (Wilkinson 2000a). The power of GIS in generating and manipulating large spatial datasets has long been recognised (Westcott and Brandon 2000; Wheatley and Gillings 2002; Conolly and Lake 2006), whilst satellite imagery and remote sensing techniques allow for the identification of sites and features as well as the classification of landscape units of various types (see Chapter 3). However, the major stumbling block highlighted by Alcock and Cherry in the quote above still holds true; the goals and methods of archaeological surveys vary, presenting significant challenges to integrated analysis.

This problem has been mitigated to some degree in this study through the author's involvement in the Fragile Crescent Project (FCP), run from the Department of Archaeology at Durham University. The project brings together survey and remote sensing data from across the Fertile Crescent into a single interpretive framework 'to chart the rise and fall of Bronze Age settlement…in a way that is comparable with the so-called heartland of urban development in Southern Mesopotamia'[3]. The primary data involved are nine surveys conducted over the past thirty years, eight involving the project leader, Professor Tony Wilkinson, and one directed by Professor Graham Philip. The FCP surveys provide a basic level of methodological and chronological consistency from which to begin regional analysis. Their geographical locations provide a good coverage across the Northern Fertile Crescent and include a variety of landscape types. The surveys are supplemented by several remote sensing datasets with various degrees of coverage (see Chapter 3) which are used to update, re-interrogate and expand the original data.

[2] An analogous contrast can be made in terms of survey methods, with full coverage survey providing broad scale information at the risk of missing smaller sites which are more likely to be recovered through more intensive methods. See Chapter 3.

[3] Taken from the Fragile Crescent Project webpage, www.dur.ac.uk/archaeology/research/projects/?mode=p-roject&id=391 accessed 8th August 2012

The involvement of the original surveyors in the project has allowed for the incorporation of large bodies of unpublished notes, sketches and electronic data, supplementing the published material. This is not to say that any of the individual surveys are uniformly and directly comparable with one another, and the problems inherent in comparing even surveys which are superficially very similar warn against simple comparison of more varied data (see Chapters 3 and 4). However, taken together, this dataset represents one of the most consistent and comprehensive bodies of survey derived data available in the Near East and provides an excellent basis for regional analysis. As Drennan and Peterson (2012) have recently pointed out, the importance of primary data in regional comparisons cannot be overstated, since synthetic explanatory accounts introduce biases and controversies which take the reader (and therefore the prospective comparator) away from the empirical evidence itself. This study reflects this concern with data quality and comparability and, as a result, is highly empirical in approach and scope. The FCP dataset is used to investigate two separate but interrelated phenomena. First, and in keeping with the aims of the FCP, the emergence of complex urban societies during the Late Chalcolithic and Early Bronze Age (EBA), and second the long term settlement patterns and landscape transformation processes which have affected our ability to interpret the archaeological record.

The Northern Fertile Crescent as a Regional Unit

Identifying temporal and spatial units of analysis in archaeology at any scale is problematic, and often reflects the concerns and constraints of the present more than those of the past. Definitions of features, sites, survey areas and the various ways of breaking down time utilised by archaeologists represent the imposition of concepts and categories for the purposes of modern academic study which may have had little bearing on the subjective experiences of individuals in the past. The best that can be hoped for is that the scale of the phenomenon under discussion is closely matched by the scale of the evidence used to examine it. For survey data, for example, the investigation of the dynamics of a complete settlement system are best served through an analysis of the totality of the settlement universe (Sumner 1990, see also Chapter 3). Defining the settlement universe is itself problematic, especially since such configurations may change though time, and may rely on combinations of natural and cultural boundaries which leave few material traces behind. The delineation of regions is subject to similar problems. The Oxford English Dictionary definition describes a region as 'an area, especially part of a country or the world having definable characteristics but not always fixed boundaries'[4]. This usefully captures the somewhat fuzzy nature of region definition, but also hints at a solution. We *can* define broad areas which demonstrate similar characteristics even though such definitions will always be to some degree both pragmatic and arbitrary in their actual spatial extents. This is the case for the

[4] From the website Oxford Dictionaries (http://oxforddictionaries.com/definition/english/region) published by Oxford University Press,, accessed August 8th 2012

Northern Fertile Crescent, where regional level similarities are apparent in geographic and landscape types, shared (pre)historical trajectories and modern histories of scholarship (Stein 2004).

Physical Context

This section provides a very general introduction to the geography and climate of the Northern Fertile Crescent; more detailed discussion can be found in the three sub-region Chapters (5-7). Geographically, the Northern Fertile Crescent is defined by the mountains of the Zagros and Taurus ranges in the east and north, several coastal mountain chains in the west including the Amanus, Jebel Ansariyah, Lebanon and anti-Lebanon, and the arid steppe zone to the south (Figure 1.1, note that the steppe zone is delineated using the modern 200mm rainfall isohyet). Between the mountain ranges and the steppe lie the broad, flat plains of inland Syria and northern Iraq, intersected by several major rivers, the most important of which are (from west to east) the Orontes, the Euphrates, the Balikh, the Khabur and the Tigris.

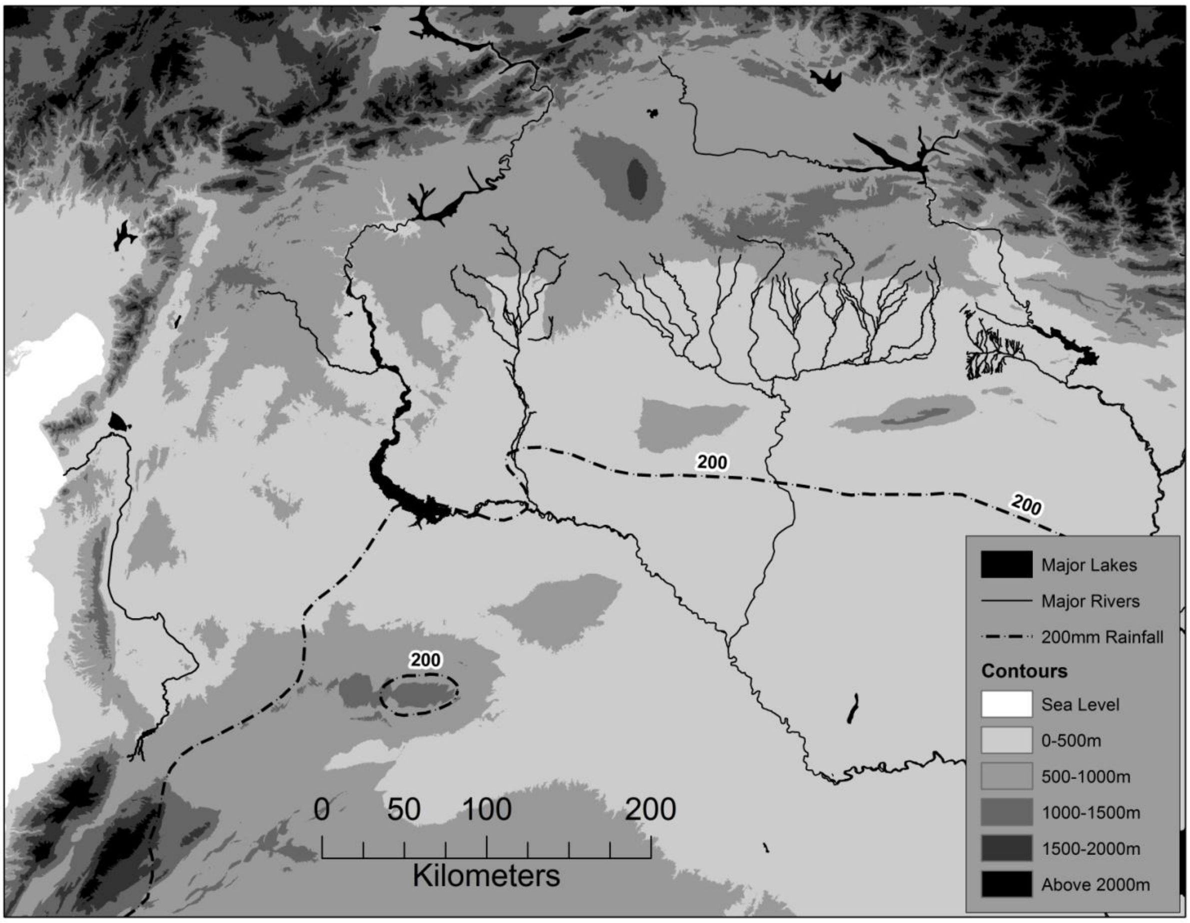


Figure 1.1: Topography of the Northern Fertile Crescent. The 200mm isohyet (taken from Wirth 1971) shows the approximate edge of the steppe zone and therefore the limits of the area discussed in this study

With the exception of the Orontes, which runs south to north, all of these rivers flow roughly from north to south, fed by the higher rainfall and winter snow melt in the Turkish highlands. Today, hydro-electric dam projects along the Euphrates, Khabur and Tigris have created reservoirs, flooding large areas of the valley floors. The land between the two largest rivers, the Euphrates and the Tigris, is known as the Jazira ('island' in Arabic) and includes the Balikh Valley and the Khabur Basin (also known as the Upper Khabur or Khabur Triangle), a well-watered area of the broader plain fed by tributaries of the Khabur river and bounded to the south by two upland areas, the Jebel Abd-al-Aziz and the Jebel Sinjar (Moore et al. 2000, see Chapter 6). Other upland zones in the interior include the Jebel Bishri south of the Euphrates in central Syria and the limestone Massif Calcaire in the west, as well as several smaller areas created by volcanic basalt flows.

Climatic and Environmental Context

The climate and environment of the Northern Fertile Crescent is a result of the complex interplay between local, continental and global weather patterns, as well as the physical geography of the region. In the present, the entire area experiences a highly seasonal Mediterranean climate, characterised by hot summers and cool, wet winters, with the vast majority of rainfall occurring between December and March (Wossink 2009; Ur 2010a; 10). There is a strong positive correlation between elevation and rainfall and also a decrease from west to east as the main moisture bearing weather systems come from the Mediterranean and are blocked by the Jebel Ansariyah and the Lebanon mountains creating a rain-shadow (Akkermans and Schwartz 2003; 4). In the mountainous zones of the Taurus and Zagros, rainfall exceeds 1500mm per year, and even in the lowland basins within the mountains may be between 600 and 1000mm (Casana 2008; see also Chapter 7). The rolling inland plains receive rather less than this, from 500mm in the north to under 100mm in the desert proper, and are subject to marked inter-annual variability (Wilkinson 1997). Comparison of modern precipitation levels from different parts of Syria has demonstrated a high regional correlation in rainfall, meaning climatic events such as droughts would have affected the entire area (Wilkinson et al. 2004; 13), and this has also been proposed for the past (Sanlaville 1997). In modern times, these climatic fluctuations have been off-set through the use of pump irrigation and other forms of agricultural intensification which have transformed the landscape of certain parts of the Northern Fertile Crescent. Gordon Hillman has reconstructed the vegetation for the Northern Fertile Crescent for the present day in the absence of modern agricultural practices and land clearances. Hillman's classificatory system divides the area into eight separate zones based on environmental data, information regarding geology and soils and historical sources (Moore et al. 2000; 49-72). As one would expect, these vegetation zones correspond strongly to the topography and rainfall data. The mountainous areas of Lebanon, Western Syria and Turkey would be heavily wooded under Eu-Mediterranean and Montane Forest (zones 1 and 2) whereas the well-watered northern parts of the steppe would include varying densities of Oak-Rosacea Woodland (zone 3) and Terebrinth-Almond Woodland Steppe (zone 4). South of the 200mm isohyet, this woodland zone gives way to arid steppe (zone 5), characterised by feathered grasses and small shrubs, and finally desert (zone 6), characterised by sparse vegetation and limited soil cover. The final two zones are Riverine or Gallery Forest (zone 7), which would have been present in the larger river valleys, and especially the Euphrates, and marsh and mud flats (zone 8), found in the Jabbul to the west of the great bend of the Euphrates and in parts of the Orontes Valley (see Chapter 7). In reality, however, modern and ancient agricultural practices have led to significant changes in vegetation and landscape use across the region. The principal crops in the lowland areas such as the Khabur basin and the western plains are cereals, specifically einkorn and emmer wheat and two- and six-row barley, whilst legumes, olives and various fruits are also grown in areas of increased rainfall (Weiss 1986). Subsistence domesticates include sheep, goat, cow and pig (Doll 2010), whilst donkey, horse and oxen are used as traction and pack animals.

How far we can project these conditions into the past remains a matter of some debate, in part due to the nature of the evidence. Reconstructions are reliant on various different proxy datasets which can be more or less affected by regional or local factors, as well as dating problems, meaning different proxies may not match up directly, and even contradict one another. Proxies for palaeoclimatic conditions include geochemical analyses of lake cores (varves) and speleotherms, pollen counts derived from cores, geomorphological investigations and faunal and botanical remains from archaeological sites (Kuzucuoğlu 2007). Due to the absence of suitable lakes and caves, there are no long term reliable varve or speleotherm sequences from within the region studied here; the closest reliable varve data is found at Lake Van in South-Eastern Turkey and the closest speleotherm data at Soreq Cave near Jerusalem. Both of these sequences show a similar general trend for the last 8000 years, with a period of wetter conditions prevailing during the Mid-Holocene, equivalent to the Chalcolithic period, a wetter period at the beginning of the 3rd millennium (Bar Matthews and Ayalon 2011) and increasing aridity and fluctuations during the later 3rd millennium and early 2nd millennium before a return to stable conditions similar to those visible in the present (Lemcke and Sturm 1997; Bar Matthews et al. 1998; Wilkinson et al. 2004). This contrasts with several pollen records across the region which demonstrate very little change over the entirety of the past 6000 years (Gremmen and Bottema 1991; Bottema 1997), suggesting the present day climate was established by the beginning of the Late Chalcolithic. Within this framework of general stability, local geomorphological investigations and some geochemical sequences in the Gulf and Dead Sea show evidence for significant short term fluctuations, often towards more arid conditions. Of these, the most significant to the present study is that said to have occurred approximately 2200 B.C. by Courty, Weiss and colleagues (Weiss et al. 1993; Weiss 1997; Courty 2001). Based on micromorphological analysis of soils and sites in the Syrian Jazira, including Tell Leilan and Tell Brak, they propose that a phase of aridification, perhaps caused by an airborne blast event, most probably a volcanic eruption somewhere in Anatolia or the Caucasus, resulted in a short (2-300 years) period of drought at the end of the 3rd millennium which caused massive social upheaval and the collapse of urban societies from Egypt and the Mediterranean to the Indus Valley. A similar hypothesis has now also been proposed for the end of the Uruk phase in Upper Mesopotamia a millennium earlier (Brustolon and Rova 2007). As a research question, the Leilan Climate Change Model (LCCM) has been highly productive (see, for example, papers in Kuzucuoğlu and Marro 2007; also Wossink 2009), in part because of the wide variety of contradictory palaeoenvironmental, archaeological and even historical data which can be mobilised in the debate. A consensus is beginning to emerge which regards the late 3rd millennium as a period of increasing aridity, although not the sort of extreme event envisaged in the LCCM (Riehl 2008; Deckers and Pessin 2011), which had profound transformative effects on the organisation of the societies present at the time (Wilkinson 1997; Wossink 2009; Bar Matthews and Ayalon 2011). Ultimately, we do not have environmental data with sufficient chronological and spatial control to provide concrete answers to these sorts of questions. Detailed discussion of the specific trends visible within sub-regions of the study area based on faunal and botanical remains recovered from archaeological sites can be found in Chapters 5-7.

The Emergence of Complex Societies in the Northern Fertile Crescent

The main premise for a large-scale study of the Northern Fertile Crescent rests on the broadly similar trajectories of societal change across the region and particularly the development of social complexity during the late 5th, 4th and 3rd millennia B.C. By social complexity, I mean the variability in the totality of socio-economic relations within a society, such that increased social complexity implies an increase in this variability. Complexity can be further broken down into ideas of ‘segregation’, meaning the level of differentiation between individuals and groups, and ‘centralization’, meaning the degree to which different forms of power are concentrated into sub-groups of the wider society (Flannery 1972; Rothman 2004; 76). Processes of segregation and centralization manifest themselves in a variety of ways, including socio-economic differentiation, craft specialisation, long distance trade, monumental architecture, administrative practices such as sealing and writing, and large scale population agglomerations. Various scholars have used these manifestations to create categories of societies based on their inferred level of complexity (chiefdoms, states, segmentary states, city-states etc) which can be used as a short-hand for cross-cultural (and cross-temporal) comparisons (Service 1960; 1962; papers in Cohen and Service 1978; Feinman and Marcus 1998), and there has also been a similar concern with the term city (Childe 1950; Fox 1977; papers in Smith 2003; Marcus and Sabloff 2008). Fundamentally, what is at stake here is an articulation of the correct use of certain words; in what context is it appropriate to use the term ‘state’ or ‘city’. The precise definitions which have resulted from these discussions vary in relation to the theoretical stances taken and the evidence employed, and there are still no universally agreed upon definitions which can be cross-culturally applied. As Ur has noted, the individual manifestations of complexity such as population agglomeration, craft specialisation and social differentiation tend to appear and disappear simultaneously in 'packages' (2010b; 2), allowing for the definitions of trends in overall social complexity through time. This model may be criticised as being too close to the early trait list approaches such as those of Childe (1950) and Service (1960; 1962) which sought to categorise cities, states and societies based on strict presence/absence criteria (see Yoffee 2005), and as insufficiently nuanced to capture the diversity of interactions occurring in the past (Bradbury 2011; 447), but it remains a useful way to conceptualise developments on a broad scale.

The earliest state-level society is traditionally considered to have developed in the alluvial plains of southern Iraq during the 4th millennium B.C. centred on the massive urban site of Uruk (Pollock 1999). By the Early Dynastic period (2900-2350B.C.), urbanism and state development had spread across the southern alluvium resulting in a network of large centres, setting a pattern which remained in place for millennia (Stein 2004). The trajectory of the Northern Fertile Crescent was rather different, and more readily understood through the idea of cycles of social complexity advocated by Ur. The following brief synopsis represents the current state of our understanding of this trajectory and provides a framework from which to examine the data. An initial development of complexity occurred during the early part of the Late Chalcolithic, between 4400 and 3600 B.C., representing a shift from the largely egalitarian societies of the Ubaid period. Recent excavations and surface collections at sites such as Tell Brak and Tell Hamoukar in the Jazira have revealed clear markers of social complexity during the Late Chalcolithic including large population agglomerations, craft specialisation, monumental architecture and long distance trade (Ur 2010a; 2010b; Ur et al. 2011; Al Quntar et al. in press, see also Chapter 6). These new data are extremely important in our understanding of the developmental trajectories of the entire region, since they predate the emergence of the Uruk state in Southern Mesopotamia during the second half of the 4th millennium. Contact with Southern Mesopotamia is not visible in the north after the end of the Ubaid until the Uruk 'expansion' (3600-3000B.C.), when material culture and architectural techniques common to the societies present in the south begins to appear in the north. The precise nature of the interaction which led to these material traces is still a matter of some debate (see, for example, Stein 1999b; 2001; Algaze 2005 [1993]) but it seems that the indigenous societies present in the north were already reasonably complex in advance of their contact with southern urban polities (Ur 2010b).

The withdrawal of clear material links with Southern Mesopotamia coincides with a downturn in social complexity during the first half of the EBA (3000-2600B.C.), characterised by the shrinking of larger urban centres, ruralisation, an absence of public architecture and perhaps a decline in interregional trade and exchange. This was followed by the another increase in social complexity during the later EBA (2600-2000B.C.), commonly termed the 'second urban revolution', which included 'the full-fledged adoption of urban life and its associated institutions' (Akkermans and Schwartz 2003; 233). Unequivocally 'urban' centres emerged across the Northern Fertile Crescent (Figure 1.2) at a density that was not matched until the 20th century (Ur 2010b) and included large public buildings, city walls, and evidence for social differentiation and mass production of goods such as pottery, stone tools and textiles.

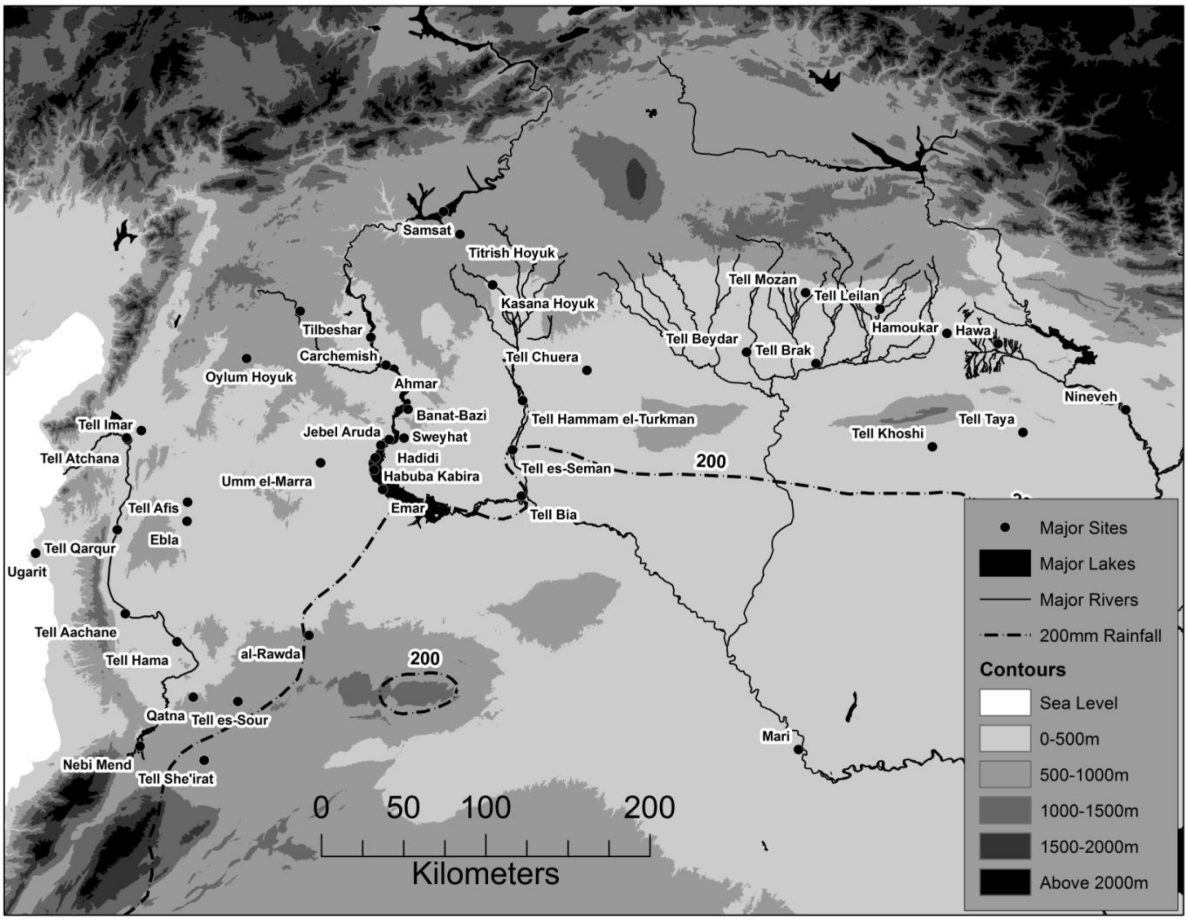


Figure 1.2: Major Sites in the Northern Fertile Crescent during the Late Chalcolithic and Early Bronze Age

Writing also appeared for the first time in the North during the later EBA, allowing for the reconstruction of political events (see below) and socioeconomic organisation. Towards the end of the EBA a second contraction in the level of complexity occurred across the region. The majority of the larger urban sites significantly decreased in size or were abandoned altogether, although importantly these events were not synchronous across the region and some sites, such as Tell Brak and Tell Hawa in the Jazira, may have remained significant centres throughout this time. The widespread disintegration of urban life has been linked to changes in climate (see above), the destabilising impact of the campaigns and conquests of the Southern Mesopotamian Akkadian Empire in the North (Akkermans and Schwartz 2003; Abay 2007) and the emergence of new social identities and ethnic groups (Wossink 2009). Complex polities re-emerged during the Middle Bronze Age but in a rather different form.

An Historical Reconstruction of the Later Early Bronze Age

Textual sources from sites in the Northern Fertile Crescent including Ebla, Brak, Beydar and Mari allow for an historical reconstruction of the political history of the Northern Fertile Crescent during and just after the period of increased urbanisation in the second half of the EBA. These suggest that the political lay-out of the region included a patchwork of city-states each ruled by a king and local elite (Archi 1996). Of these, three centres, Ebla, Mari, and Nagar (most probably Tell Brak (Eidem et al. 2001)) were more prominent, and the texts detail both their increasing individual power and the struggle for regional supremacy between them (Akkermans and Schwartz 2003; 239). This culminated in the formation of a coalition of Ebla, Nagar and the Southern Mesopotamian city of Kish, which apparently defeated Mari at a battle near Terqa on the Euphrates (Sallaberger 2007). However, some three years later the city of Ebla was destroyed, most probably by Mari (Archi and Biga 2003). Destruction layers at Brak may also be dated to this phase, perhaps showing that Mari exacted revenge on Ebla's allies (Sallaberger 2007). Mari was then itself destroyed by the Southern Mesopotamian king Sargon of Akkad, who also claimed to have taken Ebla. The nature of the Akkadian 'Empire' in Northern Mesopotamia is much debated, with some scholars considering it to have had a prolonged and profound impact and others suggesting that the actual political control it held was minimal (compare, for example, the contribution of Weiss and Courty to that of Liverani in (Liverani 1993)). Certainly it appears to have had little effect on material culture, with no discernible import of southern ceramic types comparable to that seen in the Uruk period (although some scholars have claimed to be able to relate specific northern types to the period of Akkadian control; see Chapter 4).

The only unequivocal evidence for Southern Mesopotamian imperial presence in the North comes from the Naram-Sin Palace at Tell Brak (Nagar), where every brick was stamped with the name of the grandson of Sargon, Naram-Sin (Eidem et al. 2001; 102). Wossink argues that much of the Upper Khabur basin was under the direct political control of the Akkadian Empire during the reign of Naram-Sin, via a stronghold at Tell Brak (Wossink 2009; 30), with vassal states centred on the cities of Urkesh (Tell Mozan) and Shekna (Tell Leilan). At the former, sealings related to a daughter of Naram-Sin, Tar'am Agade, have been taken as an indication of a royal marriage with the ruler of Urkesh (Buccellati and Kelly-Buccellati 2000), and therefore as a further indication of Akkadian influence in Upper Mesopotamia. Outside of the Upper Khabur region, very little is known of the Akkadian impact in the north. Both Sargon and Naram-Sin claim to have campaigned as far as the Cedar Mountain and Silver Mountains, equivalent to the Amanus in Western Syria and Turkey and the Taurus in the North, whilst Naram-Sin also states that he reached the sources of the Tigris and

Euphrates, now situated in the Turkish highlands (Sallaberger 2007). However, in the absence of other evidence it is impossible to say whether these were fleeting visits, seasonal campaigns or prolonged periods of political hegemony.

There are no indigenous textual sources available for the period of the EBA after the Akkadian Empire, coinciding with the disintegrative phase proposed above, and there are only occasional references to Upper Mesopotamia and Mari in the Ur III texts from Southern Mesopotamia (Wossink 2009; 31). One of these shows a marriage between the ruler of Ur and a princess from Mari, whilst there are also references to dynasties in Brak and Mozan with Hurrian names (Van de Mieroop 2007 [1997]; 80). By 1800 B.C., the period documented by the texts from Mari, new regional powers had arisen at Yamhad (Aleppo) and Qatna (Tell Mishrifeh) in the West and Shubat-Enlil (Tell Leilan) in the Upper Khabur basin, as well as Mari itself (Charpin 1987; 1993; Durand 2004). At the same time, previously settled areas such as the Western and Central Khabur Triangle, and perhaps the lower Euphrates Valley, appear to have been occupied by more nomadic peoples (Sallaberger 2007; 417). Unfortunately, and as with ceramic typologies (see Chapter 4), the textual evidence becomes least helpful during periods of significant change, such as those between the Akkadian period and the Ur III and the Ur III and Mari sources. Overall, the early political history of the Northern Fertile Crescent suggests a similar set of cyclical processes to the longer term trends in complexity, with a network of small city states being periodically unified for short periods by both indigenous and external powers. These cycles persisted throughout the Middle and Late Bronze Age as the Northern Fertile Crescent was dominated by a series of competing empires, including the Hittites, Middle Assyrians, and Mittanians, before the arrival of more unified and powerful territorial empires in the Iron Age (see Chapter 4).

Landscape Archaeology and Landscape Transformation Processes

Landscape archaeology has a long history and encompasses a range of theoretical and methodological approaches which I do not intend to review here[5]. However, it should be made clear from the outset that I take landscapes to be cultural products formed through a dialectical interaction between the collections of individuals and groups we call human societies and their environment in which neither has primacy as a causal mechanism (Fisher and Thurston 1999; 630). Physical and environmental factors such as mountain ranges, rivers and rainfall levels may act as structuring principles in a landscape, but the forms of existence which emerge within this structure are not determined by it, and may even overcome such constraints. Landscape archaeology as I use it here is concerned with elucidating these forms of existence, and therefore

[5] See Wilkinson (2003) Chapter 1 for a review of this history in general, as well as in relation to Near Eastern landscapes. For the British Landscape Tradition see (Johnson 2007), for reviews of phenomenological and post-processual approaches see the introductory chapters in (Tilley 1994; 2004) and also (Thomas 2001) and for a more recent attempt at an analysis of political landscapes see (Smith 2003).

with both the relationship between humans and their environment and the properties of a society which can be discerned through its spatial organisation. The value of this type of landscape approach to the study of ancient complex societies lies in the long term and large scale evidence it can bring to the topic (Adams 1965; vii). Mapping the density and organisation of settlement through time allows for the reconstruction of population trends whilst the distribution of sites of different sizes and morphologies may be related to settlement hierarchies and, by inference, degrees of social complexity (Scarborough 2005). Incorporating off-site features allows for the reconstruction of past land-use and agricultural practices (Wilkinson 1994) and the identification of relationships between settlement patterns, natural features such as topography and water bodies, and man-made systems such as canals and routes (Adams 1981). Analysis of these interactions is predicated on our ability to reconstruct past landscapes from the material traces visible in the present. A second aim of this study is therefore to investigate landscape transformation processes, the ways in which successive occupations of the same area result in the attenuation of the archaeological record. The methods by which such a study may be accomplished are discussed in Chapter 2.

Scale and Agency

A central issue in all forms of archaeology is the tension between the scale at which analysis takes place and the lived experience of social actors. This is particularly pertinent to studies employing the sort of landscape approach outlined above, since the long term and broad scale nature of the patterns which emerge are far removed from the individuals who produced them. For example, Pre-Classical chronological phases distinguishable in survey data may be hundreds of years long, such that it is impossible to examine the lay-out of settlement or land-use practices as they would have appeared even at the level of a lifetime. Focusing on long term and large scale trends effectively aggregates the lives of individuals into a series of processes in a manner which may appear both generalising and reductive. What, then, do the patterns visible at such a scale tell us about the past? One answer focuses on the emergent properties of landscapes as the products of repeated collective human actions over time. Whilst the specific motivations and concerns of the people involved in the production of a particular set of material traces may be unknown (and perhaps unknowable), the fact that the process itself continued at a scale beyond that of the individual demonstrates the presence of a larger set of social 'rules'. The relationship between societal or structural rules and the individuals who enact them has been the subject of considerable debate in the social sciences, and especially in the disciplines of sociology and anthropology (see, for example, Giddens 1984; Bourdieu 1990) where the individuals in question are available to answer questions personally. This is rarely the case for archaeologists who are reliant on the material remains of past practices. As a result of this reliance on essentially aggregated evidence, landscape archaeology as it is formulated here tends to stress the social rules which govern collective behaviour over the agency of the individual. This is not to say that the agency of certain powerful individuals cannot have a profound impact on the landscape. The construction of large irrigation systems at the behest of kings is well attested in the textual record of both Northern and Southern Mesopotamia (Renger 1990; Ur 2005), and these must have affected settlement structure and land-use. However, such top-down approaches are much more difficult to reconstruct from landscape archaeology alone in the absence of textual sources, unless the name of the individual is literally inscribed onto the feature, and are consequently much harder to apply to prehistoric periods.

Useful Concepts for Regional Analysis in the Fertile Crescent

Analysis of trends at a regional level requires a theoretical basis capable of articulating and understanding large scale variation. One of the most pervasive conceptual frameworks used in the study of interregional and regional scale interaction is World Systems Theory (WST). WST was originally proposed as an explanatory model for the development of modern capitalist nation-states in Europe during the last five hundred years (Wallerstein 1974) and has since been applied in a variety of historical and archaeological contexts (Schneider 1977; Chase-Dunn and Hall 1991; see Hall and Chase-Dunn 1993), including the pre and proto-historic Near East (Kohl 1979; Algaze 1989; 2005 [1993]). The theory gives primacy to interregional trade and exchange mechanisms as causal factors in the genesis of two contrasting areas, the core and the periphery, which cross-cut multiple individual societies. Core areas exert a degree of political and economic control over peripheries through the monopolisation of technology and other means of producing finished goods, resulting in highly asymmetric trade and exchange relationships. Peripheries provide raw materials to core areas which are then transformed into high-value products to be consumed in the core and also exported back to the periphery[6]. Cores are generally more developed than peripheries in social and political institutions and over time accumulate a larger share of the total material resources. In recent years the application of WST to archaeological data has been criticised on a number of levels. Initially, these critiques centred on the insistence of the primacy of the core area as a causal factor in the trajectory of the entire system, and the assumption of complete core dominance over every aspect of peripheral existence. Later formulations of the theory have sought to downplay this primacy (Hall and Chase-Dunn 1993), but the structuring role

[6] Perhaps the most fully realised articulation of WST in the Near East is that presented for the Uruk period by Algaze (1989; 2005 [1993]). Algaze considers the competing polities which emerged during the 4th millennium in Southern Mesopotamia to represent a core, controlling an informal economic, and in some areas actively colonial, empire stretching into Northern Mesopotamia along the Tigris and Euphrates rivers, and into Turkey and Susiana in Iran. Like the larger theory on which it is based, this model has been subject to significant critique on both theoretical and empirical grounds. Evidence from sites such as Hacinebi and Arslantepe in Turkey and Brak and Hamoukar in the Khabur basin in Syria has demonstrated that the Late Chalcolithic societies in Algaze's periphery zone were highly complex prior to the Uruk period. Further, the interaction between potential Southern Mesopotamian settlers and local populations was not one of direct domination in either the political or economic spheres (Stein 1999a; 1999b).

of the overall interaction between core and periphery is still given greater theoretical weight than local developments in either zone. Such a focus on regional and interregional scale interaction does not sufficiently address the importance of local social and environmental factors and the competing agencies of various groups and individuals *within* the societies involved in the world system (Brumfiel 1992; Stein 2002).

Despite these criticisms of core-periphery models, the concepts still hold some value as metaphors for relationships at a regional scale, particularly when combined with the sort of empirical data available in the FCP. Through close analysis of survey and other archaeological data it is clearly possible to differentiate between areas in relation to settlement density, settlement hierarchy and, to some degree, political organisation, as well as in the stability of settlement through time. Analysis at a super-community level requires some way of articulating these differences. However, as Stein has rightly pointed out, '(a)s soon as we start to call some regions "core areas" and others "peripheries," we have already structured the discourse…between the two areas into an inherently unequal relationship' (2002; 903-4). Recent scholars have sought to circumvent this problem by replacing 'periphery' with more nuanced concepts with greater explanatory power, including 'sub-optimal regions' (Philip and Bradbury 2010; Bradbury 2011) and 'marginal environments' (Geyer and Calvet 2001; Geyer et al. 2007). Whilst it could be argued that both these terms retain some of the unwanted connotations inherent in the idea of peripheries, they do represent a useful step forward. Their main advantage is that they allow for an understanding of environmental constraints whilst still incorporating the contingent and dynamic nature of human-landscape interaction. Philip and Bradbury see sub-optimal landscapes as areas which have a generally lower agricultural and economic potential than cores but which, under certain circumstances and given appropriate investments of labour, may be highly productive. Such environments are characterised by repeated pulses of settlement which may be relatively short-lived and separated by long periods of low settlement or even abandonment. Although they apply this terminology to the basalt uplands of the Northern Survey Area of the SHR, and specifically rule out its use for the steppe lands to the East (Philip and Bradbury 2010; 138), the sub-optimal concept is useful in other landscapes. Wossink, for example, sees the steppe zone as one suitable for occupation 'only under specific socio-cultural and economic conditions' and stresses that such conditions are subject to change through time. In both cases the assumption of the dominance of core areas over sub-optimal or marginal zones is not retained from the original core-periphery model. Importantly, the possibility for more than one core area to exist within a larger region has also been recognised, and in fact stressed as an important generative factor in early state formation (Wright 2005). Given the purview of this study, it is necessary to be able to recognise both cores and margins through survey data. In this case, core zones may be defined as those areas which demonstrate high agricultural potential, long term stability, high settlement densities and complex site hierarchies and settlement patterns relative to other occupied areas. Sub-optimal or marginal zones are those which experience significant fluctuations in settlement density and structure through time. We might also add a third category of landscape, those which are never densely settled and in which humans have little impact (Figure 1.3). On this formulation, regional analysis requires the archaeologist (1) to define core and sub-optimal areas in the landscape through time (2) to identify the socio-cultural and economic conditions which explain the fluctuations in the margins and (3) to relate these to the trajectories of settlement in the core zones and the conditions which prevailed there.

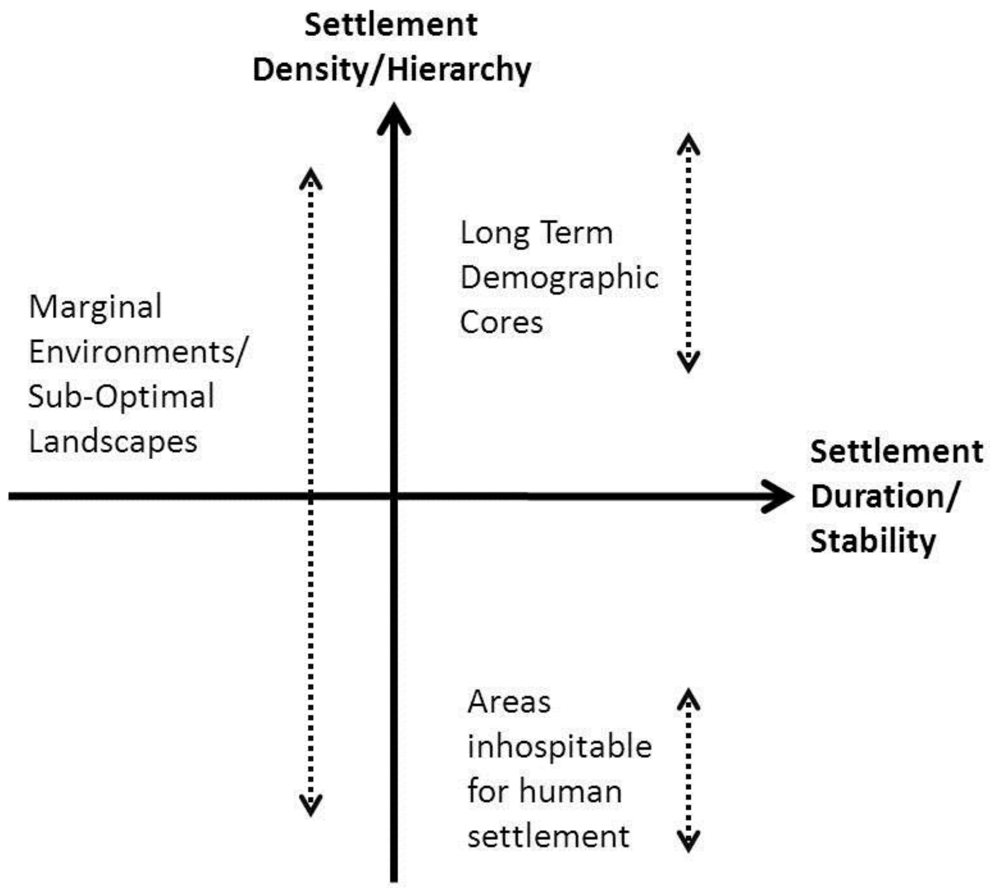


Figure 1.3: Diagrammatic representation of the continuum between core and sub-optimal/marginal areas. The Y axis relates to a combination of the density of settlement in a region and the number of distinct groups of site sizes. The X axis relates to the stability of settlement in a region, understood as the degree of fluctuations in settlement

The Zone of Uncertainty

For the dry farming part of the Fertile Crescent investigated in this study, a key environmental constraint affecting the agricultural productivity of a landscape is rainfall, both in terms of absolute amounts and in annual fluctuations (Cocks et al. 1988; Wilkinson 1997; 2000c). Based on this rainfall distribution and studies of modern agricultural practices, Wachholtz (1996) has defined a ‘zone of permanence’ and a ‘zone of transition’ for the landscapes of northern Syria, and particularly the area to the south east of Aleppo. The zone of permanence includes areas which receive at least 250mm of rainfall every other year and is occupied by sedentary communities practising dry farming of wheat and barley, with the latter predominating, along with some sheep and goat herding. The zone of transition receives between 250 and 180mm of rainfall allowing for limited cultivation of barley, with sheep and goat herding predominant. Below the 180mm limit dry farming is not possible and occupation is restricted to semi-nomadic Bedu groups (Wachholtz 1996; 8). Using Wachholtz's model, Wilkinson has defined a 'zone of uncertainty' for agricultural production equivalent to the 'zone of transition' in modern times, stretching from the southern Jazira to the Middle Euphrates and Ebla (2000c; 27; fig. 2). Like the 'marginal' and 'sub-optimal' zones described above, the zone of uncertainty can be considered a potentially productive landscape given the right social, political and economic conditions. Using modern day rainfall as a guide[7], it is possible to extend this zone into central and southern Syria, and even the southern Levant. The degree to which this may reflect rainfall levels in the past is a matter of some debate (see above). In the face of these uncertainties it is best to understand the zone of uncertainty as a heuristic interpretive device rather than a cast iron definition of settlement divisions or subsistence practices, and this is the sense in which I use it here.

Aims and Structure of the Study

The broad scale of this PhD necessarily places some restrictions on the level of detail it is possible to cover. It should be noted from the outset that I am not attempting a full scale reanalysis of any of the individual surveys which make up the FCP; the aim is rather to organise and integrate them in such a way as to allow larger trends to emerge. However, research agendas, methods and technological changes over the 40 year period in which the surveys were undertaken have resulted in significant differences in the data generated (see Chapter 3 for discussion of the issues involved in this). In order to investigate and mitigate the effects of these changes, and to retain the level of empirical rigour I have argued is vital for broad scale regional comparisons, it has been necessary to discuss the survey results in some detail (see Chapters 5-7). This limited reanalysis builds upon the original survey reports but also updates them in light of both later scholarship and interpretations possible through remote sensing data which may not have been available or used in the original survey. In the case of two sets of projects, the KHS and TS and the NJS and THS, the proximity of the original surveys combined with remote sensing data means we can investigate patterns in larger continuous areas than was possible in the original surveys. Where possible, chronological uncertainties have also been resolved through the incorporation of results from later sequences (see Chapter 4). For reasons of space, the need to update the surveys has also led to a focus on the data itself as opposed to interpretations relating to broader social and political processes, although these are discussed in Chapter 8. This tension between the need for detailed

[7] The rainfall isohyet demarcations used in this study are taken from Wirth (1971) and are derived from long term averages collected at a variety of weather stations over several years

discussion of data across a region and the desire to produce interpretations at a broad scale is worth noting, particularly given the constrained nature of most forms of mainstream academic publication currently available. It is hoped that the close examination of the data provided here will allow for more interpretative freedom in using the dataset developed in this thesis in the future.

To summarise, the aims of this thesis may be stated as follows:

- To develop methods for the integration of datasets derived from multiple landscape surveys, satellite imagery analysis and cartographic data into a single interpretive framework
- To use this framework to investigate and compare settlement trajectories and the early urban phenomenon across the Northern Fertile Crescent during the 5th, 4th and 3rd millennia B.C.
- To further compare the subsequent settlement histories across the same region and assess the impact of later occupation on the archaeological record
- To assess whether trends in settlement and landscape use are visible at a regional level

This study is divided into three sections to reflect these aims. Chapters 2-4 deal with issues concerning the understanding and integration of landscape and survey data at a regional level. Chapter 2 reviews the current state of our understanding of landscape transformation processes and proposes a method for the elucidation of such processes from the data available in the FCP. Chapter 3 provides details of the major data sources used, including the FCP surveys, satellite imagery and map data, and sets out a method through which these diverse datasets can be combined. Chapter 4 addresses the vital issue of chronology and again deals with the combination of data at a regional level. The second section includes Chapters 5-7, which deal with the three sub-regional areas of the Fertile Crescent outlined in Chapter 4, the Middle Euphrates, the Jazira and Western Syria. I deal first with the Middle Euphrates since it includes the most varied and largest dataset, with four surveys carried out between 1974 and the present, meaning the issues involved in amalgamating data at different scales are most visible (see Chapter 3). I then move on to the next most complex dataset in the Jazira, involving three surveys, before finishing with the two surveys in Western Syria. In each case, detailed analysis of settlement and land-use is provided for the late 5th, 4th and 3rd millennia, along with more general trends observable in the long term. This geographical division has been retained in the first stages of analysis as a way of negotiating the enormous amount of data involved in this study. Along with a relatively high degree of chronological similarity, each sub-region presents a broadly similar environmental and settlement universe which merits consideration in its own right. These three chapters serve as the precursor to the final section, Chapter 8, in which trends in settlement and landscape use, as well as the impact of landscape transformations, are compared at a regional scale. Such an approach results in a multi-scalar analysis based on a tripartite division, from individual surveys through sub-regions to regional analysis, allowing trends at different scales to emerge from detailed discussions of the data itself. The concluding Chapter 9 provides a summary of the main conclusions of the study, assesses the implications for regional analysis in archaeology as a whole and suggests some future research directions.

Chapter 2: Landscape Transformation Processes in the Near East: the State of the Art

Introduction

My aim in this chapter is to provide an overview of the processes and factors which affect human traces on the landscape, and from this to begin an analysis of the specific landscapes of Northern Mesopotamia. I shall begin my discussion with a brief examination of the physical and geomorphological factors involved in processes of landscape transformation. The majority of this chapter, however, will focus on the ways in which successive cultures have had an impact on the remains of preceding societies and the potential for archaeologists to overcome this impact in reconstructing past landscapes.

Physical and Environmental Landscape Transformation Processes

The principal physical factors which can affect the preservation or destruction of traces of human settlement and existence are alluviation and colluviation; the transport of soils and sediments from one place to another by water or, in the case of aeolian deposits, wind. A classic example of this occurs in the alluvial plains of Southern Mesopotamia, where the Tigris and Euphrates rivers carry enormous amounts of sediment from the upland areas of Turkey and Syria to southern Iraq, where the decrease in energy brought about by the flat terrain causes massive deposition of suspended material. This has a significant effect on the archaeology of the region, with deposits of over five metres visible above the lowest levels of some tells and, by inference, the burial of smaller settlement mounds entirely (Adams 1981). In order to get around this problem, archaeologists must be able to predict the types of settlements and features which may have been lost. It is therefore necessary to investigate the processes behind deposition itself. Two factors bring about changes in the amount of deposition over time; on the one hand climate, in particular the amount of rainfall combined with resulting vegetation shifts, and on the other the effect of anthropogenic deforestation (Goldberg and Bar Yosef 1990). The relationships between these factors, however, as well as the particular sedimentation types which result, are the matter of considerable debate.

A useful case study in this area is that of the Younger Fill, a particular type of sediment, buff or grey in colour and comprised of silty sand, which occurs all over the Mediterranean, including much of Western Syria. In his investigations of the Younger Fill, Vita-Finzi (1969) favoured a climatic origin. On his model, the fill is caused by increased alluvial deposition as a result of the wetter conditions of a regional 'minor Ice Age' (Vita-Finzi 1969; 115) during the Late-Roman period. His argument rests on his own dating of the fill, on the basis of artefactual material discovered within it, to the end of the Late-Roman/Early Medieval period, as well as the ubiquitous nature of the similar deposits across the entire region. Thus the fill is conceived of as the product of a unique event caused by conditions that prevailed for a very short period but over a very large basin (Bintliff 2002). Wagstaff (1981; 1985) disputes these arguments, instead proposing a model in which the timing and rate of the clearance of vegetation by humans results in increased erosion and the development of the fill at different times in different places. Although the fill is associated with Late-Roman artefacts in some areas, in others, such as mainland Greece, it may have begun to form as early as the Bronze Age (Wagstaff 1981; Goldberg and Bar Yosef 1990). Moreover, it is likely that specific local factors had as much of an effect as continental level climatic shifts. In the case of Western Syria, Wagstaff relates the formation of the Younger Fill to economic decline in the Late Roman period, suggesting that a combination of high taxation and labour shortages resulted in the degradation of terracing systems and therefore the release of sediment by erosion into river systems (Wagstaff 1985). This is partially supported by evidence from the Jebel al-Akra to the south of the Amuq Plain, where settlement expansion in the Late Hellenistic and Early Roman periods is at least correlated with an increase in erosion along larger wadis (Casana 2008).

Regardless of the specificities of the Younger Fill, it is widely accepted that deforestation and the general clearing of land for agriculture has had a significant impact on the landscape. This impact may have begun as early as the late Neolithic (Van Andel and Zangger 1990) and becomes more significant over time as the social complexity of the societies in the region increase (Goldberg and Bar Yosef 1990). Of particular interest in the case of Bronze Age Syria and the Levant is the widespread deforestation which may have taken place at that time, evidenced in palynological analysis and lake cores (Mikesell 1969; Yasuda et al. 2000). The effects of these processes on the landscape are certainly significant and occur at both local and regional levels. Geomorphological processes can change the material existence of sites, such as the deep gullies and alluvial fans found at larger tells like Brak in the Syrian Jazira, as well as masking or entirely obscuring smaller sites and features across vast regions such as the alluvial plains of southern Iraq (Adams 1981; Pournelle 2001). As Wagstaff has demonstrated (1985) in the case of Western Syria, it is important to take into account small-scale factors, such as local economic decline and the consequent lack of terrace upkeep, in the construction of explanatory models of ‘physical’ processes. In the main, significant alluvial and colluvial deposits will be confined to river valleys. This means that river valley settlement is more affected than that on the uplands or steppe. The Bronze Age, where most of the settlement is confined to river and wadi valleys (in the North) as well as canal systems (in the South), is particularly affected (See Cordova 2007 for a comparison with the Jordan Valley).

Landscapes of Survival and Destruction

In order to investigate landscapes it is vital to build a theoretical framework from which to deal with both natural and cultural processes. One such framework, first articulated by Taylor (Taylor 1972) and developed by Williamson (1987; 1998) and Wilkinson (2003; 41-43), involves delineating certain landscapes as zones of destruction and zones of survival. The central idea here is that any human trace left on the landscape will remain there until it is destroyed, over-run or incorporated into a later landscape. Thus zones of survival can be described as 'small and often upland areas where later peoples never lived, and only rarely cultivated', whilst zones of destruction occur in 'the greater part of the country where later people have largely or partly destroyed the evidence' (Taylor 1972; 109-110). Williamson has applied such techniques to the landscape of Britain and in doing so has deepened their theoretical possibilities, although it is important to note that he is seeking to explain the landscape we see today as opposed to reconstructing the landscapes of the past. In his various studies of the development of the British landscape, Williamson emphasises the relationship between land used for the purposes of arable and land used for pasture. The use of the plough on arable land could be said to be the principal destructive factor in terms of archaeological sites, whilst significant reorganisations of field boundaries and the encroachment of settlement onto new areas serve to at least partially destroy broader organisational correlations. Thus in reconstructing the Medieval landscape of Britain, it is more appropriate to look at areas around the Midlands, as these were gradually returned to pastureland and grassland after the periods of enclosure during the last 500 years or so, than the Essex and Fenland areas in the East which were subject to heavily industrialised and developed farming during and after the industrial revolution (Williamson 1998). Looking further back, the Late Saxon reorganisation of fields and boundaries, which Williamson relates to a process of nucleation of settlement during that period, obliterated much of the Roman and prehistoric landscape (Williamson 1987). It is still possible to reconstruct such landscapes using techniques of landscape stratigraphy and topographic analysis, in which features such as Roman roads or field boundaries derived from the earliest maps can be used as *terminus ante quem* devices to date certain patterns of occupation. Further, pristine prehistoric landscapes do survive in upland areas where arable-based agriculture and settlement has generally been sparse, such as Salisbury Plain, but these tend to be 'islands within oceans of arable or former arable' (Williamson 1998; 16) due to the domination of the British landscape by arable farming.

The theoretical framework in which the landscape is divided into zones of destruction and preservation has been adapted and applied to the Near East, particularly by Wilkinson (2003). Wilkinson incorporates Schiffer's (1987) conception of c- and n-transformations, meaning cultural and natural respectively, into the Taylor/Williamson model, and also uses the idea of 'signature landscapes' (Wilkinson 2003; 7) as reflective of a particular period. Partly because of the significantly longer chronology and relative novelty of heavily industrialised agriculture in comparison to Britain, Wilkinson has concentrated more on defining discrete zones of preservation and destruction of particular signature landscape types, rather than attempting a study of narrow time-scale landscape taphonomy in the Williamson sense. He divides the Near East into five zones, each of which allows for a different degree or different kind of landscape preservation. The mountain and desert regions, rarely settled and often abruptly abandoned, provide the most complete signature landscapes, whilst the intermediate zone, of which the Jazira is a prime example, contain a varied settlement pattern in which social, political and climatic factors may affect the extension of settlement and therefore the preservation of relic landscapes. The zone of attrition encompasses land that has been continuously or near-continuously occupied since the landscape in question came into existence and therefore contains few past traces. This is particularly significant for river valleys. We might add to the definition zones in which a significant replanning of the landscape has taken place, such as that brought about by centuriation during the Roman period (Van Liere 1958-59), and zones in which occupation on the same tell sites has continued for millennia, such as the Amuq valley (Casana and Wilkinson 2005a; Casana 2007). Wilkinson's final zone is that of the coast, an as yet under-explored area. From this framework, it is clear that the first three zones represent the best areas to look for traces of the ancient landscape. Of these three, the third 'intermediate' zone represents the most interesting area in relation to the Bronze Age for most of Syria and the Levant due to the combination of there being significant settlement during that time followed by fluctuations that have served to preserve the landscape to some degree. Mountains, uplands and the drier steppe regions have been considered to have supported lower levels of settlement during the Bronze Age and therefore to retain relatively little information even if they remain pristine. This situation is changing as new research is conducted in these regions (see, for example, Braemer and Sapin 2001; papers in Geyer 2001; Philip and Bradbury 2010) but it is also becoming clear that the form this occupation takes is very different to that in the agricultural lowlands.

Landscapes of Survival in the Lowlands

The principal areas that could be defined as intermediate in Wilkinson's terms are those of the agricultural lowlands and steppe landscapes on the edges of the desert regions in the Jazira, through to western Syria. These are rich in Bronze Age settlement and have been occupied by both sedentary villagers practising cultivation, nomads practicing pastoralism and most probably a variety of modes of existence in between. The limits of sedentary agriculture are of particular interest here, since, as I have mentioned, it is the action of the plough that principally destroys sites and features. It is generally considered to be the case that the limits of cultivation are defined not so much by climatic concerns as by socio-political ones, in particular the relationship between sedentary peoples and nomads (Lewis 1987; Rosen 1992). Lewis has demonstrated that for the Ottoman periods it is the strength of the state which makes permanent settlement in the *badiyah* region, defined as the steppe and desert interior of Syria, possible and posits that 'eastern Syria can only be maintained as an agricultural area in the face of the ceaseless pressure of the nomads by a strong and extra-vigilant government' (Lewis 1987; 23). Thus from the period of Mongol invasions, Bedouin groups occupied much of Northern Syria and the intermediate zone where previously there had been settled occupation until the Ottoman campaigns in the middle of the Eighteenth century pushed settlement southward again (Lewis 1987; Hütteroth 1990). Even after this period, sedentary occupation and agricultural exploitation of the Upper Khabur basin remained sparse until the area was 'pacified' under the French Mandate between 1926 and the Second World War (Ur 2010a; 14). The Bronze Age settlement in this region pushes far further south than any sedentary cultivation up until the most recent past, and we therefore have fairly well preserved landscapes relating to that period. Areas such as the *kranzhugeln* zone in the semi-arid region around the Jebel Abd Al-Aziz (Kouchoukos 1998; Wilkinson 2000c) or that extending west from the Euphrates valley south of Aleppo (Geyer 2001; Geyer et al. 2007; Braemer et al. 2010) are good examples of this extension into zones in which sedentary agriculture is marginal at best and which have therefore remained unsettled, in some cases permanently, but at least until the introduction of modern institutions and agricultural techniques. Such incursions, however, should also be considered with caution, as it is possible that they may not be representative of the general settlement pattern of the area. The *kranzhugeln* settlements, for example, may have been principally trading posts or places of interaction with nomadic groups (Kouchoukos 1998), and therefore reliant on a different kind of subsistence strategy to the staple producing cities further to the north. Similarly, in the region south of Aleppo there may have been a more diverse local economy that included a higher degree of pastoralism than the cities to the east and west (see Chapters 6 and 8 for further discussion).

Landscapes of Survival in the Uplands

As well as the steppe and semi-arid regions, the uplands around Aleppo and Antioch provide examples of landscapes of near complete survival. In the Massif Calcaire region, we find a relic landscape almost untouched since the area was abandoned in the sixth century A.D. The area was first settled some 400 years earlier and used predominantly for the production of olives before being abandoned due to the collapse of Antioch and the urban economy (Tchalenko 1953). On the Tchalenko model, the demand for olives, and olive oil in particular, led to the incursion of settlement into previously unoccupied zones in which staple crop production was uneconomical but in which a monoculture of olive growing provided sufficient economic reward to buy in staple products from the surrounding plains. When Antioch fell in 610 A.D., having suffered a series of disasters in the preceding years, the market for olive oil collapsed and the settlements were quickly abandoned. Although the precise length of time the villages remained occupied after the collapse of Antioch is disputed (Foss 1997), and there has been some debate as to whether olives constituted a monoculture or were part of a mixed economy (Tate 1997), the brief settlement and rapid abandonment of the Massif Calcaire certainly qualifies it as a landscape of survival. Again, however, we are faced with the problem of how representative such areas are in relation to larger settlement patterns or settlement in areas that have remained settled since the period of the landscape we wish to investigate. There is some evidence to suggest that the expansion of settlement into the uplands seen in the Massif Calcaire was a more widespread phenomenon, at least in the Southern Levant (Marfoe 1979). The unique phenomenon of the Dead Cities should therefore be regarded as a result of the ultimate failure of settlement in the Massif Calcaire rather than as the product of an unusual form of settlement, and can be contrasted with more resilient settlement in upland zones in the wider region.

Structural Transformations and Signature Landscapes

It seems, then, that an investigation of only those settlement patterns which have survived very nearly intact due to their marginality is problematic if the goal is the reconstruction of settlement over a wider region, and we therefore need to find ways of reconstructing landscapes which have been partially destroyed. The method outlined by Williamson (1987; 1998) mentioned above, in which different features are removed using a stratigraphic or taphonomic model, causes problems when applied to the Near East as the precise dating of features vital to the process is extremely difficult, particularly in the absence of the sorts of long-lived field boundary systems present in the landscapes of Northern Europe. An alternative approach builds on the ideas of ‘structural transformations’ and ‘signature landscapes’ (Wilkinson 2003). On this model, landscapes are conceived of as ‘systems either fluctuating around a steady state or subject to major changes of state that may result in a new equilibrium at another level’ (Wilkinson 1994; 484). Structural transformations are synonymous with these ‘major changes’ and imply a simultaneous change in social organisation (Casana 2007). Signature landscapes represent the material traces of the periods of stability between the structural transformations. When a structural transformation occurs, the new configuration of settlement and land-use begins to obliterate the remains of the previous configuration. Importantly, the specific form this destruction will take is discernible in the relationship between the original and the later signature landscapes.

Essentially, this approach requires an understanding of the kind of landscape we are looking for, and therefore where to look for it, as well as an understanding of the intervening landscapes and the processes that may have formed them. For the Bronze Age, the structural transformation which occurred with the dispersal of settlement in the Iron Age in the Jazira allowed for the preservation of sites to some degree, whereas in the plains to the west of the Euphrates, such as the Amuq, the continued occupation of tells has meant that Bronze Age settlement has been buried beneath later remains. The dispersed settlement pattern visible in the east may be a result of the increased security and stability afforded by the Neo-Assyrian Empire (Liverani 1992). The propensity for the introduction of an empire to result in the dispersal of settlement has long been noted (Weiss 1986; Liverani 1992), although the reasons for this are not entirely clear (see Chapter 8). Similarly, the retraction of authority may also result in abandonment or reconfiguration, such as that posited for the relinquishing of Akkadian control in Northern Mesopotamia which, coupled with environmental degradation, may have resulted in the dispersed settlement pattern at the end of the 3rd millennium (Peltenburg 2000).

Conclusion

In his original exposition on the delineation of landscape into zones of survival and destruction, Christopher Taylor suggested there were two basic requirements; that 'the recoverable pattern must be reasonably complete in a given area' and that 'there must be a fairly accurate idea of the form, size, purpose and organisation of most of the settlements in the same area' (Taylor 1972; 109). The idea that knowledge of settlement function is necessary to understand settlement patterns is seemingly slightly circular, and this in fact led Taylor to be somewhat pessimistic about the future of the discipline. However, the framework elucidated by Williamson and Wilkinson outlined above allows us to widen the definition of what a recoverable pattern might be. Further, through an integration of textual and archaeological analysis it is possible to consider the form, size, purpose and organisation of settlement during the Bronze Age, as well as the successive structural transformations and signature landscapes which occurred in the preceding and post-ceding periods. Using the high quality survey data available in the FCP we can describe the signature landscapes related to the Late Chalcolithic and Bronze Age, as well as the landscapes formations which have emerged between the 4th millennium and the present day. By comparing the differences in preservation and settlement trajectories between discrete areas within the wider region, we can begin to assess the causal factors behind structural transformations and long term landscape change.

Chapter 3: Materials and Methods

Introduction

The Fragile Crescent Project (FCP) brings together a variety of datasets. These include different types of satellite imagery, both high and low spatial and spectral resolution, as well as Digital Elevation Models (DEMs), and published and unpublished information from eight archaeological survey datasets collected under the direction of Tony Wilkinson and Graham Philip. These primary data are supplemented by published excavation and survey reports from projects undertaken by non-FCP members, as well as maps. All of these data are brought together in a Geographical Information System (GIS). Combining such a wide range of data presents several issues. The eight surveys have been conducted over the past 30 years with two still currently running. Survey techniques and technological approaches have changed markedly during this period, rendering a simple comparison of results potentially misleading. On top of this, the recognition of sites and features by satellite imagery presents a specific set of distortions relative to field derived data. It is also necessary to bring in more general environmental and geological data derived from remote sensing, maps and other sources. The degree to which the problems caused by the integration of all these data sets can be mitigated, or at least acknowledged, directly relates to the robustness of the archaeological interpretations we can make from the results. This chapter first describes the methods of integrating survey data before moving on to discuss the ways in satellite imagery has been used to add value and information to field derived settlement data. Finally, the methods by which all of these types of information have been integrated into a single database are discussed.

Survey Data

The FCP includes a primary dataset consisting of eight surveys conducted in the main within the last thirty years (Figure 3.1). Table 3.1 illustrates some of the key facts regarding each survey. Two further survey areas will be utilised in addition to these eight. The Tell Hamoukar Survey (THS), was undertaken by Dr Jason Ur in a 125km^2 survey area surrounding the large Early Bronze Age site of Tell Hamoukar (Gibson et al. 2002b; Ur 2004; 2010a). Although situated in Syria, the THS is in close proximity to the North Jazira Survey (NJS) (in some areas the survey boundaries are only 4km apart) and provides a complementary dataset. The survey also made use of very similar methodologies and chronologies to those employed by the FCP surveys meaning the results are readily comparable. Members of the FCP team (particularly Louise Rayne) are also working on bringing together a number of surveys in the drainage basin of the Balikh River. The Balikh flows from the Harran plain in Turkey into Syria and joins the Euphrates at the modern city of Raqqa. It was decided not to include these data in the current analysis due to the extremely complex nature of the dataset and history of survey. Survey was carried out by a series of Dutch teams based at the Neolithic site of Tell Sabi Abyad during the 1980s. These resulted in a number of articles on the Neolithic settlement (Akkermans 1984; 1989; 1993) a PhD thesis on the Bronze Age (Curvers 1991) and a publication on the later periods (Bartl 1994). A later survey by Tony Wilkinson was undertaken as part of the Western Jazira Landscape Project run from the Oriental Institute at the University of Chicago (Wilkinson 1998). Each phase of the Balikh Survey was characterised by different methods and undertaken at variable levels of intensity, rendering comparison with the other surveys extremely difficult.

Survey Name	FCP Survey Acronym	Country	Field Seasons	Director	Area	Total Number of Sites
Kurban Höyük Survey	KHS	Turkey	1980 - 1984	TJW	100km^2 as well as 1000km^2 'Area of Interest'	47 including wider area
North Jazira Survey	NJS	Iraq	1986 - 1990	TJW	475km^2	184
Titriş Survey	TS	Turkey	1991	TJW	175km^2	47
Tell Sweyhat & Upper Lake Tabqa Survey	SS, ULT	Syria	1974, 1991 - 1992	TJW	60km^2 (SS) as well as 350km^2 'Area of Interest' (ULT)	34 and 55 in wider area
Tell Beydar Survey	TBS	Syria	1997 - 1998	TJW	450km^2	83
Amuq Valley Research Project	AVRP	Turkey	1995 - 1998, 2000 - 2002	TJW	535km^2	346
Settlement and Landscape Development in the Homs Region, Syria	SHR	Syria	1999 - Present	GP	North Area 180km^2 South Area 400km^2	Approx 300[8]
Land of Carchemish Project	LCP	Syria	2006, 2008 - Present	TJW	500km^2	80

Table 3.1: FCP Surveys Key Information

[8] The SHR Project does not use the same conventions for site definition as the other surveys. The SHR uses an attribute based system in which features of spatial units are recorded rather than making broad classifications of spatial units into sites and non-sites as in the other surveys. This causes some problems in relating the surveys (see below)

As a result, the Balikh Survey (BS) under which all of these phases have been collected will not be included in the primary surveys used in this PhD. However, the data and interpretations will be drawn upon as required. Whilst the majority of the following discussion of these surveys will focus on the differences between them and the methodological implications of these differences for the project, their similarity is also of some importance. The fact that all the surveys were overseen by two members of the project means that we have access to substantial unpublished material, including original survey record sheets, notebooks and maps, as well as the knowledge base of both Tony Wilkinson and Graham Philip.

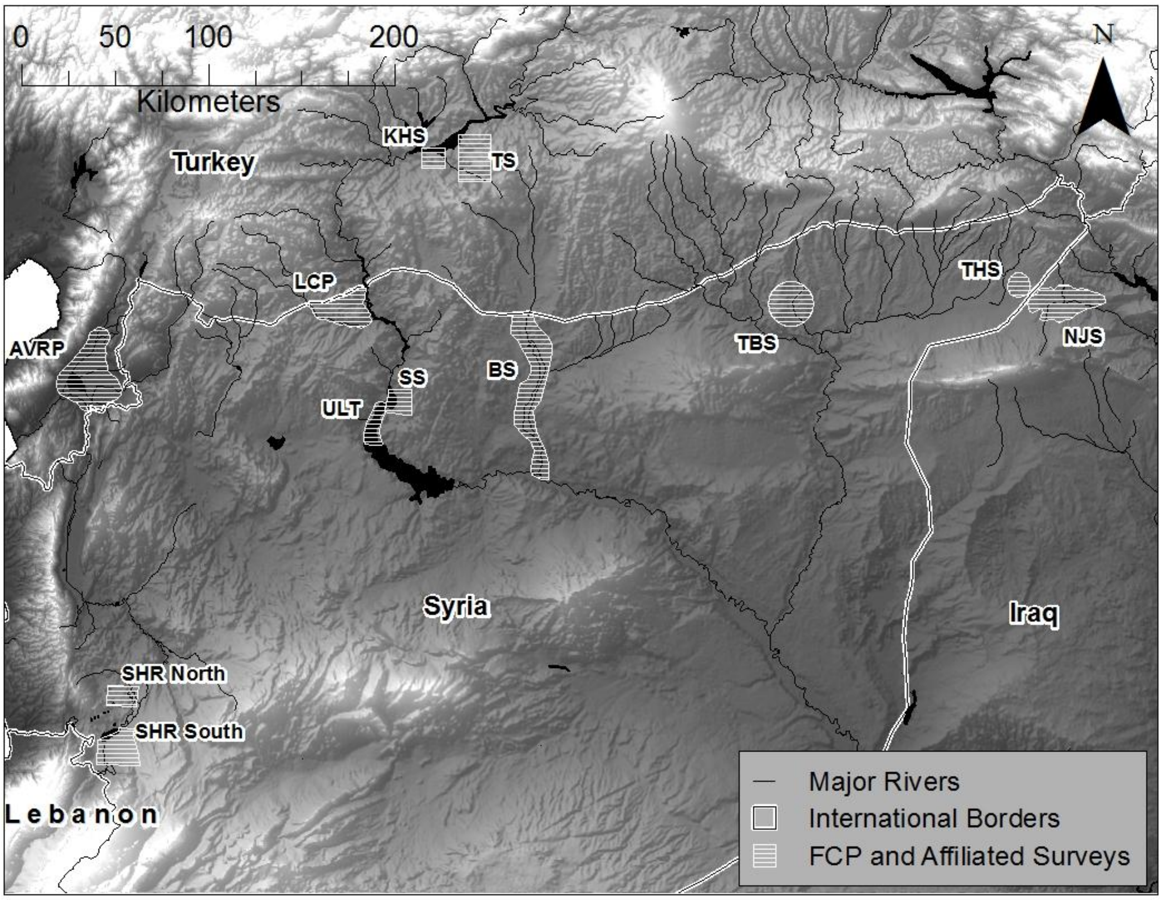


Figure 3.1: Locations of the FCP and Affiliated Surveys. See text for survey acronyms. Background DEM derived from the SRTM, February 2000

Furthermore, whilst the methods used in the surveys have changed over time, the general approach has been fairly consistent, and certainly more consistent than would have been the case in taking the work of a large number of surveys conducted by, or at least overseen by, many different individuals. This methodology has been summarised by Wilkinson himself as 'a combined approach...in which full coverage methods are used to recover the basic settlement structure, and sample surveys...provide estimates of the distribution of site sizes, particularly those at the smaller end of the spectrum' (2000a; 227). Full coverage survey, in the sense that the term is used outside of the Mediterranean, can be defined as occurring when 'the extent of the survey coincides with the extent of the study region' and is particularly beneficial in elucidating ‘the structural properties of the archaeological record that cannot be covered using sampling survey strategies’ (Sumner 1990: 93, 110). A full coverage survey involves investigating all of the significant sites within a region, rather than sampling particular areas which are assumed to be representative, allowing analysis to take place at the scale of the entire settlement universe – Sumner’s structural properties. This approach can be contrasted with that currently popular in Mediterranean Europe, with intensive sampling of very small survey areas; an approach that results in very high site recovery rates compared to surveys in the Near East (Wilkinson et al. 2004; 190 figure 14.1) at the expense of larger area analyses of complete settlement systems (Blanton 2001). The comparative ease of finding large and topographically distinct tell settlements in the alluvial landscapes of Mesopotamia has aided full coverage projects in this region since it is easy to locate and visit the major sites (Ammerman 1981; 64).

Full coverage survey in the Near East, however, does have significant implications for the discovery of smaller sites and off-site features, because it is often associated with a relatively low sampling intensity. The intensity of a survey corresponds to the amount of effort put into any given area and can be quantified in relation to the spacing of units of survey area such as transects (Banning 2002; 60-62). Full coverage survey does not by definition preclude an intense sampling strategy, but in practice limitations of time and money necessarily result in a significantly lower intensity level. This lower level of intensity may lead to the differential recovery of certain types of sites. Smaller and less obvious sites are most likely to be underrepresented, since their discovery requires a greater amount of investigation time. The second part of Wilkinson’s articulation of his survey methodology, arguing for areas of sample survey on top of the full coverage approach, is an attempt to mitigate this underrepresentation (Wilkinson 2000a; 227). Intensive survey methods, particularly transects and sample squares at varying intervals, are a feature of all of the surveys included in the FCP. Sampling areas within individual surveys differ somewhat, mostly due to the time and cost constraints placed on each project. In the Kurban Höyük and Sweyhat surveys, for example, intensive survey was carried out in areas surrounding the key sites but was not undertaken for the larger areas of interest (Wilkinson 1990; 1; Wilkinson et al. 2004; 1). The Tell Beydar survey was curtailed before large amounts of sampling had been carried out, although there is some evidence that the obtrusive nature of sites in the Jazira may render sampling techniques less important than in other parts of the study region (See Chapter 7 and Ur 2004; 106-7). However, all of the surveys include some form of off-site and intra-site transect sampling. Fundamentally, there are key similarities in the ways in which the surveys have been undertaken which commend them to comparative study.

Technology and Survey Methods

Given this shared general approach, it follows that the principal differences between the surveys are related to constraints of money and time as well as to technological advances which in turn have an impact on methods. I shall deal with the individual histories of each survey later. The technological changes most pertinent in explaining the issues related to the FCP can be dealt with more generally. These are the introduction of high spatial resolution satellite imagery, Geographical Information Systems (GIS) and Global Positioning Systems (GPS). Of vital importance to the FCP are the ways in which the use of satellite imagery has resulted in differences between the numbers and types of sites recovered by the surveys. The use of high spatial resolution imagery has resulted in the discovery of more sites, and particularly of small flat sites (Philip et al. 2002a: 113), as well as off-site features such as tracks and canals (Ur 2003; 2005). Surveys that were able to make use of declassified American Corona space photography (from 1995) and of very high resolution digital satellite imagery (from 1999) (Kennedy 1998; Kouchoukos 2001) will therefore be more likely to have picked up such sites. Moreover, techniques for analysing satellite imagery, as well as the expertise of those involved in interpretation, have also changed over the same period. A key part of the FCP is the reanalysis of original survey material with the addition of remote sensing data that was not available at the time. This re-interrogation of the original data should mean that sites which were not recognised in the first instance can be added later. This process will be discussed more below.

Categorising the Surveys

Beyond the effects of technological changes to the methods of the surveys, the specific aims, fieldwork histories and resulting published and unpublished results of individual projects have also affected the dataset. Again, the impact these differences have on the relationship between individual surveys and the FCP are best understood through the ideas of coverage and sampling intensity. On this basis, the surveys have been split into three groups. The first group comprises the KHS, NJS, SS/ULT and AVRP, and would also include the THS (see Table 3.1). All of these were undertaken as medium term projects in the context of Mesopotamian survey. All had specific aims to investigate the archaeological landscapes of delineated areas and all have been published as monographs with site catalogues (Wilkinson 1990; Wilkinson and Tucker 1995; Wilkinson et al. 2004; Yener 2005a; Ur 2010a). This group also includes the three rescue surveys, the KHS and SS as a result of Euphrates dam projects, the NJS as a result of the North Jazira Irrigation Project. The AVRP can be seen as an extension of the kind of project instigated in the KHS, as both were undertaken by the Oriental Institute at the University of Chicago and organised in similar ways (Marfoe 1990; 6-7; Yener 2005a; 8). This group also includes the two surveys (the KHS and SS/ULT) which incorporated an intensive and extensive methodology, in which a smaller area was systematically investigated and a larger area examined in less detail. In the following discussion any reference to the KHS includes the wider area study conducted for the Early Bronze Age, whilst references to the SS include the Upper Lake Tabqa sites. Overall, this first group can be characterised as surveys in which an area of the Near East was surveyed to a degree which we might call ‘complete’ and the results were published as a comprehensive and organised whole.

Table 3.2 includes a crude estimation of intensity, measured by dividing the total area surveyed by the number of seasons in which fieldwork took place. Assuming all field work seasons were the same length and included the same numbers of personnel, and that some areas were not repeatedly surveyed, the figure produced gives a measure of the amount of time spent per unit of land. In reality, both season length and personnel numbers varied to some degree, although for Wilkinson’s surveys one team in the field at a time is the norm. The figures for the KHS and SS are particularly low and this may be explained by the larger area of interest surveys which also took up fieldwork time but which would skew the figure completely if included. However, even allowing for an inflation of these figures, the first group surveys all have low values compared to the second group. This smaller group comprises the TBS and TS, both of which can be contrasted with the first group in terms of their survey intensity and the nature of their publication. The TS was carried out in one season immediately after the outbreak of the Gulf War prevented Wilkinson from continuing to work in Iraq (Wilkinson, pers. comm. 2009), whilst the TBS was curtailed after two seasons due to difficulties with the permits in Syria, resulting in the disparity in intensity figures mentioned above. Neither was published to the same data standards as the group one survey monographs, but rather in a number of articles or parts of articles. The only published data for the TS comprises a section in the preliminary report for the excavations at Titriş Höyük (Algaze et al. 1992; 40-46), along with a later reappraisal of the dating sequence as a result of further excavations at Titriş itself (Algaze et al. 2001). For the TBS, limited data was made available from the original project GIS. Whilst extremely important for locating and mapping sites, the absence of further metadata limited the usability of this resource. The main source of site data for the TBS were a series of articles in Subartu (Wilkinson 2000b; Nieuwenhuyse and Wilkinson 2008; Ur and Wilkinson 2008), although some additional information and interpretation was available elsewhere (Sallaberger and Ur 2004). None of these data sources provided a comprehensive gazetteer of sites comparable with those provided in the monographs given above. We might therefore characterise these surveys as ‘partial’, both in relative coverage and intensity to the other surveys and also in terms of their publication.

The third group comprises the SHR and LCP, both of which are still running as projects and therefore pose a slightly different set of problems. The SHR is the longest running project within the FCP and was run on a rather larger scale than the other surveys. It is also the only survey not directed by Wilkinson. However, the methods used are similar to those undertaken in the other surveys, including the use of Corona and other satellite imagery to identify areas to be targeted by intensive survey, sampling strategies such as transect walking and the use of GIS (Philip et al. 2002a; Philip et al. 2002b). The SHR has focused much more on methodological developments than the other surveys. It therefore merits inclusion in that it provides a blueprint for the addition of other types of data, particularly maps, and the expansion of analysis beyond the surveyed area (Philip et al. 2005). The LCP is best considered as a survey of the group one type but as yet incomplete. The slightly elevated intensity value will come down as more seasons are undertaken, bringing it into line with the group one surveys. Both the LCP and SHR differ from the group one surveys for our purposes principally on the basis of publication and other data available. Although neither have been published in a format comparable to the site gazetteers of the group one monographs, the presence of substantial GIS and database resources mean these surveys are the best documented in the project.

Survey	**Research Design**	**Publication Type**	**Main Site**	**Seasons**	**Total Area (km^2)**	**Intensity (Area/Seasons)**	**Group**
KHS	Rescue	Monograph	Kurban Höyük	5	100	20	Complete
NJS	Rescue	Monograph	Tell al-Hawa	5	475	95	Complete
TS	Research	Section of Anatolica Article	Titriş Höyük	1	175	175	Partial
SS, ULT	Rescue	Monograph	Tell es-Sweyhat	3	60	20	Complete
TBS	Research	Several Subartu Articles	Tell Beydar	2	450	225	Partial
THS	Research	Monograph	Tell Hamoukar	3	125	42	Complete
AVRP	Research	Monograph	Tell Atchana/ Tell Alalakh	7	535	76	Complete
SHR	Research/ Rescue in the Northern Area	Various Articles, Forthcoming Monograph	Tell Nebi Mend	11 (ongoing)	580	53	Ongoing
LCP	Research	Various Articles, Forthcoming Monograph	Carchemish	4 (ongoing)	500	125	Ongoing

Table 3.2: FCP Surveys Research Design and Intensity

The personal involvement of FCP team members in the field in both of these surveys, although particularly the LCP, has meant the production and storage of data has been organised so as to prove amenable to integration with the larger project. It is clear, then, that even with the similarities in approach and personnel involved in these surveys, there are significant differences in data availability and quality between them. As well as the obvious limitations in survey intensity and coverage, differences principally affect the FCP as a result of the degree of accuracy with which the surveys can be entered into a GIS. The fundamental information in any landscape survey is the size and shape of the entities discovered and their relationships with their surroundings. However these entities are defined, whether as sites, features, raw sherd numbers in a scatter, or landscape classes (for a comprehensive list of 'models of cultural distributions' see Banning 2002; 11-22), they are bounded features possessing topological relationships; they have edges and areas. Landscape data should therefore be inputted into a GIS as vector objects, since it is the relative position of each entity which is of interest (Conolly and Lake 2006: 26). Put simply, the sites and features discovered within the surveys need to be drawn as polygons (and where appropriate points and lines) of corresponding size, shape and position in a GIS shapefile. This format allows for the full range of spatial analysis techniques available through a GIS to be applied. It is helpful here to divide the problem of inputting data into two parts. Firstly location, meaning where the site is positioned in geographical space, and secondly shape and size. I shall discuss these separately because they require different types of data.

Site Location

The data available within the survey projects for positioning sites within the GIS consists of:

- Text Descriptions of location (e.g. '250m North West of Village X')
- Sketch Maps
- Topographic and Published Maps
- GPS points
- GIS shapefiles (both polygons and points)
- Imagery as a guide

With some exceptions, this list can be seen as a continuum from least accurate to most accurate. Producing a polygon based on GPS points is easier and more likely to be a 'true' representation of reality than those digitised from maps, whilst maps are of more use than general location descriptions. The relationship between each of these requires some investigation.

The Problem of Georectification

In order for a map to be used in GIS it must be in a digital format and georectified. Georectification involves relating all of the different data layers to a single coordinate system. A second process, registration, is then required to relate this coordinate system to the real world (Wheatley and Gillings 2002). Both processes require relating particular points available on one image or map to either real world (i.e. geographical) coordinates or to the same point on another image or map. It is good practice to select a base layer to which all other layers are rectified. This is because the errors inherent in any rectification will be repeated and increased by every subsequent rectification. For the FCP, Landsat TM and ETM+ imagery was used as the base layer because the product is supplied already rectified using the Universal Transverse Mercator (UTM) system (Tucker et al. 2004) and full coverage of the FCP study region is freely available. Where possible, all maps and imagery were related to ETM+ panchromatic Landsat imagery since this has the lowest spatial resolution available in the Landsat range (15 metres), although there are exceptions to this where ETM+ imagery was not available such as areas that were covered by lakes before the introduction of the appropriate satellite. The low spatial resolution of Landsat imagery in general, with pixel sizes between 15 and 80 metres, can mean that smaller objects do not show up, making the geo-referencing of maps of small areas, such as individual site plans, impossible, and necessitating the use of higher resolution imagery sources such as Corona, Ikonos or GeoEye-1 (see below). For maps showing general site locations, it is possible to use the Landsat, so that the satellite imagery and maps ortho- and geo-rectified[9] by members of the project all use the same base-layer. However, inaccuracies in both the maps themselves and those arising from rectification and registration mean that even the best maps contain some error.

The Impact of GPS

Map data can be compared with Global Positioning Systems (GPS) as a tool for locating sites. GPS is the name given to a network of satellites operated by the United States military that allows a receiver to pinpoint its own position on the globe. Before 1st May 2000, the United States Government systematically degraded the accuracy of the signal given by the satellites, a process known as “Selective Availability.” During this period, accuracy was approximately 30-40 metres given sufficient satellite ‘visibility’. After this date, GPS receivers could be as accurate as 5m and are generally accurate to within 10m. GPS began to be used in survey in the early 1990s, meaning that GPS points are not available for the earlier surveys in the FCP, whilst the later surveys also benefited from the greater precision available after the removal of selective availability. Even with selective availability, GPS can be considered more precise than most maps. This is because of the combination of internal map error (i.e. the inaccuracy of the drawn map in relation to reality), map generalisations and the errors inherent in rectification. Both of these mean map data

[9] Orthorectification is not the same as georectification. Orthorectification is a mathematical method for correcting distortions in a flat image of topographically varying terrain. It requires knowledge of sensor positions, topography and, importantly, specialized software and has been used in the FCP to correct the majority of the CORONA imagery, excluding those scanned and georectified in Chicago by members of the CAMEL lab (see below). Georectification refers to the process of relating maps or images to one another. The scale and orientation of one map or image can be fitted to another through the use of Ground Control Points (GCPs) where field visits have been possible or simply by visual comparison. Georectification was used in the FCP for all map data as well as satellite imagery where details of sensor position were not available. For more details on this topic see (Conolly and Lake 2006; 76-77, 86-88)

contains some error, and particularly the former mean that this error is almost impossible to quantify. For a handheld GPS the greatest error was around 30m during the period of selective availability (this was reduced from 40m by taking multiple readings and averaging the results) and around 10m afterwards (Ur 2010a; 31). We can therefore say that GPS is more likely to reflect the true location of a site than all but the most accurate maps which have been rectified using a large number of ground control points.

Multiple GPS points also provide a more precise location than a single GPS point. A site described as '250m by 50m' but for which no orientation is available could be placed at any point on an axis around a single GPS point. However, a second GPS point at a known location within a site could provide this orientation and thereby prevent a maximum error of 250m. GIS shapefiles, often based on GPS points taken in the field, are the most accurate record of a site's location as they represent the whole site and can provide further information on orientation and also oddities of shape. Table 3.3 illustrates the types of evidence available for each survey.

Survey	Site Locations Sketch Map	Site Locations Map based on Topographic Map	Site Locations drawn on Topographic Map	GPS during Selective Availability	GPS after Selective Availability	Multiple GPS points and GIS Outlines drawn in the field
KHS		X				
NJS			X			
TS	X					
SS		X				
TBS		X		X	X	X
AVRP		X		X	X	
SHR					X	X
LCP					X	X

Table 3.3: Methods of Site Location by Survey

Geographical Precision

It is clear that there are differences in the degree of precision with which we can locate sites and features across the different surveys due to the differences in the types of data available. In fact, the picture is rather more complicated in the later surveys as methods have changed whilst they were being undertaken. In the LCP, TBS and THS, for example, some sites are recorded by a single GPS point and some have GIS outlines. In addition, we can also use imagery to help to locate sites. This adds a further level of complication because the same issues and biases in site identification for finding unknown sites apply to locating surveyed sites (see below). We cannot, therefore, simply record the technological capabilities and quality of site location map for each survey; a more nuanced approach is necessary.

The FCP deals with this issue through the concept of 'geographical precision'. Geographical precision refers to the data available to the person inputting any particular site and the impact this has on the likelihood that the polygon or point which they have drawn is correctly located. As such it is a conflation of several different issues, principally the quality and scale of available maps, the information available within the maps to aid rectification, and the number and accuracy of GPS points. Synthesising these into a single concept may seem reductive but is a necessary economy when dealing with the amount of data available in the FCP. Whilst it may seem to be better to record the quality of the maps separately from the amount of imprecision introduced through rectification, the information gained from this would not be worth the cumbersome process of a second recording system for every polygon and point. By recording the overall level of geographical precision for each site, we at least recognise the disparities between surveys and have the ability to factor this into analysis. Geographical precision is recorded for each site and feature on a continuum from 'Definite' to 'Negligible' depending on the level of data available. An approximate definition of these terms is set out in the Table 3.4.

Class of Geographical Precision	Evidence
Definite	Multiple GPS points GIS outline drawn in the field
High	Sites accurately drawn on well rectified topographic map Single GPS point
Medium	Rectified general sites map based on topographic map
Low	General sites sketch map only General sites map with insufficient detail to rectify to acceptable levels of accuracy
Negligible	Text description only

Table 3.4: Classes of Geographical Precision for field derived data

Site location can also be aided by imagery. This is mainly useful in conjunction with map and textual data as the errors involved are sufficiently large for imagery to be of value. However, as we have already noted, certain types of sites and features show up on imagery more readily than others, rendering imagery as a class of evidence in the same sense as maps or GPS points problematic. In relating imagery to geographical precision, then, it is more appropriate to consider it as a 'topping up' of confidence. The level of geographical precision would therefore be raised by a single level if the site is visible on imagery. Thus a sketch map which places a tell site in a particular vicinity could move from a low level of geographical precision to a medium one if the tell was visible on imagery and there were clearly no other candidates for the mapped site in the area. Certain geometrical features, such as earthworks, may also be visible. Although raising the confidence by a single level is somewhat arbitrary, it was decided that to allow imagery to affect overall geographical precision too much would mean that geographical precision would merely reflect site visibility on imagery in general rather than measure location accuracy based on the data sources available. In practice, this has worked well, particularly as the level of confidence in the imagery as a guide for location is itself often quite low. This system may be criticised on the basis that it involves the conflation of precision, a relation of the *type* of data available, and certainty, a relation of the *quality* of data available. However, as stated above, the elision of different factors into a single metric is a necessary pragmatic step when dealing with datasets at the scale of the FCP to avoid the creation of huge amounts of data which do not add significantly to our interpretive abilities.

Site Shape and Size

The data available in the published and unpublished survey material for constructing the size and shape of sites is similar to that available for location. However, for individual sites and features, this information is required at a different scale, and this has implications for the data itself. A single GPS point, for example, is extremely useful in mapping the location of a site but useless in mapping the shape and size. Data available for site size and shape occurs in the FCP in the following forms:

- Text Descriptions of size (understood as the longest and shortest axes, e.g. ‘250m by 50m’)
- Site Sketch Maps
- Site Specific Topographic and Published Maps
- Multiple GPS points
- GIS shapefiles
- Imagery as a guide

Unlike location, combinations of these can give a more accurate picture of the surveyed data. The relation between a sketch map and a GPS point in locating a site is one of supersedence; the GPS point gives the most precise account. However, when it comes to size and particularly shape, the continuous nature of the data requires a range of media. Thus even an outline based on a number of GPS points can be added to by a sketch-map because the straight lines one might draw between such points are most probably unrealistic and a sketch-map may show small areas not covered by the GPS points[10]. We can still posit a hierarchy of levels of confidence in size and shape in the same way as that produced for location, with the proviso that the multiple strands of evidence available render this process more complex and subjective.

[10] The methodology behind site boundary definition in field data is a significant one and important in any survey. I will not discuss this issue directly here due to constraints of space but a good summary of the key issues can be found in (Banning 2002; 81-84). It is important to note that site definition has been consistent across all the surveys and is reliant on some combination of soil colour, artefact density and mounding.

Text Descriptions

The most basic level of data available for site sizes within the survey material is a simple description of size, usually in the form of dimensions (as in the example mentioned above, '250m by 50m'). Such data gives no information on site shape, meaning calculations of area and general morphology are problematic. If we were to imagine, for example, a site recorded as 50m by 50m drawn as a square, the area would be 2,500m. However, if we were to draw the same site as a circle with a radius of 50m, the area would be just 1,963m. Although the difference may seem small at this level, if we routinely inputted all such sites as square polygons we would be changing site areas by 25%. This error may be compounded for more irregularly shaped sites. Where text descriptions are the only evidence available, area has been calculated on the assumption of an ellipse shape using the figures given for width and length. The formula for calculating the area of an ellipse is:

$$\pi R r$$

Where *R* is the radius of the site measured at its longest axis and *r* is the radius measured at the shortest axis. The accuracy of this method can be assessed through comparing areas derived from the ellipse calculation with known areas mapped in the field. GIS mapped data and the length and width data necessary to calculate ellipse area were only collected at the same site for 57 sites in the LCP. In the other surveys the lengths and widths were used in the original calculations of area, although with some leeway involved given site shape (Wilkinson pers. comm. April 2011), or the use of detailed maps and GIS meant lengths and widths were not recorded. The GIS derived and Length/Width calculated data from the LCP are compared in Table 3.5.

Number of Sites	Average Site Size from GIS (hectares)	Average Site Size from Ellipse calculations (hectares)	Average Difference (hectares)	Absolute Maximum Difference (hectares)	Number of Sites where GIS Area greater than Ellipse Area	Number of sites where difference less than 0.5h
57	1.06	0.89	0.29	2.45	43 (75%)	48 (84%)

Table 3.5: Comparison of areas derived from dimensions and GIS

Although this is a fairly small sample, there does seem to be a good correlation between the two methods. We can see that the GIS derived area is usually larger than that calculated for the ellipse. This is probably to do with the method of measuring width in the field. Width tends to be taken along the main part of any site, missing out elongated areas which may add to area. The fact that 84% of the two types of area were within 0.5h of each other suggests we can have reasonable confidence in calculating area from ellipse. Of the 9 sites which had an error greater than 0.5h, 6 were larger sites over 3 hectares whilst the largest error of 2.45h was recorded at the largest site, LCP 62 at 11.78h[11].

Cartographic Data

In the case of size and shape, data derived from maps is of primary importance. As with location, the most effective way of entering map data accurately is to rectify individual maps into the GIS and then trace the site polygons from the maps themselves. Rectifying maps of single sites presents different challenges to rectifying maps of larger areas. Often Landsat TM and ETM+ data has too coarse a resolution to identify the subtle features represented on detailed maps. In these cases it is necessary to rectify to high resolution imagery such as Corona or GeoEye-1 (see below). Although this means using a different base-layer to the imagery itself, and potentially to the data which allowed the site to be located, the fact that the site map is at such a small scale should mitigate against significant error. Even with high resolution imagery it may not be possible to rectify maps which provide very little data other than site size and shape. This is particularly true of sketch-maps which often depict only the site itself with no additional information regarding the surrounding landscape. Rectifying such maps based on scale or size to predefined locations is not advisable because the rectification process may distort the image and thereby the shape and size of the site as a whole. Rather, the map should be visually examined by the user such that the polygon approximates to the map as faithfully as possible. Imagery can also be used as a guide in this case since even if there is not enough information to rectify the map there may be supplementary information which can provide an approximation of the site boundary, such as wadi channels, field boundaries and roads.

GPS and GIS

GPS points and GIS polygons drawn in the field based on GPS points are subject to the same provisos in their use for defining site size and shape as in their use for site location. In fact, small numbers of GPS points which do not relate to maps can be misleading. Four GPS points positioned 50m apart, for example, might produce a square site if considered to be absolutely representative of site shape. The GPS points in this case recreate the situation for textual descriptions which only provide dimensions, potentially leading to errors in shape recreation. Thus higher levels of confidence in size and shape require higher numbers of GPS points, whilst an accurate map combined with two or three orientating GPS points could provide a higher level of confidence than a defined GPS outline.

Returning to the surveys themselves, we can see that the evidence available in relation to site size and shape is far from uniform even within individual surveys (Table 3.6). The differences between

[11] The full data can be found in Appendix 1.

the surveys, particularly in regard to the provision of good topographic-based maps, are clearly related to the type and extent of publication. Thus the four 'group one' surveys (the KHS, NJS, SS and AVRP) which were published as monographs all contained a site catalogue with individual maps for each site, at least for the main regions if not for the areas of interest in the case of the KHS and SS. By contrast, the group two surveys (the TS and TBS) have quite poor data available for individual sites. Although the unpublished notebooks do provide some sketch-maps, these are not available for every site. This is a problem in the TS in particular, resulting in a reliance on the overall sites map which contains very rough and low resolution outlines of the sites. Finally, the group three surveys have both made some use of GPS outlines but again this is not universal. Interestingly, despite the use of GPS in both the AVRP and TBS surveys, defining site boundaries with multiple individual points is very unusual. This may be due to time constraints or an understandable concentration on producing accurate maps rather than digital data.

Survey	Dimensions	Overall Sites Map with defined sites	Sketch-maps of individual sites	Topographic-based Maps of individual sites	Multiple GPS points	GIS Outlines drawn in the field
KHS	XX		X	XX		
NJS	XX		X	XX		
TS	X	XX	X			
SS	XX		X	XX		
TBS	X		X			X
AVRP	XX		X	XX		X
SHR					X	X
LCP	X		X		X	X

Table 3.6: Types of evidence available for defining site size and shape (X = available for some sites within survey, XX = available for all sites within survey)

Boundary Certainty for Surveyed Sites

Whilst levels of location accuracy were recorded through the concept of 'geographical precision', levels of confidence in size and shape were recorded as levels of 'boundary certainty'. The term 'certainty' is used in this case to reflect the concern with the quality of the data available, rather than the type of data as was the case with geographical precision, and to include the possibility of integrating multiple data sources. Tracing features from maps and imagery is a subjective process of interpretation, meaning it is far more difficult to create universally applicable rules based on the type of data available. For example, an accurate sketch-map with a clear demarcation between areas considered to be 'site' and areas considered to be 'non-site' may result in a more accurate understanding of that site than several GPS points, and yet the next sketch-map in a notebook may be clearly inaccurate (for example, drawn such that the distance recorded as the length is shorter than the distance recorded as the width). Similarly, sites with very complex shapes require more GPS points to provide an accurate representation than simple or geometric shapes which can be captured by fewer points, but the degree to which this is the case is a necessarily subjective judgement. For the surveyed sites, boundary certainty therefore represents the level of confidence of the interpreter that the GIS polygon drawn accurately reflects the shape and size of the surveyed site or feature. Like geographical precision, it is divided into categories from 'Definite' through to "Negligible' and is recorded for each polygon constructed in the GIS. Although universally applicable rules are more difficult to define than those for geographical precision, it is possible to highlight some general correlations between data type and quality and the level of certainty normally attributed, and these are set out in Table 3.7.

Class of Boundary Certainty	**Evidence**
Definite	• Multiple GPS points and Topographic Map • Multiple GPS points and GIS outline drawn in the field • Multiple GPS points and good quality sketch-map • Multiple GPS points around outline of simple site shape
High	• 2 or 3 GPS points and Topographic/Topographic-based map • Topographic/Topographic-based map with sufficient information to georectify • 2 or 3 GPS points and good quality sketch-map
Medium	• Topographic/Topographic-based map • Good quality sketch-map with dimensions
Low	• Good quality sketch-map only • Dimensions only • Overall sites map suggests site sizes, no other information
Negligible	• General area description only • Overall sites map with locations only

Table 3.7: Classes of Boundary Certainty for field derived data

As with location, imagery can be of great use in correctly orientating and defining site boundaries. Again, it is advisable to limit the difference imagery can make to a single level of confidence increase to prevent significant distortion of the data relative to areas where the relevant imagery was not available. Using imagery for location and using imagery for boundary definition differ in that the latter does not require looking for the site itself so much as for other features which are mentioned in textual descriptions or visible on maps. For location, the user is trying to find evidence of the site itself, whilst for boundary certainty other features are more useful. This distinction, between using imagery to find and define a site and using imagery simply for orientation, is of great importance in relation to data integrity. I will address the issue of boundary certainty in imagery defined sites later; for now we can simply say that the question is not straight-forward. We therefore need to be able to articulate the difference between field derived and imagery derived data to avoid confusion between the two.

Remote Sensing Data

Supplementing the surveys, the FCP seeks to utilise a variety of remote sensing data, including several different types of satellite imagery as well as aerial photographs. Table 3.8 summarises the key information regarding each type of imagery available. The first three types represent high resolution imagery whilst the second three provide relevant lower resolution data.

Imagery	Resolution (Metres)	Dates	Spectral Properties	Coverage within the project
Corona KH-4	2-4	1960 – 1970	Panchromatic (Pan) (digitised analogue film)	All Survey areas and most of the study area
GeoEye-1	MS: 1.7 Pan: 0.4	2009	Multi Spectral (MS), Pan	LCP only
Ikonos	MS: 4 Pan: 1	2002	MS, Pan	SHR only
Landsat	15 – 80	1972 – 2000	MS, Pan	Full
ASTER	15 , 30, 90 depending on the band	DEM released July 2009	MS, Pan	Full for DEM Partial for other scenes
SRTM	90	2000	N/A	Full

Table 3.8: Remote Sensing data used in the FCP

Beyond the uses of imagery within individual projects as discussed above, the FCP makes use of remote sensing data in six distinct ways:

1. As a guide for the input of survey data into the GIS and database
2. To confirm and/or re-examine sites discovered by survey
3. To detect new sites within the survey areas which were not discovered during the original survey
4. To detect new sites outside the areas surveyed to produce and investigate a larger settlement universe
5. To generate non-archaeological but relevant information at a broad scale, such as soil maps, geology and modern land-cover, which can be factored into analysis
6. For Digital Elevation Models (including those derived from stereoscopic imagery)

The first four of these uses involve site detection and therefore benefit from high spatial resolution imagery. Although lower spatial resolution imagery has been used for site detection, much of the work done using Landsat alone has been undertaken within the framework of predictive modelling (Custer et al. 1986). Landsat images were used for prospection in two of the FCP surveys, the NJS and the KHS, but this was principally for mapping landscape types and broad geographical and geological areas (Wilkinson 1990; 8; Wilkinson and Tucker 1995; 17). Attempts at utilising other types of lower resolution imagery, and particularly the use of Digital Elevation Models (DEMs), have tended to focus more on automating the detection of archaeological entities and concentrate on such sizeable features as canals and larger mounds (Sherratt 2004a; Hritz and Wilkinson 2006; Menze and Ur 2007; see Menze and Ur 2012 for a recent more nuanced approach). For the mapping of sites and features of all shapes and sizes, as well as for more ephemeral traces with complex spectral signatures, it makes more sense to use the Corona and other higher spatial resolution imagery and interpret them with the naked eye. Within the project, Corona is the main source of high resolution imagery, supplemented by more modern imagery for the two on-going surveys, including that derived from GoogleEarth.

Corona

The implications and benefits of the American declassified Corona 'spy' photography in the Near East have been much discussed in recent archaeological literature (Kennedy 1998; Kouchoukos 2001; Philip et al. 2002a; Ur 2003; De Meyer 2004) and there is no need to rehearse these here. The FCP includes Corona in two formats. The majority of the Corona used within the project are full frame digital products produced by the USGS by scanning the negatives of the photographic film produced by the sensor on the satellite (Galiatsatos 2009). These have been ortho-rectified using a method devised by Galiatsatos and form the basic high resolution data for the Western and central parts of the region. For the Jazira and Northern Iraq we have smaller Corona part-frames scanned in manually by researchers at the Centre for Ancient Middle Eastern Landscapes (CAMEL) based in the Oriental Institute at the University of Chicago. These smaller frames were also geo-rectified manually by members of the project. Some part-frames of the SHR area which were acquired as part of that project are also included in the FCP. Again, these were manually scanned and geo-rectified as part of the SHR project.

Ikonos and GeoEye-1

As well as the Corona, we have modern very high spatial resolution imagery of two of the survey areas within the FCP, the SHR and the LCP. Both were acquired by the commercial company GeoEye (http://www.geoeye.com/CorpSite/ accessed September 11th 2011) which recoups its costs through the sale of imagery, making the products extremely expensive. For this reason neither of the images available extends beyond the boundaries of the survey areas themselves. The Ikonos imagery used in the SHR project was acquired in January 2002 and includes both panchromatic and multispectral images, at resolutions of 1m and 4m respectively (Beck 2004; Beck et al. 2007; 165 Table 2). A GeoEye-1 image of the LCP area was acquired in November 2009 and again both panchromatic and multispectral images are available with slightly higher spatial resolutions than the Ikonos at 0.4m and 1.7m. The Ikonos and GeoEye-1 sensors have four spectral bands, including three in the visible spectrum and one in the near infrared (NIR), corresponding to bands 1 to 4 of the Landsat TM and ETM+ sensors (see below). Due to their small geographical coverage, both the Ikonos and GeoEye-1 have had little impact on the results of the FCP overall, particularly as they cover the group three surveys that already have the highest levels of certainty and precision in terms of site recognition and digitisation. However, they are useful in locating some sites, particularly in landscapes such as the Northern Survey Area in the SHR where stone architecture can result in exceptionally small features (Beck et al. 2007; 171), and serve as useful comparators for the Corona imagery.

GoogleEarth

Alongside the purchased high resolution imagery, the project has made use of the enormous corpus of free imagery available through GoogleEarth. This has provided access to high resolution imagery over a much larger area. The resolution of the imagery available is variable across the region and has changed as the project has progressed due to updates from Google itself. Currently most of Northern Syria and Iraq is covered by DigitalGlobe, Geo-Eye-1, Quickbird and WorldView-1 imagery which have a nominal resolution of between 0.6 and 4 metres. The latest versions of GoogleEarth retain the originally uploaded imagery where it has been replaced by later or higher resolution versions, allowing for recent landscape changes to be detected. The principal drawback in using the software is that the precise ortho-rectification details have not been released. This means it is difficult to assess any biases present and therefore relate GoogleEarth derived imagery to other imagery sources or field data. The LCP used the software in the field as a source of modern imagery prior to the purchase of the GeoEye-1 image in 2009. In this instance, CORONA provided the main tool for site location whilst screen captures downloaded from GoogleEarth and geo-rectified (see Ur 2006; 6) to Landsat images were used to assess the current state of the site and to navigate in the field. Within the FCP, GoogleEarth has been used for the same purposes as the other high resolution imagery, namely site and feature location and recognition, for areas not covered by the purchased imagery. Sites and features were digitised within the GoogleEarth program itself using KML (Keyhole Markup Language) files and then re-projected in ArcGIS. Since we do not know the metadata for the GoogleEarth imagery, comparisons between the different geo- and ortho-rectification techniques used in the FCP are somewhat contentious. Empirically, the GoogleEarth imagery fits well with the field derived data and ortho-rectified CORONA and has proved very useful.

High Resolution Imagery and Site Detection within the FCP

Whether within survey areas or in the wider region, the FCP seeks to identify previously unknown archaeological sites. For now, the project is not employing any automated or algorithmic techniques to accomplish this; the detection of sites is down to individuals visually examining the imagery on a screen and detecting anomalies. This is normally done by superimposing a grid onto the image and examining each box in the grid in turn. Such methods allow for roughly the same amount of time to be given to each area and also for ease of recognition of areas which have been examined.

Definition of Sites and Features in relation to Imagery

In order to render imagery derived site definitions and areas comparable with field derived data, we must be sure that both methods produce similar results of site size and shape. However, both present certain difficulties. The term 'site' and the manner in which sites may be defined have long been an issue in field archaeology. The concept has been rendered problematic through the recognition that the relationship between areas of habitation and occupation and areas devoid of human contact represents a continuum rather than a stark division, and that this is reflected in the distribution of material remains (Wilkinson 1982; Dunnell and Dancey 1983; Bintliff and Snodgrass 1988; Wilkinson 2003). Although some scholars have argued that this difficulty in site definition should result in the wholesale disregard of the site as a concept (Thomas 1975 ; Dunnell and Dancey 1983), this rather seems to be throwing the baby out with the bathwater. It is intuitively clear that some areas of the landscape receive more human attention than others, and this is reflected in material culture and other features. In Near Eastern survey, site definition has generally been related to artefact and occupational debris, topography and soil colour change (Adams 1981; Ur 2002a), and this is also the norm within the FCP surveys (Wilkinson 1990; 61-63; Wilkinson and Tucker 1995; 15-17; Wilkinson et al. 2004; 55). We therefore need to relate these three criteria to the signature visible on imagery.

Operating with imagery presents several problems in this regard. First, artefact and other occupation debris such as roof-tiles, not being visible on satellite imagery, do not form an evidence source in their own right. Although individual standing buildings and structures are visible in some landscapes on certain images, such as the basaltic uplands in the Northern Survey Area of the SHR in Corona and Ikonos (Philip et al. 2002a), this is the exception rather than the norm, and it is certainly not possible to detect individual sherds or sherd quantities even with the highest resolution remote sensing data. Artefact and occupation debris, particularly limestone fragments and degraded mudbrick, may play a part in causing the colour change visible on images but we do not know enough about the spectral properties of sites to distinguish this effect from soil colour change. We are therefore reliant on areas of habitation appearing different from their surroundings due to either soil (along with clustered artefact) colour difference or topography. Topographical expression in the case of the Near East generally means mounded sites which cast shadows visible in imagery, although depressions can also be indicative of past human activity (Alizadeh and Ur 2007; 155).

Relying on soil colour and topography presents several challenges. Firstly, we can never be sure that what we are seeing is archaeological. Soil marks and mounds can be caused by geological or geomorphological processes and by the action of modern humans as well as ancient inhabitants. Without the evidence provided by the presence of artefacts it is not possible to be absolutely certain that a site is archaeologically significant. Secondly, we do not fully understand the relationship between the remains we see on imagery and those which we see in the field. Most importantly, it is not yet clear whether artefact scatters and soil marks directly or uniformly correspond to one another in size. Often it is not possible to see soil marks on the ground and artefact data is therefore used, whereas imagery is reliant on soil marks and cannot pick up drop offs in artefact density. Subtle changes in topography may be clear on imagery but less obvious in the field, or vice versa. Thirdly, the nature of the imagery can affect the visibility of sites as well as the form (size and shape) in which they appear. Factors include the type of sensor used, the digital manipulations applied to the image itself, the season the image was taken in and the atmospheric conditions at the time. Much more work is required on the relationship between each of these and the visibility or otherwise of different types of site in different landscapes, although some has taken place within the project.

Archaeological Significance

The first challenge can be characterised in relation to a continuum of probability. After working with Corona and other high spatial resolution imagery for some time, one can get a sense of which anomalies are more likely to be archaeological. Particular types of site are also easier to interpret because the way that they manifest themselves on imagery is rarely replicated by other types of phenomena. Tells are a good example of this as their elevated structure normally produces a distinctive shadow effect on Corona imagery. Several other factors can also affect interpretation. An elongated anomaly in close proximity to a wadi, for example, is more likely to be a relict channel than a site, and yet a very similar anomaly slightly further away from the wadi channel might merit more confidence in an anthropogenic origin. Similarly, anomalies which are spatially associated with modern settlement should be considered with greater caution. Anomalies which cross field boundaries are more likely to be of archaeological significance because the possibility that any given anomaly represents modern soil movement or other activity is decreased. Finally, the presence of a site on multiple images taken in different seasons and over a number of years also speaks to the durability of an anomaly over time, therefore making it less likely to be the result of modern activity or an issue with the imagery itself such as an error in scanning. None of these factors can confirm an anomaly as of archaeological interest, but they do allow us to produce hierarchies of confidence, in the same way as we can classify the boundary and location of surveyed sites based on the evidence available. Such a classification is rather more subjective than is the case for surveyed data because the huge range of factors behind imagery interpretation are more difficult to articulate. Specific definitions are not useful in this regard, since it is impossible to account for all factors. Within the FCP, a rough consensus has been developed based on the analysis of large numbers of sites. This is best illustrated through the images themselves (Table 3.9). The hierarchies for boundary certainty and geographical precision for surveyed sites include a 'Definite' category but this has not been included for archaeological significance for imagery defined sites as it is impossible to be sure that any anomaly is archaeologically significant without a field visit. Most common are tell-like landforms which are geological in origin and may confuse even the seasoned interpreter. Even the clearest example of a tell may be the result of modern human activity such as earth moving. Some tell-like features may be ancient but may not reflect settlement, such as Tell Banat North on the Euphrates which appears both in the field and on the imagery to be a classic conical tell but is in reality "comprised entirely of mortuary structures" (Porter 2002a; 160), and does not constitute a settlement in the strictest sense at all. By recording surveyed material as 'Definite' and all imagery as one of the four levels below we retain this real difference in certainty in our records.

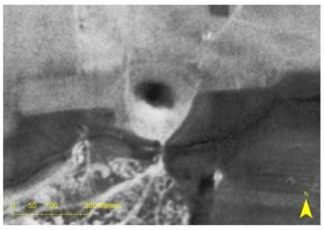
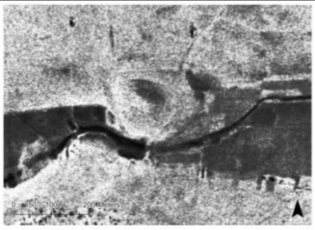
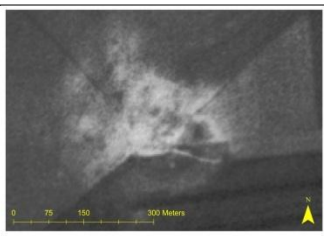
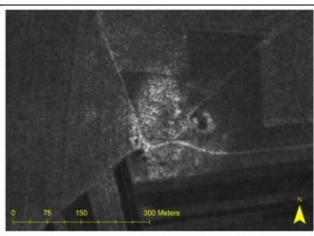
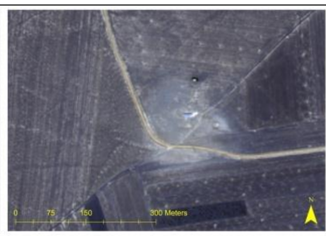
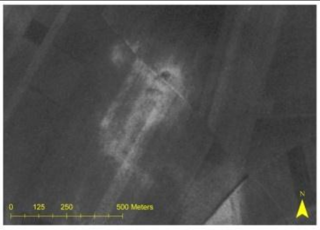
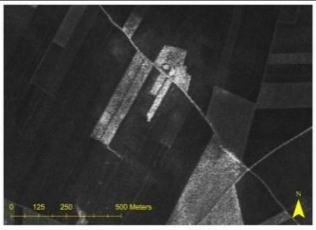
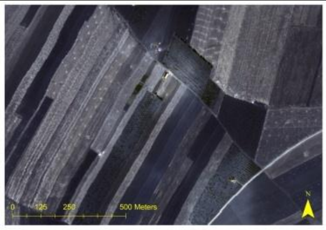
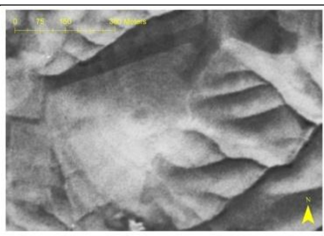
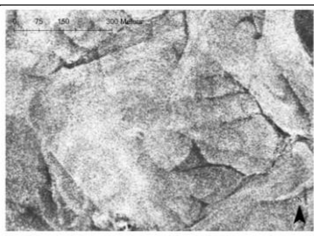
Archaeological Significance	**Example Images (from SHR and LCP)**		
	Corona 1038	**Corona 1104**	**GeoEye**
High – Type Site clearly visible in all images			
Medium – Clear anomaly in all images, crosses field boundaries			
Low – Disturbance follows field boundaries, less visible in 1104 and GeoEye			
Negligable – Probably geological formation but worth noting			

Table 3.9: Classes of Archaeological Significance for imagery derived data

Differences in Site Definition between Imagery and Field Data

The second challenge mentioned above is essentially one of equivalence; how far can we assume that defining a site through the analysis of imagery will match the definition which would be ascribed in the field? Attempts to deal with this question are hampered by the fact that we are still somewhat unsure why sites are visible on imagery. Suggestions have included the retention of moisture by anthropogenically altered soils (Ur 2004; 122), and hypotheses about soil particle size, trace metal and organic matter or ash quantities (Beck 2004; Chapter 8; Galiatsatos 2004; Chapter 9; Wilkinson et al. 2006; 740), but there have been no consistent or conclusive results. These studies have concentrated on specific landscapes (the Syrian Jazira in the case of Ur and the SHR area around Homs for Beck, Galiatsatos and Wilkinson et al) and cannot account for the wide variety of spectral signatures that can be seen across the Near East. Fundamentally, we do not have enough information regarding the relationship between artefact scatters and other types of archaeological debris as they interact through deposition and post-depositional processes to accurately predict such a relationship. Such processes are often site specific, meaning general rules which hold for large numbers of sites are difficult to formulate, even across quite small regions.

This issue is further clouded by the third problem mentioned above, that of differences in the way sites and features can appear on different sets of imagery. Whilst continued presence on successive images is useful in highlighting the robustness of a site's existence, it provides a problem for accurate site definition if anomalies change markedly between images since we must choose a single outline to represent the site. Variables which may affect the definition of sites on any particular image include:

- The nature of the imagery being used, particularly resolution and whether it is panchromatic or multispectral
- The type of landscape under consideration (geology, soil types, topography)
- The properties of the site or feature being examined – stone versus mud brick architecture, tells versus flat sites
- Proximity to certain other features including modern occupation and wadis
- The skill/experience of the operator

Boundary Certainty for Remote Sensing Data

Ultimately, it is necessary to produce a single spatial definition for each anomaly which is in some way comparable to the kinds of definitions we have for surveyed sites. To do this we can return to the idea of 'boundary certainty' as recorded for surveyed sites. Some types of sites are more easily delineated than others, whilst accumulations of evidence can also lead to greater certainty. Boundary certainty for imagery sites is an elision of two main factors: the clarity of the boundary on individual images and the similarity of boundaries across images (Table 3.10). Similarity across images is most important for comparison of Corona images. Differences in anomaly size and shape in modern imagery may be the result of modern disturbance and activity. This is far less likely to have occurred within the much narrower time frame of successive Corona images which were taken during a period in which landscape and site destructions did not occur on the scale of the last 40 years. As with the other measures of certainty, recording the degree of confidence we have in any particular site allows us to factor this into our interpretations later. Again, the 'Definite' level has not been included because even for the most obvious site we cannot know whether the boundary drawn from the satellite image matches that which would be drawn during a field visit.

Class of Boundary Certainty	Evidence
High	• Clear type site – e.g. Tell • Clear Boundary • Very Similar on multiple images
Medium	• Fairly Clear Boundary • Fairly Similar on multiple images
Low	• Diffuse Boundary • Different on images
Negligible	• Very Diffuse • Very different on different images

Table 3.10: Classes of Boundary Certainty for imagery derived data

Re-interrogation of Past Surveys and Extrapolation

Re-interrogation allows us to update and enhance the surveys using the imagery. This is particularly effective for the older surveys which did not make use of remote sensing data and for the surveys which fall into the 'partial' group mentioned above. Re-interrogation of survey means examining all of the sites within the survey and noting the degree to which the imagery matches the field data. Certain site features, such as lower towns, are easily missed in the field but are relatively obvious in the imagery, whilst restrictions of time could mean certain parts of the survey area were surveyed at a lower intensity than others, resulting in differential levels of site recovery. Through this process we can divide sites into three groups:

- Sites or parts of sites visible in the field and on imagery
- Sites or parts of sites visible only in the field
- Sites or parts of sites visible only on imagery

Re-interrogating each survey allows us to examine the spectral signatures of particular types of site which fall within survey areas, and for which we therefore have field derived data, and compare these to those in proximate areas. The examination of surveyed areas provides a sense of the kind of spectral signatures which are likely to be archaeological in the surrounding regions.

Given the paucity of knowledge of the causal relationships in this area it makes sense to work from the known to the unknown and develop our understanding through empirical comparison. Having completed a process of re-interrogation, we can also begin to see the kinds of sites which do not show up on imagery for a particular area and so factor the existence of such sites into our analysis of the wider settlement universe. For example, it has been noted that smaller and later sites provide much less obvious or even non-existent spectral signatures in the AVRP, SHR and LCP (Philip et al. 2002a; 113; Yener 2005a; 41) but to different degrees and with some exceptions (See Casana 2007; 208 Figure 9). Such sites were only discovered through field walking. This can be compared with the TBS survey in the Jazira where field walking revealed no sites which had not already been identified through Corona interpretation (Ur 2004; 124). As noted above, differences in the visibility of sites are to be expected across different landscapes (Yener 2005a; 41; Beck et al. 2007; Parcak 2009; 117). The plains of the Jazira are clearly more amenable to analysis through remote sensing than the more topographically and geologically complex landscapes of other survey areas. The nature of the settlement itself may also affect site visibility, as well as the landscape transformation processes which have resulted in the attenuation of the record (see Chapter 2).

Lower Resolution Imagery and DEMs

The FCP also makes use of lower resolution imagery, including Landsat TM and ETM+, ASTER and SRTM data. Landsat is principally of use in providing broad scale vegetation, geological and geomorphological overviews of the study regions whilst the SRTM and ASTER datasets provide DEMs.

Landsat

As mentioned above, Landsat can be freely downloaded as a fully geo-rectified product from the USGS website (http://landsat.usgs.gov/, accessed 8th July 2012), and as such has been used as the base map to which, where possible, all other imagery is rectified. The Landsat programme has been operating since 1972 using broadly similar sensors and so provides a useful dataset for change analysis (Morain 1998; USGS 2003). Seven satellites were launched, although Landsat 6 was lost before it reached orbit. Data are collected from a series of spectral bands. The first three satellites, operational between 1972 and 1983, used the MultiSpectral Sensor (MSS) and collected data covering the green, red and two near infrared (NIR) channels at a pixel size of approximately 80 metres. Landsats 4 and 5 use the Thematic Mapper sensor (TM) which was first used in 1982 and covers seven bands including the near infrared (NIR), shortwave infrared (SWIR) and thermal infrared (TIR) as well as the visible spectrum. Landsat 7, launched in 1999 and still operational, uses the Enhanced Thematic Mapper Plus (ETM+) sensor and includes the same bands as the TM scanner with slightly higher resolutions in the thermal IR range, and a 15m panchromatic band (USGS 2003). Combinations of these bands provide different types of information (for some general applications see Townshend et al. 1988; Sabins 1996). For example, the NIR band, band four in Landsat 5 and 7, is useful for showing vegetation because vegetation reflects electromagnetic energy in this part of the spectrum, producing a strong response on the imagery. Landsat is useful in the context of the FCP because of its wide coverage, long time depth, cost (free) and the fact that the general product is already rectified. Of particular importance is the amount of imagery available. As with Corona, the earlier dated imagery precedes some of the radical changes to the landscape of the region. In most cases the Landsat 7 imagery has been used as it has the highest spatial resolution. However, landscape changes around some of the survey areas, particularly those affected by the Ataturk, Tishrin and Tabqa dams (the KHS and TS, LCP and SS respectively) and large scale irrigation reorganisation (the NJS) have necessitated the use of older imagery in some areas.

ASTER

ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) is an imaging instrument flown on the Terra satellite, launched in 1999, and is a joint project between NASA and the Japanese remote sensing agency ERSDAC. Data are collected across 15 bands, including four in the very near infrared (VNIR) at 15m resolution, 6 in the short wave infrared (SWIR) at 30m resolution and 5 in the thermal infrared (TIR) at 90m resolution. There is also a backward viewing sensor in the NIR spectrum giving stereoscopic capacity and therefore allowing the creation of a DEM (Abrams et al. 2002). ASTER therefore has a similar spectral coverage to Landsat but the increased number of bands allows for a more nuanced interpretation of the imagery, whilst the higher resolution allows for the recognition of smaller and more ephemeral features such as hollow ways (Altaweel 2005). A small selection of ASTER scenes can be downloaded from various online sources, whilst a global DEM was made freely available on 29th June 2009[12]. Within the FCP, ASTER data has been used principally as a DEM. The main reasons for this are that ASTER scenes are not freely available for the entirety of the FCP region. For general mapping in such a large area, the greater coverage of Landsat has resulted in this type of imagery being used.

SRTM

The Shuttle Radar Topography Mission (SRTM) used a radar apparatus flown onboard the Space Shuttle Endeavour in February 2000 to generate topographic data across the entire globe between 60 degrees North and 56 degrees South. The resulting data are available at 30m resolution for the United States of America and 90m resolution across the rest of the globe, with an approximate average vertical error of between 6m and 10m for Eurasia (Rodriguez et al. 2005;

[12] http://www.nasa.gov/home/hqnews/2009/jun/HQ_09150_ASTER_Topographic_Map.html accessed 8th July 2012

Farr et al. 2007). Topographic data is used in the FCP for generating hydrological information, including likely wadi and river courses, and to analyse site locations and relationships. The SRTM is the main data source for general mapping of topography and height data, supplemented by ASTER derived DEMs where higher resolution data is required and available.

Data Management within the FCP

The FCP stores and organises data through a GIS linked to a database management system (DBMS) (Figure 3.2). The GIS is run though the ESRI ArcGIS package, whilst the DBMS is run through Microsoft Access. This system allows the GIS to organise the spatial characteristics of sites and features and the Access database to store and organise attribute data. The great strength of GIS is its ability to quickly generate and organise vast amounts of spatial data, whilst the strength of a database is to store specific information about entities.

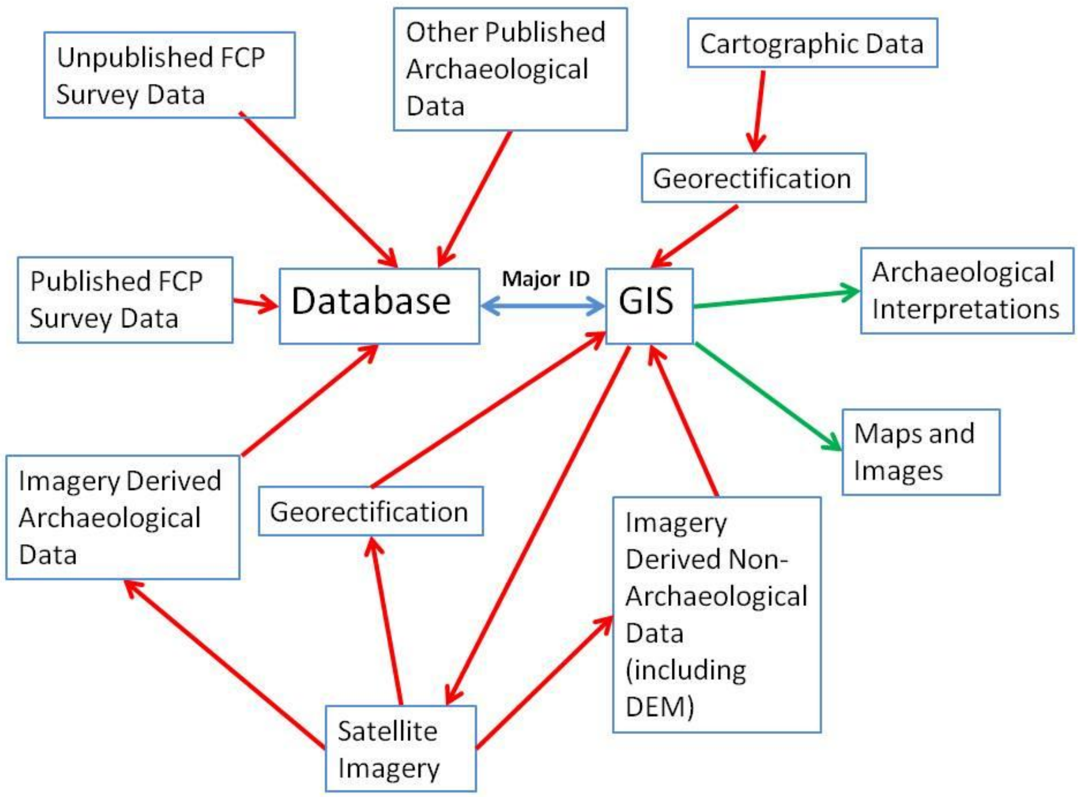


Figure 3.2: Data structure within the FCP

It is important to separate information derived from imagery from site-specific observations because of the different resolutions at which they are collected and analysed, and because they may produce conflicting results. For example, a height datum derived from a GPS point taken at a specific site may differ slightly from the same point on an SRTM derived DEM. Similarly, a landscape cover classification derived from Landsat may suggest an arable area, whilst ground observation demonstrates that the area in question was in fact on a small area of bare earth surrounded by arable. Such differences will occur when dealing with different scales and resolutions but should not present problems if the scale at which data is used remains appropriate. Thus a general SRTM derived DEM of Northern Mesopotamia will still give an appropriate relative sense of topography for different regions and areas, whilst perhaps remaining somewhat inaccurate for individual sites (Casana and Cothren 2008; 13). In terms of data structure, this means all data which pertains directly to sites and features is stored in the database, whilst more general spatial information, including that derived from the lower resolution satellite imagery such as ASTER, Landsat and the SRTM, is retained in the GIS only.

The Database

The organisation of a database which can cope with the scale and complexity of the FCP dataset requires both simplicity and flexibility. Ultimately, we want to be able to accommodate data from many different sources in a way which allows meaningful comparisons to be made. The following section illustrates the pertinent technical aspects of database construction which have an impact on methodology and interpretation.

Major ID and Direct and Indirect Relationships

Every individual site, sub-section of site and feature is entered into the database as a separate entry with an identifying number, the Major ID. Each polygon and point within the GIS shapefile has the corresponding Major ID to the entry referring to it in the database. Data added to this entry can then be referenced back into the GIS through the 'joins and relates' tool. The Major ID is designed to reflect the organisation of spatial categories found within surveys. All of the surveys divide sites into smaller sections, mostly on the basis of pottery divisions or morphological changes such as tells and lower towns. Some of the surveys, including the SHR, KHS and NJS, include even smaller sample units. The Major ID therefore has a tripartite structure with three strings of numbers conventionally separated by underscores, for example 666_0_0. The first number represents the site number as given in the survey. Many sites and features do not have any divisions and are recorded as XX_0_0. However, if site 666 was then divided into separate parts, each individual part would be given an ordinal number in the second column, so 666_1_0, 666_2_0, 666_3_0 etc. If further sampling was undertaken in these individual parts, the third column would be used, so 666_1_1, 666_1_2 etc. This system is a very slight modification of that used within the SHR. For all the surveys except the SHR, the internal recording system gives each site a number and each sample section a letter. GIS works much more effectively with numbers, meaning each site part is converted from a letter into a number. This system also allows sites to be divided into more than 26 parts without resorting to confusing multiple lettered terms. We have retained the original site number from the survey, necessitating the inclusion of the name of the survey as part of the Major ID to avoid duplication. Table 3.11 demonstrates the conversion process for a typical site in the LCP. This structure preserves the relationship between sites and parts of sites within the database itself as a direct relationship. The database can also record indirect relationships. Indirect relationships are inputted by the user and reflect the fact that a particular geographical locale may be of interest in relation to another. For example, a surveyed transect showing field scatters very close to a site might merit consideration in the interpretation of that site. This is an inherently weaker relationship than that between sites and their constituent parts or sample areas, but is still of interest. For imagery derived sites, numbering reflects their position in relation to survey areas. Imagery derived sites within surveys are recorded in the same manner as surveyed sites but with a higher number than the last surveyed site.

Survey	Survey Identification	FCP Major ID	Relationship
LCP	Site 60	LCP_60_0_0	Direct
LCP	Site 60 Sub-Section A	LCP_60_1_0	Direct
LCP	Site 60 Sub-Section B	LCP_60_2_0	Direct
LCP	5m square collection in Sub-Section B	LCP_60_2_1	Direct
LCP	Associated Off-site Transect 100	LCP_100_0_0	Indirect

Table 3.11: Example of site numbering system within the FCP

The survey identification at the start of the number still remains. Imagery derived sites outside survey areas are given a general number beginning with 'FCP' and, where appropriate, a second moniker indicating a geographical location. This second acronym is extremely helpful when dealing with such a large amount of data as it allows the data to be divided up. It is useful, for example, to be able to select only the Middle Euphrates imagery derived sites if one is working solely on that area, and this is possible by selecting the FCP_ME (Middle Euphrates) sites. These shapefiles can then be combined for analyses at a wider scale by selecting all sites with the prefix FCP_.

Observations

Within the FCP, observations may be defined as any information generated for a particular geographical locale. This broad definition allows for the inclusion of many different types of data within a single structure. For surveyed data, observations may include attributes abstracted from published and unpublished sources, such as landuse at a site, site morphology or the presence of particular artefacts and features such as qanats, cisterns, architectural remains or pottery. Levels of geographical precision and boundary certainty are also recorded as observations. For imagery data, observations might include the boundary and archaeological significance levels, a record of discernible structures or the presence of an obvious shadow suggesting a tell. Map data observations may include contour features, place names or antiquity symbols. Observations are organised by categories to provide a more accessible interface for the user. Each observation is recorded with a 'data source' and an 'observation detail'. Data source may be defined as the specific aspect of the dataset from which the observation is derived, such as a particular image or set of images, a survey or a certain map set. Recording data source within the database is vital for a project which deals with so many different datasets as it allows us to distinguish between the types of data we are using in developing an interpretation. This is especially important for sites which have been visited in the field but for which more data has been collected from imagery. The presence of an earthwork, for example, could be detected by either a field visit or image analysis. The 'observation detail' field allows for more detail to be added to an observation. If the observation were a place name, for example, the detail section might include the name itself, whereas an observation recording pottery pick-up might include the number of sherds or weight of the pottery collected. Every observation also has a comment field in which more complex data or interpretations can be recorded[13].

Outputs

The database and GIS structure employed here allows for the combination of survey, imagery and map derived data. The interpretative strength of the system lies in the ability to produce visually explanatory maps and images and also analyse spatial relationships through the tools GIS has to offer. These latter include simple buffering formulas, least cost pathways and other topographical analyses, viewsheds and relationships between spatially defined units such as rainfall isohyets and geological or geomorphological zones. Storing site size and shape within a GIS also allows for the rapid calculation of aggregate settlement data over the entire region, allowing broad trends to emerge. This can then be combined with the searchable nature of the observational and chronological data in the database to ask more nuanced questions relating to particular artefact categories or features. Importantly, the validity of these interpretations can be related back to the data through the record of data source and the concepts of geographical precision, boundary certainty and archaeological significance. By recording these measures of confidence we have in the different data types we can also begin to assess the contributions of each to overall interpretations and therefore highlight where further work is required. Finally, when dealing with literally thousands of archaeological units it is not possible to retain the same level of information about the vagaries of individual sites and features as when dealing with a single survey. At the scale of the FCP it is therefore vital to have a short-hand way of assessing the validity of broad-scale interpretations.

[13] A complete structure including all examples of observation, data source and detail types can be found in Appendix 2.

Chapter 4: Chronology

Introduction

Archaeological study requires the recognition of change over time. In order to make meaningful statements about the past, we must be able to contextualize any particular set of data within a chronological framework. In Near Eastern archaeology, these frameworks have been based on a mixture of relative and absolute dating methods. Through the excavation of stratified deposits in multi-period sites it is possible to discern relative chronological relationships between specific material culture types, particularly ceramic assemblages, which it is assumed can then be projected across to other sites which may lack preceding or following periods or overt stratigraphic relationships. Along with material culture, textual sources have also been used to distinguish chronological periods. For the earlier periods of interest here, these have principally consisted of the reconstruction of ancient King lists which can in turn be linked to astronomical events. Differences in methodology and approaches to filling the gaps in the textual record have led to significant disagreement over precise dating of particular events, kings and even dynasties, such that we can speak of High, Middle, Low and even Ultra-Low chronologies (Åström 1989; Gasche et al. 1998; 246). Finally, absolute dating methods such as radiocarbon are important. Radiocarbon dating is not without its own controversies and the science has developed significantly since the discovery of the technique in the 1940s (Taylor 2001). Any construction of a single chronology for the Near East must take account of each of these strands of evidence, although the precise manner in which each evidence type is deployed in the formation of arguments is often dependent on the specialism of the researcher (Zettler 2003).

The construction of a chronology for the FCP poses two additional sets of problems. Firstly, those associated with the analysis of survey material as opposed to other forms of data. In general, and certainly within the FCP, survey involves the collection of material from the surface rather than from excavation, ruling out stratigraphic relationships as a dating method. Surface material is also subject to very different taphonomic processes and preservation conditions to that retrieved through excavation, resulting in a more constrained range of material culture. The durability and abundance of ceramic material across all periods in the Near East has led to a reliance on pottery for chronology construction. For earlier sites, anthropogenically modified stone artefacts can also be used as an indicator whilst for later or disturbed sites it is occasionally possible to discern architectural features which can be dated. Survey collected pottery can only act as an indicator of a relationship with that collected from stratified deposits. Pottery found on the surface is almost always out of its stratigraphic context and must therefore be used as a type-fossil to be compared to chronologically attributable material from stratified deposits. The relationship between surveyed and excavated material is further complicated by the taphonomic factors which cause pottery to appear on the surface and the attenuation of the record once it is removed from the relative stability of a buried archaeological context (see papers in Francovich and Patterson 2000). In terms of chronology, such processes are of interest where they change the record from that which we might call representative; in short where they create bias in a sample such that certain types found in excavated contexts are under- or over-represented, or even completely absent, in survey assemblages. Within the FCP the principal challenges are the under-representation of earlier ceramics on multi-period sites where levels are buried by later occupation and the over-representation of more durable ceramic types and larger sherds (Postgate 1994). Certain classes of pottery may also be associated with particular functions, resulting in locational biases. This is particularly relevant in the Early Bronze Age (henceforth EBA) for ceramics associated with burials, since ceramics found in these contexts are often used as type fossils but are rarely found through survey.

The second set of problems specific to the FCP relate to the broad scale at which we are working. Chronology construction in the Near East has traditionally focused on single sites and surveys, along with occasional studies with a more regional approach, often associated with specific ceramic styles or periods (See for example Rova 1988; Pruß 2000; Rothman 2001). The individual surveys which make up the FCP dataset are no different and as such each are based on specific chronologies with greater or lesser overlap between each other. The central task for the establishment of a chronology which will allow for the comparison of trends across the region is to demonstrate the relationships between the phases used in any single survey and those used in all of the others. My aim in this chapter is not, therefore, to undertake a full reanalysis of the original ceramic chronologies used in each of the surveys but rather to organise them into a consistent and comparable framework. In order to do this we must also find a way to accommodate the diverse temporal resolutions of phases within the surveys. A variety of factors regarding the quality, quantity and general state of research across the region, as well as the nature of the archaeological record itself, has led to differences in the precision available for dating changes in the ceramic sequence. This means that for certain areas we can deal with far shorter periods of time than others, and therefore operate with a greater degree of precision in making interpretations. This central issue requires greater examination.

Phase-based chronology and Contemporaneity

Phase-based chronology involves the use of certain temporal indicators, in the FCP ceramic styles, to assign sites and features to specific phases. The degree to which the placement and division of phases structures the narrative of past events, particularly in the Near East, cannot be overestimated. Such an approach is a useful way of categorizing change over time but also presents two problems. Firstly, it promotes a view of historical progress as characterised by discrete stages of development. The archaeological record as represented by pottery is an extremely complex continuum in which all individual traits change gradually, although not at the same rate. Lumping together particular styles into bounded units ignores the particularities of ceramic development and reifies a view of culture as 'step-like, with short periods of stability punctuated by change' (Plog and Hantman 1990; 440). Whilst this is certainly a valid theoretical critique, the use of phase-based chronologies is often a pragmatic response to the lack of data available, and it is difficult to envisage an alternative approach which would be applicable in the Near East. The latest major project focused on chronology for the region, ARCANE (Associated Regional Chronologies for the Ancient Near East and Mediterranean) retains a resolutely phase-based approach (www.arcane.uni-tuebingen.de, accessed 13th April 2011). More generally, the current ubiquity of phase based approaches in Near Eastern archaeology renders the full-scale reanalysis which would be necessary to address the problem beyond the possibilities of this PhD.

The second problem is related to that of synchroneity mentioned above. Known as the 'contemporeneity problem' (Schact 1984) or the problem of 'map overestimation' (Ammerman 1981; 71; Plog and Hantman 1990), it can be defined as 'the practice of counting as contemporary settlements in a region that were not simultaneously occupied but were rather occupied sequentially within a single archaeological period' (Schact 1984; 678). For the Near East, we might put the argument as follows: that the imprecision implicit in the lumping together of sites exhibiting broadly similar ceramic styles masks the possibility that individual sites within a phase may have been occupied at different times. This becomes more acute when one considers the possibility that one ceramic period may be many times longer than another. How can we compare the number of sites or total settled area between a five hundred year period and a one hundred year period? The original recognition of the contemporeneity problem led researchers to question the validity of demographic studies rather than the wholesale rejection of phase-based approaches (Weiss 1977), perhaps because of the already tenuous assumptions behind the estimation of populations. Attempts have been made to produce models which might mitigate the effects, including using mathematical equations to produce estimations of the proportions of sites occupied during a given period (Plog 1974; Weiss 1977; Schact 1984). These have often been rather mechanistic and lead to very depressed levels of settlement which do not seem to be appropriate. Several scholars have constructed models based on assumptions regarding the likelihood of continued occupation dependent on the presence of preceding and anteceding phases (Dewar 1991; 1994; Kintigh 1994). Whilst such models are certainly useful, and have been applied in the Near East (Kouchoukos 1998; See Wilkinson 2000a; 249), they have been criticised as overly reliant on assumptions regarding certain key properties of sites (Wossink 2009; 51-53). Dewar's (1991) formulation, for example, assumes a continuous rate of founding and abandonment over time without taking into account the possibilities of mass abandonment or settlement. Given that a phase-based chronology is dependent on the recognition of sufficiently significant changes in the material record to warrant a change in categorization, it seems strange to posit a high degree of continuity across phases. Models based on adjacent phases also fail to directly take into account the possibility of sites being abandoned and reoccupied within single phases. The likelihood of multiple occupations occurring increases with the length of any single phase and is a very real problem in pre- and proto- historic Near Eastern archaeology where ceramic phase lengths based on surveyed material may be half a millennia or more (Dessel and Joffe 2000; 40-41). These models do seek to address a very real problem, however, and are useful to some extent if they are not applied in an overly mechanistic way.

The Fragile Crescent Project and Scale

Operating at the scale of the FCP provides an interesting twist on the contemporaneity problem since we are making comparisons between geographical regions rather than diachronically between periods in the same area. However, the problem of comparing different lengths of phases still applies, this time in attempting to produce models of synchronous settlement. In order to analyse a settlement pattern, it is necessary to ascertain whether particular sites and features were in use at the same time; if they were not then they must be excluded from the analysis. The difficulty in producing such a snapshot of settlement and landscape use over so large an area is best illustrated by a simple historical example. The Western half of the FCP, up to and including the western bank of the Euphrates (Strabo 1954 [1930]), came under the auspices of the Roman Empire from the middle of the first century B.C. to the beginning of the 7th century A.D. During the same time period, the Eastern part of Northern Mesopotamia was controlled first by the Parthian and then from the 3rd century A.D. by the Sasanian Empires (Table 4.1). Although we can distinguish changes in the ceramic assemblages of Roman sites over time, for small collections it may only be possible to designate a site as Roman, or even Roman-Byzantine, meaning potentially occupied at any point during the entire period. However, in certain cases we can distinguish between Parthian and Sasanian sites. Thus in comparing regional settlement during the period which is called Roman-Byzantine in the SHR we must consider both the Sasanian and Parthian periods of the NJS. This is further confused by differences in the length of the amalgamated Parthian-Sasanian phase. Whilst the Sasanian collapse and final defeat by Muslim forces was very closely contemporary with the withdrawal of Roman forces from Syria, the Parthian Empire predated the Romans by approximately one hundred years (Butcher 2003; 440).

Time	West of Syrian Euphrates	East of Syrian Euphrates
Pre 200 B.C.	Seleucids	Seleucids
300 B.C.	Seleucids	Parthians
64 B.C.	Rome	Parthians
225 A.D.	Rome	Sasanians
400 A.D.	Byzantine	Sasanians
630s A.D.	Fall of Byzantine	Fall of Sasanians

Table 4.1: Example chronological phases for Syrian Euphrates region, Seleucid-Byzantine/Sasanian

Comparing settlement patterns between the geographical areas to the east and west of the Euphrates therefore requires the comparison of a 600 year phase on the one hand and two phases of 400 years on the other. By combining the Parthian and Sasanian phases we encounter another problem since we have a 600 year phase compared with an 800 year phase. This very simple example demonstrates the two facets of the contemporaneity problem when comparing large areas. In fact, the spatial patterning represented by the Roman and Parthian/Sasanian division is one of the simplest to discern because of its relatively conservative nature through space and time, centred on the Euphrates as a frontier. The periods of interest in this PhD, the Late Chalcolithic and EBA, are not represented by such long lived and clear cut divisions, and include much greater variation at smaller scales.

Chronology and the Fragile Crescent Project Database

The central problem in designing the chronological aspects of the database was finding a way to make different phases, temporal resolutions and terminologies in some way commensurate. In doing this, the aim was not to produce models which would involve the addition of general rules based on assumptions regarding the way in which settlements and features functioned in the past, but rather to allow the data to be presented as clearly as possible. The level of confidence in any comparison between two phases in different surveys is a function of two factors, the length of either of the two phases and the amount of overlap between them.

Comparative Phase Length across the Fragile Crescent Project

Table 4.2 shows the average phase lengths used for each survey in the FCP:

	Middle Euphrates					Jazira		Western Syria	
Average Phase Length (years):	**KHS**	**TS**	**LCP**	**SS**	**ULT**	**NJS**	**TBS**	**SHR**	**AVRP**
Overall	577	435	477	449	569	557	585	553	731
Pre/Proto-historic	708	500	580	600	733	757	825	1550	1106
Historic (post EBA)	434	384	430	368	445	470	479	457	533

Table 4.2: Average Phase Length by FCP survey

These data do not include the Palaeolithic or Pre-Pottery Neolithic (PPN) phases. These were not recorded in all the surveys and have such long durations that they skew the averages of the surveys in which they were used. The overall average has also been subdivided into the average for pre-and proto-historic phases up to the end of the EBA, and later phases. The pre- and proto-historic phase lengths are almost exclusively reliant on excavated ceramic sequences associated with or directly dated by absolute methods. The later phases are more firmly intertwined with political and historical events through associations with texts and other media, and therefore merit separate treatment. With the exception of the AVRP, the overall average phase lengths are fairly similar, clustering either side of 500 years. This means that individual phases should be fairly comparable in relation to the contemporaneity problem. However, the overall averages masks marked differences in the pre- and proto- historic phases. Here the SHR and AVRP have much longer phase lengths. This is a reflection of the lack of excavated sites or regional synthetic sequences in Western Syria. Each sub-region is internally fairly consistent, with the exception of the KHS and ULT surveys in the Middle Euphrates. The higher average of the KHS can be explained by the use of the generic 'Prehistoric' at two sites, a 1300 year phase which inflates the average, as well as the presence of a single phase for the entire second half of the EBA which was divided for subsequent surveys (see below). The higher average in the ULT survey can also be attributed to the absence of later refinements in ceramic typology.

From Ceramic Phases to Absolute Dates

The solution used in the database to compare phases of different lengths is to relate all periods back to absolute dates in years. We can then use very basic mathematics to offer a rough quantification of accuracy. This provides a way of scaling up and down between different temporal and spatial resolutions as well as bypassing local terminologies. Such an approach also allows for different levels of precision to be incorporated into the system. A generic ceramic assemblage which can only be assigned to a broad phase can thus be included and the level of confidence will be reflected in the percentage. An example will serve to illustrate the point. In Table 4.3, three surveys are represented, each with their own series of phases through time. By dividing time into smaller units it is possible to equate the individual phases.

Time (years)	Survey 1 Phases	Survey 2 Phases	Survey 3 Phases
0-100	A	E	G
100-200	B	E	G
200-300	C	F	G
300-400	D	F	G

Table 4.3: Example Phase Breakdown and Lengths

Interpretation of this breakdown then depends on the phase under investigation. If we wanted to look at settlement within Survey 1 phase A, for example, we must make comparisons with phase E of Survey 2 and phase G of Survey 3. We can approximate the likelihood of any individual settlement being occupied at the same time using a simple equation:

Length of phase under investigation/Length of overlapping phase = Probability of occupation of any one site

Conceptually it is helpful to turn this into a percentage. Thus during phase A, the likelihood of a Survey 2 phase E site being occupied is:

100/200 = 0.5 = 50%.

Comparing Survey 1 phase A with Survey 3 phase G, the greater length of phase G results in a reduced probability:

$$100/400 = 0.25 = 25\%$$

Where the phase under investigation is of the same length or longer and completely overlaps with the phase with which it is to be compared, the probability is 100% and therefore all settlements within the comparison phase can be considered contemporary. Here we are back to the problem of contemporaneity as described above. Table 4.4 details the probabilities for the example above:

Phase	A	B	C	D	E	F	G
Comparisons	E = 50% G = 25%	E = 50% G = 25%	F = 50% G = 25%	F = 50% G = 25%	A = 100% B = 100% G = 50%	C = 100% D = 100% G = 50%	A = 100% B = 100% C = 100% D = 100% E = 100% F = 100%

Table 4.4: Calculated probabilities for phase lengths A-G

The figures produced through this equation are not meant to be used mechanistically to make assumptions regarding the archaeological record. Rather they are a shorthand way of reflecting the relationship between two phases numerically. When combined with the computing power of a GIS it is possible to use such crude measurements selectively to model and compare numerous scenarios. One could therefore choose to look at all sites within an area with a threshold of comparability greater than 80% and then investigate how the settlement situation changes at different percentage intervals quickly and easily.

Comparative Chronologies within the Fragile Crescent Project

The next task in assembling a chronology for the FCP is to establish the phases which will be used in this system and the time periods in years so that they may be compared. In constructing the database for the entire FCP, all periods were included[14]. However, this PhD focuses on the 4th and 3rd Millennia B.C. As a result, the discussions which follow deal principally with the periods classified as occupying this time period, the Late Chalcolithic and EBA. A brief discussion of the other phases will follow this. There is a degree of homogeneity between the individual chronologies of all of the surveys but there are also notable differences in both terminology and phase length, most of which can be understood as a result of either geographical shifts in pottery types or the state of research at the time the survey was carried out. Organising this mass of different phases into a comparable sequence requires a mixture of assigning phases to absolute time periods and re-examining individual ceramic types to fit into more up to date schemes. Recent scholarship has made this task significantly easier through a focus on synthetic regional chronologies for discrete areas of Northern Mesopotamia. Schemes based on excavated data produce finer grained chronologies than it is possible to achieve from survey data. For excavated data it is far easier to take into account quantitative changes in ratios of different types of pottery

[14] A full list of phases, along with the start and end dates used in the database, is available in Appendix 3.

to distinguish between phases (See Algaze 1990; 263 for a LC-Uruk example), whereas the reliance on surface material in survey leads to significant uncertainty as to the degree to which an assemblage is representative. It is therefore inevitable that the phases produced for survey will be amalgamations of the phases used in regional chronologies based on excavated data.

Absolute Dates and Time blocks

The above method requires each phase to be assigned start and end dates in calendar years. These are calculated on the basis of published dates for particular ceramic styles. The period between the start and end dates of any given phase is considered the maximum length of time in which a site could be occupied. By turning the occupation phases of different surveys into a similar metric, (i.e. calendar years) it becomes possible to compare settlement trends across ceramic chronologies.

Time block (100 years)	**0-100**	**100-200**	**200-300**	**300-400**
Survey 1 Phases	A	B	C	D
Site Count Survey 1	5	10	30	20
Survey 2 Phases	E		F	
Site Count Survey 2	14		39	

Table 4.5: Simple example time blocks breakdown

Such an approach also allows for the conversion of phase based chronologies into arbitrarily defined periods or 'time blocks'. Using the same method as outlined above, we can calculate the percentage relevance of all phases to successive periods of set numbers of years. Generating and representing data through time blocks is particularly useful for comparing between surveys which have phase changes at very different times. Time blocks can also be used to circumvent the problem of contemporaneity mentioned above since they make it possible to compare periods of uniform length. Table 4.5 shows the same chronological phases used in the above example for Survey 1 and Survey 2 (Survey 3 has been removed for clarity) along with some example data, in this case fictional numbers of sites occupied in each phase. By displaying the data as a series of time blocks as opposed to by phase, we can see the relationships between the two surveys on a single graph (

Figure 4.1). The length of the time block should be the same as the minimum overlap between phases, in this case 100 years. This allows for the representation of all phases separately. The greater subdivision of time available in Area A therefore provides a more nuanced data set, but it is also evident that both areas experience a broadly similar trend over this 400 year period. It is important to stress that this method does not involve standardising or correcting the number of sites or other aspects of the data in the manner of Dewar, Sumner and others such approaches. Correction in the above example may seem straightforward, since one could simply halve the totals given in Survey 2 to make comparable time blocks to those in Survey 1.

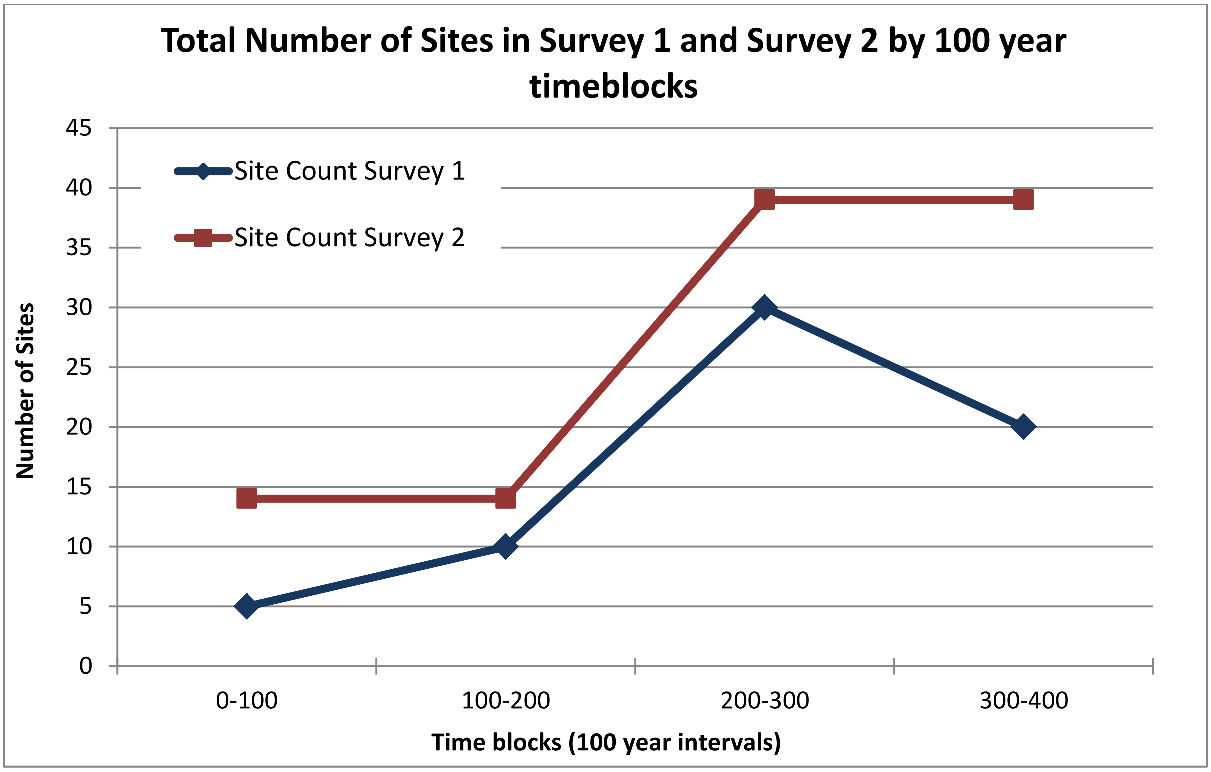


Figure 4.1: Simple example time blocks graph

However, when more surveys and longer periods are included, things become rather more complicated, both mathematically and conceptually. Table 4.6 provides a more complex and realistic example dataset than Table 4.5.

Time Blocks (100 years)	**0 - 100**	**100 - 200**	**200 - 300**	**300 - 400**	**400 - 500**	**500 - 600**	**600 - 700**	**700 - 800**	**800 - 900**	**900 - 1000**	**1000 - 1100**	**1100 - 1200**
Survey 4 Phases	A			B			C			D		
Survey 4 Counts	5			12			15			9		
Survey 5 Phases	E					F			G			H
Survey 5 Counts	11					21			7			13
Survey 6 Phases	I		J		K		L		M		N	
Survey 6 Counts	2		5		14		19		13		10	

Table 4.6: Complex example time blocks breakdown

It is clear that corrections related to dividing or adding sites are far more complicated in this second example due to the overlapping of different phases and variation in phase length. However, when the data in Table 4.6 is plotted as a graph by time block an overall trend for an expansion and contraction of settlement is visible (Figure 4.2). For the purposes of this thesis, I do not use the time blocks graphs to attempt corrections, but rather as a way of visualising the data as it is, thereby allowing such trends to emerge. Used appropriately, time block graphs represent a useful way of comparing complex data between surveys.

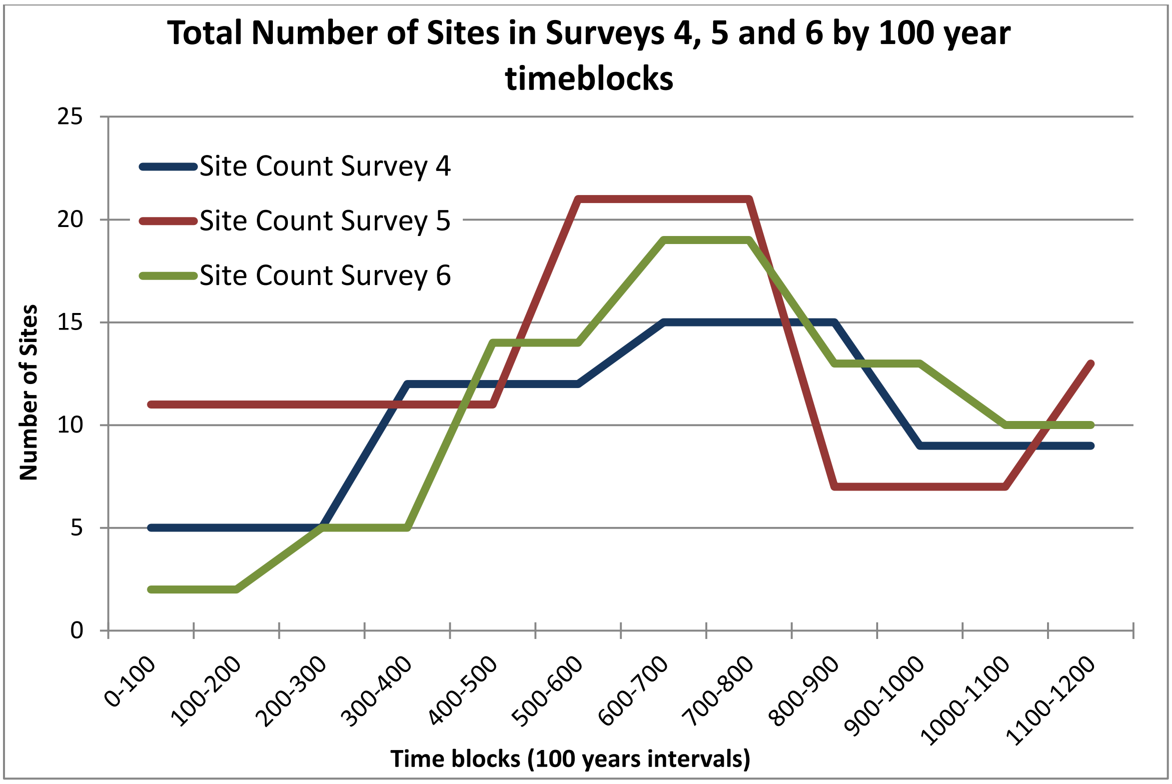


Figure 4.2: Complex example time blocks graph

Chronological Summary

For the Late Chalcolithic and Uruk periods, the LC 1-5 chronology developed at a School of American Research Advanced Seminar in 1998 and refined in Manchester later that year (Rothman 2001; Postgate 2002) represents a comprehensive amalgamation of excavated data and radiocarbon dates. Ceramic styles during this period are remarkably similar across the whole of Northern Mesopotamia, meaning this chronology is a useful comparator for all of the FCP surveys except perhaps the SHR. For the later periods, a higher degree of regionalisation of ceramic types means more local chronologies are required (Schwartz 2001). In the Jazira region, the closely correlated Early Jezira (EJ) chronologies put forward by Lebeau (2000) and Pfalzner (1998; 2010), as well as the links between the NJS, TBS and THS made explicit through the work of Ur (2004; 2010a) are most useful. In the Middle Euphrates region, the syntheses of Porter (2007a; 2007b) and Cooper (2006a) for the EBA are similarly closely related and can be usefully applied to the SS, LCP, KHS and TS. All of these approaches use excavated ceramics from a number of sites to produce a regional chronology, and as such reflect the amount of archaeological work undertaken in a particular area. The EJ chronology, for example, relies on the long sequences available at large multi period sites which have been excavated over some time, including Tell Brak, Tell Leilan, Tell Beydar and Tell Mozan. The Middle Euphrates chronologies have benefited from the large numbers of sites excavated in advance of the constructions of a number of hydro-electric dam projects in Turkey and Syria. Unfortunately, there are no comparable synthetic sequences for Western Syria, and few well published multi-period sites available for comparison. This paucity of data accounts for the far higher average phase lengths in the pre- and proto-historic phases noted above (see Table 4.2). The Amuq sequence developed by the Braidwoods and other members of the University of Chicago team during surveys in the 1930s (Braidwood and Braidwood 1960) remains extremely important, along with excavated materials from Tell Nebi Mend (Mathias and Parr 1989) and Hama (Theusen 1988). For the SHR, ceramic types display a greater affiliation with the Southern Levant than Northern and Eastern Syria during some periods, whilst the inclusion of the basaltic upland zone within the Northern Survey Area throws up certain chronological anomalies (Philip and Bradbury 2010). In the following discussion I will deal with the application of the LC chronology throughout the region before discussing the individual surveys in the following regional groups: the Jazira, the Middle Euphrates, including the Kurban and Titrişh surveys, and Western Syria.

High, Middle and Low Chronologies

Before turning to the specific chronologies of the surveys themselves, we need to address the debate concerning High, Middle and Low chronologies mentioned above. This has implications for the length of key periods in the EBA and preceding periods, as well as our ability to link settlement and landscape change to historical events. As mentioned above, the calculation of chronological dates can be accomplished by projecting back king lists and other texts recorded in both Mesopotamia and Egypt. Occasionally the names of kings can be related to material remains, such as the so called Naram Sin palace at Tell Brak where the name of the Akkadian king Naram Sin was stamped on every brick (Eidem et al. 2001; 102) or at Ebla where stone vessels inscribed with the names of Egyptian pharaohs were discovered in Palace G (Reade 2001; 12). This allows associated material culture phases to be related to the textually derived chronology. Radiocarbon dates provide an absolute form of dating which can be compared to that provided by textual sources. The reason for the continued debate over the appropriate chronology is essentially that the material culture, text and radiocarbon strands of evidence do not match up precisely. The most common text derived chronology is the Middle Chronology, first articulated by Brinkman (1977 [1964]). Attempts to reanalyze this chronology have generally argued that it is too high (Gasche et al. 1998; Reade 2001), although many scholars simply accept it as the best estimation available (Ur 2010a). Arguments are generally centred around particular events which have potential correlates in the textual sources, as well as radiocarbon evidence and material cultural associations. The destruction of Ebla Palace G and Mari Ville II are both key in this regard, along with radiocarbon dates derived from material associated with various tablet archives, including Tell Beydar, Tell Brak and Tell Mozan (Archi and Biga 2003; Sallaberger 2007; 421). For the purposes of the FCP, it seems prudent to continue using the lower Middle Chronology as proposed by Sallaberger (2007) which fits best with the available radiocarbon dates and therefore the ceramic chronologies. In this model, 40 years are ascribed to the Gutian period between the

Akkadian and Ur III dynasties, resulting in a reign of 2298-2254 B.C. for Sargon of Akkad, 2231-2176 for Naram-Sin and dates of 2110-2003 B.C. for the Ur III dynasty. The destruction of Ebla is attributed to Mari rather than either Sargon or Naram Sin (contra Matthiae 1981; Archi and Biga 2003; 35). The end of the Ur III dynasty therefore roughly compares to the end of the EBA (see discussion below). This revised Middle Chronology should not be considered the final word on the subject, however, and all relationships between absolute dates and historical events should be considered in some sense provisional.

The Late Chalcolithic in the Fragile Crescent Project

The Santa Fe chronology accounts for the period between the Ubaid phases and the beginning of the EBA, a span of roughly 1400 years between 4400B.C and 3000B.C. The period encompasses the Late Chalcolithic period and the so called Uruk Expansion, in which Southern Mesopotamian 'Uruk' ceramic styles are found in a variety of contexts in Northern Mesopotamia. Another major subdivision can be made between chaff tempered Amuq F style ceramics described by the Braidwoods in the Amuq (Braidwood and Braidwood 1960) and so called Gawra A and B (Gut 1995; Rothman 2002). Until the late 1990s, and particularly the development of the Santa Fe chronology, the relationship between these three ceramic traditions was not clear, and even now there are certain ambiguities regarding the LC 5 (Ur 2010a; 240-241). It was not known whether the Uruk style ceramics represented a cultural or a chronological horizon or for how long the Uruk period may have lasted, whilst the Amuq and Gawra sequences were considered potentially contemporary. Through analysis of radiocarbon dates this issue was resolved into the LC 1-5 chronology, in which LC 1 and 2 represent pre-Uruk Gawra type phases, LC 3 includes a minor Uruk presence, specifically at Tell Brak, and the spread of the Amuq F, and LC 4 and 5 represent full Southern Uruk assemblages, labelled Middle and Late respectively (Schwartz 2001; Wright and Rupley 2001). This clearly presents problems for the integration of earlier surveys, for which these divisions were not available. In the NJS, the phase labelled as 'Northern Uruk (Late Chalcolithic)' includes both Coba Bowls (NJS Type 7) and Sprig Ware (NJS Type 9), diagnostic of LC 1 and 2 in the Santa Fe chronology, and Bevelled-rim Bowls (NJS Type 6) and Nose and Crescent Lug Handles (NJS Type 18) which are clear Southern Mesopotamia types. Presciently, the NJS does note the presence of Southern Uruk types where they occur (Wilkinson and Tucker 1995), and further assignations were made by Lupton (1996). The TBS and THS, which both used the ceramic sequence developed for the NJS but with some modifications, dealt with the issue presented by Uruk ceramics by dividing the Late Chalcolithic into two contemporary phases, one defined as a Southern Mesopotamian Uruk assemblage and one as a typically local Late Chalcolithic (Ur 2004; for the most recent manifestation of this sequence see Ur 2010a; Appendix B).

In general, the Northern Mesopotamian Late Chalcolithic is characterised by a chaff-faced pottery phase, exemplified in the Amuq F sequence (Braidwood and Braidwood 1960). This is used as a Late Chalcolithic indicator in all of the surveys included in the FCP, including Kurban Höyük Phase VI (Algaze 1990), Sweyhat Survey Period III (Wilkinson et al. 2004; 86), the SHR (Philip and Bradbury 2010; 155), the LCP and the Amuq itself (Yener et al. 2000b; 195). Schwarz asserts that the Amuq F chaff faced horizon should be considered to begin in the LC 2 period at the earliest and to predominantly belong to the LC 3 period, principally because the later stages of Amuq F contain Uruk (i.e. LC 4 and 5) types (2001; 241). This distinction may be visible in the Eastern parts of Northern Mesopotamia at Brak and Leilan but in Middle Euphrates and the West at Tell Hammam et-Turkman, Tell Afis and possibly at Hama the chaff faced horizon seems to directly follow the end of the Ubaid (Akkermans 1988; Theusen 1988), suggesting the chaff tempered phase may be pushed back to the beginning of the Late Chalcolithic, LC 1 (Mazzoni 2000a). Certain ceramic types also transcend regional boundaries and provide possible linking points between the surveys, although there is significant regionalisation of ceramic styles within the chaff-tempered horizon (Pollock and Coursey 1995; Lupton 1996). These include Coba bowls, ascribed to the LC 1 and 2 periods, carinated casseroles and hammerhead bowls, both associated with LC 3 but continuing into the LC 4 and 5 periods.

The Santa Fe conference established that the Uruk expansion into Northern Mesopotamia lasted far longer than originally thought and therefore could be subdivided into Middle and Late phases. Several sites along the Euphrates represent single phase occupations during these periods, including Sheikh Hassan and Hacinebi Tepe for the Middle Uruk (LC 4 period) (Pearce 2000; Stein 2001) and Habuba Kebira and Jebel Aruda for the Late Uruk (LC 5) period. Both phases are also present at Tell Brak in levels 12 (Late Uruk) and 13 (Middle Uruk) (Oates and Oates 1994). For survey purposes, the Uruk diagnostics include the Bevelled-rim bowl (BRB), as well as pierced nose lugs, and band-rim bowls on the Euphrates and in the Karababa area (Lupton 1996; 43), and are generally characterised by distinctive highly fired grit tempered wares, very different to the chaff-tempered and generally coarser local Late Chalcolithic material. None of the FCP surveys make chronological distinctions between the LC 4 and 5 phases due to the high degree of homogeneity between the two (Ur 2010a). Drooping spouts are diagnostic of the LC 5 period (Schwartz 2001) but do not occur in sufficient numbers to warrant a distinction being made in the field. As Ur has pointed out (2010a; 247), the BRB remains the most common type fossil for the Uruk period as it occurs in large numbers and its unique morphology and composition mean that the discovery of almost any fragment of the original bowl is immediately diagnostic.

Uruk and Local Late Chalcolithic Material: LC 4-5

Although the Santa Fe chronology focuses on the Uruk ceramic styles to define the later LC periods, there can be little doubt that local assemblages persisted. In the Jazira, Middle Uruk style ceramics have been discovered in the same context as local chaff tempered styles in areas TW and CH at Brak (Oates and Oates 1994; 168). Excavations at Hacinebi Tepe on the Turkish Euphrates have revealed contemporary but distinct areas of Uruk style and Local Late Chalcolithic architecture and material culture suggesting the presence of a colony of southern Mesopotamians living in a spatially separate part of a Late Chalcolithic village (Stein 1999a; 16; 2001). At Kurban Höyük in the Karababa region, Algaze documented a steady increase in grit tempered plain simple ware (PSW) and other Uruk forms after its first introduction alongside the chaff faced simple ware (CFSW) through phases VIA and VIB (Algaze 1990; Lupton 1996; 43), perhaps equivalent to LC 4 and LC 5 respectively. Elsewhere in the Karababa region, Uruk material is overwhelmingly concentrated at sites along the Euphrates, as well as larger sites away from the river terraces (Algaze 1999), although this is in part a reflection of the areas commonly investigated by archaeologists. It is highly unlikely that such large sites represent the only occupation during the Uruk period, meaning we must assume the presence of Uruk ceramics represents a functional or cultural choice by people in the past as well as a chronological indicator. This model implies the existence of sites which were occupied contemporaneously with sites which contain Uruk material but which were bypassed by the Uruk ceramics, although not necessarily the social and material changes which the intrusion brought. Returning to chronology, we can, therefore, discern four types of site for the Late Chalcolithic period (Table 4.7).

Local Late Chalcolithic Phases	Uruk Phases	Phasing Assigned
LC 1-2 types	-	LC 1-2
LC 3-5 types	Not Present	LC 3-5
LC 3-5 types	LC 4-5	LC 3-5
Not Present	LC 4-5	LC 4-5

Table 4.7: Interpretations of Late Chalcolithic and Uruk ceramics

Sites with only LC 1 and 2 material can be considered to belong to the earlier part of the Late Chalcolithic. Sites with material representative of LC 3 in the Santa Fe scheme may represent occupations before the Uruk period but may also be contemporary with sites which have Uruk material but lack Southern imports for cultural, functional or economic reasons. The continuity of forms and types through the period of Uruk ceramic intrusion rules out distinctions between local Late Chalcolithic assemblages, at least for survey material (See Pollock and Coursey 1995 for an attempt to clarify changes through stratified deposits). Sites which have both local Late Chalcolithic and Uruk materials must be considered to be LC 4 and 5 sites but may also have been occupied in the LC 3 period before the Uruk material was brought in. Here the lack of stratigraphic understanding inherent in surface collection comes into play. Sites which only include Uruk material can be placed into a slightly tighter chronological period, LC 4 and 5.

With the exception of the LCP and the THS, none of the surveys within the FCP made a distinction between the earlier Late Chalcolithic (LC 1 and 2) and the later local Late Chalcolithic (LC 3, continuing through the Uruk period), further compounding the problem of describing a contemporaneous settlement pattern which includes Uruk material. The later surveys (the LCP, TBS, THS and SS) dealt with the problem of having two potentially distinct assemblages representing the same period.

<table>
<tr><th rowspan="2">Years (B.C)</th><th rowspan="2">Santa Fe</th><th colspan="4">Northern Middle Euphrates</th><th colspan="3">Middle Euphrates</th><th colspan="4">Jazira</th><th colspan="3">Western Syria</th></tr>
<tr><th colspan="2">KHS</th><th colspan="2">TS</th><th colspan="2">LCP</th><th>SS</th><th colspan="2">NJS</th><th colspan="2">TBS/THS</th><th>SHR</th><th colspan="2">AVRP</th></tr>
<tr><td>3000</td><td rowspan="4">LC 5</td><td colspan="7">Middle Euphrates Early EBA</td><td rowspan="15">Northern Uruk (Late Chalcolithic, Lupton’s ‘Pre-Contact’ Phase)</td><td rowspan="6">"Southern Uruk" (from notes and Lupton’s ‘Contact’ Phase)</td><td rowspan="15">Late Chalcolithic</td><td rowspan="6">Uruk</td><td rowspan="15">Chalco-EB</td><td rowspan="4">Amuq G-J</td><td rowspan="6">Uruk (noted)</td></tr>
<tr><td>3100</td><td rowspan="14">Late Chalcolithic B (Local)</td><td rowspan="5">Late Chalcolithic A (Uruk)</td><td rowspan="14">Late Chalcolithic (Local)</td><td rowspan="5">Uruk</td><td rowspan="8">Local Late Chalcolithic</td><td rowspan="5">Uruk</td><td rowspan="5">Uruk</td></tr>
<tr><td>3200</td></tr>
<tr><td>3300</td></tr>
<tr><td>3400</td><td rowspan="2">LC 4</td><td rowspan="11">Amuq F</td></tr>
<tr><td>3500</td></tr>
<tr><td>3600</td><td rowspan="3">LC 3</td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="3"></td><td rowspan="9">Late Chalcolithic</td><td rowspan="9"></td><td rowspan="9"></td><td rowspan="9"></td></tr>
<tr><td>3700</td></tr>
<tr><td>3800</td></tr>
<tr><td>3900</td><td rowspan="4">LC 2</td><td colspan="2" rowspan="6">Early LC, Santa Fe divisions</td></tr>
<tr><td>4000</td></tr>
<tr><td>4100</td></tr>
<tr><td>4200</td></tr>
<tr><td>4300</td><td rowspan="2">LC 1</td></tr>
<tr><td>4400</td></tr>
</table>

Table 4.8: Late Chalcolithic and Uruk Chronology (compiled from Wilkinson 1990; Algaze et al. 1992; Wilkinson and Tucker 1995; Lupton 1996; Yener et al. 2000b; Schwartz 2001; Ur 2004; Wilkinson et al. 2004; Yener 2005a; Ur and Wilkinson 2008; Philip and Bradbury 2010)

The presence of Uruk ceramics at a site resulted in a separate period classification in all of these, although no Uruk site was recovered within the intensively surveyed part of the SS (Wilkinson et al. 2004)[15]. The earlier surveys in the Amuq included both local Late Chalcolithic and Uruk material together during the Amuq 'F' and Amuq 'G' phases (Braidwood and Braidwood 1960). The later survey preserved the original phasing of the Braidwoods but did record the presence of Uruk material in the published site catalogue (Yener et al. 2000b; Yener 2005a). In the KHS, the relationship between Uruk and Late Chalcolithic assemblages was thought to be chronological based on the Kurban Höyük sequence (Algaze 1990), but this still resulted in a separation into Late Chalcolithic B (local Late Chalcolithic) and Late Chalcolithic A (Uruk), meaning the distinction has not been lost (Wilkinson 1990; 209-13). For the NJS, as mentioned above, the presence of 'Southern Uruk' materials was recorded in the field notes and the published site catalogue (Wilkinson and Tucker 1995; Appendix C), and has been slightly revised as a result of Lupton's (1996) reassessment. The TS also documented the presence of Uruk materials in publication as a note on the Late Chalcolithic periods in general (Algaze et al. 1992). No Uruk materials were discovered in the SHR region, where a far broader time-scale for the Chalcolithic period has been adopted due to ambiguities in the pottery record (Philip and Bradbury 2010). Taking all this into account, Table 4.8 represents the chronological divisions possible for the Late Chalcolithic and Uruk periods across the FCP. The recent extension of the length of the Uruk intrusion and Late Chalcolithic in general (Rothman 2001; Postgate 2002) is an extremely valuable insight into the prehistory of this region. Material from these periods are often buried beneath substantial later remains, particularly at tell sites, resulting in a paucity of excavated deposits. When combined with relatively conservative local pottery traditions throughout the period, this results in a lack of high resolution chronologically sensitive type-fossils to rely on in survey. We are left, therefore, with a 'long' fourth millennium in which a period of some 1400 years is difficult to breakdown in the absence of distinctive Southern Mesopotamian ceramic types. It is hoped that reassessment of earlier survey collections where available, particularly in the Jazira and Middle Euphrates where recent chronologies have enabled distinctions between the LC 1-2 and LC 3-5 periods from surface assemblages (Ur 2010a), may in future lead to possibilities of a more nuanced examination of this period.

The Early Bronze Age (EBA)

The period immediately after the end of the Uruk and Late Chalcolithic phases has been characterised as one of 'balkanisation' (Lupton 1996; 50), in which the regional ceramic types and inferred social relationships prevalent in the preceding periods gave way to sub-regional trajectories (Algaze 1999). The most obvious distinction at the beginning of the 3rd millennium occurs between the areas surrounding and to the west of the Euphrates and the Jazira, the former

[15] A few Bevel Rim Bowls (BRBs) were discovered at one site in the SS area, Tell Hadji Ibrahim (SS 3). These were discovered during the excavations at the site carried out by Michael Danti (Danti 1997; 2000; 105-195) and there was no suggestion of Uruk presence at the site from the surface collections (Wilkinson et al. 2004; 200). This study will follow Danti in treating Hadji Ibrahim as a trace Uruk occupation.

dominated by Plain Simple Ware (PSW) assemblages, reserved slip ware and Khirbet Kerak Ware (KKW), also known as Red-Black Burnished Ware (RBBW) and the latter by incised and painted Ninevite V types. For the far West and Southern Syria, a terminological confusion is introduced as researchers have tended to adopt Levantine chronological schemes. The earlier phases of the EBA in these areas are difficult to distinguish, at least until the significant changes which occur in the EB IV phase of the Levantine chronology. In the Eastern Jazira some scholars continued to use the Early Dynastic phasing developed for southern Mesopotamia until very recently. These sub-regional differences merit a discussion of each of these areas as discrete entities. I shall therefore discuss the TBS and NJS surveys as part of a larger Jazira group, the SS, LCP, KHS and TS under the umbrella of the Middle Euphrates and the AVRP and SHR as Western Syria.

The Early Bronze Age in the Jazira

The synthetic chronology recently developed for the Jazira area in North-Eastern Syria and North-Western Iraq designates the entire third millennium as EBA and divides this period into 7 phases, EJ ('Early Jezirah') 0 to V with phase III subdivided into IIIa and IIIb (Pfälzner 1998; Lebeau 2000; Table II). Again, it should be stressed that this phasing is based on a number of excavated sequences, and we should not expect the same degree of precision from survey assemblages. In fact, the NJS, TBS and THS divide the entire period into only two phases, labelled Ninevite V and Later Third Millennium in the NJS (Wilkinson and Tucker 1995) and Early Third Millennium and Mid-Late Third Millennium in the TBS and THS (Ur and Wilkinson 2008; Ur 2010a) (see below, Table 4.9).

EJ I and II: Ninevite V and the Early Third Millennium

The Ninevite V pottery tradition was first discovered by Max Mallowan in the Nineveh deep sounding in 1931 (Akkermans and Schwartz 2003; 211). Styles include incised and excised decoration as well as painted wares, a preponderance of pedestal bases and so called bead-rimmed cups (Ur 2010a; 249), and are crucial in delineating the EJ I and II phases in the EJ chronology, giving rough dates for the Ninevite V period as 2900-2600 (Lebeau 2000). There have been a number of attempts at subdividing the Ninevite V period and there do appear to be chronological distinctions with painted wares preceding incised and then excised grey wares with some overlap between each phase (Roaf and Killick 1987; Schwartz 1988). These decoration changes are used in the EJ chronology to distinguish between EJ I and II. For the purposes of survey such divisions are difficult to incorporate because they are based on relative abundances in a single assemblage rather than single type fossils. In the absence of stratigraphically intact secure contexts such ratios cannot be accurately calculated. The painted wares are also usually found on rather delicate fabrics and the paint itself may be erased by surface exposure resulting in under-representation in surface assemblages (Wilkinson and Tucker 1995; 49; Ur 2010a; 250). The absence of decorated wares may also be a function of the geographic distribution of those types. Rova (1988; 187) and others have suggested a Tigridian origin for the decorated Ninevite V types, and there does appear to be a marked drop off in diagnostic sherds from East to West, attested even in the relatively proximate THS (Ur 2010a) and Lyonnet's surveys in the Western Khabur basin (1996a), as well as the TBS and NJS. This is reflected in the EJ chronology in the division of the Khabur Triangle into Eastern and Western zones, the east characterised by Ninevite V types and the west by so called Metallic ware, found almost contiguously with the *kranzhugel*-type sites (Lebeau 2000; Pruß 2000). This is significant for the FCP analysis of this region because the TBS falls into the Western zone and the NJS and THS within the Eastern zone. However, all three used a typology derived from Tell al-Hawa and designed for the NJS (Ur 2004), resulting in a concentration on Ninevite V types. The TBS was also carried out in a relatively short period (see Chapter 3) before much of the more recent excavations at Tell Beydar. It is hoped that a re-examination of the TBS material may allow for the subdivision of the period, particularly given the continuing excavation at the site which may in the future provide a more appropriate local chronology.

EJ 0: Accommodating the Late Uruk – Ninevite V Transitional Phase

Phase-based chronology, as mentioned above, tends to suggest a step-like progression of separate cultural entities, masking the continuity of traits which one might intuitively expect. This problem is clearly present in the relationship between the Santa Fe LC 1-5 chronology, ending at the turn of the Third Millennium, and the beginning of the EJ chronology, originally ascribed to EJ I in 2900. The 100 year gap was subsequently filled by EJ 0, a transitional phase represented in excavated levels only at Tell Brak in the entire Khabur basin and described as a post-late Uruk/proto-Ninevite V sequence (Lebeau 2000). This phase also corresponds to the 'Painted Transitional Style' posited by Rova for the Eski Mosul and perhaps Upper Turkish Euphrates region, where Late Uruk styles gradually shift toward a classic Ninevite V assemblage (Rova 2003a). As with the other internal phase divisions of the Ninevite V period, this phase is reliant upon particular decorations which do not survive in sufficient quantities to be detectable by even intensive survey methodologies. The phase had not been recognised at the time of the NJS and was not mentioned in the TBS publications which defined the Early Third Millennium as representing EJ 1 and 2 (Ur and Wilkinson 2008; 307). For the calculations mentioned above, it is vital that the lengths of given phases are as accurate as possible, and it is therefore important to include the EJ 0 period as part of the larger Early Third Millennium (Ninevite V) phase. This is a conservative approach, in that it opts for the longest period possible to be represented by the presence of Ninevite V sherds. It is clear that this is more desirable than the alternative, in which spurious accuracy would be given to certain phases and gaps would be left in what must be a continuous chronological record. The Early Third Millennium phase, then, can be assigned to the period between 3000 and 2500 B.C for the NJS, TBS and THS (Table 4.9).

EJ III-V: The Later Third Millennium

The Mid-Late Third Millennium in the Jazira sees a significant peak in urbanism and a corresponding standardization of pottery manufacture, and is also the period in which the integration of historical sources and ceramic styles becomes possible. The EJ sequence reflects this latter point by equating a single phase, EJ IV, with the period of Akkadian influence over the Jazira as a whole (Lebeau 2000; 192 Table IX). The expectation that ceramic styles should directly reflect political machinations is perhaps misguided in this instance, particularly given the relatively short-lived Akkadian domination of Northern Mesopotamia and the probability that craft production was organized at a household rather than institutional level (Stein and Blackman 1993; 55; Ur 2010a; 253). The three distinctive features of this period are stone wares (in the east), metallic wares (in the west) and comb-incised decoration, whilst the key vessel forms include flat-based bowls and beakers, string cut bases and bowls with horizontal lugged handles (Wilkinson and Tucker 1995; 96-97; Ur 2004; 369-70). As with the Ninevite V period, the phase distinctions within the EJ chronology are often reliant on changes in decoration which are impossible to reconstruct on the basis of surface assemblages. At Brak, for example, certain comb-ware decorations are associated with the post-Akkadian period (Phase N), including the absence of dots and other additional features as decoration on vessels (Oates 2001; 165-73). However, comb-ware also occurs in Akkadian (phase M) and perhaps pre-Akkadian deposits, and distinctions between these and the post-Akkadian decorations cannot be made with enough reliability from survey material to merit a division of phases within the comb-ware horizon. The issue of subtle differences between types is compounded by geographical variations in both the form and duration of certain styles. As with the Early Third Millennium, variations in pottery traditions can be distinguished between the eastern and western Jazira which are not reflected in the TBS and NJS chronologies. Subtle changes in the duration of use of a few ceramic types in the light of recent excavations at Tell Beydar may allow for a more nuanced phasing of the later third millennium in that region (See Lebeau 2000; 188 Table V; Rova 2003b). However, a note of warning is provided by other surveys which have applied chronologies derived from large multi-period sites to their hinterlands in the eastern part of the basin. Surveys around Tell Leilan (Stein and Wattenmaker 2003), Tell Mohammed Diyab (Lyonnet 1990) and Tell Hamoukar (Ur 2010a) have all considered the pre-Akkadian, Akkadian and post-Akkadian periods described in the EJ chronology as one phase. The only survey which attempted to distinguish a post-Akkadian assemblage, carried out by Meijer (1986) in the eastern Khabur, made use of a ceramic typology which does not agree with the ceramic sequence (at the time unpublished and largely unexcavated) available at Tell Brak (Kolinski 2007; 347). At the present time, then, it seems that the longevity of forms and vagaries of surface assemblages combine to produce a single phase for the second half of the third millennium in this region, dating from 2500 to 2000 (Table 4.9).

<table>
<tr><th>Years</th><th>Lebeau 2000 Table 2</th><th>Pfalzner 2010</th><th>NJS</th><th>TBS/THS</th></tr>
<tr><td>1800</td><td rowspan="5">OJ</td><td>OJ II</td><td rowspan="5">Khabur</td><td rowspan="5">Khabur</td></tr>
<tr><td>1850</td><td rowspan="3">OJ I</td></tr>
<tr><td>1900</td></tr>
<tr><td>1950</td></tr>
<tr><td>2000</td><td rowspan="3">EJ V</td></tr>
<tr><td>2050</td><td rowspan="4">EJ V</td><td rowspan="9">Late 3rd Millennium</td><td rowspan="9">EJ 3-5 Pre-Akkadian, Akkadian, Post-Akkadian</td></tr>
<tr><td>2100</td></tr>
<tr><td>2150</td><td rowspan="3">EJ IV</td></tr>
<tr><td>2200</td></tr>
<tr><td>2250</td><td rowspan="3">EJ IV</td></tr>
<tr><td>2300</td><td rowspan="2">EJ IIIB</td></tr>
<tr><td>2350</td></tr>
<tr><td>2400</td><td rowspan="2">EJ III</td><td rowspan="4">EJ IIIA</td></tr>
<tr><td>2450</td></tr>
<tr><td>2500</td><td rowspan="2">EJ II</td><td rowspan="11">Ninevite V
Early 3rd Millennium</td><td rowspan="11">EJ 1-2 Nin V
Early 3rd Millennium</td></tr>
<tr><td>2550</td></tr>
<tr><td>2600</td><td rowspan="5">EJ I</td><td rowspan="5">EJ II</td></tr>
<tr><td>2650</td></tr>
<tr><td>2700</td></tr>
<tr><td>2750</td></tr>
<tr><td>2800</td></tr>
<tr><td>2850</td><td rowspan="4">EJ 0</td><td rowspan="4">EJ I</td></tr>
<tr><td>2900</td></tr>
<tr><td>2950</td></tr>
<tr><td>3000</td></tr>
</table>

Table 4.9: EBA Chronology for the Jazira Sub-Region (Based on Wilkinson and Tucker 1995; Lebeau 2000; Ur and Wilkinson 2008; Pfälzner 2010; Ur 2010a)

The Early Bronze Age in the Middle Euphrates

The Middle Euphrates region represents an extremely complex ceramic zone during the EBA. The large multi-period tell sites traditionally used to produce typologies cluster in areas where landscape and environmental conditions are amenable to that type of settlement, whilst some stretches of the river valley are without tells. This has led a number of scholars to divide the Euphrates valley into discrete ‘sectors’ which may be considered to have distinct ceramic traditions to varying degrees (Algaze 1999; Peltenburg 2007). The hydroelectric projects undertaken at a number of points along the Euphrates, including the Tabqa, Tishrin, Birecik, Carchemish and Karababa/Ataturk dams, have resulted in the excavation of a relatively large number of sites across the region, leading to a number of subtle distinctions in ceramic styles even within these sectors. This body of research has also led to a plethora of different terminologies and phase distinctions dependent on the material culture available at individual sites, the training and backgrounds of the excavators and the dates of excavation and publication (Campbell 1999; Peltenburg 2007; 18). Earlier researchers in the region tended to adopt the Levantine chronology developed for Western Syria and the Levant. This sequence divides the period between 3500B.C and 2000B.C. into five distinct phases, EB I, II, III, IVA and IVB. Of these, only the two EB IV periods have been comprehensively stratigraphically understood through the Ebla and Amuq sequences, whilst the application of the EB I-III periods has been described as 'frustratingly vague' (Akkermans and Schwartz 2003; 243). More recently, attempts at synthetic chronologies specific to the region have been made, notably Jamieson's four part division (Jamieson 1993) and Lisa Cooper (2006a) and Anne Porter's (2007a; 2007b) very similar chronologies which divide a long third millennium (3200/3100-1900 B.C.) into six phases. The Cooper-Porter chronology, based on the sequences at the Tell Banat complex (Tell Banat itself and Tell Kebir) but including parallels where appropriate, is currently the best available, at least for the Syrian Euphrates (Peltenburg 2007; 18), and will form the basis of the following discussion. The FCP surveys demonstrate some variation in phasing. The SS and LCP both divide the third millennium into three phases, the Early, Middle and Late EBA (Wilkinson et al. 2004; 84). The KHS divides the period roughly into two, an Early EBA and a combined Mid-Late EBA, along with an EB-MB Transition phases which straddles the late third and early second millennia. The TS adopts a similar phasing to the KHS (Algaze et al. 1992; 40), although a later reanalysis of the survey material in the light of excavations at the large local site of Titrişh Höyük resulted in a sub-division of the Mid-Late EBA into two separate phases (Algaze et al. 2001).

The LC 5 - Early EBA Transition

The Early EBA assemblage on the Middle Euphrates is characterised by Plain Simple Ware (PSW) and late reserved slip ware, whilst key forms are the cyma-recta and sinuous sided cups, as well as restricted jars with simple out turned rims. There are also regional indicators, such as the champagne cups found in the Carchemish sector. These diagnostic forms and wares are fairly easy to distinguish from the preceding Late Chalcolithic and Uruk forms. However, the transition between the Uruk phase and the EBA does not take the form of a sharp break. Significant amounts of Uruk material, particularly BRBs, have been found in the same context as Early EBA sherds at Tell Hadidi (Dornemann 1990; 90), although this is confused by the Levantine terminology applied by the excavators, and Tell Hadji Ibrahim (Danti 2000; 180-181). Many sites demonstrate great continuity in both forms and wares between what might be considered exemplary Late Uruk and Early EBA assemblages (Cooper 2006a; 11; Frangipane 2007). The Cooper-Porter chronology deals with this overlap by dividing the earliest EBA assemblages into two types, those with associated Uruk material and those not associated. Phase 1 of their chronology represents the mixed assemblages whilst phase 2 represents the same EBA types but where Uruk materials are lacking. There are two problems in applying this scheme to surveyed material. Firstly it relies on the presence of Uruk material at all sites where there is a later occupation, and this is by no means the norm. Secondly, it relies on the identification of stratigraphic relationships between different sherds. As noted above, such relationships are not detectable through conventional survey techniques. The seemingly coterminous assemblages of Early EBA and LC 5 sherds account for the overlap between the Santa Fe chronology, which dates the end of the LC 5 period to around 3000 B.C (Schwartz 2001; 242), and the Cooper-Porter chronology which pushes the Early EBA back to 3100 (Porter 2007a; 2007b), perhaps even 3200 B.C (Cooper 2006a). Both sequences are supported by radiocarbon evidence (Danti 2000; 260 Table 5.65; Wright and Rupley 2001; Danti and Zettler 2007), lending further support to the idea of a contemporaneous overlap of ceramic styles. As with the Late Uruk – Ninevite V division for the Jazira, it is worth avoiding spurious accuracy in this area by allowing for the maximum amount of time for any particular ceramic tradition. Thus the Early EBA in the Middle Euphrates must begin in the late fourth millennium, around 3100 B.C. This date raises the possibility that single period Late Uruk sites may be contemporary with Early EBA sites but considered as belonging to an earlier phase, and this should be considered in the analysis.

The Early EBA: 3100 – 2600 B.C.

The Early EBA survey assemblage consists of ceramic types included in phases 1-2 of the Cooper-Porter chronology, Kurban Höyük Period V and Tell es-Sweyhat excavation periods G, H and J. Within the three FCP surveys, there is some regional differentiation (Table 4.10). The SS in the south uses a variety of PSW forms as type fossils, mostly related to the sequences at Tell es-Sweyhat, Tell Hadidi and Tell Hadji Ibrahim. Although the distinctive cyma-recta cups are rare in this region, and none were found on the survey itself (Wilkinson et al. 2004; 90), there are parallels with both the Cooper-Porter sequence and the LCP, KHS and TS survey types. These include plain bowls and some narrow necked jars, both with simple rims (Wilkinson et al. 2004; 89; Cooper 2006a; 10). There is a notable absence of a number of the more distinctive diagnostics of the period further to the north, such as the aforementioned cyma-recta cups, sinuous-sided bowls, champagne vases and reserved slip wares (Marro 2007; 287). However, the use of securely dated radiocarbon sequences from Sweyhat and Hadji Ibrahim in developing the survey chronology allows us to be reasonably confident in relating SS period V to the Early EBA phase. The distinctive characteristics of the SS ceramic assemblages can largely be attributed to the physical and cultural differences attested between the Euphrates zones mentioned above.

The LCP type-fossils for the Early EBA bear a closer resemblance to the Cooper-Porter sequence. Late Reserved Slip decoration, often found on restricted neck jars (Jamieson 1993; 43), is sufficiently common in the areas north of Tell Banat to use as a type-fossil for the phase (Cooper

2006a; 10-11), whilst the cyma-recta and sinuous-sided bowls, hemispherical bowls and restricted necked jars are prevalent in the surveyed materials. These diagnostics have been found in significant quantities at the key local sequences, including Tell Shioukh Fouqani, Tell Shioukh Tahtani, Jerablus Tahtani and Zeytinli Bahçe (Falsone 1998; Morandi Bonacossi 2000; Ricci pers. comm. 2011). Local to the Carchemish region are the distinctive champagne-vases or champagne-cups, a form of pedestal bowl first discovered in tombs at Carchemish itself but now noted at other sites, including Shioukh Tahtani, Jerablus Tahtani and Qara Quzak (Cooper 2006a; 11; Falsone and Sconzo 2007). Curiously, these, along with the characteristic fruit stands of a similar type, are less common in survey material, although the distinctive bases mean they are often diagnostic when present. It is possible that this may be due to an association with funereal rights (Peltenburg in press), and therefore funerary locations, resulting in a relative paucity in survey assemblages which are normally dominated by domestic, or at least non-funerary, ceramic types.

The KHS and TS made use of very similar typologies for the Early EBA. As with the LCP, the cyma-recta cup and reserved slip decoration were used as key indicators, particularly the former which has a distinctive and durable ring base in the KHS/TS region (Wilkinson 1990; 215). Plain Simple Ware again dominated the assemblage. Globular cups and similar narrow necked jars were also used, extrapolated from their presence in period 5 contexts at Kurban Höyük itself (Algaze 1990; 283 Bowl Type 5, 285 Jar Type 5). As with the Sweyhat region, the longevity of types, especially the cyma-recta and reserved slip wares but also narrow necked jars, precludes a finer sub-division for the Early EBA than the first two phases of the Cooper-Porter sequence. Some of these types may be even longer-lived, such as the reserved slip decoration which is found even in Amuq phase I (Braidwood and Braidwood 1960; Porter 2007b; 10). However, the evidence from local sequences suggests dates for the Early EBA of 3100 – 2600 B.C.

The Middle and Late EBA

The second half of the long third millennium represented by the EBA on the Middle Euphrates is characterised by the emergence of fine ware types and a trend towards mass production, as well as the continuation of a number of the plain simple ware forms common in the Early EBA. Various sub-regional differences in overall assemblages also emerge, although these are still based around broadly similar types (Marro 2007). Distinguishing between the Middle and Late EBA has proved problematic in survey assemblages, and this is reflected in the phase divisions used in the FCP surveys (Table 4.10). The KHS uses ceramic types derived from Kurban Höyük phase IV, occupying almost the entire second half of the third millennium, including horizontal reserved slip ware, metallic ware and the local Keban/Karababa painted ware (See Algaze 1990; Chapter 10). Important forms include pedestal bases, distinguished from the Early EBA varieties more by ware than form, straight sided bases, conical cups cooking pots with triangular lugged handles and grooved rim bowls (Wilkinson 1990; 218). Several forms characteristic of the later third millennium were placed in the subsequent Late EBA/EB-MB transition phase, reflecting their discovery in contexts related to Kurban Höyük phase III. These include the distinctive and very widely distributed corrugated or 'Hama' goblets and long necked jars with double or triple grooved rims, both of which appear in phase 4 of the Cooper-Porter chronology, beginning in 2450 B.C, and continue into phases 5 and 6 (Cooper 2006a; 18-19). Probable Late EBA forms include grooved rim and 'blackberry' rim jars both of which are found in the EB IV phases (Levantine chronology) at Tell Hadidi. The two sites which were classified as Late EBA/EB-MB transition also contained several types which can be firmly dated to the Early MBA such as barrel jars. Pushing the Late EBA/EB-MB transition phase back to the Mid-EBA in the KHS on the basis of a single ceramic type is problematic and perhaps a step too far without a thorough reinvestigation of the material. Such a reinvestigation proved fruitful for the TS which was firmly sub-divided into Mid-EBA and Late-EBA phases. The precise diagnostics for this division have not been published, but it seems the excavations and a program of radiocarbon dating at the large, multi-period, and as yet unpublished, site of Titrişh Höyük provided new information, as well as the investigations of numerous sites in the intervening decade (Algaze et al. 2001; 25).

The SS divides the second half of the EBA into two phases, a Middle EBA and a Late EBA, designated SS Periods VI and VII, with Period VIII representing the Middle Bronze Age. However, no single period sites for any of these phases were discovered, resulting in a de facto division between sites with period VI and VII ceramic types and period VII and VIII, i.e. Mid-Late EBA and Late EBA/Early MBA. The sequence relies heavily on the excavations carried out at Tell Hadidi, and periods V, VI and VII roughly equate to Stratum 2 level 1, Stratum 2 level 2 and Stratum 4 respectively (Dornemann 1990; Wilkinson et al. 2004; 90-92), as well as assemblages from Tell es-Sweyhat itself, Tell Banat and Tell Kabir. Key type-fossils for the Mid-Late EBA include hemispherical bowls with thickened rims, often curving inwards, and certain jar forms. The bowl forms begin in phase 4 of the Cooper-Porter chronology (compare Wilkinson et al. 2004; 89 Table 6.3 Type G with; Cooper 2006a; Figure 1.5m) whilst the jars begin in phase 5 (Wilkinson et al. 2004; 89 Table 6.3 Type I, J and K; Cooper 2006a; 21 Figure 1.7), and both continue into the beginnings of phase 6 (Porter 2007b; 12).

Phase 3 of the Cooper-Porter chronology is not well represented in the excavated sequences at Tell es-Sweyhat and Tell Hadidi or in the type-fossils used in the survey (Dornemann 1990; Wilkinson et al. 2004; Holland et al. 2006). Porter has argued that there may be a hiatus in settlement during phase 3 at Tell Hadidi (2007b; 11) and as the main sequence used for this period in the SS this may account for the paucity of types recognised in the survey. Common diagnostic types for phase 3 including Metallic and Euphrates Banded Wares, so called 'sugar-loaf' beakers and chalice types. These have been discovered predominantly in funerary contexts, such as at Tell Halawa, Tell Banat and Tell Shioukh Tahtani, (Sconzo 2007; 250; Porter 2007b; 11), which provides another reason for their absence in surveyed material (Wilkinson et al. 2004; 91). The strong continuation between the PSW forms of phases 1 and 2 and phase 3 in the Cooper-Porter chronology argues for the inclusion of phase 3 in the Early EBA grouping. However, the association of SS Type G bowls with metallic wares in tombs in Stratum 2 Level 2 at Tell Hadidi suggests a potential early form of these in phase 3 contexts. Given the heavy reliance placed on Type G bowls in the survey, it seems sensible to include phase 3 in the Mid-Late EBA rather than the Early EBA. The sites designated Late EBA/Early MBA in the SS, representing the amalgamation of periods VII and VIII, are defined by a number of forms from the last two phases of the Cooper-Porter chronology as well as Early MBA forms derived from the MBA levels at Tell Hadidi. Variants of the Type G bowls are still present, along with collared jars, grooved top storage jars and bowls with carinations on the rim and body which begin in phases 5 and 6 (Cooper 2006a; 21-25). Barrel jars (SS Type L) are considered indicators of the Early MBA due to their absence from Tell es-Sweyhat and ubiquity in MBA levels at Tell Hadidi (Dornemann 1992), and are the main diagnostic for distinguishing Late EBA from Early MBA (Wilkinson et al. 2004; 92).

Like the SS, the LCP divides the second half of the EBA into two phases where possible but does not attempt spurious accuracy where the pottery types are difficult to distinguish. Important types for the entire period include Hama goblets, hemispherical bowls with thickened incurving rims similar to SS Type G, and cooking pots with triangular lug handles. These are attested at Tell Shioukh Tahtani in the EB III-IV periods (Sconzo 2007; 262), Tell Amarna in the EB IV (Pons 2001) and in Tell Jerablus Tahtani Assemblage C (Peltenburg et al. 1997) and sit comfortably within phases 4 to 6 of the Cooper-Porter chronology. The Late EBA types comprise jars with rilled or blackberry rims used as diagnostics in both the SS and KHS, although very similar forms exist in the MBA. A northern parallel for these grooved wares can be found at Horum Höyük where grooved rims and combed wares appear, almost exclusively in jar forms, in phases III4 and III5. This is equivalent to the EB IV period in the Levantine terminology used by the excavators, and therefore represents the last quarter of the third millennium (Marro 2007; 227). As with the SS, single period Middle or Late EBA sites are rare and distinguishing between the two phases is often difficult. It may be possible to sub-divide based on the presence or absence of collared rimmed cups or goblets. These are found in phases 5 and 6 of the Cooper-Porter chronology and occur in the later (EB IV) levels at Shioukh Tahtani, Qara Qusak and Tell Ahmar (Sconzo 2007; 259) and are present in some survey assemblages. Marro, in her discussion of ceramic provinces surrounding Carchemish in the EBA, has pointed out the similarities between assemblages in the Carchemish-Birecik sub-region and those from Tilbeshar and Gaziantep, suggesting a homogenous ceramic package across the LCP survey area (Marro 2007; 229). It is hoped that further analysis of the results from this ongoing survey will allow the distinction between Middle and Late EBA assemblages to be disentangled at all the sites occupied in the second half of the third millennium.

<table>
<tr><th>Years</th><th>Porter 2007a and b</th><th>Cooper 2006</th><th>KHS</th><th>TS</th><th>SS and ULT</th><th>LCP</th></tr>
<tr><td>1800</td><td rowspan="5">MB</td><td rowspan="3">MB</td><td rowspan="3">MB</td><td rowspan="3">MB</td><td rowspan="3">SS 8
MBA</td><td rowspan="3">MBA</td></tr>
<tr><td>1850</td></tr>
<tr><td>1900</td></tr>
<tr><td>1950</td><td rowspan="4">Phase 6</td><td rowspan="6">EB-MB Trans (KH III) Ph H</td><td rowspan="6">EB-MB Trans (KH III) Ph H</td><td rowspan="8">SS 7
LEBA</td><td rowspan="8">LEBA</td></tr>
<tr><td>2000</td></tr>
<tr><td>2050</td><td rowspan="3">Phase 6</td></tr>
<tr><td>2100</td></tr>
<tr><td>2150</td><td rowspan="4">Phase 5</td></tr>
<tr><td>2200</td><td rowspan="3">Phase 5</td></tr>
<tr><td>2250</td><td rowspan="8">MEBA/LEBA (KH IV) Ph G</td><td rowspan="3">LEBA</td></tr>
<tr><td>2300</td></tr>
<tr><td>2350</td><td rowspan="3">Phase 4</td><td rowspan="3">Phase 4</td><td rowspan="6">SS 6
MEBA</td><td rowspan="6">MEBA</td></tr>
<tr><td>2400</td><td rowspan="5">MEBA</td></tr>
<tr><td>2450</td></tr>
<tr><td>2500</td><td rowspan="3">Phase 3</td><td rowspan="3">Phase 3</td></tr>
<tr><td>2550</td></tr>
<tr><td>2600</td></tr>
<tr><td>2650</td><td rowspan="6">Phase 2</td><td rowspan="6">Phase 2</td><td rowspan="8">EEBA (KH V) Ph F</td><td rowspan="8">EEBA (KH V) Ph F</td><td rowspan="8">SS 5
EEBA</td><td rowspan="8">EEBA</td></tr>
<tr><td>2700</td></tr>
<tr><td>2750</td></tr>
<tr><td>2800</td></tr>
<tr><td>2850</td></tr>
<tr><td>2900</td></tr>
<tr><td>2950</td><td rowspan="4">Phase 1</td><td rowspan="6">Phase 1</td></tr>
<tr><td>3000</td></tr>
<tr><td>3050</td><td rowspan="4" colspan="4">LC 5</td></tr>
<tr><td>3100</td></tr>
<tr><td>3150</td><td rowspan="2">LC 5</td></tr>
<tr><td>3200</td></tr>
</table>

Table 4.10: EBA Chronology for the Middle Euphrates Sub-Region (Based on Algaze 1990; Wilkinson 1990; Algaze et al. 1992; Wilkinson et al. 2004; Cooper 2006a; Porter 2007a; Wilkinson et al. 2007a; Porter 2007b)

The Early Bronze Age in Western Syria

There are no recent regional syntheses available for the western and south western parts of Northern Mesopotamia in the EBA, and this can be considered a reflection of the state of research in the region. There are simply not enough well-excavated sites, and certainly not enough which have been published and include radiocarbon dates, to allow an analysis comparable to those recently developed for the other two Northern Mesopotamian sub-regions (Philip and Baird 2000; 6). This in part explains the elevated average phase lengths relative to the other surveys (see

Table 4.2). Comparisons with the other two sub-regions are further complicated by the ubiquitous use of the Levantine chronology mentioned above. As with the Middle Euphrates, there appears to be significant regional variation, and the two FCP surveys attributed to this western zone use markedly different chronologies (Table 4.11). The AVRP built on the chronology developed specifically for the region by Robert and Linda Braidwood through a combination of survey and excavation during the 1930s, dividing the EBA into four phases labelled G, H, I and J (Braidwood and Braidwood 1960; Yener 2005a; 203). This phasing has since been revised based on further ceramic developments in other regions but still remains largely coherent, especially for survey purposes. Little has been published for the SHR and there are very few excavated sequences which may provide comparisons. Key local sites for the early EBA are Tell Nebi Mend and Tell Hama, although there are doubts over the stratigraphic integrity of the latter, as well as the coastal sites of Tell Arqa, Byblos and Ras-Shamra. Parallels may also be found to the south at sites such as Khirbet el-Umbashi, reflecting the association of the Homs region with southern Syria and the northern Levant in general during the first half of the third millennium (Braemer and Echallier 2000; 409). During the later EBA the ceramics in the SHR area become increasingly related to northern assemblages, with Ebla providing the best known sequence, as well as the continuing occupations at Tell Nebi Mend, Hama and Tell Arqa. Throughout this period the northern survey area seems to follow a rather different trajectory which includes a high degree of continuity in pottery assemblages and types.

In general, excavations and surveys in Western Syria have followed the Levantine chronology which dates the beginning of the EBA to 3400, dividing the next 1400 years into four major phases, EB I to EB IV. This creates problems when comparing the Early EBA as defined in the Levant with the other two areas, both of which suggest a later date for the beginning of the EBA, closer to 3100 in the Middle Euphrates and 3000 in the Jazira (see above). In the Amuq valley, this gap is occupied by Amuq Phase G which is characterised by reserved slip and plain simple wares, as well as the first occurrences of Khirbet Kerak Ware (KKW), also known as Red-Black Burnished (RBB) Ware. Phase H sees a marked increase in the KKW wares and a continuation of the reserved slip and plain simple wares, all of which are also present in phase I. The lack of KKW is one of the main differences between phase I and phase J (Braidwood and Braidwood 1960). In the AVRP, KKW was used as the main Early to Middle EBA diagnostic type (Yener 2005a; 245), and this is supported by recent discussion suggesting a date between 2900 and 2800 for the appearance of KKW in the Northern Levant (Philip and Millard 2000; 280). The Amuq phase J horizon has a number of parallels with EB IV in the Levantine chronology elsewhere, as well as with the later phases of the Middle Euphrates chronology, most notably the Hama goblets (Braidwood and Braidwood 1960; 438) which occur in vast numbers at Ebla and begin in phase 4 of the Cooper-Porter chronology (Cooper 2006a; 17). We can therefore suggest a tentative date for the KKW sites in the Amuq as between 2900 and 2400. It should be noted, however, that not all sites within this period may include a KKW types, and therefore that an absence of KKW does not necessarily mean an absence of settlement during this time (see Chapter 7). We are also still left with the intermediate Phase G, occupying the period between the Amuq F styles and the occurrence of KKW in large quantities, and phase J which comes after the end of the KKW phase. Phase G includes some Uruk material, such as BRBs, drooping spouts and nose lugs in the earliest phases, and on the basis of the Hama and Tell Afis sequences may be considered to end after EB II (Mazzoni 2002; 72). If we take the BRBs to represent the last part of the LC chronology, LC 5, we arrive at a date of 3300 for the beginning of Amuq G. This fits well with the radiocarbon dates from a sounding at Tell al-Judaidah in the Amuq plain conducted in 1995 which places the Amuq G phase between 3300 and 2900 (Yener et al. 2000b; 197). The continuing presence of Amuq F style chaff tempered ceramics in phase G supports the arguments given above for the continuation of local Late Chalcolithic traditions through the period of Uruk ceramics. Phase J types were not uniformly distinguished from the other plain simple ware forms. Although individual Amuq phases were identified and mentioned in the site gazetteer where appropriate, the only universal chronological distinction made was between sites with and without KKW. This results in a phase of 3300-1900 for the combined Amuq G-J EB I-III PSW and KKW phase. The published data for the AVRP allows a slight sub-division here as KKW is recorded in the field notes (as RBB ware). We can therefore distinguish between sites which have PSW and KKW, which may be dated to the whole EB I-IV phase, Amuq G-J, and sites which only have KKW which miss out phases G and J, and therefore date to between 2900 and 2400.

This dating differs somewhat from that employed in the SHR. In the marl landscapes of the southern survey area, EB I-III in the Levantine sequence are amalgamated into a single phase, whilst EB IV is recognised as separate. KKW is extremely rare in this region, with only a few sherds present at Hama and none from Tell Nebi Mend (Philip and Millard 2000; 285), the two closest relevant sequences to the SHR survey area. However, it is possible to discern changes in ceramic production, including a shift from chaff tempered wares to plain simple wares, between the Late Chalcolithic and the EB I. The subsequent EB II and III periods are extremely difficult to divide from survey material due to the level of continuity of types and wares (Mazzoni 2000a; 104). The situation in the basaltic part of the Northern Survey Area of the SHR is rather more complex due to the general paucity of surface ceramics and the presence of basalt tempered pottery with few parallels in form or fabric (see Philip and Bradbury 2010; 153-156 for discussion). Phasing in the SHR during the Early EBA therefore differs between the northern and southern survey areas. In the south, the EB I-III period can be considered to cover 3400 to 2400 (Braemer 2002; 10 Tableau 3), a lengthy phase reflecting the lack of knowledge about local sequences, particularly Tell Nebi

Mend. The continuing presence of Amuq F ceramics into the EBA has been accommodated through the designation of an LC-EBA transitional phase covering 4200-3300.

<table>
<tr><th>Years</th><th>Levantine Sequence (Braemer 2002)</th><th>Amuq (Braidwoods 1960)</th><th colspan="2">SHR Southern Area</th><th colspan="2">SHR Northern Area</th><th colspan="2">AVRP</th></tr>
<tr><td>1800</td><td rowspan="4">MBA</td><td rowspan="2">K</td><td colspan="2" rowspan="2">MBA</td><td colspan="2" rowspan="2">MBA</td><td colspan="2" rowspan="2">Amuq K</td></tr>
<tr><td>1850</td></tr>
<tr><td>1900</td><td rowspan="11">J</td><td colspan="2" rowspan="11">EB IV</td><td rowspan="11">EB IV</td><td rowspan="33">Chalco-EBA (4500 - 1900)</td><td rowspan="31">Amuq G-J Plain Simple Wares</td><td rowspan="11"></td></tr>
<tr><td>1950</td></tr>
<tr><td>2000</td><td rowspan="5">EB IVB</td></tr>
<tr><td>2050</td></tr>
<tr><td>2100</td></tr>
<tr><td>2150</td></tr>
<tr><td>2200</td></tr>
<tr><td>2250</td><td rowspan="4">EB IVA</td></tr>
<tr><td>2300</td></tr>
<tr><td>2350</td></tr>
<tr><td>2400</td></tr>
<tr><td>2450</td><td rowspan="5">EB III</td><td rowspan="4">I</td><td rowspan="20">EB I-III</td><td rowspan="17"></td><td rowspan="22">Chalco-EB III (4500 - 2400)</td><td rowspan="10">KKW from notes</td></tr>
<tr><td>2500</td></tr>
<tr><td>2550</td></tr>
<tr><td>2600</td></tr>
<tr><td>2650</td><td rowspan="5">H</td></tr>
<tr><td>2700</td><td rowspan="5">EB II</td></tr>
<tr><td>2750</td></tr>
<tr><td>2800</td></tr>
<tr><td>2850</td></tr>
<tr><td>2900</td><td rowspan="11">G</td></tr>
<tr><td>2950</td><td rowspan="10">EB I</td><td rowspan="10"></td></tr>
<tr><td>3000</td></tr>
<tr><td>3050</td></tr>
<tr><td>3100</td></tr>
<tr><td>3150</td></tr>
<tr><td>3200</td></tr>
<tr><td>3250</td></tr>
<tr><td>3300</td><td rowspan="5">LC-EBA Transiti on</td></tr>
<tr><td>3350</td></tr>
<tr><td>3400</td></tr>
<tr><td>3450</td><td rowspan="2">LC</td><td rowspan="2">F</td><td rowspan="2">LC</td><td colspan="2" rowspan="2">LC</td></tr>
<tr><td>3500</td></tr>
</table>

Table 4.11: EBA Chronology for the Western Syria Sub-Region (Braidwood and Braidwood 1960; Braemer and Echallier 2000; Braemer 2002; Wilkinson et al. 2004; Yener 2005)

It is hoped that future research on the trench VIII sequence from this site will allow for greater sub-divisions of this period. In the northern survey area, an even broader ceramic phase is used, Chalcolithic-EB. This equates to the Late Chalcolithic and EB I-III before the emergence of the distinctive EB IV forms (Philip and Bradbury 2010; 156), giving dates of 4500-2400.

The later part of the third millennium in Western Syria is characterised by increasingly standardised ceramic production and the arrival of several new mass produced forms (Akkermans and Schwartz 2003; 270). The key diagnostic type which serves to link the AVRP and SHR, as well as the Middle Euphrates region, is the Hama J goblet form. The Braidwoods described these as getting a 'good start' in the later periods of phase I in the Amuq but reaching a 'floruit' in phase J (1960; 412). At Ebla the Hama goblets are taken as the beginning of the EB IV period (Mazzoni 2002; 78), whilst in the Cooper-Porter Middle Euphrates they begin in phase 4 and continue into phase 5. Other parallels with the Middle Euphrates chronology include the triangular lugged cooking pot and the Syrian bottle (Compare Mazzoni 2002; 96 Plate XLV 135 with ; Cooper 2006a; 17 Figure 1.5d). To the south, hole-mouthed cooking pots similar to those found in Amuq phase J and Ebla are characteristic of the Late EB III and EB IV phases at Khirbet el-Umbashi (Braidwood and Braidwood 1960; 433 Fig. 333 4; Braemer 2002; 18 Planche IV 16-18; Mazzoni 2002; 78). Such parallels suggest "EB IV" as used in the SHR should be considered to span the majority of the second half of the third millennium as well as the first century of the second, approximately 2400-1900. As mentioned above, this division was not made for many of the sites in the AVRP resulting in a long EB I-IV (Braidwood G-J) phase running from 3300-1900 with a sub-section between 2900 and 2400 where KKW was recorded (Table 4.11). Individual Amuq phases are occasionally mentioned in the site notes and these have been recorded where appropriate.

Comparative Chronologies of the EBA across Northern Mesopotamia

In order to compare settlement dynamics across the three sub-regions we must bring together the chronologies mentioned above. Whilst relating ceramic typologies to calendar years renders different typologies comparable, the strength of the comparison is reliant on some overlap between the phases used for different geographical areas. As mentioned above, longer phases are more likely to suffer from overestimation of settlement sizes and numbers. Table 4.12 shows the phase divisions for all the surveys related back to calendar years and is compiled from the previous four tables. Although there are significant differences between the sub-regions, there are sufficient homologies to allow for comparisons. The different colours here represent roughly comparable blocks of time. The green represents the last phase of the Santa Fe Late Chalcolithic chronology. The orange might be considered a generic Early-Mid EBA and demonstrates the relationship between Ninevite V and the EEBA phases of the Middle Euphrates, as well as with KKW in the West. The blue phases may be taken as representing the second half of the EBA. The Middle EBA phase divisions possible in the Middle Euphrates have been included here as opposed to in the orange section because the ceramic types are more closely linked with the later types. This is a reflection of the lack of Cooper-Porter phase 3 type ceramics found through survey.

<table>
<tr><th>Years</th><th>NJS</th><th>TBS/THS</th><th>KHS</th><th>TS</th><th>SS/ULT</th><th>LCP</th><th>SHR SSA</th><th>SHR NSA</th><th colspan="2">AVRP</th></tr>
<tr><td>1500</td><td rowspan="11">Khabur</td><td rowspan="11">Khabur</td><td rowspan="3">LBA</td><td rowspan="3">LBA</td><td rowspan="3">SS 9 LBA</td><td rowspan="3">LBA</td><td rowspan="3" colspan="2">LBA</td><td rowspan="3" colspan="2">LBA</td></tr>
<tr><td>1550</td></tr>
<tr><td>1600</td></tr>
<tr><td>1650</td><td rowspan="6">MB</td><td rowspan="6">MB</td><td rowspan="6">SS 8 MBA</td><td rowspan="6">MBA</td><td rowspan="6" colspan="2">MBA</td><td rowspan="6" colspan="2">MBA</td></tr>
<tr><td>1700</td></tr>
<tr><td>1750</td></tr>
<tr><td>1800</td></tr>
<tr><td>1850</td></tr>
<tr><td>1900</td></tr>
<tr><td>1950</td><td rowspan="6">EB-MB Trans (KH III) Ph H</td><td rowspan="6">EB-MB Trans (KH III) Ph H</td><td rowspan="8">SS 7 LEBA</td><td rowspan="8">LEBA</td><td rowspan="10">EB IV</td><td rowspan="10">EB IV</td><td rowspan="28">Amuq G-J (Plain Simple Wares)</td><td rowspan="10"></td></tr>
<tr><td>2000</td></tr>
<tr><td>2050</td><td rowspan="9">Late 3rd Millennium</td><td rowspan="9">EJ 3-5 Pre-Akkadian, Akkadian, Post-Akkadian</td></tr>
<tr><td>2100</td></tr>
<tr><td>2150</td></tr>
<tr><td>2200</td></tr>
<tr><td>2250</td><td rowspan="8">MEBA/LEBA (KH IV) Ph G</td><td rowspan="3">LEBA</td></tr>
<tr><td>2300</td></tr>
<tr><td>2350</td><td rowspan="6">SS 6 MEBA</td><td rowspan="6">MEBA</td></tr>
<tr><td>2400</td><td rowspan="5">MEBA</td></tr>
<tr><td>2450</td><td rowspan="18">EB I-III</td><td rowspan="22">Chalco-EB III (4500-2400)</td><td rowspan="10">KKW (from notes)</td></tr>
<tr><td>2500</td><td rowspan="11">Nin V</td><td rowspan="11">EJ 1-2 Nin V</td></tr>
<tr><td>2550</td></tr>
<tr><td>2600</td></tr>
<tr><td>2650</td><td rowspan="8">EEBA (KH V) Ph F</td><td rowspan="8">EEBA (KH V) Ph F</td><td rowspan="8">SS 5 EEBA</td><td rowspan="8">EEBA</td></tr>
<tr><td>2700</td></tr>
<tr><td>2750</td></tr>
<tr><td>2800</td></tr>
<tr><td>2850</td></tr>
<tr><td>2900</td></tr>
<tr><td>2950</td><td rowspan="8"></td></tr>
<tr><td>3000</td></tr>
<tr><td>3050</td><td rowspan="10">Late Chalc</td><td rowspan="10">Late Chalc</td><td rowspan="10">Late Chalc</td><td rowspan="10">Late Chalc</td><td rowspan="10">Late Chalc</td><td rowspan="10">Late Chalc</td></tr>
<tr><td>3100</td></tr>
<tr><td>3150</td></tr>
<tr><td>3200</td></tr>
<tr><td>3250</td></tr>
<tr><td>3300</td></tr>
<tr><td>3350</td><td rowspan="4">Late Chalc</td><td rowspan="4" colspan="2">Late Chalc</td></tr>
<tr><td>3400</td></tr>
<tr><td>3450</td></tr>
<tr><td>3500</td></tr>
</table>

Table 4.12: Comparative Chronologies for the EBA in the FCP

Finally, the red and pink reflect the Middle and Late Bronze Ages, again demonstrating the overall comparability of the ceramic phases. Table 4.12 also clearly shows state of the chronology in

Western Syria, where far longer phases do not fit into the sub-divisions possible to the north and east.

Other Periods

This study will make use of settlement data for periods outside of the EBA and Late Chalcolithic for comparative purposes and also to investigate processes of landscape transformation, and it is therefore necessary to briefly examine the details of the other periods surrounding those of interest. I will not discuss these different periods in any great detail for reasons of space but it is worth recording how the absolute dates used in the database were arrived at. For the most part this has been through secondary literature, especially for the later historic periods where literary sources allow for far greater precision in absolute dating.

Prehistoric Periods

With some exceptions the phases which precede the Late Chalcolithic are applicable across most of Northern Mesopotamia and include the Pre-Pottery Neolithic A and B, the Early Pottery Neolithic, Hassuna and Samarran, Halaf, and Ubaid periods. In Anatolia, Early and Middle Chalcolithic phases replace the later part of the Halaf and the Ubaid, whilst the Hassuna-Samarran types are not found in any of the surveys west of the TBS. Some of these phases have not been recorded across all of the surveys due to the absence of settlement during certain periods, as well as the interests and knowledge of the survey teams. The earliest phase recorded in the AVRP, KHS, and TS was the Neolithic, described as the early 6th millennium (Wilkinson 1990; 3; Yener 2005a; 203), whilst the SS recorded no sites older than the Halaf period (Wilkinson et al. 2004; 84 Table 6.1). The NJS and TBS both recorded Early Neolithic and Hassuna sites (Wilkinson and Tucker 1995; Wilkinson 2000b; Ur and Wilkinson 2008)[16] and the SHR and LCP include remains dating back to the Palaeolithic (Wilkinson et al. 2007a; 216 Table 1), although these have only been systematically studied in the SHR. As with all other phases, the absolute dates mask a degree of internal change which is not universally visible in survey assemblages. This is particularly relevant at the transitions between phases. It is an unfortunate paradox that the material cultural changes used to determine chronologies often coincide with the kinds of profound social upheavals archaeologists are seeking to analyse, such that the material resists categorisation at the point at which it is most important to establish it.

Earlier prehistoric material also suffers from a severe lack of available dating evidence when compared to historic periods. Textual sources available for later periods are by definition absent

[16] The presence of ceramic and lithic specialists during the TBS survey allowed for far finer subdivisions to be made for the earlier sites in this survey, particularly the Neolithic (Nieuwenhuyse and Wilkinson 2008). These sub-divisions cannot be replicated across the other surveys and are not therefore helpful in comparing settlement trends between the surveys. They have been included in the database and other records but are not discussed here.

from the prehistoric phase, whilst the material remains are often buried under those of later occupations. Constraints on money and time, as well as the fact that many important sites were excavated before the arrival of modern scientific techniques, have led to a paucity of secure absolute dates derived through scientific dating methods, particularly radiocarbon, across the region. Prehistorians across Northern Mesopotamia are, furthermore, certainly not immune from applying terms in the 'frustratingly vague' way ascribed to Levantine archaeologists (Akkermans and Schwartz 2003; 243), whilst real differences in the dates of certain ceramic traditions adopted in different parts of the FCP study area may also account for disparities.

Years	Jazira	Western and Central Syria	Anatolia
4,400 onwards	Santa Fe LC Chronology	Santa Fe LC Chronology	Santa Fe LC Chronology
5,300 - 4,400	Ubaid	Ubaid	Middle Chalcolithic
5,900 -5,300	Halaf	Halaf	Halaf
6,800 -5,900	Hassuna and Samarra	Pottery Neolithic - Dark Faced Burnished Ware	Pottery Neolithic
8,700 -6,800	PPNB	PPNB	PPNB
10,000 -8,700	PPNA	PPNA	PPNA

Table 4.13: Dates for the Earlier Prehistoric Phases (Based on Wilkinson 1990; Schwartz 2001; Akkermans and Schwartz 2003; Wilkinson 2003)

This is perhaps the case for the spread of the Ubaid pottery tradition, a distinctly southern Mesopotamian phenomenon which spread over several hundred years northwards into highland Anatolia and southwards into Saudi Arabia and the Gulf (see papers in Carter and Philip 2010 particularly; Gurdil 2010). Despite these complications, the central narrative for the prehistoric periods remains essentially the same across Northern Mesopotamia and southern Anatolia. Pre-pottery Neolithic material culture gives way to simple Early Neolithic ceramic types which are in turn replaced by first Halaf-like and then Ubaid-like painted ceramic traditions, although here there is some local variation (Algaze 1990; 239-240). For Syria, the dating for the prehistoric phases has been taken from Akkermans and Schwartz's overview volume (2003). These are generally in agreement with Wilkinson (2003), which also include phases for south-eastern Anatolia, and taken together these two present a sound overview. Table 4.13 shows the key periods, divided into the Jazira, western and central Syria and Anatolia. This is more due to differences in terminology than differences in ceramic horizons.

Historic Periods - Territorial Empires of the Bronze and Iron Ages

It is easier to ascribe absolute year dates to the phases following the EBA due to the increased availability of textual sources and the greater number of excavations. However, as we saw with the Akkadian example during the EBA, and to a lesser extent the Uruk phenomenon, drawing associations between particular ceramic types, historically attested cultures and political entities is inherently problematic. Generally speaking, the later surveys have tended to avoid the use of politically or culturally loaded terms such as 'Mittanian' or 'Neo-Assyrian' in favour of more neutral terms such as Late Bronze Age or Mid-Iron Age. For the older surveys, the original nomenclature has been retained with the addition of the equivalent non-political term. The high degree of homogeneity of ceramic forms across large swathes of the region during the phases occupied by the later territorial empires also allows for direct comparisons between assemblages. However, the earlier phases immediately after the end of the EBA continue the trend of sub-regional ceramic types and merit discussion in these terms.

In the Jazira, the MBA and early LBA is defined by the Khabur phase. Khabur pottery sees a return to painted traditions, although with simpler designs than the Ninevite V period. Khabur Painted Ware also survives on the surface far better than the Ninevite V types and as such represents an excellent diagnostic type for the period (Wilkinson and Tucker 1995; 97). The Khabur phase has been subdivided based on excavated sites but, as with the earlier phases, it is not possible to distinguish between these using survey materials. The absolute dates for this period are somewhat problematic. The middle periods of Khabur Ware can be securely linked to the reign of Samsi-Adad in the Old Assyrian period thanks to the discovery of tablets and ceramics in secure contexts at Tell Chagar Bazar (Kolinski 2007; 343). Evidence from Tell Brak suggests some overlap with Southern Mesopotamian Isin-Larsa type pottery for the earliest levels, that is immediately after the Ur III (EJ V) period, and an early Mittanian date for the latest (Oates and Oates 1994; 171-2; Oguchi 1997; 199). This gives rough dates for the Khabur period of 2000 to 1500 B.C., a comparable length of time to the earlier phases. To the west in the Middle Euphrates and Western Syria different pottery assemblages predominate. The MBA phase must be considered to begin slightly later as the EB-MB transition phase used in the KHS and TS takes up the first hundred years of the traditional MBA phase of 2000-1600[17]. The western ceramic traditions are not generally painted and are characterised by vertically grooved rims, particularly on jar forms, carinated bowls and incised comb decorations (Nigro 2002).

<table>
<tr><th>Years B.C.</th><th>Western and Central Syria</th><th colspan="2">Jazira</th></tr>
<tr><td>300</td><td>Hellenistic</td><td colspan="2">Hellenistic</td></tr>
<tr><td>350</td><td rowspan="18">Generic IA with some divisions through survey notes</td><td colspan="2" rowspan="5">Late IA - Persian</td></tr>
<tr><td>400</td></tr>
<tr><td>450</td></tr>
<tr><td>500</td></tr>
<tr><td>550</td></tr>
<tr><td>600</td><td colspan="2" rowspan="5">Mid IA - Late Assyrian</td></tr>
<tr><td>650</td></tr>
<tr><td>700</td></tr>
<tr><td>750</td></tr>
<tr><td>800</td></tr>
<tr><td>850</td><td rowspan="8">Early IA</td><td rowspan="4"></td></tr>
<tr><td>900</td></tr>
<tr><td>950</td></tr>
<tr><td>1000</td></tr>
<tr><td>1050</td><td rowspan="8">Middle Assyrian</td></tr>
<tr><td>1100</td></tr>
<tr><td>1150</td></tr>
<tr><td>1200</td></tr>
<tr><td>1250</td><td rowspan="8">LBA</td><td rowspan="6">LBA Mittanni and Middle Assyrian</td></tr>
<tr><td>1300</td></tr>
<tr><td>1350</td></tr>
<tr><td>1400</td></tr>
<tr><td>1450</td><td rowspan="2"></td></tr>
<tr><td>1500</td></tr>
<tr><td>1550</td><td colspan="2" rowspan="10">Khabur</td></tr>
<tr><td>1600</td></tr>
<tr><td>1650</td><td rowspan="6">MBA</td></tr>
<tr><td>1700</td></tr>
<tr><td>1750</td></tr>
<tr><td>1800</td></tr>
<tr><td>1850</td></tr>
<tr><td>1900</td></tr>
<tr><td>1950</td><td rowspan="2">EBA</td></tr>
<tr><td>2000</td></tr>
</table>

Table 4.14: Dates for the Earlier Historic Phases (Based on Akkermans and Schwartz 2003; 365 Fig. 11.3; Wilkinson 2003; xviii-xix; Anastasio 2010; 5)

[17] The date of 1600B.C. for the end of the MBA in the west is based on historical assumptions regarding the destruction of Ebla IIIB which are the subject of some debate. For the purposes of comparability with the other sub-regions and in the absence of any other widely used chronological distinction at this time I will continue to use the 1600B.C. date in this thesis.

The Late Bronze Age includes the periods of Mittanian followed by Middle Assyrian imperial control and again requires a division between East and West. The NJS identified separate Nuzi, Mittanni and Middle Assyrian pottery types where possible but later surveys in the region, including the TBS, opted for an amalgamated LBA phase due to the continuity of various ceramic forms between the two political entities (Ur and Wilkinson 2008; Ur 2010a; 267). This approach was also taken for the Middle Euphrates and Western Syria sub-regions, although it should be noted that the KHS, TS and SS found no single phase LBA sites (Wilkinson 1990; 111-112; Algaze et al. 1992; 43; Wilkinson et al. 2004; 94), and specific local typologies are difficult to establish. The political and cultural changes occurring during this period, including the emergence of a number of local polities on the Middle Euphrates and the complex relations between these polities and the larger Mittanian, Middle Assyrian and Hittite empires, argue against any attempt at fine sub-divisions for this phase, at least for survey pottery (see Serifoglu 2009 for an attempt to establish cultural zones in the Middle Euphrates region based on excavated material). Ultimately, the LBA phase can be attributed to the period between 1600 and 1200 (Wilkinson 2003; xviii-xix). This allows for the maximum possible extent of Nuzi and Mittanian types, although there is a possibility that some of the Middle Assyrian forms continue into the IA. Key ceramic types across the region include squared storage jar and bowl rims, an extremely useful survey type in distinguishing the LBA due to their durability, and collared or cordoned necked jars (Wilkinson et al. 2004; 94; Ur 2010a; 267).

The IA phase occupies the period between 1200 and 330 B.C, running from the end of the Middle Assyrian period to the beginning of the Hellenistic, and includes two major political and cultural units, the Neo-Assyrian and Persian empires. The long duration and pervasive power of the first of these had such an effect on material culture that in certain areas it is possible to identify specific ceramic types associated with it (Parker 2003). This was attempted for the Jazira surveys, where Late Assyrian and Post-Assyrian (equivalent to Persian) forms were differentiated. West of the Jazira, the KHS, TS, SS and AVRP all used a generic IA phase representing the whole of this period (Wilkinson 1990; 112-113; Wilkinson et al. 2004), although unpublished notes do give more specific dates for individual sites. Preliminary attempts at sub-division in the LCP are on-going. The SHR has a very finely sub-divided set of IA phases based principally on Levantine sequences which are rather less applicable to the rest of the FCP. Absolute dates for the IA are again drawn from secondary literature, including Akkermans and Schwarz (2003; 365 Fig. 11.3), Wilkinson (2003; xviii-xix) and Anastasio (2010; 5), all of which are roughly in agreement. The sub-divisions have been named Early, Mid and Late Iron Age so as to reflect the fact that the sub-divisions which can be made in the surveys outside of the Jazira may not be directly related to the political and cultural terminology used in the east. Taking all of this into account, we arrive at dates of 1200-800 for the Early IA , equivalent to Anastasio's 'Transitional Phase' between Middle and Neo-

Assyrian (2010; 5), 800-550 for the Mid IA Neo-Assyrian (termed Late Assyrian in the NJS) and 550-330 for the Late IA Post-Assyrian or Persian period (Table 4.14). This last phase is extremely difficult to distinguish since we know so little about the specifics of Persian ceramics. It is highly likely that the Middle IA types continued well into the 6th century, whilst the Seleucid forms may be pushed back into the early 3rd century. Even with these accommodations there is effectively a gap in our understanding of the settlement patterns of around two hundred years.

Historic Periods – Hellenistic to Islamic Phases

The Hellenistic period in Northern Mesopotamia is well attested historically and also resulted in the introduction of an easily identifiable range of ceramic fabrics and types. The homogeneity of these types across the entirety of the region (Ur 2010a; 280) combined with the relatively short time span between their introduction and replacement by Roman and Parthian types means the Hellenistic phase (called Seleucid in the NJS) is one of the phases about which we can be most certain. Key survey types include incurved rim bowls, a variety of so called fish-plates and jars with folded over rims, all of which have been discovered across Northern Mesopotamia (Wilkinson and Tucker 1995; 118; Gerritsen 1996; 102; Wilkinson et al. 2004; 97; Ur 2010a; 280) and south-eastern Anatolia (Wilkinson 1990; 114). Given the fairly rapid process of Hellenization across the region following Alexander's defeat of the Achaemenid Empire it is appropriate to give an absolute start date to the Hellenistic phase of 330 B.C, the year in which the last Achaemenid Emperor, Darius III, died (Kuhrt 1995: 675). The end of the Hellenistic phase is marked by the introduction of Roman forms in Anatolia and the west and Parthian forms in the east. These may be correlated with the political annexation of Seleucid territory by the two expanding empires. This gives overall dates for the Hellenistic/Seleucid phase of 330-125 in the east and Anatolia and 330-50 B.C in the west (Table 4.15). These may be rounded to 300-100 and 300-50 for the purposes of long term time block comparisons at scales where the effects of such a rounding process will not be significant.

The period immediately following the Hellenistic phase sees the rise of two empires, the Roman and the Parthian, with a fluctuating political boundary, often around the Euphrates river valley (Butcher 2003; 32). As with the period of Hellenistic control, both the Romans and the Parthians brought with them new ceramic forms which are relatively easy to date. The earlier Roman occupations are characterised by Eastern Sigilatta forms which can be dated to between the second centuries B.C and A.D (Wilkinson 1990; 114), although it is likely that they became more prevalent in central Syria after the middle of the first century B.C when this area came under full Roman control. This corresponds to the historically attested dates for the Parthian empire which must be taken as the best estimate for the few ceramic types so far excavated (Ur 2010a; 289), giving dates of 50 B.C – 300 A.D for both.

Years A.D	Western and Central Syria	Anatolia	Jazira
1900	Late Islamic	Late Islamic	Late Islamic
1850			
1800			
1750			
1700			
1650			
1600			
1550			
1500			
1450			
1400			
1350			
1300	Middle Islamic	Medieval	Middle Islamic
1250			
1200			
1150			
1100			
1050		Early Islamic	
1000			
950	Early Islamic		Early Islamic
900			
850			
800			
750			
700			
650	Late Roman-Byzantine - Brittlewares	Late Roman-Byzantine - Brittlewares	Sasanian
600			
550			
500			
450			
400			
350			
300	Roman - Terra Sigillata and Finewares	Roman - Terra Sigillata and Finewares	Parthian
250			
200			
150			
100			
50			
0			
-50			
-100			

Table 4.15: Dates for the Later Historic Phases (Based on Wilkinson 1990; 252; Wilkinson 2003; xviii-xix; Wilkinson et al. 2004; 84)

The later Roman and Byzantine period is characterised by a range of brittleware, Late Roman C ware and related forms. Brittleware becomes prevalent towards the end of the third century A.D and continues all the way through to the beginnings of the Early Islamic phase, whilst the C wares date to the Byzantine period between in the 5th and 6th centuries A.D (Wilkinson 1990; 242; Yener 2005a; 203). Although sub-divisions on the basis of brittleware forms and the presence or absence of Late Roman C ware are possible in some cases, the Late Roman-Byzantine phase has not generally been sub-divided. The small size of many of the sites discovered for this period argues against a heavy reliance on fine wares such as the Late Roman C ware as these may be absent from less wealthy or rural settlements. This slightly longer phase also allows for comparison with the Sasanian phase to the east. As with the Parthian empire, we must rely more on historical texts than excavation for our knowledge of absolute dates for Sasanian ceramics. The Sasanian empire is generally considered to begin with the defeat of the Parthian emperor in approximately 224 A.D and falls within a few years of the Roman defeat in Syria in 636 (Butcher 2003; 53). It seems appropriate to allow some lee-way in pottery styles either side of these dates. The gradual pace of change in the East coupled with the prevalence of brittlewares after the end of the third century in the Roman dominated West allows us to propose comparable dates for the Late Roman-Byzantine and Sasanian phases of 300-640 (Table 4.15).

The last 1400 years is divided by all of the surveys except the KHS and TS into an Early, Middle and Late Islamic phase. Pottery types are fairly homogenous across the whole of the FCP region, although there are slight differences in the dates at which specific forms become common in particular areas. The introduction of glaze provides a new diagnostic characteristic for distinguishing between phases. Blue-green glaze is a good indicator of the Early Islamic phase, the very distinctive Sgraffito ware can be considered Middle Islamic and another green glazed ware, as well as rouletted wares, represent Late Islamic assemblages (Wilkinson and Tucker 1995; 105-108). Absolute dates for the Islamic phases are taken from Wilkinson (2003; xviii-xix; 2004; 84), giving dates of 650-1000 for the Early Islamic, 1000-1300 for the Middle Islamic and after 1300 for the Late Islamic. The KHS and TS used a slightly different terminology, using 'Medieval' to represent the 11th to 13th centuries. This is as a result of the excavated sequence at the nearby site of Gritille (Wilkinson 1990; 252; Redford 1998) which provided a local sequence unavailable to any of the other surveys.

Combining Phases and other Outputs

The phases described in this chapter represent the most specific chronological periods used in the surveys. However, some sites do not contain sufficient diagnostics to distinguish between similar phases. Many sites in the NJS, for example, were assigned to a generic Sasanian-Early Islamic phase. In the FCP database this is easily accommodated by combining the absolute dates for the Sasanian and Early Islamic phases. Again, by referring to absolute dates the relative imprecision of this longer phase will be captured when comparing sites which have definite Sasanian ceramics and definite Early Islamic ceramics to sites of the longer combined phase. These amalgamations generally occur when the relationships between successive phases are not well understood or when distinctions between phases are reliant on multiple rather than single type fossils which may be absent from smaller survey collections. The main areas of uncertainty across the whole FCP include the Late Bronze Age-Iron Age transition, the Late Iron Age-Persian gap mentioned above and the relationship between the Sasanian/Byzantine and the succeeding Early Islamic phases. All of these phases are loosely connected to the rise and fall of states and empires and reflect the fact that the relationship between material culture and political change is not well understood, as well as the tendency of scholars to emphasise historical rather than material divisions. Overall there appears to be sufficient overlap between the phases used in the different surveys to allow for comparisons to be made. I hope to have shown that issues of terminology and phase length can be overcome by referring back to absolute dates in years. This is can be more or less successful for different phases, dependent on the quantity and quality of material remains, chronometric dates and, for the historical periods, textual sources. Advances in any of these three which result in a greater accuracy of absolute dates can be incorporated in the structure presented here by changing the dates given for any particular phase.

Chapter 5: Historical Geography and Regional Summary 1: The Middle Euphrates Sub-Region

Introduction

This chapter will first make some general points regarding the Middle Euphrates sub-region before addressing the individual surveys themselves. The starting point for analysis will be the combination of the KHS and TS surveys in the northernmost sector of the sub-region, since there has been no synthetic detailed study using both datasets[18]. The aim is not to produce a full analysis of the results of the other FCP surveys in the Middle Euphrates region. The Land of Carchemish Project will be the subject of a PhD by Andrea Ricci, as well as future publications, whilst the Sweyhat and Upper Lake Tabqa Surveys were comprehensively discussed in a recent volume (Wilkinson et al. 2004). Rather I want to present the main trends in settlement for comparative purposes with the other surveys in the region. Emerging themes will then be discussed in relation to the sub-region as a whole.

Geographical Definition of the Middle Euphrates Sub-Region

The Middle Euphrates sub-region encapsulates the Middle Euphrates valley and the surrounding area. The precise geographical extent of the area defined by the term 'Middle Euphrates valley' has been the subject of some discussion (Peltenburg 2007; 45), partly because the area is divided by the modern border between Turkey and Syria. Reference to the Middle Euphrates bypasses the confusingly similar terminologies applied by scholars working within the two countries, such that the Northern or Upper Euphrates zones when applied to Syria may in fact be downstream of the Southern or Lower Euphrates as the terms are commonly used in Turkey. Kuzucuoglu et al (2004; 196) consider the Middle Euphrates to represent the valley from the Adiyaman region in Turkey to the confluence of the Euphrates with the Khabur. This fits well with the northern extent of the Turkish Euphrates zone outlined by Algaze (1999; 535) and excludes the Keban Dam area further upstream which most probably retained closer links to the Tigris basin. To the south, the confluence between the Euphrates and the Balikh seems a more pertinent division than that between the Euphrates and the Khabur, given the divergent settlement trends in the western Khabur Valley (see Lyonnet 1996a; Lyonnet 2000). This also fits better with discussions of settlement along the Euphrates in Syria which tend to treat the area downstream of Emar as a separate area (see, for example, Cooper 2006a; Peltenburg 2007) due to the decrease in rainfall (Wilkinson 2007; 30). Far more difficult to define is the boundary of this sub-region on either side of the river. The vast majority of archaeological investigation in the region has concentrated on the immediate vicinity of the Euphrates itself, with some notable exceptions such as Titriş Höyük

[18] Although see Lupton (1996) for a fairly detailed analysis of the Uruk phenomenon based on the KHS and Ozdoğan's survey (1977) in the Karababa area, Algaze (1999) for an excellent overview of the major trends in the Samsat-Lidar and Carchemish-Zeugma sectors and Wattenmaker (1998; 21-27) for a summary of the area around Kurban Höyük.

and Tell es-Sweyhat. The majority of archaeological missions in this sub-region have been rescue excavations in advance of the large dam projects (see, for example, papers in del Olmo Lete and Montero Fenollos 1999; Peltenburg 2007; 3), leading to an understandable focus on those sites in the river valley which will be directly affected by flooding.

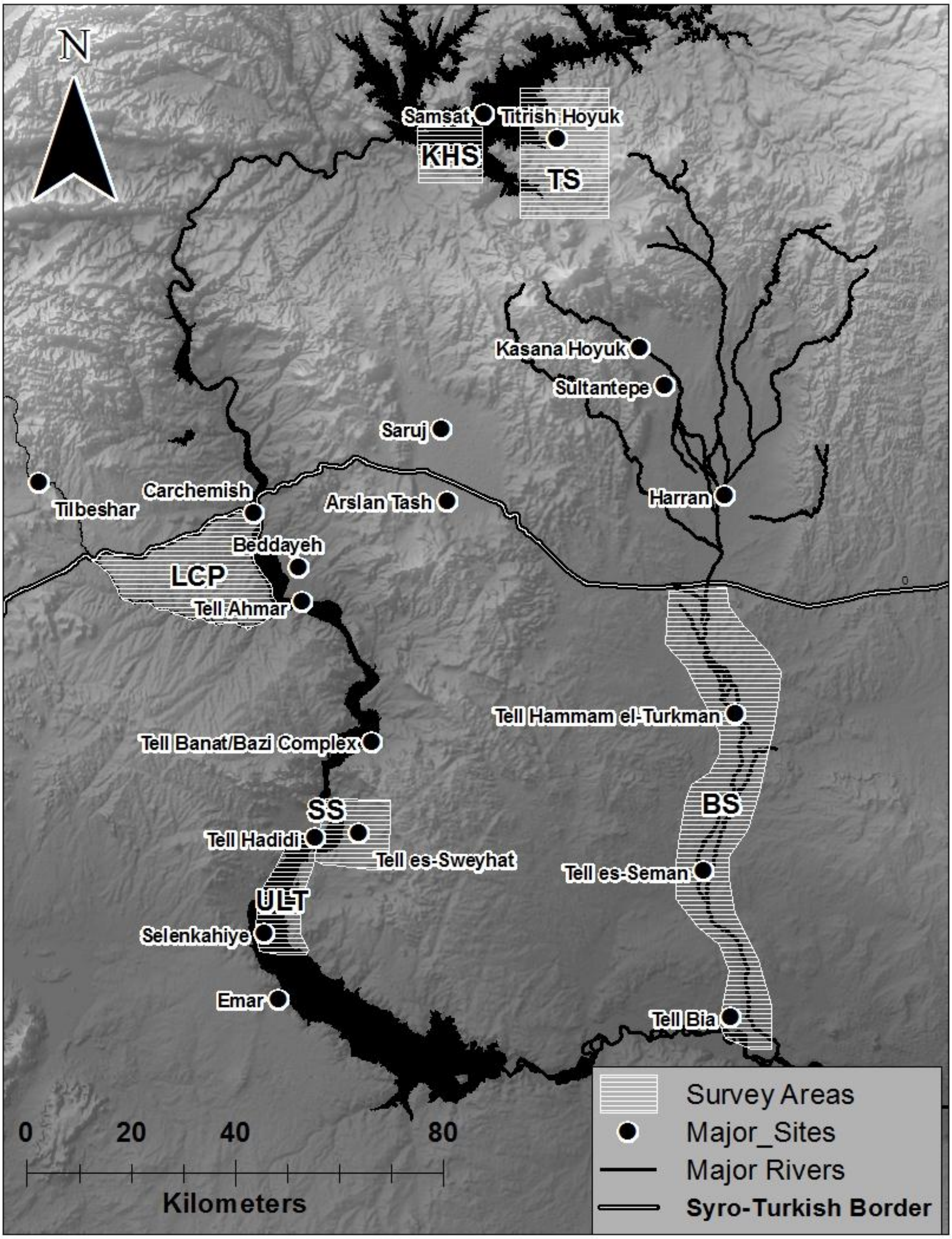


Figure 5.1: The Middle Euphrates region, FCP surveys and major sites. Background: SRTM acquired February 2000

This unintentional bias has been reinforced by the assumption that the upland areas beyond the river valley were 'vast tracts of empty steppe land' (Cooper 2006a; 69). When discussed at all, the areas outside of the valley are considered marginal and devoid of significant settlement, a view that is challenged in this chapter. The Middle Euphrates sub-region, then, may be considered to include a large swathe on either side of the river itself, up to and including the Balikh to the east and extending to the eastern edges of the Qoueik and Jabbul plains to the west. This area is represented in the FCP by five surveys, from north to south the Titriş Survey (TS), Kurban Höyük Survey (KHS), Land of Carchemish Project (LCP), Sweyhat Survey (SS) and Upper Lake Tabqa survey (ULT) (Figure 5.1).

The Physical Environment

The present day geomorphology of the Middle Euphrates can be divided into a number of different zones. The river flows through a series of broad valleys punctuated by more constricted gorges and 'narrows' (Wilkinson 2007; 30). In these latter areas the river may be incised hundreds of meters into the limestone bedrock. The resulting high cliffs restrict the possibility of settlement to a narrow strip along the valley floor, whilst the cliffs themselves contain rock cut tombs, small caves and quarries (Algaze et al. 1994; 6). In the areas where the valley opens up, the alluvial flood plain is surrounded by successive river terraces providing relatively stable plains, and which in turn give way to the Jazira plateau on the eastern side of the river and upland plains and basaltic promontories on the western side. There are four such areas in the Middle Euphrates sub-region, labelled by Peltenburg from north to south as the Samsat-Lidar, Carchemish, Banat and Tabqa sectors (2007; Figure 1.2). With the exception of the smallest Banat sector, the FCP surveys cover significant portions of each (see Figure 5.1). Taken together, the TS and KHS include very nearly the whole of the Samsat-Lidar sector on the southern bank of the Euphrates, as well as a large part of the plain to the south of the river. The LCP covers the southern half of the Syrian side of the Carchemish sector on the western bank of the Euphrates whilst the SS and T surveys include the eastern side of the Tabqa sector, as well as sites on both banks of a strip of the Euphrates to the south. The only large area not covered by the FCP surveys is therefore the northern part of the Carchemish sector on the Turkish side of Carchemish itself. Parts of this area in close proximity to the river were surveyed by Algaze (1994) in advance of the rise in river level caused by the Carchemish and Bireçik dams.

Climate and Subsistence

The north-south alignment of the great bend of the Euphrates, as well as the river's descent from the mountainous uplands of the Anti-Taurus to the desert steppe, results in changing climatic conditions from one enclave to the next. Given the marginality of the region as a whole, this leads to variation in natural vegetation, agricultural and subsistence practices. Rainfall varies from upwards of 450mm per year in the Samsat-Lidar sector to approximately 250mm in the vicinity of Tell es-Sweyhat, although importantly there is a high degree of variation between years (Wilkinson 1990; 13; Wilkinson et al. 2004; 13). The Carchemish sector lies between these two extremes with between 300mm and 400mm of annual precipitation. This places the Sweyhat and probably the Tell Banat sectors at the limit of dry farming agriculture, generally considered to be between 200mm and 300mm rainfall per year (Wallen 1967) and also has implications for the natural vegetation. In Hillman's characterisation of the region as a whole (2000; Part 1 Chapter 3), the Samsat-Lidar sector falls into his zone 3a represented by Dense Deciduous Oak-Rosaceae Woodland, the Carchemish sector into zone 3b, Oak-Rosaceae Park Woodland, and the Banat and Sweyhat sectors into zone 4, Terebrinth-Almond Woodland Steppe. Moving south from the Samsat-Lidar sector, then, one would find gradually thinning oak, plum and rose woodland giving way to pistachio, hawthorn and almond steppe lands. The fertile and well watered river valley is considered riverine forest along its entire length. This classification is based on modern rainfall and other climate, soil and topographic data and assumes the absence of grazing, tree felling or other anthropogenic processes. Comparisons of charcoal remains at Jerablus Tahtani in the Carchemish sector and Emar, situated south of Tell es-Sweyhat, support this interpretation, at least for the EBA (Deckers and Riehl 2007; Deckers and Pessin 2011).

The distinctions in natural flora between sectors are also reflected in the agricultural regimes. In Wilkinson's 6 part classification of the agricultural zones of the Middle Euphrates (Wilkinson et al. 2004; 43) the Samsat-Lidar sector falls into zone 1a, suggesting wheat, barley, lentils, some legumes and viticulture (Wilkinson 1990; 46), the Carchemish sector somewhere between zone 1b and zone 2, again involving wheat, increased barley production, lentils and legumes, and the Banat and Sweyhat sectors to the border between zones 3 and 4, with barley the staple crop and limited legume and wheat production. This is supported by the excavated plant remains across the sub-region. Miller's analyses of charred plant remains from a number of sites in the SS, including Tell es-Sweyhat itself, Tell Jouweif and Tell Hadji Ibrahim, suggest two-row barley was the staple crop across the survey area and that wheat was at most a very minor crop (1997a; 100). There is no evidence for irrigation in the Middle Euphrates until at least the Late Bronze Age, although this may be because any evidence for such schemes has been washed away by the active Euphrates channel (Wilkinson et al. 2004; 38; Cooper 2006a; 36), meaning agriculture in the Sweyhat region would have been reliant purely on rainfall, and therefore a risky undertaking. Sites in the Carchemish enclave demonstrate higher proportions of wheat, although barley is still the main crop in the EBA (Riehl 2010; 68 Figure 80a), as well as evidence for fruit tree cultivation (Deckers and Pessin 2010; 225). There are few published plant remains from excavated sites in the Samsat-Lidar sector but evidence from Kurban Höyük suggests wheat was the staple crop and a variety of legumes and pulses, lentils and grapes were grown during the Late Chalcolithic and

EBA (Miller in Marfoe et al. 1986; 85-89; Miller 1997b; 127 fig. 7.6), as well as in modern times (Wilkinson 1990; 43).

The faunal data available for the Middle Euphrates sub-region also reflects the changes in climate and agriculture between the sectors. The four major domesticated species across Northern Mesopotamia during the Late Chalcolithic and EBA were goat, sheep, cow and pig, whilst domesticated dogs, donkeys and horses are also found in many assemblages, although often in small numbers. Equids, aurochs, deer and gazelle represent the main wild animals (Doll 2010; 196-198). Although all of these species are found throughout the Middle Euphrates, their proportions change from north to south. Speaking in general terms, pig and cow form a greater percentage of assemblages in the wetter northern sectors and a more specialised pastoral economy reliant on sheep and goat is prevalent in the south (Weber 1997; 167, Appendix 8.7). This is unsurprising as both pig and cow require more water (Zeder 1995; Doll 2010; 197). There is also some evidence to suggest that wild animals were exploited to a greater extent in the more marginal areas, particularly at Tell es-Sweyhat (Weber 1997; 142). Such shifts in relative proportions of species may reflect social and political pressures or choices as well as environmental constraints. However, the north-south patterns are sufficiently robust across space and time, as well as correlating with environmental evidence, for us to suggest that ecological conditions have a significant effect. A more nuanced account of the subsistence strategies and political economy of the sub-region will emerge in Chapter 8.

The Samsat-Lidar sector field dataset

The Samsat-Lidar sector is covered by two FCP surveys, the KHS and TS. Although these differ somewhat in intensity due to the length of each project (see Chapter 3), they are broadly comparable and use very similar chronologies. Comparing the Boundary Certainty and Geographical Precision also demonstrates some similarities. Figure 5.2 shows the percentages of each certainty class (Definite to Low as there were no sites designated as Negligible) for the surveys . Boundary Certainty and Geographical Precision are closely correlated to one another within the surveys. This is to be expected as both projects were undertaken before the use of GPS and sites which are well mapped are usually also easier to locate through imagery interpretation. In terms of comparability, both surveys demonstrate a clustering around the High and Medium classes for Geographical Precision and Boundary Certainty. As one would expect, the KHS tends to have greater degrees of certainty whilst the TS has a higher percentages of Mediums and Lows. This is a reflection of the quality of mapping available for each survey, in turn a reflection of the intensity and publication methods (see Chapter 3). The absence of GPS and GIS systems has affected the reliability of the evidence in relation to the other FCP surveys but overall comparisons between the KHS and TS are reasonably robust.

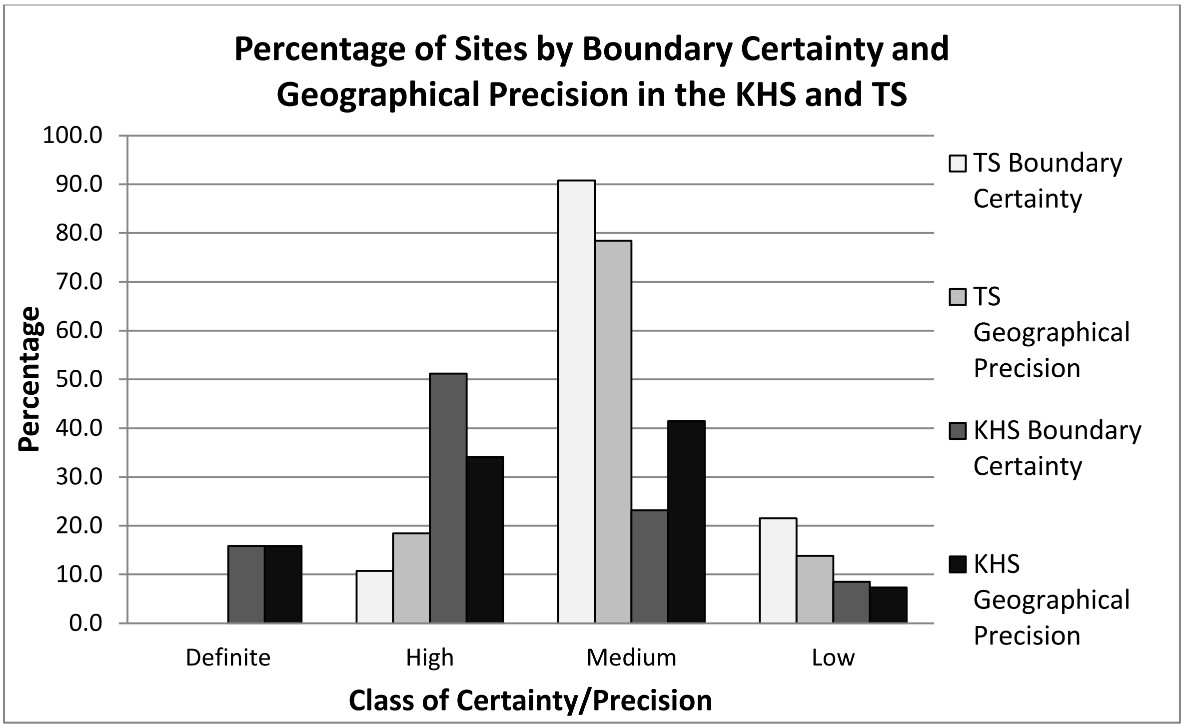


Figure 5.2: Percentage of Sites by Boundary Certainty and Geographical Precision in the KHS and TS

Along with the KHS and TS, the Samsat-Lidar sector was also part of a much larger survey undertaken by Mehmet Ozdoğan (1977) and very small intensive surveys around the sites of Lidar and Gritille, the former by Gerber (1996) and the latter by Stein. A number of the major 4th and 3rd Millennia *höyük* (tell) sites both within and outside the survey areas were excavated, including Titriş (Algaze et al. 1992; Algaze et al. 1995; Matney et al. 1997; Matney et al. 1999; Algaze et al. 2001), Samsat (Özgüç 1992), Lidar (Hauptmann 1984; 1985; 1987), Kurban (Marfoe et al. 1986; Algaze 1990; Wilkinson 1990), Hassek (Behm-Blancke 1985; 1986; 1991-1992; 1992), Hayaz (Roodenberg 1980; 1982; Thissen 1985) and Gritille (Redford 1998). With the exception of Titriş, all of this research was conducted through rescue projects in advance of the construction of the completion of the Atatürk Dam in 1990, and all excavated sites except Titriş were lost by 1992 due to the up-filling of the reservoir. There is therefore a bias in the excavated dataset towards sites located on the river terraces, as well as in Ozdoğan's rescue driven survey (1977; 3) and to some extent the KHS. With the exception of Ozdoğan's, all of the surveys concentrated overwhelmingly on the southern side of the Euphrates, with only Samsat, Gritille, Hayaz and Bireçik on the northern banks systematically investigated. This is a recurring issue in surveys in the environs of the Euphrates since the river often serves as a useful delimiter of the survey universe. Whilst this may be of benefit for easy definition in permits and on maps, as well as a pragmatic response to a lack of bridges or other crossing points available for easy access by field teams, it is occasionally to be regretted since relations across rivers may have been integral to past people and therefore the interpretation of past settlement patterns.

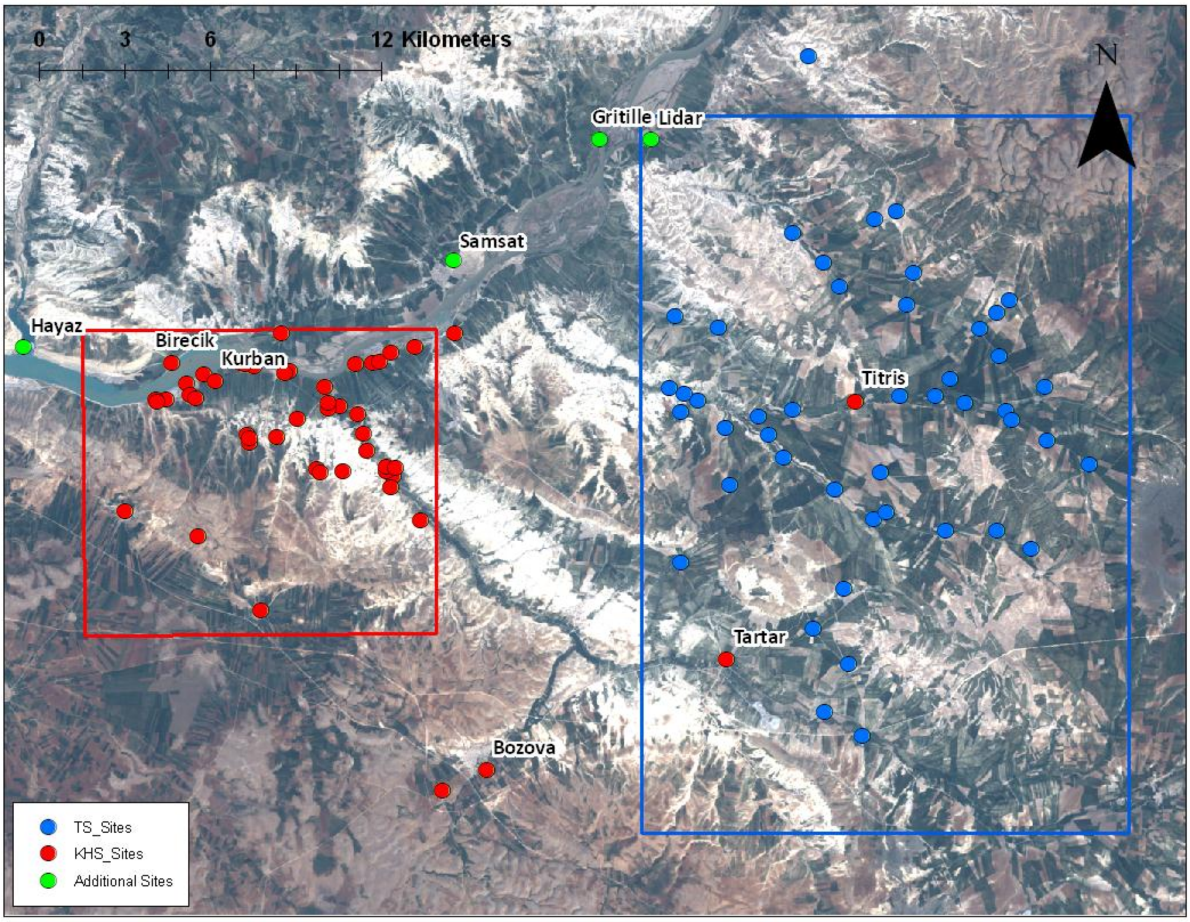


Figure 5.3: The Samsat-Lidar Sector showing FCP surveys and major excavated sites. Note the KHS sites outside the intensive survey area were investigated as part of the wider survey. Landsat TM image acquired 05/03/1987 displaying bands 3, 2, 1 (true colour)

Remote Sensing and Landscape Transformation in the Samsat-Lidar Sector

The flooding of a large portion of the landscape in the Samsat-Lidar sector presents problems for the use of remote sensing techniques in the region. High resolution modern imagery did not become available until the late 1990s, the SRTM data was collected in February 2000 and even the later Landsat sensors were not deployed in time to capture images of the area prior to the up-filling of the reservoir in the early 1990s. Corona space photography, dating to the 1960s and 70s, therefore takes on an even more important role in site location and interpretation. Unfortunately, a combination of the quality of the CORONA available for this area and the unobtrusive nature of many of the sites means re-interrogation and expansion of the survey area through analysis of satellite imagery is very difficult. There are far more shallow-sided tells in this region than further south, where high conical tells are the norm, and these do not show up on the imagery as clearly because they cast less of a shadow. Even quite large sites, such as the 14m high and 6 hectare mound of Kurban Höyük, can be virtually invisible on panchromatic imagery if they do not cast shadows (see Figure 5.4). Intensive agriculture in the region over many thousands of years has also led to the obliteration of tell and non-tell sites and other landscape features. Here again, the shallow gradient of the mounded sites allows farmers to surmount them with their ploughs and therefore spread the site further. Steeper sided tells, by contrast, are normally skirted or at worst planted with olives or other trees which do not require ploughed fields for sowing. As a result of these factors remote sensing analysis in the Samsat-Lidar sector has been used to confirm sites which are visible within the survey area and to accurately locate the prominent visible sites which were not included in the FCP surveys such as Samsat, Lidar, Gritille, Titriş, and Hayaz. Landsat 5 imagery dating to 1984 and 1987 was also used to provide a base-map and for the definition of modern geomorphological and vegetation zones as the earliest Landsat 7 imagery dates to 2000, after the dam construction. Extrapolating past landscapes from present day imagery is always somewhat conjectural. However, the broad landscape units derived from the Landsat data are fairly stable and can be linked to ground control studies undertaken as part of the KHS (Wilkinson 1990; 8-11)

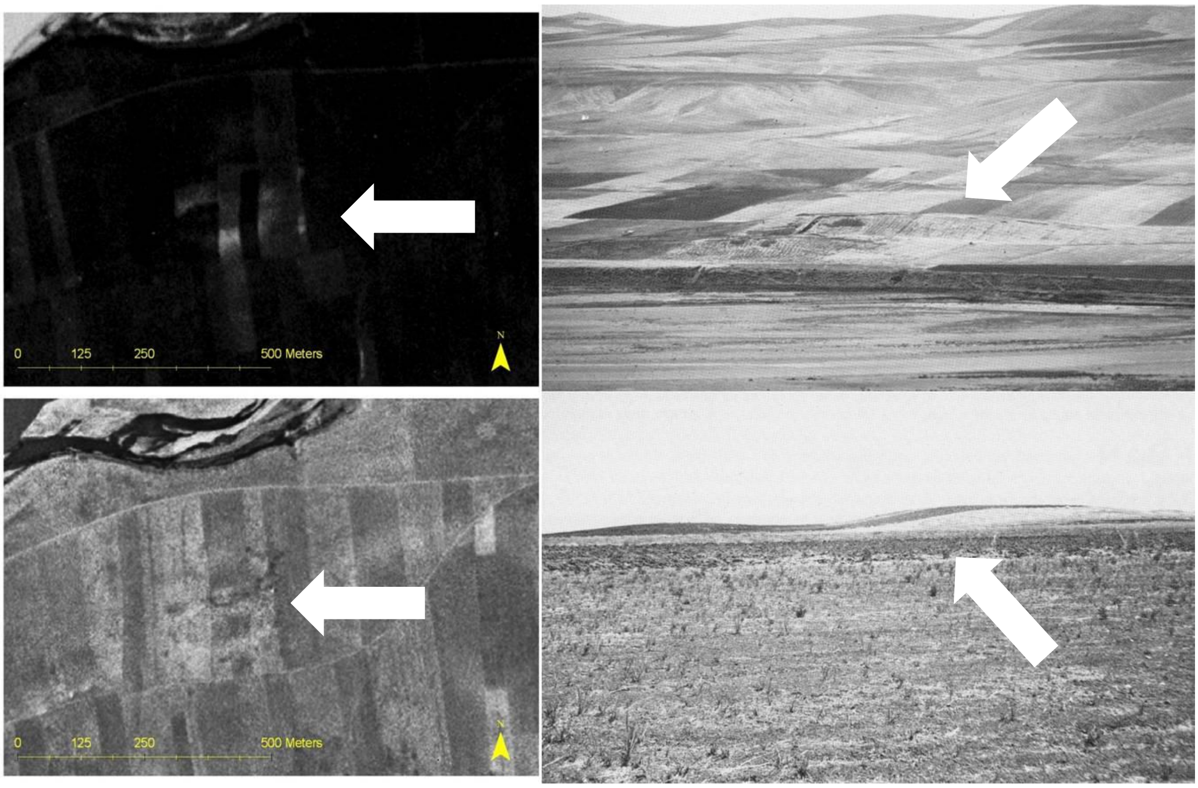


Figure 5.4: Kurban Höyük on CORONA imagery and in the field. Top left image: CORONA Mission 1068, acquired 22/01/1967. Bottom left image: CORONA Mission 1104 acquired 08/08/1968. Right hand photographs from (Algaze 1990; 6 Figure 5). Arrows point to the main mound in all images. Note the 14m high mound is hardly visible in the two CORONA images

Geographical and Geomorphological setting of the Samsat-Lidar Sector

As mentioned above, the Samsat-Lidar sector is situated in one of the areas along the Euphrates where wider flood plains open up on either side of the river. Figure 5.5 shows the main geomorphological zones. The river terraces and lowland plain to the south-east are the most fertile agricultural zones, whilst the upland pastures to the south-west would have provided ideal grazing land. Access to the river from the south-east would have been easiest through the valleys of the Inçesu and Tavukçay wadis (Algaze et al. 2001).

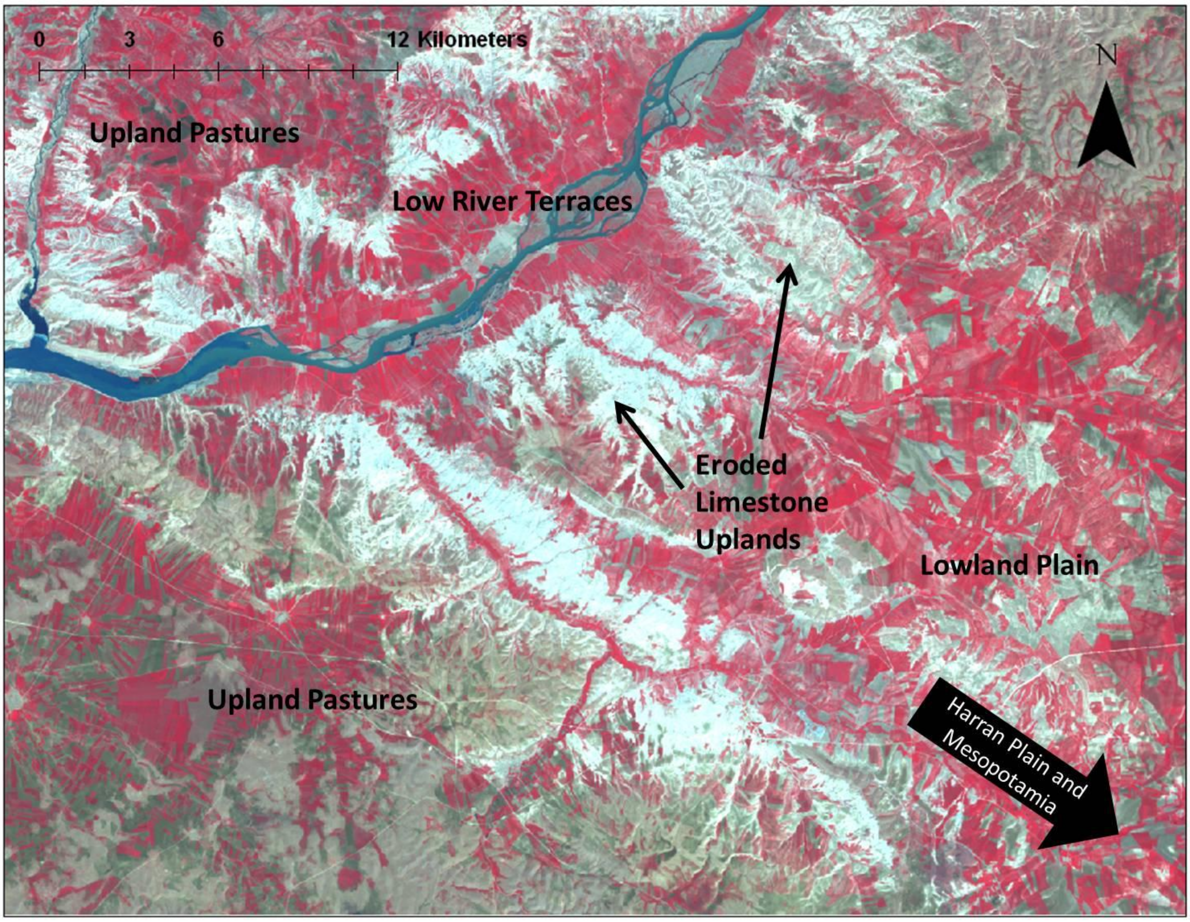


Figure 5.5: Geomorphological Zones in the Samsat-Lidar Sector traced from vegetation and rock type. Landsat TM image acquired 05/03/1987 displaying bands 4, 3, 2. Dense vegetation is redder, lower level vegetation more green, eroded limestone white. The Euphrates river runs through the upper left of the image from east to west. Ground control provided by Wilkinson (1990; 8-11)

Settlement Overview of the Samsat-Lidar Sector, Neolithic-Present Day

The KHS and TS both recorded very limited data prior to the Early Chalcolithic phases (Halaf- and Ubaid-like, see Chapter 4). Two Neolithic sites within the valley were excavated prior to the dam projects, Kumartepe (KHS_28) (Roodenberg et al. 1984) and the major Aceramic Neolithic site of Nevalı Çori (Hauptmann 1988; 1991-1992), whilst a site with similar material culture to Kumartepe was discovered in the TS (TS_23) (Algaze et al. 1992; 41). Analysis of settlement patterns becomes possible during the Early and Middle Chalcolithic phases, with ten sites occupied in each phase. These are small settlements dispersed fairly evenly across the lowland plains and river terraces. Between the Late Chalcolithic and the end of the EBA the Samsat-Lidar sector sees two periods of nucleation in the Uruk and Mid-Late EBA (MEBA-LEBA) phases punctuated by ruralisation in the Early EBA (EEBA) and immediately following the end of the EBA in Wilkinson's EBA-MBA Transition phase. In the first phase of nucleation a three tiered settlement hierarchy develops with a centre at Samsat on the banks of the Euphrates. In the second phase the pre-eminent site is Titriş, located on the wide plain to the south of the Euphrates, which sits at the centre of a four tiered settlement system. During this phase Samsat sits in the second tier and could be described as a small town, along with Lidar, Tatarhöyük, Kurban and perhaps Millisaray. This system disappears abruptly at the end of the EBA. Very few sites were recorded in the surveys during the MBA and LBA, although the discovery of some Khabur ware sherds at Lidar suggests it was a significant centre during these phases (Mellink 1985; 1988; Algaze et al. 1992; 43). The Iron Age and subsequent Hellenistic and Roman phases saw a massive expansion and dispersal of settlement across the landscape, as well as the development of larger centres at Şaşkan Küçüktepe (KHS_7) and the 100 hectare Hellenistic-Roman city of Samosata, built on and around the older settlement at Samsat. The Early Islamic phase sees another decline in settlement, perhaps due to the region being situated on the boundary between the southern Arab and northern Byzantine and later Selçuk empires (Wilkinson 1990), followed by slight increases in settlement up to the present day.

The Late Chalcolithic Phase in the Samsat-Lidar sector

The limited amount of excavated data available for this period precludes a traditional analysis of hierarchy reliant on site features such as grave goods or monumental architecture. Late Chalcolithic exposures were only possible at Kurban and Hayaz Höyüks before the flooding of almost all the key sites. Based on site size we can suggest that the Late Chalcolithic phase in the Samsat-Lidar sector involved a three tiered hierarchy with Samsat as the predominant site. Samsat is situated on the river terrace very close to the Euphrates and encompasses a high mound and a large lower town. Ozdoğan reports Late Chalcolithic Amuq F style chaff faced wares eroding from all sides of the 17.5h main mound, although with a slight decrease in density on the southern slopes (1977; 133). Lupton offers a slightly lower estimate of 10h (1996; 22) and this more conservative approach will be followed here. The lower town was not investigated during this survey beyond the recognition of a large volume of later pottery types across the surface, and so may have contained Late Chalcolithic material. Even using this lower estimate, Samsat was comfortably the largest site in the region, and one of the largest anywhere in Northern Mesopotamia outside the Khabur valley, with a second level of sites between 3.1 and 2 hectares in size (see Figure 5.6) including the major mounded sites of Bozova, Kurban and Lidar Höyüks. Sites cluster along the river and on the major wadis in the lowlands, with the exception of two small sites on the upland plateau to the south-west and the larger site of Bozova Höyük which is situated in a small but highly fertile plain of its own. This phase sees the solidification of the settlement pattern on the river terrace for the next fifteen hundred years, with paired sites at Lidar and Gritille and Kurban and Bireçik forming probable crossing points both upstream and downstream of Samsat (Figure 5.7). The paucity of excavated data precludes a nuanced analysis of social complexity at this time. Seal impressions recovered from section cleaning at Samsat hint at a degree of political organisation and control.

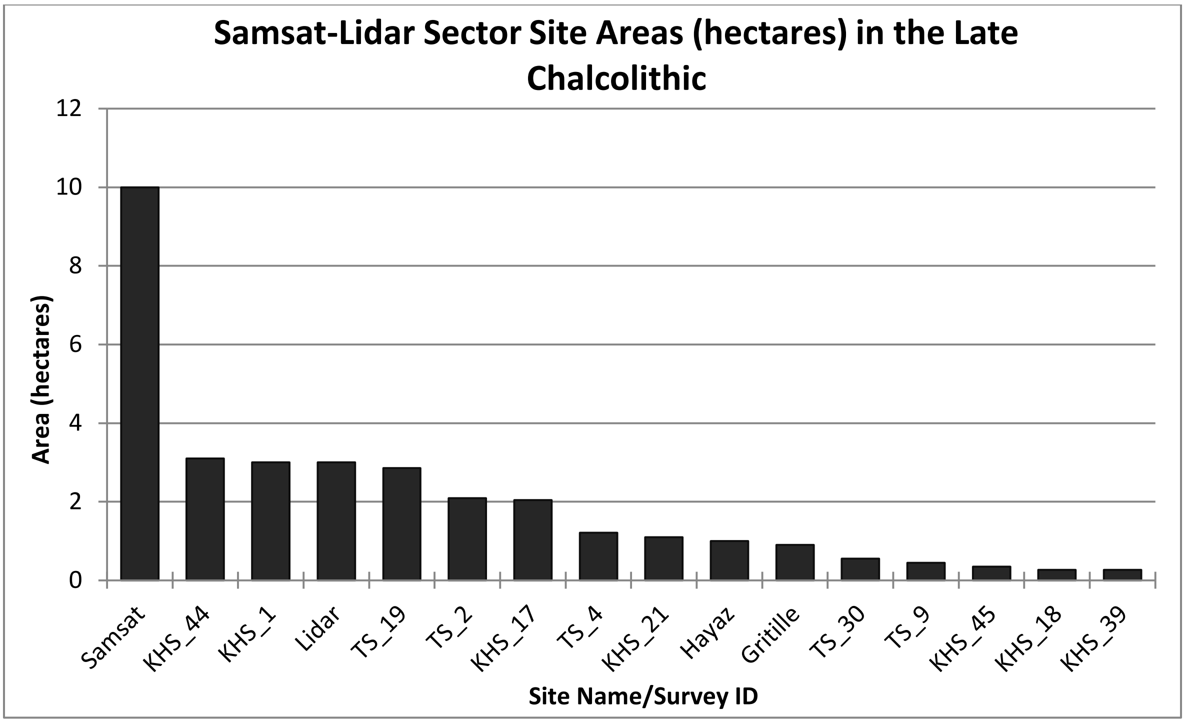


Figure 5.6: Samsat-Lidar Sector Site Areas (hectares) in the Late Chalcolithic

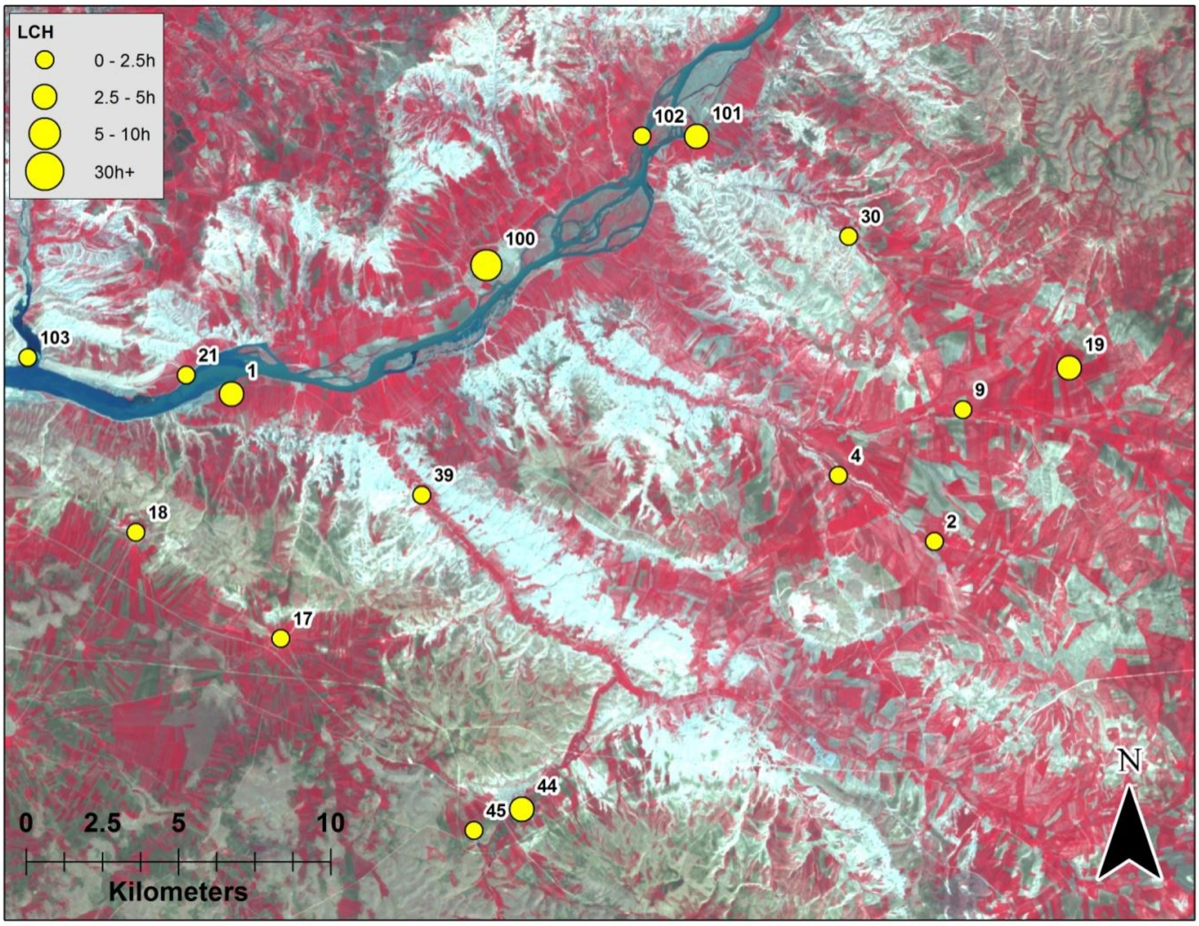


Figure 5.7: Site Locations for the Samsat-Lidar Sector in the Late Chalcolithic. Samsat is number 100. Background: Landsat TM image acquired 05/03/1987 displaying bands 4, 3, 2

Excavations at Kurban Höyük did reveal a pre-Uruk Late Chalcolithic phase containing Amuq F style ceramics but the small exposure in Area A contained only a few pits and one possible ground surface. Based on settlement data alone we might describe the Samsat-Lidar sector in the Late Chalcolithic as a nascent polity with Samsat as the central site. The paired sites suggest the presence of trade routes already during this phase, although there is no way of knowing how long-distance they were. The small size and dispersed location of the majority of sites in agriculturally fertile areas argues for a broad spectrum subsistence economy.

Representing the Uruk: The chronological and the spatial

The precise nature of the so called 'Uruk Expansion' in the Samsat-Lidar area has been much discussed (Algaze 1989; Wattenmaker 1990; Lupton 1996; Algaze 2005 [1993]). It is generally agreed that a similar settlement system continued from the pre-contact Late Chalcolithic phase, with Samsat at the apex of a three tiered hierarchy. Southern Uruk style sherds and Plain Simple Ware were recorded by Ozdoğan on all sides of the main mound at Samsat with a particular concentration on the eastern side (Ozdoğan 1977; 133). For the sake of continuity, I again follow Lupton (1996) in retaining a settled area of 10h. Fundamental to the analysis of the settlement pattern is the relationship between Late Chalcolithic and Uruk ceramics. In the Santa Fe chronology, Uruk ceramics are treated as their own phase and are used as type fossils for LC 4 and LC 5. However, excavations at Hassek Höyük revealed both Late Chalcolithic Amuq F style and Uruk style ceramics in the same assemblages (Behm-Blancke 1991-1992) and at Kurban the excavators noted a gradual shift from Amuq F to Plain Simple Ware over time (Algaze 1990; 263 Figure 137). Uruk ceramics therefore become only part of the wider later Late Chalcolithic assemblage. Given the understanding that certain parts of any general assemblage may be absent from sites, we must give countenance to the possibility that sites on which only Late Chalcolithic material was found could be contemporary with sites which contained Uruk material. Such a possibility is of interest because the spatial patterning of Uruk sites differs from the Late Chalcolithic. Figure 5.8 displays the overall site areas for both Uruk and Late Chalcolithic ceramics. Uruk material is concentrated at the larger sites and at those positioned close to the Euphrates. Where both pottery types were present, they tended to have a similar spatial distribution, manifested in the graph as equal areas. It is telling that the only site which has different occupation areas for the Uruk and Late Chalcolithic is the most heavily investigated, Kurban Höyük, suggesting distinctions based on surface assemblages are more difficult to establish. The map in Figure 5.9 clearly shows the strong relationship between Uruk material and perennial streams and rivers. With the exception of Bireçik, all the sites on the Euphrates flood plain and lower river terraces occupied in the Late Chalcolithic also contained Uruk material. The absence of Uruk at Bireçik may be due to the small collection made at the site, as sherd counts for the other prehistoric phases are lower than those for the larger tells (Wilkinson 1990; 286 Table B.4).

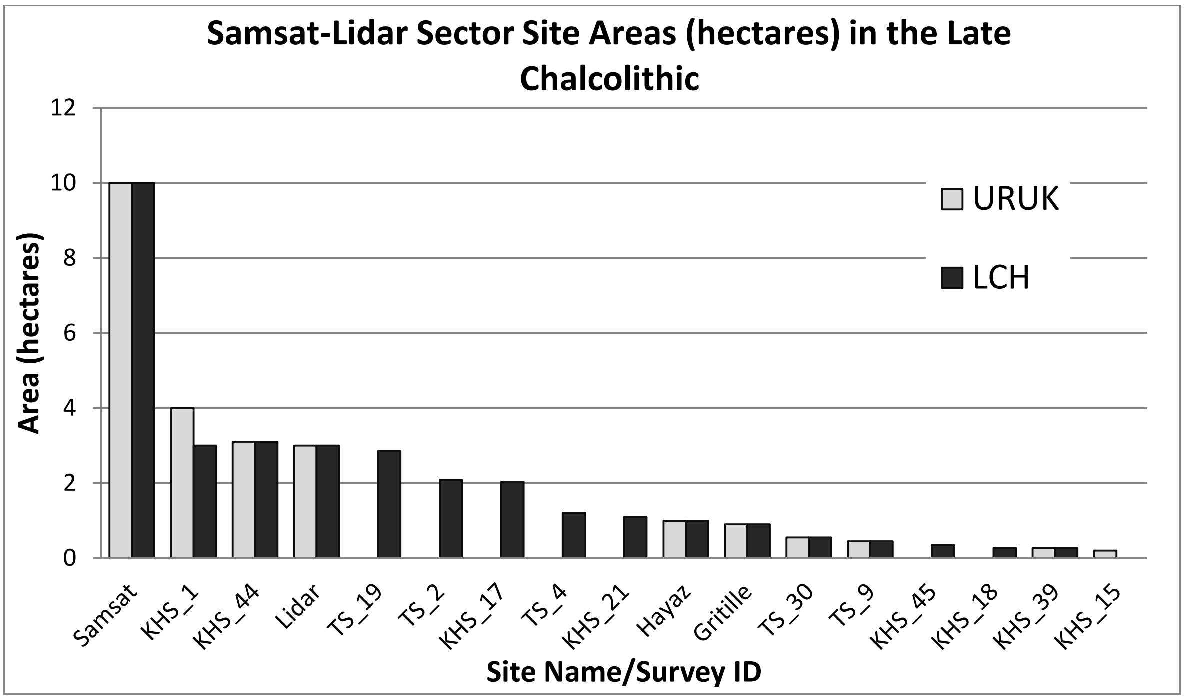


Figure 5.8: Comparative Site Areas (hectares) for the Samsat-Lidar Sector in the Late Chalcolithic and Uruk phases

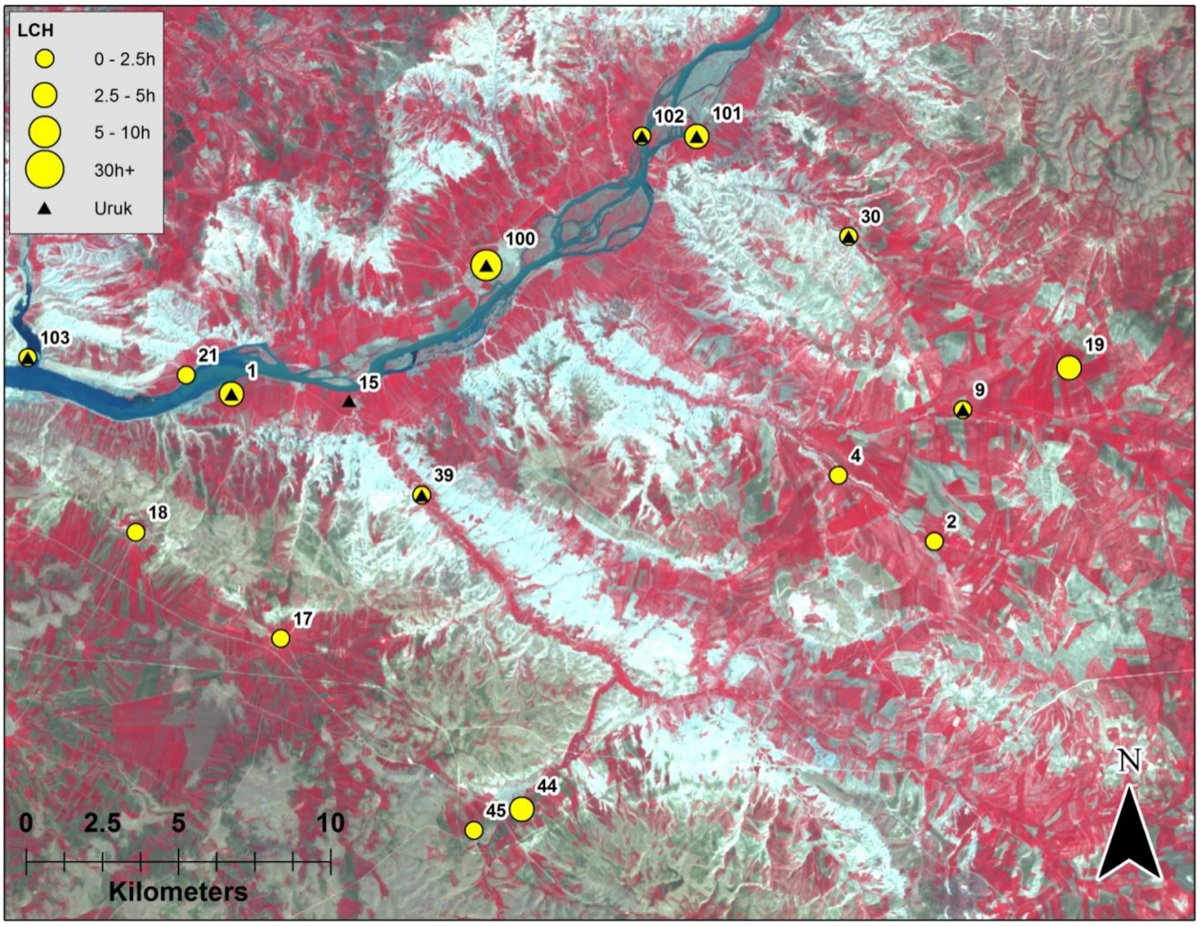


Figure 5.9: Site Locations for the Samsat-Lidar Sector in the Late Chalcolithic and Uruk. Background: Landsat TM image acquired 05/03/1987 displaying bands 4, 3, 2

KHS_15, the only newly founded site in the Uruk phase, was situated on a steep escarpment at the confluence of the Euphrates and the Inceşu, whilst the other four Uruk sites away from the

Euphrates were all on major wadi systems. The area between the Inceşu upstream of KHS_39 and the limestone upland on the Tavukçay falls between the KHS and TS surveys which may explain the absence of Uruk sites. In fact, if we take small ephemeral sites such as KHS_15 to be typical of Uruk presence away from Late Chalcolithic settlements during this phase we might assume an underrepresentation in the TS due to the generally lower intensity of survey.

Settlement during the Contact Period

Given the uncertainty over the chronological relationships between Uruk and Late Chalcolithic assemblages, the complete settlement system is difficult to discern. We can say that the general settlement pattern during the Uruk phase lies somewhere between the occupation of all sites with Uruk material and all Uruk and Late Chalcolithic sites. Overall, the Uruk phase appears to represent a continuation of the pre-contact hierarchy. The increase in settlement size at Kurban, coupled with the presence of Uruk ceramics on the major trade routes along the Euphrates and the passes to the south west, suggests an increase in the importance of external trade networks. Uruk-style sealings discovered in the eroded sections of Samsat (Özgüç 1992; 152) provide further evidence of southern practices, if not individuals, being firmly integrated into political and power structures in the region. Some scholars have suggested that the social and material cultural effects of the Uruk expansion in the Samsat-Lidar sector were mediated through Samsat itself (Lupton 1996; Algaze 1999). Our understanding of this relationship is further clouded by the Uruk occupation at KHS_15. The site is situated at a highly strategic point in the landscape, controlling the mouth of the Inceşu, equidistant between the large sites at Samsat and Kurban and possibly at the very edge of the agricultural land needed to sustain the population at the latter (Lupton 1996; 53 Figure 3.11). In the Jazira, satellite Uruk settlements around larger sites such as Tell Brak and Tell Hamoukar have been interpreted as trading outposts or *karums* of settled Southern Mesopotamians (Wattenmaker 1987; Ur 2010a; 150). It seems unlikely that the high numbers of sherds discovered at the larger sites would all have been traded through this very small outpost, or even a number of such outposts. It is possible that successive waves of Uruk interaction in different forms but varying intensity could create multiple patterns within a single phase. This would fit well with the gradual changes in ceramic forms and production techniques recorded in successive phases at Kurban Höyük. However, the assemblage at KHS_15 contains both LC 4 and 5 (Middle and Late Uruk) type-fossils and is too small to allow for an investigation based on subtle chronological differences within the period.

The Early EBA Phase in the Samsat-Lidar sector

The EEBA phase sees a decline in settlement hierarchy to a pattern of small dispersed village sites. The general settlement pattern continues that of the Late Chalcolithic and Uruk phases, with settlement concentrated along the river and at the established tells. Samsat probably remained the largest site in the area for much of this period, although there is some ambiguity in regard to its size. Ozdoğan's survey did not distinguish sub-phases within the EBA but does suggest the whole of Samsat was sparsely covered with EBA forms with a greater preponderence on the Western half of the mound, although he does mention that on the eastern side Iron Age sherds lie directly over the Uruk (1977; 133). Lupton takes this to imply a continued occupation at Samsat on a similar scale to the Uruk and Late Chalcolithic phases, that is at around 10 hectares (Lupton 1996; 84). However, very few sherds of the only definite EEBA form used by Ozdoğan, Reserved Slip Ware (ware 2.3), were discovered at the site.

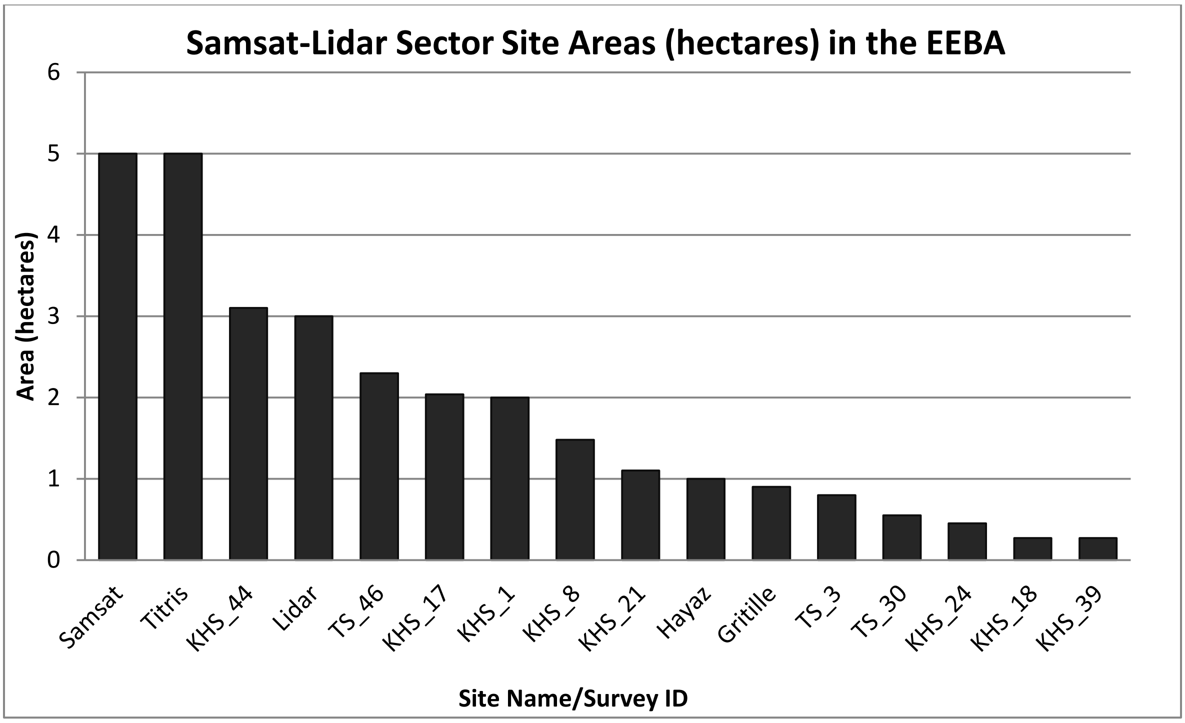


Figure 5.10: Comparative Site Areas (hectares) for the Samsat-Lidar Sector in the EEBA

Given these ambiguities, I have ascribed 5 hectares to Samsat during this phase to reflect both the sparseness of the scatter relative to the previous phases and the possibility of reduced spatial coverage. This places Samsat on a similar scale to the newly founded site of Titriş Höyük. Again, the area ascribed to the site is somewhat tenuous, in part due to the difficulty of accessing EEBA levels beneath the massive MEBA and LEBA deposits. Very ephemeral EEBA remains were discovered in a single trench on the western part of the lower town, including pits and some plaster floors but no walls (Algaze et al. 2001; 56). The excavators interpreted this as the edge of the settlement during that period, and it seems logical to assume the entirety of the high mound was occupied during this time. This gives a rough area of 5 hectares for the EEBA settlement at Titriş, although the possibility that the central mound was expanded by later EBA settlement means this may be too large. Limited exposures of EEBA material were also made at Lidar and revealed a possible fortification wall dated to EB I and some small sections of standing architecture (Mellink 1985) but again the limited exposures possible preclude further analysis.

Evidence from Kurban suggests the settlement contracted to around 1 hectare, but intriguingly that a wide-range of activities were occurring at the site, including leather and copper working (Algaze 1990; 426). This may hint at the continuing participation of sites in the Karababa sector in inter-regional trade networks. The founding of the first settlement at the nodal site of Titriş during this phase and the continuing presence of settlements at the river crossing points (Figure 5.11) supports this hypothesis.

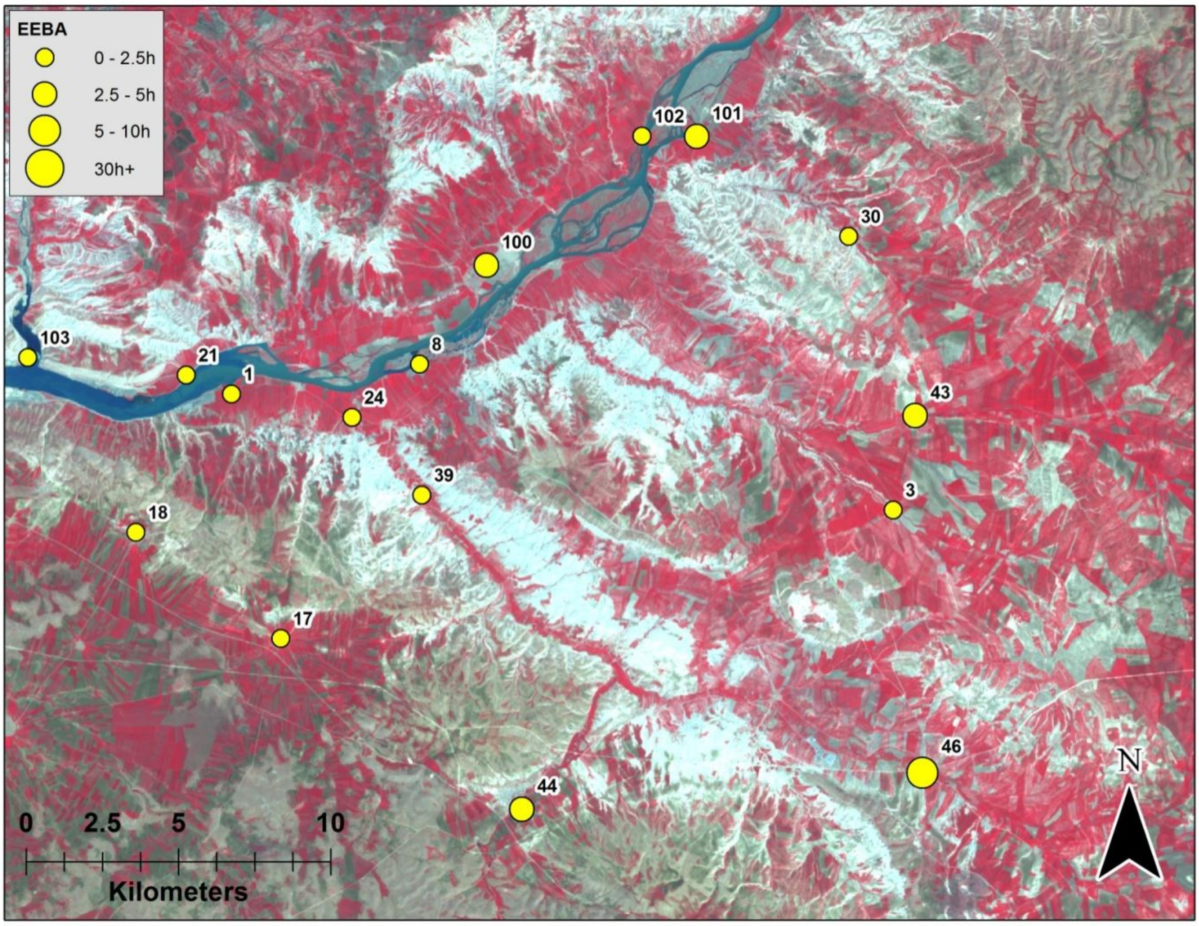


Figure 5.11: Site Locations for the Samsat-Lidar Sector in EEBA. Background: Landsat TM image acquired 05/03/1987 displaying bands 4, 3, 2

The Middle and Late EBA Phases in the Samsat-Lidar sector

The later phases of the EBA see the rapid development of a four tiered settlement hierarchy surrounding the 43 hectare site of Titriş. Secondary centres emerged at Lidar and Tatar, which may have grown to 15 and 11 hectares respectively, with a third tier between 3 and 6 hectares represented by Kurban, Bozova, Millisaray and possibly Samsat. Finally, a dense network of small communities emerged, particularly on the plain around Titriş. This period is among the best documented from excavated sources, with large exposures of Middle and Late EBA levels achieved at Titriş, Kurban, and Lidar. The two phases will be treated together in this analysis due to the inconsistency in dating between the two surveys. The KHS and TS did not divide the second half of the EBA into separate phases during survey but the TS sites and the larger tells from the

KHS were later reassessed in the light of excavations at Titriş, allowing for a distinction between the Middle and Late EBA (Algaze et al. 2001; 80 Table 10). This was not done for most of the KHS sites, and we must therefore be cautious in combining the surveys for these phases. The total settled area is consistent across the phases in the TS, although the settlement pattern does show a small change with four small sites on the plain to the south and east of Titriş abandoned and replaced by sites further north on the route to Lidar.

The other major difference between the MEBA and LEBA in terms of settled area occurs at Titriş itself. The site consists of a central high mound, a surrounding mounded lower town, a flatter outer town and a number of surrounding suburbs. Settlement expanded from the high mound and perhaps the edge of the lower mound in the EEBA to the entire area in the MEBA, giving a total settled area of some 43 hectares. During the LEBA phase, settlement in the suburbs was abandoned and a large city wall was built at the eastern end of the site, giving a total settled area of around 32 hectares (Algaze et al. 2001; 99-100 Figures 22 and 23). Algaze sees this development as a response to inter- or intra-regional conflict, and suggests the abandonment of the sites around Titriş may be a result of conflict with Tatar Höyük to the south (Algaze 1999).

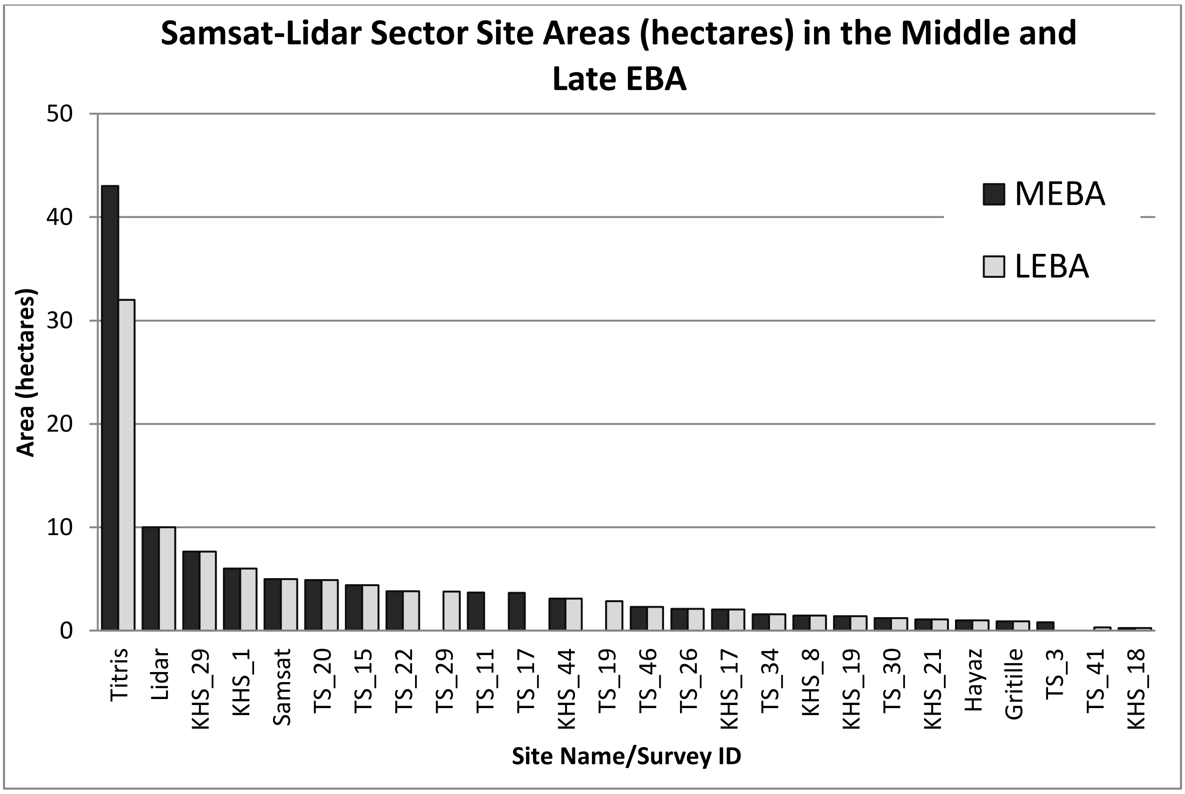


Figure 5.12: Comparative Site Areas (hectares) for the Samsat-Lidar Sector in the MEBA and LEBA

The main settlements on the Euphrates continued to be occupied and even expanded throughout this period and evidence the continued importance of cross river trade. There are also clear alignments of sites from the plains up the main tributary river valleys to Kurban and especially Lidar. Whilst it could be argued that settlement along water courses is a local response to an arid environment, the lack of settlement in these zones during the EEBA points to a new incentive in the MEBA and especially LEBA. Excavations at Titriş and a number of the larger surrounding sites have demonstrated that this urbanised phase coincides with high levels of craft specialisation and perhaps social and political integration. Both Titriş and Kurban were extensively redeveloped during the MEBA with regular house plans and long-lived streets (Algaze 1999), as well as the construction of a fortification wall around Kurban (Algaze 1990; 38).

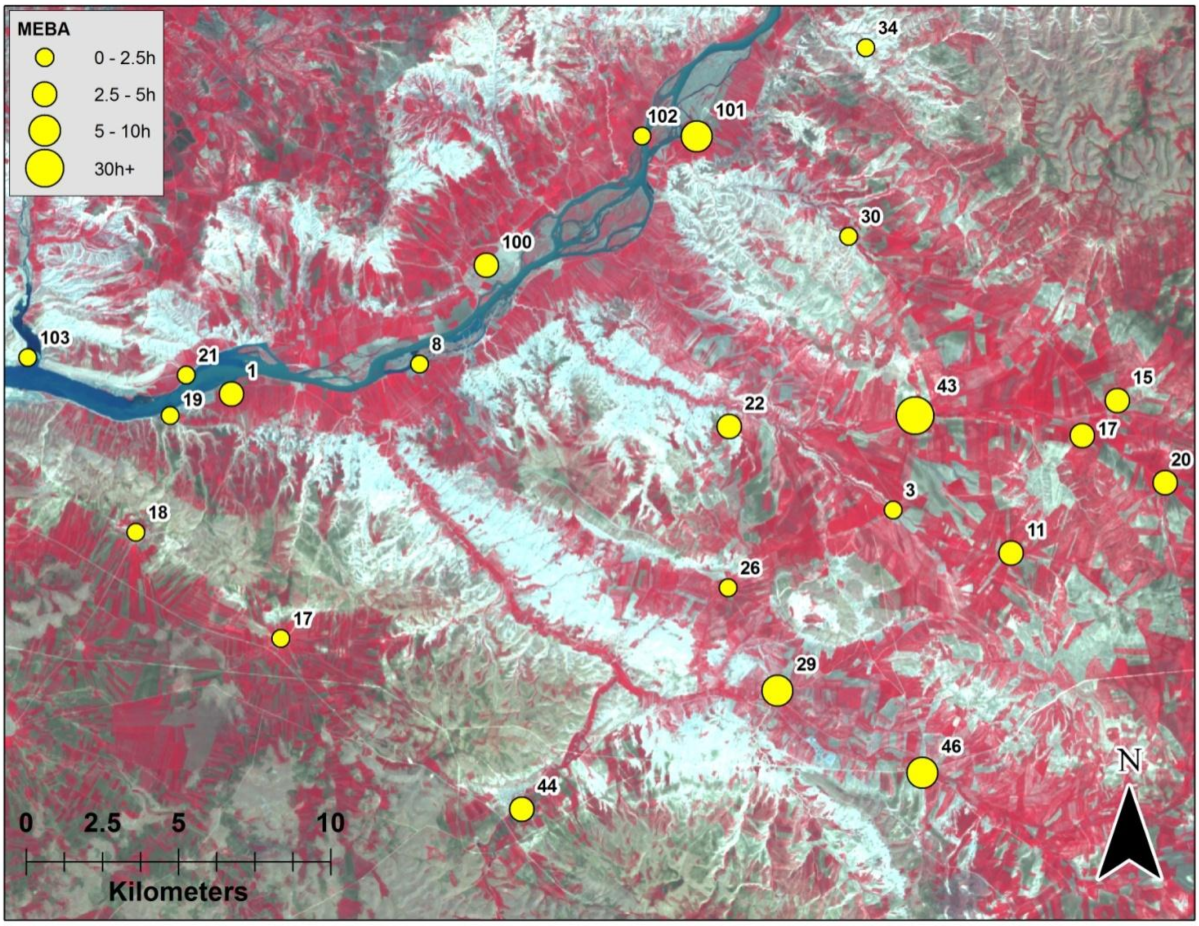


Figure 5.13: Site Locations for the Samsat-Lidar Sector in MEBA. Background: Landsat TM image acquired 05/03/1987 displaying bands 4, 3, 2

Evidence for specialisation comes from Titriş, where a significant lithic workshop was discovered in the MEBA levels of Suburb 1 (Rosen and Hartenberger in Algaze et al. 2001; 37-41), and the so-called 'Potter's Quarter' at Lidar, a complex of 19 kilns dating to the MEBA and LEBA (Hauptmann 1985; 1987; 206). The settlement pattern in both phases can also be interpreted as evidence for a degree of centralised organisation. No settlements were recorded within a 3km radius of Titriş, corresponding to a low density zone of battered sherds which have been interpreted as evidence of manuring (Wilkinson 1982; Algaze et al. 1992), suggesting the prime agricultural lands around Titriş were retained for that purpose (Wilkinson 1994; 497). Overall, the Samsat-Lidar sector in the MEBA and LEBA phases appears to represent a relatively highly integrated settlement system with a centralised political authority, almost certainly based at Titriş. This system operated on a completely different scale to that of the preceding phase of centralisation in the Late

Chalcolithic/Uruk, and seems to have emerged extremely rapidly from the small dispersed settlement pattern, and inferred social and political decentralisation, of the EEBA.

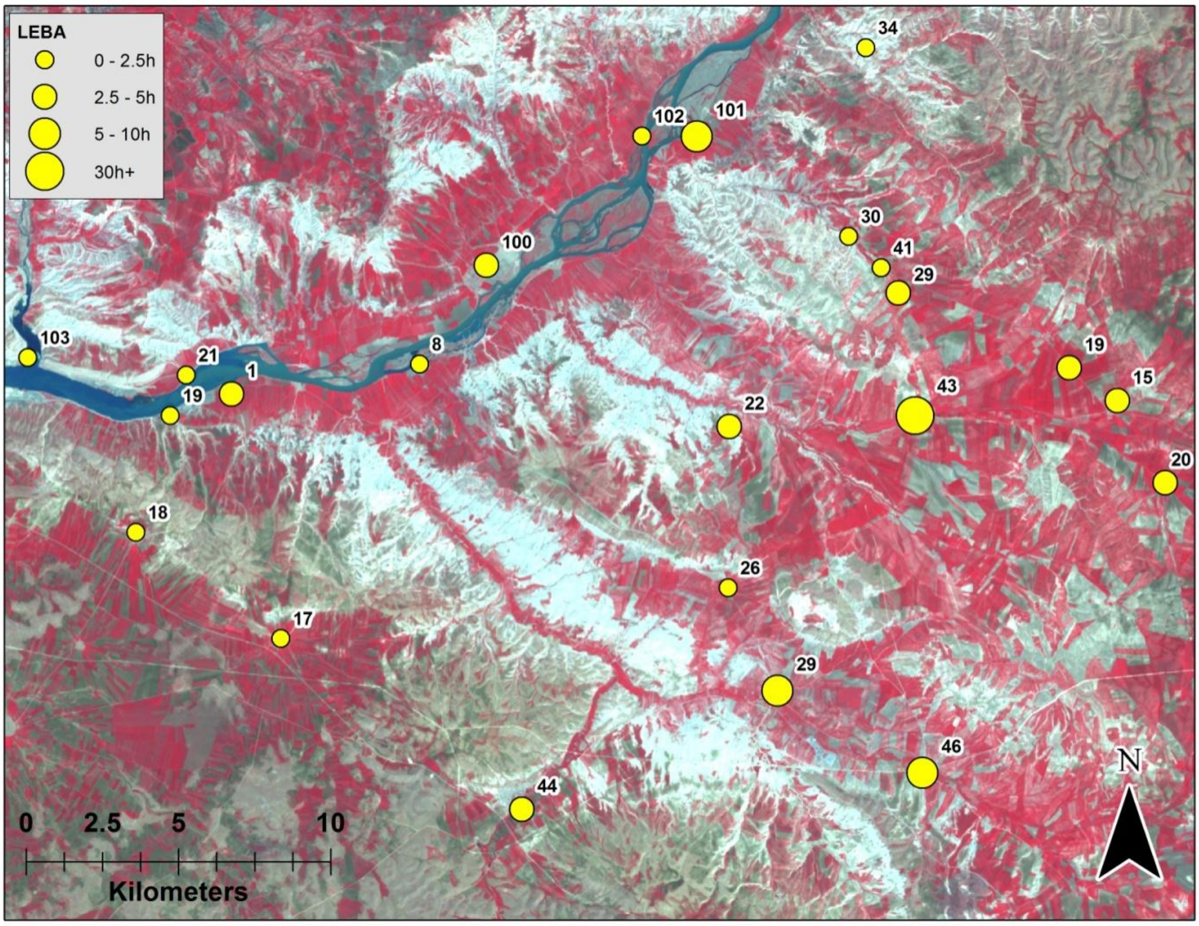


Figure 5.14: Site Locations for the Samsat-Lidar Sector in LEBA. Background: Landsat TM image acquired 05/03/1987 displaying bands 4, 3, 2

The Early Bronze Age-Middle Bronze Age Transition Phase in the Samsat-Lidar sector

The EBA-MBA transitional phase sees a return to a non-hierarchical dispersed pattern of small village settlements and a sharp decrease in total settled area, from around 100 hectares to just over 60. Although Titriş was still the largest site, occupation was restricted to the main tell, giving a total occupied area of between 4 and 5 hectares. Again, little is known of the occupation at Samsat during this phase but the site was probably of a similar size to Titriş, if not smaller. Kurban was briefly abandoned at the end of the LEBA before a reoccupation on a much reduced level on the summit of the southern mound totalling approximately 1 hectare (Algaze 1990; 430). Lidar may also have been briefly abandoned before the construction of a large fortification wall at the beginning of the MBA (Hauptmann 1987; 204). Due to the continued occupation of the main mound found in the step trench a provisional settlement size of 3 hectares has been assigned (Hauptmann 1984; 1985; 227).

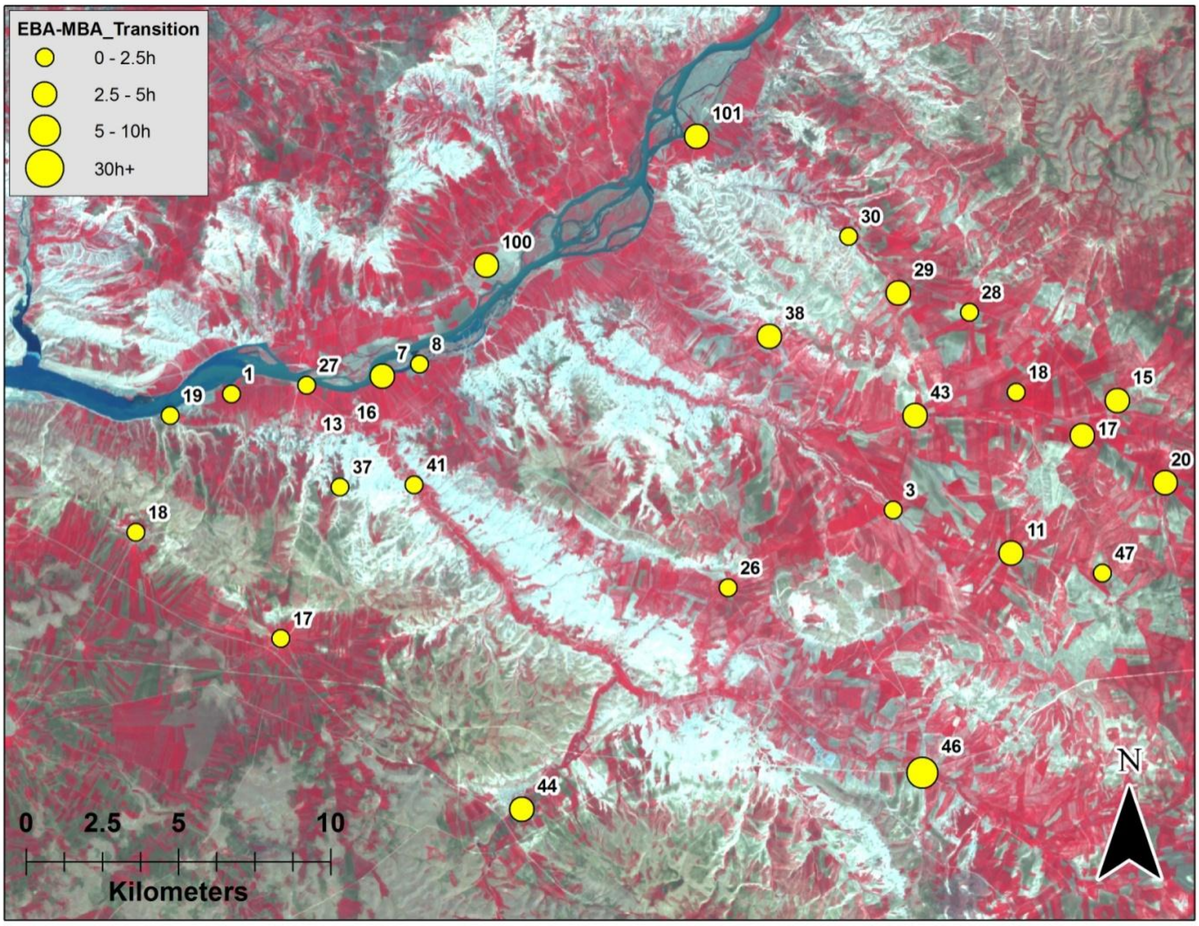


Figure 5.15: Site Locations for the Samsat-Lidar Sector in EBA-MBA Transition phase. Background: Landsat TM image acquired 05/03/1987 displaying bands 4, 3, 2

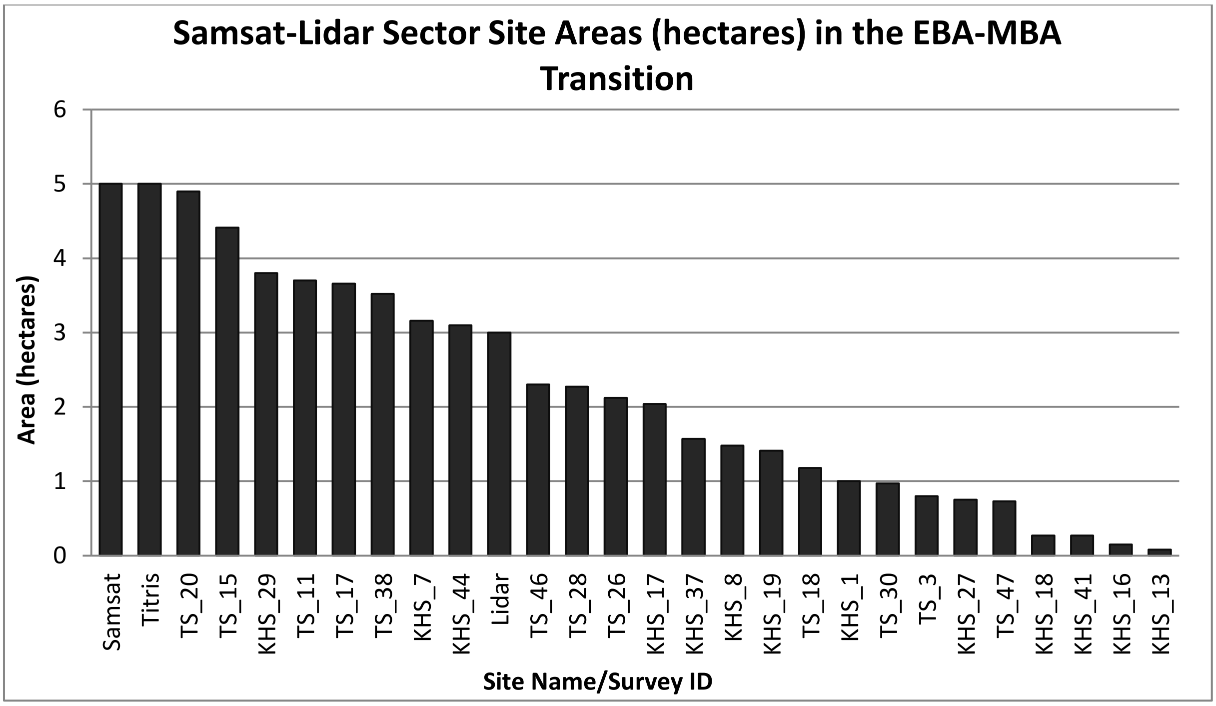


Figure 5.16: Comparative Site Areas (hectares) for the Samsat-Lidar Sector in the MEBA and LEBA

The number of settlements actually increased from the MEBA and LEBA phases from 20 to 28 with several newly founded small scale sites springing up across the lowland plain and continued occupation along the river. Interestingly, both Gritille and Bireçik were abandoned after the LEBA, perhaps hinting at a decline in the importance of river crossing points and therefore overland trade and exchange networks.

Trends in the Samsat-Lidar sector in the 4th and 3rd Millennium

Figure 5.17 shows the total settled area by phase for the 4th and 3rd Millennia divided using the system outlined in Chapter 4. Settled area is displayed by percentage probability that a site was occupied in the individual phase, in effect the likelihood that the site in question was settled at that time. We can see that the LCH and EBA_MBA_T(ransition) can be tightly linked to a clearly defined time interval. The Uruk phase presents the greatest issue since it overlaps with the Late Chalcolithic and, in the Middle Euphrates, with the EEBA (see above and Chapter 4). Since Uruk is equivalent to the last 600 years of the far longer Late Chalcolithic, it is contained in the 80-100% category for the Late Chalcolithic phase. In the EEBA, the 100 year overlap with the end of the Uruk period produces the high proportion of 0-20% relevant sites.

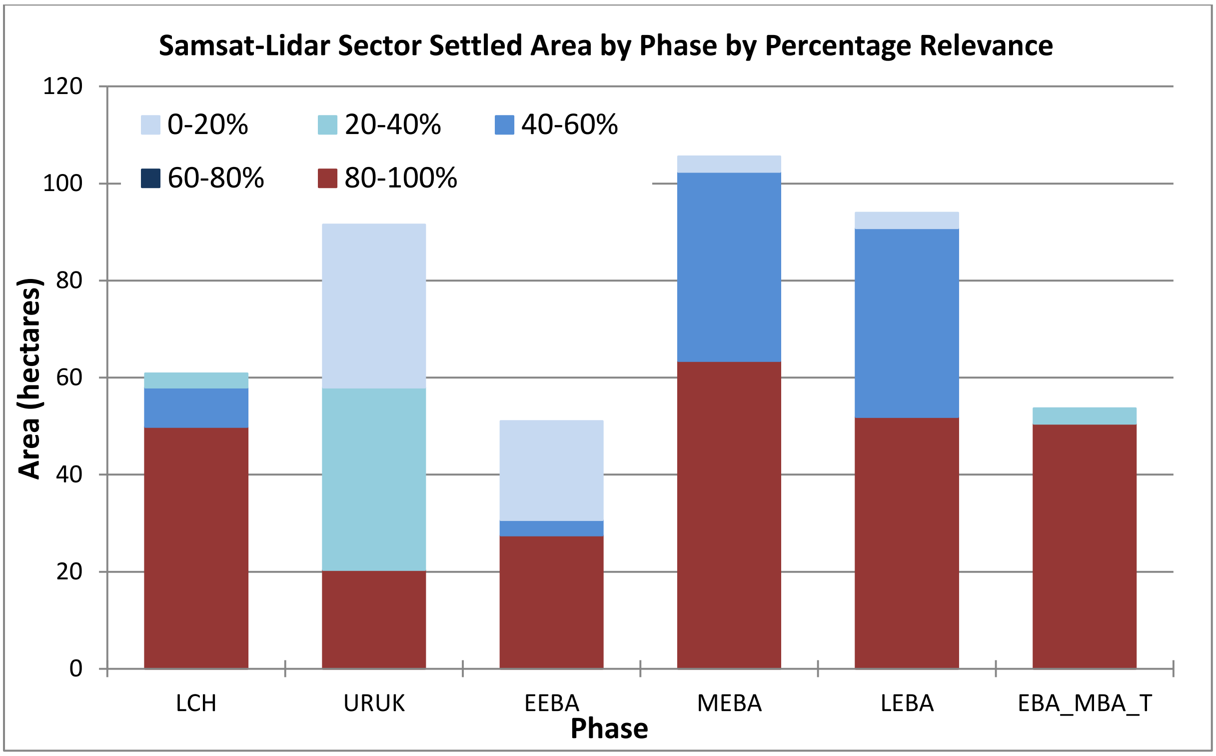


Figure 5.17: Samsat-Lidar Sector Settled Area by Phase by Percentage Relevance

Finally, the preponderance of 40-60% relevant sites in the MEBA and LEBA phases result from the combined Mid-Late EBA phasing in the KHS. We can therefore assume that the red marks roughly the appropriate area for all phases except the MEBA and LEBA, where the inclusion of the KHS sites would result in a settled area closer to the total height of the bar. The two phases of nucleation in the Late Chalcolithic (and possibly Uruk) phase and the MEBA and LEBA phase clearly correspond to a higher settled area, whilst the EEBA represents a decline. The EBA_MBA Transitional phase also shows a decline from the LEBA but is almost the same as the Late

Chalcolithic. This suggests the retention of some residents of the Titriş enclave in the wider settled population after the demise of the urban centre.

We can interrogate the data further by moving away from a phase based approach and displaying the data in timeblocks (Figure 5.18). The timeblocks graph allows us to visualise the relationship between the relatively long-lived system around Samsat (1) and the extremely rapid fluorescence around Titriş (4). The drop in the number of small sites at (2) is an artefact of a specific Pottery Neolithic-Chalcolithic phase which could not be subdivided and was used for two tells investigated in the TS (TS_23 and TS_46). The plateau at (3) represents the EEBA, when only three of the larger sites were occupied after the decline of the Samsat system. The rise of Titriş sees a similar rise in the settled area of both small sites and larger sites to very nearly equal proportions. The decline in settlement at Titriş is mirrored by the larger sites but the small sites actually increase in total area as the foundation of new small sites creates the dispersed settlement pattern mentioned above (5). As mentioned above, this bounce in small sites most probably reflects the movement of people from Titriş to rural villages.

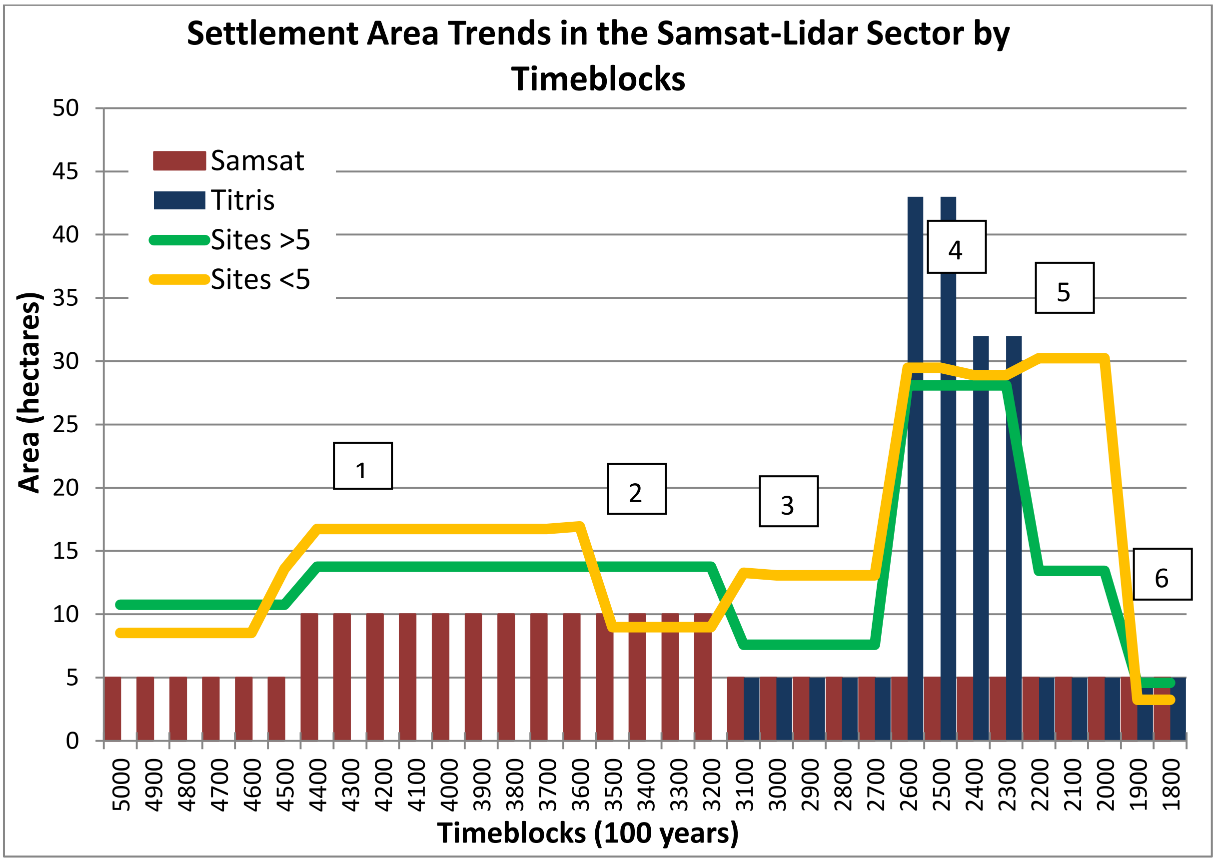


Figure 5.18: Settlement Area Trends in the Samsat-Lidar Sector by Timeblocks, divided between small sites (under 5 hectares), medium sized sites (sites over 5 hectares) and the centre of Titriş.

Finally, the Middle Bronze Age (6) sees a substantial decline in all sizes of sites and occupation continuing only at Titrişh and three very small sites along the Euphrates. In part due to the coarse nature of the dating evidence available, the causal factors behind the genesis and subsequent collapse of the two nucleated settlement systems which developed between the Late Chalcolithic and EBA-MBA Transition are difficult to assess. It is clear that the degree of integration of the Samsat-Lidar sector into larger networks of trade and exchange must have been heavily involved in determining events within the basin but intra-regional interaction may also have played a role.

The demographic shifts inferred from changes in total settled area are far too large to have occurred through natural growth or decline in population (Wilkinson et al. 2011). We also do not see the classic urbanisation process found in southern Mesopotamia where the rise of a large site results in the abandonment of surrounding smaller sites as local populations are drawn into the centre (Adams 1981; 82-84). This means increases in settled area must be the result of either an influx of people from outside the sector or the settling of previously archaeologically invisible nomadic pastoralist population. Similarly, declines in population must result from an exodus of individuals, a return to nomadic ways of life or some kind of catastrophic event resulting in mortality on a very large scale (Algaze 1999; 552). The concentration of settlement in the river valley during the Late Chalcolithic, and especially during the Uruk phase, suggests a greater reliance on the Euphrates as a conduit for long distance interaction. However, this period also saw the development of paired sites to the east and west of Samsat, suggesting river crossings were already of some importance. The long duration of the Late Chalcolithic phase might allow for a gradual change in routes over time, such that a more locally centred interaction network utilising the trade routes between the copper rich Anatolian highlands and the Harran and Jazira plains to the south east may have been supplanted by Euphrates based trade. Alternatively, both routes could have been in operation simultaneously. These questions cannot be answered through the use of survey data alone. Unfortunately, the vast majority of the pertinent sites have been lost beneath the waters of the Karababa reservoir. The shift in location of the main centre from Samsat to Titriş suggests a decline in river trade and a greater reliance on overland routes to the south east. Another explanation may be the larger agricultural area and access to timber and other resources afforded by a location on the plains rather than the constrained river terraces around Samsat (Algaze et al. 2001; 67). This move away from the river accounts for the high number of newly founded sites during the MEBA phase as satellite settlements grew up around Titriş. All four of the paired sites along the river attained their largest sizes during the MEBA and LEBA phases and the alignment of sites along the main tributary wadis, whilst present in the Late Chalcolithic and Uruk, is most clear in the LEBA. The fact that the larger sites declined in line with Titriş suggests they may have been more reliant on the same factors for growth than the smaller sites.

A stronger relationship between the larger sites and Titriş than the smaller sites is supported by faunal evidence from Kurban and Gritille. Faunal remains from Kurban show a trend for animal production towards specialised herding of sheep and goat over household level exploitation of sheep, goat, pig and cow. The absence of remains from animals at prime meat producing age (1-3 years) suggests animals were exported from the site and perhaps given as tribute (Wattenmaker 1987; 1998; 186-7), almost certainly to Titriş. In contrast to this, the smaller site at Gritille showed no signs of either specialised herding or the export of animals. Animal production was rather orientated towards 'subsistence level pastoral production strategies' (Stein 1987; 108). Stein uses the contrast between Kurban and Gritille to argue that the political institution present in the Samsat-Lidar sector during the Mid-Late EBA must have been a loosely integrated 'segmented state' in which the lower levels of socio-political complexity duplicate work done by the higher levels (Stein 1987; 109). This view is not supported by the excavated data from Kurban and Titriş which suggest a strong political force was able to control and manage large building projects and maintain strict settlement organisation. We might hypothesise that there are two different systems in operation here, the first of which revolves around Titriş and includes the larger sites as secondary centres, along with perhaps their smaller local satellites, and the second representing relatively autonomous smaller sites. Gritille, situated on the other side of the river from Titriş and Kurban and with easy access to both rich agricultural land on the river terraces and upland pastures to the north, may fit into this latter category. The collapse of the Titriş system resulted from a perfect storm in which fluctuations in long distance trading networks, perhaps as a result of the expansion of the Akkadian Empire into the Khabur region (Abay 2007), coupled with the overexploitation of local resources necessary to sustain the urban centre (Algaze et al. 2001) combined. In both of the periods in which the larger sites are reduced in size the underlying system of small hamlet settlements seems to have been largely unaffected.

The Land of Carchemish Project field data set

The LCP covers the southern part of the Carchemish sector as defined by Peltenburg (2007) in Syria and was specifically designed to examine settlement systems outside the river valley (Wilkinson et al. 2007a; 213). The survey area is triangular in shape, defined to the east by the Euphrates, to the south and west by the Sajur River and to the north by the Syro-Turkish border (sees Figure 5.19). Two previous surveys covering portions of this area were conducted during the late 1970s by British and French teams (Copeland and Moore 1985; Sanlaville 1985), although these concentrate on selected, mostly early, periods and were relatively low in intensity. The Turkish part of the Carchemish sector, north of Carchemish itself, has also been surveyed as part of the Turkish Euphrates Survey Area (Algaze et al. 1994). This was undertaken in advance of the construction of the Carchemish and Bireçik dams and therefore focuses on settlement in the vicinity of the river. Dam projects in the Syrian Euphrates as a whole have also meant that the majority of the excavated sites have been located close to the river, whilst areas such as the land between the river valley and the large EBA centre of Tilbeshar on the Sajur to the west has received little attention (Kepinski 2007). Within the area surveyed by the LCP, excavations have been conducted at Jerablus Tahtani and Tell Amarna. Excavations have also been carried out at sites on the opposite bank of the Euphrates at Shioukh Fouqani, Shioukh Tahtani and Tell Ahmar. Known sites which have not been systematically investigated include the large tell at Beddayeh, the part flooded site of Qumluk and Talik. The largest site in the area, Carchemish, presents significant challenges for interpretation and will be discussed below.

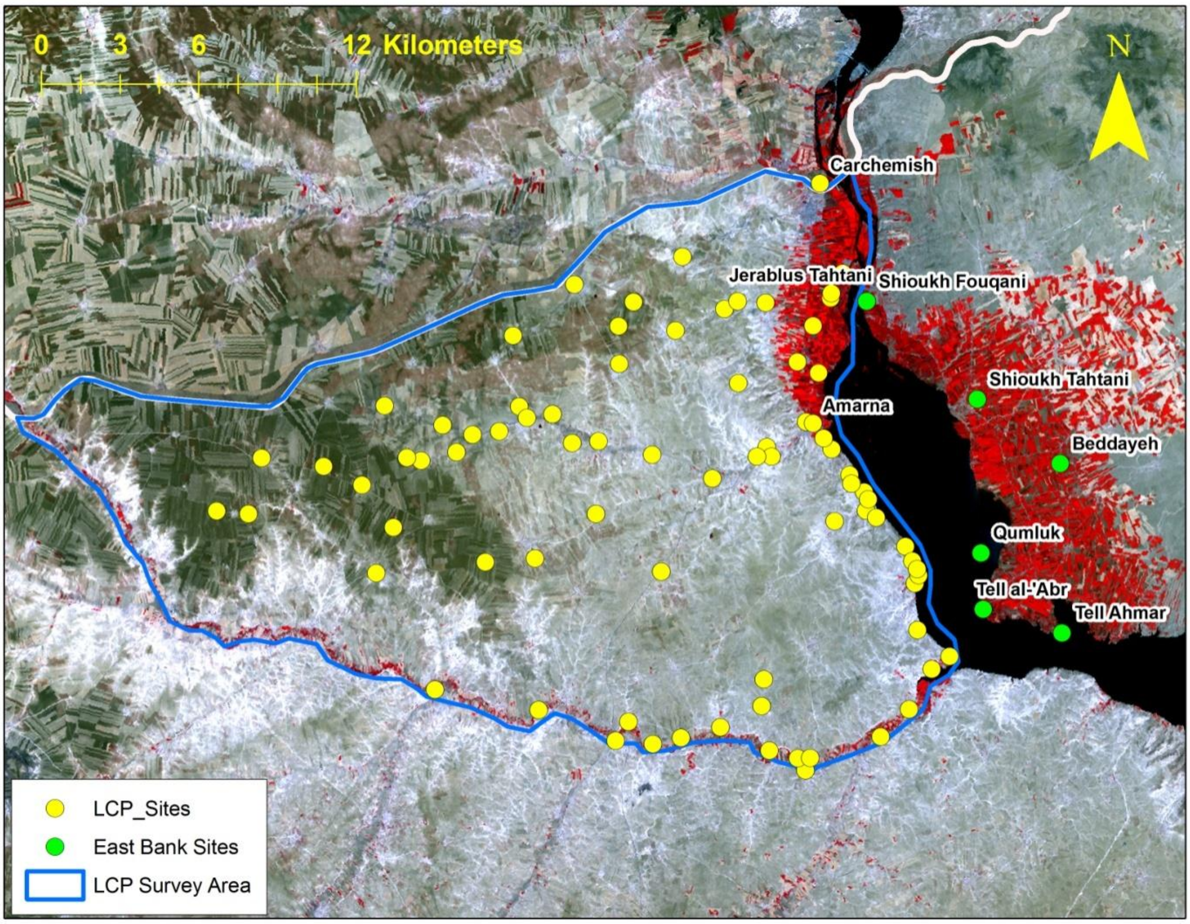


Figure 5.19: The LCP survey area, excavated sites and major east bank sites. Landsat Enhanced Thematic Mapper Plus (ETM+) image acquired 07/04/2004 displaying bands 4, 3, 2

The LCP dataset is relatively accurate in comparison with the KHS and TS. Remote sensing data, including CORONA and high resolution modern imagery, have been used throughout the project, as have GPS and GIS techniques. This has led to higher percentages of the Definite and High classes of Boundary Certainty and Geographical Precision (see Figure 5.20). All sites have a Geographical Precision class of High or Definite, reflecting the ubiquitous use of GPS points in mapping site locations. The slightly lower percentages for Boundary Certainty reflect the lack of multiple GPS points for some of the sites recorded in the two earliest seasons. High resolution GeoEye imagery acquired in November 2010 has also aided field collection and site mapping. One site, LCP_72, has been recorded in the Low category for Boundary Certainty. This is due to the brevity of the original site visit which meant that a definitive boundary was not recorded.

Unfortunately, subsequent visits have not been possible. Overall, the LCP dataset is extremely accurate due to the technology available.

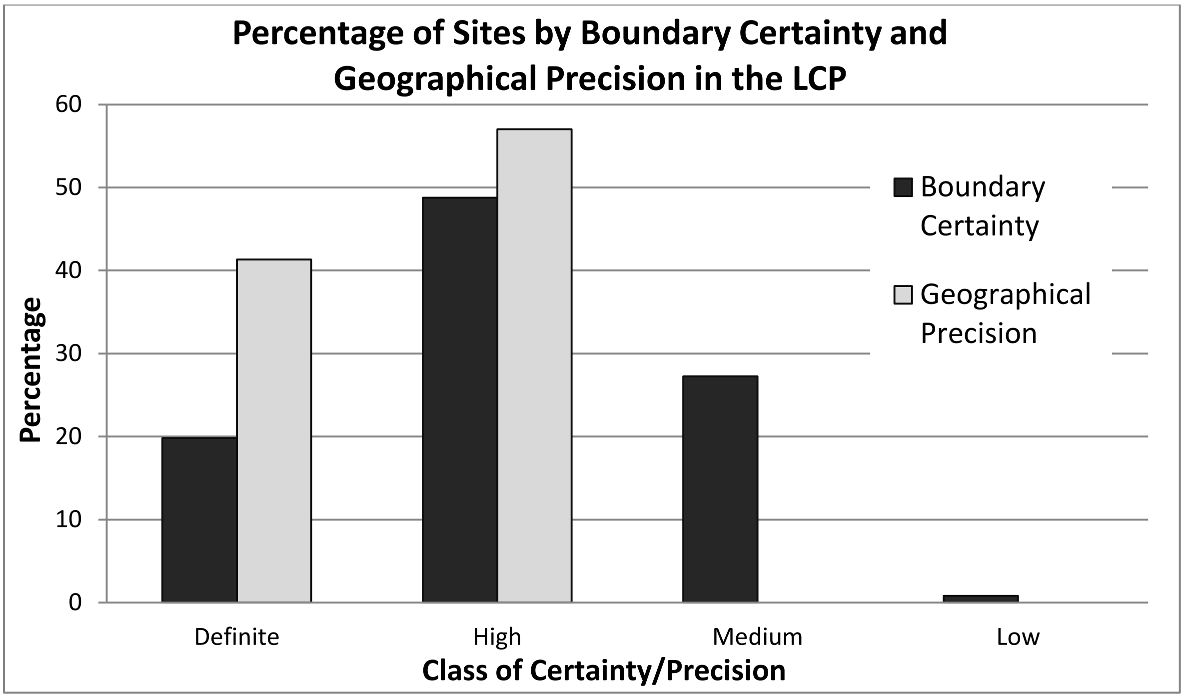


Figure 5.20: Percentage of Sites by Boundary Certainty and Geographical Precision in the LCP

Geographical and Geomorphological Setting of the Land of Carchemish Project Area

The LCP can be divided into three major geomorphological zones, from west to east:

1. The edge of the Gaziantepe-Nizip high plain (Green in Figure 5.21)
2. Eroding limestone valleys between the plain and the Euphrates (White in Figure 5.21)
3. River terraces and floodplains in the Euphrates valley itself (Red in Figure 5.21)

Zone 1 represents the south-easternmost edges of the Gaziantepe-Nizip plain, a high plateau veneered with terra rossa soils extending into southern Turkey and adjoining the Quwayq plain in Syria. Except at its eroded edges, the plain can be considered a relatively stable geomorphological unit throughout the Holocene, and therefore the phases considered here. The river terraces which make up zone 3 are relict flood plains of the Euphrates. Most of the Holocene river terraces along the length of the Euphrates are relatively late in date due to the dynamic nature of the river itself (Wilkinson et al. 2004; 22). However, the presence of Late Chalcolithic and Early Bronze Age sites such as Jerablus Tahtani (Peltenburg 1999), Qumluk and Tell Ahmar on the flood plain and lower terraces on either side of the river suggest ancient floodplains are present in isolated areas (Wilkinson 2007; 32). Zone 2 includes the land between the plain and the river terraces where wadis feeding the Sajur and Amarna rivers, as well as the Euphrates, have incised into the plain creating a degraded limestone landscape. As a result of these erosional properties, zone 2 represents a highly dynamic landscape with relatively few water sources and thin soils. Zone 2 also includes the fairly open and rolling landscape in the valley of the Amarna as well as the high bluffs along the west bank of the Euphrates to the south of the relict flood plains. The Sajur valley is rather more incised, with low Pleistocene terraces along its length providing similar high fertile land to those along the Euphrates, although on a far smaller scale. Finally, to the south west of the survey area on the road to Aleppo can be found a small area of Basalt uplands.

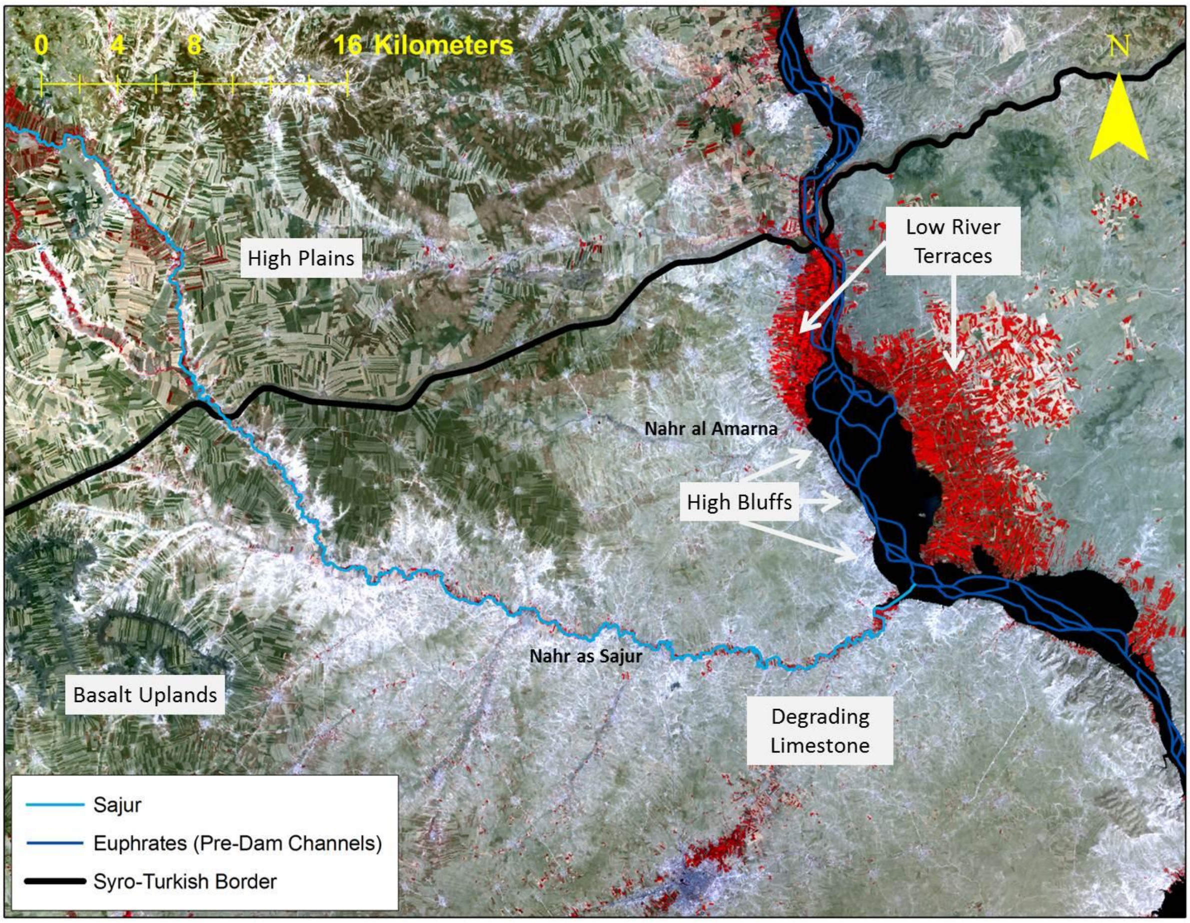


Figure 5.21: Geomorphological Zones in the LCP area. Landsat ETM+ image acquired 07/04/2004 displaying bands 4, 3, 2. Dense vegetation is redder, lower level vegetation more green, eroded limestone white.

The Problem of Carchemish

Any discussion of urbanism in the Carchemish sector during the third and fourth millennia is to some degree hamstrung by our lack of knowledge in regard to Carchemish itself. Carchemish lies in the no-man's land of the border between Syria and Turkey. This difficulty of access has precluded investigation of the main tell and inner town since the excavations made by Sir Leonard Woolley and his team prior to the First World War (Woolley 1921; Woolley and Barnett 1952) and severely curtailed our understanding of the site. A number of scholars have made (often rather divergent) estimates of the occupied area for different phases (Algaze et al. 1994; McClellan 1999a; Bunnens 2007). Investigations in the outer town have recently been undertaken (Peltenburg et al. 2011; Wilkinson et al. 2011) but these have revealed mainly Iron Age and later remains which are not pertinent to the periods discussed here. The debate for the Late

Chalcolithic, Uruk and EBA phases centres on the occupation of the citadel mound and inner town, and particularly when the latter became settled. Late Chalcolithic levels, along with Uruk Bevelled Rim Bowls (BRBs), were discovered in Trench B on the south-eastern part of the main citadel mound, along with a number of Early EBA pot and cist graves containing highly diagnostic 'champagne-cups' (Woolley and Barnett 1952; Falsone and Sconzo 2007). Excavations on the north-western part of the citadel also revealed graves containing champagne-cups, although the other deposits were most probably Iron Age and were heavily disturbed (Falsone and Sconzo 2007; 76). Using the presence of tombs as evidence of occupation would be somewhat spurious in normal circumstances but in this case it is our only evidence from the main citadel. The following calculations assume the entire citadel mound was occupied during the Late Chalcolithic, Uruk and EEBA phases, giving a settled area of 4 hectares (contra Algaze et al. 1994; 61 who suggest 0.5 hectares). I then follow Falsone and Sconzo (2007) and McClellan (1999a) in assuming the occupation of the entire inner town occurred in the MEBA and LEBA, an area of some 40 hectares (calculated from satellite imagery). This gives a total occupied area for Carchemish during the second half of the third millennium of 44 hectares and is based on isolated finds at various points across the inner town, including the main city gates (Woolley 1921; 79), and the presence of domestic architecture in the Lower Palace Area (Woolley and Barnett 1952; 230-236; Falsone and Sconzo 2007; 88-90). These estimates do not agree with that put forward by Bunnens (2007) who argues for the lower town to be dated predominantly to the MBA or later. Bunnens' argument relies heavily on the scarcity of references to Carchemish in textual sources, particularly those from Ebla, and the fact that when it is referred to it is in the 'second tier' of settlements (2007; 45). However, the likelihood of a four hectare settlement being mentioned at all seems somewhat remote. Survey of the nearby site of Tiladir Tepe on the eastern bank of the Euphrates revealed a 12 hectare LEBA or Early MBA settlement which has been interpreted as a suburb of the urban centre at Carchemish (Algaze et al. 1994; 15), suggesting Carchemish itself must have been sizeable at the time (Cooper 2006a; 56). It is hoped that the new program of excavations planned will clarify some of these debates. For the purposes of the following discussion I will use the 44 hectare figure with the proviso that this may change as new evidence is brought to light.

Dominance of tell based settlement in the Land of Carchemish Project

Settlement in the LCP throughout the 4th and 3rd Millennia is characterised by a high degree of continuity at a small number of locations, resulting in a landscape of long-lived tells. Individual settlements do not appear to fluctuate significantly in size and there is a notable absence of the sorts of medium-sized town settlements which grew up in the Samsat- Lidar sector during the Late Chalcolithic/Uruk and MEBA/LEBA phases.

Site ID	Site Morphology (Tell Type)	HALAF	UBAID	LC1_2	LC3	URUK	EEBA	MEBA	LEBA	MBA	Total Phases
Amarna	Ovoid	■	■	■	■	■	■	■	■	■	9
LCP_60	Conical	■	■	■	■	■	■	■	■		8
LCP_55	Conical	■	■	■	■	■		■	■	■	8
Carchemish	Complex Topographic Mound			■	■	■	■	■	■	■	7
LCP_50	Conical	■	■	■	■	■		■	■		7
LCP_5	Conical	■				■	■	■	■	■	6
LCP_3	Conical		■	■		■	■	■	■		6
LCP_2	Low			■	■	■	■	■	■		6
LCP_10	Conical			■	■		■	■		■	5
LCP_25	Conical			■	■		■	■		■	5
LCP_47	Conical			■		■	■	■		■	5
LCP_53	Low				■	■	■	■	■		5
Jerablus Tahtani	Conical					■	■	■	■		4
LCP_78	Conical				■	■	■		■		4
LCP_59	Conical			■			■	■			3
LCP_1	Low							■	■	■	3
LCP_65	Shallow Sided			■	■		■				3
LCP_69	Shallow Sided								■	■	2
LCP_54	Shouldered							■	■		2
LCP_68	Shouldered							■	■		2
LCP_38	Unspecified			■	■						2
LCP_11	Conical							■			1
LCP_19	Flat Site	■									1
LCP_56	Flat Site							■			1
LCP_61	Flat Site							■			1
LCP_24	Low									■	1
LCP_71	Low					■					1

Table 5.1: Site morphology and occupied phases for all sites in the LCP between the Halaf and the Middle Bronze Age phases

Changes in total occupied area are therefore more the result of the total abandonment of sites during different phases. Table 5.1 shows all sites occupied between the Halaf and Middle Bronze Age in the LCP area. All but three of these sites are tells and the vast majority have very long sequences. One of the flat sites, LCP_19, is a single phase Halaf occupation on the wadi Amarna (Tunca et al. 2004) whilst the other two, along with the low sites at LCP_24 and LCP_71, produced very few sherds and were only classed as sites because of substantial later occupations in the Iron Age and Classical phases. This continuity of settlement is even more remarkable given the relatively small collections available from many of the high conical mounds within the LCP area. The compacted nature of the soil on these mounds results in very little pottery being present immediately on the surface. It is worth noting that the conical tells with the most phases are also the largest or those which have been disturbed by modern settlement or non-archaeological excavation. Tell Amarna, Koundariyeh and LCP_55 are all heavily incised by small streams as a result of surface water run-off. This aids collection by washing out ceramic material from within the mound. Sites LCP_50, LCP_5, LCP_3, LCP_2 and LCP_10 have all been partially destroyed by non-archaeological excavation, either through modern settlement, looting or soil extraction pits. We might compare these with the similar morphological tells at LCP_59 and LCP_11. Both of these are small, heavily compacted tells which do not reach sufficient sizes or gradients for incised gullies to form. Neither has been disturbed to the same degree as the above mentioned tells, and both have significantly fewer phases. LCP_11 does have a modern cemetery on one side, but the absence of freshly dug graves during the field visits and the fact that removed soil tends to be replaced once the body has been deposited means this type of post-depositional process has less of an impact in terms of bringing ceramics to the surface.

The Late Chalcolithic and Uruk in the Land of Carchemish Project

As with the Samsat-Lidar sector, it is clear that the pattern for EBA settlement was established during the Late Chalcolithic, although the larger long-lived sites at Amarna, Koundariyeh (LCP_60) and LCP_55 were founded even earlier, during the Halaf phase. No clear settlement hierarchy is discernible throughout the Late Chalcolithic and Uruk phases. Prior to the Uruk phase, settlement clustered in the Amarna Valley, with the Sajur Valley rather more sparsely settled, and on the high plains to the west of the survey area (Figure 5.22). There was no settlement on the floodplain between Carchemish and Amarna. The presence of these two sites at the point at which major wadis fed into the Euphrates, along with the site of Duluk (LCP_2) at the mouth of the Sajur, suggests access to and control of riverine trade and communications was of some importance. The alignment of sites along the Amarna in the LC1-2 suggests a possible route-way running East-West to Tell Amarna. A river crossing point may also have existed between Duluk and Tell al 'Abr dating back to the Ubaid period when both sites were first occupied (Hammade and Yamazaki 2006). These systems seem to have been replaced, or at least competed with, during the Uruk phase. Jerablus Tahtani and Shioukh Fouqani both rose to prominence during this phase, although a small site at the former may have existed during the Late Chalcolithic (Peltenburg et al. 2000), and represent a paired site complex.

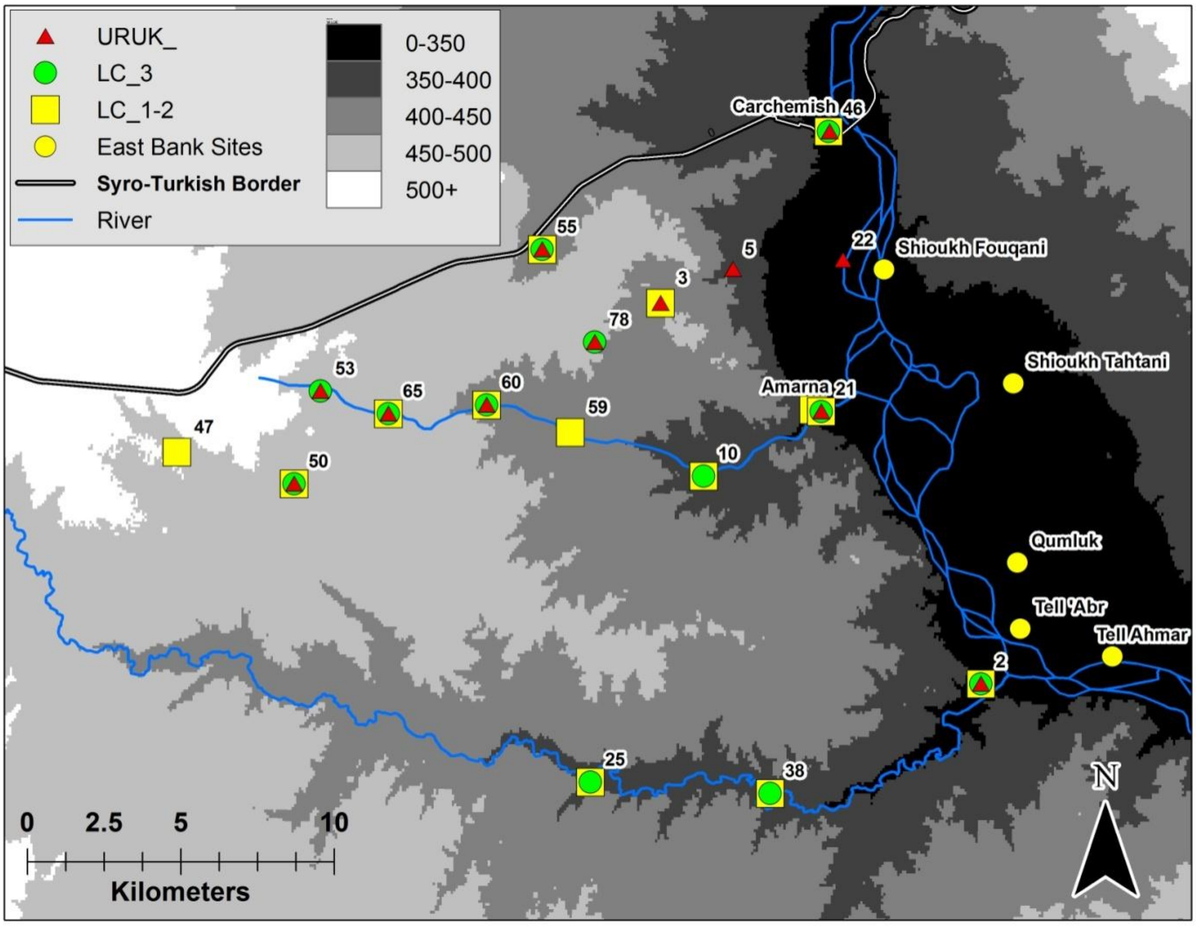


Figure 5.22: Site Locations for the Late Chalcolithic and Uruk Phases in the LCP. Background: Contour map derived from SRTM acquired February 2000

Excavations at both sites revealed very small exposures of Uruk deposits due to the depth of overburden from later phases (Morandi Bonacossi 2005; 134; Wilkinson et al. 2007a; 228), meaning little can be said about the nature of these occupations. The presence of BRBs and related ceramics in well sections surrounding the main tell and in surface collections has been interpreted as evidence for the presence of a significant lower activity area, pushing the total occupied area during the Uruk phase to 12 hectares (Wilkinson et al. 2007a). However, excavations in this area revealed no architectural remains and the precise nature of the settlement remains inconclusive. I have assigned the main tell to the Uruk phase but it should be noted that the site was almost certainly substantially larger. Inland from Jerablus, the Halaf site at Tashatan was re-occupied and there is a clear alignment of sites with Uruk ceramics leading inland as far as the survey has so far progressed. Although these sites do not all include the full range of Uruk ceramics, and interestingly there appears to be an absence of BRBs in the western sites, clearly Uruk types are discernible in all the assemblages. Some of these inland sites were already settled during the Late Chalcolithic but the absence of settlement at the upland sites between the Euphrates and the Amarna mean the alignment is only really visible during the Uruk phase. Interestingly, no Uruk ceramics were discovered in the eastern parts of the Amarna valley, implying either a shift from the LC1-3 pattern of settlement or, if local ceramics continued to be used, that southern influences were for some reason bypassing this area. The Duluk-Tell al ’Abr pairing continued to operate as both have Uruk ceramics but this may have been as a way of controlling predominantly riverine transport since no sites on the Sajur yielded Uruk remains. Uruk interactions in the area, whether undertaken directly by southern populations or through trade and exchange, were clearly complex.

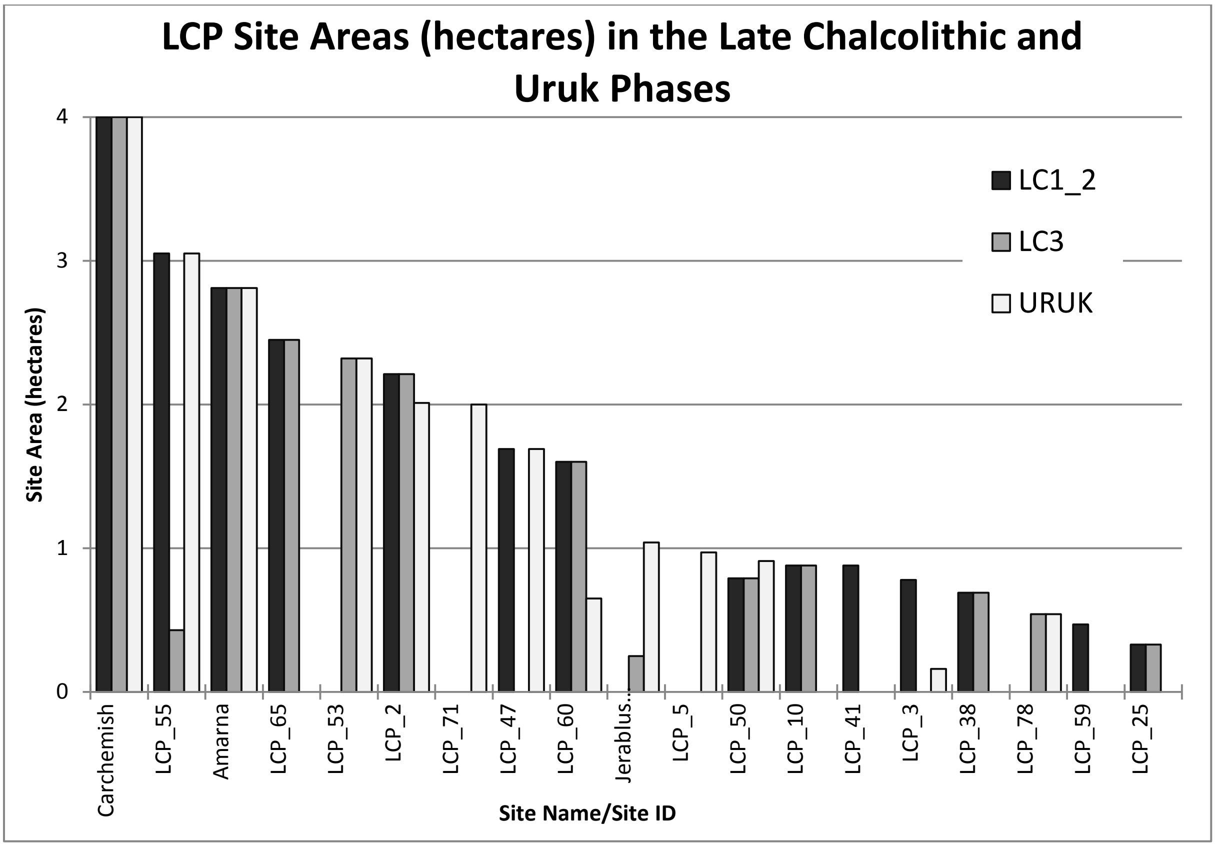


Figure 5.23: LCP Site Areas (hectares) in the Late Chalcolithic and Uruk Phases

The Early Bronze Age in the Land of Carchemish Project

There is a high degree of continuity between the Late Chalcolithic and Uruk phases and the EEBA. No new sites were founded and the pattern of occupation continues, with an alignment from Jerablus Tahtani inland (Figure 5.24). Two of the small tells along the Amarna founded in the Late Chalcolithic were re-occupied, as well as the conical tell at Dadate on the Sajur. Excavations at Shioukh Fouqani have revealed planned streets and evidence of specialisation during this phase (Quenet 2007) and a cylinder sealing with possible connections to Byblos and Jebel Aruda has also been found at the otherwise ‘unsophisticated…village’ of Jerablus Tahtani (Peltenburg 1999; 100). This evidence, combined with the sophisticated and stratified EEBA graves from the citadel at

Carchemish, suggests the continuation of a degree of social complexity in the period immediately following reduced contact with the Uruk world.

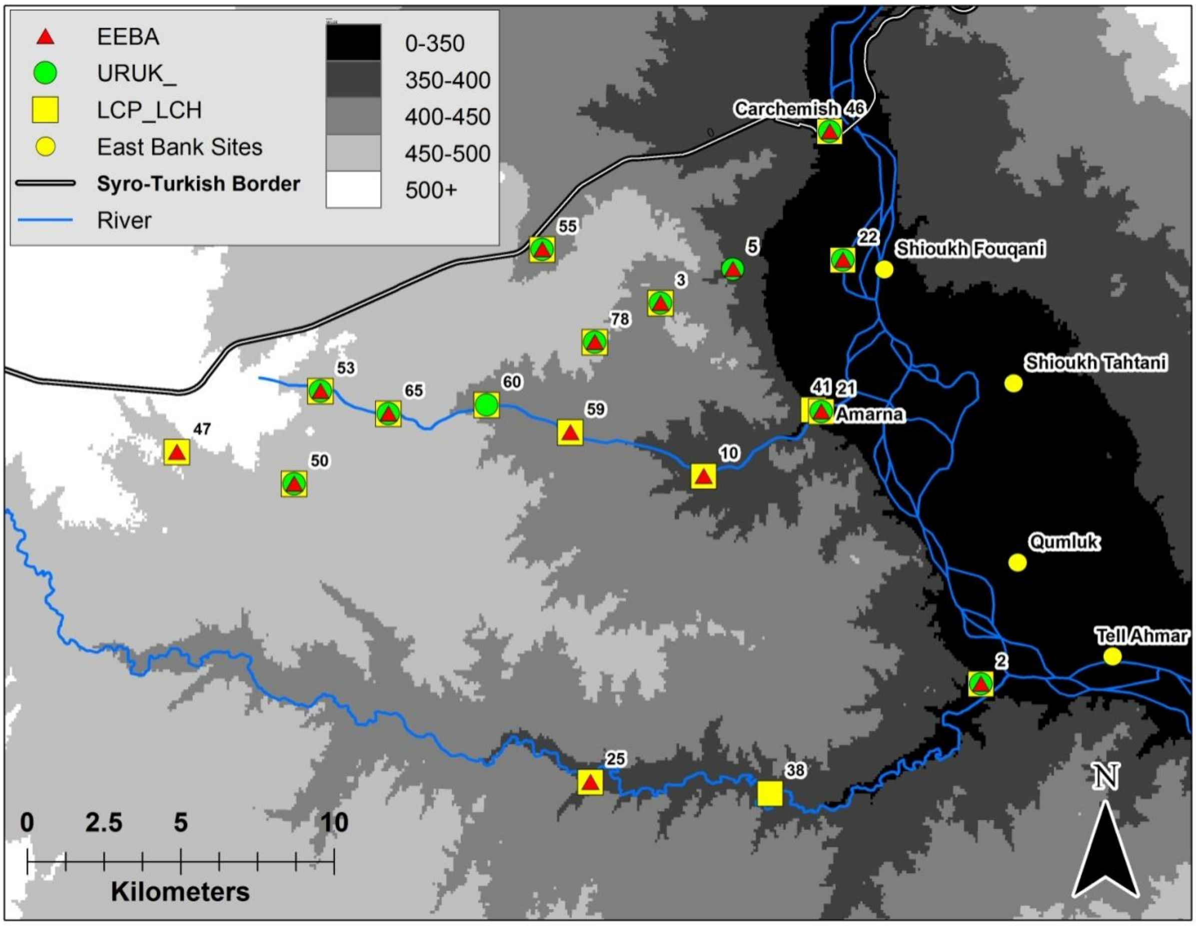


Figure 5.24: Site Locations in the EEBA with previous occupied phase. Note no new sites were founded during this phase. Background: Contour map derived from SRTM acquired February 2000

The MEBA phase most likely sees the development of a true urban centre at Carchemish and, like the Samsat-Lidar sector, a rise in both site numbers and total occupied area. However, the overall pattern of settlement is not affected by whatever developments were occurring at Carchemish, with all save one of the conical tells on the Uruk/EEBA alignment and along the Amarna continuing to be occupied. New sites were also founded, often only discernible in the survey as trace occupations on later settlements such as at sites LCP_56 and LCP_61, breaking the pattern of continuous tell occupation set in the Chalcolithic (see Figure 5.25). The correlation between occupations on the conical tells and the MEBA, combined with evidence from Jerablus Tahtani and elsewhere, might be taken to suggest the distinctive shape of these smaller sites result from fortifications constructed during the phase. A fortification wall was constructed at Jerablus Tahtani during the MEBA, with further walls and a massive glacis added within the phase, whilst walls were also constructed at Tell Shioukh Tahtani (Peltenburg et al. 1996; Peltenburg et al. 2000). Such large constructions cannot fail to have affected the visual character of the settlement at the time (Peltenburg 1999; 101) but they may also have affected the present-day appearance of the tell by acting as retaining walls to prevent erosion and allow the site to maintain a high conical shape.

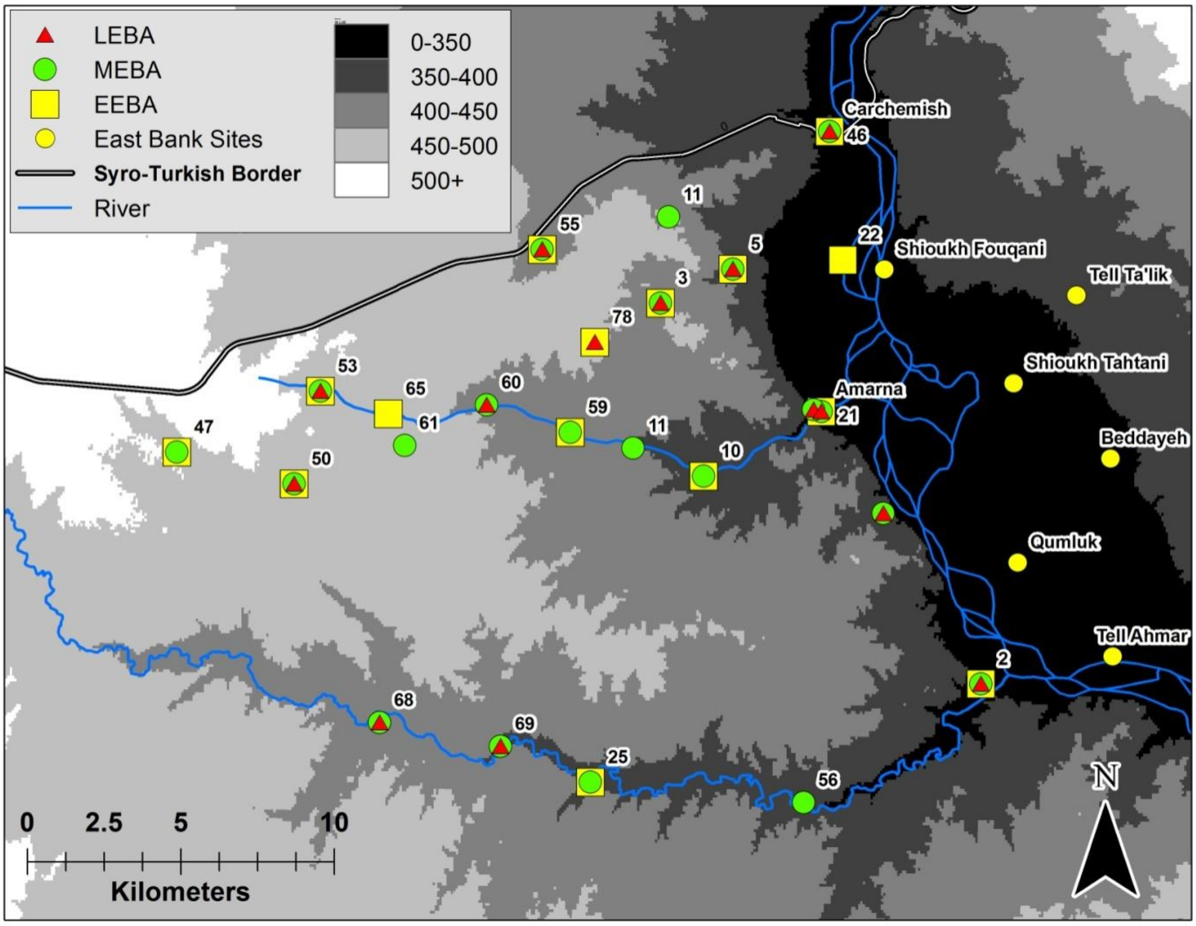


Figure 5.25: Site Locations in the EEBA, MEBA and LEBA phases. Background: Contour map derived from SRTM acquired February 2000

The relationship between the MEBA, fortifications and conical tells can only be fully understood through the excavation of these small sites but the correlation is intriguing. One niggling question concerns the degree to which Jerablus Tahtani can be considered representative of this type of site, given its proximity to Carchemish and the presence of monumental architecture such as Tomb 302 (Peltenburg et al. 1996; 13-14). Overall, the MEBA seems to be a phase of settlement expansion, although not to the same degree as in the Samsat-Lidar sector, with contrasting trajectories of possible fortification at the tell sites and the founding of very small ephemeral settlements on the Sajur. The expansion of Carchemish during this period mirrors that at Titriş and may have been similarly rapid. However, the current state of research at the site precludes more detailed comparisons. Analysis of the LEBA must be undertaken with caution as the diagnostic ceramic types are rather unclear and there may be a high degree of pottery continuity between the MEBA and LEBA phases (Ricci, pers. comm 2011). Settlement during this phase experiences a slight decline from the preceding MEBA phase. No new sites were founded and the tells along the Amarna were once again abandoned, whilst the Sajur remains relatively sparsely settled. Control of the river remained important, attested by occupations at Duluk, Amarna, Jerablus Tahtani and LCP_1, and settlement continued at the sites along the East-West route-way. As with the preceding phases, no settlement hierarchy can be established beyond the presumed pre-eminence of Carchemish (Figure 5.26).

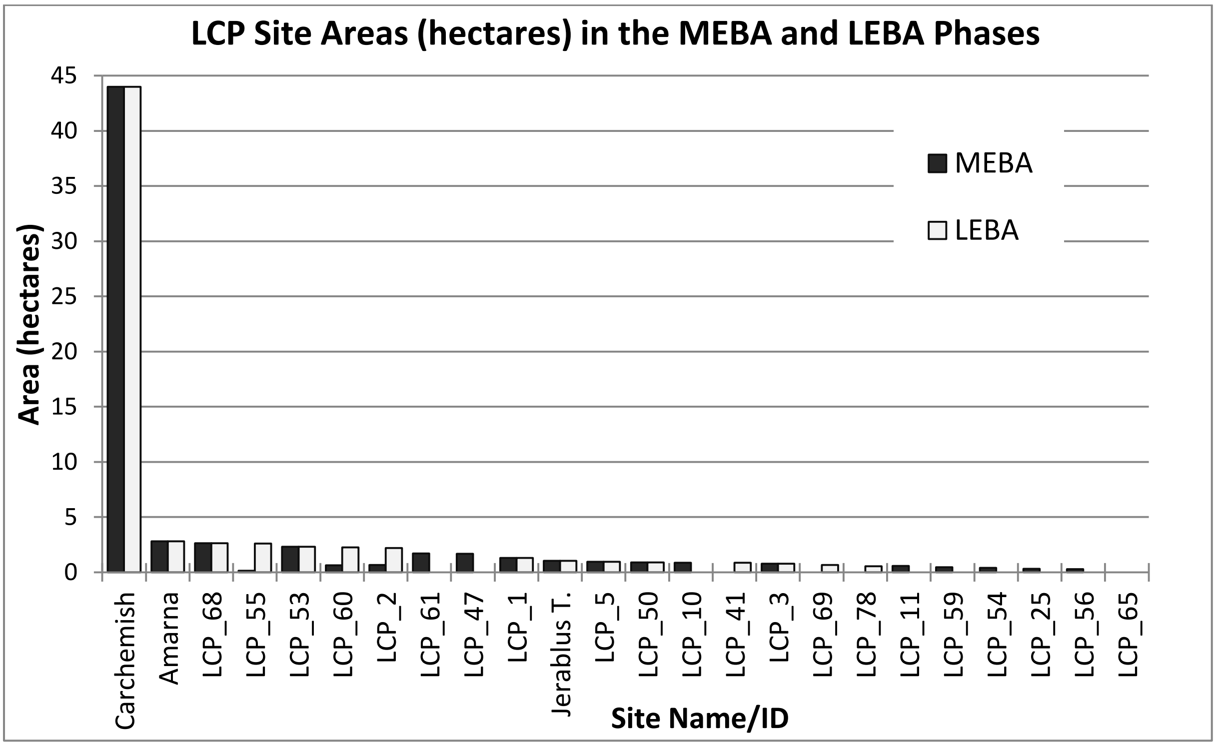


Figure 5.26: LCP Site Areas (hectares) in the MEBA and LEBA Phases

Trends in the Land of Carchemish Project

The most obvious trend through the fourth and third millennia in the LCP area is one of stability. Two phases of site foundation, one in the earlier part of the Late Chalcolithic and the other during the Uruk phase, produce a network of small sites aligned along the river valley and a single east-west routeway. This pattern continues, with some fluctuations, for approximately two thousand years. In the phase-based graph below (Figure 5.27), the relatively high degree of precision in dating is reflected in the proportions of relative certainty. The LCP has managed to subdivide all sites to a significant degree, meaning there are few ambiguous sites with lower levels of relevance. The main area of chronological confusion lies between the Uruk and the EEBA. This reflects a genuine overlap in ceramics and therefore possible settlement (Cooper 2006a; 8-9). On the whole we might assume that a few sites occupied during the latest Uruk phase may be contemporary with the earliest EEBA phase, such as Tell Hadidi and Tell Hadji Ibrahim further south, but this is probably not a common phenomenon given the respective lengths of time involved. Across the period, settled area remains fairly constant at around 20 hectares prior to the MEBA and then jumps to over 60 hectares. The vast majority of this jump can be attributed to Carchemish, and therefore the uncertainties involved in estimating its size during the EBA.

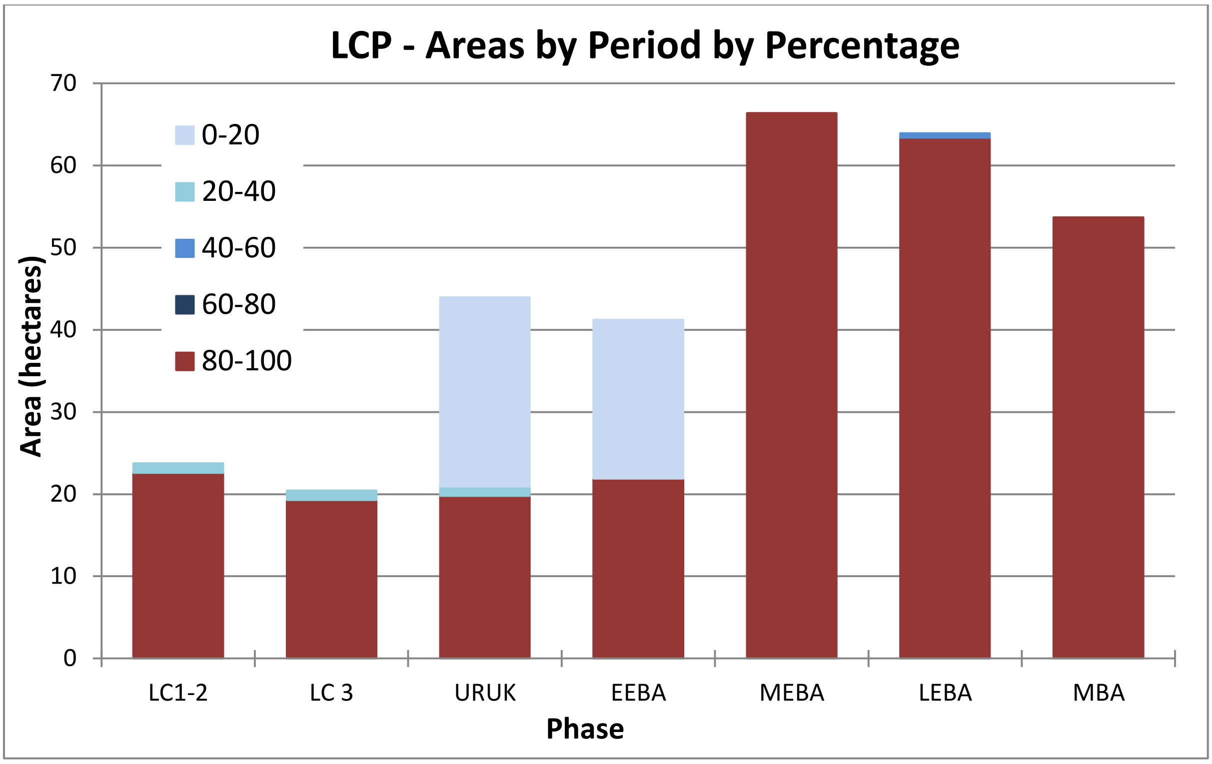


Figure 5.27: LCP Area Settled Area by Phase by Percentage Relevance

This is clear from the timeblock graph (Figure 5.28). With the exception of a small spike between 3100 and 3000 created by the overlapping Uruk and EEBA phases, total settled area remains fairly stable. There is then a slight increase in the MEBA and LEBA, although nothing like the explosion in settlement seen at Titriş during the same periods, and finally a drop in settlement during the MBA.

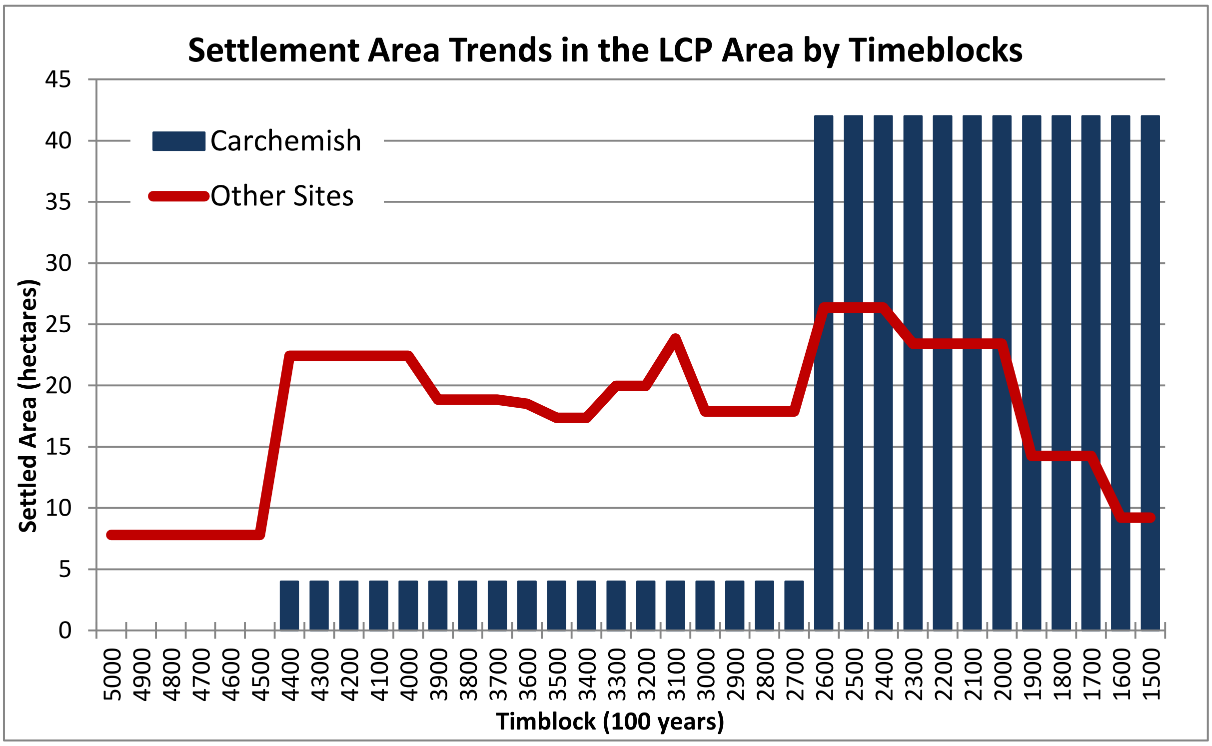


Figure 5.28: Settlement Area Trends in the LCP by timeblocks

Again as with Titriş, the emerging urban centre does not seem to have drawn in local populations, at least not during the EBA. It is possible that the decline in settlement during the MBA and LBA may have been the result of this process, and this hypothesis has been suggested for individual sites such as Jerablus Tahtani (Peltenburg 1999; 103). Certainly the settlement pattern during the MBA differs markedly from the preceding LEBA, with settlement moving away from the east-west alignment and the Amarna, a generally dispersed pattern and a greater emphasis on north-south routes (Figure 5.29).

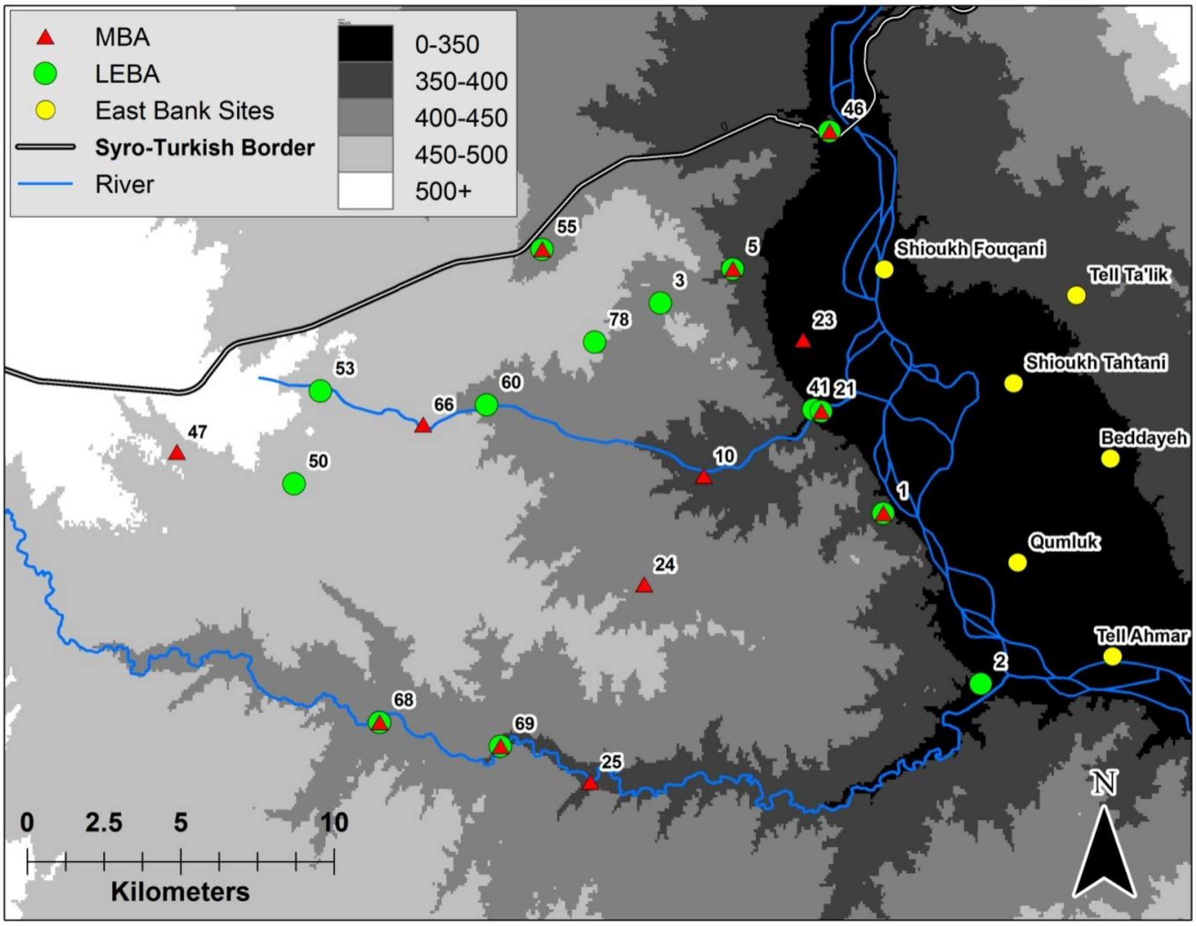


Figure 5.29: Site Locations in the LEBA and MBA phases. Contour map derived from SRTM acquired February 2000

Remote Sensing and Settlement Extrapolation in the Land of Carchemish Project

The preponderance of high conical tells within the LCP area provide an opportunity to make use of remote sensing techniques to expand the settlement pattern. Such tells appear very clearly on the GeoEye and CORONA imagery and can therefore be easily identified and mapped. Tells discovered on imagery cannot be dated but by extrapolating from the LCP dataset we can begin to quantify the likelihood of occupation during individual phases. The LCP area is a useful case study for this type of approach because settlement is so overwhelmingly concentrated on tells during the fourth and third millennium (see Table 5.1). Figure 5.30 shows all anomalies described as tells with a rating of Medium or High in the imagery sites classification system described in Chapter 3. Almost all of these anomalies appear to be very similar to the small tells recorded on the plain within the LCP survey area. If we assume that these tells are part of a similar network, and here we should remember the arbitrary nature of the northern survey boundary based on a modern international border, we might extrapolate from the dating of the tells within the LCP to those outside it.

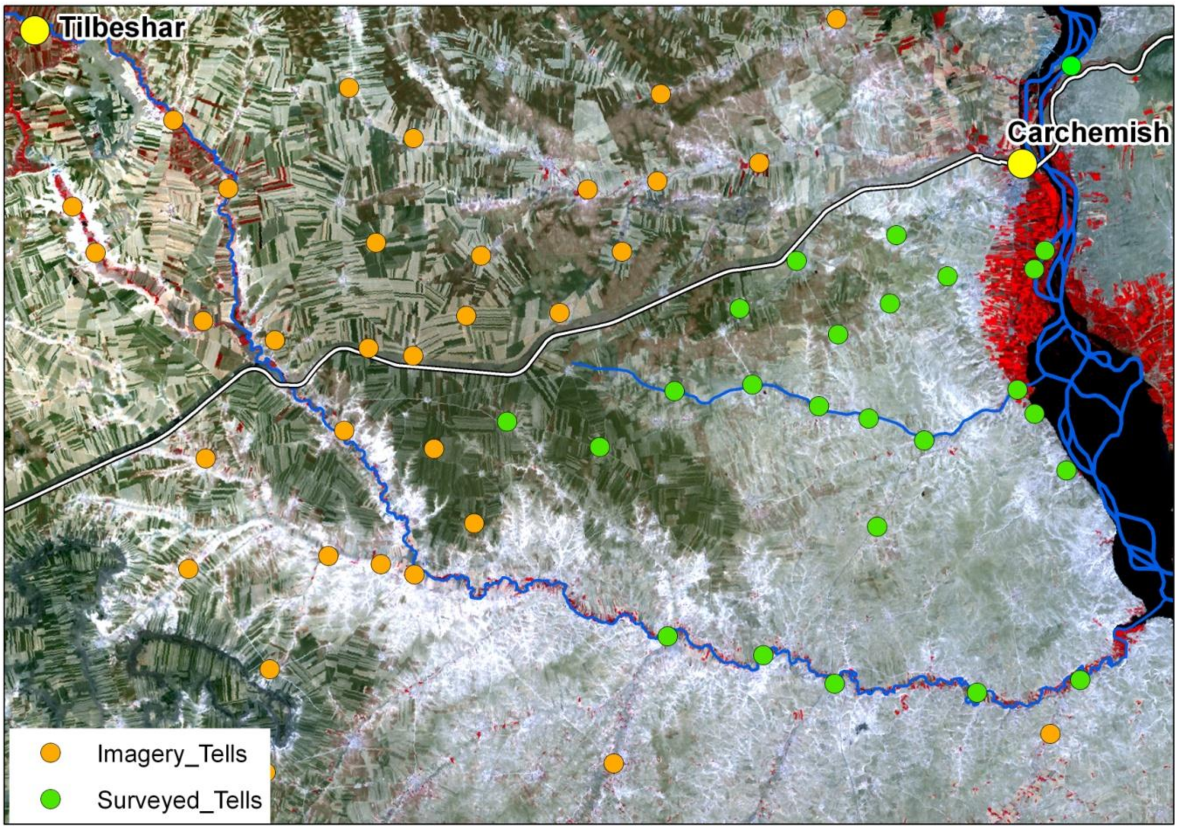


Figure 5.30: High and Medium level tells visible on CORONA and GeoEye imagery, along with tells visible on imagery in the LCP area. Landsat ETM+ image acquired 07/04/2004 displaying bands 4, 3, 2

To do this we need to know both the likelihood that any given tell will have been occupied during a phase. It is also useful to know how likely the settlement pattern visible to us on the imagery is to represent the complete pattern. We can calculate both of these from the LCP data by assessing the number of tells visible on imagery occupied per phase in relation to the total occupied sites in that phase and the total occupied tells across the phases (Table 5.2). For the EEBA, 10 of the 15, or 66.67%, of the tells visible in the LCP were occupied. Extrapolating this to the wider area, we can suggest that two thirds of the tells visible only on imagery would have been occupied during the EEBA. The second percentage gives the number of occupied tells during a phase over the total number of occupied sites. This gives a measure of the completeness of the pattern we are seeing. For the EEBA, then, sites visible on imagery account for just over 71% of the settlement pattern, meaning we are probably missing around 30% of EEBA settlements in the extrapolated area. Percentages such as these should not be applied mechanistically but they do allow for the beginnings of an interpretation to emerge by working from the known to the unknown. The very high figure for tell occupation during the MEBA of 93%, for example, suggests the settlement pattern during that phase may come closest to resembling that depicted in Figure 5.30, with a very dense network of small tells occupying the plain between Carchemish and the large city of Tilbeshar. If nothing else, imagery analysis allows us to say that it is highly likely settlement continued much further from the river than excavated sites, and even survey evidence, has so far documented.

Phase	LC 1-2	LC 3	Uruk	EEBA	MEBA	LEBA	MBA
Total Sites Occupied	13	12	13	14	20	15	10
Number of Tells visible on imagery	9	7	9	10	14	10	6
Total Tells	15	15	15	15	15	15	15
Occupied Tells/All Tells (%)	60	46.67	60	66.67	93.33	66.67	40
Occupied Tells/All Sites Occupied (%)	69.23	58.33	69.23	71.42	70	66.67	60

Table 5.2: Extrapolating from survey to imagery data. Tell and Non-tell based settlement by phase in the LCP

The Sweyhat Survey and Upper Lake Tabqa field data set

The SS and ULT cover a portion of the Tabqa sector, the southernmost opening in the Middle Euphrates Valley. Two surveys were undertaken in the Sweyhat region during the 1960s in advance of the construction of the Tabqa Dam (Rihaoui 1965; Van Loon 1967), both of which concentrated on narrow strip of land which was likely to be flooded. The SS and ULT surveys are treated together here because they cover adjacent areas and were published in the same volume (Wilkinson et al. 2004). However, the two surveys are rather different in intensity and scale. The SS covers approximately 60 square kilometres of the east bank of the Euphrates, extending inland up to 16km (see Figure 5.31) and was conducted over three seasons as an intensive survey in the manner of the main group one surveys described in Chapter 3. A wider series of field visits, combined with information from Van Loon's survey and published excavation reports for sites in the corridor of land along both banks of the river affected by the construction of the Tabqa Dam were collected into a gazetteer by Clemens Reichel and make up the ULT (Wilkinson et al. 2004; Appendix B). These sites include many excavated in advance of the dam construction by a number of different teams using a variety of different methodologies and dating schemes (Reichel 2004; 223) and although the vast majority were informally visited by Wilkinson, direct comparison with the other surveys are problematic. We might rather consider the ULT as analogous to the 'Area of Interest' around the original KHS in which only the more prominent, usually meaning larger, sites were visited to gain a picture of the overall settlement pattern (Wilkinson 1990). As such, settled area data for the ULT will not be used for comparative purposes, since the detail available varies widely between sites and the probability of small sites and sites away from the river being underrepresented is too high. Within the SS area, two sites have been excavated, both of which date predominantly to the EBA. Tell es-Sweyhat was investigated for three seasons from 1973-5 under the direction of Thomas Holland and from 1989 by Holland, Richard Zettler and latterly

Michael Danti (Zettler 1997c; Holland et al. 2006; Danti and Zettler 2007). Danti also excavated the far smaller site of Tell Hadji Ibrahim and carried out limited survey in the upland plains to the east of Tell es-Sweyhat as part of his PhD dissertation (Danti 2000).

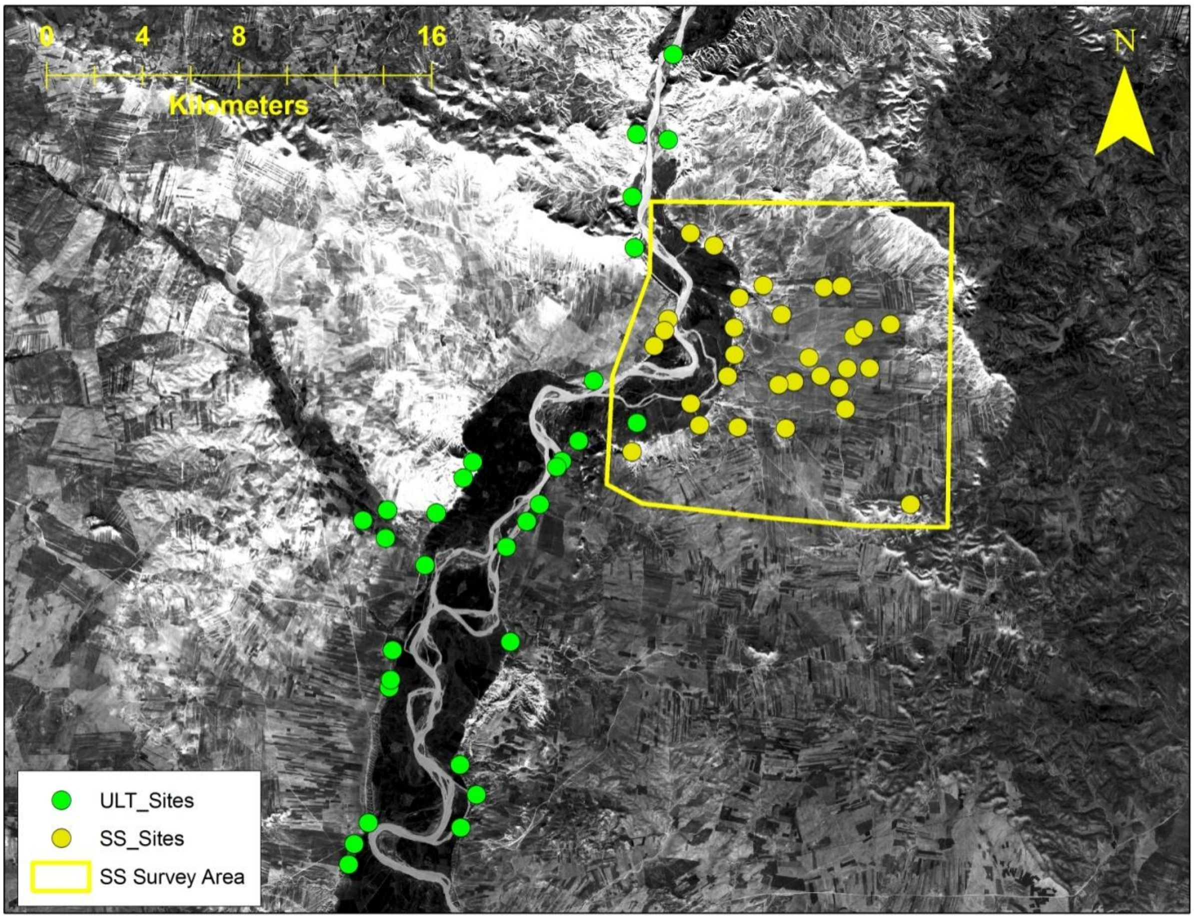


Figure 5.31: Areas covered by the SS and ULT surveys. Background image CORONA Mission 1068, acquired 22/01/1967, showing river level during the 1974 season before the up-filling of the reservoir behind the Tabqa Dam

Although published in 2004, the field visits upon which the SS and ULT are based were carried out in 1974, 1991 and 1992, predating the systematic use of GPS and GIS for survey purposes. Detailed sketch maps were only published for seven of the 30 sites (Wilkinson et al. 2004; 216-222) with rough versions for more sites drawn in the field notebooks. Site locations were inferred from geo-rectifying the general maps of the survey area in the published reports. All of this means the levels of geographical precision and boundary certainty are fairly low in comparison with the other surveys, despite the fact that many of the sites are more visible on the imagery (Figure 5.32). Again, boundary certainty and geographical precision are closely correlated for both surveys and across the categories. Interestingly, the ULT demonstrates slightly higher percentages of the higher levels of certainty and precision. This may be because the generally larger and more prominent sites such as those included in the gazetteer tend to be easier to define on the imagery, leading to an increase in certainty/precision. Overall the SS and ULT have the lowest levels of certainty and precision of any of the Middle Euphrates surveys. Lower levels of boundary certainty are to some degree mitigated in the area calculations by the fact that, unlike in the other surveys, areas were routinely calculated for each site in the field. This means we are less reliant on an accurate representation in the GIS to calculate the area. Lower levels of geographical precision remain an issue, however, and this should be taken into consideration in the distribution maps which follow.

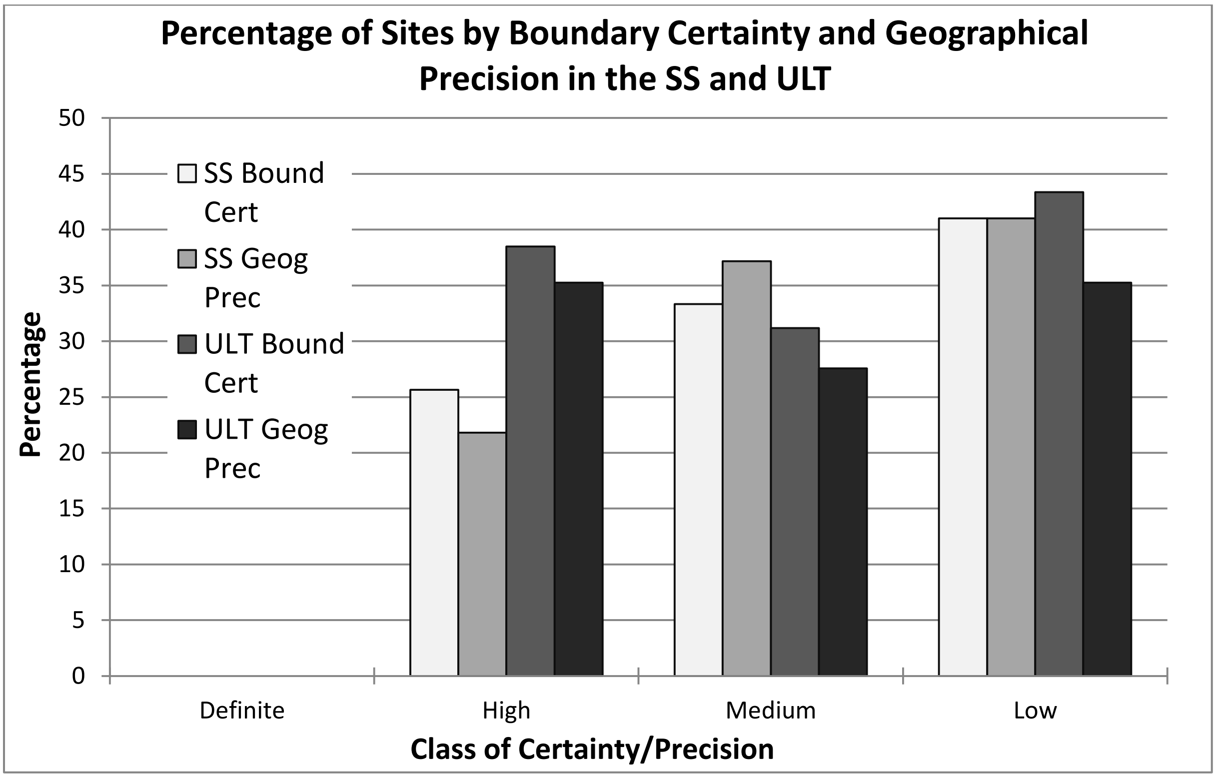


Figure 5.32: Percentage of Sites by Boundary Certainty and Geographical Precision in the SS and ULT

Geographical and Geomorphological Setting of the Sweyhat Sector

The geomorphology of the region has been discussed in some detail in the survey publication (Wilkinson et al. 2004; 19-35) and will not be discussed in detail here. Working outwards from the river, the floodplain gives way to low river terraces forming a wide and fertile plain, at the centre of which sites the main site, Tell es-Sweyhat. Further to the east, low limestone bluffs separate the plain from the Jaziran Plateau. These bluffs are clearly visible on the composite Landsat and CORONA image below (Figure 5.33) as a halo of bright white around the greener plain. The floodplain itself is now submerged by the waters of the Tabqa dam. However, by overlaying the Landsat onto the CORONA we can see the braided channel which was visible in the late 1960s. Most of this area could be classed as a zone of destruction due to the highly active Euphrates channel. However, as in zone 1 in the LCP area, a small section to the south east of Sweyhat can be dated to at least the Early Bronze Age through the presence of settlement, notably Tell Jouweif (SS_8) and the ULT site of Shams ed-Din Central tell (T_536) (Wilkinson et al. 2004; 22). The lower river terraces on both sides of the river are heavily irrigated and therefore dense in vegetation in the present day and consequently show up as red. On the west bank, the main terraces behind

Tell Hadidi give way to a heavily eroded limestone landscape, whilst to the east around Sweyhat the plain continues. In the bottom left hand corner of the image another dappled red area represents the beginnings of the highly fertile Jabbul plain which stretches west to the south of Aleppo. The occasional small areas of red on the Jaziran Plateau also represent modern farming practices, most probably pump irrigation, but also show the potential for small scale agriculture even in this marginal zone.

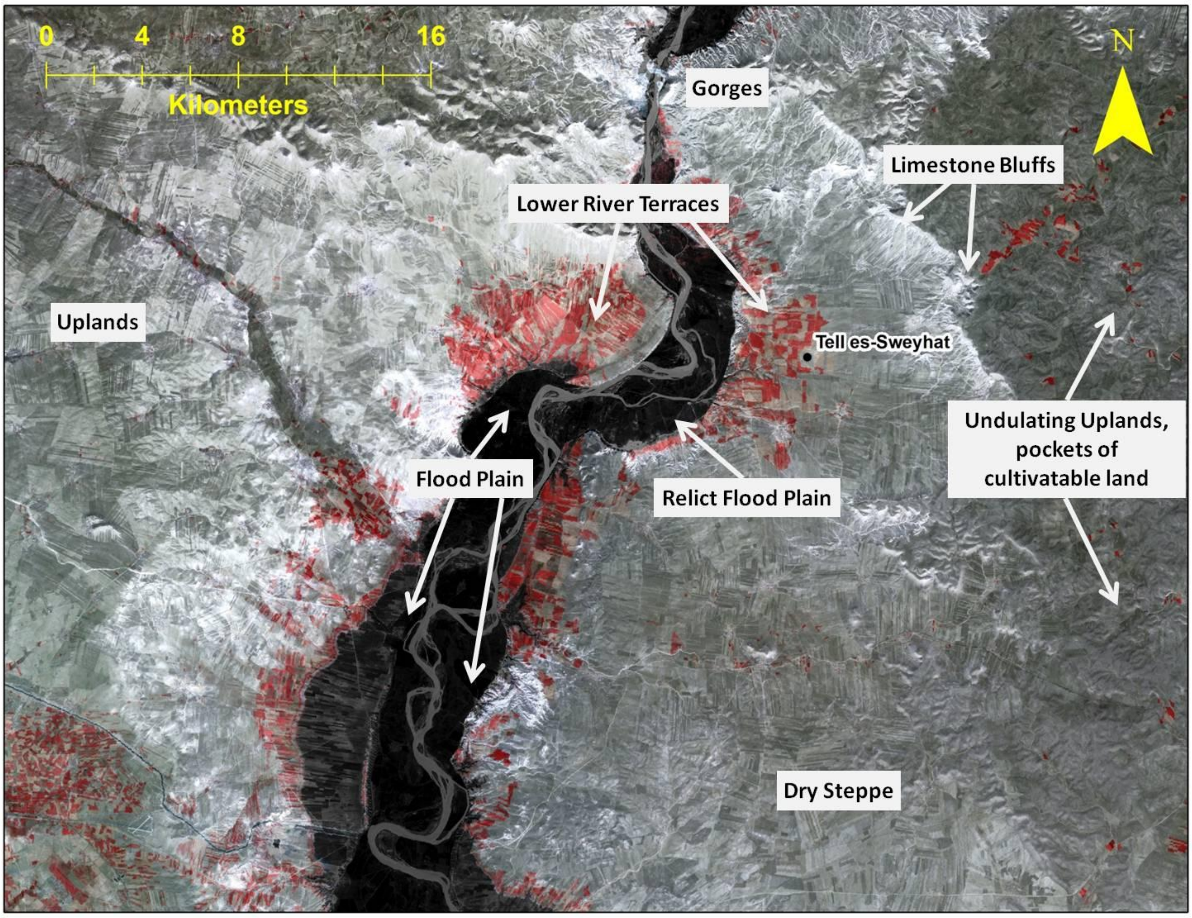


Figure 5.33: Geomorphological Zones in the Sweyhat Sector. Landsat ETM+ image acquired 07/04/2004 displaying bands 4, 3, 2 overlaying CORONA Mission 1068 image, acquired 22/01/1967. Dense vegetation is redder, lower level vegetation more green, eroded limestone white. Ground control provided by (Wilkinson et al. 2004; 19-30)

The Late Chalcolithic and Uruk phases in the Sweyhat Sector

Unlike the Samsat-Lidar and Carchemish sectors further to the north, settlement in the Sweyhat Sector prior to the EBA is very sparse (Figure 5.34). Ubaid and early Late Chalcolithic assemblages were discovered at adjacent sites on the west bank of the Euphrates (SS_25 and SS_30), suggesting a fairly large but diffuse settlement may have existed during the chalcolithic, perhaps extending onto the now eroded floodplain (Wilkinson et al. 2004; 135). Later Late Chalcolithic settlement, probably relating to the LC 3 phase, has been inferred at two sites situated on the lower river terraces, SS_13 and SS_19, due to the presence of Amuq F style chaff tempered ceramics. However, this dating should be taken with caution as the numbers of sherds were extremely small. No Uruk style ceramics were found in the surface assemblages collected during the SS.

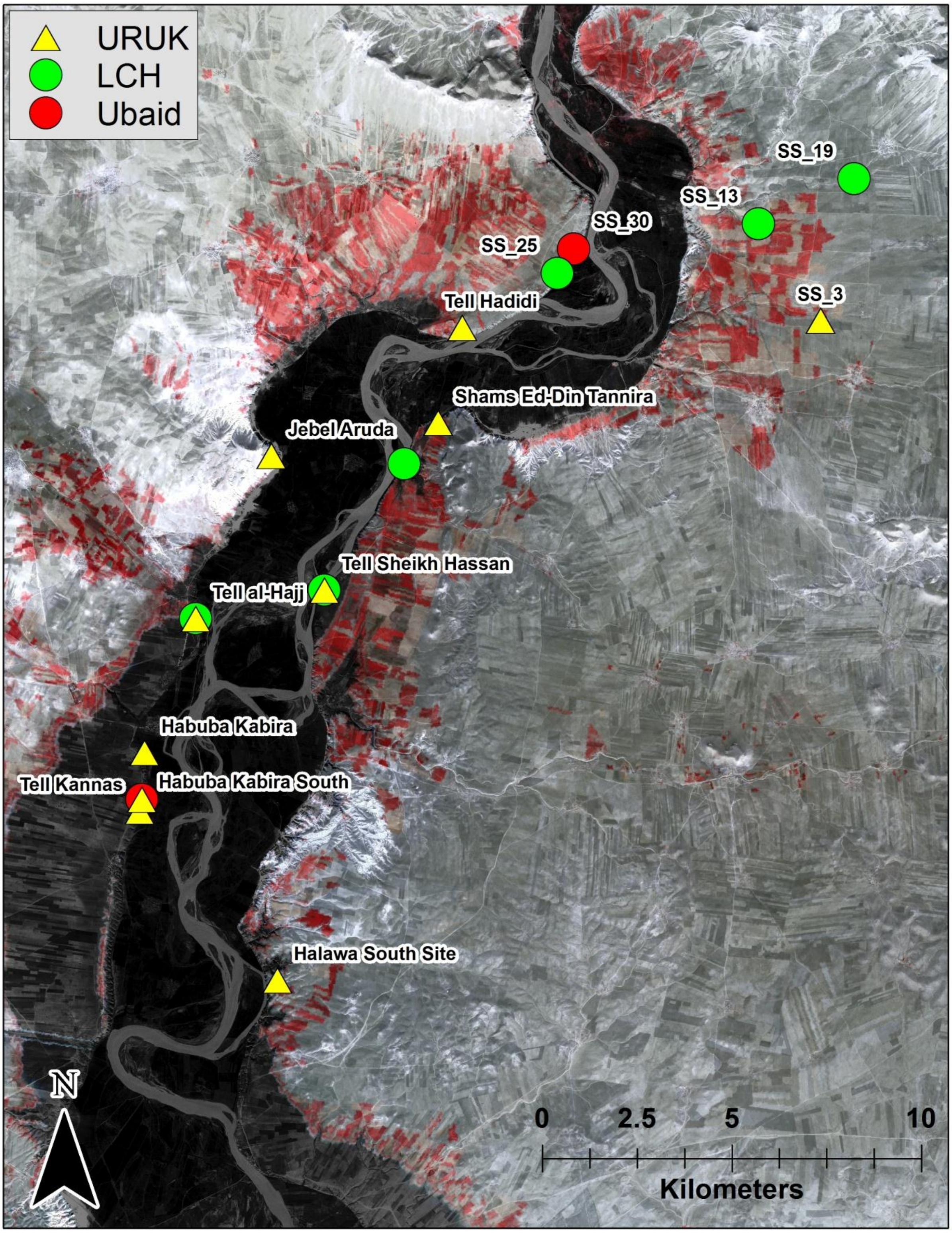


Figure 5.34: Ubaid, Late Chalcolithic and Uruk site locations in the Sweyhat Sector. Sweyhat Survey sites are labelled with the prefix SS, ULT sites are labelled by name. Landsat ETM+ image acquired 07/04/2004 displaying bands 4, 3, 2 overlaying CORONA Mission 1068 image, acquired 22/01/1967.

However, excavations at Tell Hadji Ibrahim (SS_3) did turn up a few BRBs in the lowest levels of the EEBA contexts, radiocarbon dated to the very end of the fourth millennium (Danti 2000). A more complete LC 5 assemblage, including highly diagnostic drooping spouts as well as BRBs, was discovered in the earliest levels at Tell Hadidi, again in conjunction with EEBA plain simple wares (Dornemann 1988; 16; 1990), although the ceramic record here is more difficult to interpret due to the Levantine chronology applied by the excavator. This would correspond to Phase 1 of the Cooper-Porter chronology (see Chapter 4), in which the last vestiges of the Uruk system persist into the EEBA. It seems, then, that there was no Uruk phase settlement within the SS. The paucity of Ubaid and Late Chalcolithic settlement is mirrored in the wider area, with one site from each phase. However, there is a stark contrast between the SS and the ULT during the Uruk period, where the so-called 'Uruk Triangle' of large sites, Jebel Aruda, Habuba Kabira/Tell Kannas and Sheikh Hassan, dominate the middle part of the Sweyhat sector. There were also smaller Uruk presences at Tell al-Hall, Shams Ed-Din Tannira, and Halawa South, along with the possible occupation at Hadidi, suggesting the existence of a potentially stratified Uruk enclave centred on the Habuba Kabira/Tell Kannas complex (Algaze 2005 [1993]: 29). Quite how such a system might have supported itself given the absence of sites in the fertile plains on either side of the river remains a matter of debate, although it should be remembered that the floodplain may have been used for agriculture and even settlement.

The Early Bronze Age in the Sweyhat Sector

Within the SS, the EBA offers a marked contrast to the sparse settlement of the preceding periods, culminating in the development of a fully-fledged urban settlement of at least 40 hectares at Tell es-Sweyhat by the end of the third millennium. Tell Hadidi, on the western bank of the Euphrates, attained an even greater size of some 56 hectares at some point during the EBA[19]. Taken together, these two sites represent the greatest concentration of urban settlement anywhere along the Middle Euphrates until Carchemish reached its height in the Iron Age. The EEBA settlement pattern mirrors that of the Samsat-Lidar sector in the immediate aftermath of the Uruk phase, with a dispersed pattern of small settlements across the plain. The largest of these was the newly founded site of Sweyhat, where occupation was constrained to the fortified high mound of around 5 hectares, with a cemetery to the north-west of the site (Danti and Zettler 2007; 180). Excavations at the small, square site of Tell Hadji Ibrahim (SS_3), occupied during the Uruk/EEBA transition and the earlier part of the EEBA, reveal a series of rectangular structures interpreted as silos for the storage of grain, along with a house and courtyard area with structures for grain processing (Danti 2000; 105-135). During the MEBA phase, Sweyhat grew to approximately 15 hectares and settlement shifted to accommodate the developing urban

[19] The excavations at Tell Hadidi used the Levantine (EB I-IV) chronology and as such are difficult to interpret in relation to the results from the SS. According to the excavators, the entirety of the 56 hectare site was occupied for significant periods during the EB III and particularly EB IV phases, roughly equating to the second half of the third millennium (Dornemann 1985; 54). It is still unclear whether this means both Tell Hadidi and Tell Sweyhat reached their maximum size simultaneously but we can be certain that both were decidedly urban in character contemporaneously.

environment. The small EEBA sites on the north side of the plain were abandoned and sites clustered around Sweyhat and on the routes to the river (Figure 5.35). There is a concentration of population in the centre of the plain. By the LEBA, a clear site hierarchy had been established with Sweyhat reaching its maximum extent and a small network of satellite villages at SS_5, SS_20 and SS_27 situated between 3 and 4 kilometres away, most probably so as to avoid settling on agricultural land in the vicinity of the largest settlement (Wilkinson 1994; 496). As at Titriş, the presence of an even field scatter of battered MEBA and LEBA sherds across this zone, especially on the fertile land towards the river, may be interpreted as evidence for manuring during this phase (Wilkinson 1982; 1994; Wilkinson et al. 2004; 144 Figure 7.7). Occupations continued at the sites along the Euphrates, including Tell Jouweif (SS_8) and SS_22, although the northern site of SS_17 was abandoned. Based on site size, it is difficult to establish a clear site hierarchy beyond the predominance of Sweyhat at any point in the EBA (Figure 5.36). We might draw a tentative distinction between the larger conical tells such as SS_22, SS_8 and SS_20 and the smaller, lower sites with similar morphologies to Tell Hadji Ibrahim (SS_2), such as SS_3 and possibly SS_5 (Danti 2000; 105).

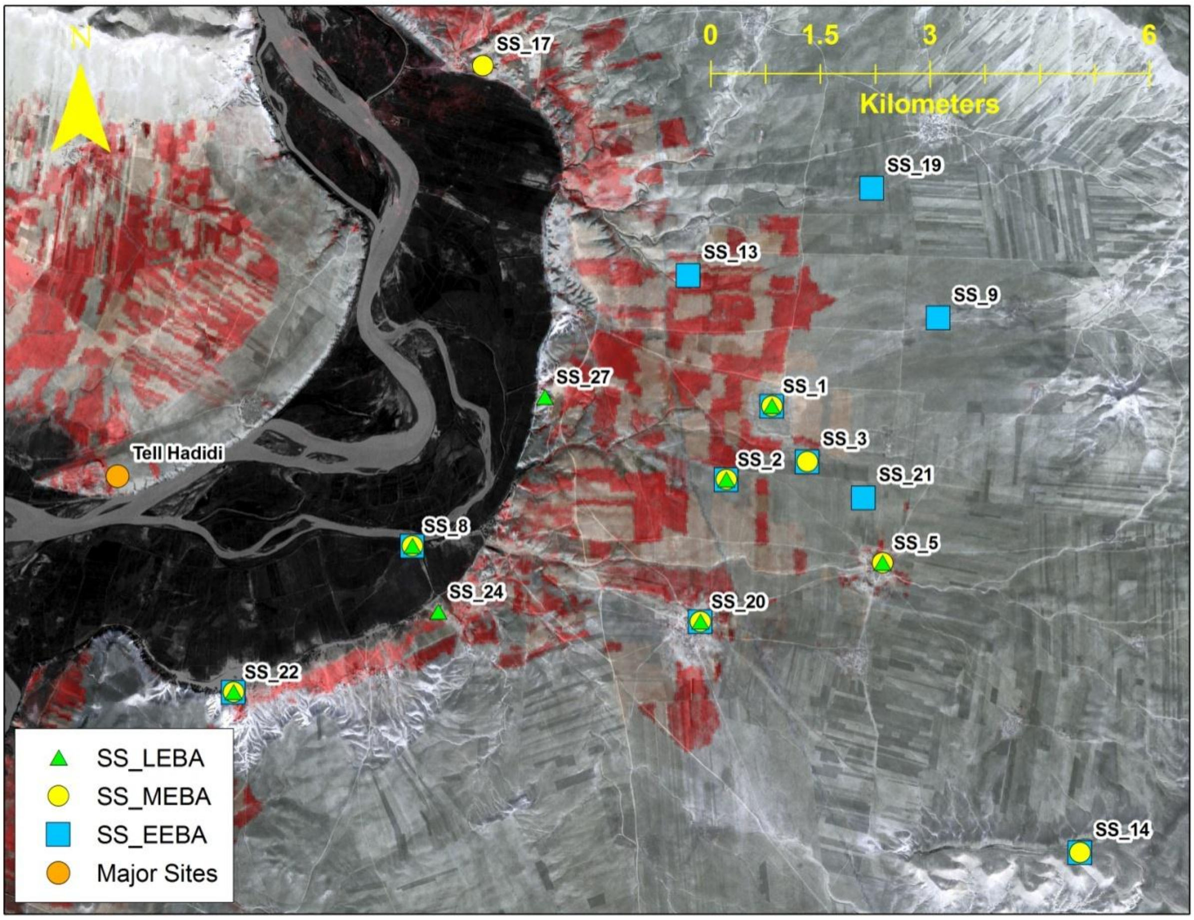


Figure 5.35: EBA site locations in the Sweyhat Sector. Landsat ETM+ image acquired 07/04/2004 displaying bands 4, 3, 2 overlaying CORONA Mission 1068 image, acquired 22/01/1967.

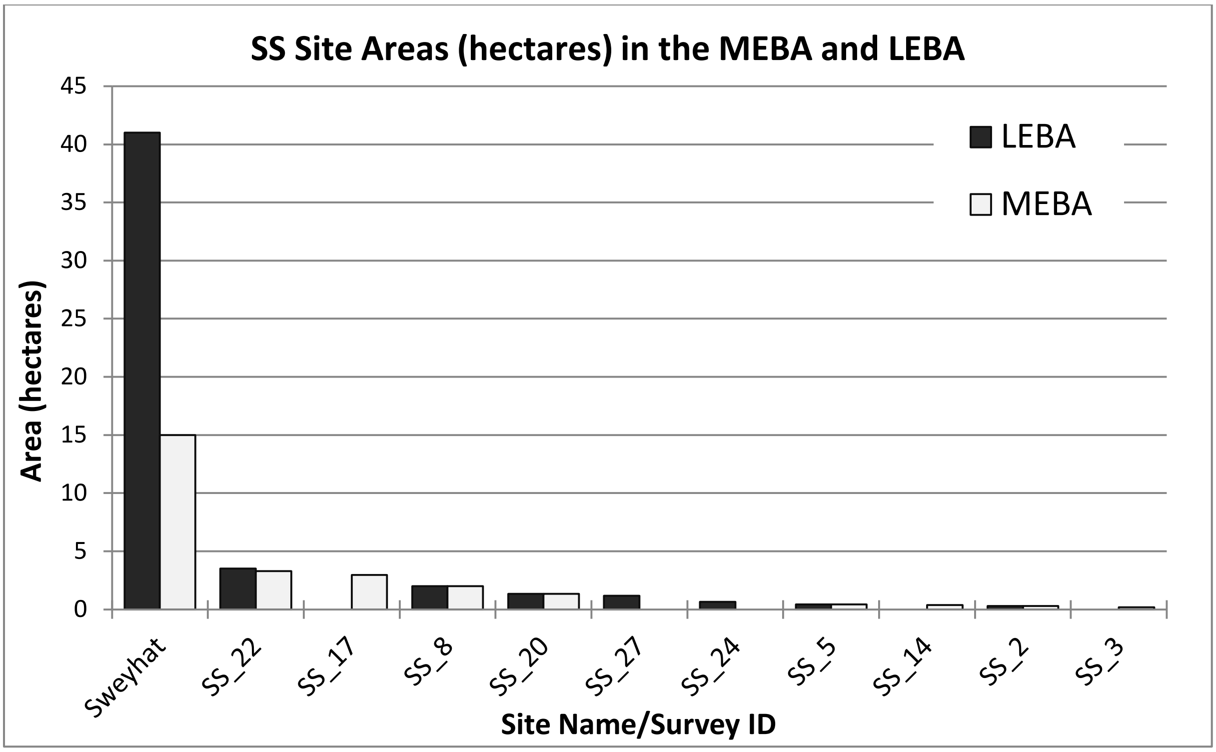


Figure 5.36: Site Areas (hectares) in the SS in the MEBA and LEBA phases

Evidence for fortification walls in the form of limestone blocks have been discovered at both SS_8 and Tell al-Abd (T_535) and this, coupled with their distinctive morphology suggest these conical mounds could be analogous to those found in the Carchemish and Samsat-Lidar zones further to the north. The final phases of the EBA and the beginning of the MBA are difficult to distinguish due to the continuity of ceramic types between the two phases. This uncertainty is critical in the case of Tell es-Sweyhat since it coincides with a period of rapid decline in settled area and urban characteristics. Excavations on the high mound revealed 'scattered and fragmentary buildings' in Phase 6, attributable to the very early second millennium (Armstrong and Zettler 1997), but surface collections in the lower town revealed no sherds later than the LEBA (Zettler 1997b). For the purposes of this discussion, it is assumed that the entire high mound was occupied during the MBA giving a settled area of 5 hectares, the same as that in the EEBA. This is almost certainly an overestimation but does at least capture the contrast between the later EBA and the MBA phases. Away from Sweyhat, the satellite communities on the plain founded in the MEBA and LEBA phases also decline, with no occupation at SS_20, SS_5 or SS_2. Unequivocal evidence for MBA occupation comes from sites along the river, including the long-lived Tell Jouweif (SS_8) and the LEBA foundations at SS_24 and SS_27. Across the river, the large, diffuse settlement at Hadidi is replaced by a heavily fortified citadel of some 15 hectares at the beginning of the MBA (Dornemann 1985; Wilkinson et al. 2004; 143).

The density of settlement in the SS and Hadidi, during the EBA is not mirrored in the ULT. The Uruk sites which made up the Uruk triangle were largely abandoned, with only the main tell at

Habuba Kabira still occupied during the EEBA, followed by a reoccupation at Tell Kannas during the MEBA. The gap left by this abandonment of a large swathe of the Sweyhat sector was not filled by any significant site until the Late Bronze Age.

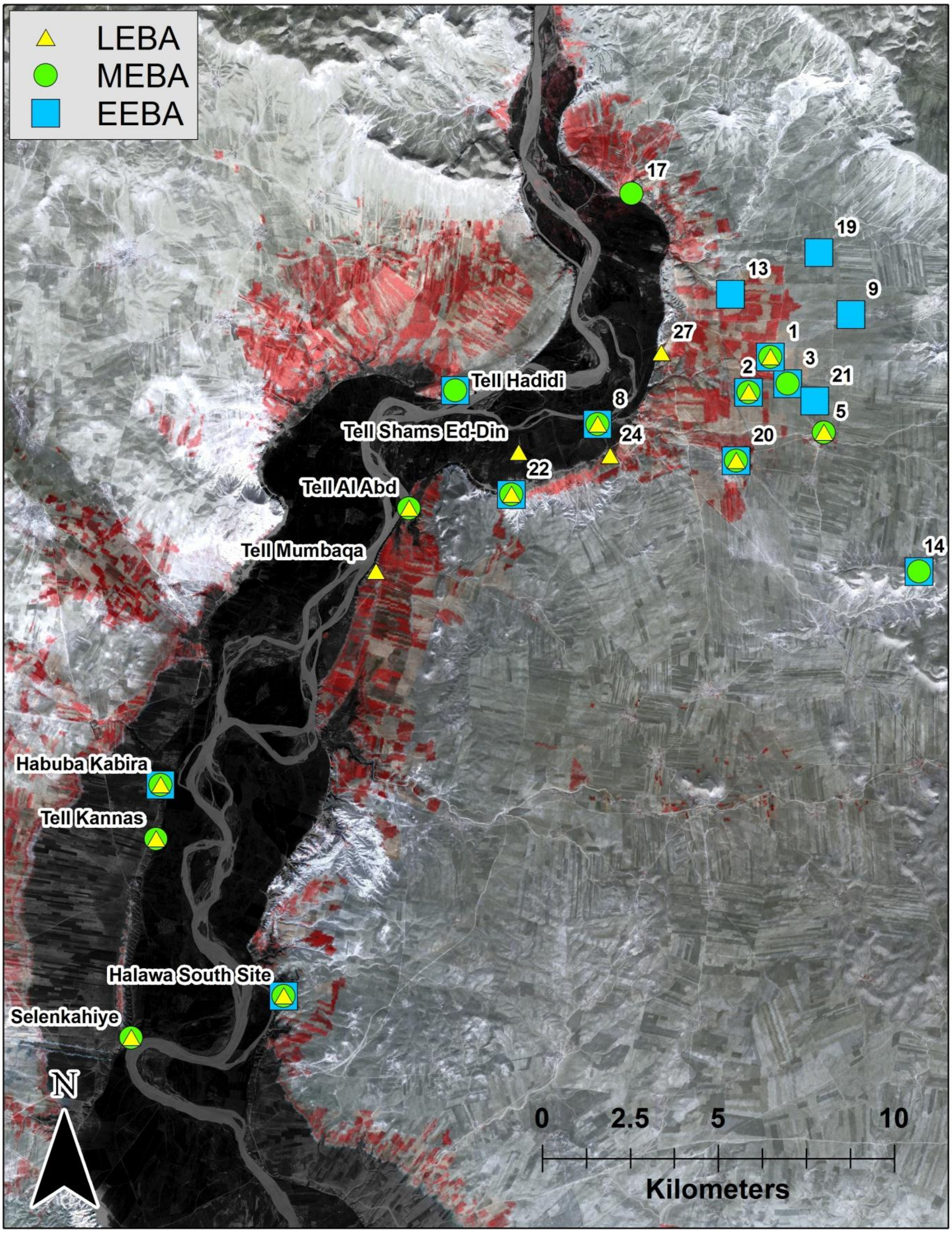


Figure 5.37: EBA site locations in the Sweyhat Sector. Sweyhat Survey sites are labelled by number, ULT sites are labelled by name. Landsat ETM+ image acquired 07/04/2004 displaying bands 4, 3, 2 overlaying CORONA Mission 1068 image, acquired 22/01/1967.

Further south, a similar pairing of sites to the Sweyhat-Hadidi zone developed to the south of the Habuba complex between Selenkehiye on the west bank and Tell Halawa on the east bank. Both of these may have reached between 15 and 20 hectares during the later part of the EBA (Reichel 2004), although as with the Sweyhat-Hadidi pairing there is insufficient evidence to assess whether the greatest spatial extents of both sites were contemporary with one another. No systematic survey has been conducted in the environs of these two sites but their position in a far narrower section of the valley, particularly on the eastern side, means any smaller settlements are likely to have been on the floodplain itself and therefore lost even before this area was submerged beneath the floodwaters of Lake Tabqa. Overall, it seems that settlement in the Sweyhat sector became concentrated around two paired systems over the course of the EBA.

Trends in the Sweyhat Sector

With the exception of the Uruk phase, where the overlap with the EEBA results in the possibility of contemporary settlement, the phases used in the Sweyhat survey are all based on well excavated and closely defined local sequences, resulting in little internal overlap (Figure 5.38). In contrast to the Carchemish sector, settlement in the SS fluctuates significantly from the Late Chalcolithic to the MBA. From very low levels of settlement in the Late Chalcolithic and Uruk phases (the potential overlap with the EEBA notwithstanding), total settlement increases over the course of the EBA before a sharp decline into the MBA back to around the level of EEBA.

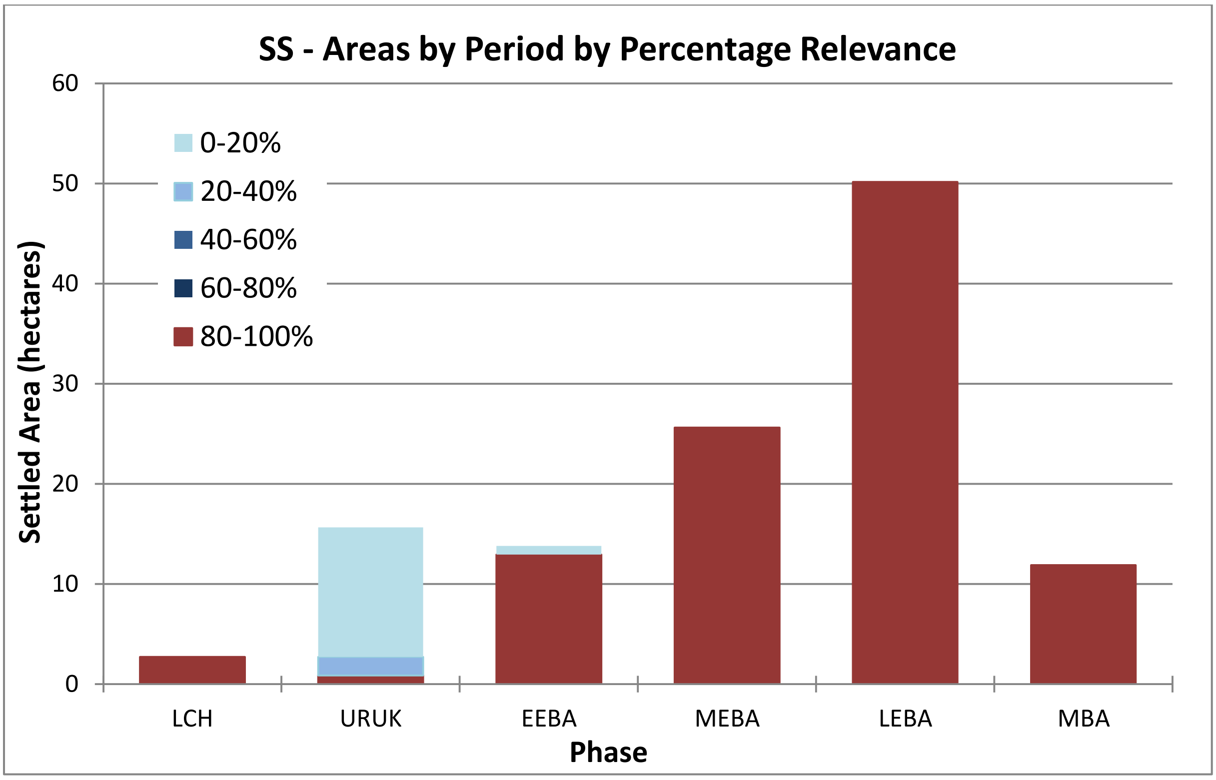


Figure 5.38: Settled Area by Phase by Percentage Relevance in the SS

Much of this fluctuation can be attributed to the dynamics of Sweyhat itself. We can see from the timeblocks graph (Figure 5.39) that settlement at the smaller sites remains fairly constant in the Late Chalcolithic and Uruk phases before a jump to just under 10 hectares which persists throughout the EBA and into the MBA. Sweyhat, on the other hand, grows from 5 to 15 and eventually to 41 hectares over the EBA before declining in the MBA. The growth of Sweyhat does have an effect on the settlement pattern, with the abandonment of three sites in the northern part of the survey area during the EEBA and the founding of satellite settlements around the site itself (see above). However, it does not seem to drastically affect the level of local rural population, as far as this can be inferred from settled area. The settled area for the small sites does rise slightly in the first phase of Sweyhat's expansion in the MEBA but there is no marked rise during the truly urban phase in the LEBA. It appears that two contrasting systems were in operation with rural settlement displaying a high degree of stability whilst the urban centre rapidly expands and contracts.

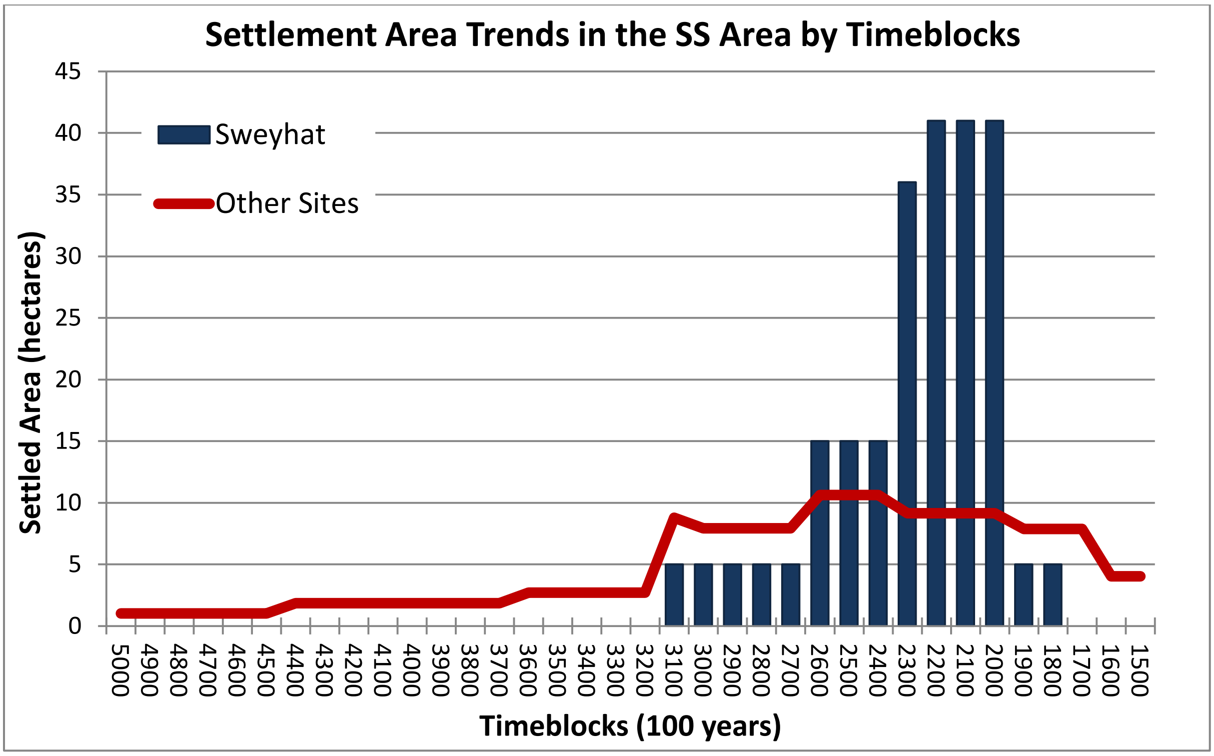


Figure 5.39: Settlement area trends in the SS area by 100 year timeblocks

Remote Sensing and Survey in the Upland Zone

The landscape in the vicinity of the Sweyhat sector is more akin to the rolling uplands in the Samsat-Lidar sector than the broad plain to the north and west of the LCP, resulting in similar problems of site recognition through remote sensing techniques. Furthermore, morphologically distinctive features, such as the high conical tells in the LCP, are less common within the survey and therefore extrapolation into the surrounding landscape, especially in regard to dating, becomes commensurately more tenuous. A program of anomaly mapping was carried out by Niko

Galiatsatos within the FCP project. Unfortunately this mapping was undertaken before the development of the certainty system for classifying imagery interpretation, meaning breaking down the interpretation of these anomalies into groups is not possible. However, we can make broader spatial classifications, especially through combination with surveys. Survey in the upland zone to the east of Sweyhat has been carried out by Danti (1997; 2000; 261-301). Danti's survey did not apply a full coverage methodology in the manner of the FCP surveys (see Chapter 3) but rather targeted specific landscape zones through sampling.

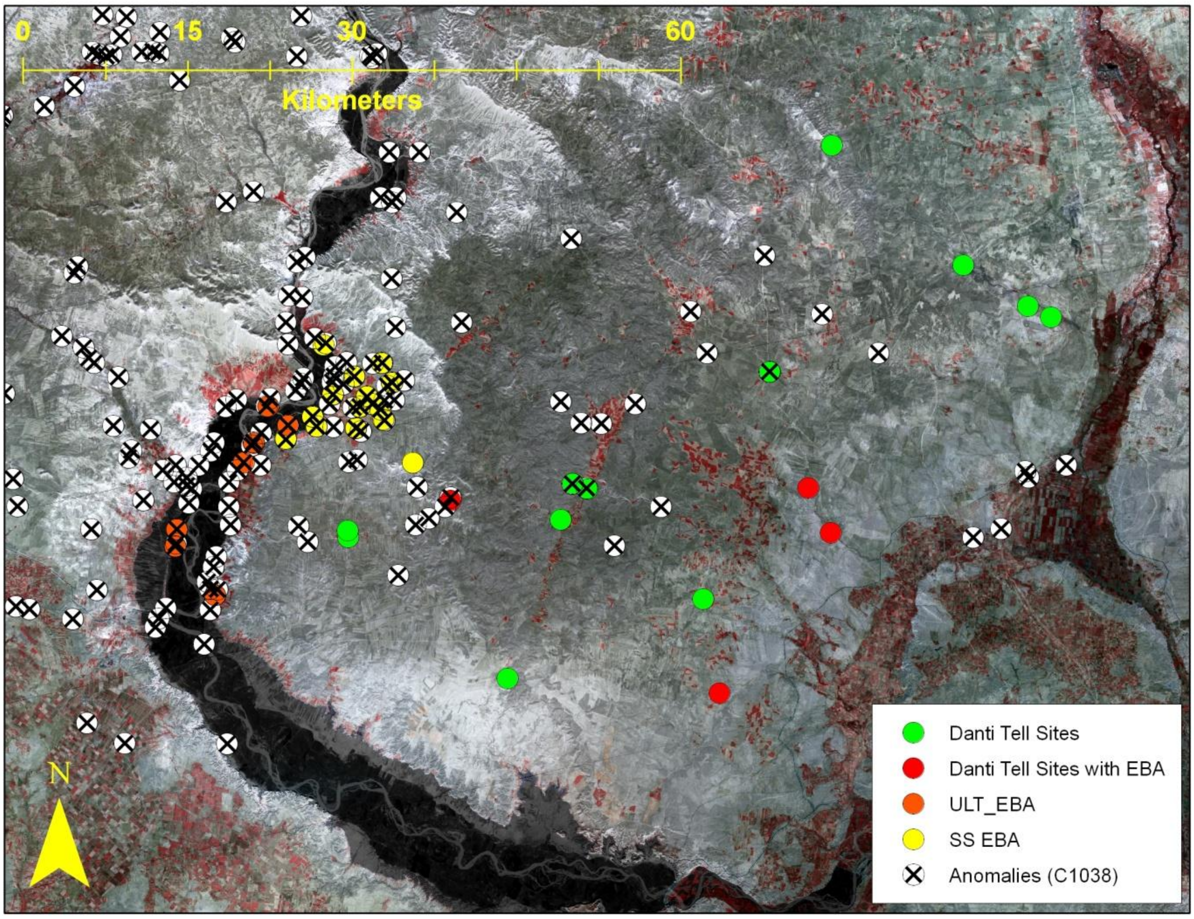


Figure 5.40: Mapped anomalies and surveyed site locations between the Euphrates Valley and the Balikh Valley. Landsat ETM+ image acquired ?? displaying bands 4, 3, 2 overlaying CORONA Mission 1068 image, acquired 22/01/1967.

Comparing results between the surveys in any meaningful way is rendered problematic due to these differing methodologies and the lack of published materials, including a site catalogue. Overall, fifteen tells were discovered, four of which can be dated to the EBA, along with an unrecorded number of sheepfolds and potential pastoral encampments and various clusters of tombs and tumuli (Danti 2000; 272). Comparing the survey record for the SS, ULT and Danti data with the imagery demonstrates the problem for remote sensing in the area (Figure 5.40). Anomalies are very common along the river valley and in the lowland plains but far scarcer in the uplands. Almost all the known EBA settlements in the SS and ULT were clearly identifiable on the imagery, along with a great many other anomalies, but only four of the fifteen tells in the uplands were visible. It seems likely that the landscape characteristics of the lowland plains and the river valley combined with the obtrusive nature of large and long-lived settlements mean that sites are relatively easy to spot. However, these conditions also produce large numbers of anomalies, particularly in the river valley, resulting in large numbers of false positives (recognised through their absence from the sites recovered by the SS and ULT surveys). In the uplands, by contrast, anomalies are far less common but the sites, which tend to be smaller and more ephemeral as far as they have been investigated, are also less visible.

Comparative Rural Settlement Patterns in the Middle Euphrates

There are a number of similarities in general settlement placement across the FCP surveys in the Middle Euphrates. These include:

- Sedentary (predominantly tell-based) settlement along the Euphrates and away from the river
- Paired Sites
- Reorganisation of settlement around larger centres in the EBA

An important discovery in the LCP, also paralleled in the Samsat-Lidar zone and to a lesser extent in the SS, is the presence of settlement outside the main Euphrates river valley (contra Cooper 2006a; 69). In the Samsat-Lidar and Carchemish sectors, sites cluster on the main tributary rivers and wadis but can certainly be said to represent a fairly dense continuum across the landscape. This pattern is also present in the SS during periods of dispersed settlement such as the EEBA, although it is rapidly skewed by the urban developments at Sweyhat. The ubiquity of such a settlement pattern, visible in all three surveys, means instances where it does not hold are of particular interest. The clearest examples of this which cannot be directly attributed to urban development come from the LCP, where the Sajur river valley remains relatively under settled throughout the 4th and 3rd millennia. The settlements within the Uruk alignment in the same region also appear to suggest a deliberate avoidance of the densely occupied Amarna river valley in favour of an overland route through the limestone upland areas to the north, perhaps so as to meet routes coming south from Carchemish. This can be compared to the Samsat-Lidar sector, where settlement between the Euphrates river valley and the plain around Titriş is concentrated along the smaller river valleys, particularly between Titriş and Lidar. It is possible that in some cases the fertile agricultural land and ease of transport afforded by river valleys was superseded by their role as political or cultural boundaries. Identifying such boundaries through the simple absence of settlement is somewhat problematic. However, that the Sajur may have operated as a frontier zone is supported by evidence for large Middle and Late Bronze Age fortresses on the southern side of the river (Eidem 2008a). These instances aside, however, it now seems clear that the model of the Euphrates valley as a narrow corridor of settlement surrounded by an unknown, and presumed unknowable, number of invisible nomadic pastoralists is unsustainable, particularly in the northern sectors.

Another phenomenon present in all three surveys is that of paired sites, although there is some difference in the scale and duration of these settlements. Paired sites clearly developed at key crossing points of the Euphrates but may also have provided a degree of control over the river at strategic locations. In the Samsat-Lidar and Sweyhat sectors, paired settlements appear to have developed in tandem with the larger sites. During the Late Chalcolithic and Uruk phases, Samsat lay directly between the Lidar and Gritille and Kurban and Bireçik pairs. During the EBA, all of these sites continued to be occupied with both Lidar and Kurban expanding significantly, whilst the main site of Titriş grew up a significant distance from the river. In the SS, paired settlement only developed during the EBA. One could almost describe the entire Sweyhat-Hadidi complex as a large-scale pairing during this period. However, Sweyhat sits some three kilometres from the river with the smaller satellite of Tell Jouweif (SS_8) located immediately above the floodplain. Further to the south, Selenkehiyeh and Halawa represent a pairing of relatively large sites, with both situated in close proximity to the floodplain. Although a much earlier pairing may have been present between Duluk on the mouth of the Sajur and Tell al ‘Abr, the principal pairing in the LCP developed in the Uruk phase between Jerablus Tahtani and Shioukh Fouqani. This is mirrored in the Turkish part of the Carchemish sector, with at least three pairings of small sites recorded (Algaze et al. 1994; 79 Figure 15). Unfortunately, Algaze’s survey did not investigate areas above the 400 metre contour line, meaning we cannot know whether these pairings mark the beginnings of similar alignments of sites away from the river to the one recorded in the LCP. Imagery analysis in this region has proved inconclusive but this may be a result of the surrounding landscape which is not conducive to site identification. The Jerablus-Shioukh pairing continued into the MEBA and LEBA phases, therefore overlapping with the rise of Carchemish.

The relationship between developing urban centres and paired sites is undoubtedly a complex one, but it is striking that each of the largest sites during the fourth and third millennia were located close to pairings but were not themselves part of them. Sweyhat and Titriş both grew up on overland routes orientated towards the crossing points, perhaps because the constrained river valley did not provide access to the amounts of resources necessary to sustain both local and travelling populations (Wilkinson et al. 2004) . Samsat, on the other hand, is situated on the river directly between paired sites, perhaps suggesting control of river-based trade was of greater importance than that of overland routes. Carchemish fits neither pattern but would have been very well located to maintain control over the Jerablus-Shioukh pairing as well as the river. There is also a small tell opposite Carchemish on the eastern bank of the Euphrates. This is visible on the CORONA imagery and in the field but is situated in the no-man’s land of the Syro-Turkish border and has consequently not been visited by either the LCP or Algaze's team. The final commonality between the surveys is the reorganisation of settlement around growing urban institutions during either the EBA, in the case of the Samsat-Lidar and Sweyhat sectors, or the early part of the MBA in the case of Carchemish. This will be discussed in more detail below.

Demography and Settlement Dynamics in the Long Term

In order to place settlement development in the 4th and 3rd millennium in context, we need to make comparisons with other periods, as well as between the surveys. To do this I have retained the focus on settled area as a proxy for demographic trends. Figure 5.41 shows the total settled area in hectares across the surveys by 100 year time blocks. It is clear that there is a reasonable degree of homogeneity in the general trends, with sharp rises in the Late Chalcolithic and EBA, a decline in the MBA and LBA and an extended period of higher settlement between the Iron Age and Byzantine phases. The effect of the rise in area of the major centres at Carchemish, Titriş and Sweyhat is clear during the EBA, continuing into the Iron Age and Roman periods for Carchemish, with a high proportion of the total settlement of between 60 and 100 hectares concentrated at centres of around 40 hectares. The graph clearly shows that the relationship between the maximum urban fluorescence at Titriş and Sweyhat is successive rather than simultaneous, whilst the paucity of our knowledge of EBA Carchemish results in an assumption of continuity. Finally, the graph serves to highlight the incredibly rapid rise in settlement during the EBA. Although the steep gradient of the trends during the EBA must be to some degree an artefact of phase based chronology, the overall timeframe over which very large populations agglomerated and dispersed is relatively short, perhaps not even 500 years. Even assuming a relatively low figure for population density of 100 persons per hectare (Wilkinson et al. 2004; 175; Cooper 2006a; 35), the magnitude of the fluctuations in settlement over the EBA would necessitate the movement of many thousands of individuals.

Raw sums of occupied area are a useful way of comparing very general trends in settlement data but when comparing surveys it is useful to take into account the size of the survey area. Assuming a uniformly settled landscape, and all other factors being equal, we would expect settled area to increase in proportion to surveyed area, and therefore that larger surveys would record a greater total occupied area than smaller ones. By dividing the total occupied area by the total surveyed area we arrive at a comparable figure between surveys. This is effectively a measure of the density of settlement, since it is the total occupied area in hectares per square kilometre of survey, and is the best method for comparing between the surveys. The survey areas used in this discussion are given in Table 5.3. The areas for the Carchemish and Sweyhat sectors are fairly straightforward. However, the Samsat-Lidar sector requires a little more explanation, as the inclusion of sites within the 1000km2 'Area of Interest', as well as those from Ozdoğan's survey, renders a simple combination of the areas for the KHS and the TS insufficient.

Sector	Surveys	Survey Area (km^2)	Source/Notes
Samsat-Lidar	KHS TS Wider Area Total	100 175 125 400	Publication (Wilkinson 1990; 5) Publication (Algaze et al. 1992; 40) Inclusion of Samsat-Lidar area and Bozova-Tartar area through GIS mapping
Carchemish	LCP	500	GIS mapping of triangle between Euphrates, Sajur and Syro-Turkish border. Note this is a slightly larger area than surveyed at the present time as some parts of the survey area have not been formally analysed
Sweyhat	SS	60	Publication (Wilkinson et al. 2004; 1)
Total	KHS, TS, LCP, SS	960	

Table 5.3: Calculations of total surveyed area for the Samsat-Lidar, Carchemish and Sweyhat sectors

Simply adding the 1000km2 area of interest would also be misleading as the intensity of that survey was far lower than that conducted within the KHS and TS, being limited to field visits to the larger known mounds. Similarly, the sites included through imagery analysis are the larger mounds surveyed by Ozdoğan and visible on the imagery within the Euphrates floodplain on the north side of the river. Given that this area is the most densely settled of the geomorphological zones in the survey during all periods, simply adding the total area would give an artificially low estimate of surveyed area. However, the opposite problem is true of the additional sites in the wider area survey at Bozova and Tatar Höyüks, where the concentration on large mounds led to an absence of survey around both sites. This was later rectified for the land to the east of Tatar as this is covered by the TS but gaps still remain to the west. Given these divergent trends, I have calculated the surveyed area by including the northern floodplain and the land between the southern limit of the KHS detailed study zone and the Bozova enclave. This gives an additional area of approximately 125km^2, and therefore a total surveyed area of 400km^2. An alternative to this model would be to calculate the ratio between occupied area and survey area for the KHS and TS for each period and extrapolate this to the larger sites. Whilst this model has the advantage of being based on solid data from within the surveys, it would not be appropriate for these larger sites as they tend to behave differently to the totality of settlement. Such a system would also add a layer of complexity to the data which would need to be considered at every stage. In the following discussion, it should be remembered that if anything, the 125km2 figure is slightly too low, meaning the values for the Samsat-Lidar sector may appear inflated as the total occupied area is divided by a lower figure.

In the main, there is a very high degree of consistency between the surveys in terms of density of settlement (Figure 5.42). There is also some consistency across the periods between the Late

Chalcolithic and the Iron Age, with the exception of the EBA, before the familiar explosion of settlement in the Iron Age and Classical periods. Within the EBA, the impact of the main urban sites is plain. The prominence of the SS is in part a result of the small survey area around the very large site at Sweyhat (compare Figure 5.42 and Figure 5.44) but the fact that the same pattern is observable in the small sites suggests there really is a higher density of settlement in the SS (Figure 5.43). A rise in settlement in the MEBA and LEBA phases might be explained by the reorganisation and founding of new settlements around a growing urban centre. However, the major jump in the settled area of small sites in the SS occurs during the EEBA, prior to the rise of Sweyhat. When one factors in the presence of Tell Hadidi in very close proximity to the Sweyhat system the evidence for a very high degree of settlement density in this zone during the EBA becomes compelling. This is all the more surprising given the marginality of the environment around the Sweyhat sector in comparison with the other surveys. The Samsat-Lidar sector experiences a similar jump in density during the MEBA and LEBA phases, although not as marked, mostly due to the rise of Titriş and the medium sized sites. There is also a jump in the smaller settlements at this time due to the founding of a number of satellite sites on the plain around Titriş (see above). Finally, the Carchemish sector remains extremely stable throughout the EBA, despite the development of Carchemish itself and Tilbeshar to the north-west. This continuity continues in later periods and settlement does not decline significantly during the MBA and LBA as it does in both the other surveys.

Overall, these results demonstrate that settlement trends in the Middle Euphrates are fairly comparable and relatively consistent. Where present, fluctuations in settlement appear to affect all three sectors, although to different degrees. During the Late Chalcolithic and Uruk phases, settlement in the Samsat-Lidar and Carchemish sectors was relatively low in density and was virtually absent from the SS. The EBA saw the rapid development of large urban centres, resulting in the expansion of medium sized sites in the surrounding area in the Samsat-Lidar sector, and the founding of new sites in previously sparsely settled areas, specifically the plains around Titriş and Sweyhat. In areas which were already occupied by smaller sites, such as the LCP and parts of the Samsat-Lidar sector, settlement continued as before. The large urban centres at Titriş and Sweyhat dispersed in succession towards the end of the EBA, if anything more rapidly than they arose, whilst Carchemish remained a significant city until at least the Roman-Byzantine period. The dispersal of the large urban centres in the Titriş and Sweyhat sectors resulted in a general decline in settlement, although interestingly this was preceded by a brief phase of dispersed rural settlement at small sites in the Samsat-Lidar sector. This decline into the MBA and LBA is even present in the otherwise highly stable small sites in the Carchemish sector, although to a lesser degree than the near total abandonment of the landscape in the Samsat-Lidar and Sweyhat sectors.

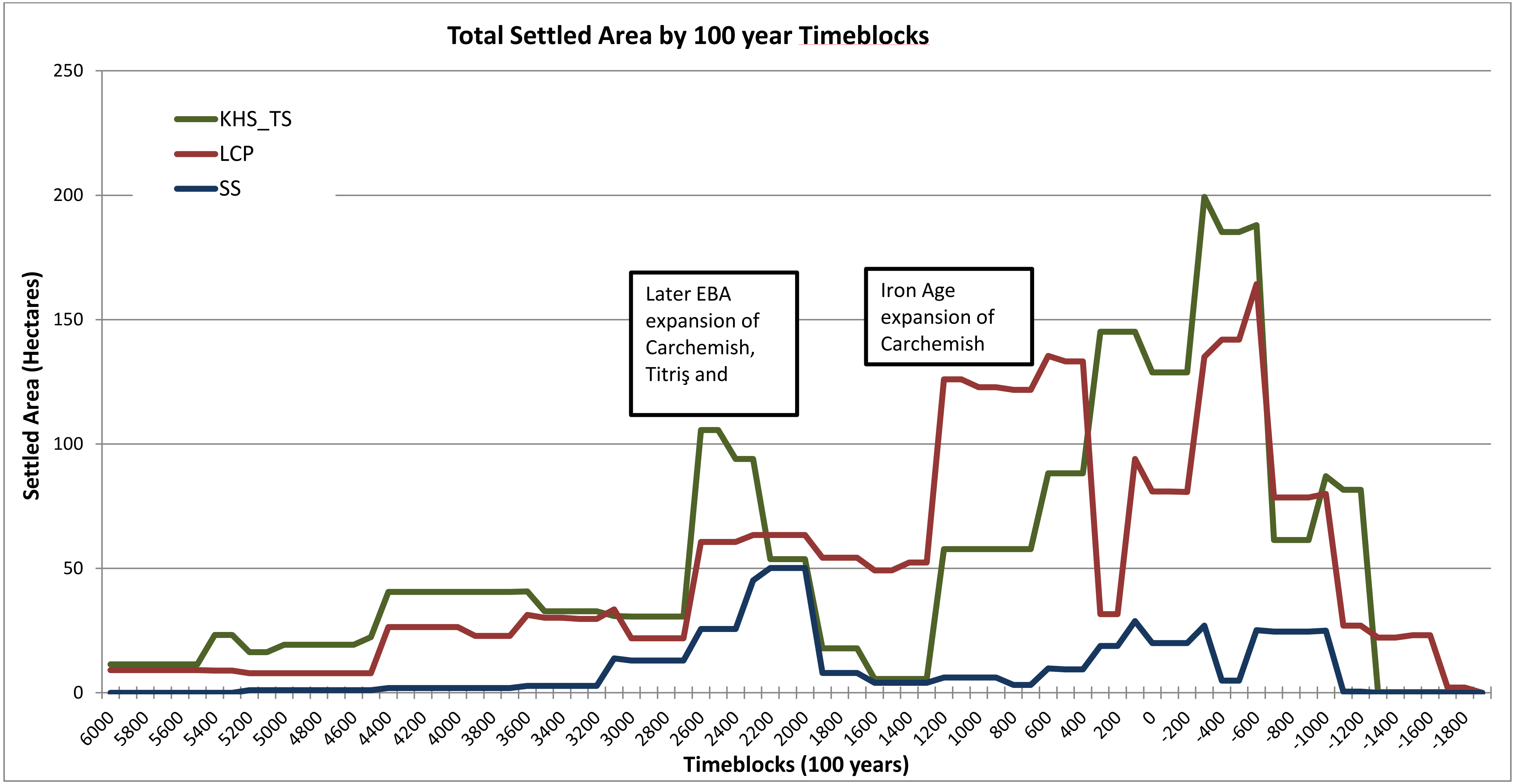


Figure 5.41: Total settled area in the KHS-TS, LCP and SS by 100 year time blocks

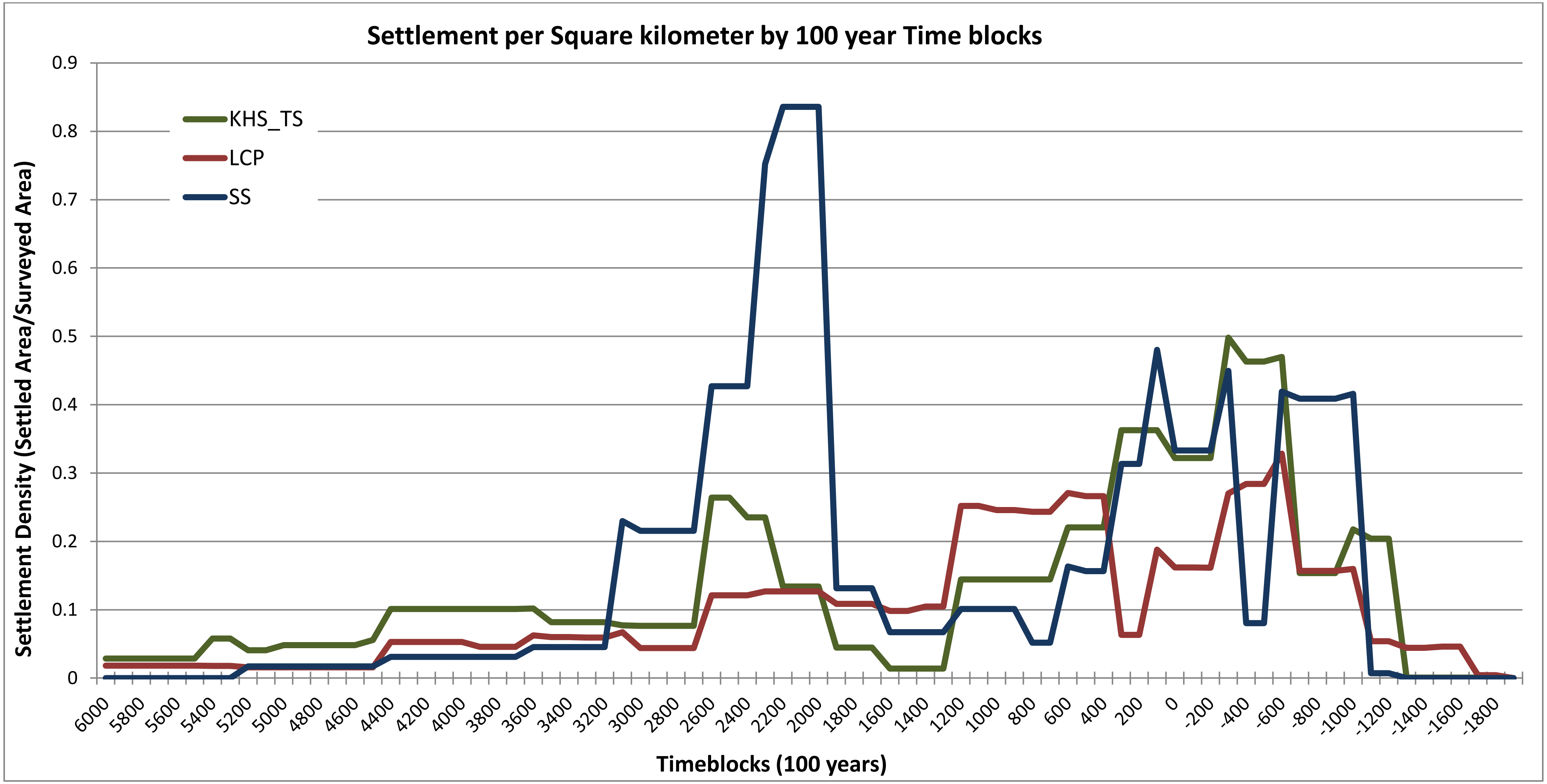


Figure 5.42: Settled area per square kilometre in the KHS-TS, LCP and SS by 100 year time blocks

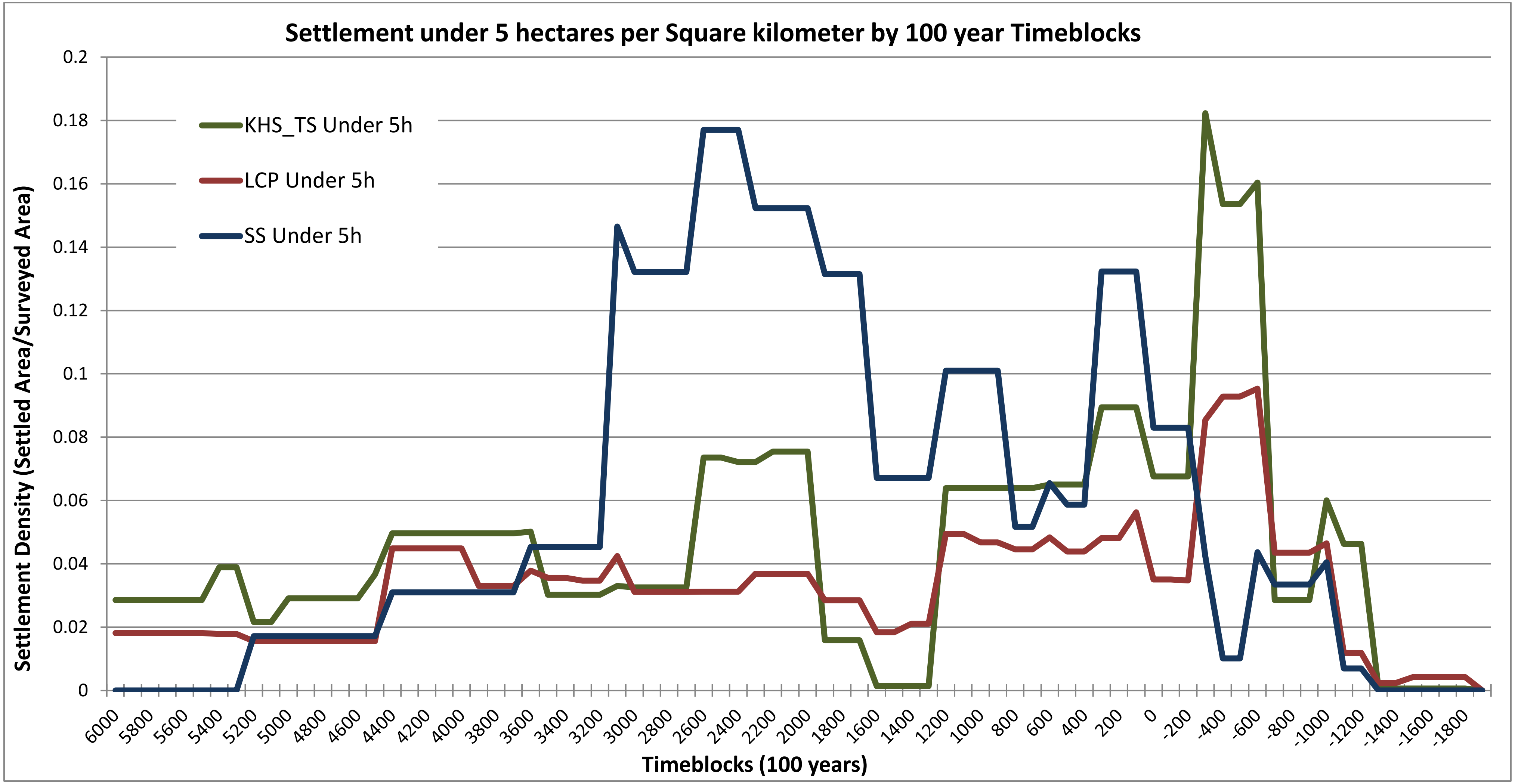


Figure 5.43: Settled area of sites under 5 hectares per square kilometre in the KHS-TS, LCP and SS by 100 year time blocks

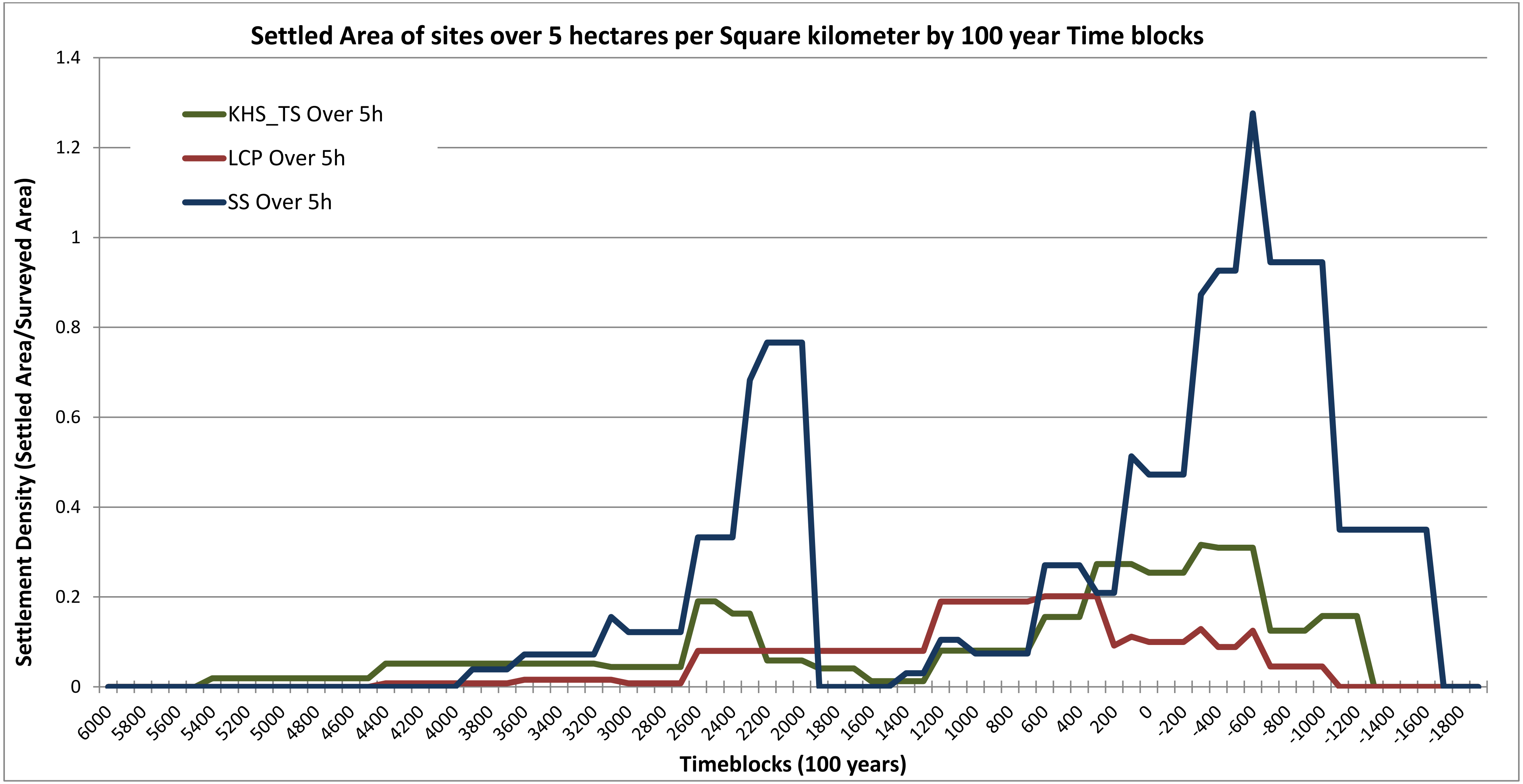


Figure 5.44: Settled area of sites over 5 hectares per square kilometre in the KHS-TS, LCP and SS by 100 year time blocks

Citadel Cities

Along with similarities in settlement pattern, a number of the main urban settlements in the Middle Euphrates also share certain characteristics, although to different degrees, encapsulated in the idea of the citadel city. The term citadel city was first used by Oppenheim (1964), and more recently by Zettler (1997a) and Cooper (2006a; 74-78), to describe a specific form of urban settlement prevalent in Northern Mesopotamia. Such sites are characterised by a high citadel mound upon which the major administrative and religious buildings are situated, and a surrounding walled lower town. Numerous EBA sites in the Middle Euphrates fit into this category, including Titriş, Sweyhat, Tilbeshar and Carchemish (Figure 5.45), as well as possibly Tell Hadidi[20]. Similar sites are located across Northern Mesopotamia, including Kazane Höyük and Tell es-Seman in the Balikh (Figure 5.46), Tell Taya, Tell Leilan and Tell Mozan in the Iraqi/Syrian Jazira (Zettler 1997b; 7; Pfälzner 2010). This morphology can also be linked to the so-called *Kranzhugel* (wreath-shaped) mounds in the western Jazira, such as Tell Beydar and Tell Chuera (Cooper 2006a; 76), and sites in the steppe zone to the west of the Euphrates, such as Al-Rawda (Castel and Peltenburg 2007), although the latter do not have a central mounds. In the Middle Euphrates, a number of the citadel cities follow very similar evolutionary trajectories. The high citadel mounds at Titriş, Sweyhat and Tilbeshar were all founded in the EEBA as small rural communities. During the MEBA and LEBA phases, densely settled and walled outer towns developed extremely rapidly with a high degree of centralised planning, attested by the regularised house structures, architectural styles and the presence of long-lived streets, whilst monumental buildings were constructed on the citadel (Zettler 1997b; Algaze 1999; Matney et al. 1999; Algaze et al. 2001; Danti and Zettler 2007; Kepinski 2007). In the cases of Titriş and Sweyhat, the maximum extent of occupation was increased by extra-mural suburbs in the surrounding landscape (Zettler 1997a; 4; Algaze et al. 2001; 99 Fig. 22). Finally, during the later part of the EBA and perhaps the early MBA, the lower towns were abandoned, again over very short periods of time. At Titriş and Sweyhat, settlement on the citadel mound continued but the settlement most probably returned to a small rural type site.

Beyond similarities of morphology and evolution, the citadel cities in the Middle Euphrates seem to be located in similar positions on major route-ways. Titriş, as noted above, lies on a possible overland route between the Syrian Jazira and highland Anatolia, as well as potentially controlling Euphrates trade. Tilbeshar may have controlled similar inland routes as well as linking western Syria with Anatolia via the Qoueik River and plain. Sweyhat, along with Hadidi, is situated at a prime location for the control of Euphrates and cross-river trade, and Carchemish may also

[20] The main central mound at Tell Hadidi was substantially reorganized during the MBA to create a smaller highly defended town. EBA remains were discovered in excavations at the site but the precise morphology and full extent of the upper citadel cannot currently be established.

control both Euphrates trade and east-west routeways. Such control points would have allowed the inhabitants of citadel cities to extract tribute or taxation from, and also act as way-stations for, travellers and merchants. This may explain the locations of Titriş and Sweyhat which are set back from the Euphrates itself, whilst Tilbeshar is located in its own small plain between two arms of the Sajur River. It is possible that greater pressure on resources resulting from large numbers of people passing through required a location with a larger agricultural sustaining area away from the restricted river valley and for easy access to upland environments (Wilkinson et al. 2004; 185).

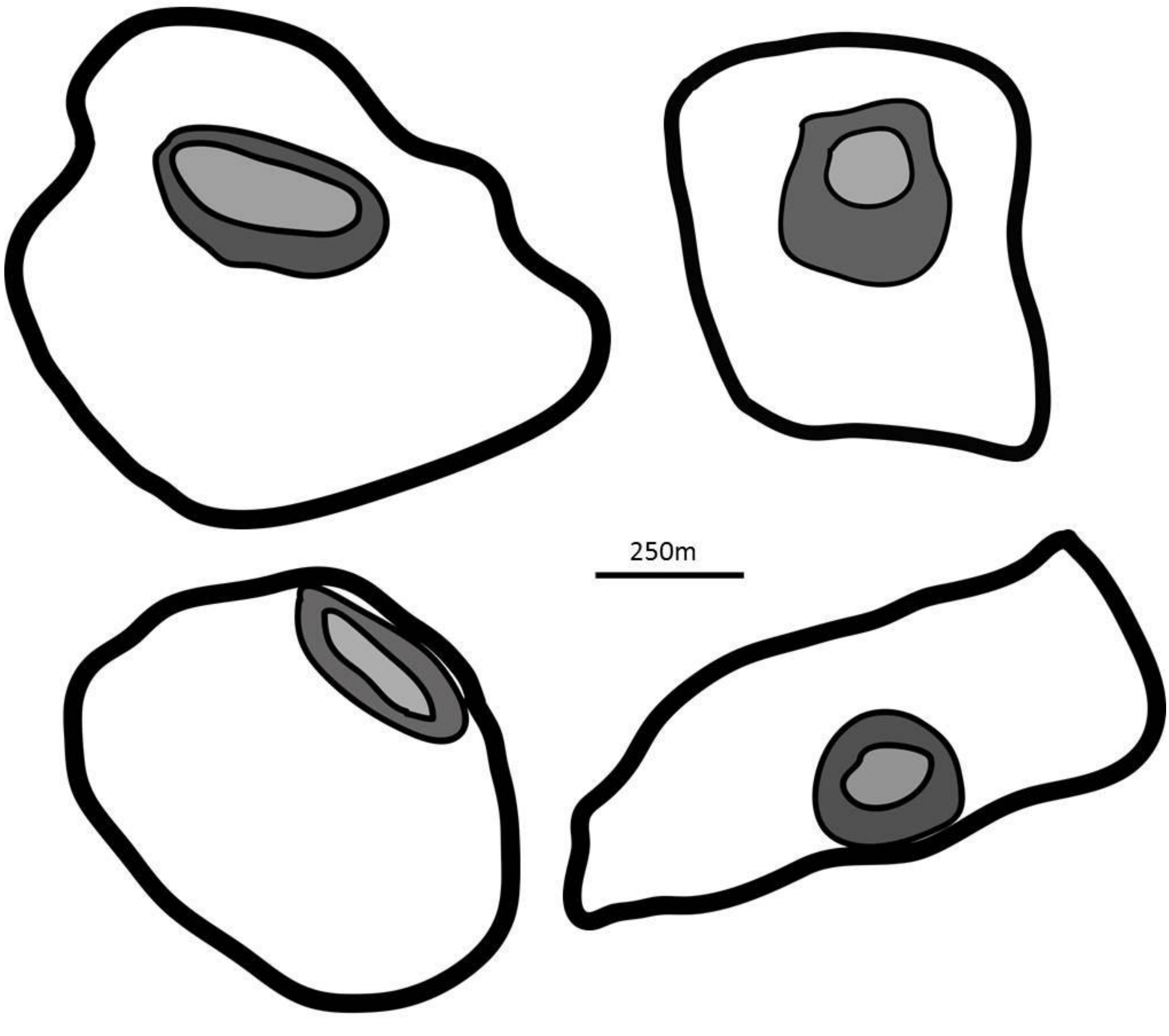


Figure 5.45: Citadel Cities in the Middle Euphrates. Top Left: Tilbeshar Top Right: Tell es-Sweyhat Bottom Left: Carchemish Bottom Right: Titriş Höyük. All mapped from CORONA Mission 1068, acquired 22/01/1967

In understanding the citadel cities of the Middle Euphrates, the importance of lower towns cannot be overstated. It is the settlement and abandonment of these lower towns which results in the massive jumps in total settled area, and, given the density of mostly domestic architecture, population, outlined above. This expansion is even more remarkable because it is not correlated with a decline in local populations. In the Samsat-Lidat sector, settlement expansion occurs at all levels of site at the same time as Titriş, whilst in the LCP the rise of Carchemish has no discernible effect on the smaller tells. Even in the Sweyhat sector, the expansion of Sweyhat during the MEBA and LEBA phases does not result in a reduction in rural settlement from the level seen in the preceding EEBA (Figure 5.43).

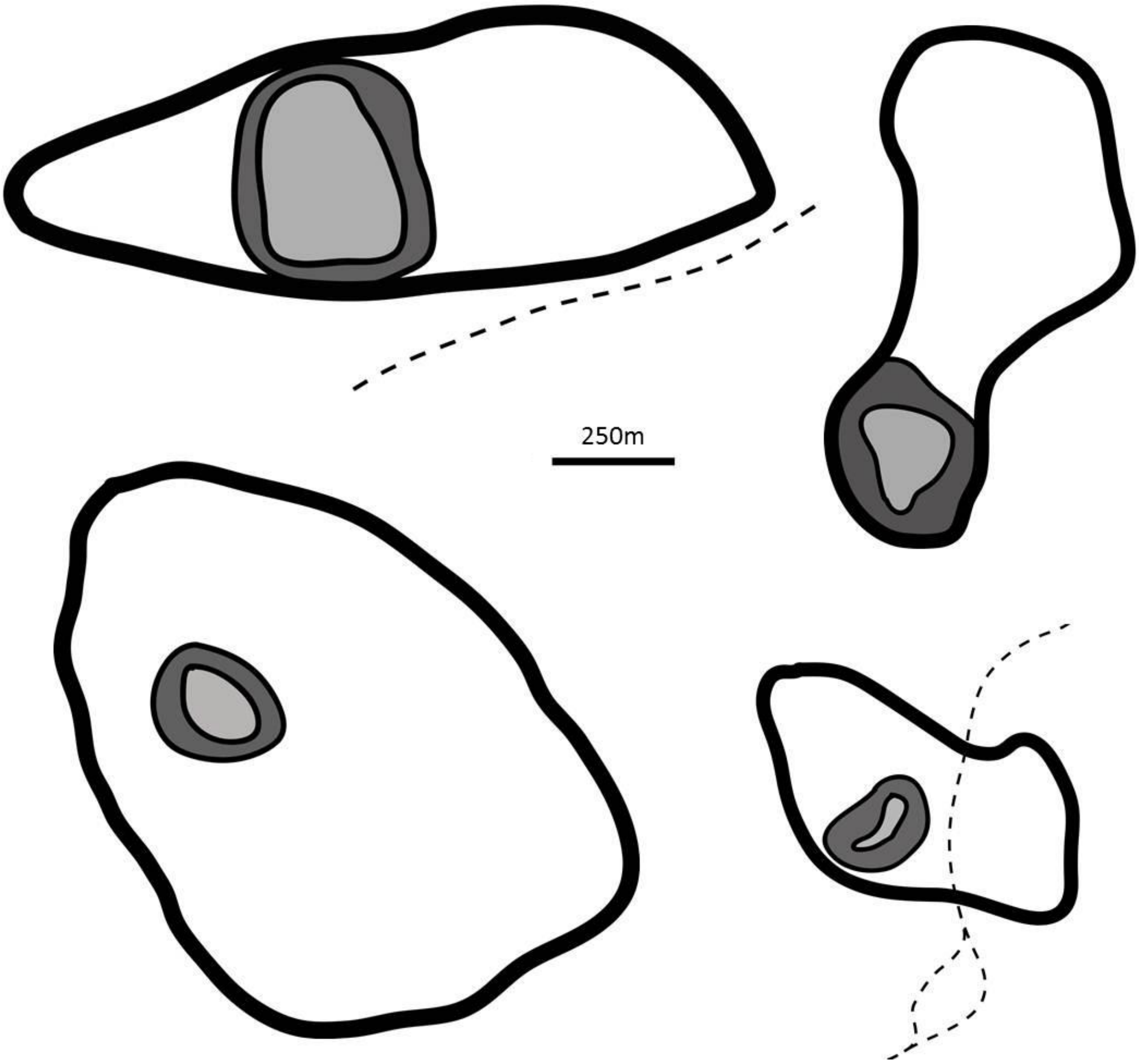


Figure 5.46: Possible Citadel Cities in the Middle Euphrates and Balikh. Top Left: Tell Hadidi Top Right: Banat-Bazi Complex Bottom Left: Kazane Höyük Right: Tell es-Seman. Dashed lines represent major river courses. All mapped from CORONA Mission 1038, acquired 22/01/1967

The abandonment of the citadel cities presents a similar conundrum because, with the possible exception of the Samsat-Lidar sector, local rural populations do not expand as the urban centre declines. In the Samsat-Lidar sector there is a small rise in settled area of the small rural sites after the abandonment of the lower town of Titriş, although this phase is rather short-lived and precedes a precipitous drop in all settlement at the beginning of the MBA, intriguingly at a similar time to the decline of Sweyhat. The rapid rise and decline of the citadel cities in combination with continued underlying rural settlement raises three fundamental and interrelated questions. Firstly, where did new inhabitants of these urban centres come from? Secondly, what was the impetus for their move to a sedentary and urban existence in the Middle Euphrates zone? Thirdly, why did they leave?

The Role of Pastoralists in the Middle Euphrates

There is little direct evidence for nomadic or semi-nomadic pastoralist groups during the EBA in the Middle Euphrates, or Northern Mesopotamia as a whole (Ristvet and Weiss 2005). Material remains which can be unequivocally related to nomadic pastoralist groups are extremely rare. The reasons for this perceived invisibility are manifold but centre around the idea that the modes of existence of nomadic pastoralists leave fewer material traces than settled groups due to the absence of substantial dwellings or large amounts of material culture (Cribb 1991; Finkelstein 1995; 24-25). Whilst this is most probably the case, other factors are also involved, including a general under-theorisation of nomadic ways of life across different environments and a resulting inability to distinguish potential transhumant occupations from a variety of other material phenomena (Alizadeh 2008; Bradbury 2011; 453). Scholars across the Near East are beginning to engage with these issues, employing combinations of intensive methodologies and satellite imagery analyses to access material cultural remains where they are available (Braemer and Sapin 2001; Braemer et al. 2004; Alizadeh and Ur 2007; Ur and Hammer 2009; Hammer 2012). Beyond material culture remains, the presence of nomadic groups in the wider landscape has been inferred in various different ways. Textual sources from both Mari (Lyonnet 2004) and Ebla (Archi and Biga 2003) contain references to certain nomadic groups. Archaeologically, evidence for a predominance of sheep and goat bones in faunal assemblages from sites such as Tell es-Sweyhat (Weber 1997) and Kurban Höyük (Wattenmaker 1987; 1998) highlight the importance of these species in the subsistence economy, whilst the excavation of granary type structures at Tell Hadji Ibrahim in the SS area has been interpreted as evidence for food storage related to pastoralism (Danti 2000). Ethnographic evidence has also been used to demonstrate the importance of nomadic pastoralists in the present day, and thereby to make inferences about their role in the past (Danti 2000; Wilkinson et al. 2004; 53; Alizadeh 2008). This absence of direct evidence has also led to various interpretations of the degree of interaction between sedentary and non-sedentary communities. Studies relying on the strong relationship between pastoralism as a mode of subsistence and tribal organisation have led to new models for the social structure and political development of the Middle Euphrates (Porter 2002a; 2002b; Fleming 2004; Peltenburg 2007). These models have emphasised the cooperative and corporate aspects of tribal society as an alternative to the more hierarchical and top-down impositions implied by city-state and peer-polity interaction models (McClellan 1999a). Rather than a series of city states (Archi 1996), the Middle Euphrates can be characterised as having a 'dual socio-economic character' (Cooper 2006a; 282), whereby the tendency for elites to assume more power, particularly through the control of trade and exchange, is tempered by the retention of tribally organised heterarchical power structures. Evidence for this type of organisation is difficult to detect in the archaeological record but such models merit consideration as potential alternative to the more hierarchical explanations of the dominant paradigm (see Chapter 8).

Alternative forms of Citadel City

The tension between elite control and corporate tribal organisation may also be tacitly related to that between sedentary agriculturalist and nomadic or semi-nomadic pastoralists. Adams (1978) argues that during times of political stability, nomads were likely to become sedentary, whilst instability would result in a return to a non-sedentary mode of existence. Whilst it is true that this argument assigns a certain primacy to sedentary settlement which may not be warranted (Bradbury 2011; 442), it is the case that the ability to subsist in environments outside the control of sedentary elites could allow sectors of society a degree of freedom during times of difficulty, as well as a method of avoiding taxation. It is of some interest, then, that the two large centres on the Middle Euphrates which diverge from the classic citadel city model, the Tell Banat Complex and Carchemish, are situated in landscapes which illustrate the two extremes of these ways of life. As noted above, the Carchemish sector exhibits a high degree of stability of settlement, along with a reasonably dense settlement pattern stretching unchecked to a considerable distance away from the river. The opportunity for nomadic pastoralist activity in this area is fairly limited, and it is more likely that locally-managed or owned flocks of sheep and goat were grazed in the vicinity of the small sites themselves, perhaps in the upland zone to the south of the Nahr Amarna. Significantly, and unlike the other citadel cities, settlement at Carchemish is not restricted to the EBA. There is strong evidence for occupation during the Late Chalcolithic and Uruk periods, and the site also survived the MBA decline to become a large and important city through to the Roman period. Carchemish, then, may represent a conflation of the sort of long-term large-scale settlement present at Samsat with the morphological properties of a citadel city.

At the other end of the scale, the short-lived Tell Banat-Bazi Complex is situated in an area with very limited other settlement, and has been interpreted as a religious centre organised around the treatment of the dead (Porter 2002a; 2002b). The complex consists of five tells, of which the Banat village mound at 30 hectares is comfortably the largest, and a citadel on the Jebel Bazi. Settlement began towards the end of the EEBA, perhaps around 2600 (McClellan 1999b) although possibly before (Cooper 2006a; 49 Table 3.1) and was abandoned at the end of the third millennium. There are relatively few excavated domestic structures at the site and, unlike both Titriş and Sweyhat, the lower town at Banat has not been the subject of a systematic geophysical remote sensing survey. The areas which have been excavated were dominated by industrial and monumental architecture and numerous tombs. Tell Banat North, one of the smaller tells in the overall Banat-Bazi complex, is known by the excavators as the white monument and consists of a large, tell-like structure built up over many years and containing a multitude of human remains. The complex depositional rituals, absence of grave goods and disarticulation of the remains have led the excavators of the site to posit the existence of an ancestor cult in which the corporate and collective nature of social existence is maintained and enacted through the treatment of the dead (Porter 2002b). Through ethnographic and anthropological analogy, Porter argues that such an ancestor-based religious system based on a shared sense of place and a concentration on descent-based legitimacy is likely to have been linked to tribally organised nomadic pastoralist groups (Porter 2002b; 2004). This interpretation may be correct, but it is worth noting that organisation of the Banat village site and Bazi citadel is very similar to the other citadel cities in the Middle Euphrates. Recent discoveries at Bazi include a large building on the summit of the main mound and a series of massive fortification walls dating to the EB IV period, whilst the walls which surround the Banat village mound adjoin the base of the citadel (Otto 2006; 11), resulting in a ground plan very similar to the other large mounds in the region (Figure 5.46). No intensive survey of the vicinity of the Banat complex has been published and it is located in the smallest of the Middle Euphrates sectors. Three seasons of survey were conducted during the late 1980s and revealed no sites in the sub-region beyond those associated with the Banat complex itself (McClellan and Porter in press) and analysis of Corona imagery has revealed no clear sites in the region, although of course this does not preclude the existence of sites not visible on the imagery or long-since eroded from the valley floor. Analysis of Landsat images undertaken within the FCP suggests there is sufficient agricultural land in the surrounding plain to support the 30 hectare settlement, at least at a relatively low population density (Wilkinson et al. 2012). Overall, the Tell Banat complex does seem to represent a different type of urbanism to that found elsewhere on the Euphrates, and may have been a cultic or religious centre. However, the basic structure of the citadel city is still discernible.

Conclusion

The Middle Euphrates sub-region experienced two distinct periods of settlement agglomeration during the 4th and 3rd millennium, one during the Late Chalcolithic and one during the second half of the EBA. During the Late Chalcolithic, relatively small centres such as Samsat and Carchemish emerged within dense networks of small, stable settlement. Unfortunately, we know so little about these early centres in the Middle Euphrates that it is difficult to make any meaningful statements regarding their developmental trajectories. Evidence for sealing practices during the Uruk phase at Samsat suggest a concern with property control, whilst both Samsat, Carchemish and the possible 12 hectare site of Jerablus Tahtani were situated in good locations for the control of long distance route systems, both along the Euphrates and overland. These centres probably continued into the early part of the EBA but settlement in general became more dispersed. At the same time, new sites were founded in areas which had previously contained little settlement, including the Sweyhat embayment and the plains to the south-east of the Euphrates in the Samsat-Lidar area. During the later part of the EBA, settlement in these areas expanded and a new form of urban centre developed, the citadel city, characterise by a high citadel mound, often a previously occupied small site, and a large lower town. These sites reached sizes of between 30 and 56 hectares and, with the exception of Carchemish, seem to have developed very rapidly in previously sparsely populated areas, with the greatest concentration to the south of the Sajur River in the steppe zone. Although there are some variations in the maximum extents of the various centres along the Euphrates, only Carchemish retained a sizeable occupation in the MBA, with occupation at both Titriş and Sweyhat restricted to the citadel mound. The dynamic nature of these urban developments can be contrasted with the long term stability of the network of small, stable tells visible in both survey and satellite imagery north of the Sajur Valley. We can now demonstrate that this pattern of settlement extends both east and west from the Euphrates, especially into the plains to the north and west of the LCP but also in the uplands between the Euphrates and the Balikh to the east. The contrasting trajectories of the fluctuating urban centres and the stable rural settlement will be discussed further in Chapter 8.

Chapter 6: Historical Geography and Regional Summary 2: The Jazira and Upper Khabur Valley Sub-region

Introduction

The second sub-region considered here encompasses the dry farming plains of the northern Jazira, situated in the modern nation states of Turkey, Syria and Iraq (Figure 6.1). Such a vast sub-region merits consideration as a single unit due to a variety of climatic, environmental, archaeological and historical homologies, as well as a shared history of scholarship. The area was first explored through aerial reconnaissance, first during the 1920s by Poidebard (1934; 1938), and again in the 1940s by Van Liere and Lauffray (1954-1955), recording numerous archaeological features. The first systematic investigations of sites on the ground were carried out by Mallowan from the 1930s onwards (Mallowan 1936). Excavation and survey has continued almost without break up to the present day, with the result that the sub-region is now one of the most thoroughly investigated landscapes in the Near East (Ur 2010a). The density of large urban centres which emerged during the second urban revolution, the largest of which may have reached 120 hectares, is unmatched in the northern Fertile Crescent and compares with the larger centres in southern Mesopotamia.

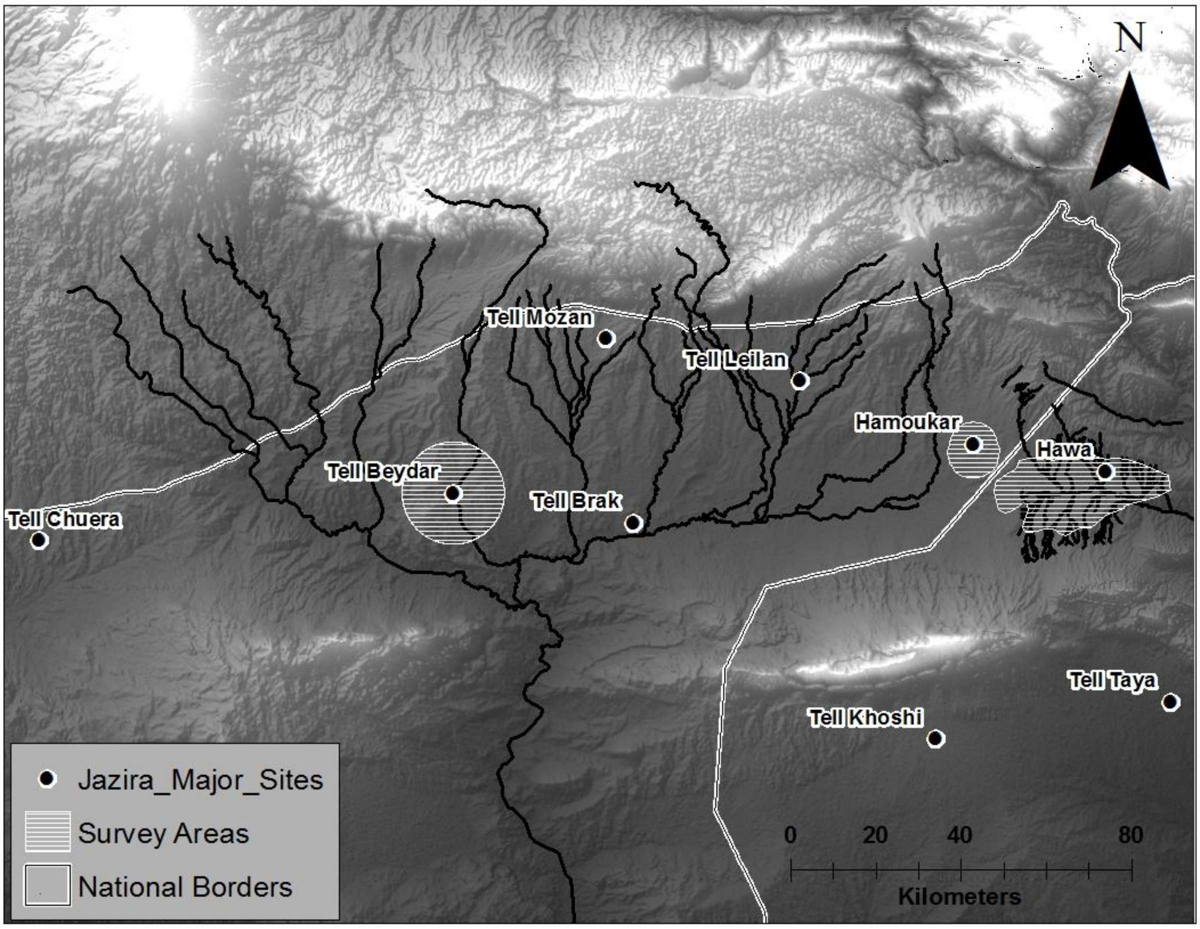


Figure 6.1: The Jazira sub-region, FCP surveys and major sites. The basin is visible as a darker (lower) area in the centre of the image. Background: SRTM acquired February 2000

Within the FCP, the Jazira sub-region is represented by the Tell Beydar Survey (TBS) and the North Jazira Survey (NJS), both of which were conducted under the directorship of Tony Wilkinson. Detailed settlement data has also been obtained for the Tell Hamoukar Survey (THS) conducted by Jason Ur and others, although this has not been fully incorporated into the FCP database. In this chapter I provide a brief overview the Jaziran sub-region before moving on to specific discussion of the surveys. I first deal with the THS and NJS surveys before moving on to the TBS, and finally discussing data from other surveys within the sub-region. Although situated in different countries, the THS in Syria and the NJS in Iraq, these surveys provide a useful comparative dataset because they are very nearly spatially contiguous, separated by only 4km in places. The two central sites, Tell Hamoukar and Tell al-Hawa, also show markedly different long term trajectories, and it is therefore very useful to be able to compare settlement patterns through time. Bringing in the TBS allows for comparison with settlement patterns further west, although still within the Khabur Valley.

The Physical Landscape of the Upper Khabur Valley and Surrounding Areas

The Jazira sub-region is defined to the north by the Taurus mountain range in Turkey, and more specifically the highlands of the Tur Abdin, and to the south by two east-west aligned anticlinal ridges, the Jebel Abd al-Aziz in Syria and the Jebel Sinjar which runs from Syria into Iraq. These ridges are bisected by the Khabur River which flows down through the steppe and joins the Euphrates close to the modern city of Deir er-Zor. To the west, the sub-region extends to the Balikh River and in the east to the Tigris. Geomorphologically, the sub-region is relatively homogenous, in the most part consisting of a broad undulating plain drained by the Khabur and Jaghjagh rivers, as well as a number of perennial and seasonal wadis all of which eventually join the Khabur itself (Deckers and Riehl 2008; 173). Whilst the majority of the sub-region falls within the catchment of the Khabur Basin, the watershed between the Tigris and the Khabur lies slightly to the east of the THS area, so that the wadis within the NJS fall within the Tigris catchment. All of these wadis begin in the Tur Abdin or large karstic springs at the base, and flow roughly north to south, bringing with them alluvial deposits and creating a broad plain of highly fertile calcic xerosol soils (Wilkinson 1997; 70; Ur 2010a; 7 Figure 2.4). This plain is interrupted by a number of basalt upland areas resulting from volcanic activity including the Ardh al-Shaykh or Hemma plateau which lies partly within the TBS area (Ur and Wilkinson 2008; Ur 2010a). In the south-east of the region to the north of the Jebel Sinjar a more marshy area occurs around the Wadi Radd (Zone 5 in Wilkinson 2002). In the western part of the sub-region, the well watered plains of the Balikh and Khabur basins give way to drier gypsum steppe as the 300mm rainfall isohyet takes a dramatic sweep to the north. Soils are shallower and more stony, giving far lower agricultural yields (Kouchoukos 1998; 356) and there are few large wadis or streams.

Climate and Subsistence

Discussions of climate conditions in the Jazira, and across Northern Mesopotamia, have proliferated in recent years, particularly in relation to the Early Bronze Age (see, for example, papers in Kuzucuoğlu and Marro 2007), as a result of the hypothesis put forward by Harvey Weiss and colleagues in regard to settlement collapse towards the end of the third millennium (Weiss et al. 1993). The aim of this section is to give a general overview of climatic conditions and subsistence patterns before dealing with the issue of settlement collapse as a whole in Chapter 8. As in the Middle Euphrates, the climate of the Jazira sub-region can be characterised by a pattern of increasing aridity running roughly north-south, with annual rainfall in the vicinity of the Tur Abdin reaching 500mm compared to 250mm or under at Hasseke (Ur 2010a; 10). This places the entire Upper Khabur basin, as well as the North Jazira plain, above the 250mm isohyet regarded as the limit for dry farming (Wallen 1967), although the southernmost parts would have experienced greater fluctuations in agricultural potential and higher probabilities of failing harvests (Wilkinson 1997; Riehl 2010; 69). Within Hillman's classification, the landscape falls within zones 3b and 4, Oak-Rosaceae Park Woodland and Terebrinth-Almond Woodland Steppe, with the division between the two occurring slightly to the north of Tell Brak (Moore et al. 2000; Deckers and Pessin 2011). Quite how this woodland might fit within what must have been a generally agricultural landscape is unclear, but Deckers (2010; 176) has suggested the EBA landscape would have consisted of occasional trees within agricultural fields, at least in the northern parts of the sub-region (Deckers and Pessin 2010). As in the Middle Euphrates, the floodplains of the rivers, as well as perhaps the larger wadis, may have supported small stands of gallery forest (Moore et al. 2000), and this is corroborated zooarchaeologically by the continued hunting of wild animals reliant on those environments, including beaver and leopard, into the EBA (Zeder 1998a; 575; Doll 2010; 281).

As in the Middle Euphrates, in general terms the agricultural regimes across the sub-region reflect the gradually changing climate, although these differences are less marked than those in the Euphrates valley (Riehl and Bryson 2007a). The main crops were two and six-row barley and einkorn, emmer and free-threshing wheat, as well as lentils, vines and garden peas. Two-row barley and free-threshing wheat seem to have been the dominant crops throughout the Late Chalcolithic and EBA. There is some evidence to suggest an increase in barley cultivation over the course of these phases, although this is mainly concentrated in the Middle Khabur to the south of Brak and the gap between the Jebel Abd al-Aziz and the Jebel Sinjar (McCorriston and Weisberg 2002). Recent evidence from Tell Mozan reveals a brief shift from two-row barley to free-threshing wheat as the staple crop during the last hundred years of the third millennium, demonstrating the flexibility of the agricultural regimes at this time (Riehl 2010), whilst at Leilan emmer and free-threshing wheat were slightly more prevalent than barley during the Ninevite V phase (Wetterstrom 2003; 390). At Brak there is some evidence for a slightly wetter climate during the Late Chalcolithic, allowing the cultivation of small quantities of chickpea, but the staple crops were two-row barley and emmer wheat (Hald 2008; Charles et al. 2010). During the EBA, the dominant staple crop was again two-row barley, along with free-threshing wheat (Charles and Bogaard 2001; 325). The fact that two-row barley was the main crop at both Brak in the south and Mozan in the north during the EBA demonstrates the relative homogeneity of agricultural regimes which were possible throughout the Upper Khabur basin.

Faunal remains suggest a reliance on the four major domesticated species of sheep, goat, cow and pig, and there is some evidence for significant exploitation of wild animals into the EBA (Zeder 1998a). Again, and generalising somewhat, sheep and goat make up the majority of the recovered faunal assemblages throughout the Late Chalcolithic and EBA, although fluctuations through time and to a lesser extent space are of course discernible. Sheep and goat make up between 40 and 70% of the total assemblage throughout the EBA at Mozan (Doll 2010; 280), between 50 and 60% at Tell Brak (Weber in Emberling et al. 1999; 28) and around 60% at Leilan (Zeder 1998a; 574). In earlier periods at Brak, sheep and goat were even more dominant (Weber in Emberling et al. 1999). Pig and cattle also make up significant proportions of a number of the assemblages, with pig providing upwards of 20% of the assemblage at Brak, Leilan and Mozan by the middle of the third millennium (Weber 2001; Doll 2010). Overall, there is less of a marked contrast between the faunal data of different sites in the Khabur Basin than in the Middle Euphrates, with sheep and goat being found in roughly equal proportions and pig and cow still present even in the southern parts of the sub-region. Significant changes occur further south at sites in the Middle Khabur, where sheep, goat and especially wild animals provide far greater proportions of the assemblages (see below) (Zeder 1998a).

Satellite Imagery and the Archaeological Landscape

Archaeologically, the plains of the Jazira represent one of the richest landscapes in the Near East, both in terms of site visibility and the preservation of landscape features, especially when the destructive impact of development over the last forty years can be mitigated through the use of CORONA imagery (Ur 2010a; 16). This phenomenon has come about through a complex interplay between natural and cultural processes of landscape transformation (see Chapter 2), including the geomorphological stability of the plain and cycles of sedentary and nomadic settlement over time. During certain periods, the specific modes of existence of the inhabitants of the Jazira resulted in durable landscape features capable of surviving over time. In contrast to other parts of Northern Mesopotamia, the vast majority of sites are mounded, all be it on occasion rather subtly, including those from later periods. Within the NJS, for example, only one of the 184 sites (NJS 33) was recorded as completely flat in the field, and this may have been the result of burial by alluvial deposits (Ball et al. 1989; 8; Wilkinson and Tucker 1995). Within the TBS, four flat sites were recorded. Of these, two were situated on the upland basalt area (TBS 71 and 80) and therefore represent a rather different landscape situation, whilst one (TBS 7) was probably originally mounded before being eroded by the Wadi Aweidj (Wilkinson 2000b). The strong correlation between mounding and archaeological remains aids site recognition in the field and through imagery and cartographic data sources. The western Jazira also provides a more specific morphological type, the *kranzhügeln. '*Kranzhügel' literally means wreath- or crown-shaped and refers to the distinctive shape of the sites, with a circular outer wall and an inner higher tell. These sites were first recognised by Oppenheim in the early part of the 19th century (Oppenheim 1933; Moortgat-Correns 1972), and have not been systematically studied since. The most significant analysis of the *kranzhügel* phenomenon comes from the Yale Khabur Basin Project which recognised a number of *kranzhügel*-type sites around the Jebel Abd-al-Aziz (Kouchoukos 1998), whilst two of the largest have been subject to major excavations, Tell Chuera in the eastern part of the Balikh drainage and Tell Beydar in the Upper Khabur plains (Lebeau and Suleiman 1997a). With the exception of Tell Beydar, *kranzhügeln* are limited to the steppe zone between the Balikh and Khabur rivers, and around the Jebel Abd-al-Aziz (Wilkinson 2000a).

Other visible landscape features across the northern Jazira include hollow ways, canals and irrigation channels, as well as depressions which can be related to human activities. Hollow ways, or linear hollows (Wilkinson 1993), represent the traces of ancient movement across the landscape[21] and consist of shallow depressions up to 200m wide (Ur 2003). First comprehensively mapped from aerial photography by Van Liere and Laufray (1954-1955), they are visible under certain conditions both in the field and on satellite imagery such as CORONA. The majority of hollow ways occur in radial patterns around sites dating to the EBA (and slightly earlier) and fade out a few kilometres from the site, whilst some continue over great distances. The former group most probably reflect the constrained pathways between agricultural fields through which flocks must have been driven on an almost daily basis, before spreading out into the steppe beyond. Using this model, the point at which the hollow ways fade out can be taken as the edge of the agricultural land around a site, allowing for more accurate estimations of agricultural zones (Wilkinson 2003; Ur and Wilkinson 2008). These can also be correlated with battered sherd scatters, interpreted as evidence of ancient manuring (Wilkinson 1982; 1994). Long distance

[21] McClellan et al (2000) argue that hollow ways operated as water gathering systems designed to canalize surface run-off towards sites. This argument may be dismissed on the grounds that many of the hollow way features traverse watersheds and would therefore not conduct water uniformly, and because of the absence of up-cast one would expect to see from an excavated feature. Hollow ways, like other substantial landscape features, may become incorporated into hydraulic networks, and may even transport water in the manner described by McClellan and colleagues (Ur 2003; Wilkinson 2003; Alizadeh et al. 2004). However, their original formation processes are much more likely to have been the repeated movement of animals and humans.

hollow ways provide evidence of interaction between sites at a larger scale and may be used to interpret potential networks of trade and exchange (Wilkinson 2003; 117; Wilkinson et al. 2010; Ur 2010a). For the most part, hollow ways are confined to the Upper Khabur Basin and the north-eastern Jazira. Traces of hollow ways are rare to the west of the Euphrates but some have been recorded within the FCP surveys, including a single feature in the Kurban Höyük Survey (Wilkinson 1990), a small network in the Sweyhat Survey area (Wilkinson et al. 2004; 148 figure 7.6), and perhaps three on the plain to the west of Carchemish, although these are highly ephemeral. Possible hollow ways have also been discovered outside the Jazira through CORONA imagery analysis in the Qoueik plains to the north of Aleppo (Casana 2012 pers. comm) and through field survey in Khuzestan Plains in south west Iran (Alizadeh et al. 2004; 76). Within the FCP, and in the maps and analysis in this chapter, we make use of a digitised map of hollow ways compiled by Jason Ur. This was originally produced through the digitisation of features from mapping undertaken by Van Liere and Laufray (1954-1955) and Wilkinson and Tucker (1995) combined with imagery analysis and ground control (Ur 2010a), and has been supplemented through imagery analysis by members of the FCP team.

Survey Boundaries and Settlement Continuity

Various parts of the Jaziran sub-region have been surveyed over the past thirty years, and these surveys can be divided into two categories on the basis of scale, intensity and research design. Broad scale surveys of the western and eastern parts of the entire Khabur Basin have been carried out by Lyonnet (1996a; 1996b; 2000) and Meijer (1986) respectively. The methodologies adopted by these two surveys were very different. Lyonnet focused on the detailed analysis of a small number of sites to obtain a representative sample (Lyonnet 2000; 12-13) whilst Meijer undertook a more conventional low intensity survey aimed at investigating the main mounds. The Yale University Khabur Basin Project also included a broad-scale survey which fits into this group. This covered the area between the Khabur and the 36th parallel to the south, including the entirety of the Jebel Abd al-Aziz (Hole 1997; Kouchoukos 1998), at a slightly higher intensity than both Lyonnet and Meijer, although in a very different landscape. In contrast to these, the second category of surveys can be characterised as highly intensive full coverage investigations of the hinterlands of major urban centres (‘complete’ surveys in the typology established in Chapter 3). These include several seasons of survey around Leilan (Stein and Wattenmaker 1989; 1990; 2003; Ristvet 2005; Ristvet and Weiss 2005; Brustolon and Rova 2007; Arrivabeni 2010) and two separate surveys around Tell Brak (Eidem and Warburton 1996; Wright et al. 2006-2007), along with the THS centred on Hamoukar (Wilkinson 2002; Ur 2002a; 2010a). The two FCP surveys were of this latter type, with the TBS centred on Tell Beydar and the NJS including Tell al-Hawa.

The latter type of survey is very useful in assessing the trajectories of urban centres and their relationship with the surrounding landscape. However, the absence of significant geographical features in the rolling plains of the north-eastern Jazira presents a methodological problem for surveys which attempt an intensive full coverage approach because of the tension between diachronic settlement patterns and the static boundaries of survey. Full coverage survey relies on the settlement universe, in this case the urban centre and its dependents, being contiguous with the boundaries of the survey (Sumner 1990), but settlement in the relatively featureless plains is continuous and evenly distributed. This can be compared to the Middle Euphrates sub-region where the combination of gorges and wider valleys, along with the river itself, form fairly constrained zones of settlement. Furthermore, the spatial extent of any given settlement universe is likely to change over time. An obvious example of this would be surveys designed to investigate the hinterland of an urban centre. During periods in which the urban centre experiences a decline in occupation, or even total abandonment, it cannot be considered as a structuring principle in settlement patterns. In some instances, the correlation between survey area and potential settlement universe may be shown to be fairly close. Comparison of textual and survey data from EBA Tell Beydar, for example, demonstrated that sites in the 452km^2 survey region actually mapped rather well onto the small towns and villages mentioned in texts referring to agricultural administration (Sallaberger and Ur 2004). However, this also serves to highlight the problem apparent in other surveys. The THS investigated a far smaller survey area of some 125kmsq around a far larger site. Whilst it is not possible to demonstrate that a directly proportional relationship exists between the size of an urban centre and the size of its hinterland, especially through time, Hamoukar was at least five times the size of Beydar during the EBA and it is difficult to envisage a scenario in which it may have been part of a smaller settlement universe. The problem of the continuity of the settlement universe is fundamentally insurmountable, in that solving it would require a high intensity survey of the entire world. However, satellite imagery analysis does allow us to factor in to the analysis sites in close proximity to the survey area. The adjacent surveys of the THS and NJS allow for an examination of the relationship between survey size and settlement dynamics, as well as the possibility of combining both datasets.

The North Jazira Survey Dataset

The NJS was conducted over four seasons from 1986-1989/1990 in advance of the construction of the North Jazera Irrigation Project. This involved the use of the recently dammed waters of the Tigris to provide water for an area of some 475km^2; this entailed the reorganisation of the entire landscape around a new canal-fed irrigation system and supporting infrastructure. Unlike the other FCP surveys in the Jazira and Middle Euphrates, the survey was not spatially orientated around a single major site, but the major urban centre in the region, Tell al-Hawa, was intensively surveyed and excavated, as part of the larger project (Ball et al. 1989). Excavations were also carried out at four locations within the survey area, including the small sites of Khanijdal East (NJS_66) and Tell al-Hilwa (NJS_86), dated to the Ubaid and Uruk phases respectively, a quarrying upcast area at Tulul al-Biyadir (NJS_104) and a Late Assyrian site, Khirbet 'Aloki (NJS_113) (Wilkinson and Tucker 1995). More recently, a number of sites within the survey area and its immediate suroundings have been sounded by Iraqi archaeologists as part of the Jazira Salvage Project[22] (Altaweel 2006; 2007). The recent excavations have resulted in a large amount of detailed data for these sites and have confirmed many of the original chronological phases assigned by the NJS in the field (Altaweel 2006; 180). In general, there are very few differences between the phases and site areas found by the NJS and those from the excavation and surface collections collected in the Jazira Salvage Project but where pertinent these will be discussed below, along with relevant sites found just outside the boundaries of the NJS.

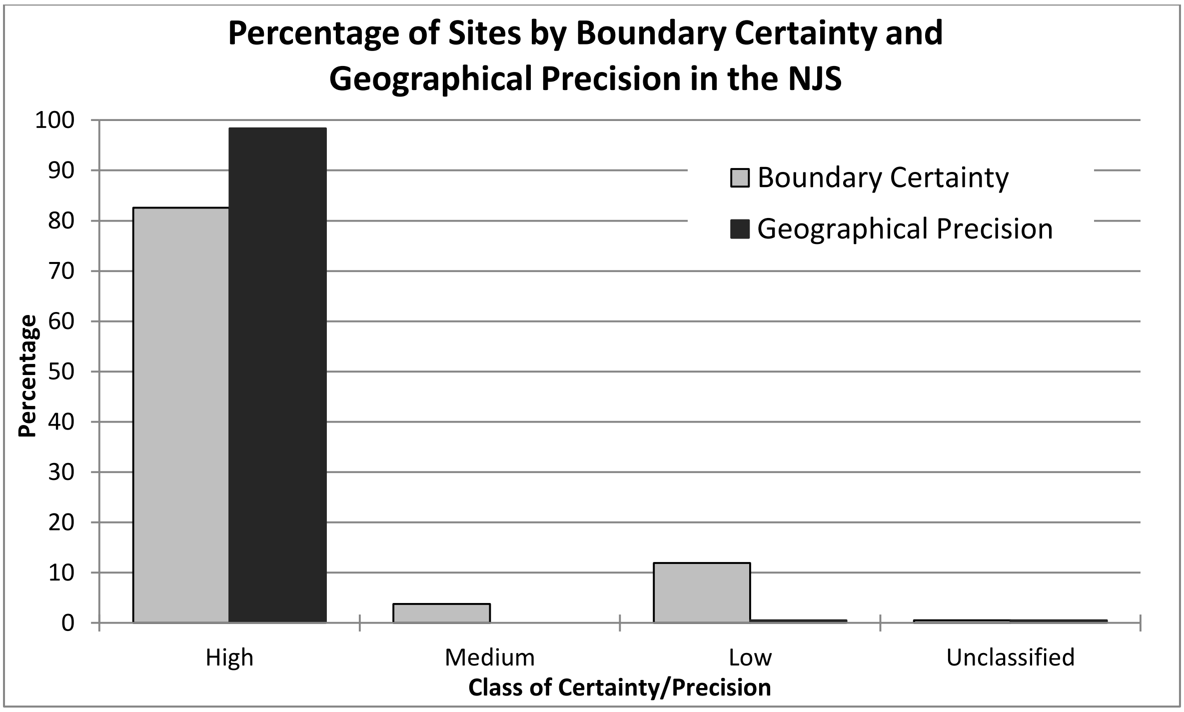


Figure 6.2: Percentage of Sites by Boundary Certainty and Geographical Precision in the NJS

Within the framework of the FCP, the NJS has the highest percentage of sites categorised as 'High' in Geographical Precision and Boundary Certainty but has no 'Definite' sites (Figure 6.2). The absence of the 'Definite' category is due to the fact that the survey was carried out before the use of GPS and GIS systems, and CORONA imagery, although Landsat TM was used for large scale mapping. Site recognition was completely reliant on high resolution topographic map data and cross checked with aerial photography, both of which were geocorrected by hand, introducing possible error. The large number of 'Highs' can be attributed to the combination of the ubiquity of

[22] The Jazira Salvage Project was initially called the Ray Jazira Project and is referred to in this way in the 2006 report. The initials 'RJP' are retained for the survey IDs in the later article for the sake of clarity (Altaweel 2007; 117) and will be used here for the same reason.

site mounding and the use within the survey of a one metre contour map, allowing even very low mounds to be distinguished from the background landscape. This also explains the slight discrepancy between Geographical Precision and Boundary Certainty. Detailed close-up maps were available for most of the sites but a small number were traced from the overall map, and therefore received a lower rating. Some of these were visible on CORONA imagery and some were not, resulting in the levels of both 'Mediums' and 'Lows'. Geographical Precision was not affected because the general location of the site can still be inferred. The single site designated as having 'Low' geographical precision, NJS_155, is situated just to the north of the extent of the map and was sufficiently clear on the CORONA to be mapped. NJS_92 was classed as 'Unclassified' because it was also located to the south of the extent of the map and was not clearly visible on the imagery. For the purposes of the FCP it has been mapped by proximity to the nearest village.

The Tell Hamoukar Survey Dataset

Although not strictly included in the FCP, the THS provides a useful complement to the larger NJS dataset. Undertaken predominantly between 1999 and 2001, the THS investigated a 125km2 area, the limits of which were defined as 5km from the central site, Tell Hamoukar. This produced a slightly ovoid survey area due to the huge southern extension (defined as a separate entity to the main site at Hamoukar within the survey) (Ur 2010a; 42). The THS was carried out within the larger Tell Hamoukar research project which includes excavations and a detailed surface survey at Hamoukar itself similar to that carried out at Tell al-Hawa (Gibson et al. 2002a; Gibson et al. 2002b; Ur 2002b; 2010a; Chapter 3), as well as geomorphological investigations of the surrounding area (Wilkinson 2002). Beyond the main mound of Hamoukar, excavation has been restricted to a number of soundings in the southern extension (THS_25) and three large trenches undertaken as part of the geomorphological studies and for the purposes of investigating a hollow way (Wilkinson 2002; Gibson et al. 2002a).

The THS has not been included within the FCP database due to both time constraints and the absence of the kinds of associated data available for the other surveys such as site notebooks and other unpublished sources (see Chapter 3). For this reason, classes of Boundary Certainty and Geographical Precision have not been generated for the THS. However, we can be extremely confident of the validity of the spatial aspects of the data as this was derived from a GIS geo-database used in the field by Jason Ur and the field team. Although the fieldwork spanned the period before and after 'selective availability' affected GPS readings, the sites were all remapped after its removal (Ur 2010a; 52). Site identification and mapping were essentially identical to those used in the NJS and other projects within the FCP (Ur 2010a; 49-53), whilst the chronological scheme was closely related to that used in the NJS and TBS (see Chapter 4). Overall, the THS can be considered as a comparable dataset to the LCP and TBS, with sites generally at the higher end of the classes of certainty and precision available in the FCP due to the technology and methodology employed in the field. As such, it is readily comparable to the NJS which achieved similarly high levels of accuracy by different methods.

Geomorphology of the NJS-THS area

Geomorphologically, the NJS and THS are fairly homogenous, both internally and in comparison, falling entirely within the low relief silt plain which stretches from the Tigris into Syria (Wilkinson and Tucker 1995; 3; Wilkinson 2002; 89). A number of slightly incised shifting wadi systems traverse the plain, whilst the watershed between the Tigris and the Khabur is situated between the two surveys and in the south-western sector of the NJS. The great majority of the wadis in the NJS therefore drain into the Tigris, mostly via the Wadi al-Murr. The wadis in the THS are more difficult to trace due to infilling with material from the uplands to the north and localised plough wash (Ur 2010a; 8), but seem to drain into the Khabur by way of the marshy area around the Wadi Radd. With the exception of minor shifts in wadi courses and localized infilling, this landscape is most probably relatively unchanged since at least the beginning of the Holocene with little evidence for aggradation of sediments which would obscure sites. Beyond the boundaries of the surveys geomorphological and geological changes are evident. Around Hamoukar, Wilkinson identified five zones on the basis of field visits and analysis of CORONA imagery. To the north-east of the THS, and the north of the NJS, zone 1 includes tertiary uplands with thin soils and very few tell settlements, interpreted by Wilkinson as a long-term pastoral resource (2002; 90). Zone 2 represents the plains on which the surveys were carried out, the most fertile land in the area and the most densely covered by tells. Zone 3, to the north-west of the THS and on the western side of the Wadi Rumaylum, is a low basalt plateau with fairly well-developed soils and a few small tells, perhaps representing a secondary cultivation zone in the EBA. Finally, zones 4 and 5 cover the multi-channel wadis in the flat land to the south-west of both survey areas and the salt marshes of the Wadi Rumm respectively. There is some evidence that these areas may have been irrigated, including linear and grid pattern channels visible on CORONA and high resolution modern imagery. Although the dating of these systems is not currently known it is highly likely they are Iron Age or later. For the purposes of this characterisation, we can add the Jebel Sinjar and Jebel Ishkar hills to the south of both the THS and NJS, which may have provided limited pastoral resources and are also the source of a number of smaller wadis flowing south to north in the NJS area. Placing the two surveys in a broader context, then, it is clear that their inhabitants could have had access to significant resources beyond the agricultural potential of the plain itself.

Remote Sensing and Settlement Pattern Expansion in the NJS-THS

The flat plains of the Jazira are ideally suited to the use of CORONA imagery and the great majority of the archaeological sites discovered within the surveys are visible. This is not the case for later images due to the high degree of attenuation suffered by sites during the last 40 years. Despite this general visibility, it is difficult to extrapolate settlement trends outside the surveys. To understand this problem we can return to the ideas of 'uniqueness' and 'completeness' mentioned above (see Chapter 5). In order to extrapolate from survey data to imagery, we need to be certain that a specific spectral signature visible on the imagery can be associated with a particular chronological phase. We also want to know how representative this spectral signature is in relation to the phase in question, that is what proportion of the total settlement system will be recovered through mapping of a particular visible type. In the Jazira, almost all sites show up on the imagery as a distinctive mottled discolouration, regardless of when they were occupied. This makes sites very easy to detect but does not allow for significant distinctions between sites based on phase. However, it is occasionally possible to make distinctions based on the size and shape of mounds, and particularly height, which is visible on CORONA imagery as light patches and darker shadows (see Chapter 3). We therefore need to look for patterns in site morphology through time within the survey to extrapolate to the surrounding area.

In the case of the NJS, there is a clear link between generally high mounded sites and the Late Chalcolithic, ETM, and Khabur phases. Low mounds, by contrast, dominate during the Late Assyrian, Hellenistic and Parthian phases (Figure 6.3). Extrapolating from these figures, then, we can state that a high tell visible on imagery in the vicinity of the NJS represents a 56% likelihood of a Khabur phase or Late Chalcolithic occupation and slightly less for the EBA. Whilst this is well below the levels of certainty attained in some areas of the Middle Euphrates, it does allow us to begin to analyse parts of the landscape which have not yet been surveyed. Beyond the morphology of the sites themselves, during certain periods we can also use associations with other features. The association of hollow ways with sites occupied in the EBA provides such an example. In the NJS, approximately 30% of sites for the phases outside the EBA were located on or close to hollow ways. However, between 40% and 50% of the ETM and Khabur phase sites were located on hollow ways, rising to between 50% and 60% in the LTM[23] (Wilkinson and Tucker 1995; 199, Fig. 58). We can also add a subjective association to this data, in that EBA sites are more likely to be associated with radial patterned hollow ways. Thus a high tell surrounded by a radial pattern of hollow ways is very likely to have been occupied in the EBA.

The main problem with extrapolation through imagery in the vicinity of the NJS, and to some degree the eastern Jazira as a whole, is that of completeness of the settlement pattern. Although we may be able to make statements about certain morphological types for particular phases, in this case demonstrating a relationship between the Late Chalcolithic and EBA and high mounded

[23] These percentages are not given precisely due to the subjective nature of judging a site's relationship with hollow ways (Wilkinson and Tucker 1995; 199).

sites, if these sites represent only a very small percentage of the total settlement during that phase then we cannot reconstruct the detailed settlement pattern.

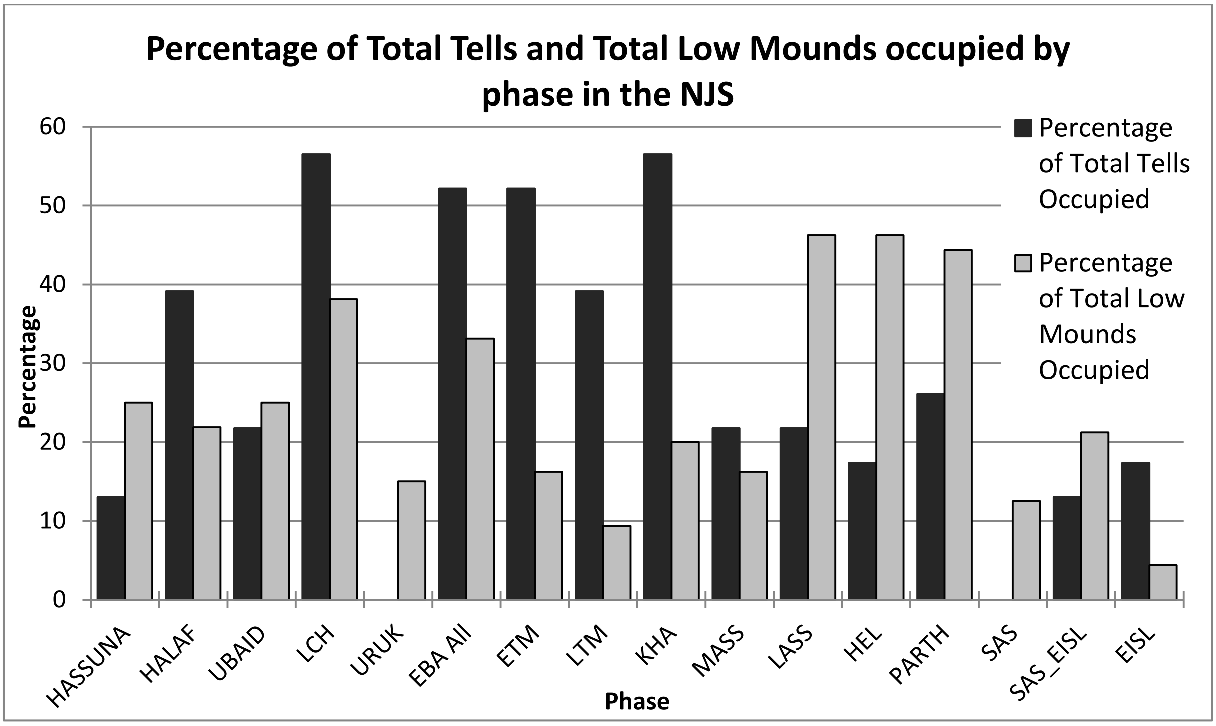


Figure 6.3: Percentage of Total Tells and Total Low Mounds occupied by phase in the NJS

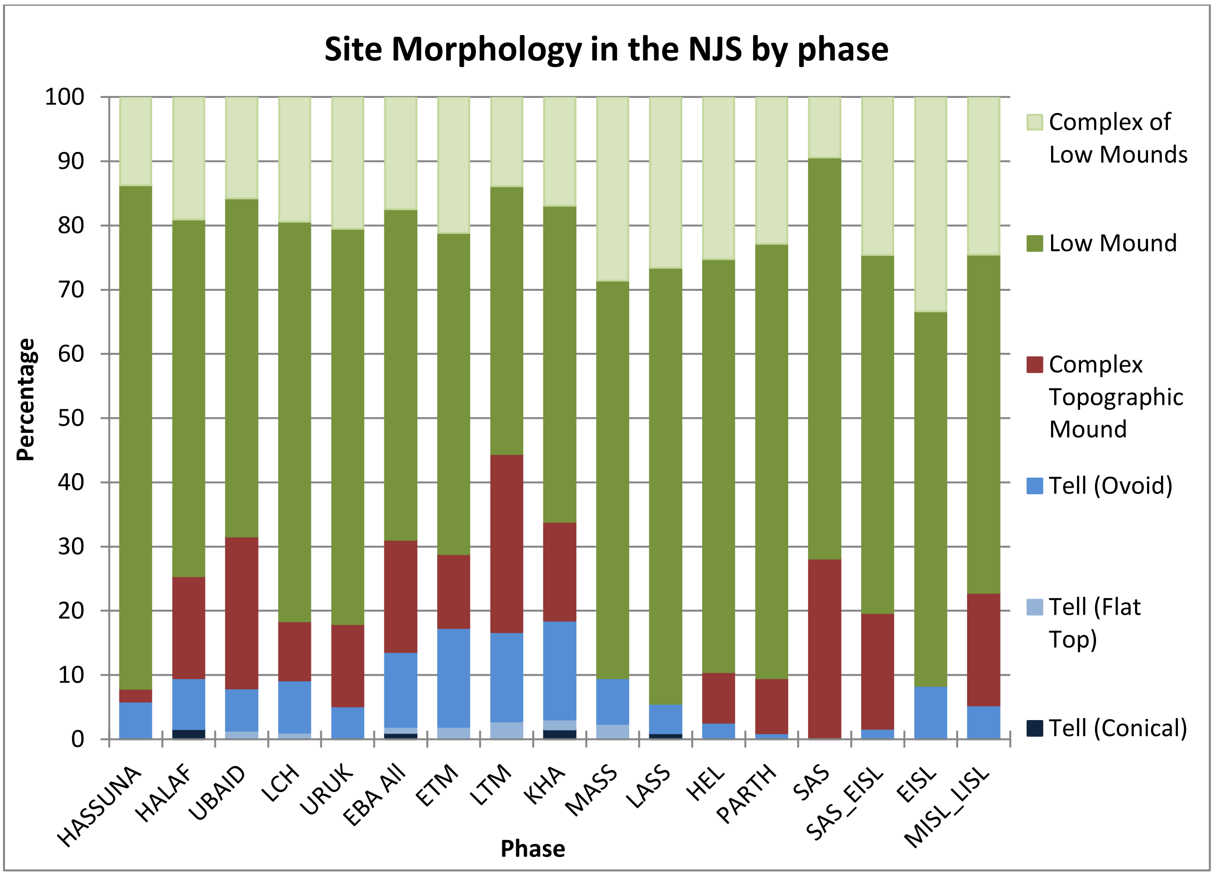


Figure 6.4: Site Morphology in the NJS by phase

This is the case in the NJS. In contrast to the Middle Euphrates, where settlement during the EBA was confined to the high tells, a significant proportion of EBA, and especially Late Chalcolithic, settlement in the Jazira was located on low mounds. This has profound implications for studies which seek to map total settlement from the manual inspection of satellite imagery alone (e.g. Deckers and Riehl 2008; Deckers and Drechsler 2011), since these low mounds are far less obvious. As is clear from Figure 6.4, low mounds represent the most common form of settlement across all phases and there is little difference in the proportion of total settlement they represent. The period with the highest percentage of occupation on high tells in the NJS was the Khabur phase, when 18% of settlement was tell based. During this phase, the highest number of high tells were also occupied, 56%. This means that even if we were to map all the high mounds and assume that 56% were occupied during the Khabur phase based on the associations outlined above, we would have captured only 18% of the total settlement pattern. This is not sufficiently representative to make major inferences regarding the nature of past activity within the landscape.

The Late Chalcolithic and Uruk Period in the North Jazira and Tell Hamoukar Surveys

Presenting the Late Chalcolithic data for the NJS and THS together is potentially misleading due to the differences in phasing used in each survey. The THS was able to distinguish between the earlier part of the Late Chalcolithic (LC 1-2 in the Santa Fe sequence) and the later part (LC 3-5) whilst the NJS used only a general Late Chalcolithic classification encompassing the entire period, as well as a noting the presence of southern Uruk material equivalent to LC 4-5 (see Chapter 2 and Lupton 1996). In discussing settled area or site organisation in the NJS and THS together during the Late Chalcolithic phases, then, we may not be comparing like with like due to the problems of contemporaneity and continuity. Of the 30 sites occupied across the Late Chalcolithic in the THS, thirteen dated to the LC 1-2 phase (43.3%) and 17 to the LC 3-5 (56.6%), whilst 6 (20%) were occupied in both phases. Extrapolating the same pattern to the NJS, we might suggest that of the 74 sites recorded for the Late Chalcolithic phase, just under half could be considered LC 1-2 and just over half LC 3-5 to approximate settlement for the LC 1-2 and LC 3-5 phases used in the THS. Such an extrapolation is problematic, however, due to the relatively small sample size available in the THS compared to the NJS and the uncertainty introduced by the decline of the unique settlement at THS_25 (Al Quntar et al. in press). Further, disregarding a certain proportion of sites renders settlement pattern analysis impossible since there is no way of knowing which specific sites may be ignored. Broadly speaking, settlement in the Late Chalcolithic and Uruk phases in the NJS continues that of the Halaf and Ubaid phases (Figure.6.5) and can be characterised as evenly dispersed and ruralised, with a single large centre at Tell al-Hawa.

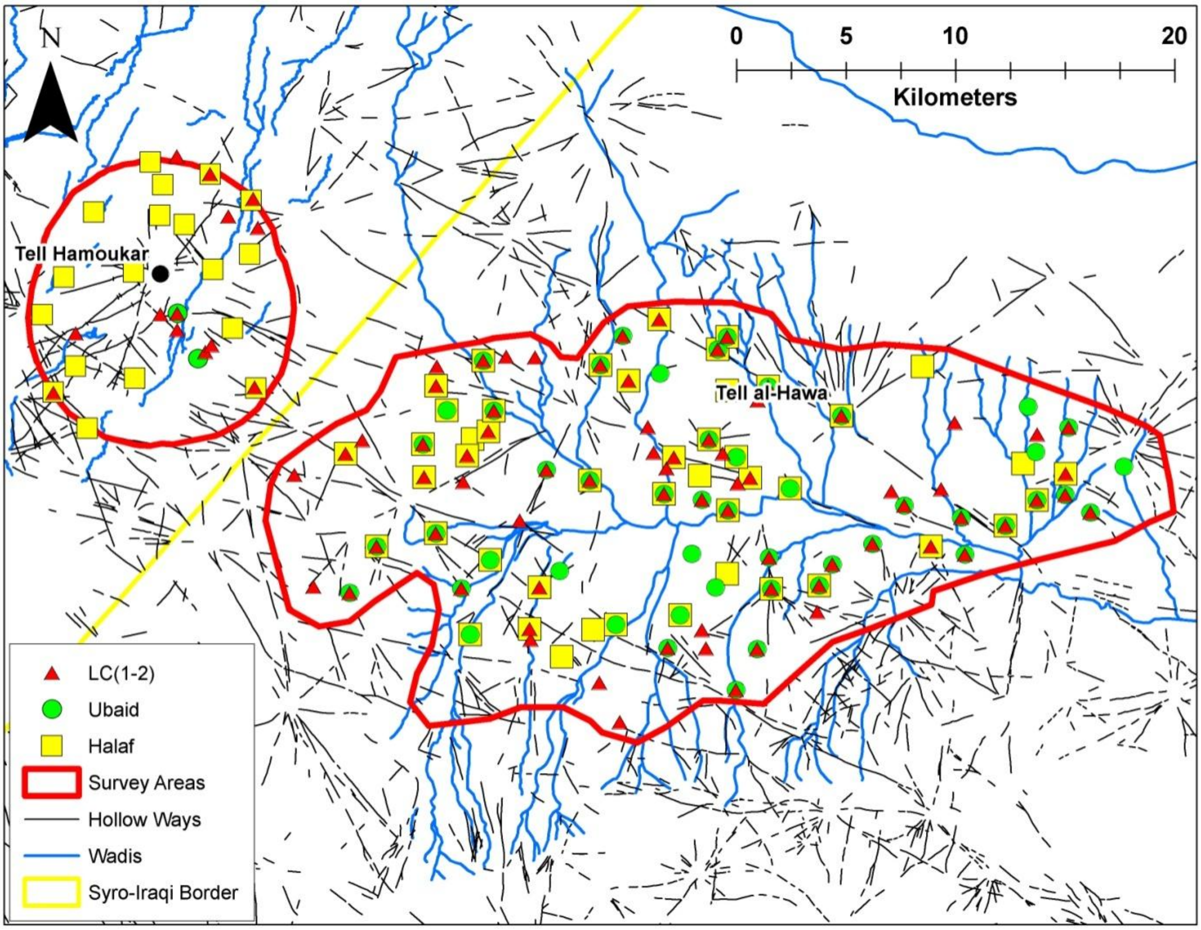


Figure.6.5: Settlement patterns in the THS and NJS during the Halaf, Ubaid and Late Chalcolithic. Note the THS sites are only those recorded as LC 1-2 (phase 4) whilst the NJS sites are those for the entire Late Chalcolithic.

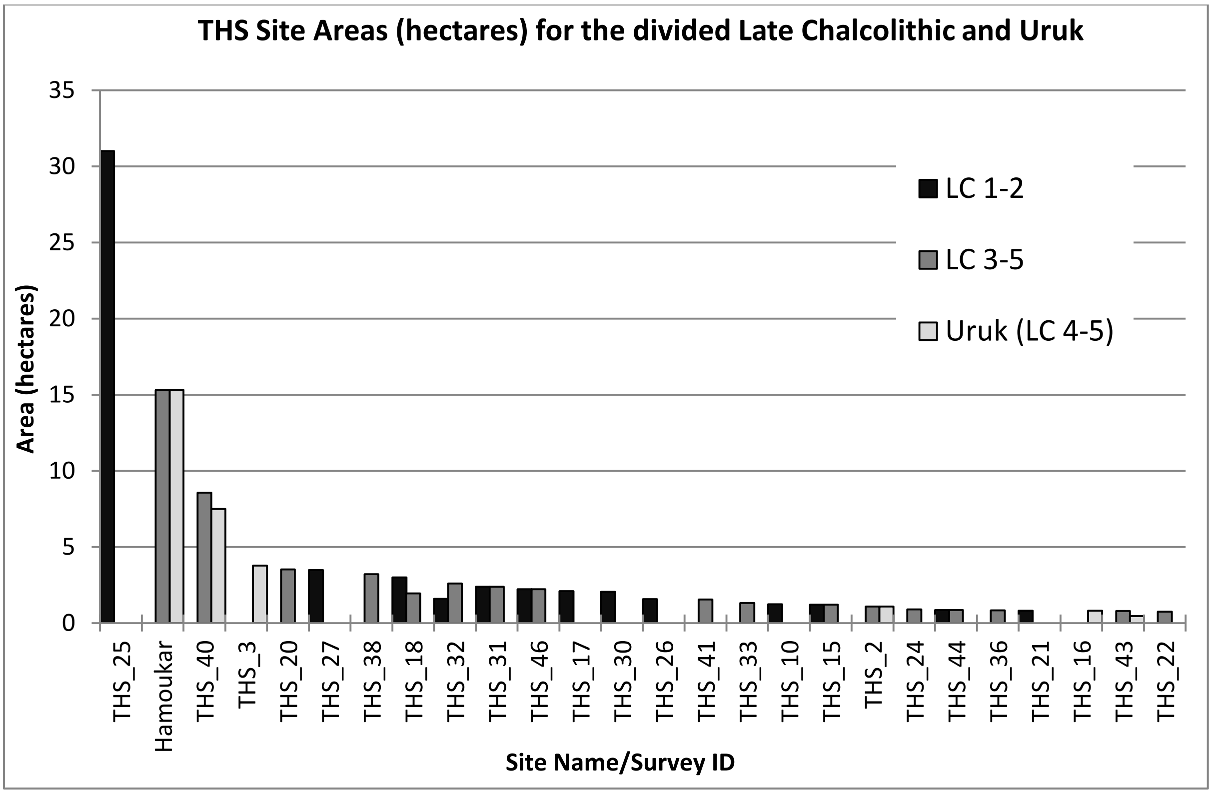


Figure 6.6: Graph of THS Site Areas (hectares) for the divided Late Chalcolithic phase and Uruk phase

Already some 16 hectares by the end of the Ubaid, Tell al-Hawa was the largest site in the area by a considerable distance through to the end of the Khabur period, and reached somewhere between 33 and 50 hectares during the Late Chalcolithic (Ball et al. 1989). In the THS the intriguing site of THS_25 extended over at least 31 hectares during LC 1-2, and may have been as large as 300 hectares, before being replaced by the LC 3 phase by a smaller 15 hectare settlement at Tell Hamoukar itself (Ur 2010a; Al Quntar et al. in press). Secondary settlements in the NJS were probably located at NJS_19, NJS_89 and NJS_91, all of which were over 5 hectares, whilst THS_40 reached 8 hectares during the LC 3-5 phase. However, clear hierarchies are difficult to distinguish from settlement size and the vast majority of sites were small villages fairly evenly distributed across the landscape and situated on wadis (see Figure 6.6 and Figure 6.7).

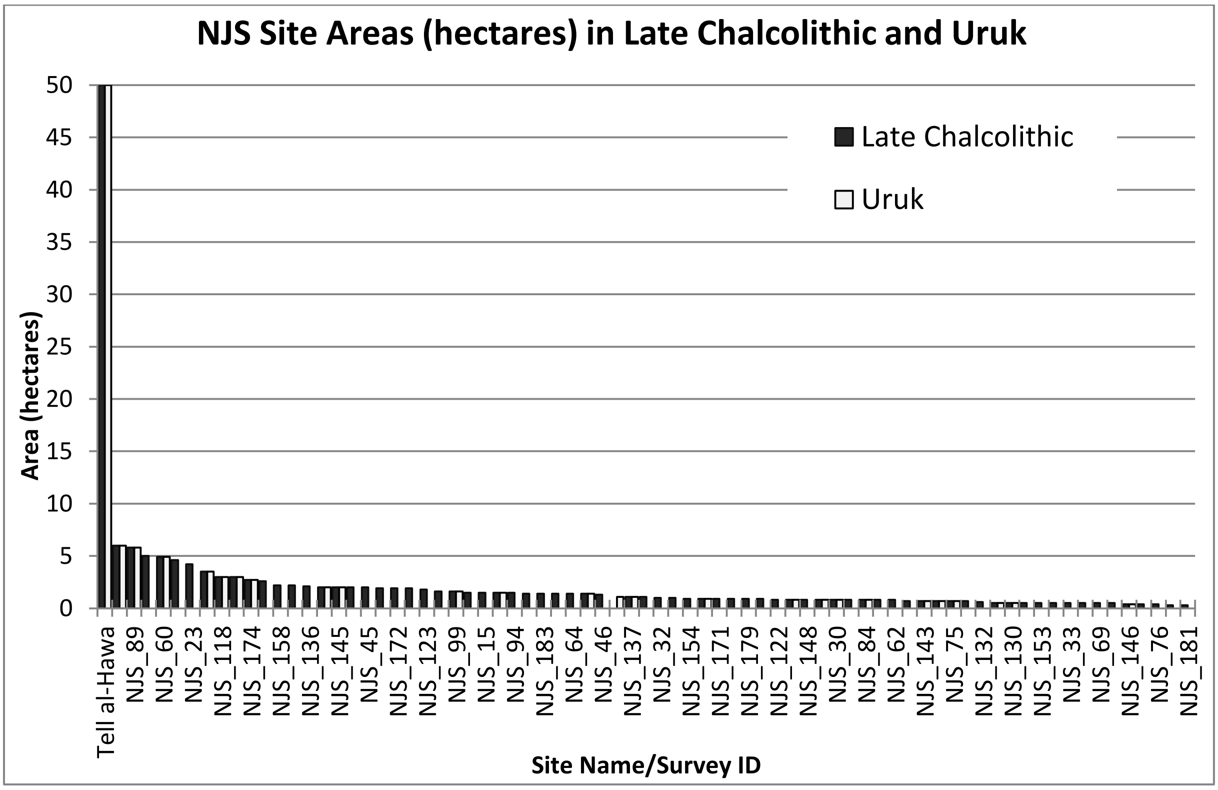


Figure 6.7: Graph of NJS Site Areas (hectares) for the divided Late Chalcolithic phase and Uruk phase

Emerging Complexity during the early Late Chalcolithic in the Tell Hamoukar Survey

The beginning of the Late Chalcolithic in the THS area saw the development of a number of new sites of varying size. Only two Ubaid sites were recorded within the survey, a marked difference to the NJS, although the dispersed village pattern one might expect was visible during the Halaf phase. Settlement in the LC 1-2 phase was dominated by the southern extension of Tell Hamoukar, THS_25 in the survey. This extremely complex site includes a central mounded area of around 31 hectares and a scatter of phase 4 (LC 1-2) pottery, along with thousands of obsidian artefacts, including flakes, blades and cores, covering 270 hectares (Ur 2010a; 96). Excavations at the site revealed very shallow stratigraphy of between 20 and 50cm, along with sparse architectural remains, including a single wall and possible floor layer and a number of burials (Wilkinson 2002; Al Quntar et al. in press). The ephemeral nature of the archaeological deposits and the presence of noticeable differences in the density of mottling visible on CORONA imagery, along with the sheer scale of THS_25, suggest it should not be interpreted in the same way as other sites during this period and that we cannot assume that the area of sherd scatter is representative of sedentary occupation (Ur 2010a; 96-98). This picture is further complicated, however, by the presence of fragments of large storage jars, along with a general high density of artefacts, suggesting a certain degree of permanence (Ur 2010b). The presence of obsidian in all stages of working suggests the site may have operated as an import and manufacturing centre. Analysis of the provenance of the obsidian found at the site demonstrated a link with southern Turkey, and particularly sources in the Bingol area in the Taurus (Khalidi et al. 2009), some 150km away. It is not clear whether this obsidian trade involved the movement of individuals directly from obsidian sources to THS_25. A possible model which would explain all of the current data would argue for the presence of non-sedentary groups, possibly practising vertical nomadism, moving between the Taurus and the Jaziran plains and also trading in obsidian (Khalidi et al. 2009; 891). This would account for the 'low density urbanism' inferred from excavation and imagery (Ur 2010a; 98). In the graphs and calculations below, I have assumed the area of the dense scatter across the 31 hectare mounded part of the site to be representative of occupation. This may be an under-representation given the scatter elsewhere but appears to be the least arbitrary method of assessing area. Even this lower estimate places THS_25 as one of the three largest sites in the basin along with Tell al-Hawa, at between 33 and 50 hectares, and Tell Brak at 55 hectares (Ur et al. 2011).

Along with the emergence of THS_25, the presence of new alignments of sites during the LC 1-2 phase also provides evidence for long-distance networks. Two east-west site and hollow way alignments are present in the THS, one leading directly to THS_25 and one conspicuously bypassing it to the north (Figure 6.8). This orientation also allows us to trace these routes through the NJS. Tracing routes between the two surveys is somewhat problematic during this period due to the problem of contemporaneity mentioned above; we may be making use of LC 3-5 sites in the NJS to complete alignments. Looking for lines of sites in a reasonably dense and dispersed settlement pattern such as that found in the NJS is always likely to yield false positives. Furthermore, similar routes are also likely to have been present during the LC 3-5 periods, and are especially visible during the period of southern contact (LC 4-5, see below), meaning the alignments may be real in the NJS but may post-date those in the THS. This issue cannot be overcome except through reanalysis of the ceramics from the NJS. For now, we can say that the presence of alignments in the THS, possibly continuing into the NJS, supports the evidence of fairly long-range trade networks provided by the obsidian provenance analysis for THS_25.

Interestingly, the east-west alignments visible in the THS would cross cut the most direct routes to the obsidian sources in the Taurus and around Lake Van which run roughly north-south, either up the Tigris valley or through passes in the Tur Abdin. If the model of semi-sedentary pastoralist traders moving between the mountains and the plain is accepted, we might argue that the east-west trade made use of a different organisational network, perhaps more closely related to sedentary settlement. However, there is certainly insufficient evidence to go further with this model at present.

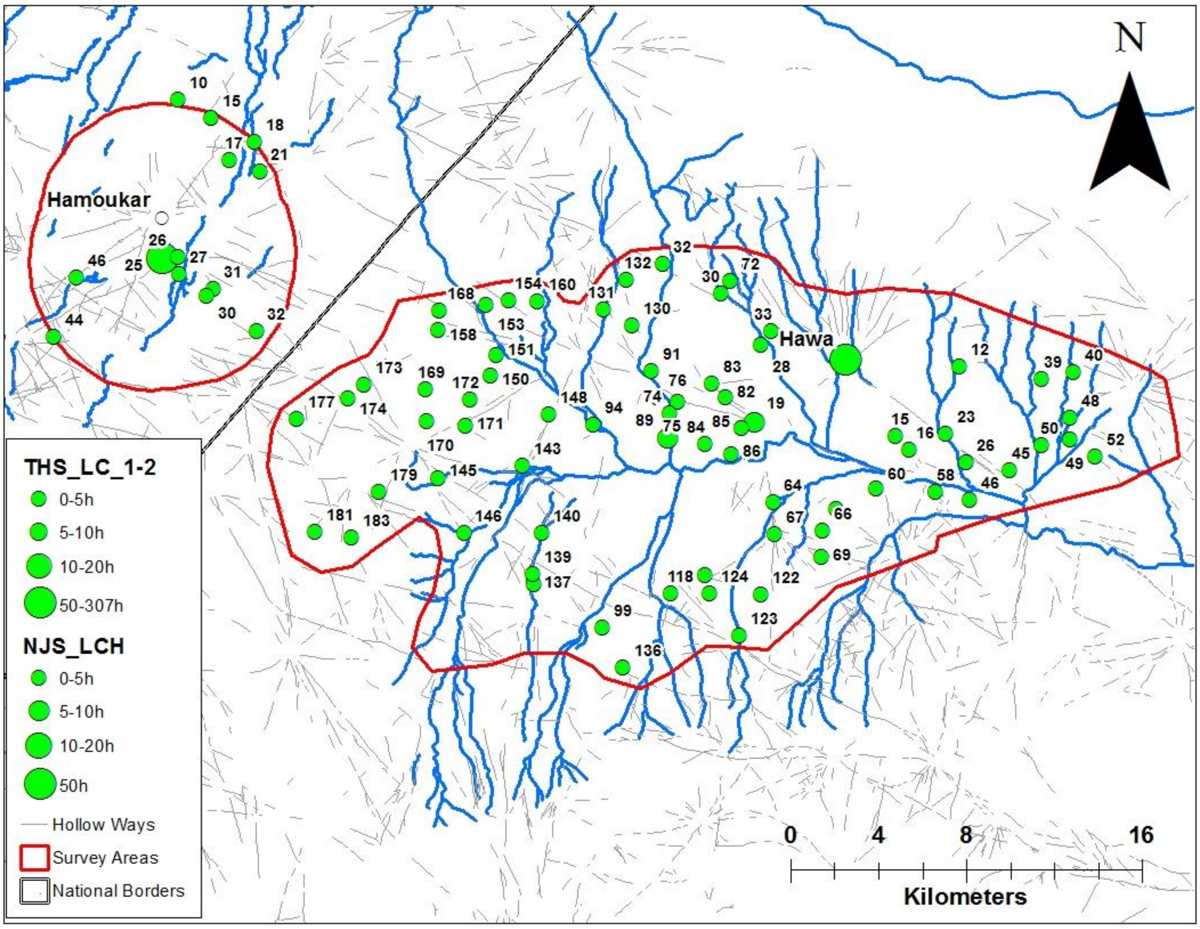


Figure 6.8: Settlement patterns and possible routes in the THS and NJS during the early Late Chalcolithic. Note the THS sites are only those recorded as LC 1-2 (phase 4) whilst the NJS sites are those for the entire Late Chalcolithic.

The Later Late Chalcolithic in the North Jazira and Tell Hamoukar Surveys

Assuming THS_25 to be 31 hectares, the total settled area in the THS remains remarkably consistent between the LC 1-2 and LC 3-5 phases, at 51 and 50 hectares respectively. However, the organisation of settlement changed considerably. THS_25 was replaced by the 15 hectare upper tell at Hamoukar and a distinct gap emerged in the north-west of the survey area. Hamoukar was surrounded by a halo of smaller settlements at a distance of 3-4 kilometres, mirroring the pattern found around Tell al-Hawa (Figure 6.9). This may be interpreted as deliberately non-settled agricultural land surrounding the main site. A possible alignment exists following the earlier route to the south east of Hamoukar via the THS_30 and THS_31, which were occupied across both phases, whilst three of the five sites present in the northern alignment are no longer occupied. It is possible that trade routes realigned around the emerging centre at Hamoukar after the decline of THS_25.

Dealing with the Uruk in the North Jazira and Tell Hamoukar Surveys

Both surveys recorded Uruk forms as a different class of pottery, although in rather different ways. The NJS was undertaken before the establishment of the Santa Fe chronology and recorded southern types as a noted part of the general Late Chalcolithic assemblage. This was later clarified by Lupton (1996) into Pre-contact and Contact phases. A decade later, a full understanding of Hamoukar's place in the Uruk expansion was one of the stated goals of the survey and excavation (Gibson 2010; Ur 2010a), resulting in greater attention being paid to the phase. Across the surveys, as in the Middle Euphrates, we are faced with the issue of whether to categorise the southern ceramics as a chronological phase or as a type within the later Late Chalcolithic assemblage signifying southern contact. This question can only really be resolved through stratigraphic association, or lack thereof, between southern Uruk and local Late Chalcolithic styles. However, excavated data within the region provides little help in this matter. One of the sites excavated within the remit of the Jazira Irrigation Project, Tell al-Dur (RJP 17, almost certainly NJS_83 Area A[24]) contained both local and southern types (Middle/Late Uruk in the sequence used in the publication), but nothing is known of their stratigraphic relationship (Altaweel 2007; 120). At Hawa, 'Northern Uruk' ceramics were excavated in trench LP, whilst the other trenches concentrated on second millennium remains (Ball et al. 1989; 40). Given the absence of Amuq F style ceramics, the LP assemblage most probably dates to the earlier part of the LC sequence, perhaps LC 1-2. No southern Uruk material was excavated and all records for southern style ceramics at the site come from the surface collection. Possible evidence of southern interaction can be found in Area B at Hamoukar, where southern style sealings were found in association with LC 3 seals and ceramic types (Gibson et al. 2002a; 29). Elsewhere in the sub-region, excavations in area TW at Brak show a gradual transition from LC 3 ceramics in level 14 to LC 3 and southern style ceramics in level 13. By level 11, the assemblage is entirely southern (Oates 2002). How far this relatively small exposure at such a large site can be considered to be representative of the wider settlement pattern is difficult to say. Overall, the evidence does suggest that there was chronological overlap between local and southern traditions, but there is still no clear relationship between the distinct ceramic groups.

[24] The spatial location of the sites within the Jazira Irrigation Project and the relationship between these sites and site numbers within the NJS is extremely difficult to determine due to the nature of the evidence available. Estimations have been made by Altaweel (2006) based on similarities of site description [distance from villages, morphology, dimensions etc.) and periodization and, again, these will be followed here.

Further arguments for some level of contemporaneity between the LC 3 type assemblages and southern Uruk sites comes from the surface assemblages and settlement patterns derived from the surveys. Only one site in either of the surveys exhibited wholly southern style ceramics without any possible LC 3 forms, THS_3, the collection from which was extremely small and difficult to interpret (Ur 2010a; 103). At the vast majority of the sites surveyed in both the NJS and THS, southern Uruk and local Late Chalcolithic sherds were found on the same mound and over similar areas (see Figure 6.9), suggesting a degree of continuity of settlement, if not an actual stratigraphic relationship. A large number of sites with LC 3 material in the THS, and general Late Chalcolithic in the NJS, did not produce southern Uruk pottery. This means that if we are to treat the Uruk as a phase, we must explain the abandonment of these sites at the end of the LC 3 phase. For the NJS, we might suggest that these are simply LC 1-2 sites which were abandoned over the course of the earlier Late Chalcolithic. This argument cannot, however, be used to explain the presence of a significant number of sites in the THS with only LC 3 type ceramics. Finally, as in the Middle Euphrates, southern Uruk ceramics are distributed in a patterned way across the landscape (Figure 6.9) and also concentrated at the larger sites (see Figure 6.6 and Figure 6.7).

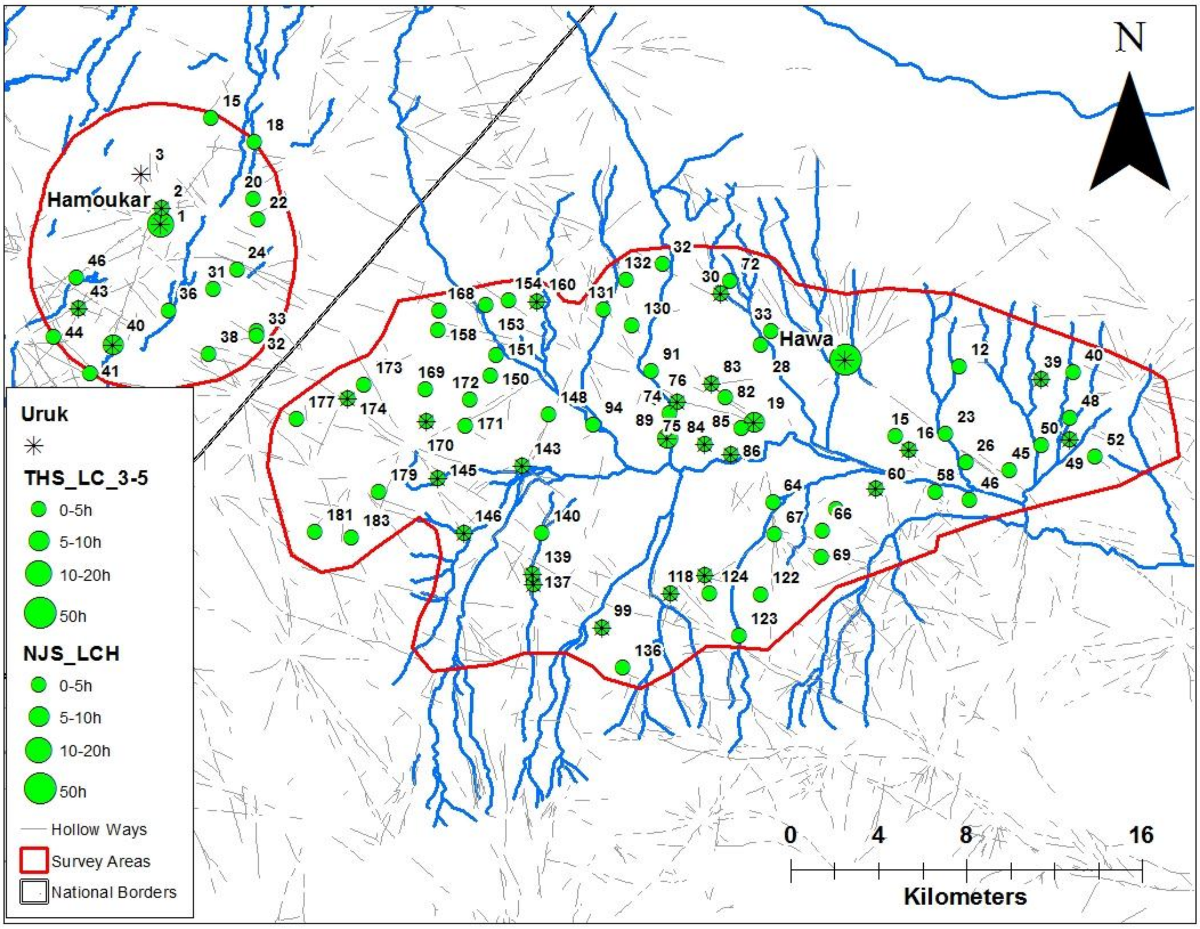


Figure 6.9: Settlement patterns in the THS and NJS during the Late Chalcolithic and Uruk phases. Note the THS sites are only those recorded as LC 3-5 (phase 5a) whilst the NJS sites are those for the entire Late Chalcolithic

The Uruk settlements in the NJS seem to align themselves along three axes, all of which run roughly east-west through the survey area. The northernmost of these includes Tell al-Hawa, whilst southern two converge on Tell Hamoukar which itself has a significant Uruk presence. Survey further to the west in the Leilan region also noted a concentration of Uruk sites along the Wadi Radd corridor (Brustolon and Rova 2007), perhaps continuing to Tell Brak. These axes also coincide with the long distance route-ways visible in the settlement pattern of the LC 1-2 phase in the THS, hollow ways of the third millennium and on a larger scale the regional communication and exchange networks hypothesised by Algaze for the Uruk period (Algaze 2005 [1993]; 45, Fig. 21).

If we are to consider the southern Uruk ceramics as a phase, then, we must explain a massive decline in settlement which includes the abandonment of large areas of the survey region, along with a concentration of settlement at a few larger centres. It seems more parsimonious to suggest the continued presence of wholly indigenous settlements during the later part of the Late Chalcolithic, and that southern interaction was restricted to the larger centres and sites situated on significant trade routes, as seen in the other areas (Lupton 1996; 72). The recording methods for Uruk ceramics employed in the NJS are limited to counts of diagnostic types and preclude further investigation in this matter. However, the more nuanced collections obtained in the THS show that the quantities of southern style ceramics, and their ratio to local types, is far from consistent. Of the four Uruk sites, Hamoukar and the small site of THS_43 were predominantly local with small numbers of southern types in comparison to LC 3. By contrast, THS 40, at 8 hectares the second largest site in the survey area, and THS_2, situated less than 200 metres from Hamoukar itself, were dominated by southern sherds, leading Ur (2010a; 150) to suggest that they may represent intrusive southern colonies. The THS provides too small a sample to make inferences in regard to the settlement patterns in the NJS but it is clear that Uruk interaction in this area was not uniform. Whether these differences represent contemporary forms of existence or successive waves of interaction remains to be seen.

The Early Third Millennium in the North Jazira and Tell Hamoukar Surveys

The definition of the Early Third Millennium (ETM) phase in both the NJS and THS was reliant on Ninevite V ceramic types which were in use for the first 500 years of the third millennium. Further chronological division was possible to some degree in both surveys, made on the assumption of a progression from painted decoration to incised and finally excised grey ware sherds (Roaf and Killick 1987; Wilkinson and Tucker 1995; 49; Ur 2010a; 249). However, painted Ninevite V types rarely survive on the surface, meaning assemblages were for the most part dominated by the incised and particularly excised grey wares. The settlement patterns and settled areas given for the ETM period in both surveys are therefore heavily reliant on the later ceramics and most probably reflect settlement towards the end of the phase. This may account to some degree for the stark contrast between the Late Chalcolithic and ETM, since we are comparing settlement patterns which may be as much as two or three hundred years apart. There is strong continuity in total settled area between the Late Chalcolithic and Early Third Millennium (ETM) phases in the NJS, with a slight decrease from 162 to 156 hectares. However, the raw figures mask a substantial reorganisation of settlement, including the total abandonment of the south-western parts of the survey area and a significant nucleation of settlement into larger centres.

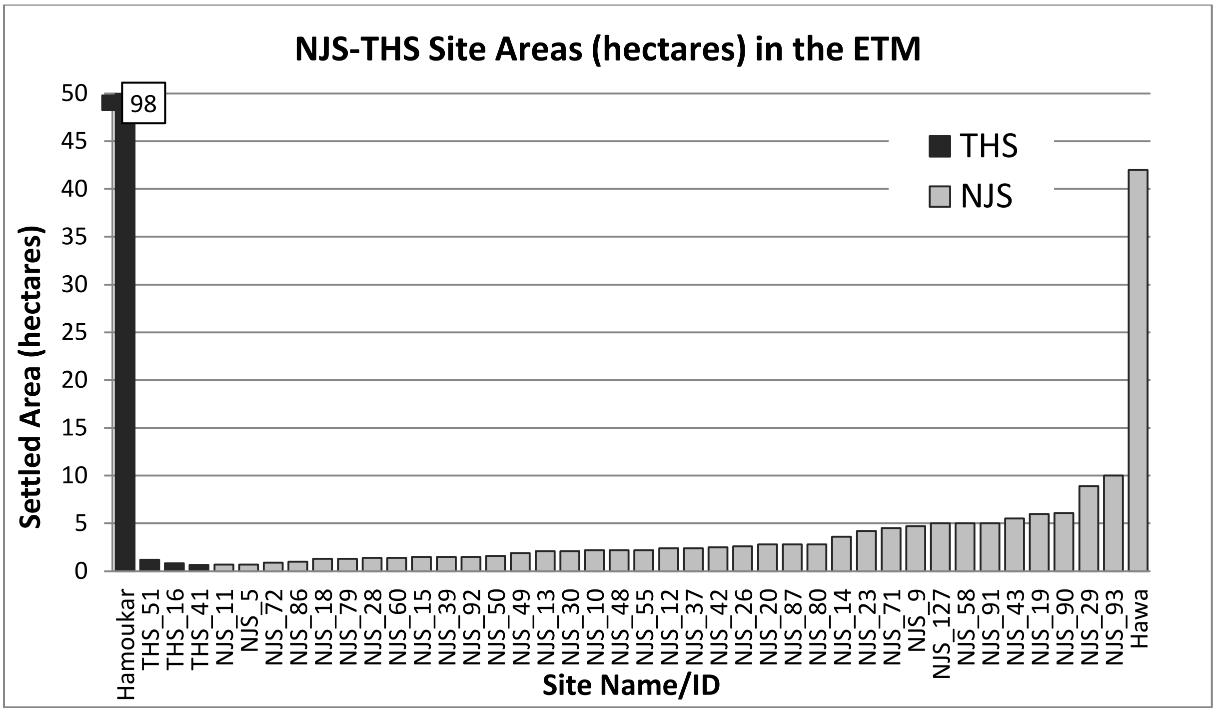


Figure 6.10: Graph of NJS and THS Site Areas (hectares) in the ETM phase

Surprisingly, Tell al-Hawa may have actually contracted during this phase, assuming it had reached 50 hectares in the closing stages of the Late Chalcolithic, to approximately 42 hectares (Ball et al. 1989). However, by the end of the ETM, a four tiered settlement hierarchy had developed, with larger satellite settlements at Tell al-Samir (NJS_93) and NJS_29 reaching between 8 and 10 hectares and a third level of larger villages between 4 and 6 hectares, as well as a number of smaller sites (Figure 6.10). By contrast, settlement in the THS more than doubled, from 50 hectares to just over 100. The vast majority of this settlement is accounted for by Hamoukar itself which reached 98 hectares by the end of the phase (Ur 2010a; 105) and was therefore one of the largest sites in Northern Mesopotamia at this time. Three other sites were occupied at some point during the ETM, all of which were smaller than 1.2 hectares. None of these sites, including the two very close to Hamoukar itself, THS_51 and THS_16, had later excised decorated Ninevite V type ceramics in their assemblages, meaning they were probably abandoned in the earlier stages of the ETM. This means that during the period when Hamoukar was reaching its maximum size there were no other sites occupied in the survey area.

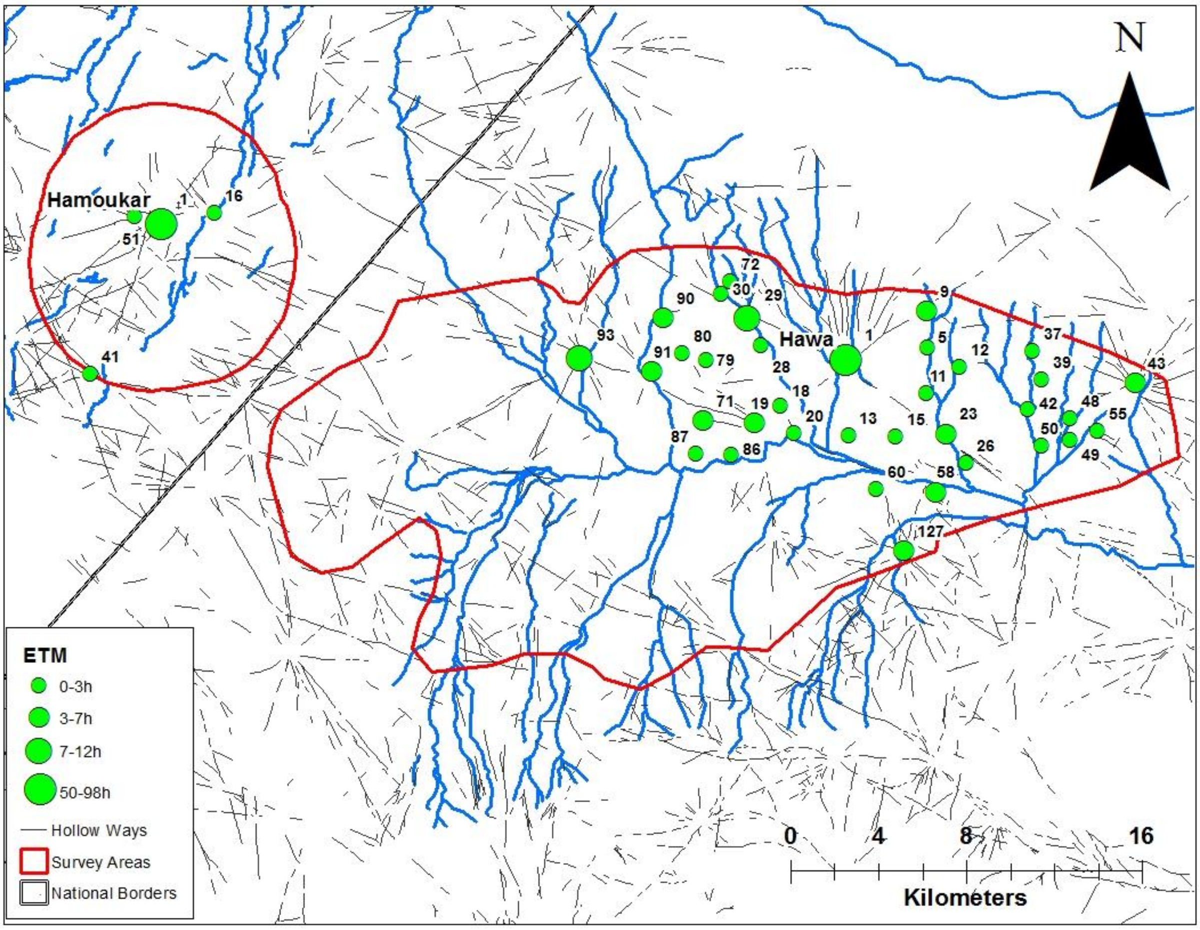


Figure.6.11: Settlement patterns in the THS and NJS during the ETM

The most obvious settlement pattern change in either survey is the total abandonment of the south-western part of the NJS (Figure.6.11). This desertion is difficult to interpret but may be the result of the need for pasture land in a densely settled landscape (Wilkinson and Tucker 1995; 88; Wilkinson 2000c). The newly opened area is located in an accessible location for inhabitants of both Hamoukar and Hawa (Figure 6.12) and may be taken as an indication of the presence of two separate but related systems centred on the two major sites. If this were the case, the larger size of Tell al-Samir (NJS_93) may be explained as one of the closest sites to this pastoral area and also as roughly equidistant between Hamoukar and Hawa, and therefore a centre for mutual interaction. The abandoned sites include all of those involved in the possible Late Chalcolithic and Uruk southern route running from Hamoukar to the south-west, perhaps hinting at a decline in more long-distance trade, or at least a realignment to routes further north. There is a distinct ring of smaller settlements around the urban centre at Tell al-Hawa, and to a lesser extent the larger satellites at Tell al-Samir and NJS_43, which can be correlated with low density sherd scatters and probably relates to the zone of intensive farming around the larger sites (Wilkinson 1982; 1994; 7). Similar sherd scatters were recovered to the north of Tell Hamoukar (Ur 2010a; 75, Fig. 5.18) suggesting an equivalent zone of intense cultivation may in part account for the lack of sites in the THS during this phase. The small sites which make up the halo around Tell al-Hawa are located between three and five kilometres from the main site.

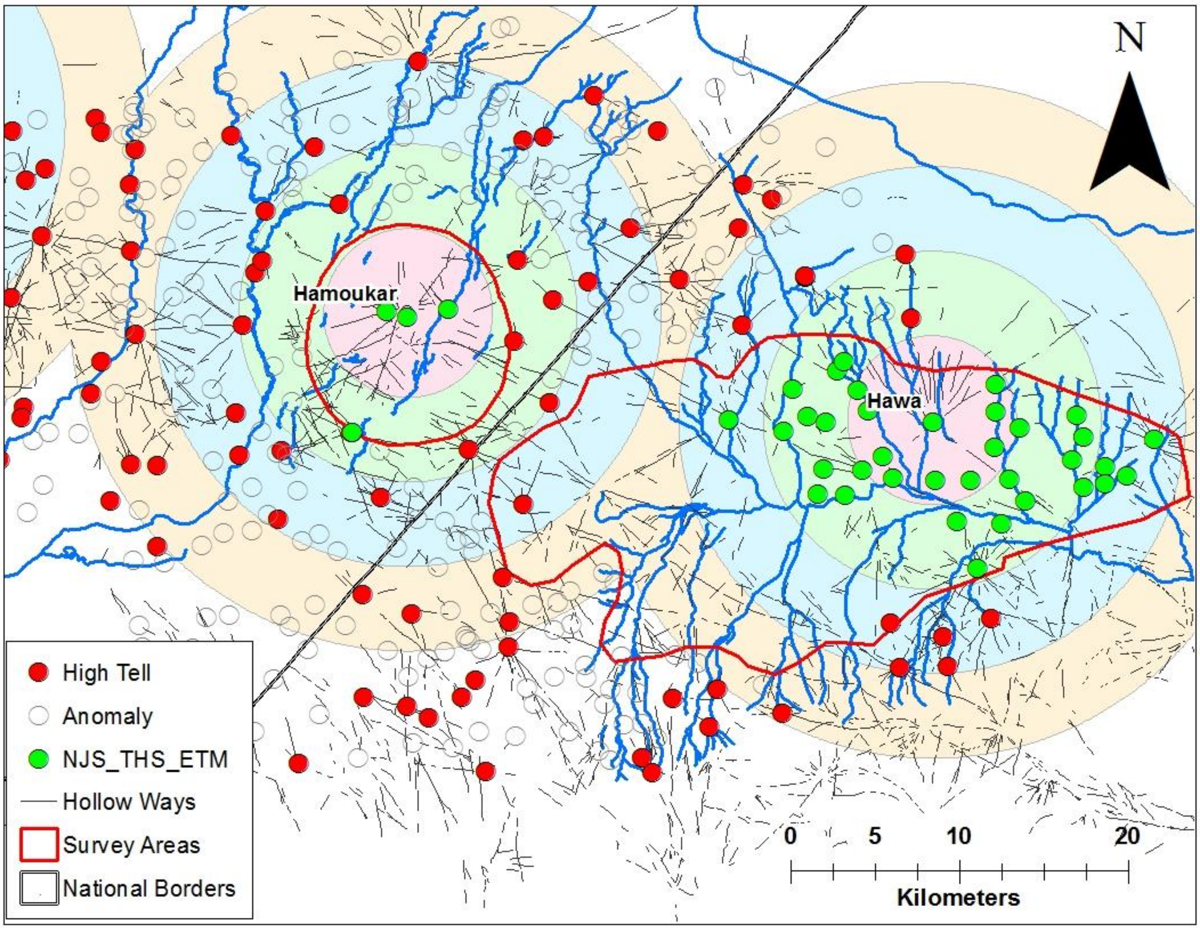


Figure 6.12: ETM sites in the NJS and THS along with anomalies mapped from CORONA imagery, divided between high mounds and low mounds. Buffers at 5km intervals from Tell Hamoukar and Tell al-Hawa have also been included

Given that Hawa was less than half the size of Hamoukar at this time, we might expect a larger area surrounding Hamoukar to remain unoccupied. Calculations by Ur (2010a; 154) for the Later Third Millennium (LTM), when Hamoukar was only 5 hectares larger than in the ETM, have demonstrated that, assuming 100 persons per hectare and that fallow was not violated, almost all the land within the survey area would have needed to be utilised to feed the population. Ur argues against the utilisation of such a large area for the LTM on the basis of estimates of agricultural zones derived from the catchment of the hollow ways around the site, as well as the presence of numerous small sites during that phase, and instead suggests yields may have been enhanced by the violation of fallow. However, it may be that the lack of sites in this earlier period is a reflection of the land needed to feed the site under a more sustainable cropping regime. If this were the case, we should look for potential satellite settlements in the wider area around Hamoukar.

Given the provisos mentioned above, extrapolation from surveyed data to imagery derived data should be undertaken with great caution in the eastern Jazira. However, we can be reasonably sure that distinctive high mounded sites with radial hollow way patterns were occupied during the EBA (see Figure 6.3 and Figure 6.4). Mapping such sites in the vicinity of Hamoukar suggests there was significant EBA settlement in the region, and therefore it is likely that some of this included ETM settlement (Figure 6.12). The wadi systems to the west of Hamoukar appear to be fairly densely settled and there are a number of sites which fall between the two surveys in the modern border zone between Syria and Iraq. Of particular note is the imagery-mapped site within the NJS survey area, NJS_156. No EBA ceramics were found at the site during the survey but it was only briefly visited, and the main 10m high mound within the village was not collected (Wilkinson and Tucker 1995; 133). The main mound and hollow way pattern together present the kind of morphological signature which would be considered very likely to be EBA if it were outside the survey area, and as it was not fully collected it has been included here.

The Later Third Millennium in the NJS and THS

The Later Third Millennium (LTM) phase covers the entire second half of the third millennium, and therefore includes the development of the Akkadian Empire and its collapse and aftermath within a single phase. The LTM sees rather divergent developments in the NJS and THS. In the NJS, the process of nucleation which began in the ETM continues, with a decrease in sites occupied, from 38 to 24, and a very slight increase in total settled area, from 156 to 161 hectares. Tell al-Hawa increased in size from 42 hectares to 66 hectares and the four tiered hierarchy which began to develop in the ETM became much more pronounced (Figure 6.13). Secondary centres were located at Tell as-Samir (NJS_93), which grew from 10 to 19 hectares, Kharaba Tibn (NJS_43) and Abu Kula (NJS_127) which reached 17 and 10 hectares respectively. There is some evidence that both Kharaba Tibn and Abu Kula may have had substantial city walls based on surface finds of large limestone blocks (Wilkinson and Tucker 1995; 51). Below these larger satellites, a clear third tier emerged of between 5 and 10 hectares. This expansion of the larger sites was closely paralleled by a decline in the number of smaller villages, especially around Tell al-Hawa. Smaller villages did remain around Kharaba Tibn, and to a lesser extent Tell as-Samir, despite their increases in size. The LTM in the THS, in contrast, saw an expansion of small sites in the immediate vicinity of Hamoukar, which itself grew slightly to 103 hectares. All three small sites occupied in the ETM continued into the LTM and 11 new sites were founded. Of these, 8 were considered trace occupations due to the low level of mounding and sparse ceramic collection and may represent temporary settlements related to agricultural labour. These sites may represent a reorganisation of the population, and therefore labour, from Hamoukar itself or the presence of non-local groups such as pastoralists (Ur 2010a; 109). As in the previous period, site hierarchies are impossible to discern. Only one site within the THS, THS_54, reached a size which would be considered within the third tier of settlement in the NJS. This lack of satellites can almost certainly be attributed to the size of the survey area. In the NJS the three second tier settlements are situated 12-13km from Tell al-Hawa, whilst only one larger village was present in the equivalent zone to that covered by the THS in the vicinity of Hamoukar.

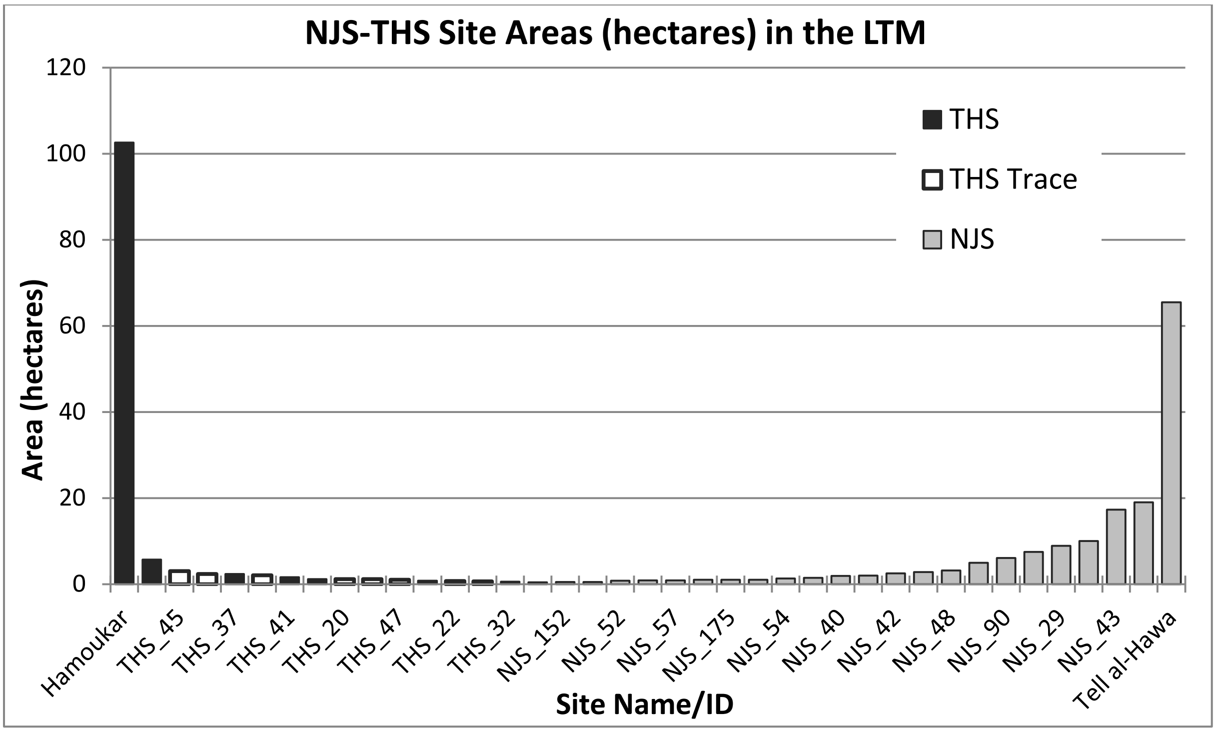


Figure 6.13: Graph of THS Site Areas (hectares) for the LTM phase

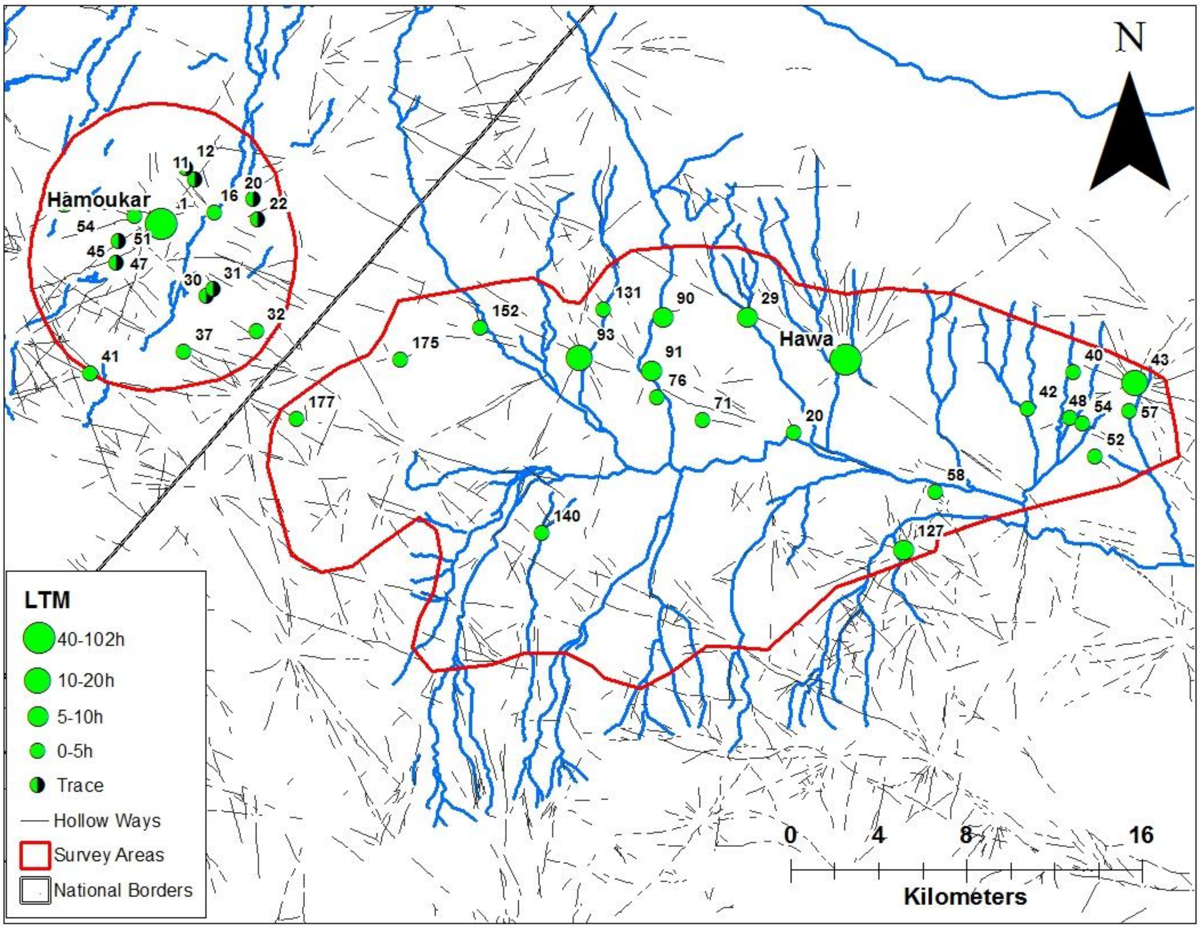


Figure 6.14: Settlement patterns in the THS and NJS during the LTM

Settlement patterns in the NJS continue the ETM abandonment of the south and western part of the area. However, a notable string of settlements appear in a linear arrangement in the north western section of the survey, from east to west NJS_152, NJS_175 and NJS_177 (Figure 6.14). Given their proximity to Hamoukar, it is possible that these small villages represent the edge of that system, in which case the fact that they were (re)settled during the LTM can be seen as part of the same phenomenon as in the THS. The only other site which encroaches on the area abandoned during the ETM, NJS_140, was recorded as only 1 hectare in the LTM. This may be an underestimation due to overburden from the large Khabur phase occupation, when the site reached 8 hectares. It is possible that this site, along with Tell as-Samir and perhaps the site at the un-surveyed high mound of NJS_156, may have served as an administrative or exchange centres for pastoralist activities in the abandoned zone. Alternatively, the location of both NJS_140 and NJS_156 on the potential hollow way route from Hamoukar to the Tigris may have resulted in increased traffic through the sites resulting in the development of larger settlements.

The Khabur phase in the North Jazira and Tell Hamoukar Surveys

Following the EBA, a marked difference in settlement organisation between the NJS and the THS emerged during the Khabur phase. Within the NJS, the total settled area increased from 161 to 237 hectares and site numbers also went up, from 24 to 45. Tell al-Hawa remained around 66 hectares, whilst the major satellites at Tell al-Samir and Kharaba Tibn and Abu Kula either remained the same size or grew very slightly. The major rise in settlement occurred in the third tier of medium sized villages, and also through the return of small satellite sites around Tell al-Hawa. Satellite settlements also remained around Tell al-Samir, although not around Kharaba Tibn where the growth of NJS_48 may have drawn in local populations. Overall, the Khabur phase in the NJS could be considered as both a continuation of the nucleation seen in the LTM and an expansion of the smaller sites. This cannot be said of the THS, where the main centre at Hamoukar was completely abandoned. In fact, no clear Middle Bronze (MB) 1 types were found across the survey, suggesting a brief abandonment of the area (Ur 2010a; 109). When settlement did return it was at a much reduced level, reaching only 32 hectares spread over 9 sites. The distribution of site sizes shows some parallels with the NJS, although without the larger centres. Thus the 10 hectare site at THS_24 corresponds to medium sized towns in the NJS such as NJS_91 and NJS_127, whilst the larger village sites of THS_18 and THS_54 at just over 5 hectares can be related to at least eight sites in the third tier of settlement in the NJS.

Settlement patterns in the NJS demonstrate some continuity from the preceding LTM phase. The resettlement of the south-west part of the survey area abandoned during the ETM continues, with a number of small settlements founded in the southern zone and the expansion of NJS_140 from 1 hectare (although probably larger, see above) to 8 hectares. The halo of smaller sites around Tell al-Hawa is particularly clear during this period, with no sites within a 4km radius. Tell al-Samir also has a similar halo, and as in the preceding phases there is still a large gap immediately to the south. The growth of villages around Tell al-Hawa resulted in a very dense area of settlement which can be contrasted with the relatively sparse occupation both to the south in the NJS and west in the THS. Three small sites on the north eastern edge of the NJS, NJS_159, NJS_169 and NJS_175, are roughly equidistant between the larger centres at Tell al-Samir, NJS_140 and THS_24. If THS_24 and NJS_140 are considered mini-centres of a largely rural system, these three sites may represent nodes of exchange between the three systems. Alternatively, they may represent the western boundary of the settlement system centred on Tell al-Hawa. Possible alignments of sites are visible, all roughly orientated from south-west to north-east, but none of these can be clearly traced into the THS.

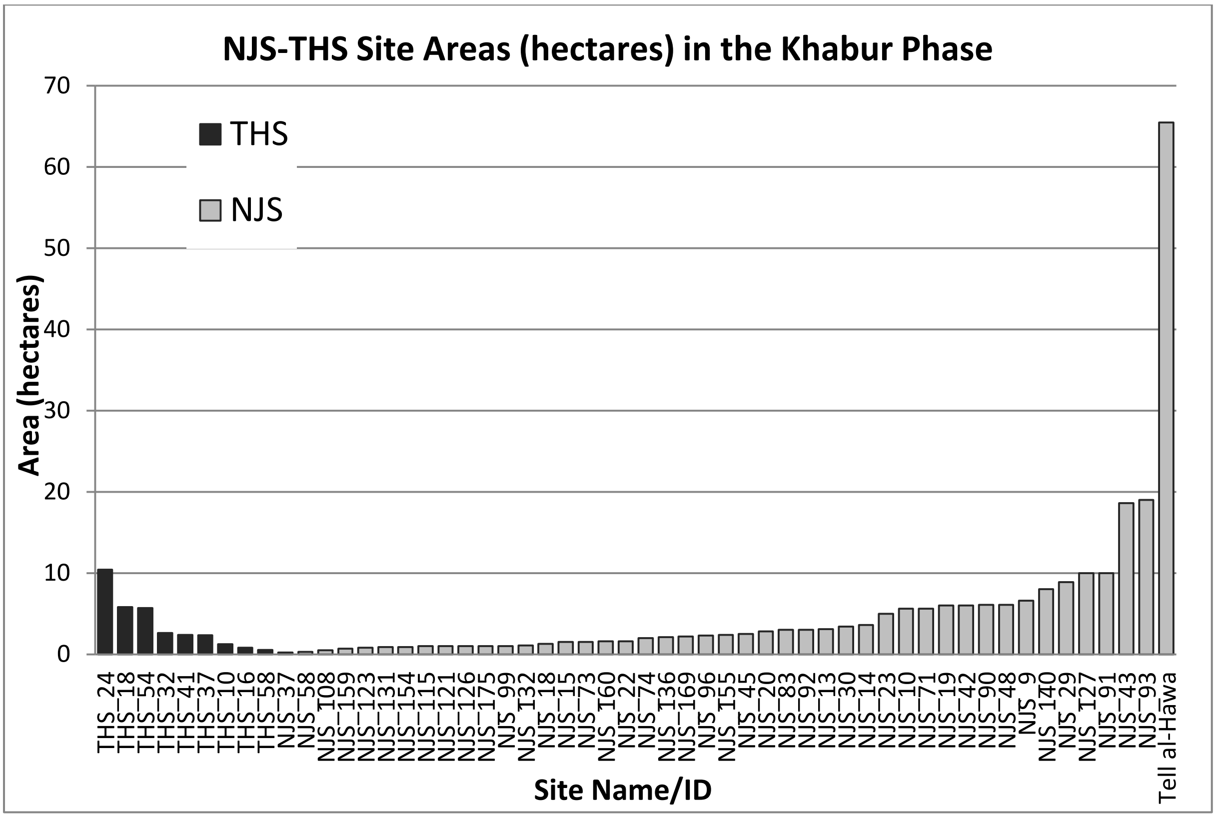


Figure 6.15: Graph of THS and NJS Site Areas (hectares) for the Khabur phase

Long distance routes between the Tigris and central Khabur sites such as Tell Leilan (Shubat Enlil) are historically attested for this period (Hallo 1964) and may be traced through larger sites where ancient names can be ascertained. This is the case for the Tigris routes, some of which passed through Tell Abu Marya (Apqum) and possibly Tell al Rimah (Qattara) (Wilkinson and Tucker 1995; Ur 2010a). Wilkinson and Tucker suggest the route from Abu Marya may have passed through the southern part of the NJS and included NJS_140 and perhaps NJS_123 (1995; 55). A direct path from this alignment would pass to the south of THS_24 through THS_32 and would take in the large village at THS_54. If the unsurveyed high mound at NJS_156 is included, a rough alignment of evenly spaced larger centres begins to emerge. Such interpretations are highly speculative at present and it is possible that the Abu Marya route may have passed to the south of both surveys

(Ur 2010a; 160). Alignments of sites further north are more difficult to discern due to the effects of the dense settlement around Hawa. It should also be remembered that Hawa, at 66 hectares a significant local city, may represent a destination of routes in itself.

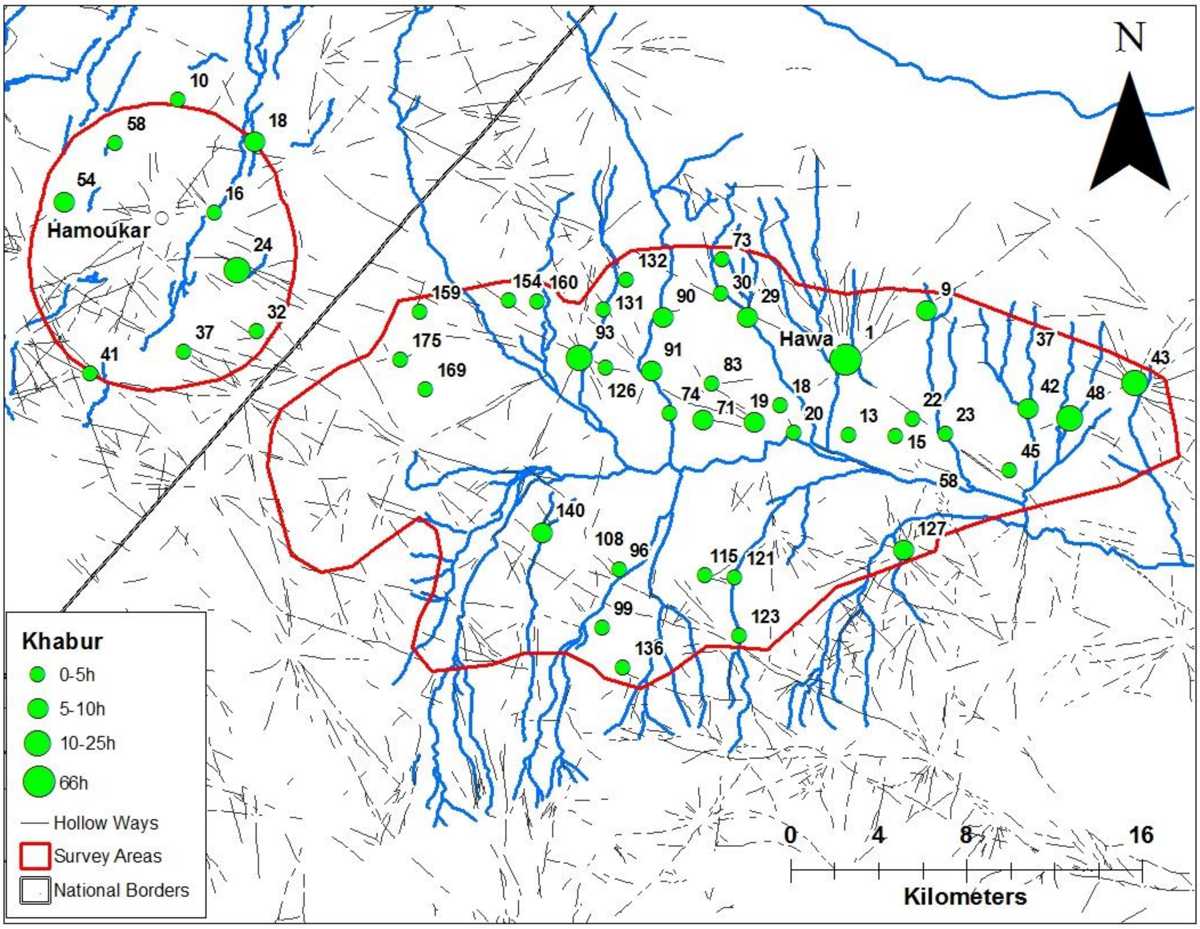


Figure 6.16: Settlement patterns in the THS and NJS during the Khabur phase

Trends in the North Jazira and Tell Hamoukar Surveys

For the prehistoric periods the majority of sites in both the NJS and THS are fairly securely dated to individual phases. Figure 6.17 shows the total settled area during each phase, displayed by the percentage likelihood of occupation, for the NJS. Two sites were recorded as generically prehistoric and account for the addition of just under a hectare of settlement below 20% likelihood of occupation in the Hassuna, Halaf, Ubaid and Late Chalcolithic phases. The addition of a small area of sites of between 40 and 60% likelihood in the Khabur phase is due to the presence of a number of sites with undifferentiated Second Millennium material. This has little effect on the overall trends. The main chronological challenge relates to the Uruk phase. The percentages reflect the uncertainty surrounding the continuing presence of Late Chalcolithic sites, a problem further compounded in the NJS by the undifferentiated Late Chalcolithic phase which most probably includes some sites which were abandoned by LC 3. The 80-100% figure for the Uruk phase presented below represents the area covered by southern ceramic types, whilst the large 20-40% relevant area represents the maximum amount of settlement continuing from the Late

Chalcolithic phase. The combined total of both Uruk and Late Chalcolithic is only slightly greater than the total for the Late Chalcolithic because, for the most part, the southern Uruk ceramics are found in the same areas of the same sites as Late Chalcolithic ceramics. Only one site in the NJS, NJS_26, included Uruk ceramics without local Late Chalcolithic material, resulting in a disparity of 1.1 hectares between settled area during the Late Chalcolithic and the maximum settled area during the Uruk period. Total settled area during the contact period (Lupton 1996), then, may be considered to be somewhere between the total hectares covered by the Uruk ceramics and the total of the Uruk and Late Chalcolithic combined, i.e. somewhere in the blue bar on the graph. Leaving aside the Uruk, the total settled area in the NJS demonstrates a remarkable degree of continuity, remaining between 155 and 160 hectares for almost two millennia between the end of the Ubaid and the Khabur phases, despite the fluctuations in settlement pattern. However, some interpretive caution is necessary as the Late Chalcolithic phase represents 1400 years, from 4400 – 3000, whilst the ETM and LTM cover 500 years each. In the THS, ceramic types were sufficiently distinct to allow every site to be securely ascribed to individual phases. Uncertainty in this case comes from the relationship between trace occupations and settled occupations. However, with the exception of the LC 1-2 phase, this uncertainty has little effect on the general trends.

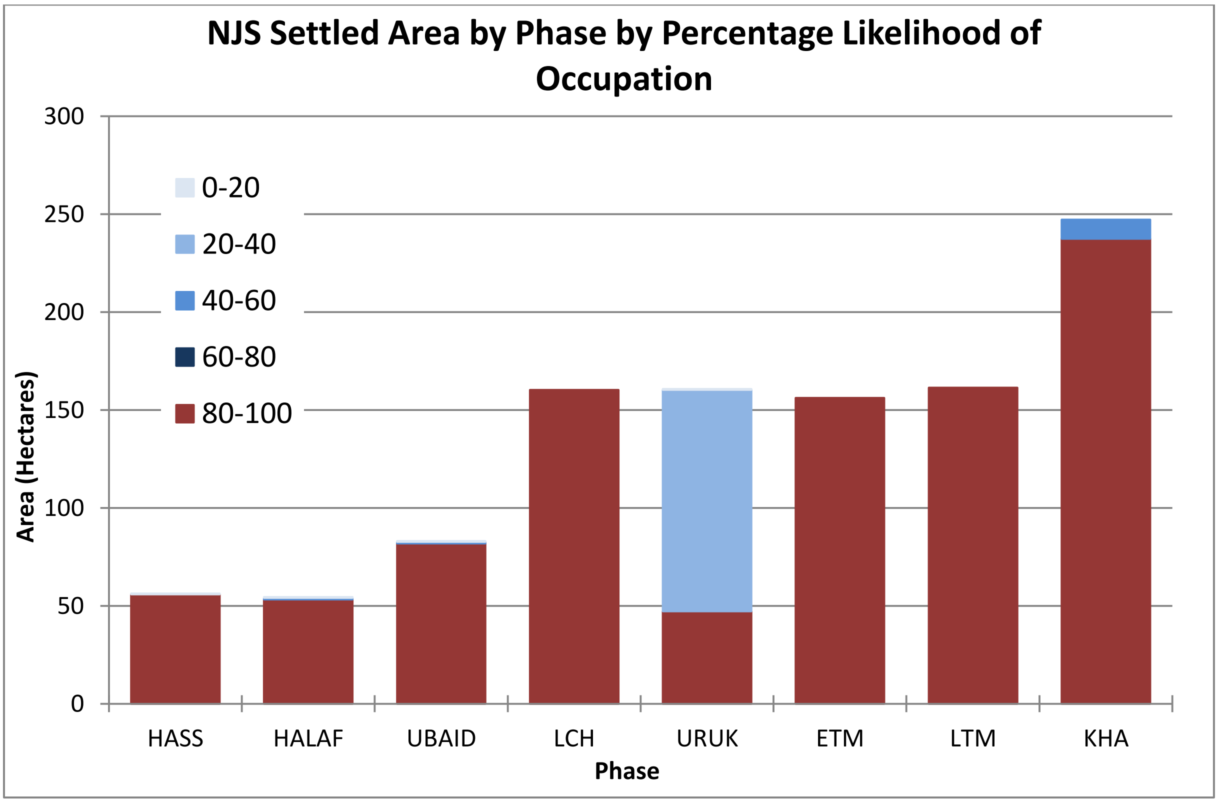


Figure 6.17: NJS Settled Area by Phase by Percentage Likelihood of Occupation

In the THS graph (Figure 6.18), the potential disparity between total settled area defining the Uruk as a phase in its own right and the total settled area based on the continuing occupation of local Late Chalcolithic sites is presented slightly differently. The Uruk bar shows the total settled area for the Uruk as well as the total area of LC 3-5 settlement which did not also contain Uruk ceramics. Settlement during the period when southern ceramics were in circulation in the THS area can be considered to be somewhere in the green area represented on the graph. Even leaving aside the trace occupation in LC 1-2, total settled area in the THS demonstrates greater fluctuations than the NJS. Low levels of settlement in the Ubaid were replaced by a reasonably high level of settlement during the Late Chalcolithic phase. Significantly, the shift from THS_25 to Hamoukar between the LC 1-2 and LC 3-5 phases appears to have little impact on the overall settled area. Total settled area rose sharply during the ETM with the development of Hamoukar and continued to rise in the LTM, although some of this was due to trace settlement. The demise of this system resulted in a massive decrease in settlement by the Khabur phase.

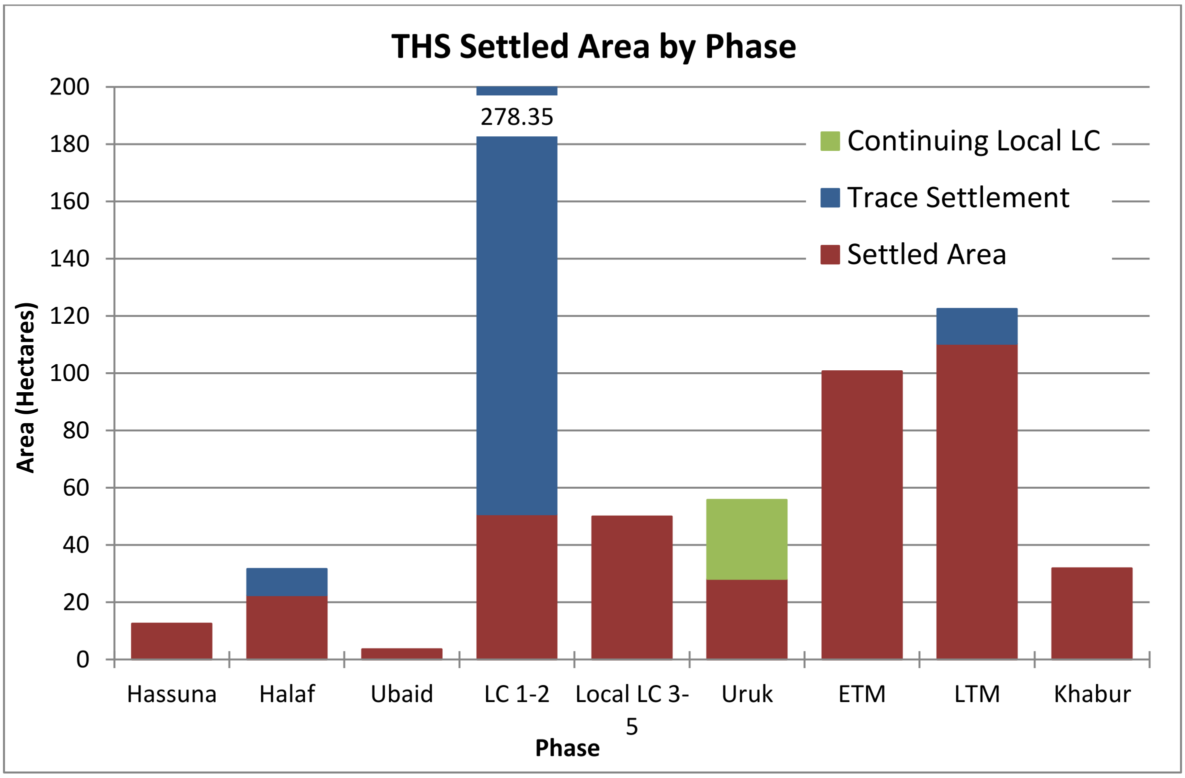


Figure 6.18: THS Settled Area by phase

We can use the timeblock graphs to examine the relationships between site size and organisation in both surveys. Figure 6.19 presents the total settled area in the NJS divided between the main centre at Tell al-Hawa, sites which grow into small towns (5-20 ha) and sites which remain small villages (under 5 ha). There are two clear trends in the area. Firstly, from the Halaf phase (1), through the Ubaid (2) and up to the Late Chalcolithic (3) and Uruk (4), settled area gradually increased at all levels of site size. Urbanisation of some kind took place at Tell al-Hawa during this period, such that the site reached approximately 50 hectares by the end of the Late Chalcolithic, but the majority of the population must have lived in small rural communities. Whatever interaction occurred during the Uruk contact phase had little impact on the overall settlement. This gradual build-up came to an end during the ETM (5) when the abandonment of the south-western section of the survey area led to a significant drop in the aggregate area of smaller sites. This coincides with a slight decrease in the size of Tell al-Hawa. However, total settled area remained the same as in the Late Chalcolithic phase due to a massive increase in the size of medium sized sites. Nucleation in the ETM in the NJS was not towards one substantial urban centre but from small villages to small towns. This nucleation continued into the LTM (6), with a further decline in the small sites and a slight increase in the size of the medium sized sites, whilst Tell al-Hawa also grew to 66 hectares. Finally, the Khabur phase (7) saw a rise in both small sites and medium sized sites. Tell al-Hawa remained at its maximum extent.

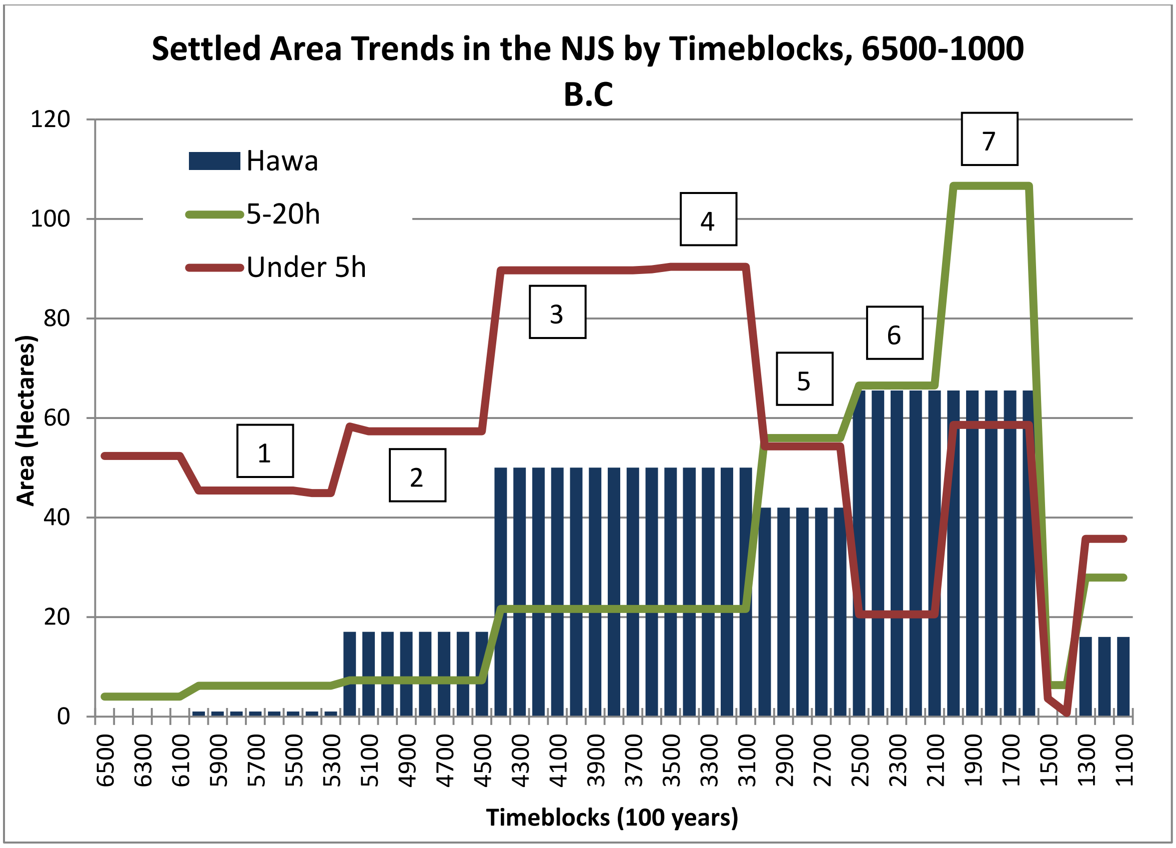


Figure 6.19: Settled Area Trends in the NJS by Timeblocks, 6500-1000 B.C

The general trends in the THS are fairly similar to those in the NJS (Figure 6.20). Throughout the periods in question there is a notable absence of medium sized sites, and this may be explained by the limits of the survey area around the centre at Hamoukar (see above). Again, settlement from the Halaf (1) to the LC 3-5 (5) is fairly constant at the smaller sites, although the lack of Ubaid (2) settlement in this context is rather difficult to explain. The division of the Late Chalcolithic into LC 1-2 and LC 3-5 allows us to see this gradual increase in a slightly more nuanced form than in the NJS. However, the THS does not see the development of a substantial urban centre in the form of Tell al-Hawa. Instead, THS_25 developed through the LC 1-2 phase to 31 hectares but was abandoned by the LC 3 and replaced by the 15 hectare site at Hamoukar. The overall settled area remained constant through the expansion of smaller sites, perhaps suggesting the retention of the settled inhabitants of THS_25 in the surrounding landscape. The ETM (6) in the THS saw an even more drastic decline in smaller sites than in the NJS. However, this did not precipitate the development of medium sized sites, but rather the massive expansion of Hamoukar from 15 to 98 hectares. The rise in small sites in the LTM (7) is also rather different from the pattern seen in the NJS, although it should be noted that some of these sites represent trace occupations. The abandonment of Hamoukar towards the end of the LTM did not result in a significant rise in settlement at the smaller sites. However, the Khabur (8) phase saw the emergence of a new medium sized centre, along with two large villages, and a slight decline in the small sites.

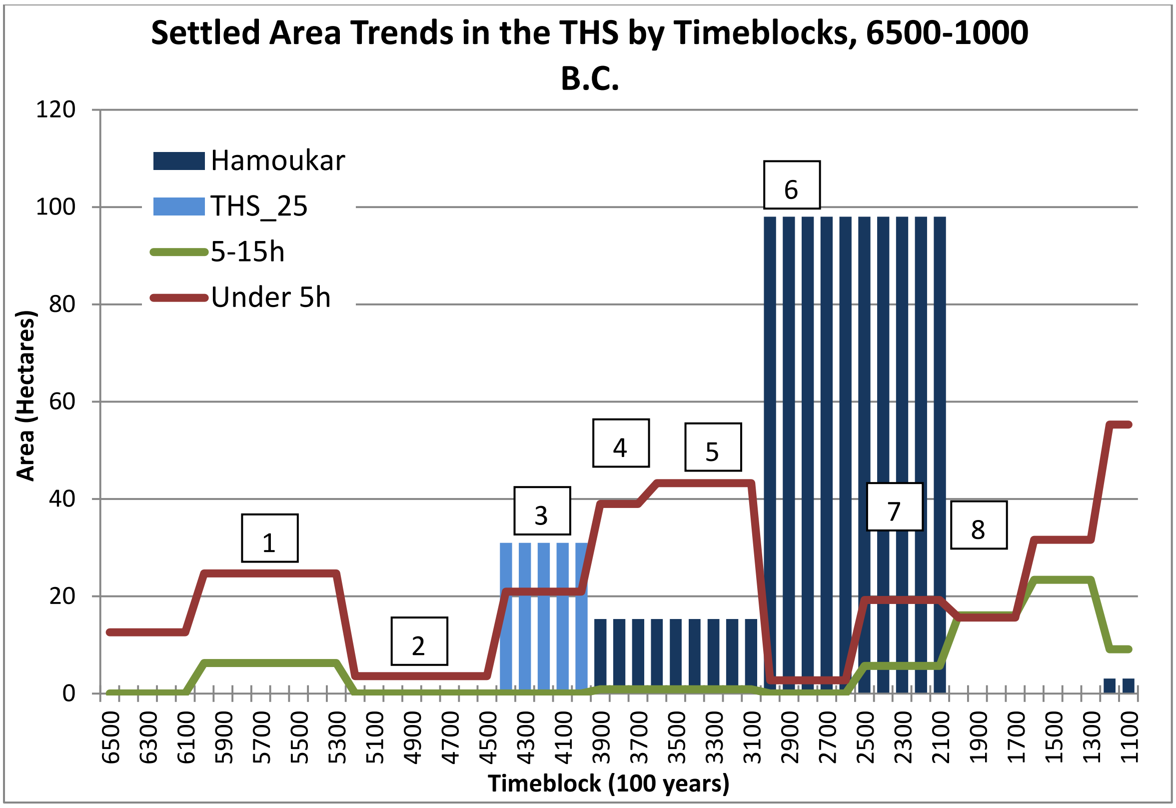


Figure 6.20: Settled Area Trends in the THS by Timeblocks, 6500-1000 B.C.

The Demographics of Urbanisation in the North Jazira and Tell Hamoukar Surveys

The spatial proximity of the NJS and THS allows them to be treated as a single entity. This also highlights the two clear trajectories of urbanisation visible in the NJS-THS system (Figure 6.21). Urbanisation at Tell al-Hawa was a relatively long-term process, beginning in the Ubaid and culminating in the Khabur phase. Total settled area remained remarkably consistent during this period but the organisation of settlement shifted from a dispersed pattern with a single growing centre at Tell al-Hawa during the Ubaid and Late Chalcolithic to a phase of nucleation at a second level of sites in the EBA. The initial phase of urbanisation at Hawa occurred during a period of generally rising population across the survey, whilst the second phase represents a true nucleation of settlement and conforms to Adams' urbanisation model, in which the rise of urban centres results in a decline in small sites as local rural populations are drawn in (Adams 1981). The development of Hamoukar occurs during this second phase of nucleation. Urbanisation at Hamoukar is comparatively rapid, occurring within a single phase, the ETM, and almost certainly towards the end of that phase. This rapidity, combined with the small size of the survey, makes general demographic trends more difficult to interpret. Certainly the rise in population which must have occurred during the ETM in order to populate the 98 hectare centre at Hamoukar cannot be accounted for by the decline in small sites from the LC 3-5 phase (Figure 6.21). In the context of demographic continuity in the NJS and significant shifts in the THS, the abandonment of the south western part of the survey area takes on a new significance. It is possible that an emerging polity centred on Tell al-Hawa might draw in local populations, not to the city itself but into a closer spatial relationship, particularly if the main site was already substantial at the outset.

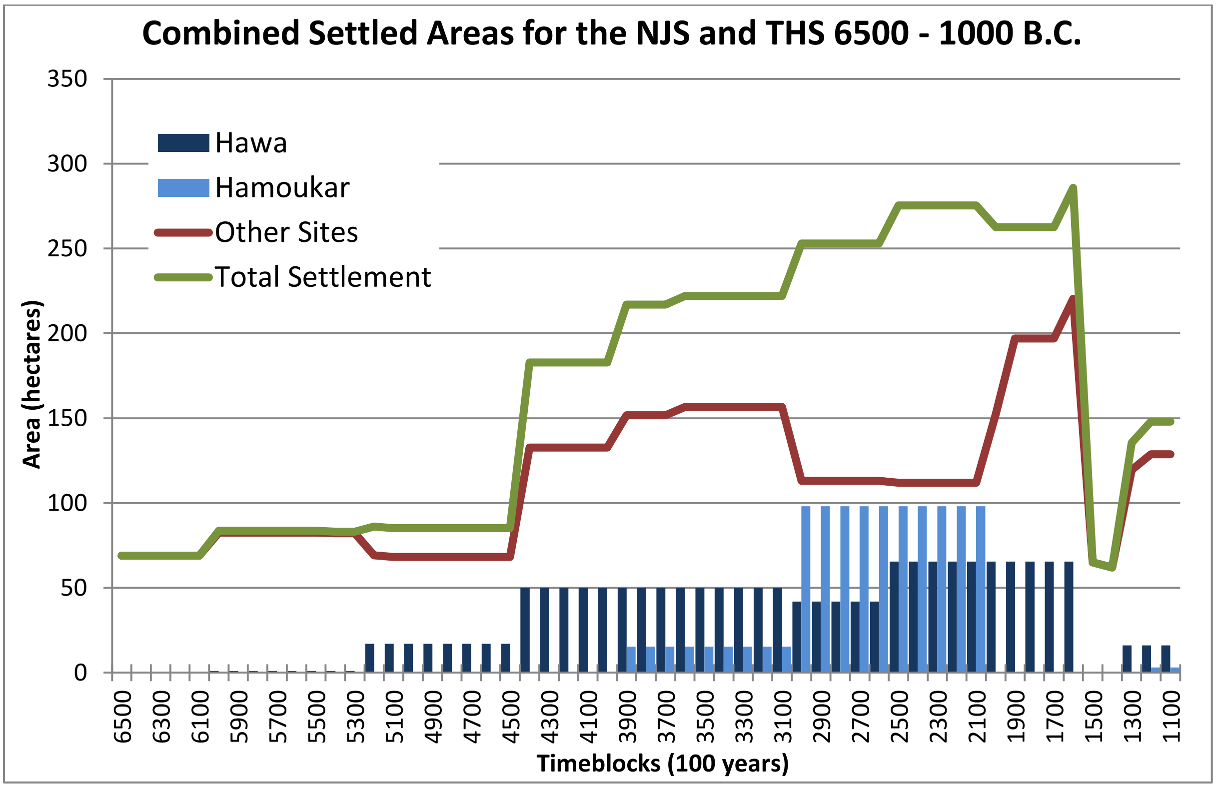


Figure 6.21: Combined Settled Areas for the NJS and THS 6500 - 1000 B.C

The fact that the decline in total area of small sites almost exactly matches the rise in larger sites might suggest the NJS represents an internally coherent system. However, it should be remembered that a large part of the western half of the survey area is closer to Hamoukar than Hawa. It is an oversimplification to equate spatial proximity with social and political interaction but it is possible that some of the abandonment in the south-western part of the NJS may be the result of populations being drawn in to Hamoukar. Smaller settlements in the unsurveyed areas to the west of the THS may also have declined. Alternatively, the clear evidence for significant long-range trade and exchange networks, beginning in the LC 1-2 with THS_25 but also present in the Uruk alignments and later hollow way patterns, suggests population shifts could have occurred over greater distances. The rise of an urban centre the size of Hamoukar must also have had profound political implications at Tell al-Hawa. The abandoned south-western sector may have acted as a pastoral resource but also as a buffer zone between the two cities and their hinterlands. The rapid urbanisation at Hamoukar was followed by similarly rapid decline at the end of the LTM. The causes of this abandonment are unknown at present but there is some evidence for a violent end to the final phase of occupation at Hamoukar.

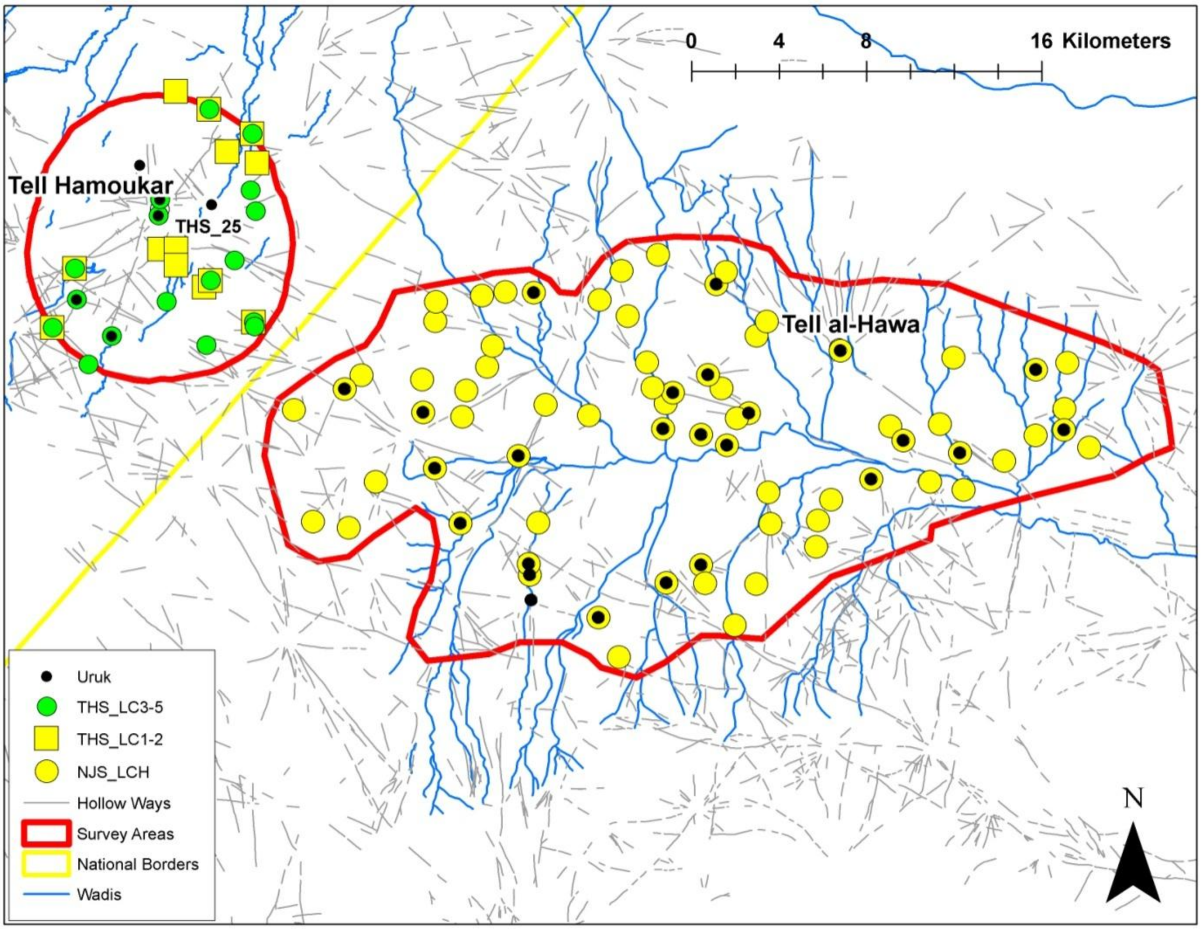


Figure 6.22: Settlement in the NJS and THS during the 4th Millennium

Excavations in areas H and C in the lower town revealed domestic structures dating to the post-Akkadian EJ V phase which contained large quantities of smashed pottery suggestive of looting, as well as burned buildings and unburied corpses, interpreted as evidence of a 'citywide sacking' at some point during this period (Colantoni and Ur 2011; 23). This again provides a contrast with the apparent continuation of urban life at Tell al-Hawa and the rise in total settled area within the Hawa system. It is possible that the decline of Hamoukar resulted in a shift in population to the Hawa area, although the rise in settlement during the Khabur phase is significantly less than the total area abandoned within the THS, suggesting the dispersal of the populations at Hamoukar must have been more widespread. Taken as a single system, it seems that the NJS-THS area experienced a steady and continuous increase in settlement during the Late Chalcolithic and EBA periods (Figure 6.21), but it is clear that the organisation of that settlement changed over time. The trajectories of the two major centres, Tell al-Hawa and Tell Hamoukar, were markedly different, with the former attaining urban status far earlier and continuing after the rapid rise and decline of the latter. During the first half of the EBA, settlement in both surveys became highly nucleated. However, the urban proportions of Hawa developed in the preceding Late Chalcolithic and Uruk phases meant this nucleation was at first confined to the second tier of sites in the NJS, whilst in the THS growth occurred at Tell Hamoukar itself.

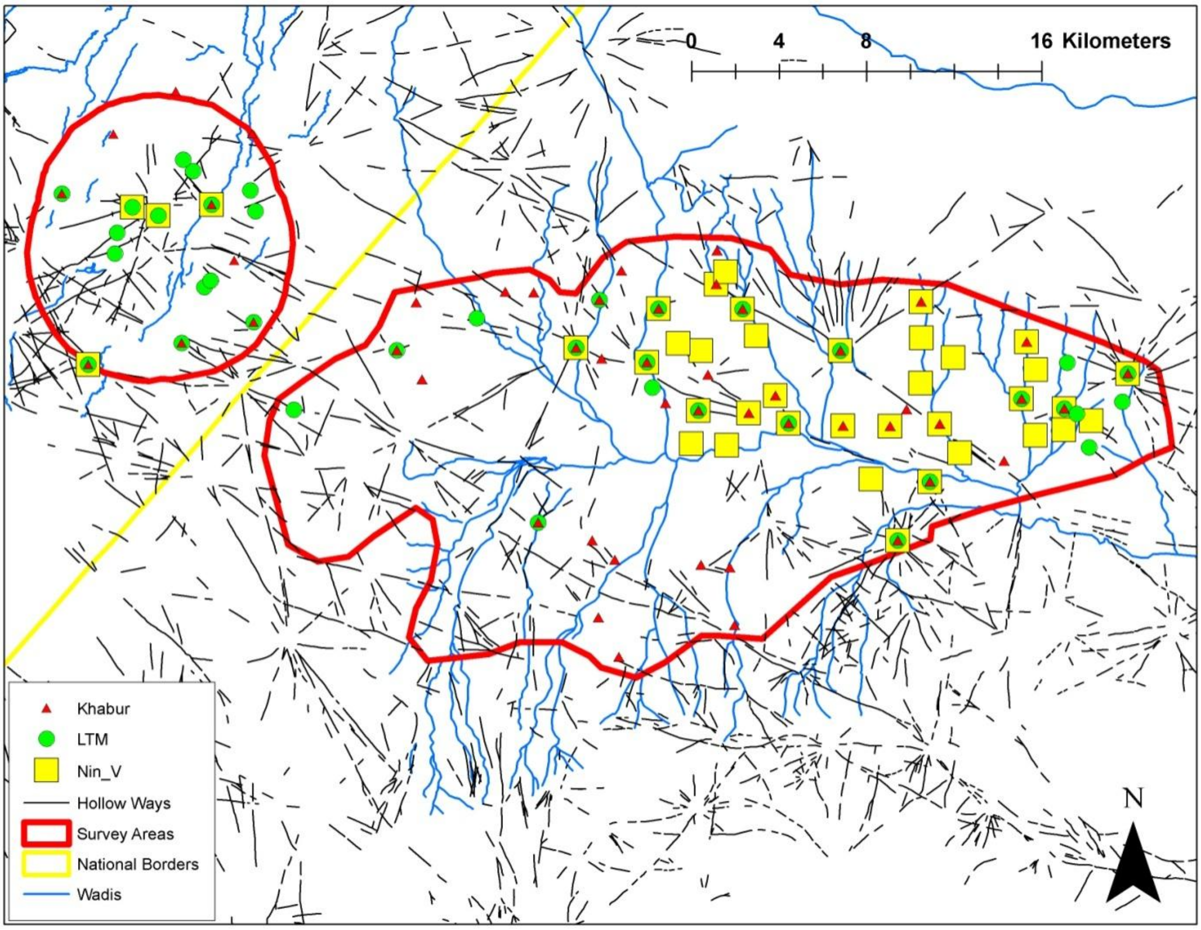


Figure 6.23: Settlement in the NJS and THS during the 3rd Millennium

The Tell Beydar Survey Dataset

The Tell Beydar Survey (TBS) was carried out over two short late summer seasons in 1997 and 1998 in a circular survey area within 12km of the main site at Tell Beydar, covering approximately 450km2. The survey project was intended to last longer but was curtailed due to permit issues. This meant that many of the sites discovered, and particularly the larger tell sites, did not receive the same degree of attention as those in the other surveys where systematic recollections over multiple seasons of fieldwork often provide more ceramic material, and therefore greater chronological precision. Outlying mounds at a number of sites were not surveyed at all due to time constraints and the assumption that they could be investigated at a later date. SPOT and, to a lesser extent, CORONA imagery were used to detect sites prior to conducting the survey (Wilkinson 2000b), but again some of the anomalies noted on the imagery were not visited in the field. The TBS therefore represents the most complex dataset of the three FCP surveys in the

Jazira. This can be contrasted with the central site at Tell Beydar which has been excavated since 1992 by a joint Syrian-European team and has revealed both significant architectural remains and a large cache of historical sources in the form of over 200 tablets (Ismail et al. 1996; Milano et al. 2004). Beyond Tell Beydar itself, no other sites within the TBS have been excavated. A number of smaller sites to the south of the survey zone have been excavated, including the Neolithic site of Kashkashok (Matsutani 1991) and the small EBA site of Abu Hujayra (Martin 1998). Four of the sites within the TBS were previously investigated by Lyonnet in her larger survey of the Western Jazira (Lyonnet 1996a; 1998; 2000). Although the overall methodology had very different goals to the TBS (see above), Lyonnet's survey employed similar systematic collections over individual sites (Lyonnet 2000; 12-13), and the results have been incorporated into the TBS (Ur 2004; 170; Ur and Wilkinson 2008) and FCP databases. Survey has also been conducted in the upland basalt zone in the western part of the survey (see below), revealing a number of desert kites and other landscape features, as well as instances of rock art (Van Berg and Picalause 2003; Van Berg 2004) and provides greater detail on the sites discovered in the basalt by the TBS. The area has also been reinvestigated by members of the FCP team, resulting in the discovery of previously unrecognised sites within the surveyed area (Cunliffe 2012; Wilkinson and Cunliffe 2012; Cunliffe in press a). The TBS made use of both GPS and GIS in the field, although the GPS points were taken prior to the removal of selective availability in May 2000, resulting in lower levels of geographical precision.

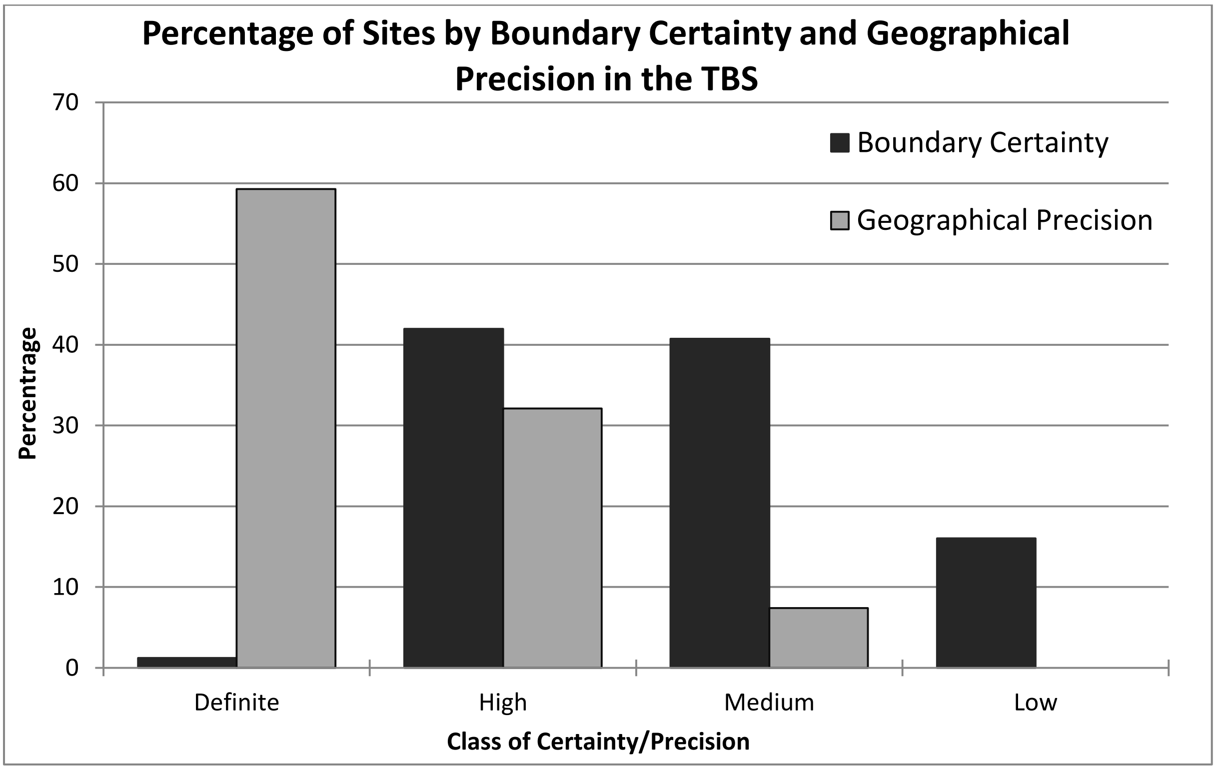


Figure 6.24: Percentage of Sites by Boundary Certainty and Geographical Precision in the TBS

The lower levels for boundary certainty generally reflect disparities between the published data, electronic data in the form of GIS shapefiles and GPS points, and sketch maps and descriptions from field notes and notebooks (Figure 6.24). Where such disparities occur the published area figures have been assigned primacy but boundary certainty has been lowered to reflect the conflicts within the dataset. Differences between 'Medium' and 'Low' sites reflect the degree to which the imagery could be used as a guide. The few 'Medium' geographical precision levels are due to similar minor discrepancies between imagery, map and GIS data which may be a result of differences in imagery rectification or GPS error as a result of selective availability or mapping errors in the field. Overall, despite the complex nature of the TBS dataset we can be reasonably confident in the general quality of the data.

The Geomorphology of the Tell Beydar Survey area

The TBS area includes three distinct geomorphological zones (Wilkinson 2000b). Firstly the lower terraces and valley floors of the three larger wadis running north-south through the survey area, and particularly the largest of these, the Wadi Aweidj, represent the focus of long term settlement. This zone experienced low levels of alluviation during the Holocene resulting in the burial or partial burial of sites. Soil profiles at the EBA settlement at TBS 4 on the Wadi Aweidj revealed up to a 1.4 metres of sediment (Wilkinson 2000b). The second zone includes the rolling steppe land between the wadi floors and includes much of the eastern part of the survey area. Although soils in this area are fairly deep and relatively fertile there are few water resources (except for the wadis themselves). Finally, the west of the TBS is dominated by the basalt plateau of the Ardh al-Shaykh, or Hemma plateau. Soils on the plateau are thin and rocky and water resources are scarce, restricting the agricultural potential. However, this zone most probably functioned as a long term pastoral and hunting resource, as well as a source of ground stone (Wilkinson 2000b). This absence of sedentary settlement and agriculture suggests that the Hemma plateau represents a classic landscape of preservation, further attested by the discovery of ephemeral structures such as kites and field walls which, assuming they were present, have not survived in the lowland areas (Van Berg and Picalause 2003).

Remote Sensing and Settlement Reanalysis in the Tell Beydar Survey

As in the NJS, it is possible to extrapolate from the known sites within the survey to unknown sites in the surrounding area through the use of CORONA imagery. Within the TBS, furthermore, we can extrapolate to the sites discovered through the re-interrogation of the survey area itself. In terms of morphology, a similar pattern is visible in the TBS as to the NJS, with post-Neolithic prehistoric settlement concentrated on tells and later settlement more prevalent on low mounds (Figure 6.25). Once again the EBA sees a rise in tell based settlement, but the peak of this phase in the LTM is even more marked such that almost 90% of the high tells within the survey were occupied. In further contrast to the NJS, the Khabur phase in the TBS involved a sharp decline in settlement and therefore in the occupation of tells. Again, it is also possible to make use of hollow ways as corroborating evidence. Every EBA site within the TBS was associated with at least one hollow way, and the majority with the same sorts of radial patterns as in the NJS, whilst 10 of the 19 Late Chalcolithic sites (53%) were associated (Ur and Wilkinson 2008). Taking the hollow way and morphological evidence together, we can be almost certain that a high tell with radial patterned hollow ways in the vicinity of the TBS was occupied during the LTM, and is fairly likely to have been occupied during the ETM and LC 3-5 phases.

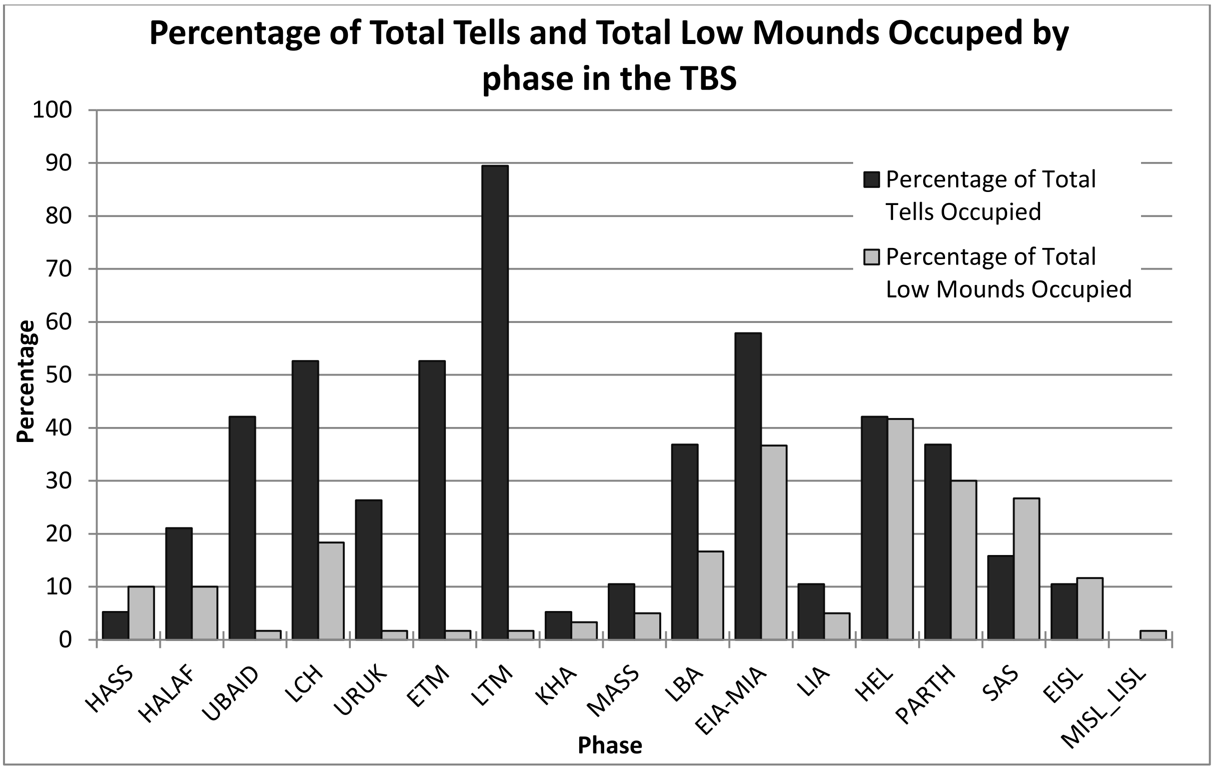


Figure 6.25: Percentage of Total Tells and Total Low Mounds occupied by phase in the TBS

Figure 6.26 shows the locations of the anomalies discovered within the survey area divided by the classes of archaeological significance assigned by the interpreter. ‘High’ and ‘Medium’ certainty anomalies which are most likely to represent sites are clustered in the north of the survey area to the east of the Wadi Aweidj. None of the anomalies discovered through the FCP reanalysis are conventional high tells. It is occasionally possible to infer mounding from plough-lines, particularly on the modern imagery, as farmers tend to plough with the contours rather than directly up or down slopes. Where this is possible for these anomalies it is clear from the extent of the ploughing that the height of mounding is fairly low. Extrapolating from the results of the rest of the survey, it seems unlikely that these sites date to the fourth and third millennium. One could make an argument for the idea that they represent the non-mounded component of the EBA settlement pattern evident in the NJS further to the east but the fact that they are largely confined to specific areas argues against a systematic survey bias and therefore a bias in the overall results. It is possible that they may relate to the Late Chalcolithic phase which included a small but significant number of low mounded sites but it is far more likely that they relate to the massive expansion of dispersed settlement which began in the Late Bronze Age (Wilkinson and Cunliffe 2012).

The TBS area is more amenable to extrapolation into the wider area than the NJS because a particular morphology, high tells, can be more closely associated with a particular chronological phase, the LTM, fulfilling the 'uniqueness' criterion.

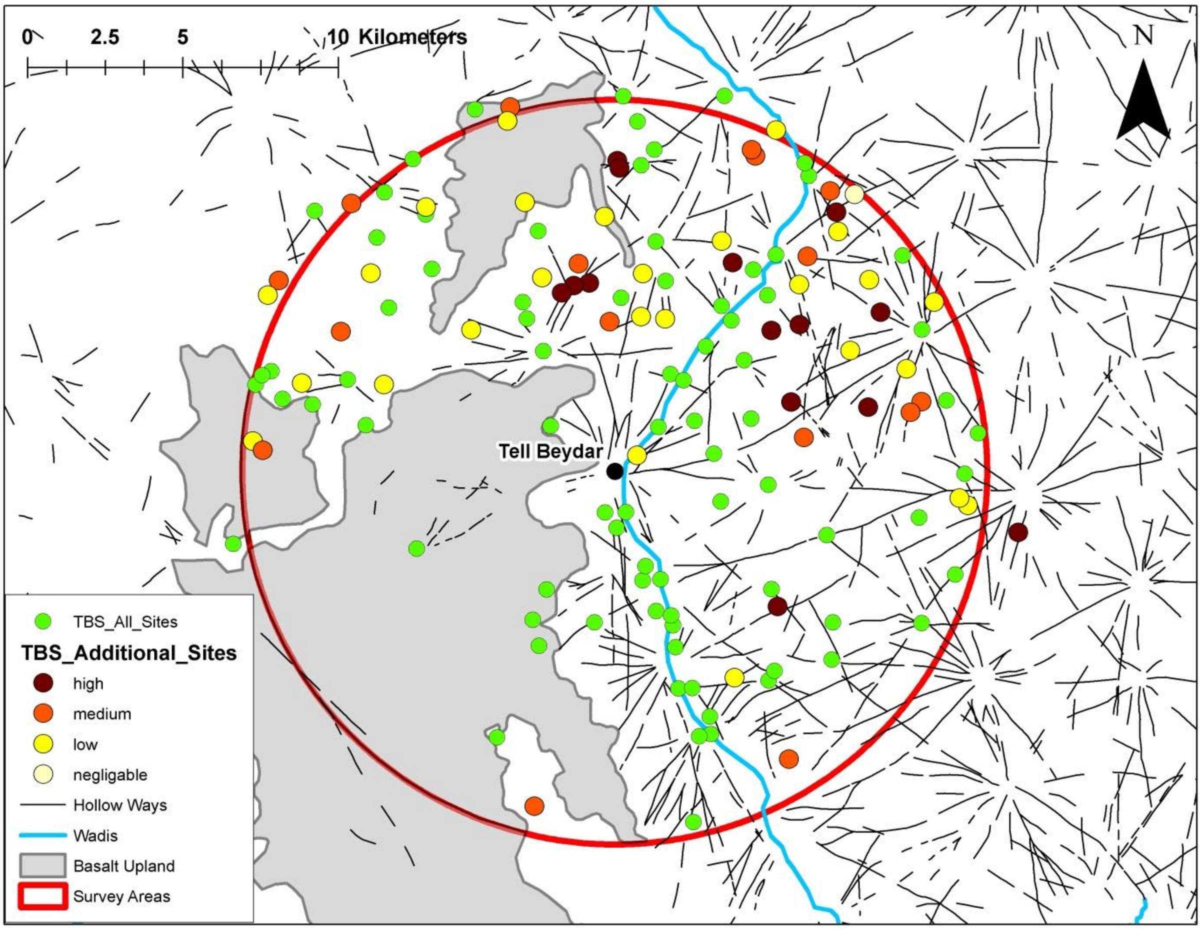


Figure 6.26: Location of remotely sensed anomalies and surveyed sites in the TBS

We can now turn to the 'completeness criterion' which allows us to quantify how far mapping the specific morphological type would give a representative sample of settlement during that phase. Figure 6.27 shows the site morphology types as entered in the FCP database, and therefore derived from field observation. These allow for a more nuanced approach than a simple high tell and low tell division. Complex mounds can be considered high tells in the context of imagery analysis because they include a high tell component along with other topographic expression. On the imagery, the high tell part is always visible whilst the other areas may not be. Over 90% of LTM and 78% of ETM settlement can be found on tells, fulfilling the 'completeness' criteria. This means that by mapping all of the high tells in the vicinity of the TBS we can be confident we have captured the greater part of the EBA settlement pattern. The only non-tell site occupied in the LTM, TBS_61, included only a very few EBA sherds in a predominantly Halaf phase assemblage whilst the only non-tell occupation in the ETM was a similar trace occupation on a lower mound on the edge of the larger Tell Jamilo (TBS_59) (Wilkinson 2000b; 36), suggesting the types of sites we may be missing are small and possibly ephemeral occupations. In the wider area, we can also use the distinctive morphology of the *kranzhügel*n sites as an indicator of early LTM settlement.

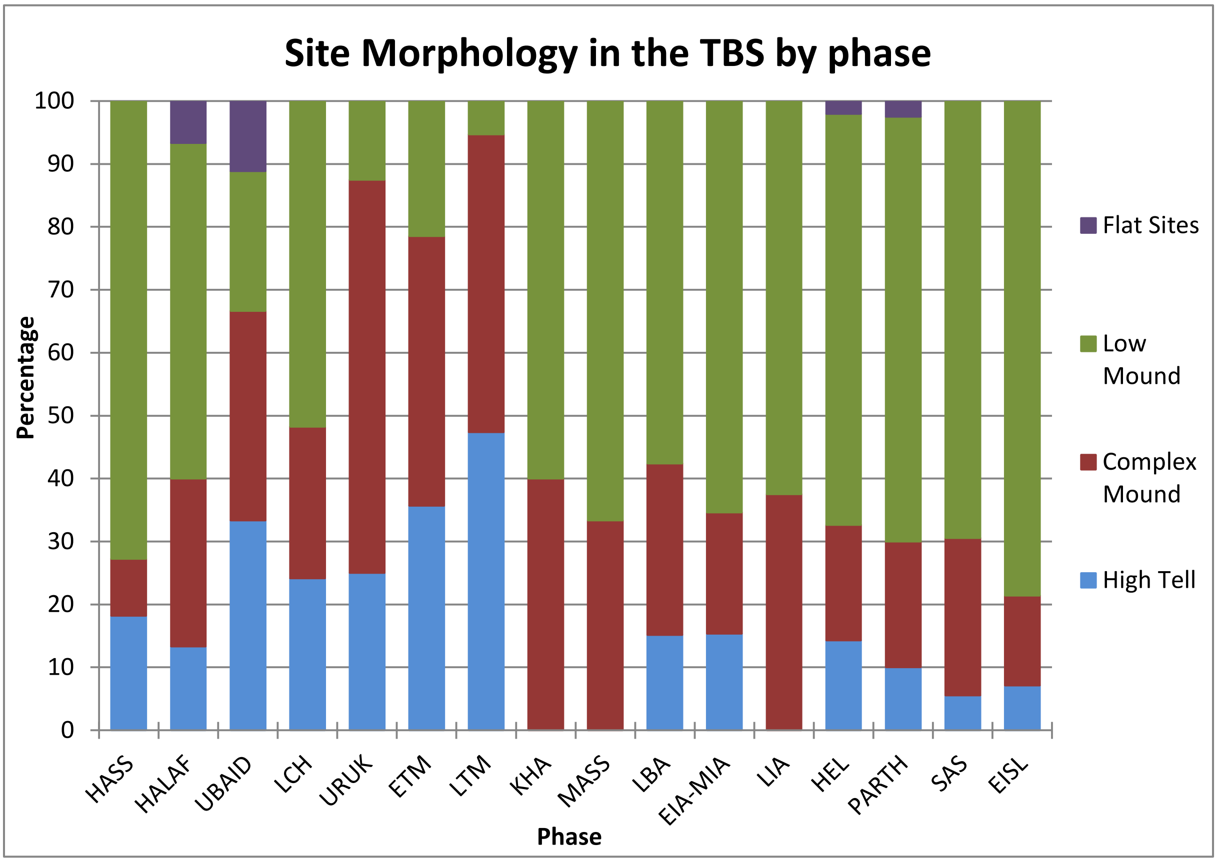


Figure 6.27: Site Morphology in the TBS by phase

In the sample of *kranzhügeln* surveyed by the Yale Khabur Basin Project, every site could be dated to the EJ III phase (Kouchoukos 1998; 372 Fig 7.17) corresponding to the early part of the LTM in the TBS chronology and the phase of significant settlement at the excavated *kranzhügel* at Beydar. This approach may not be appropriate for the wider *kranzhügeln* phenomenon. Excavations at Tell Chuera have revealed a longer history of settlement dating back to the Uruk phase (Stefan Smith, pers. comm 2011) and including a significant expansion in the earlier part of the third millennium (Meyer 2007). However, Tell Chuera presents a unique case, being by far the largest *kranzhügel*, at over 80 hectares (Meyer 2007; 131), and located some distance from the TBS. In the vicinity of the Jebel Abd-al-Aziz it is reasonable to assume an early LTM occupation at the vast majority of clear *kranzhügen* sites. How far this can be considered the complete settlement pattern during this phase cannot be verified given the current data available from the Yale Khabur Basin Project, but it is likely that there were small village settlements contemporary with the *kranzhügeln* which may not be visible as high tells. Before tackling the imagery-expanded settlement pattern it is first necessary to examine the general trends within the survey area.

The Late Chalcolithic in the Tell Beydar Survey

The TBS did not divide the Late Chalcolithic due to the absence of distinguishing ceramic types. Uruk pottery was noted, but only discovered at two sites, TBS_34 and TBS_38, in both cases in the same area as chaff tempered Amuq F style local Late Chalcolithic assemblages (Wilkinson 2000b). The situation is complicated by the fact that two of the largest tells, Tell Jamilo (TBS_59) and Tell Hassek (TBS_4)) were collected by Lyonnet's survey and only briefly visited by members of the TBS. Lyonnet did not differentiate between local Late Chalcolithic and intrusive Southern Uruk types, including both in a generic 'Uruk' (meaning Northern Uruk) category, and also did not provide total site areas for these larger sites (Lyonnet 1996a). In both cases the brief visit by members of the TBS did not reveal Uruk ceramics and I have therefore assumed a purely Late Chalcolithic occupation. In terms of area, I have assumed the entirety of the main tell at both TBS_43 and TBS_59 was occupied during the Late Chalcolithic, based on the general spread of Late Chalcolithic found by both Lyonnet and the TBS collections (Lyonnet 1996a; Wilkinson 2000b), giving areas of 5 and 4 hectares respectively. This may be an overestimation as both tells were heavily occupied during the EBA and may have expanded during this phase. However, it should be remembered that subsequent settlement would have resulted in significant overburden which may have buried Late Chalcolithic levels.

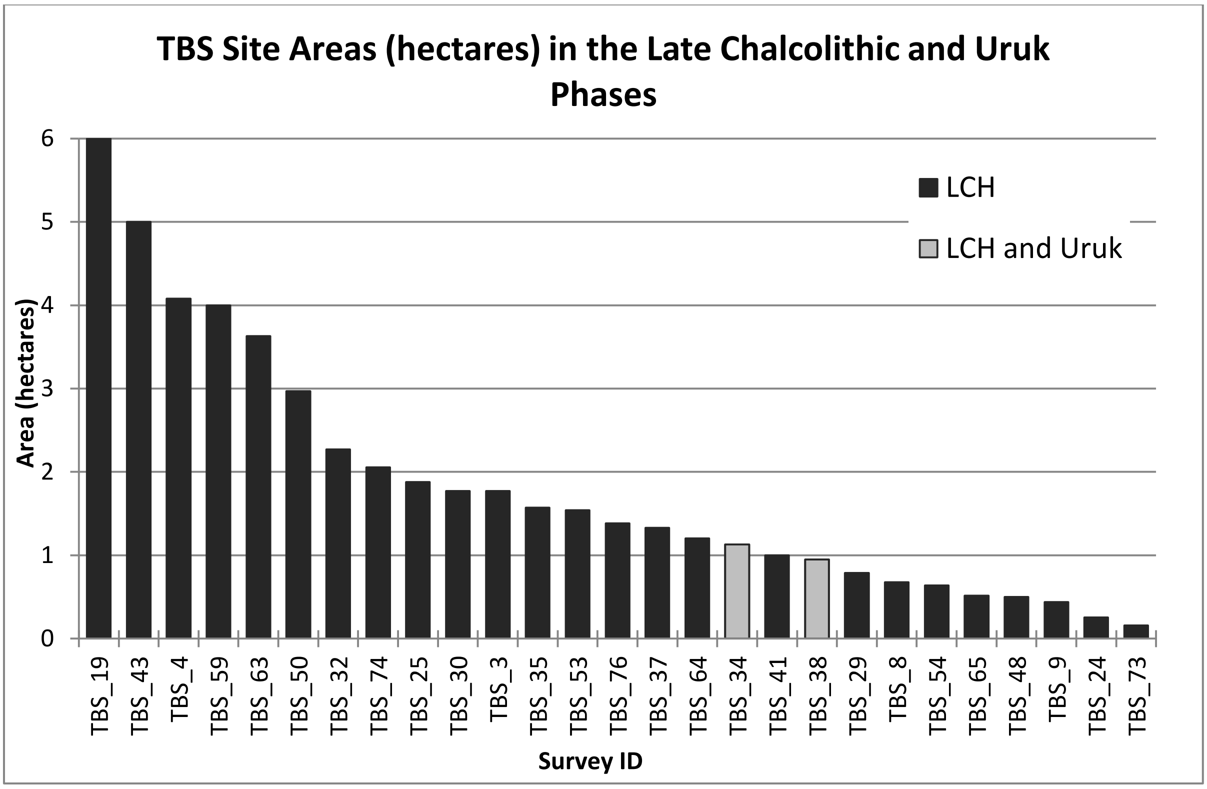


Figure 6.28: Graph of TBS Site Areas (hectares) for the Late Chalcolithic and Uruk Phase

The Late Chalcolithic phase in the TBS is characterised by a dispersed pattern of small to medium sized villages with no clear hierarchy (Figure 6.28 and Figure 6.29). Settlement was concentrated along the Wadi Aweidj and its tributaries, as well as in the lowland area adjacent to the basalt uplands in the north-west part of the survey area. Only one very small site, TBS_54, was located on the basalt itself, and this on the very edge, whilst the higher ground to the east of the Wadi Aweidj was also sparsely settled. The two sites which included Uruk ceramics were both fairly small and located in the northern part of the survey area on the 'great bend' of the Wadi Aweidj (Ur and Wilkinson 2008). This paucity of Uruk ceramics is another strong argument for the continuation of local Late Chalcolithic assemblages into the LC 4 and 5 periods as it seems highly unlikely that the level of settlement in the Late Chalcolithic and ETM phases would be punctuated by a collapse to just two small sites. Except for the Uruk ceramics, both sites appear to be similar to the small villages with only local ceramics. An elucidation of the nature of the Uruk contact in this area requires more evidence, but we can say that there appears to be significantly less contact than further east.

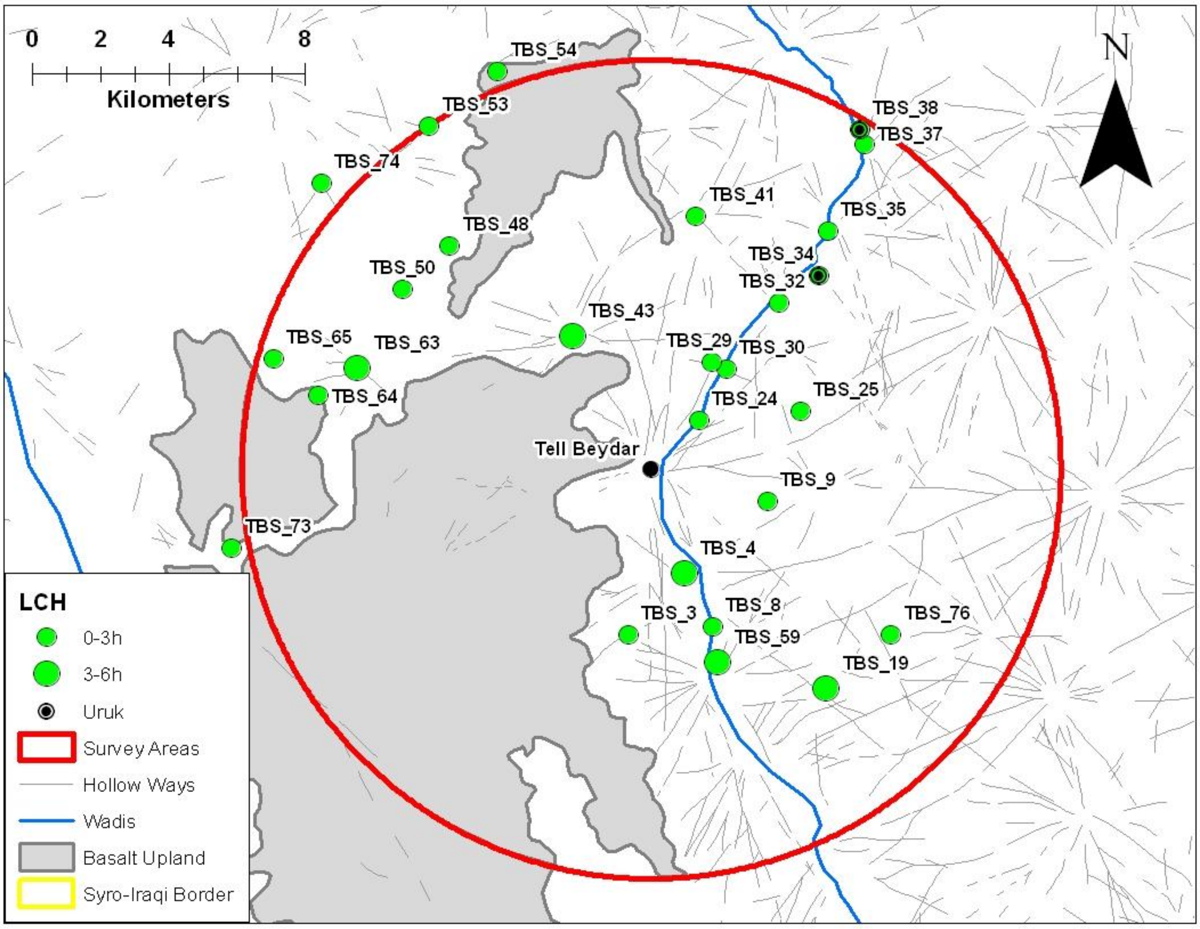


Figure 6.29: Settlement patterns in the TBS during the Late Chalcolithic and Uruk phases. The location of Tell Beydar is retained for the purposes of orientation

The Early Third Millennium in the Tell Beydar Survey

As in the eastern Jazira, the TBS relied on Ninevite V-style painted and incised ceramics to identify the ETM. However, these types are far rarer in the western part of the Khabur basin, meaning this phase is rather difficult to identify. However, we can be reasonably confident in the identification of 12 sites for this phase, a significant reduction from the 27 in the preceding Late Chalcolithic, although the settled area does not change significantly. This is due to the development of the large site at Tell Beydar, most probably ancient Nabada (Sallaberger 1998). Although the main areas so far excavated, including the palace, date to the early part of the LTM, the presence of incised Ninevite V in a deep sounding on the northern part of the site (Suleiman 2003) suggests the site was occupied in some form from the middle of the ETM phase. However, it is possible that Beydar was founded far earlier, perhaps at the beginning of the EBA, since none of the excavations have so far reached the limit of cultural layers. The earliest architecture discovered was a series of walls close to the north-eastern gate which date to the EJ II phase, approximately 2600 B.C. The Inner City gate may also date to this phase, or the beginning of the EJ IIIa (Milano et al. 2005). In the following discussion I have assigned Tell Beydar 17 hectares for both the ETM and LTM. This represents a reduction in the total area of the site of 22.5 hectares to account for the enclosed depression (between the central mound and the enclosing ramparts) which was almost certainly unoccupied (Ur and Wilkinson 2008; 307). The ETM in general sees the development of a nascent three tiered hierarchy centred on the TBS, with secondary centres emerging at TBS_43, TBS_4 and TBS_59 and a number of small villages (Figure 6.30).

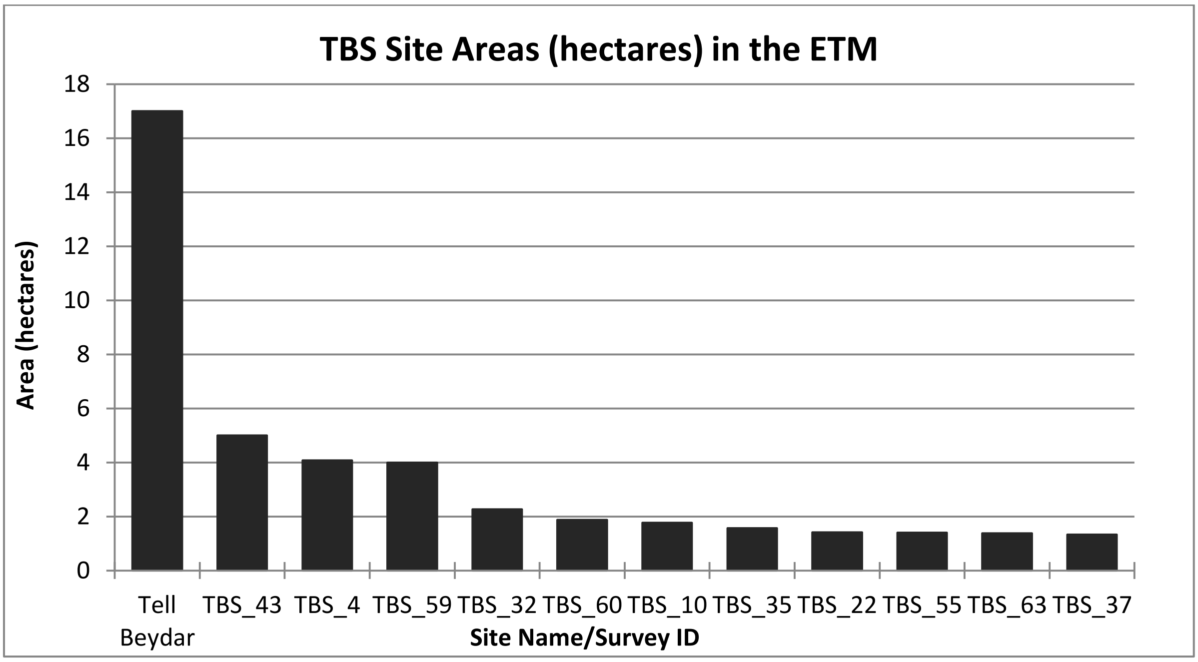


Figure 6.30: TBS Site Areas (hectares) in the ETM

Settlement is again concentrated along the Wadi Aweidj, with no sites in the basalt area and only TBS_10 situated in the eastern part of the survey (Figure 6.31). The north-western part of the survey area occupied during the Late Chalcolithic is entirely devoid of settlement and there are no settlements within 4km of Tell Beydar. The ETM in the TBS displays the beginnings of a settlement pattern structured around the river valley and the emerging centre at Beydar. The LTM in the TBS, as in the THS and NJS, includes the EJ III-V in the Jaziran chronology employed at Beydar, in which EJ IIIa and IIIb represent the pre-Akkadian part of the second half of the third millennium, EJ IV the period of Akkadian expansion and EJ V the post-Akkadian (Lebeau 2000). Excavations at Beydar allow us to be more precise in regard to settlement transitions at the main site than in the hinterland. The full 17 hectare extent of Beydar was only occupied during the EJ IIIa and IIIb phases and included a large palace complex and substantial city walls and gates, as well as domestic dwellings. Settlement shrank to a very ephemeral occupation of around a hectare during the EJ IV and finally a simple temple structure with no domestic architecture during EJ V before total abandonment in the Middle Bronze Age (Lebeau and Rova 2003). We have no direct way of knowing to what degree the surrounding settlements were contemporary with the fluorescence of the main site at Beydar, but intuitively it seems fairly likely that they were. In the following discussion, I assume that the sites in the TBS other than Tell Beydar itself were occupied throughout the LTM.

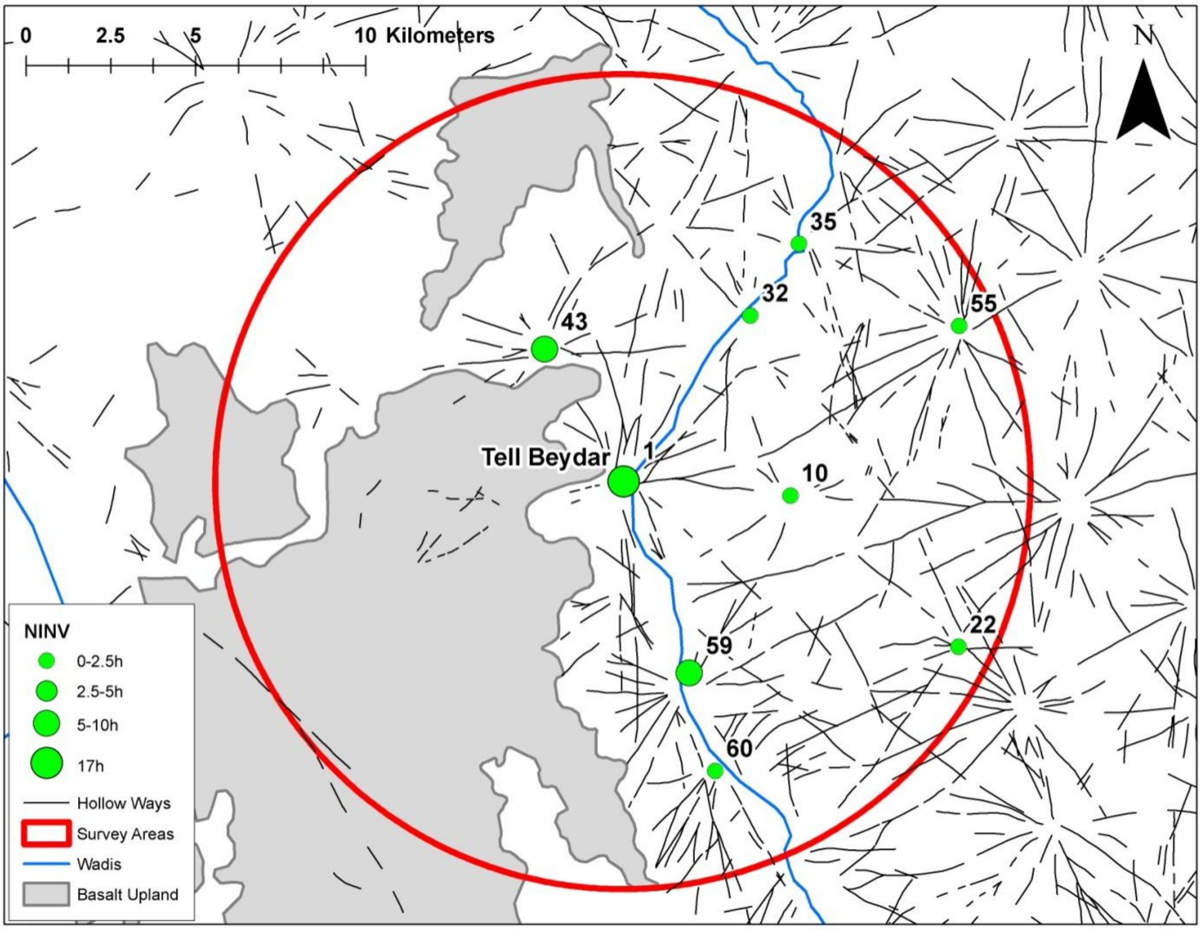


Figure 6.31: Settlement patterns in the TBS during the ETM

The Late Third Millennium in the Tell Beydar Survey

By the beginning of the LTM, EJ IIIa, Tell Beydar sat at the head of a three tiered hierarchy, with three major secondary centres located at Tells Farfara (TBS_52), Effendi (TBS_59) and Hassek (TBS_43) and a surrounding network of small villages (Figure 6.32). TBS_59 and TBS_43 were both long term occupations which grew slightly during the phase, whereas TBS_52 represents a new foundation. The significance of this is difficult to interpret as the site is located on the north-western edge of the survey area close to the edge of the basalt zone with little surrounding settlement (Figure 6.33), and it should be noted that the significant depth of LTM could mask earlier layers.

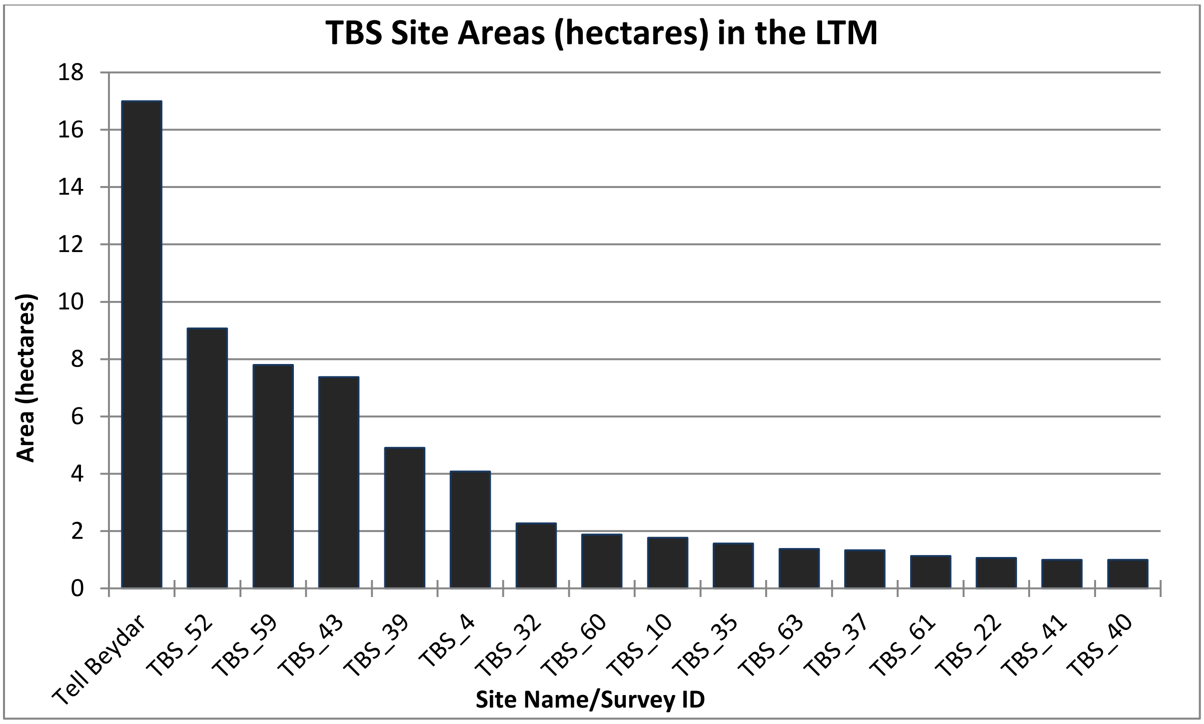


Figure 6.32: Graph of Site Areas (hectares) in the TBS during the ETM

However, it is possible that the site may have grown up, or at least expanded, as a locus of interaction between sedentary occupants of the central Khabur plains to the east of the Hemma plateau and pastoralists living in the steppe to the west. TBS_43 may also have expanded in response to this interaction as it is situated in an ideal location for the control of a narrow gap between two parts of the plateau. As in the preceding phases, settlement was concentrated along the Wadi Aweidj, with a number of evenly spaced small sites and two larger sites at TBS_59 and Tell Beydar. Dense radial hollow way networks surround each site and longer distance routes are also visible, particularly from sites on the Wadi Aweidj traversing the watershed in the eastern part of the survey zone and both north and south from Tell Beydar.

The discovery of a large cache of texts dating to the EJ IIIb phase has allowed for the combination of archaeological and historical material in the reconstruction of urban and rural life at and around Tell Beydar (Widdell 2003; Sallaberger and Ur 2004; Wilkinson et al. 2007b). Tell Beydar, almost certainly ancient Nabada, appears as a 'province' of the larger state based at Nagar, modern Tell Brak, during this period, and the texts display a remarkable affinity with the archaeological data. Lists of ancient settlements imply a similar three tiered hierarchy to that discovered through the survey and accounts of the redistribution of goods, and particularly foodstuffs, closely correlate with population estimates derived from total occupied area in the LTM (Sallaberger and Ur 2004). These correlations suggest a highly centralised and integrated administrative system in which almost all aspects of daily economic life were recorded, and by inference controlled. The texts also highlight the importance of pastoralism to the economy, detailing flocks tied to the central authority at Nabada containing approximately 7400 sheep and goats (Sallaberger 2004; 20).

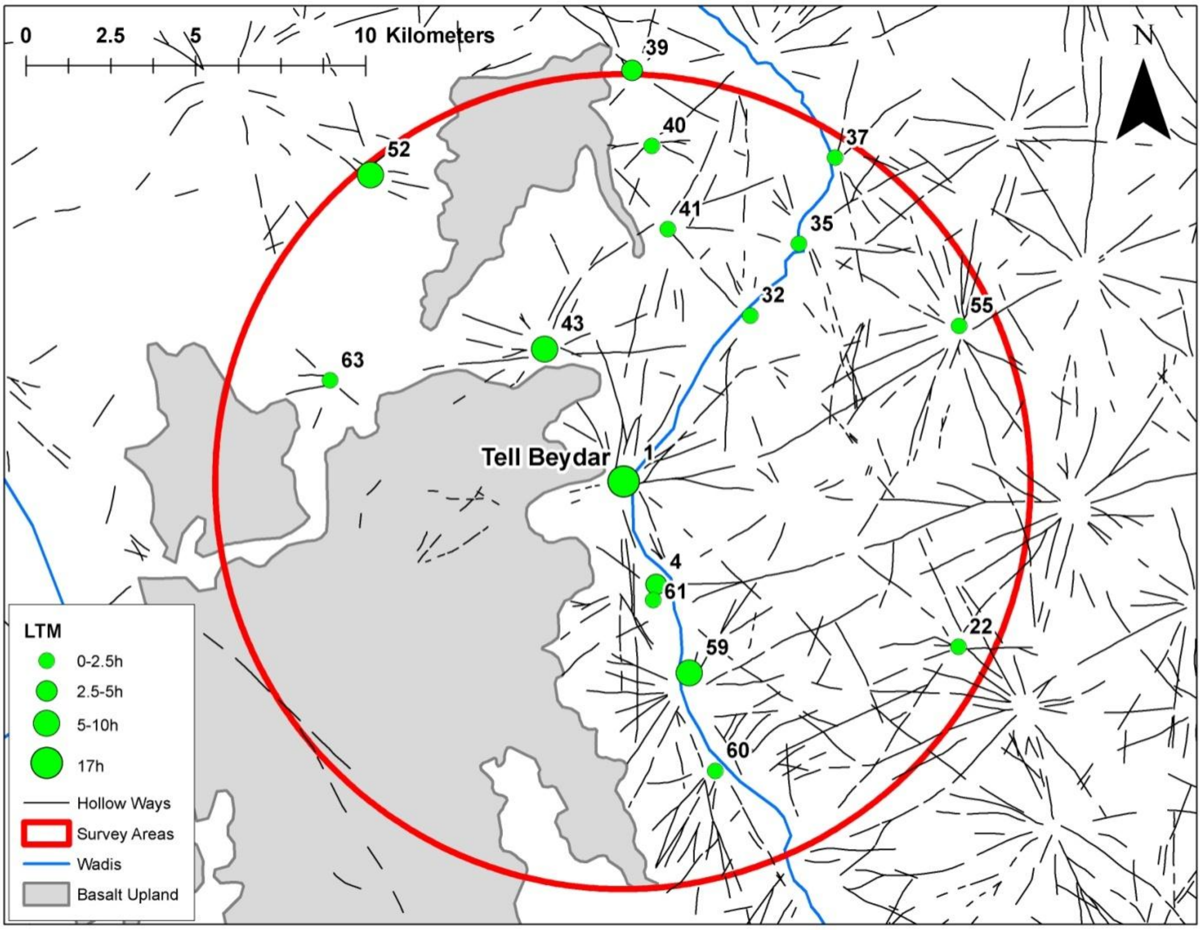


Figure 6.33: Settlement patterns in the TBS during the LTM

Extrapolating from the Tell Beydar Survey in the Late Third Millennium

Figure 6.34 shows the locations of tells, *kranzhügeln* and anomalies ascribed a 'high' rating of archaeological relevance, mapped from a number of CORONA images. As noted above, by extrapolating from the TBS data we can be fairly certain that the high tells and *kranzhügeln* represent LTM occupations. Surveys in the region of Tell Brak have largely confirmed this pattern of occupation, although the results are difficult to interpret. The Land of Nagar survey visited 56 mounds along the Jaghjagh and reported third millennium ceramic types from 31 (Eidem and Warburton 1996), or just over 50%. However, these results are somewhat skewed by the concentration on sites along the wadi and the inclusion of several mounds in close proximity to the main tell at Brak which are better interpreted as the lower town and later occupations of the site of Brak as a whole. There are also questions relating to the ceramic chronology of the later part of the LTM which may have resulted in a reduction in the number of sites recognised (Eidem and Warburton; 55). A later survey of the Brak environs, including settlement away from the river valley, mentions at least 90 LTM sites but the published material does not include sufficient information regarding site morphology to make inferences regarding imagery derived settlement patterns. Isolated LTM sherds were found at a number of very small low mounded sites interpreted as farmsteads or hamlets (Wright et al. 2006-2007) which would be missing from the this map.

The close correlation between archaeological survey data and historical sources in the TBS is even more surprising given the essentially arbitrary size of the survey area and the continuous nature of settlement in the wider region. It is clear that the TBS area is part of a much larger zone of dense settlement, extending across much of the western and central Khabur basin. The highest densities of sites occur along the larger wadis, the Aweidj, Khanzir and Jaghjagh, as well as around the major centre at Tell Brak, and there is no evidence of a drop off in numbers from north to south, as one might expect in response to gradually declining rainfall. None of the four largest sites, Brak, Beydar, Chagar Bazar and Mozan, have any high tells within 4km, most probably corresponding to the zone of intensive cultivation[25] (Wilkinson 1994). Settlement in the plain between the Wadi Aweidj and the Wadi Khanzir is similar to that in the TBS, although of greater density. Sites are fairly evenly distributed at intervals of between three and five kilometres and are connected by a dense network of hollow ways. This area may correspond to the heartland of the emerging regional state centred on Nagar (Tell Brak) (Sallaberger and Ur 2004; 69), in which settlement was organised to maximise agricultural productivity. To the west of the TBS, on the other side of the Hemma plateau, the number of high tells is sharply reduced. Those that are present are clustered along the Khabur with few settlements to the south and west. A linear alignment of *kranzhügeln* is also visible along the northern part of the Jebel Abd-al-Aziz. These may have been positioned to take advantage of pockets of alluvial soils washed down from the Jebel (Kouchoukos 1998; 375). The decline in settlement west of the TBS may be accounted for in two ways; a real decline in the number of settlements or changes in settlement such that high tells are not the dominant type. In fact, it is likely that a combination of these two factors may

[25] Although the gap to the north and east of Tell Mozan is due to the lack of CORONA imagery for this area and should not be taken as evidence for a lack of settlement

have been in operation. Although little is known about the possible alternative forms of settlement in this region during the EBA, the Khabur Valley Project did find a number of small low mounded sites dating to the EJ I and II phase (Kouchoukos 1998) which are not likely to be clearly visible on imagery. The evidence from later phases in the TBS and in Lyonnet's Upper Khabur Survey also suggests this area may have been occupied by mobile pastoralists rather than sedentary occupants (Lyonnet 1996a; 1998; Ur and Wilkinson 2008).

The density of settlement between Beydar and Brak also raises questions regarding hollow ways. Almost every site is surrounded by a radial pattern, some of which fade out and some of which 'connect' to other sites. Connecting hollow ways between sites suggest contemporaneous occupation and would seem to attest to significant traffic between the two. If current theories regarding hollow way formation are correct, this movement must have included reasonable sized flocks of sheep and goat (Wilkinson et al. 2010). A further assumption of this model is that the fade-out points of hollow ways represent the limit of intensive agriculture (Wilkinson 2003; 111-122; Ur and Wilkinson 2008).

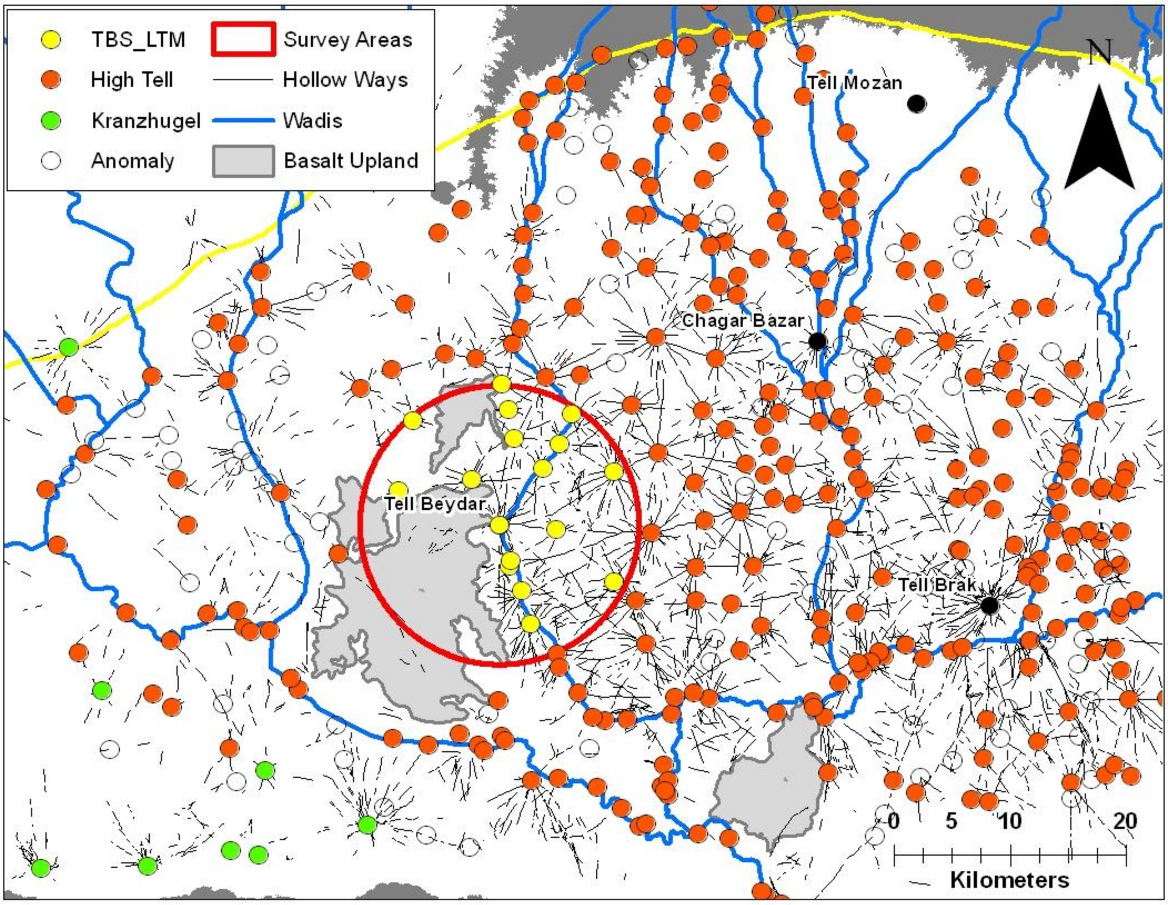


Figure 6.34: Settlement pattern reconstruction in the western and central Khabur basin during the LTM mapped by the author from CORONA missions 1038, 1102, 1105 and 1117. Note that the gap to the north and east of Tell Mozan is due to the lack of CORONA imagery for this area rather than lack of settlement

However, in the densely settled agricultural core of the land of Nagar the gaps between sites and hollow way derived catchments are extremely small, leaving little space for pastoralism to be practised. We might interpret this as an indication that flock sizes were fairly small and herding practised at a local level, although smaller herd sizes would result in less daily traffic and therefore more ephemeral hollow way traces. Alternatively, flocks may have been taken outside the area due to lack of pasture but this too would have decreased the amount of animal traffic available to produce the hollow ways. The intensity of traffic between sites is also of some importance here. It is possible that movement across the central Khabur involved complex social processes which necessitated movement between villages rather than simply taking the most direct route (Sallaberger and Ur 2004; 70; Ristvet 2011). The hollow ways between sites might therefore represent the traces of more long distance routes. Little more can be said on this topic without excavation of multiple sites within the region, and particularly the recovery and examination of faunal assemblages from different types of site.

The Khabur Phase in the Tell Beydar Survey

The Khabur phase in the TBS follows a similar pattern of settlement decline and dispersal to the THS, rather than the continuity shown in the NJS. Only one site, TBS_39 on the extreme northern edge of the survey area, retained a substantial occupation, whilst five other sites had fewer than 10 sherds (Figure 6.35).

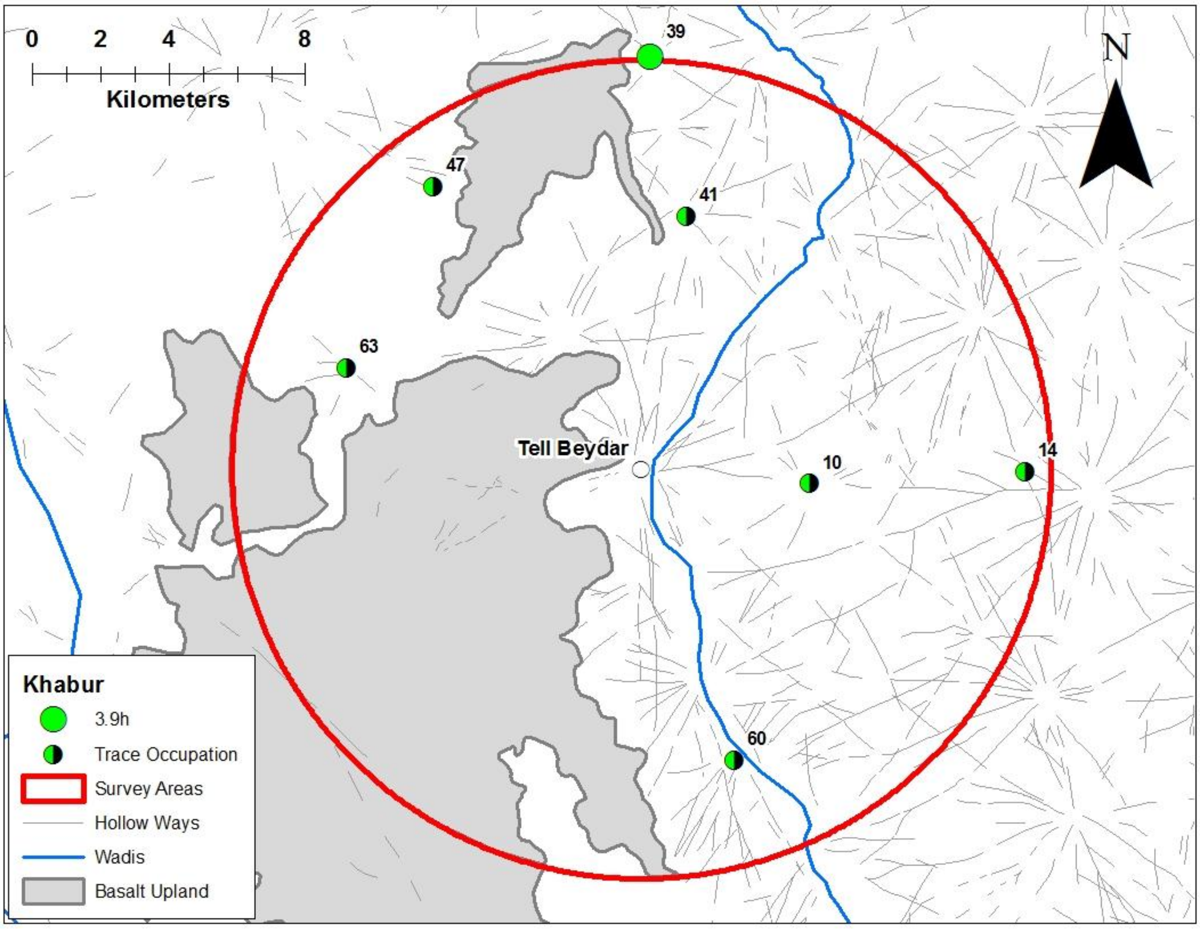


Figure 6.35: Settlement patterns in the TBS during the Khabur phase

A further Khabur phase occupation was discovered by Lyonnet (1996a) at TBS_63 based on a very small sample which was not recognised in the TBS. These latter trace occupations have been interpreted as evidence for mobile pastoralist occupation of the area (Lyonnet 2000; Ur and Wilkinson 2008; 308). In the later discussion, I have not assigned the areas of the sites at which trace occupations were recorded as the size of the collections renders the distribution of sherds almost meaningless. Sedentary settlement is therefore considered to be confined to TBS_39, giving an area of 3.9 hectares. This is almost certainly an underestimation of the population present in the area. This abandonment is also visible in Lyonnet's survey which recorded decreasing amounts of Khabur types in the western part of the basin, as well as similar trace occupations to the TBS along the Khabur valley (Lyonnet 1996a; 370-372; 1998; 180). The dominance of nomadic groups in the western Jazira is also attested in Mari texts dating to the 19th century B.C. (Charpin 1987; Durand 2004), close to the beginning of the Khabur phase. Four of the sites at which trace occupations were discovered, TBS_10, TBS_41, TBS_60 and TBS_63, were small tells occupied in the preceding LTM, suggesting the locations of former settlement may have retained some importance for later groups in the area. The other two trace settlements, TBS_47 and TBS_14 contained only two and three sherds respectively in much larger assemblages of later phases.

Settlement Trends in the Tell Beydar Survey

As in the THS, the vast majority of sites within the TBS are securely dated to individual phases, allowing for some degree of certainty in total settled area during each phase. Again, a single settlement, TBS_21, was assigned to a generic 'Prehistoric' phase in the field and contributes 1.77 hectares at a low level of certainty to all phases predating the EBA (Figure 6.36). The Khabur phase is slightly raised by the categorisation of one site, TBS_37, to a transitional MBA-LBA phase which includes the very end of the Khabur period. Although the assemblage collected was inconclusive this is highly likely to post-date the Khabur phase as no Khabur-ware sherds were found in the area. Lower towns in the survey area were predominantly Iron Age, although at Beydar there may also be a Late Bronze Age component. The total Uruk settlement is recorded as the same as that for the Late Chalcolithic as both of the sites which contained Uruk ceramics also included Late Chalcolithic occupations in the same areas. The overall trends are similar to those found in the NJS. Total settlement rose slowly through the Neolithic and Ubaid phases before increasing markedly in the Late Chalcolithic. Unlike the NJS, settlement declined slightly during the ETM, perhaps as local populations were drawn into the emerging centre at Tell Beydar, before a second increase in settlement during the LTM. Finally, during the Khabur phase only a single site was permanently occupied as mobile pastoralist populations dominated the western Khabur basin. Turning to the timeblock graph, we can see that the same broad trends are visible in both the small and medium-sized sites as in the NJS and THS. Gradually increasing settlement in all site sizes culminates in a boom in small settlements during the Late Chalcolithic, followed by nucleation in the EBA, and particularly the LTM.

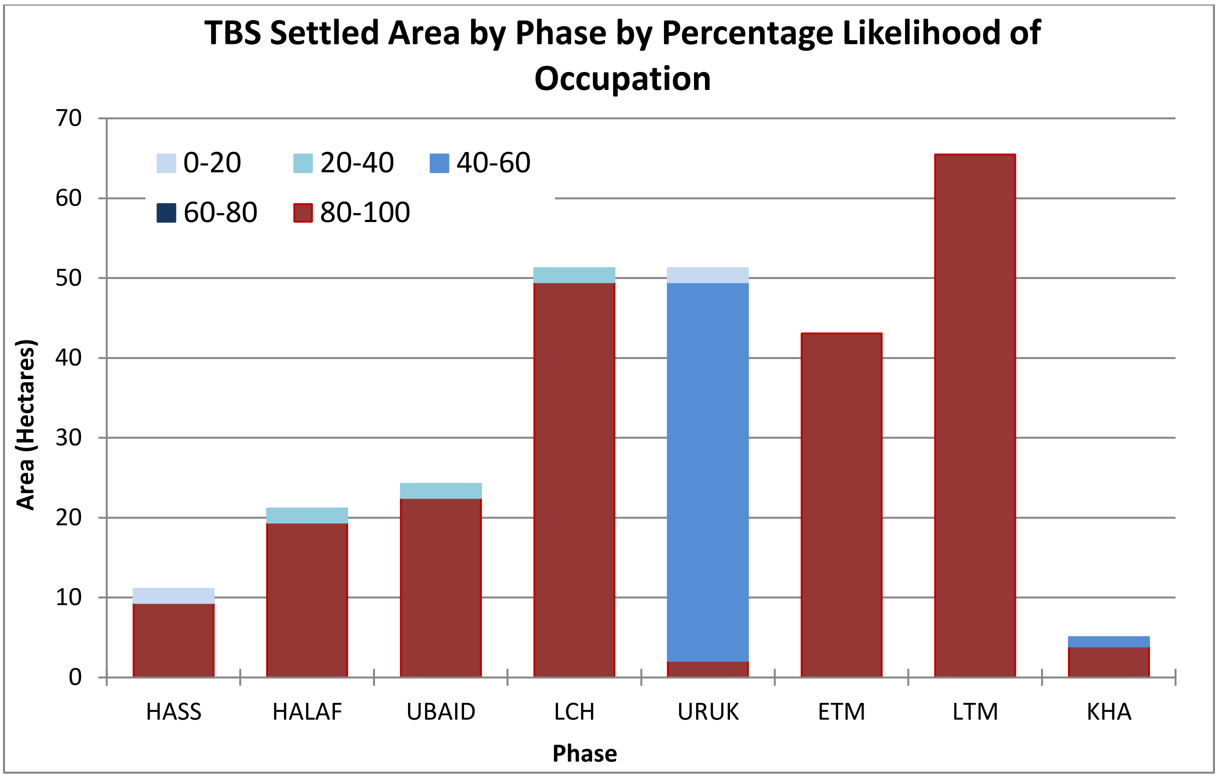


Figure 6.36: TBS Settled Area by Phase by Percentage Likelihood of Occupation

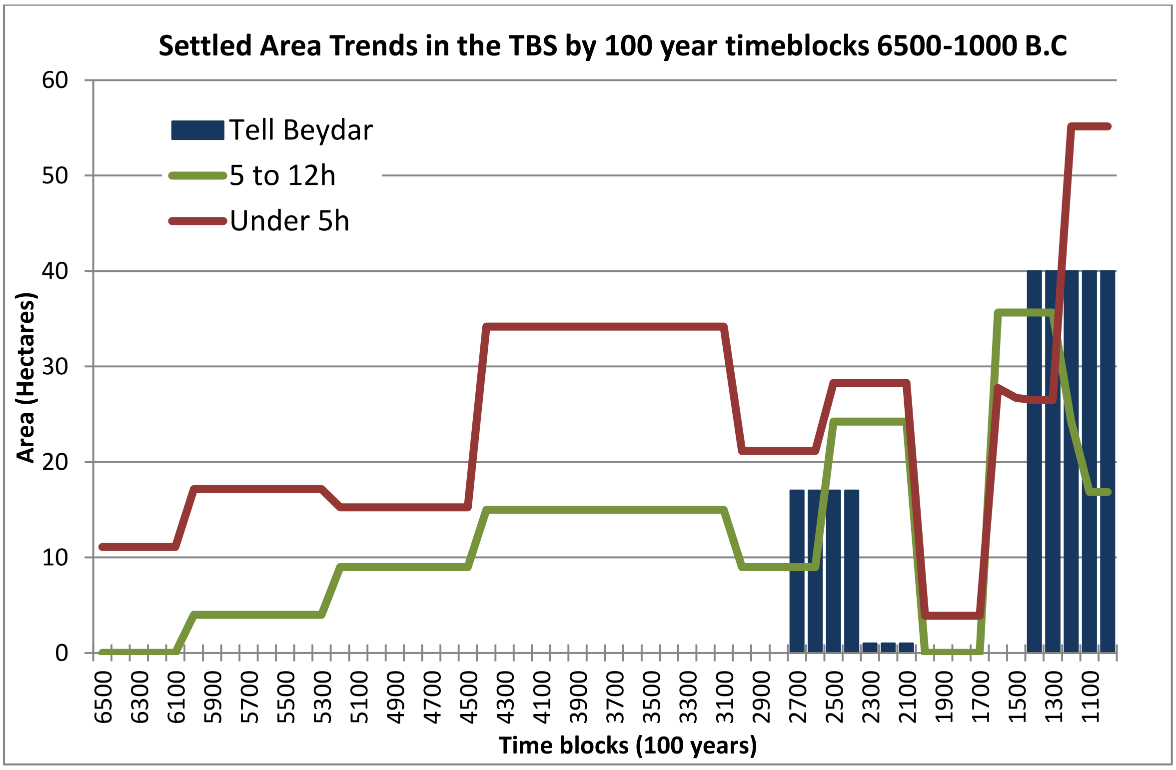


Figure 6.37: Settled Area Trends in the TBS by Timeblocks, 6500-1000 B.C

The precise timing of this nucleation is difficult to assess due to the disparity in dating precision between the TBS and the excavations at Tell Beydar. From the graph, it seems that the expanded medium-sized settlements remained settled after the decline of Tell Beydar from the substantial EJ IIIb settlement to an ephemeral occupation on the main tell. This situation seems unlikely given the high degree of political and economic integration between ancient Nabada and the settlements in its hinterland inferred from textual evidence (Sallaberger and Ur 2004). However, it is possible that a similar situation held to that at Titriş, where the decline of the main centre did not cause rural collapse, and may even have resulted in an increase in population as Beydar was abandoned. From the evidence available, we can say that the foundation and expansion of Beydar occurred in a relatively sparsely populated landscape after the decline of the Late Chalcolithic, and that this foundation predated the development of a hierarchy of nucleated villages and small towns during the early part of the LTM. This system probably disintegrated during the EJ IV phase with the decline in settlement at Beydar, although it is possible that settlement continued in the surrounding area. The decline in settlement in the Khabur phase is far less equivocal with only a single site occupied.

Comparative Long-term Trends in the Jazira Surveys

The continuous nature of settlement in the Jazira necessitates the use of settlement density calculations to establish comparisons between surveys. In calculating settlement density I have used the following areas for each survey:

Survey	Survey Area (km^2)	Sources /Notes
THS	125	Publication (Ur 2010a; 42)
NJS	475	Publication (Wilkinson and Tucker 1995; 1)
TBS Basalt Area Adjusted Total	452 136 452-136=316	Publication (Ur and Wilkinson 2008)
Total	916	

Table 6.1: Calculations of total surveyed area for the THS, NJS and TBS

The values for the THS and NJS are taken directly from the main survey publications. The TBS figure has been adjusted to take into account the presence within the survey area of the basalt upland zone. This zone, representing some 30% of the total survey area, was not subject to the same level of intensive survey as the rest of the area by the TBS team and would artificially depress the settlement density values if retained in the calculations. Figure 6.38 shows the long term settlement trends for the three FCP surveys in the Jazira, from 6500B.C. to the beginning of modern times. In general, there is a high degree of visual correlation in the overall trends in settlement, although at markedly different densities at different times. The fluctuations in the NJS during the Iron Age are an artefact of the phases used within the survey (see Chapter 3); settlement was almost certainly gradually increasing in a manner similar to the other two surveys during this period, although perhaps at a slightly lower density.

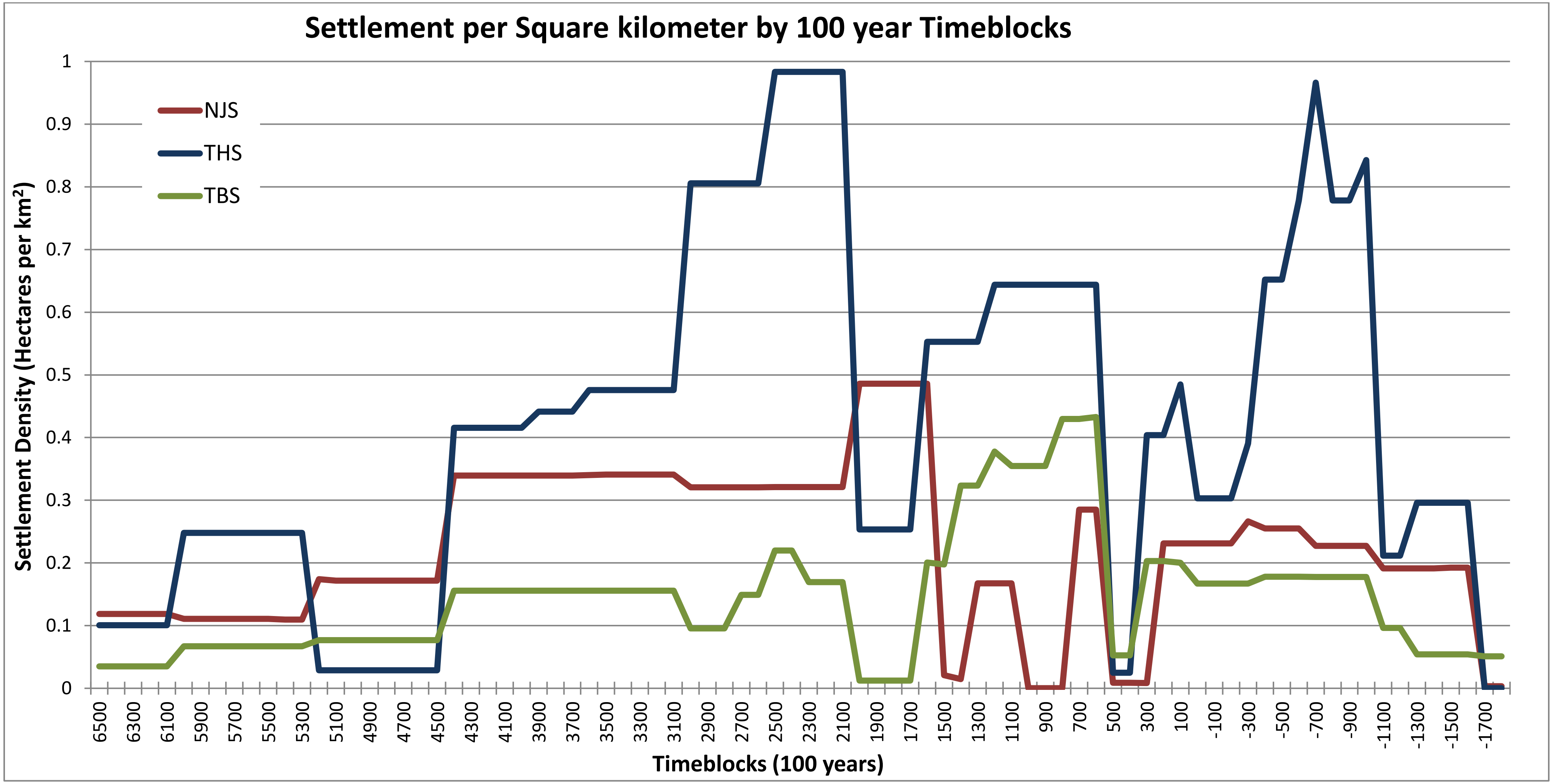


Figure 6.38: Total Settled Area in the THS, NJS and TBS by 100 year time blocks

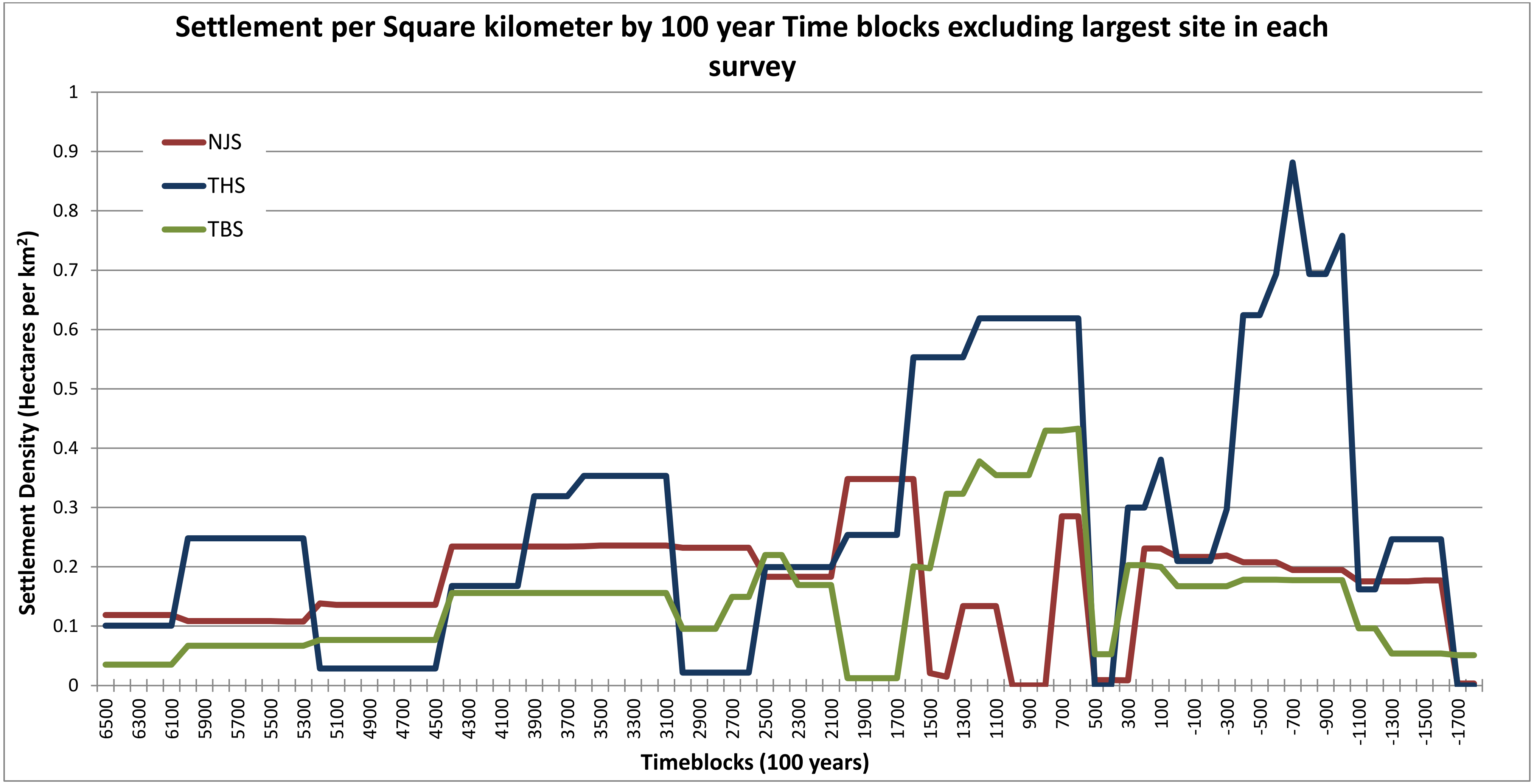


Figure 6.39: Settled Area in the THS, NJS and TBS by 100 year time blocks excluding the largest site in each survey

The greater fluctuations in the THS can be attributed to the smaller survey area; since we are dividing by a smaller total surveyed area figure, smaller changes in settlement have greater effects. Similarly, the small survey area affords a greater weight to changes in the largest site. Tell Hamoukar reaches close to 100 hectares during the EBA, resulting in a density of almost one site per square kilometre in the 125km^2 survey universe. Finally, all three surveys show an abrupt decline during the Late Iron Age. This is due to the difficulty in recognising Persian (or post-Assyrian) phase ceramics. Rather than smooth the data I have chosen to retain the raw calculations which serve to highlight periods of uncertain chronology in each survey. Figure 6.39 shows the same data as Figure 6.38 but excluding the largest sites, Tell al Hawa, Tell Hamoukar, THS_25 and Tell Beydar. This second graph demonstrates even greater similarity. Broadly speaking, rural settlement in all three surveys gradually increased through the prehistoric phases, with an exception in the Ubaid in the THS, fluctuated in the EBA and Khabur phases before remaining fairly stable until modern times. Settlement densities were slightly higher in the eastern basin during the prehistoric phases and more similar during the later historic periods. Overall, settlement remained at a remarkably consistent and fairly high density for much of the past 8000 years. Settlement shifts in the Khabur phase may reflect differences between the eastern and western halves of the basin observed elsewhere during this period (Lyonnet 1996a), with settlement expanding in the east and declining significantly in the west. If we assume this pattern to hold across the basin, we might posit a shift in settled population from the west to the east as the western Jazira was given over to new groups of mobile pastoralists. Alternatively, local factors may have been of greater significance, with the rise in population visible in the NJS attributable to the displaced population of the abandoned centre at Tell Hamoukar. Textual sources for this period demonstrate the fluidity of political and social organisation (Eidem 2008b), meaning shifts in settlement may relate to highly localised and short-lived factors as well as broader scale socio-political change. If this is the case, a full understanding of the landscape will only be elucidated through contextualised analysis with a high degree of temporal and spatial resolution, particularly given the potential influence of archaeologically ‘invisible’ nomadic populations attested in the texts (Ristvet 2008).

The major differences between the surveys occur during the EBA, when urban development at Hamoukar and Tell Beydar create spikes in the overall graph and drops in the rural settlement graph as populations were sucked into the emerging centres. This can be contrasted with the situation in the NJS, which had already experienced at least 500 years of urban development, where overall settlement densities remained consistent from the Late Chalcolithic to the beginning of the Khabur phase despite the growth of Tell al-Hawa to urban proportions. It seems, then, that we can distinguish two different trajectories of urbanism in the Khabur basin. On the one hand, Tell al-Hawa represents a long term hub which developed into a major centre over a long period, perhaps beginning as early as the Ubaid, with very little discernible impact on its hinterland of small dispersed villages. On the other, Tell Hamoukar and Tell Beydar represent relatively short-lived upstarts which experienced episodes of rapid agglomeration and dispersal during the EBA involving the drawing in of local populations in a manner similar to that seen in the urbanisations of southern Mesopotamia (Adams 1981). This is not to say that Tell al-Hawa and its hinterland remained unaffected by the developments of the EBA. As noted above, the consistency in the total settled area in the NJS between the Late Chalcolithic and LTM masks increasing concentration of settlement at a few larger sites and the near total abandonment of the south western part of the survey area. Tell al-Hawa itself was initially unaffected by this nucleation and even declined during the ETM, before expanding slightly during the LTM. Intriguingly, Hawa was also the only one of the three major sites to survive into the Middle Bronze Age. Within the 'hubs and upstarts' model, THS_25 may be considered a proto-hub which for some reason failed to develop into a more organised and cohesive settlement.

The record of other surveys

Comparison between the FCP surveys and others is somewhat problematic due to the differences in methodology and chronology employed. However, it is possible to elucidate general trends for several surveys around major centres which serve to contextualise the results from the FCP surveys. Within the Khabur basin, significant survey work has been undertaken around Tell Leilan and Tell Brak. These sites have also been the subject of long-term excavation and surface collection, providing relatively detailed data on the trajectory of the urban centre to complement information on the hinterland. The Leilan survey also included the environs of the large EBA sites of Tell Farfara, which may have reached 100 hectares during the LTM (Meijer 1986) but was probably nearer 75 (Ur 2004; 60), and the 43 hectare site of Tell Mohammed Diab (Ristvet 2005). The only excavated urban centre within the basin which has not been the subject of a landscape survey is the largest, the 120 hectare site of Tell Mozan. Outside of the basin, survey has been conducted in the region of the Jebel Abd-a-Aziz and the Middle Khabur by the Yale Khabur Basin Project, supplemented by a number of excavations in advance of the construction of the Hassake Dam, as well as further west in a small area around Tell Chuera and the Wadi Hammar.

Survey around Tell Leilan was first conducted in the late 1980s in a circle of 15km radius around the main site, and included surface collection of tell sites and limited fieldwalking (Stein and Wattenmaker 1990). This has now been supplemented by survey making use of satellite imagery, including CORONA, GIS and GPS techniques, in a 30km transect between the Syro-Turkish and Syro-Iraqi borders (see Ristvet 2005; 35-40 for a summary of the methodology employed). Approximately 1900km^2 of the central part of the basin was surveyed and 327 sites were recovered ranging in date from the Pre-pottery Neolithic to the Islamic period. The large size of the survey necessarily resulted in a reduction in intensity, and this is reflected in the relatively low density of sites in comparison to the FCP surveys in the same region (0.17 sites per km^2 compared to 0.39 in the NJS and 0.54 in the THS (Wilkinson et al. 2004)). The survey employed a very detailed ceramic chronology during the 4th and 3rd millennia, following the Santa Fe LC 1-5 divisions for the Late Chalcolithic, with some amalgamations, and then dividing the EBA into six phases based on the periodization used in the excavations at Leilan. Although details of the ceramic types used in these subdivisions are as yet unpublished, they appear to have been based on the presence or absence of small numbers of highly specific forms designed to provide a high degree of temporal resolution (Ristvet 2005; Brustolon and Rova 2007). Given the vagaries of surface assemblages, this fine grained chronology may be overly optimistic (Ur 2004; 72) and could have resulted in a further underestimation of settlement in any given phase (Wossink 2009; 96).

Taking all of these factors into account, the Tell Leilan data does broadly corroborate the patterns seen in the FCP surveys, whilst the site itself represents a clear example of an 'upstart'. Settlement during the Late Chalcolithic was dispersed across the landscape in small villages. Towards the end of the period, three centres of between 10 and 15 hectares emerged. Southern Uruk ceramics were found at several sites along the Wadi Radd in the south of the survey area, perhaps corresponding to an ancient route running towards Tell Brak (Brustolon and Rova 2007) as well as on the Wadi Jarrah around Leilan (Stein and Wattenmaker 1989). Amuq F type ceramics and southern Uruk material were also found in the step trench on the acropolis at Tell Leilan itself (Schwartz 1988), suggesting the entire 15 hectare high mound was occupied during the latter part of the 4th millennium. Total settled area for the entire Late Chalcolithic in the Leilan region amounted to just over 178 hectares (Brustolon and Rova 2007), giving a settlement density of 0.12 sites per km^2. This is rather less than the FCP surveys (see Figure 6.38 and Figure 6.39) and probably reflects the intensity of the survey rather than a real drop off in settlement. Following a brief hiatus, this system of small centres surrounded by dispersed rural settlement continued into the early part of the ETM, with four sites over ten hectares and a possible nascent hierarchy of small towns and villages emerging through Phase 2 before the massive expansion of Tell Leilan from 15 to 90 hectares during the Leilan IIId phase, around 2600 B.C (Ristvet 2005). After its expansion, Leilan sat at the head of a four tiered settlement hierarchy, including large towns such as Mohammed Diab and perhaps Farfara. As in the FCP surveys, this period also saw significant nucleation, evident in a reduction in the number of small sites, especially around Leilan and the other centres, as rural populations were likely drawn in (Stein and Wattenmaker 1990). Detailed data regarding the absolute values, or even ratios, of urban and rural settlement during this phase are as yet unpublished but Ristvet does mention that as much as 68% of the total occupied area may have been concentrated at Leilan and four second tier sites (Ristvet 2005). This is comparable with Tell al-Hawa and significantly greater than around the smaller polity centred on Tell Beydar. Phase 5 in the Leilan survey purports to correspond to the century of Akkadian control within the Khabur basin and sees a slight reorganisastion and dispersal of settlement in the southern part of the survey area[26]. The immediate aftermath of the Akkadian expansion coincides with the widespread abandonment of the region, including Leilan itself, from 2200 until the beginning of the Khabur phase, with total settled area decreasing by approximately 70%. The return of settlement was dramatic, settled area increasing to 767 hectares, perhaps twice as much as at the height of EBA nucleation. Leilan and Farfara were once again occupied and must have been large cities but outside these there was a generally ruralised settlement pattern with occasional larger settlements evenly dispersed throughout the survey area (Ristvet 2005).

Two surveys have been conducted around Tell Brak, as well as a detailed surface collection of the site itself similar to that conducted at Tell Hamoukar. The first survey, undertaken over a single season in 1988, only investigated prominent sites along the Jaghjagh (Eidem and Warburton 1996) and therefore almost certainly under represents sites of all periods, and does not provide settled area but rather site counts. A more comprehensive survey employing very similar methods to the FCP surveys has also been conducted but has only been published in very preliminary form. In both cases, the general trend of small, dense and dispersed Late Chalcolithic sites, followed by nucleation in the ETM and both continued nucleation and settlement expansion in the LTM can be inferred (Eidem and Warburton 1996; Wright et al. 2006-2007) but further analysis must await more comprehensive publication. The settlement trajectory of Tell Brak itself is now fairly well established through a combination of excavation and comprehensive survey, demonstrating an almost continuous sequence of occupation from prehistoric times to the Islamic period (see below).

In contrast to the continuous and dense settlement in the upper Khabur basin, surveys and excavation around the Jebel Abd al-Aziz and Middle Khabur demonstrate marked fluctuations in settlement through time. The earliest settlement in the Middle Khabur dates at least to the 5th millennium at Ziyadeh (Hole 1999) but the area is devoid of Late Chalcolithic occupation. Uruk period occupations are attested at Mashnaqa, Bderi, Ziyadeh and Umm Qseir (Akkermans and Schwartz 2003) before a second expansion in the early part of the ETM. This in turn is followed by a decline in settlement and total abandonment for over 1500 years between 2500 B.C. and the Neo-Assyrian period (Wossink 2009; 98). Evidence for large collective storage facilities and administrative practices including sealings at otherwise small EJ I and II settlements such as Tells

[26] The precise types used to distinguish Akkadian period settlement from more general LTM assemblages in the Leilan survey have not been comprehensively published, but seem to make use of types which cannot be assigned only to the EJ 5 phase (Arrivabeni 2010; 12, Table 5). Given that the phase has not been distinguished in other surveys, or even uniformly through excavation, it seems unlikely that such a clear distinction is currently possible, particularly for so large an area [see Chapter 4).

Atij, Raqa'i, Kerma and Knedij have led some scholars to hypothesise that these sites developed around silos used to collect grain from the Khabur valley before exporting it to cities downstream such as Mari, or even southern Mesopotamia (Margueron 1991; Schwartz 1994) . An alternative hypothesis, based on slightly different population estimates and changes in faunal and botanical assemblages, sees the Middle Khabur sites as 'tethers from which herding people ranged out seasonally' (Hole 1999; 280) and emphasises the importance of local consumption and the use of grain stores to feed expanding herds of sheep and goat (Kouchoukos 1998; Zeder 1998a). In this second interpretation, the Middle Khabur sites represent the beginning of a wider expansion of sedentary settlement into the steppe which in turn led to the formation of the *kranzhügeln* settlements around the Jebel Abd-al-Aziz and the western Jazira (Hole 1999). The Yale Khabur Basin Project did not note any settlement in this region until the EJ I and II phases when a number of small sites emerge on the lower slopes of the Jebel which may have been only seasonally occupied (Kouchoukos 1998), coinciding with the expansion of settlement in the Middle Khabur. Settlement then exploded during the EJ IIIa phase, with 36 sites of various sizes up to 30 hectares, including a number of *kranzhügeln*, occupying the steppe (Hole 1997). These sites were abandoned by the end of the EJ IIIa period at around 2400 B.C. and, as in the Middle Khabur, there is no evidence for resettlement until the Neo-Assyrian period. This pattern is also visible in the Wadi Hammar survey, covering a circle of 10km radius in the steppe round the Wadi Hammar, including Tell Chuera. The survey has not been formally published and little information on survey methodology is available, although a combination of site visits, conversations with local people and some satellite imagery analysis are mentioned in the information available online[27]. The available results of the survey are limited to site counts by period. This shows a gradual increase in settlement from the PPN to the Ubaid phases before a complete absence of sites in the Late Chalcolithic and Uruk phases. The following undifferentiated EBA phase saw significant resettlement, with 11 sites occupied, before a second decline to 2 sites in the MBA. It is hoped that the ongoing survey in the vicinity of Tell Chuera will expand upon and clarify this nascent dataset[28].

Trajectories of Urban Centres in the Jazira

Beyond the evidence from surveys, we can trace the distinction between long-lived hubs, characterised by gradual pre-EBA expansion, and rapidly developing upstarts, characterised by explosive settlement towards the end of the ETM, through excavation at major urban centres. These results also supplement the more general trends visible in surveys by providing more nuanced chronological indications, based on stratigraphy and radiometric dating as well as

[27] This data is available on the survey website: http://web.uni.frankfurt.de/fb09/vordersarch/survey.htm accessed 16th February 2012

[28] Within the FCP the kranzhugeln phenomenon is being investigated in a PhD dissertation by Stefan Smith

ceramic types. The majority of the largest sites in the Jazira represent upstarts and have a distinctive and interlinked morphology and settlement trajectory. Examples of this type include many of the cities implicated in the so called 'second urban revolution' (Akkermans and Schwartz 2003; 233), such as Tell Leilan, Tell Mozan, Tell Khoshi and Tell Taya, as well as Tell Hamoukar. All of these sites have an upper town of between 15 and 20 hectares and a large lower town, bringing the total settlement to between 90 and 120 hectares[29] (Reade 1968; Weiss et al. 1993; Kepinski-Lecompte 2001; Pfälzner 2010; Ur 2010a). In contrast to the Citadel Cities found in the Middle Euphrates, these upper towns contain both public buildings such as palaces and temples and clear domestic quarters during the LTM (Pfalzner 1997). Investigation of the pre-EBA levels is hampered by the substantial deposits of the EBA itself, meaning most of our evidence for earlier occupations come from rather small sample areas in step trenches and deep soundings. At Hamoukar, as mentioned above, the lowest levels reached in the excavation on the high mound date to the LC 3 phase, although isolated Ubaid and Halaf sherds have been discovered in early soundings (Gibson et al. 2002a; 12). Excavations in the step trench at Tell Leilan revealed ephemeral levels dating to the Ubaid (Schwartz 1988), whilst LC 3 deposits were discovered in soundings at Tell Mozan (Buccellati and Kelly-Buccellati 1988). It is possible that many of the larger sites in the Khabur have small prehistoric settlements at their core which are not visible even through detailed and systematic surface collection due to the overburden of later periods (Ur 2010a). Attempts to reconstruct the exact sizes and configurations of any of these centres are not possible at the present time due to the limited exposures available. However, the absence of pre-EBA settlement in the lower towns means settlements cannot have exceeded the size of the upper mounds, that is between 15 and 20 hectares.

As in the Middle Euphrates, the phase of urban expansion at all of these sites is characterised by the development and expansion of a large, usually walled, lower town. The two most thoroughly investigated of these are Tell Mozan and Tell Leilan. At Mozan, a combination of excavation and geophysical survey has demonstrated that settlement expansion occurred during the EJ III phase, during which the entire lower town was occupied and a massive city wall constructed (Figure 6.40) (Pfälzner and Wissing 2004; Pfälzner 2010). Settlement continued in the lower town throughout the LTM, although population declined and settlement became increasingly 'sparse and diffuse' over time (Pfälzner 2010; 4), before complete abandonment in the MBA. The upper city continued to be occupied during this overall decline, and may even have experienced

[29] Reade reports the size of Tell Taya as between 70 and 160 hectares (Reade 1973). Analysis of multiple CORONA images and high resolution Digital Globe imagery available on GoogleEarth suggest an area closer to the lower estimate, although this should be taken as a preliminary assessment. Part of the uncertainty regarding Tell Taya comes from the presence of stone wall lines in a large area around the main site. It is possible that low-level extramural settlement was common around third millennium urban developments but is now only visible when constructed from materials more durable than mud brick (Reade 1997; Pfälzner 2001).

increased prosperity during the early MBA (Dohmann-Pfälzner and Pfälzner 2001; Pfälzner 2010). Overall, however, the total size of the settlement decreased to approximately 20 hectares and remained at this level until the end of the MBA. At Leilan, as at Mozan, the expansion of the lower town occurred during a single phase, the EJ III. Excavations have revealed fairly large houses organised into neighbourhoods around well maintained streets, again surrounded by a fortification wall (Weiss 1990; Ristvet 2007). Despite the changes in settlement patterns brought about by the Akkadian expansion (see above), settlement at Leilan continued until the total abandonment of the entire site during the EJ V (Weiss et al. 1993; Weiss 1997) .

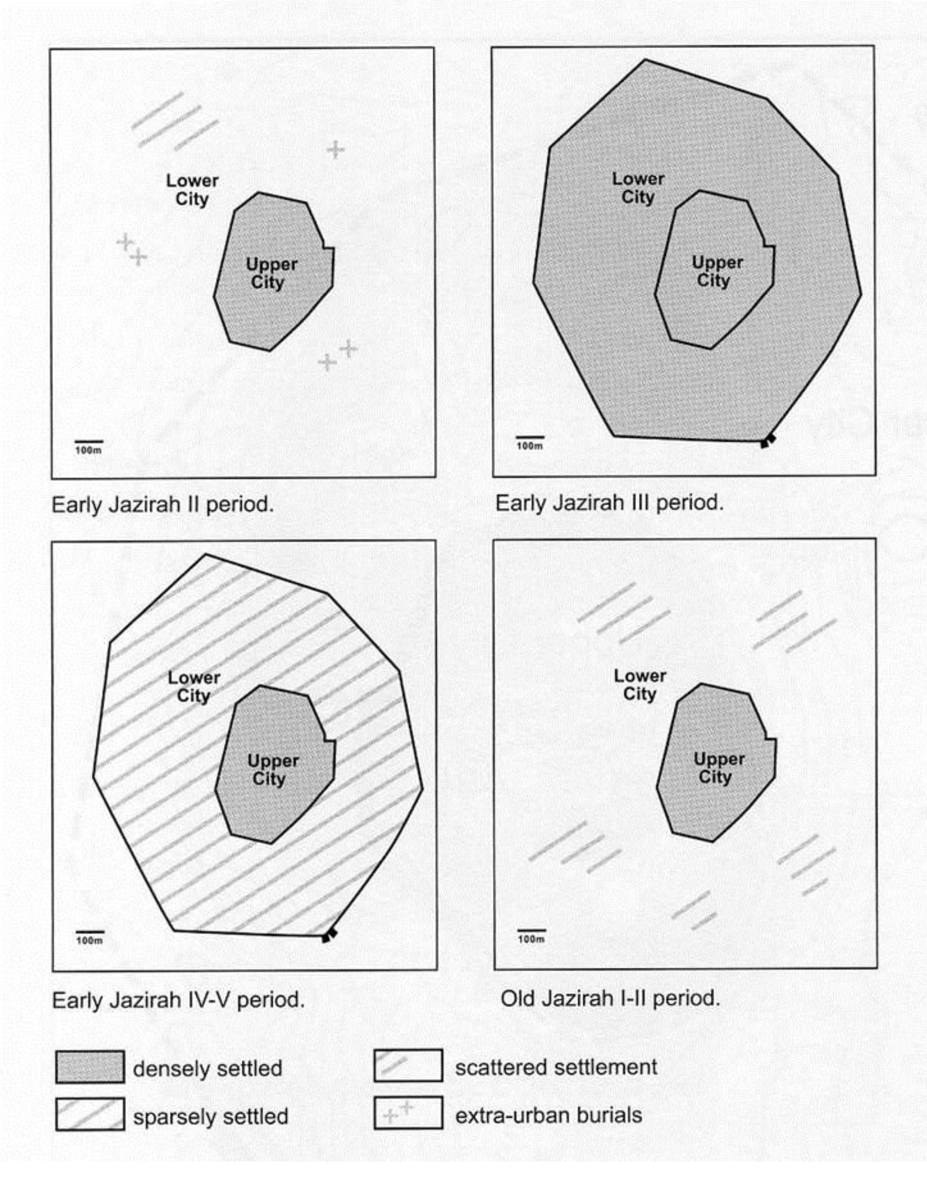


Figure 6.40: Settlement development at Tell Mozan, reproduced from (Pfälzner 2010; 6, Fig. 3)

This was followed by resettlement across the entire 90 hectares in the early part of the Middle Bronze Age, before the probable final destruction of the site in 1728 B.C. by Samsu-iluna of Babylon (Ristvet 2005; 123). At Hamoukar, as mentioned above, the expansion of the site to include a lower town occurred towards the end of the ETM phase, most probably contemporary with that elsewhere during the EJ III, and involved similarly well planned houses and neighbourhoods, before the 'citywide sacking' event in the EJ V phase (Ur 2010a; Colantoni and Ur 2011). Evidence from Tell Taya and Tell Khoshi is rather more equivocal. The earliest levels excavated at Taya, including monumental architecture on the citadel, planned houses in the lower town and a large city wall, all set directly on bedrock, are dated to level IX, with pottery characterised by both incised Ninevite 5 and stonewares (Reade 1968; 245; 1973) suggesting an EJ III date. The city wall, and therefore most probably the majority of the site, continued to be in use until level VIII (Reade 1973; 163), corresponding very approximately to the end of the EJ V, before a decline in settlement into the phases when Khabur ceramics become dominant. At Khoshi, surface collections revealed no ETM sherds but significant Akkadian and Khabur-ware collections were recovered and limited LTM levels have been excavated (Nashef 1990; 275-277; Kepinski-Lecompte 2001). In general, then, the upstarts of the EBA all experienced rapid growth during the EJ III phase before similarly rapid decline and abandonment at different points over the next thousand years. We can also add to this group the excavated *kranzhügel* sites at Tell Beydar and Tell Chuera. Beydar, as we have seen, represents a further compression of the upstart group, emerging at the end of the EJ II and declining at the end of the EJ III phases. Excavations at the 80 hectare site of Tell Chuera have revealed a more complex evolution, with successive phases of expansion over the course of the late ETM and LTM, although with similar levels of continuous and highly organised internal structures as the other expanded lower towns (Meyer 2007). The presence of a small Late Chalcolithic or Uruk settlement buried under later deposits places the evolution of Tell Chuera somewhere between the true *kranzhügeln* and the major upstarts in the Khabur basin.

Two of the major EBA urban centres in the Jaziran sub-region do not conform to the upstart trajectory, Tell al-Hawa and Tell Brak. The long-lived nature of large-scale settlement at Hawa, beginning in the Ubaid period and continuing for four thousand years until the end of the Khabur phase, has been noted above. Recent systematic surface collection at Brak, combined with excavated data, suggests a similar settlement history. Morphologically, Brak is rather different from the upstart cities, comprising a large mound of some 40 hectares with several lower mounds in the surrounding area. This different morphology may be attributed to significant pre-EBA settlement. The site was occupied from at least the Ubaid period, although the precise nature of the settlement at that time is unknown due to burial by later deposits. However, surface assemblages and evidence from area TW suggest that by the early part of the Late Chalcolithic, Brak was an extensive settlement of some 55 hectares, containing dense areas of housing and monumental architecture on the high mound and discrete clusters in the surrounding landscape (Ur et al. 2011). By the LC 3 phase, Brak had increased to 130 hectares and included substantial occupation areas surrounding the main mound (Ur 2010b). Excavated evidence suggests a period of consolidation and expansion during the Later Late Chalcolithic, including the construction of the monumental 'Eye Temple' and evidence of increased craft specialisation, social differentiation and ritual feasting practices within domestic contexts (Emberling and McDonald 2003; McMahon and Oates 2007). During the period of Uruk intrusion settled area becomes difficult to assess and depends on the degree of contemporaneity ascribed to local and southern assemblages, but the site continued to be a substantial urban centre and it is likely that the entire high mound was occupied (Felli 2003). Settlement declined to the 40 hectare high mound during the ETM before expanding again to around 70 hectares in the LTM, including a lower town to the south of the main mound (Ur et al. 2011). Brak in the early part of the LTM would therefore have had a similar morphology to the upstart centres, although with a far larger upper town. The lower town was abandoned towards the end of the LTM, perhaps after the withdrawal of Akkadian influence, but settlement remained across the high mound before a reduction to the northern ridge of the high mound during the Khabur phase (Ur et al. 2011). Limited settlement continued at the site during the Late Bronze Age, Neo-Assyrian, Parthian and Islamic phases, although at a much reduced scale to the pre- and proto-historic periods.

Conclusion

As in the Middle Euphrates, the Jazira sub-region experienced two phases of urbanisation during the fourth and third millennia. Throughout the entire period, populations remained relatively stable, although gradually increasing, across the region suggesting urbanisation was a process of reorganisation rather than rapid population growth or an influx of external groups. The first phase occurred in the early part of the Late Chalcolithic, when massive agglomerations of dispersed settlement emerged at Tell Brak, THS_25 and perhaps Tell al-Hawa. The degree to which these sites can truly be called urban depends on one's definition of the term, but the evidence for craft specialisation and monumental architecture at Brak and the long distance interaction networks visible through obsidian sourcing from both Brak and THS_25 (Khalidi et al. 2009) suggests the presence of a degree of social complexity. This complexity is not born out in the wider settlement pattern, however, with the vast majority of sites consisting of small villages less than five hectares in size. This first phase of urbanism took place within a dense network of rural settlements distributed across the landscape at sites located at important nodes. The absence of distinct settlement hierarchies despite the presence of sites of urban proportions confounds traditional models for assessing social development, in which the complexity of a society can be 'read off' from the number of tiers in a ranked settlement hierarchy (Scarborough 2005; 7). Assessments of the generative factors behind these first large scale centres are hampered by the ubiquity of these models in our understanding of the emergence of complex societies. The location of Brak allowed for access to the steppe and eventually the Euphrates via the Khabur and the Sinjar gap, as well as lying on east-west routes. THS_25 and Tell al-Hawa sat at the intersection of east-west routes from the Tigris, perhaps a more significant transport route than the Euphrates at this time (Matthews 2003; 37), to the inner Khabur basin and north-south routes accessing the Tur Abdin and highland Anatolia. Certainly their role as intermediaries in long distance trade and exchange networks seems to have played a significant role in their early growth, especially at THS_25. However, this economic importance did not result in the emergence of social institutions capable of integrating the rural and urban environment into a larger system (Ur 2010b; 44). We might rather envision a more corporate and heterarchical social organisation, perhaps including significant populations of highly mobile groups capable of moving between proto-urban and more rural settings.

The second phase of urbanism took place over the course of the ETM and entailed significant settlement reorganisation. The dense network of small village communities characteristic of the Late Chalcolithic gave way to a hierarchically organised pattern, culminating in the emergence of evenly spaced large scale urban centres at around 2600 B.C. At the same time, settlement expanded to the south and west of the central basin, firstly to the series of small villages along the Middle Khabur and then, contemporary with the founding of massive lower towns around the major centres, into the wider steppe. In the following LTM phase, settlement expanded across the Khabur basin and agricultural production intensified, evidenced by the dense networks of hollow ways and sherd scatters. This initial settlement boom was relatively short-lived. The number of sites in the steppe declined massively in the EJ IV phase, perhaps as a result of Akkadian expansion into the region and the need for greater control over local populations, and did not recover until the first millennium, whilst evidence from excavations demonstrates great fluctuation in the size of sites in the Middle Khabur. Chronological precision within the FCP surveys is insufficient to fully understand this phenomenon but the fluctuations in settlement visible in the Leilan survey suggest the later LTM was a period of instability. The construction of small low class houses in the central upper city of Mozan during this period has been interpreted as evidence of a weakening of elite power (Pfälzner 2010) and a similar encroachment may be visible in the surface collection of the high mound at Hamoukar (Ur 2010a). Hamoukar was abandoned after a violent confrontation at the end of the third millennium and Brak drastically reduced in size. However, centres such as Hawa and Leilan remained substantial settlements until the end of the MBA. It is possible that after the initial impetus for development, the success or failure of cities in the northern plains became closely linked to internal historical and political contingencies as well as the fortunes of the broader region. The wider implications of these varying trajectories in the 4th and 3rd millennia will be discussed in Chapter 8.

Chapter 7: Historical Geography and Regional Summary 3: The Orontes Valley and Western Syria

Introduction

The final sub-region discussed in this study includes the western portion of Syro-Mesopotamia, stretching from the edge of the Euphrates Valley in the east to the Orontes River in the west, and encompassing a large part of north-western Syria and the Turkish Hatay (Figure 7.1)[30]. Although geographically diverse, the sub-region does demonstrate a degree of cultural homogeneity in the periods investigated here, particularly in the later EBA (Mazzoni 2000b). Archaeological research has been rather more fragmentary than in both the Middle Euphrates, where dam projects have resulted in the excavation of numerous sites, and the Jazira, where the large size of urban centres has long attracted scholars. The two outstanding FCP surveys, the Amuq Survey (AS), undertaken as part of the wider Amuq Valley Regional Project (AVRP), and the Settlement and Landscape Development in the Homs Region Project (SHR), provide data only for the Orontes Valley and its immediate environs. Limited survey has been carried out around the EBA/MBA capital of Qatna (Morandi Bonacossi 2007a; 2007b), and several larger surveys conducted in the steppe further east (Geyer 2001; Geyer et al. 2007). The main sequences for the Late Chalcolithic and EBA come from two larger sites, Ebla and Hama, as well as several sites in the Amuq Valley (Akkermans and Schwartz 2003; 224-225), but there is little published data available for the immediate surroundings of the larger centres . In contrast to this paucity of archaeological data, the textual sources available for the western zone are extremely rich, including the vast corpus of tablets from the Ebla palace and, for the Middle and Late Bronze Age, Tell Atchana (Alalakh) and Ras Shamra (Ugarit). In the absence of detailed full coverage survey in the landscape surrounding the major cities, these textual resources are invaluable, and will be discussed below.

The Physical Landscape

In contrast to the Euphrates Valley or Jaziran Plains, the western sub-region is not related to a single landscape type and includes the Orontes Valley, the upland areas of the Amanus, Jebel an-Nusayriyah and Massif Calcaire, and the low relief plains and steppe between the Orontes and the Euphrates. The western part of the sub-region represents a continuation of the Dead Sea Fault Zone, and ultimately the African Rift Valley, at the point where the African and Arabian tectonic plates meet. Collision between the two plates has resulted in a series of coastal mountain chains, including the Lebanon, Anti-Lebanon and Nusayriyah ranges, creating a division between inland and coastal zones. As a result, the Orontes flows north from its source in the Beqa'a Valley in

[30] Due to time and spatial constraints, and in keeping with the aims of this thesis, this chapter is orientated more towards Northern Mesopotamia than southern and coastal Syria and the Levant. For more detailed analysis of the SHR data in relation to southern Syria and the broader area, see (Philip et al. 2005; Philip and Bradbury 2010).

Lebanon before turning back on itself in the southern part of the Amuq Plain to meet the sea close to Anatakya in modern Turkey.

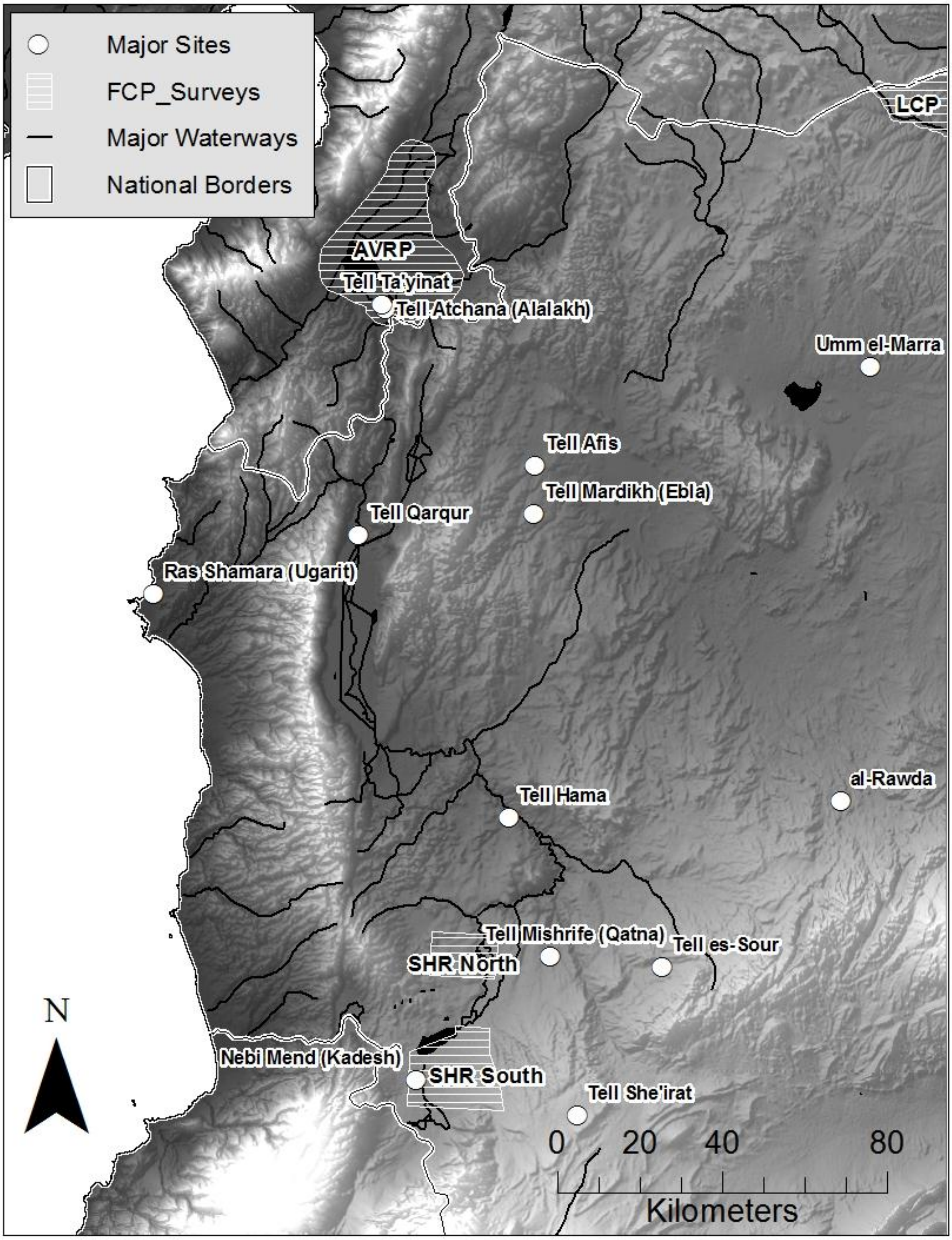


Figure 7.1: The Western Syria Sub-Region, including FCP surveys and major sites. Background: SRTM acquired February 2000

Between the Beqa'a Valley and the modern town of Rastan, the Orontes Valley is dominated by lacustrine marl soils, as well as alluvial deposits on the lower terraces. Further to the north the Orontes, like the Euphrates, has incised a number of gorges along its course, as well as producing broad, flat and occasionally marshy areas around Lake Qatina and in the Ghab and Amuq valleys. Geological investigations in the Homs region have revealed a long staircase of up to 12 terraces, the latest of which may date to the Middle Palaeolithic (Bridgland et al. 2003). The Pleistocene succession suggests that the southern stretch of the Orontes has been relatively stable throughout the Holocene period. In contrast, remote sensing has revealed multiple palaeo-channels across the Amuq Plain and there is also archaeological evidence for shifting settlement during the pre-Classical period (Casana and Gansell 2005; 158-159). This can be taken as evidence of an active and shifting channel in the fairly recent past. Tectonic activity has also resulted in several large upland basalt zones, almost exclusively to the west of the river valley. In the southern part of the sub-region the Orontes Valley merges with the North Syrian Plateau, equivalent to the Jaziran Plateau on the other side of the Euphrates and comprising similar calcic xerosol soils with occasional basaltic outcrops (Geyer et al. 2007). Further north in the vicinity of Ebla these give way to Mediterranean Terra Rossa soils, separated from the Amuq Valley by the limestone uplands of the Massif Calcaire and Jebel Zawiye.

Climate and Subsistence

The climate of the western sub-region may be thought of as similar to the Middle Euphrates and Jazira but rotated ninety degrees, with increasing aridity running from the mountain regions and Orontes Valley eastwards into the plains and steppe. Present day annual rainfall in the SHR Southern Survey Area decreases from 600 to 300mm in a south-easterly direction across the survey area with approximately 30% variability (Dorrell 2003; 6). In the Amuq this rises to between 700 and 1500mm (Casana 2007). The plains stretching from Ebla and Tell Afis to Qatna in the south receive rather less than these amounts, although most probably still more than 300mm, whilst sites further to the east such as Al-Rawda lie outside the 250mm limit for dry farming agriculture and on the edge of the Syrian Desert proper (see maps in Chapter 8) (Castel and Peltenburg 2007; Riehl 2007b). The diversity of the landscape is reflected in the vegetation zones assigned in Hillman's classification, in which the Orontes Valley represents zone 7, Riverine Gallery Forest, with zones 3a and 3b Oak-Rosaceae Park Woodland further to the east and finally zone 5a Moist and Medium Dry Steppe to the west of the Euphrates Valley (Moore et al. 2000; 50). Reconstruction of past subsistence practices and patterns in this sub-region are hampered by a lack of excavated sites, particularly for the Late Chalcolithic but also in the EBA. Excavations at Tell Kurdu in the Amuq revealed Halaf, Ubaid and possible very early Late Chalcolithic levels (Amuq E) which contained charred lentil and wheat as well as sheep, goat, cattle and pig remains and evidence for the exploitation of wild resources including gazelle, deer, fish and shellfish (Yener et al. 2000b), although the relative amounts of these have not been published. At Nebi Mend, einkorn and emmer wheat, as well as barley, were all present in levels dated to the early part of the EBA in trench VIII, along with very small samples of bean, lentil and olive (Moffat 1989) but nothing has been published regarding faunal remains beyond a note that some were discovered. Recent excavations at Tell Mishrifeh (ancient Qatna) to the east of Homs and Al-Rawda in the steppe have added to our understanding of subsistence practices in the later EBA and MBA. Archaeobotanical evidence from the palatial complex and the lower town at Qatna points to the dominance of two row barley during this period, although emmer and einkorn wheat were also present along with a variety of legumes and fruits (Pena-Chocarro and Rottoli 2007; Riehl 2007b). Unfortunately there are no published animal remains available for the site. At Al-Rawda, occupied in the second half of the 3rd millennium, the assemblage was again dominated by barley with limited amounts of wheat, along with legumes, grape and olive (Herveux 2004). However, this cannot be taken as a reflection of the general state of affairs in the steppe as the site is beyond the limits of rain-fed agriculture and made use of significant water harvesting and irrigation technologies (Moulin and Barge 2005; Castel and Peltenburg 2007; Braemer et al. 2010). Faunal remains from Al-Rawda demonstrate a heavy reliance on sheep and goat but also some cattle and pig (Vila and al-Basso 2006), the latter being highly unusual in such an arid environment. Given this very limited dataset, it is difficult to make general statements regarding subsistence practices in the western sub-region. However, the broad trend seems to follow that of the Middle Euphrates, with increasing aridity coinciding with a greater reliance on barley over wheat and legumes, and sheep and goat over cattle and pig. Clarification of this situation must await further study.

Constraints on the Interpretation of Archaeological Survey in the West

There are four principal constraints which affect the interpretation of the archaeological record in the Orontes Valley:

- Chronological Uncertainty
- The impact of geomorphological processes, particularly alluviation and colluviation, over the Holocene period
- The attenuation of the archaeological record by successive later occupations
- The long duration of occupation of tells from prehistoric periods into the Iron Age and even Hellenistic periods

Whilst each of these factors has some effect across the FCP surveys, and Northern Mesopotamian survey in general, they are particularly significant in the West. Issues of chronology have already been discussed in Chapter 4 and can largely be attributed to the paucity of excavation in the region. The localised impact of both natural and cultural landscape transformations processes mean these issues are best discussed in relation to the individual survey areas (see below). However, the final point requires some elucidation.

Settlement Continuity in the West

Figure 7.2 and Figure 7.3 show the numbers of tells and flat sites occupied in each phase between the Neolithic and Islamic periods in the SHR and AS respectively. It is clear that in both cases occupation is concentrated on tells from the Early Bronze Age until the Hellenistic/Early Roman phase, and it is only in this period that settlement begins to spread to flat sites. Even during the period of dispersed settlement tells remained of some importance, particularly in the Amuq where the highest count of occupied tells actually occurred during the Late Roman phase.

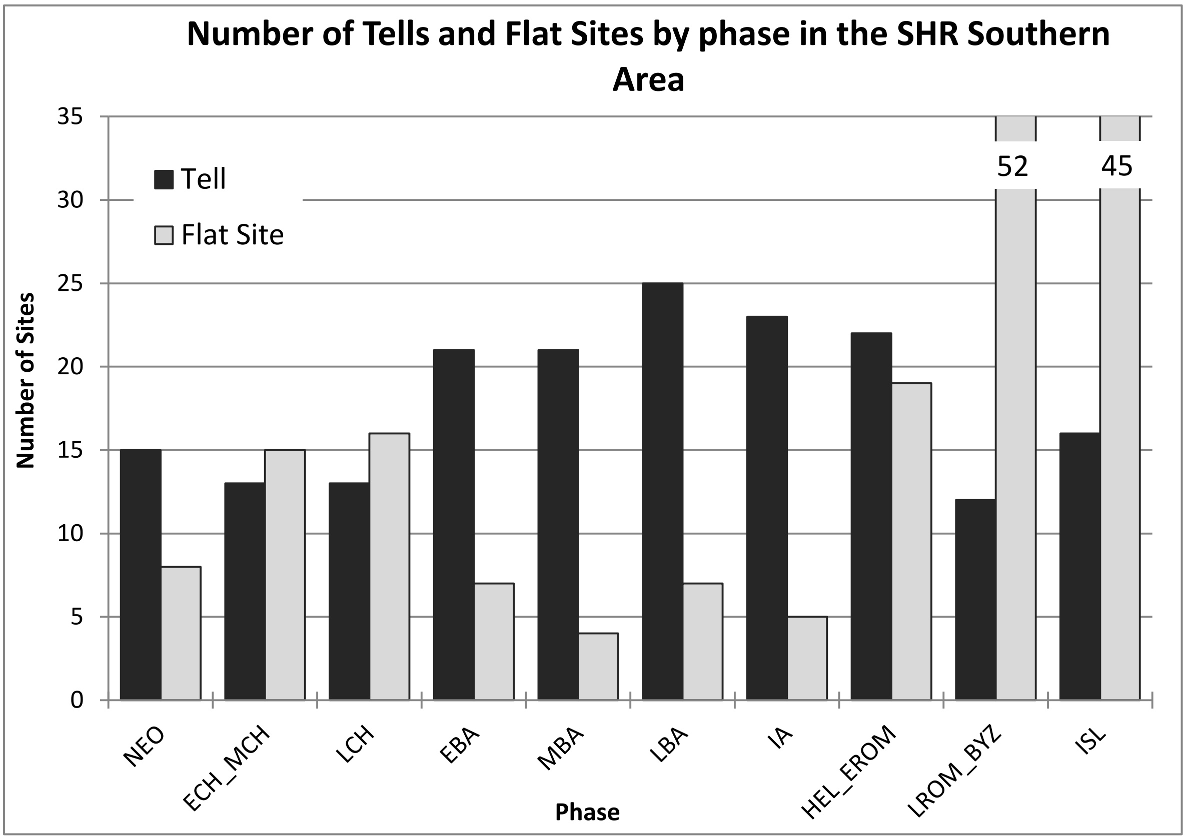


Figure 7.2: Number of Tells and Flat Sites by phase in the SHR Southern Area

This figure is slightly misleading as the majority of these phase assignations were based on very small collections, especially in comparison to the size of earlier assemblages at the larger sites, meaning it is unlikely that the later occupations are of the same magnitude. In the Amuq, the continuing occupation of tells may be related to the marshy conditions which prevailed in the valley from the end of the 1st millennium. Tells would have acted as habitable islands within perennial marshes and also as safe havens in areas which received seasonal inundation. The absence of flat sites even in drier areas before the Hellenistic period suggests this is unlikely to have been the sole motivating factor in settlement location, however, and it is clear that the nucleated pattern which came into being in the EBA remained strong until at least the Iron Age, with very few flat sites occupied. This can be contrasted with the abandonment of tells in the first part of the 2nd millennium in the Jaziran sub-region and the Iron Age in the Middle Euphrates (see Chapters 5 and 6). The causal factors behind these changes are difficult to interpret, and may relate amongst other things to systems of land tenure and social and political organisation (Casana 2007). This will be discussed further in Chapter 8. The longer duration of tell-based settlement has a significant impact on the size of ceramic collections (Casana and Wilkinson 2005a; 37), and therefore on site dating, and also on the ability of surveyors to distinguish discrete areas of particular ceramic types.

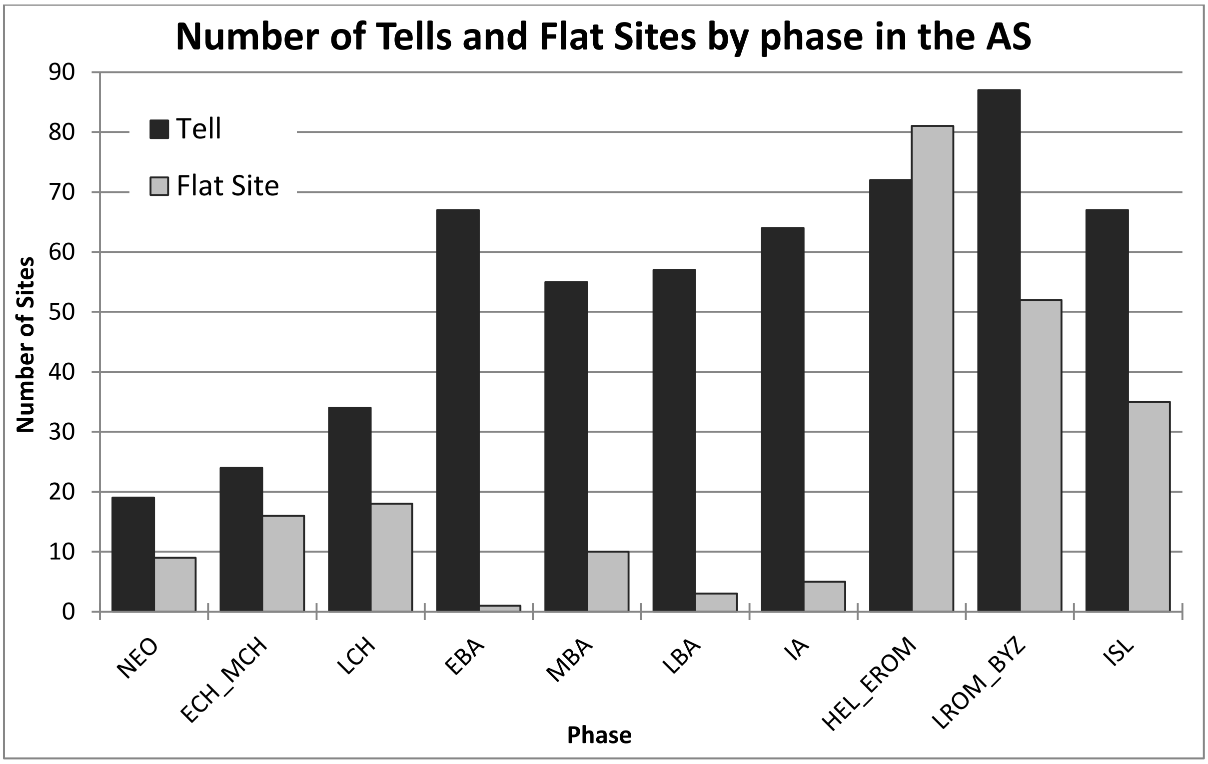


Figure 7.3: Number of Tells and Flat Sites by phase in the AS

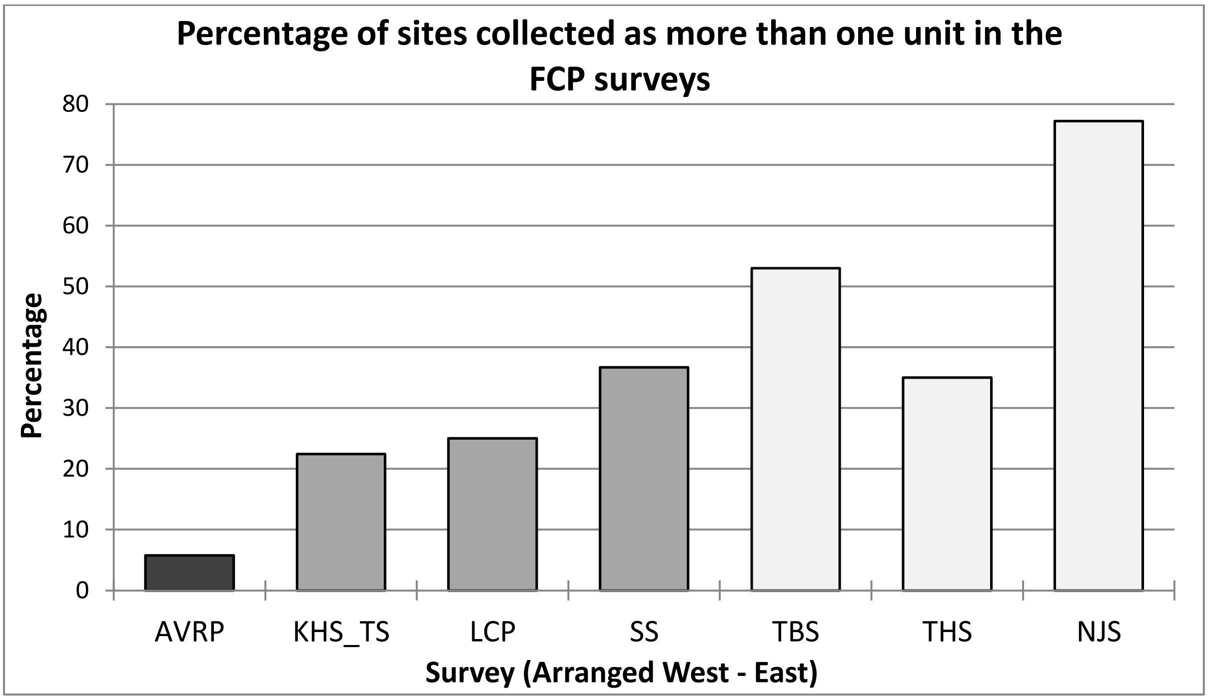


Figure 7.4: Percentage of sites sub-divided into separate collection units displayed by survey. Jazira Surveys are coloured light grey, Middle Euphrates Surveys mid-grey and the Amuq in dark grey

This second point is of some importance in the analysis of settled area since fewer sub-divisions of sites are possible, and therefore changes in the size of individual sites over time are harder to reconstruct. Figure 7.4 shows the percentage of the total sites in each survey which were sub-divided for the purposes of ceramic collection. There is a clear trend towards greater sub-division in the Jazira, and to a lesser extent the Middle Euphrates, whilst in the AS only 6% of the sites were collected as two or more units. This pattern reflects a number of variables, including differences in survey methodology, intensity and recording methods, the number of large sites included in the survey area (which probably accounts for the lower percentage in the THS) and the number of smaller sites which do not require sub-division. The low percentage in the Amuq is certainly linked to the high numbers of small later period sites within the survey area but the value is sufficiently low to suggest we may also be losing some of the nuances of individual site changes which were recorded in the other surveys, particularly at the larger multi-period sites. Site collection in the SHR followed rather different strategies to the other FCP surveys (see below) and made greater use of alternative collection methodologies such as on-site transects and sample squares. However, the same issues of overburden and continued settlement apply. With the exception of the two largest sites, all of the tells in the southern and northern marl survey areas were collected as single units, prohibiting the analysis of changing size over time. How this problem affects the analysis of settlement trends at the level of an entire survey depends on the number of larger sites involved since these will have a disproportionate effect on the settlement data. This issue will be discussed further in relation to the individual surveys.

The Amuq Valley Regional Project and Amuq Survey Dataset

The Amuq Valley Regional Project (AVRP) was conducted between 1995 and 2002 by a team based at the University of Chicago and included a program of excavations, environmental and geomorphological analysis as well as the Amuq Survey (AS) (Yener 2005b). The project built on the previous survey and excavations carried out under the direction of Calvin McEwan between 1932 and 1938 which produced a full ceramic and architectural sequence based on soundings at several sites in the Amuq plain, including the largest, Tell Tayinat (Braidwood 1937; Braidwood and Braidwood 1960; Haines 1971). Excavations were also carried out at the large 2nd millennium site of Tell Atchana, along with a number of soundings at smaller tells, by the British archaeologist Leonard Woolley during the late 1930s and early 1940s (Woolley 1953; 1955). The AVRP excavated new trenches at three of the sites previously investigated by the Chicago team and Woolley, including the predominantly prehistoric mounds of Tell Kurdu (Yener et al. 2000a; Ozbal et al. 2004) and Tell Judaidah, as well as the two ancient capitals, Tells Tayinat and Atchana. Detailed surface collection, geophysical survey and coring were also carried out at the latter two sites (Batiuk and Burke 2005; Batiuk et al. 2005; Casana and Gansell 2005; Batiuk 2007) and excavation continues at Tell Tayinat through the Tayinat Archaeological Project (http://www.utoronto.ca/tap/, accessed 1st May 2012).

Unlike the other FCP surveys, the AS dataset has already undergone a process of reorganisation and GIS integration, undertaken by Jesse Casana as part of his PhD dissertation (Casana 2003a). This included the development of a comprehensive site database and the creation of GIS data for each site based on the notes and descriptions available in field notebooks, sketch plans and digital data collected over the course of the survey. This data has been imported into the FCP database and forms the basis for the following discussion. In the absence of the original metadata it has not been possible to assign levels of geographical precision or boundary certainty to the AS data. The early years of the project included vehicle survey and extensive off-site transect walking, and this was supplemented in the later years (post 2001) by extensive use of CORONA imagery and French Mandate period maps, along with GPS (Casana and Wilkinson 2005a; 27-28). Given this multitude of sources and the detailed notes available in the AS database we would expect the AS to be dominated by 'Definite' and 'High' values in geographical precision and boundary certainty, although the latter may have been affected by the number of GPS points on which site definition was based. Assessed on the specific criteria relevant for the inclusion of information in the broader database the AS represents a comparable dataset to the other FCP surveys.

Geomorphology of the Amuq Valley

In contrast to the other FCP survey areas, the Amuq plain experienced significant environmental and sedimentary fluctuations during the Holocene, and consequently represents a complex geomorphological landscape. Rather than rehearse the descriptions and discussions given elsewhere (see especially Wilkinson 1999; 562-567; Yener et al. 2000b; Casana and Wilkinson 2005a), I will concentrate on the impact of these processes on settlement development and the recovery of archaeological material. The three major factors affecting the archaeological landscape are patterns of sedimentation, the size of the Lake of Antioch, situated in the centre of the plain, and the lateral movement of the larger rivers. With the exception of a small area of relict plain to the east of the present day lake known as the Cakaltepe Sedimentary Window (Yener et al. 2000b; 173), the entire plain has experienced some degree of aggradation during the Holocene (Figure 7.5). Importantly, this sedimentation has not been uniform in either time or space. Broadly speaking, the greatest accumulations occur along the edges of the Amanus and the Jebel al-Aqra upland areas, where even the Roman ground surface may be covered by several metres of colluvial gravels (Casana and Wilkinson 2005a; Casana 2008). The valleys of the Orontes, Afrin and Kara Su rivers have also seen high levels of aggradation; coring on the main mound at Tell Tayinat in the Orontes flood plain has shown that Iron Age levels are consistently covered by between 2.5 and 3 metres of sediment (Batiuk 2007). Evidence from a drain section at nearby Tell Atchana suggests a steady accumulation of sediment prior to the Late Chalcolithic and a period of stability up to the Iron Age, before a marked increase in the pace of aggradation during the Hellenistic and Roman periods, resulting in the burial of Late Chalcolithic levels several metres below the current plain level (Yener et al. 2000b; 173). Finally, the size of the Lake of Antioch has not remained static over time. Coring close to the centre of the lake suggests there was a body of water present up until the beginning of the fifth millennium, perhaps in the form of a series of pools along the course of the modern Afrin River surrounded by marshland. Between the 4th and the 1st millennium the lake was greatly diminished, and may have been completely dry for long periods. Several sites now situated within the modern lake revealed Bronze and Iron Age material overlain by lake deposits, including the large site of Karatepe (Yener et al. 2000b). During the 1st millennium, and coterminous with the higher levels of aggradation noted in the Atchana drain section, the lake began to grow again and stabilised at somewhere near its present size throughout Roman times before expanding to the north into a long-standing marsh during the medieval period (Casana 2003a).

The accumulation of significant amounts of sedimentation across the plain during different periods cannot fail to have an impact on the number and the types of sites found through survey. Unfortunately, in the context of such a complex geomorphological history the precise implications for site recovery are difficult to reconstruct. Generally speaking, the biases introduced through alluvial deposition are the same as those which apply to larger tells in that earlier occupations are more likely to be buried. It is possible that the pattern of tell based settlement visible in Figure 7.3 is simply a reflection of the burial of pre-Hellenistic flat sites by later deposition. However, the presence of flat sites in the Neolithic and Chalcolithic phases suggests the situation is more complicated. We can say that the general paucity of single period sites between the Late Chalcolithic and Iron Age periods may in part reflect the burial of smaller and flatter sites by alluvial deposits, particularly in the river valleys and to a lesser extent the fringes of the Amanus range, but may also reflect the concentration of settlement on tell sites visible across the Levant at this time (Casana 2012). Alluvial deposition may also account for the paucity of off-site features found in the plain, including the absence of field scatter around the major sites (Casana and Gansell 2005). Evidence from the small Cakaltepe Sedimentary Window, where deposition was almost absent, confirms these hypotheses with a relatively high density of prehistoric sites, evidence for field scatter and small topographic features such as mud brick extraction pits, moats and ditches (Casana and Wilkinson 2005a; 31). This area is too small to extrapolate settlement density across the entire plain, and may not be representative of the wider settlement pattern, but it does hint at the types of sites and features which may be missing from the archaeological record.

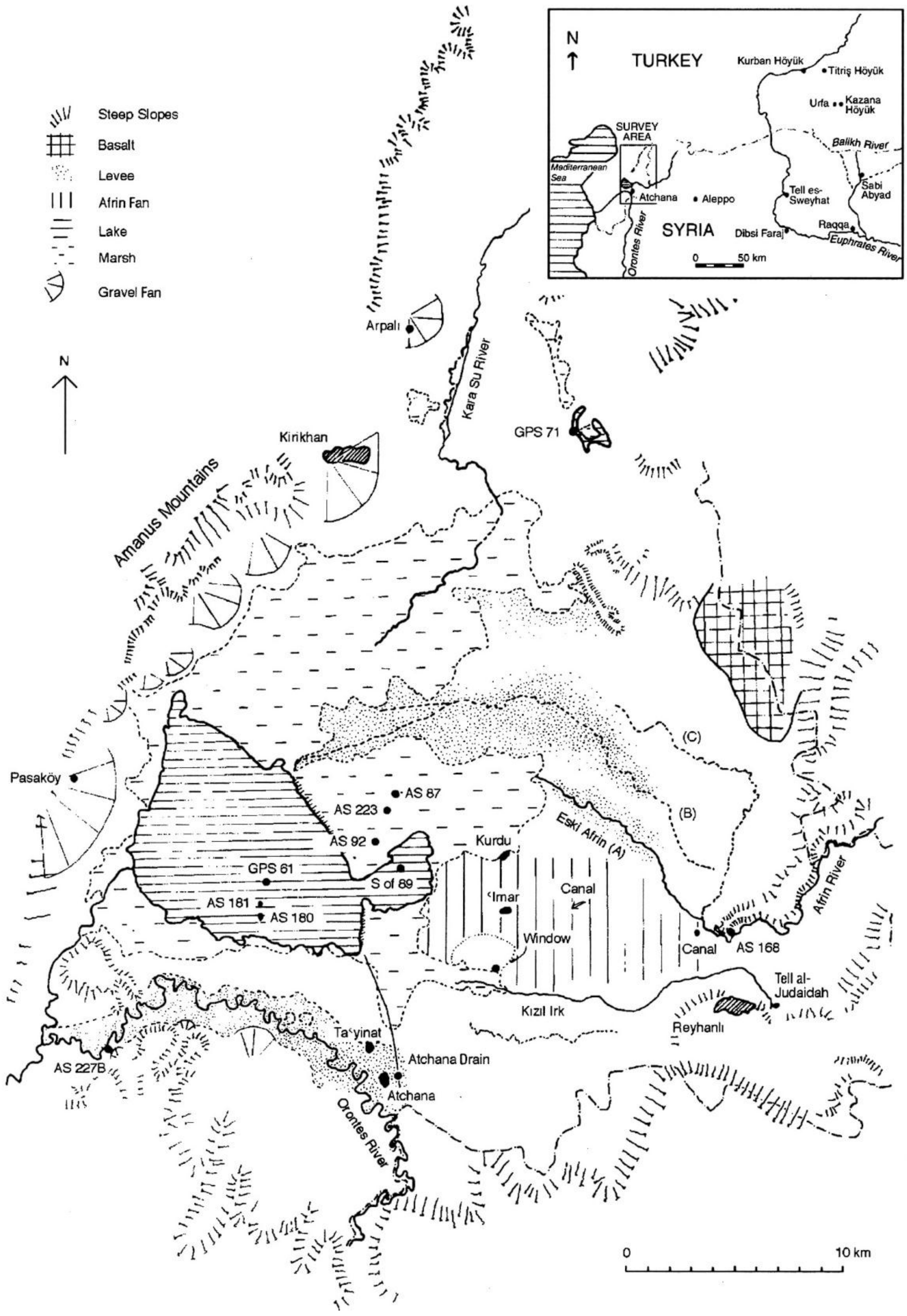


Figure 7.5: Geomorphological map of the Amuq Valley, taken from (Casana and Wilkinson 2005a; 50)

The Amuq Valley in the 4th and 3rd Millennia

The combination of chronological, geomorphological and methodological issues discussed above renders a simple phase based analysis of settlement in the Amuq Valley problematic. In response to this, Casana has introduced the idea of 'structural transformations' (2007; 197) in settlement patterning and land-use (see Chapter 2). Casana defines three broad periods of stability in the Amuq Valley between the Neolithic and the present day based on site morphology and distributions, with the first including the Neolithic through to Late Chalcolithic pattern of dispersed villages, the second the Early Bronze to Iron Age tell-based pattern and the third the dispersed landscapes evident from the Hellenistic period onwards. The time period of interest in this thesis, the 4th and 3rd millennia, straddles the first and second of these periods of stability. Despite the chronological uncertainties it is possible to distinguish settlement changes across three broad phases during this period, the Late Chalcolithic, the EBA and MBA.

The Amuq Valley in the Late Chalcolithic

The Late Chalcolithic settlement pattern in the Amuq Valley represents the final stage of the dispersed village pattern, evident from the Neolithic phase onwards. Throughout this period the largest site in the valley was situated in the centre of the plain, with settlement probably shifting from Tell Hasanuşaği (AS_93) in the Neolithic to Tell Kurdu (AS_94) in the Early and Middle Chalcolithic and finally Tell Imar (AS_101) in the Late Chalcolithic. These three low mounded sites were between ten and fifteen hectares in area, at least twice the size of the next largest site in the plain at the time (Figure 7.6). Significantly, none have later occupations dating to the Bronze or Iron Ages meaning their size can be entirely attributed to prehistoric occupation. Excavations at Tell Kurdu have revealed domestic structures and a small cemetery and demonstrate that almost the entire mound was occupied during the Early and Middle Chalcolithic, although there is some evidence of a shift from north to south over time (Yener et al. 2000b; 199).

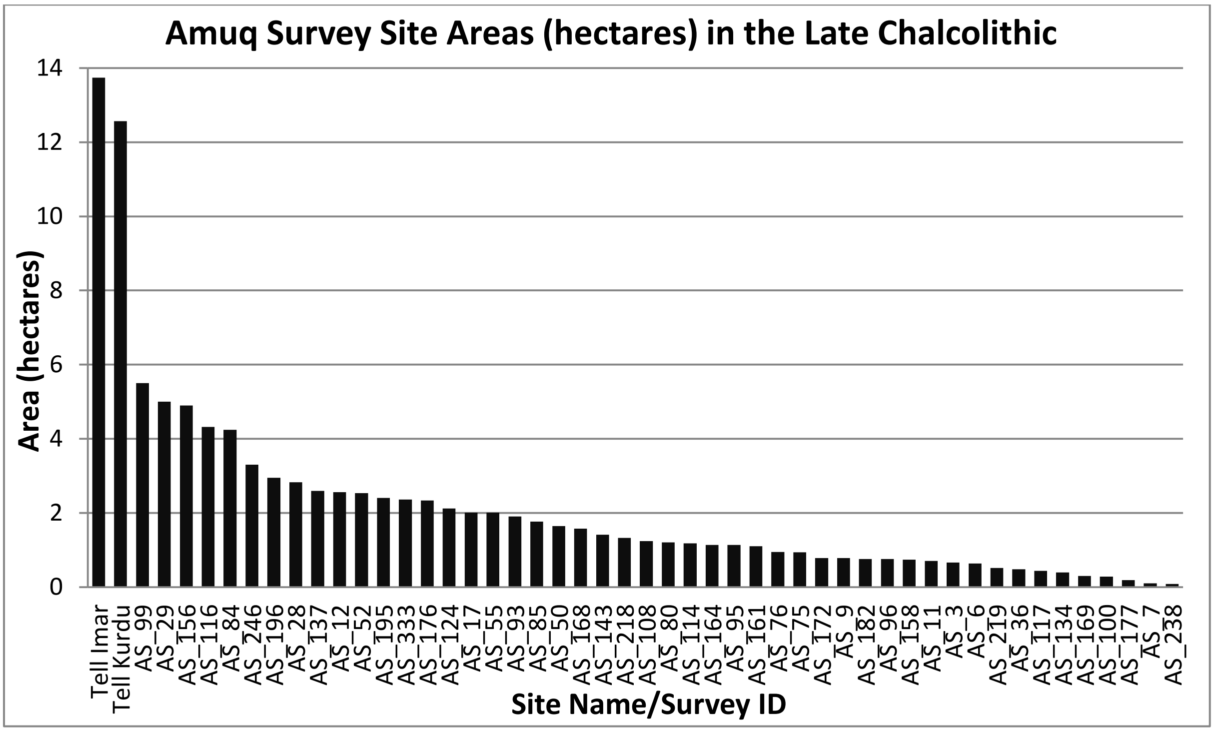


Figure 7.6: Amuq Survey Site Areas (hectares) in the Late Chalcolithic

By the Late Chalcolithic period Tell Imar was the largest site in the plain and was surrounded by a fortification wall of limestone blocks. Tell Kurdu may still have been occupied at the beginning of this period, although it is unlikely that settlement extended over the entire 13 hectare mound. These two sites were surrounded by a dense network of smaller sites with settlement spread more sparsely in the northern and eastern parts of the plain along the larger wadis (Figure 7.7).

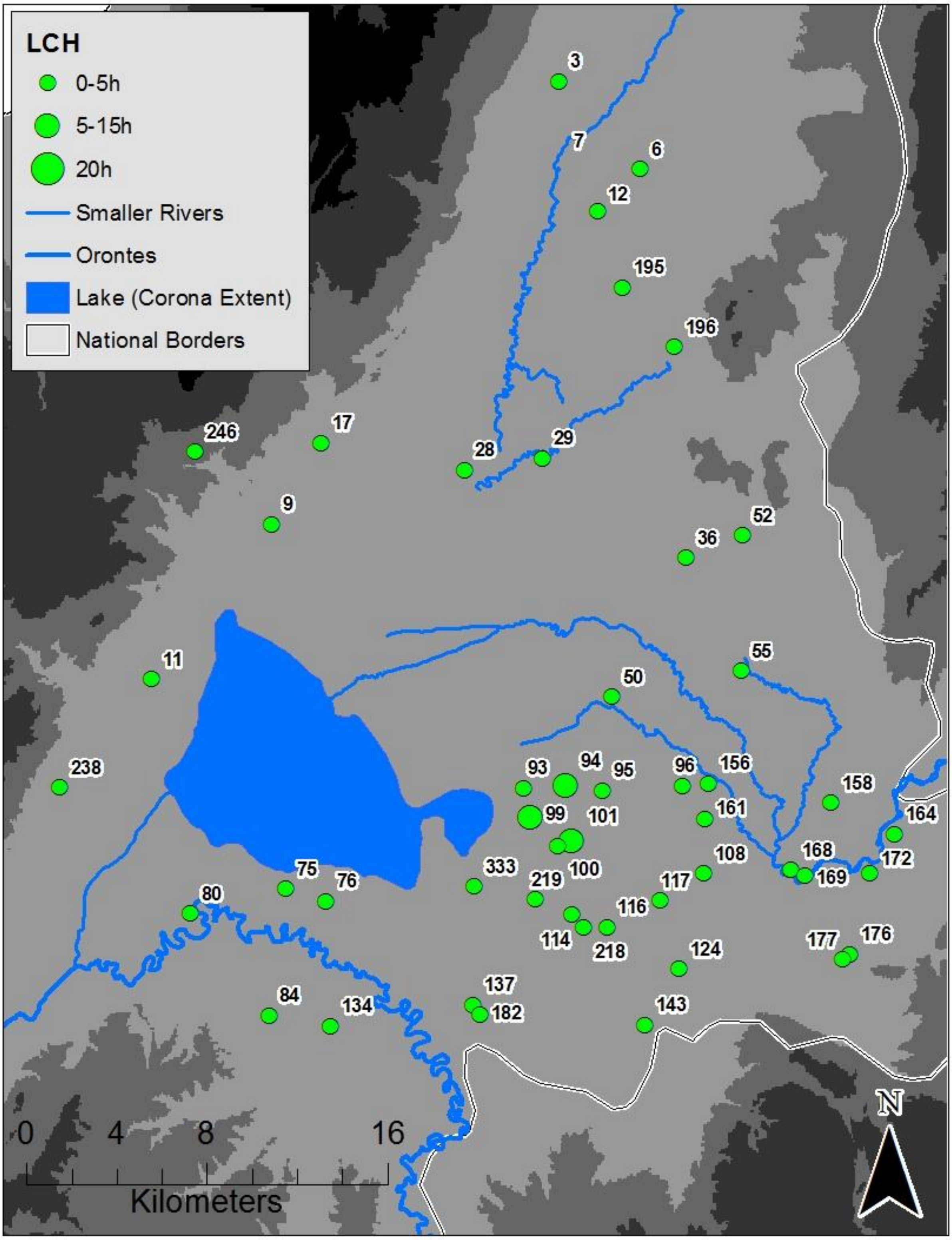


Figure 7.7: Site Locations for the Late Chalcolithic in the AS. Site numbers correspond to both AS and Braidwood surveys

This pattern may in part reflect the burial of sites in the wider valley by alluvial deposition (see above) as there is a noticeable increase in the number of sites within the Cakaltepe Sedimentary

Window. It is not possible to determine whether this localised density is a result of an increase in site recovery or an increase in settlement due to favourable local conditions (Casana 2003a; 208). The excavations at Tell Kurdu provide evidence for developing social complexity during the Amuq E phase (equivalent to the later Ubaid or Middle Chalcolithic period), including a large grill planned building interpreted as a granary, long-lived streets and roads, several stamp seals and possible feasting paraphernalia (Yener et al. 2000b; 212; Ozbal et al. 2004). The only excavated levels which date to the Late Chalcolithic Amuq F and G phases were exposed in a small sounding (5m by 1.5m) at Tell Judaidah (AS_176). The sounding revealed three phases of domestic architecture dated to the Amuq F-G transition but the limited exposure prevented recognition of site-wide occupational trends. Tell Judaidah also provides the only unequivocal evidence for an Uruk presence in the Amuq Valley, with bevel-rimmed bowls, band-rimmed bowls, drooping spouts and nose lugs all found in the Chicago expedition's original JK 3 sounding and in the AVRP sounding (Braidwood and Braidwood 1960; 280; Yener et al. 2000b; 197). Nose lugs and a single drooping spout were discovered during surface collection and section cleaning at AS_181, situated within the modern Lake of Antioch, but the absence of other Uruk indicators such as BRBs combined with the small size of the collection argue against a significant occupation and the overall assemblage relates to the local PSW wares of Amuq G and the EBA. As in the TBS, it appears that outside the main areas of colonisation along the Middle Euphrates and in the eastern Jazira the Uruk intrusion had little impact on local material culture. Overall, then, the Late Chalcolithic settlement pattern demonstrates a continuance of the two tiered hierarchy which had developed over the preceding two thousand years. The centre of this system was the large walled site of Tell Imar, although Tell Kurdu may have remained a substantial settlement during the early part of the phase, whilst smaller sites were concentrated in the central and south-western plain.

The Amuq Valley in the Early Bronze Age

Although the only universally applied chronological distinction in the Amuq during the EBA was that between Plain Simple Wares (PSW) and Khirbet Kerak Ware (KKW) (see Chapter 4), a more precise dating related to the Braidwoods' sequence was possible at certain sites. We can see an abandonment of several of the larger sites in the centre of the plain between the end of the Amuq F phase and the introduction of KKW, including the Late Chalcolithic centre of Tell Imar (AS_101) and the large mounds at Tell Kurdu (AS_94) and Karacinik (AS_92). This coincides with a broader reorganisation of settlement in the plain during this period and the emergence of a new centre at Tell Tayinat (Figure 7.8). Intensive surface survey of the upper mound and lower town at Tayinat was conducted as part of the AVRP. KKW was discovered in large quantities across the main mound, along with slightly lower concentrations of PSW (Batiuk et al. 2005), and clear EBA forms have been found in every trench so far opened (Welton 2011; 27), suggesting the site may have been as large as 20 hectares during the middle and later part of the EBA. Survey and excavations in the lower town revealed only an Iron Age presence (Batiuk et al. 2005). More generally, the EBA phases see the development of a three tiered hierarchy centred on Tayinat, with probable secondary centres at ChatalHöyük, Karatepe and perhaps Hasanuşaği.

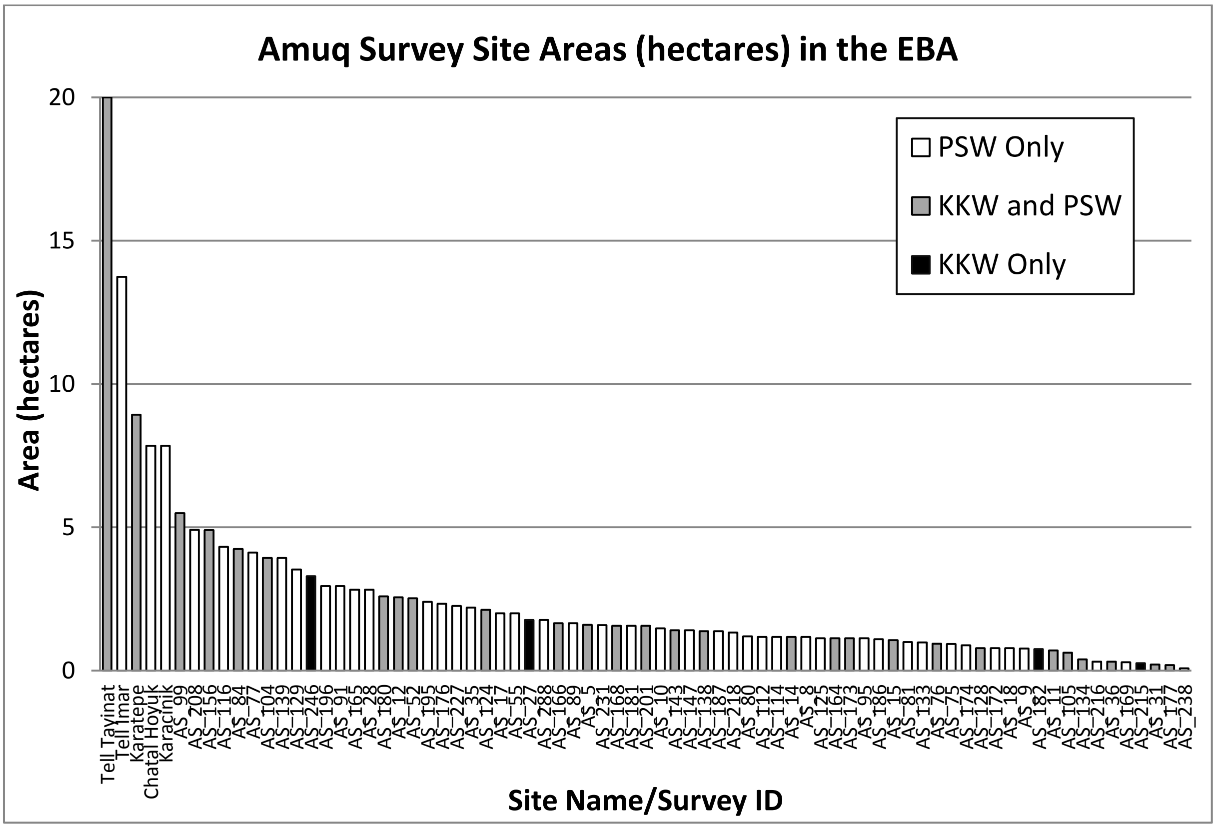


Figure 7.8: Amuq Survey Site Areas (hectares) in the EBA divided between sites with PSW only, PSW and KKW and KKW only

In the wider valley, there is a marked increase in both settled area and site numbers, in part as a result of a number of new foundations in the southern part of the plain which form a dense line of settlement from Chatalhöyük in the east through to Tayinat in the west, close to the possible course of the Orontes (Figure 7.9). New settlements also sprang up in the northern part of the plain associated with the Kara Su and its larger tributaries as well as the wadis descending from the Amanus range to the west. This reorganisation has been linked to the movement of new groups into the Amuq, attested by the material culture related to the Early Transcaucasian Culture (ETC) of eastern Anatolia and the Caucasus, most notably KKW (Batiuk 2005; 111-112; Welton 2011). A complete analysis of the KKW phenomenon is outside the scope of this study (see Philip 1999; Philip and Millard 2000; Batiuk 2005; Palumbi 2008 for significant treatments). The principal areas of debate are similar to those relating to the Uruk phenomenon and focus on how far the spread of a particular ceramic assemblage can be said to represent the movement of people or ideas, and on the nature of the interaction between the inferred migrants and local populations. Analyses of the distribution of KKW in the Amuq valley have used the presence of alignments along important East-West route-ways as evidence of the movement of migrant groups into the plain (Braidwood 1937; 54; Batiuk 2005), or at least of the inclusion of the Amuq in a larger 'cultural sphere' including north-west Syria and south-eastern Anatolia (Welton 2011; 20), and suggested that this may have been the impetus for settlement reorganisation.

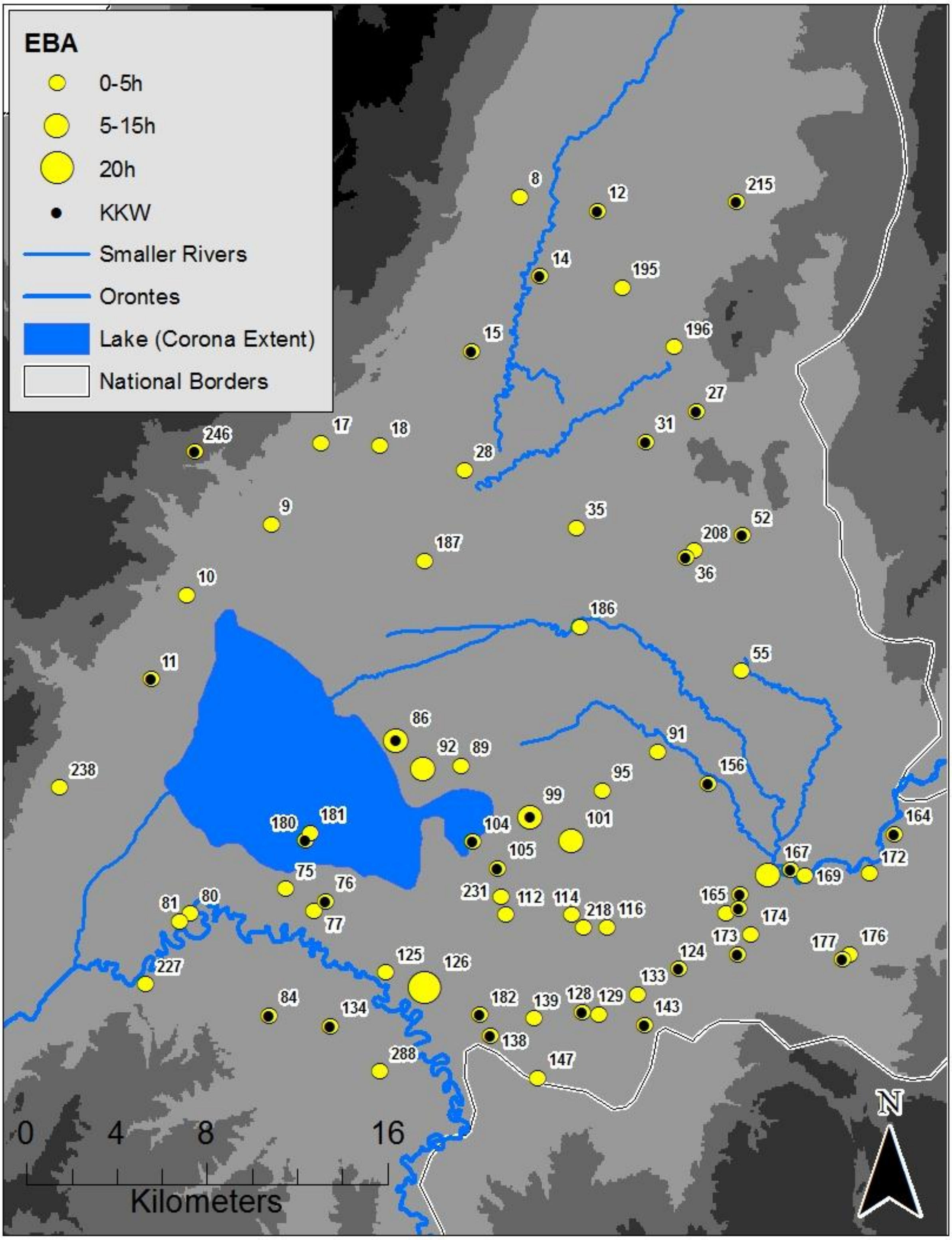


Figure 7.9: Site Locations for the EBA in the AS including sites with KKW. Site numbers correspond to both AS and Braidwood surveys

The validity of these statements is difficult to assess from the current excavation evidence; KKW has only been found in relatively small exposures at Tell Judaidah and Tell Tayinat, in both cases in conjunction with relatively poorly preserved architectural features which do not aid interpretation (Braidwood and Braidwood 1960). Furthermore, KKW was present in the plain from Amuq Phase G to at least Phase I, and therefore may represent occupation from a roughly one thousand year period, between 3400 and 2400 B.C[31], during which the nature of interactions may have undergone significant change. During the later part of the EBA, textual evidence from the Ebla archive allows for the reconstruction of the political geography of the Amuq plain. Tablets dating to approximately EBIVA, equivalent to phase I in the Amuq sequence, provide evidence for a small kingdom of Mukish centred on Alalah, likely equivalent to the Amuq plain and perhaps Tell Tayinat (Archi 2006). There is also some evidence for a decline in settlement during phase J, perhaps attributable to the destruction of the Eblaite state and therefore a downturn in regional interaction (Welton 2011; 21), although the lack of precise ceramic dating renders this interpretation somewhat tenuous. In general, the EBA settlement pattern can be seen as a consolidation of the Late Chalcolithic tell-based settlement and a simultaneous expansion in the north and south of the plain to form a reasonably coherent and constrained landscape of tells with a centre at Tayinat.

The Amuq Valley in the Middle Bronze Age

The identification of MBA settlement in the Amuq is again hampered by issues of chronology, particularly in distinguishing between MBA and LBA sites. This situation is unfortunate because we have a reasonably good grasp of the political history of the region during the same period through textual sources found at Tell Atchana and large MBA capitals such as Mari. During the Middle Bronze Age, Alalakh (likely Tell Atchana, see below) was the capital of a small vassal kingdom affiliated to the Amorite kingdom of Aleppo before being incorporated into the Mitannian and Hurrian Empires, and finally the Hittite Empire in the Late Bronze Age (Woolley 1953; Yener 2005c). It is tempting to equate the boundaries of this kingdom with that of the valley itself, given the geographical constraints provided by the upland areas on three sides, although there is no way to corroborate this with the current data and it is also likely that any political boundaries would have been subject to change through time. Despite the problems of chronological identification, the reconstructed settlement pattern in the Amuq for the MBA demonstrates remarkable continuity from the EBA. Settlement is again concentrated at tell sites along the southern part of the plain, although there is a slight increase in the number of small sites in the north, and especially the north-east. Chatalhöyük and Karatepe remain large centres whilst there is some evidence for the development of a new larger site, Esen Tepe (AS_29), in the north which may have been surrounded by a basalt fortification wall (Casana and Wilkinson

[31] Although it is far more likely to be related to the period between 3000 and 2700 B.C. See Chapter 4.

2005b; 210). The precise size of this site during the MBA is rather ambiguous due to significant overburden from later periods, especially the Late Roman and Byzantine phases, but the height of the tell (10 metres) argues for significant earlier occupation. If Esen Tepe were occupied during this period it would represent a northern node in a three tiered settlement hierarchy dominated by Tell Atchana which replaced Tell Tayinat at the end of the EBA as the largest centre in the plain (Figure 7.10).

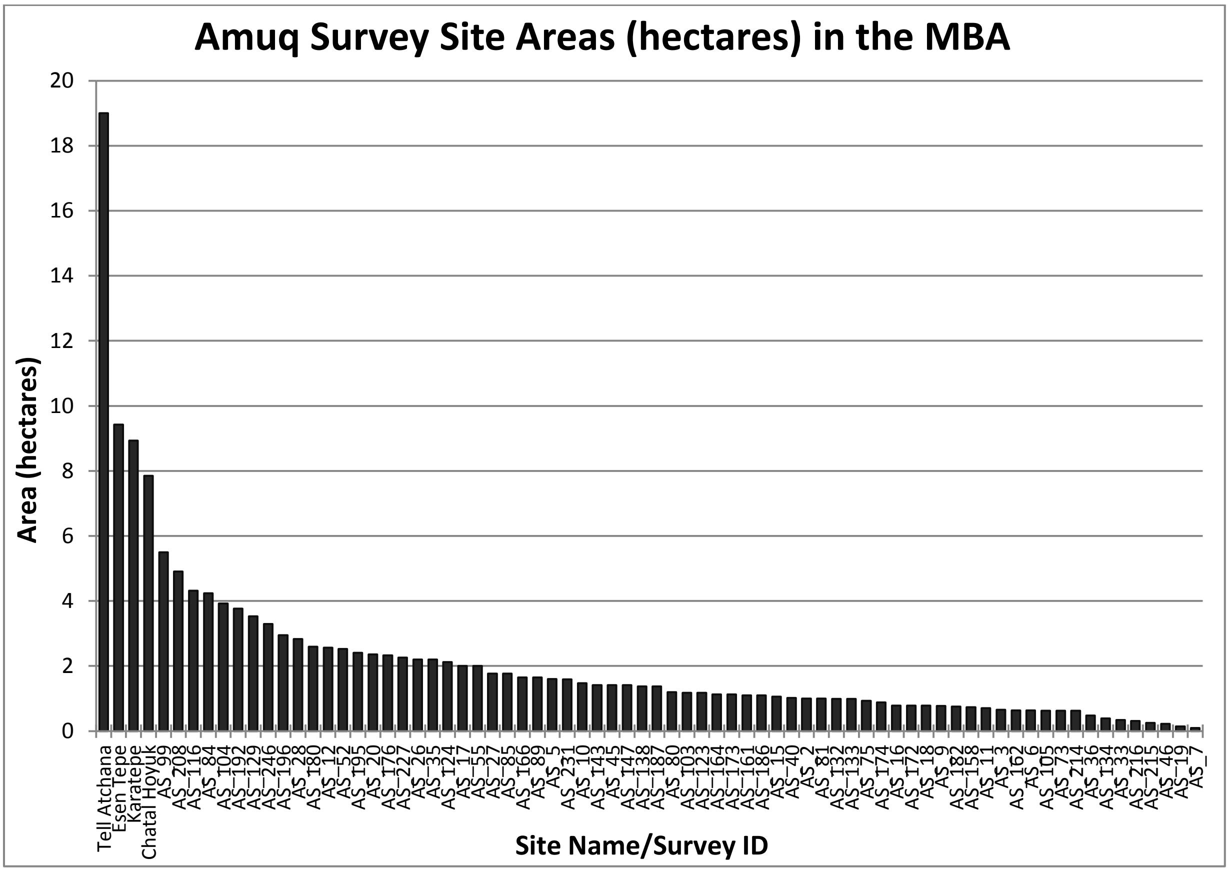


Figure 7.10: Amuq Survey Site Areas (hectares) in the MBA

The shift from Tayinat to Atchana at this time, along with the return at the end of the LBA, has been tentatively attributed to changes in the course of the Orontes, although further geomorphological and archaeological investigation is required to confirm this (Casana and Wilkinson 2005a; 46). In contrast to Tell Tayinat, where significant overburden from Iron Age occupation has restricted the recovery of the EBA levels, excavations and surface collection at Tell Atchana have revealed a wealth of data regarding the earliest urban phases. Excavations have revealed a succession of palace and temple complexes, domestic architecture and massive city walls, as well as over 550 tablets (Woolley 1953; 1955; see reconstructions in Yener 2005c), whilst the surface survey demonstrates that the entire 19 hectare mound was occupied throughout the MBA and LBA (Casana and Gansell 2005). Despite the lack of chronological precision available, through a combination of textual and archaeological evidence we can reconstruct the existence of a small city-state in the Amuq during the MBA, with a three tiered settlement hierarchy centred on Tell Atchana.

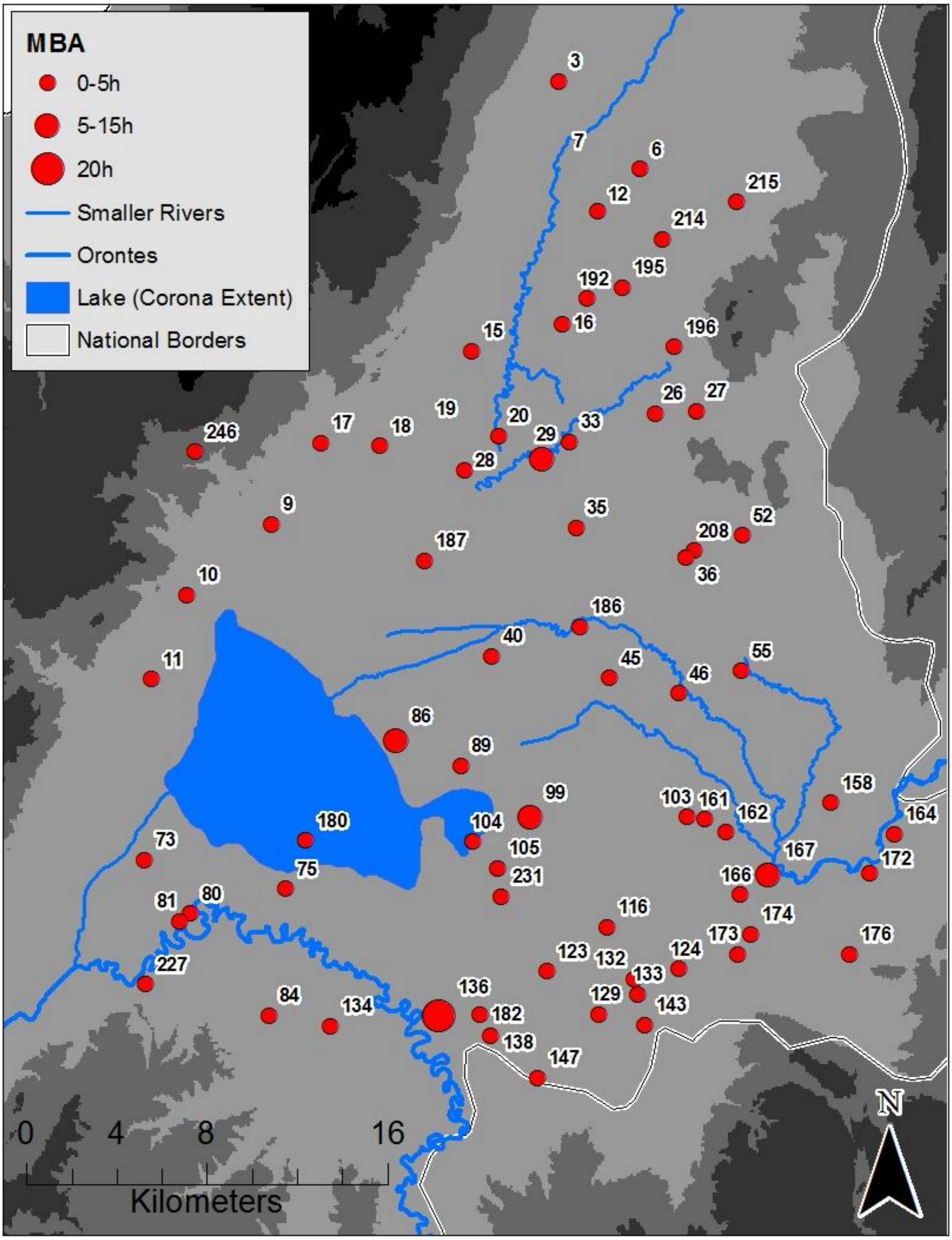


Figure 7.11: Site Locations for the MBA in the AS. Site numbers correspond to both AS and Braidwood surveys

Settlement Trends in the Amuq

The ambiguity in dating for the Amuq comes across in the graph of percentage relevance (Figure 7.12). Broader phases overlapping with the Late Chalcolithic contribute almost 100 hectares of settlement, mostly through the generic 'Prehistoric' and 'Chalcolithic' categories which probably reflect earlier occupation. There are also approximately 3 hectares related to a combined Middle and Late Chalcolithic phase which is more likely to be directly related to the Late Chalcolithic. It is clear from the graph that the EBA as a whole is a unified phase, and we can also see the contribution of KKW in hectares to this settlement pattern.

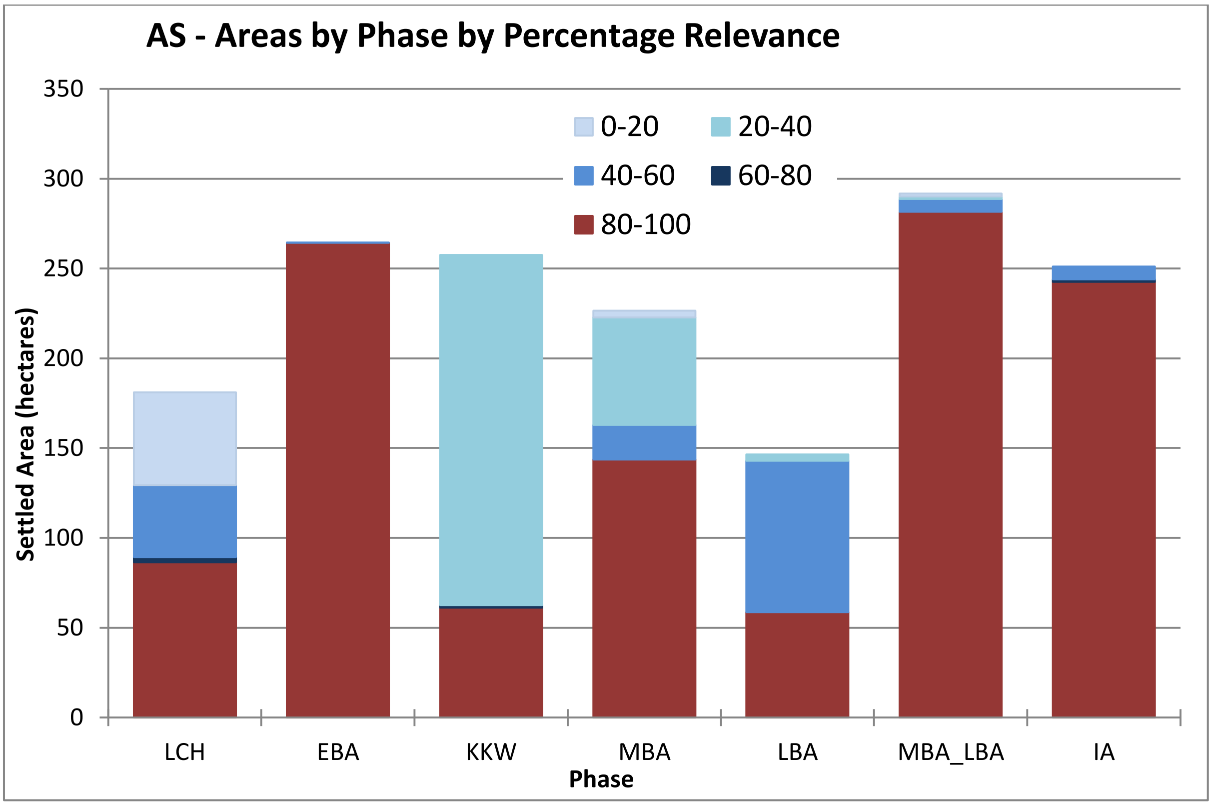


Figure 7.12: AS Settled Area by Phase by Percentage Likelihood of Occupation

Problems in the subdivision of the MBA and LBA are clear in the significant areas within the 20-40 and 40-60% ranges, relating to a number of sites recorded as 'Second Millennium' and 'MBA-LBA'. In this case, we can use the percentage graph to demonstrate the coherence of wider phase lengths, since the ambiguities in the MBA and LBA phases all but disappear when the two phases are combined into the MBA_LBA. Comparison of these larger phases shows a rise in settled area from the Late Chalcolithic to the EBA, even including the lower percentages, and a high degree of continuity between the EBA to the Iron Age. The trends expressed in the timeblocks graph demonstrate a similar pattern of increasing settlement during the Middle and Late Chalcolithic and then a long period of relative stability throughout the EBA and MBA (Figure 7.13). The shifting location of the central place is also visible as first Tell Kurdu and Tell Imar and then Tell Tayinat and Tell Atchana rose to prominence. There is little difference between the trajectories of the larger sites and the smaller ones, although the fluctuations in the changing sizes of the latter are more marked, and there is no evidence that the growing size of these centres drew in local rural populations. In general, we can characterise the Amuq Valley settlement system as involving a large rural base with relatively few larger sites. Excavations at Tell Tayinat and certainly Tell Atchana have revealed monumental architecture and evidence of institutional complexity which allow them to be characterised as urban sites, and textual sources provide clear evidence for both political organisation and a degree of local autonomy. However, at 20 hectares both of these sites can be considered small in relation to the urban centres of the Jazira, and even the Middle Euphrates. The implications of this phenomenon will be explored below.

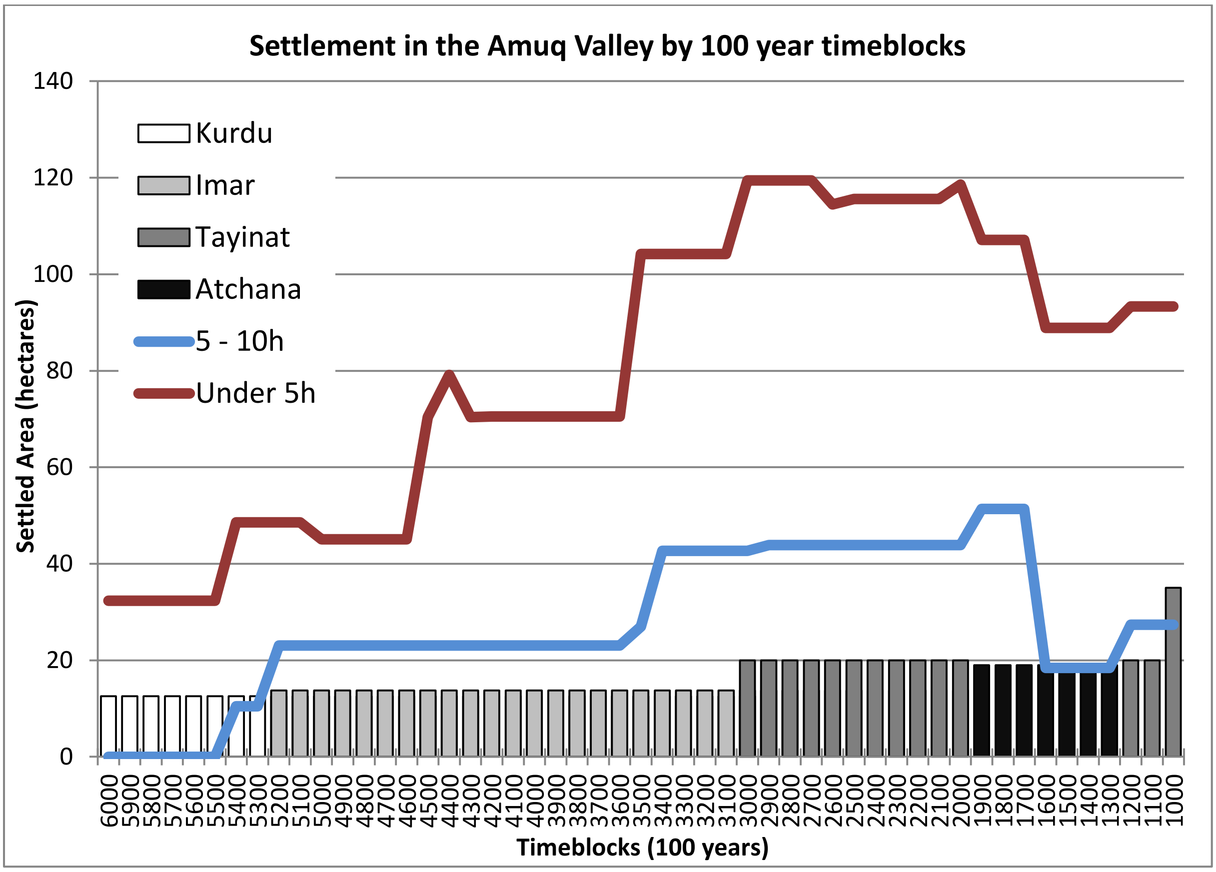


Figure 7.13: Settled Area Trends in the AS by Timeblocks, 6000-1000 B.C

The Homs Region Dataset

The SHR Project began in 1999 and continues to the present time, with the last field season taking place in the summer of 2010. Although the SHR is the only survey within the FCP not undertaken under the direct supervision of Tony Wilkinson it is methodologically very similar to the other surveys in a number of ways, including the use of CORONA and other imagery, map data, GPS and GIS (Philip et al. 2002b). The project made use of GIS from its inception and this data has been systematically reorganised by Dr Rob Dunford and others as part of the Vanishing Landscapes Project which ran alongside the FCP. As was the case with the Amuq dataset, this GIS and database system has been incorporated wholesale into the FCP framework. Levels of certainty and precision have not been recorded but we can be reasonably certain that the data quality meets similar standards to those of the other more recent surveys. The main difference between the SHR and the other surveys relates to the definition of sites. Rather than the simple binary division between sites and off-site features employed in the surveys carried out by Wilkinson, the SHR employs a more nuanced set of categories which are recorded as properties of a more general concept of geographical locale.

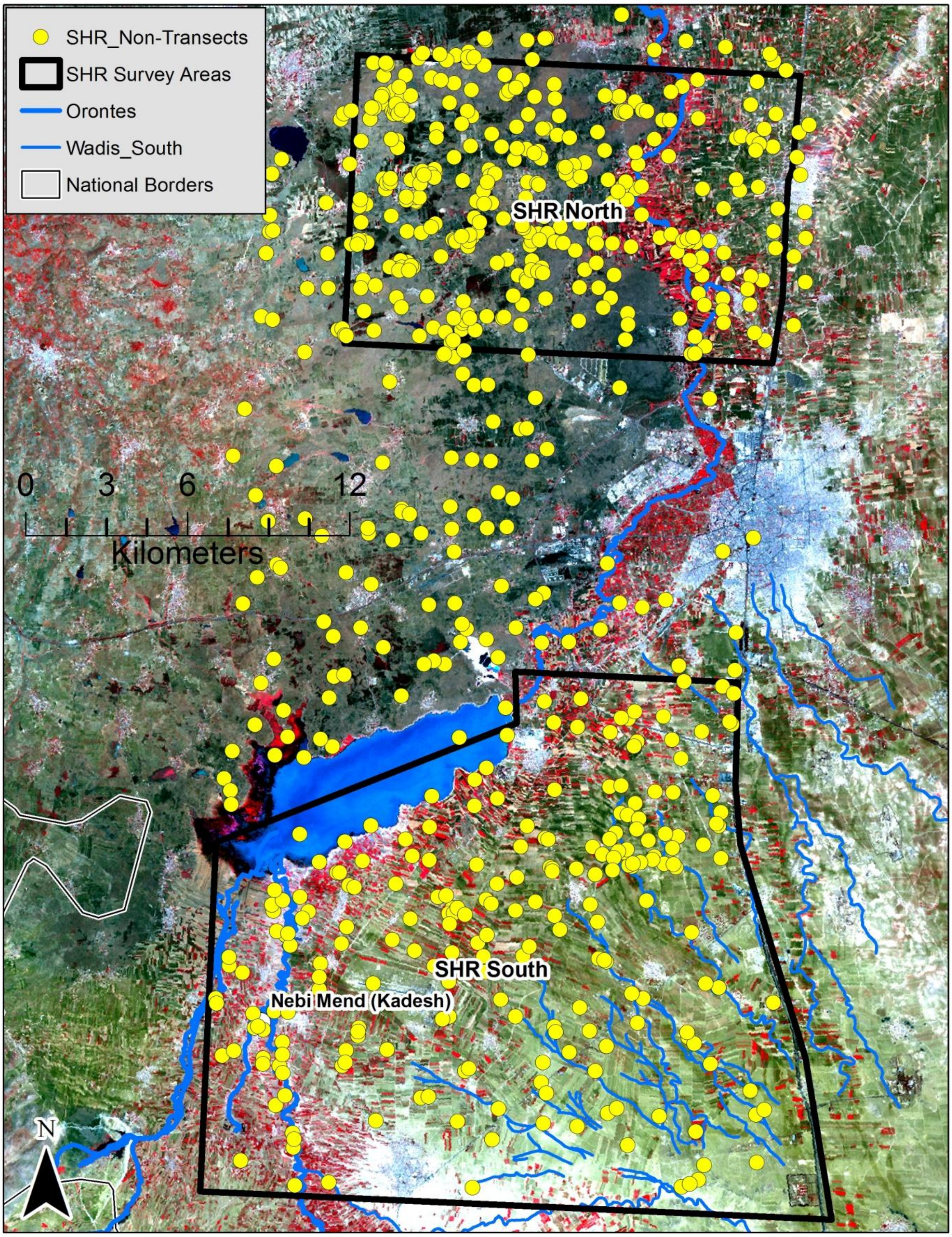


Figure 7.14: SHR survey extent and location of all surveyed sites. Landsat Enhanced Thematic Mapper Plus (ETM+) image acquired 26/06/2007 displaying bands 4, 3, 2.

In practice this has little effect on the field methodology or material collections but does present issues in extracting comparable information from the SHR project database. In the following analysis I have included all types of geographical locale which would be considered as a site in the other FCP surveys, based on the criteria set out for site definition in Chapter 3.

A key part of the SHR research design involved the comparison of the trajectories of settlement in different environmental zones, and for this reason the survey area is divided into two separate parts. The Northern Survey Area (NSA) is dominated by an upland basalt landscape with predominantly stone based architecture, along with a small strip of land along the Orontes, whilst the Southern Survey Area (SSA) encompasses part of the Orontes river valley and the flat plains to the east (Figure 7.14). The particularities of the material remains and occupational history of the NSA (see Philip and Bradbury 2010 for a comprehensive description) preclude a comparative analysis with the more conventional[32] tell-based landscapes of the other FCP surveys. For the purposes of this study I will therefore concentrate on the SSA as a discrete unit of analysis. Within this area, two sites have been extensively excavated, although rather less extensively published. The largest settlement within the survey area, Tell Nebi Mend, was excavated by a British team directed by Peter Parr from the 1970s to the early 1990s. The site included remains from the Late Chalcolithic and the EBA (Mhairi Campbell, pers. comm. April 2012; Mathias and Parr 1989) and has been identified as the Middle Bronze Age capital of Qadesh (Parr 1983) and the Seleucid-Roman city of Laodicea ad Libanum (Grainger 1990; Philip et al. 2005; 39). In the course of the investigations at Tell Nebi Mend excavations were also carried out at Tell Arjoune, a smaller tell site located across the Orontes dating to the Late Neolithic/Early Chalcolithic period (Marfoe et al. 1981; Parr 2003). Although outside the SSA, the major urban centre in the Homs region, Tell Mishrifeh (ancient Qatna) has been excavated by a joint Syrian-German-Italian team since 1999, providing a wealth of data on the regional capital. In the following maps I have also included two tells (SHR_265 in the east and SHR_225 in the west) which are clearly visible on the imagery but which have not been visited since they are within the boundaries of modern military bases, and are therefore inaccessible.

Geomorphology of the Southern Survey Area

In contrast to the Amuq Valley to the north, the geomorphological history of the SSA during the Holocene seems to have been reasonably stable. Philip et al. (2002b) divide the area into two major geomorphological units. Unit 1 consists of low relief lacustrine marls dated to the Upper Miocene overlain by thin sheets of Pleistocene pebbles and shallow red-brown soils up to 0.7m in depth (Beck 2004; 98). Buried soil horizons visible beneath archaeological deposits dating to the MBA and Roman periods suggest Unit 1 has been subject to deflation which must be post-Roman in date (Philip 2007; 236). This would not have had a significant impact on archaeological remains

[32] ‘Conventional’ at least in terms of the areas which have been systematically surveyed - see Wilkinson on this ‘consistent bias in survey coverage’ (2000a; 222).

such as pottery or chipped stone but may have changed the shape and size of soil marks visible on CORONA and other imagery and perhaps the height of mounded sites. Shallow wadis are visible as dark linear features on Corona imagery but analysis in the field suggests they are not currently perennial and perhaps only conduct surface run-off towards the Orontes during the winter rains (Philip et al. 2002b; 5). Outside of the immediate surroundings of these wadis, which may have received alluvial deposition, and taking into account the changes brought about by deflation, Unit 1 represents a long term stable landscape, at least for the duration of the Holocene, and as such site recovery for the periods of interest to this project should be extremely high. Unit 2 equates to the valley of the Orontes itself, a highly complex environment including the lower river terraces and the alluvial soils deposited by the river. Today this area is heavily irrigated and has been subject to significant remodelling in recent times making interpretations of the age of the river terraces and assessments of the impact of fluvial erosion or alluviation on site recovery difficult (Beck 2004; 103). Finally, the north-western part of the SSA includes the shoreline and southern part of lake Qatina. The lake formed naturally as a result of basalt flows which interrupt the course of the Orontes but was dammed in antiquity, perhaps during the Roman period, and also during the 1930s under the French Mandate, expanding the surface area. Coring in the northern part of the lake has revealed lacustrine sediments dating to at least the 2nd millennium BC (Philip et al. 2002b; 14). However, the presence of several tell sites forming islands within the current lake such as SHR_212 and SHR_216, along with heavily eroded sites on the lakes edge such as SHR_275 and SHR_173, demonstrate the potential for the loss of smaller and less obtrusive sites in this area.

The SHR Southern Survey Area in the 4th Millennium

Phase based analysis of the settlement patterns in the SSA during the Late Chalcolithic and EBA period is severely hampered by a lack well dated ceramic indicators. No southern Uruk material was recovered from any site in the SHR, with the nearest evidence for Uruk interaction coming from Hama to the north (Philip 2002). The three main phases used to divide the 4th millennium include a broad Late Chalcolithic-EBA phase, encompassing the period between approximately 4500 and 1900, a Late Chalcolithic-EBA Transitional phase equivalent to approximately 4200-3300 and a generic EBA phase based on the Levantine EBA sequence, equivalent to 3400-1900. It has not been possible to apply these consistently across the survey area, meaning that some sites can be dated with a higher degree of temporal resolution than others. Finally, our understanding of developments at the largest site in the survey area, Tell Nebi Mend is limited. Radiocarbon dates recently obtained for the Trench VIII sequence at the site, which contained Amuq F-like chaff tempered ceramics, demonstrate that the site was occupied during the early part of the 4th millennium before a brief hiatus around 3700 and resettlement some 200 years later (Mhairi Campbell pers. comm. May 2012). Trench VIII provided only very limited exposures, although some domestic architecture and even rectilinear building structures were discernible (Mathias and Parr 1989), and it is impossible to extrapolate from such a small sample to estimate the size of the occupation in the unexcavated part of the mound in a given phase. For the purposes of this study I have assigned the entire area of the main tell, approximately 9 hectares, to all phases attested anywhere during the excavations or the limited survey collections obtained by the SHR team.

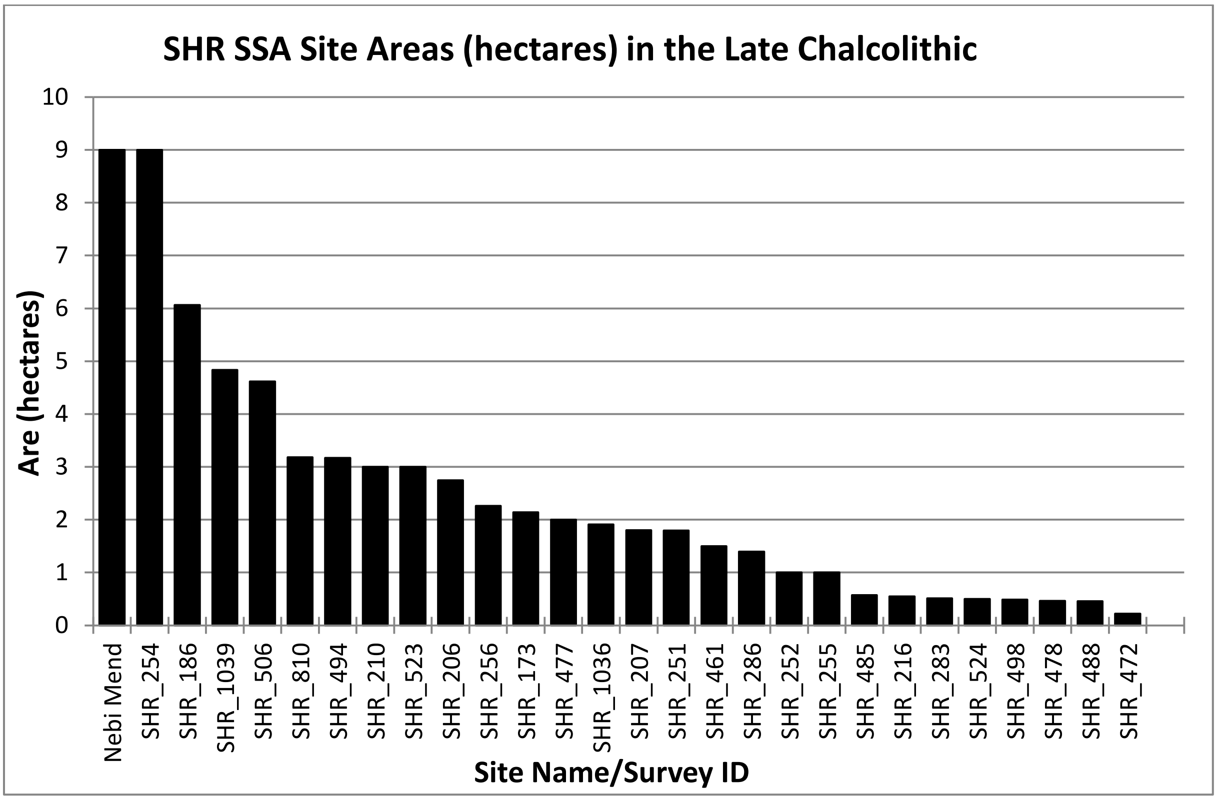


Figure 7.15: SHR SSA Site Areas (hectares) in the Late Chalcolithic (amalgamated Late Chalcotlithic Transition and Late Chalcolithic-EBA phase sites)

This is almost certainly an overestimation, especially for the earlier periods, but in the absence of more definitive evidence at least provides a maximum occupied area figure (assuming occupation was confined to the main tell). If Tell Nebi Mend was this size during the Late Chalcolithic period it would have been the largest site in the SSA, along with the site 254 (see Figure 7.15). Site 254 is rather difficult to interpret, since it incorporates a 2 hectare high mound and a 7 hectare lower town, with both areas yielding Neolithic, Chalcolithic and EBA ceramics. It is likely that the site was a significant occupation for much of this time but there is so little data available that it is impossible to make further interpretations. The undifferentiated nature of the rest of the settlement hierarchy suggests a similar pattern to the Amuq at this time, with a small centre and dispersed settlement pattern. Alternatively, if Nebi Mend and SHR_254 were much smaller they might be considered as two of a number of larger villages in a broader landscape of dispersed rural settlement. In terms of settlement location, the SSA displays a similar 4th millennium pattern to the rest of the region with sites clustered along the Orontes and also the shallow wadis in the south and east of the survey area (Figure 7.16). These latter sites appear to be arranged in linear alignments but it is difficult to assess whether this is a result of their location in close proximity to the wadis running south-east to north-west, whether they represent route systems leading into the steppe or a combination of these factors. Interpretation is further complicated by the two unsurveyed tell sites.

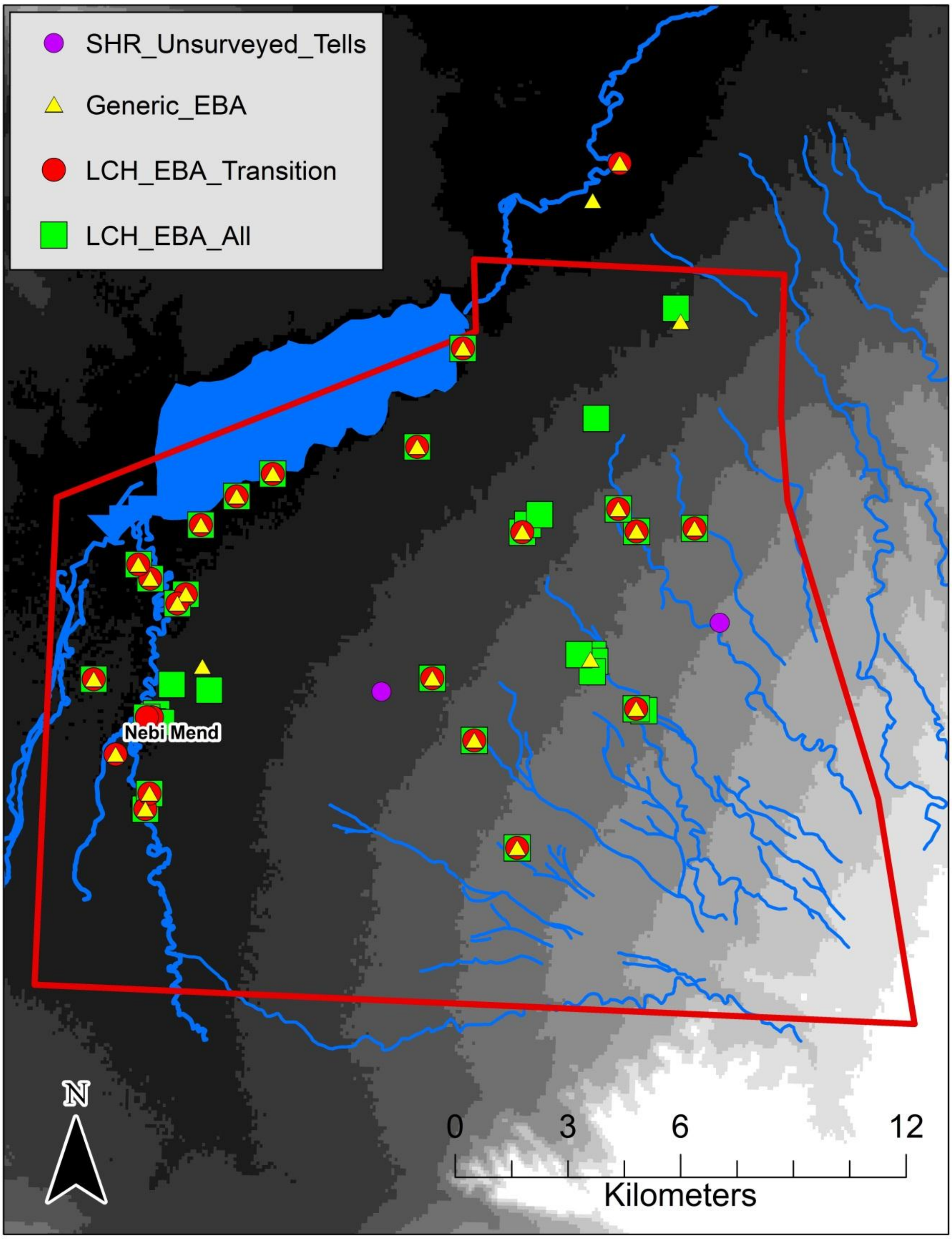


Figure 7.16: Site locations for Late Chalcolithic-EBA, Late Chalcolithic-EBA-Transition and Generic Early Bronze Age periods, along with the two unsurveyed tells in the SHR. Background: 25m interval contour map derived from SRTM acquired February 2000

The absence of sites in the extreme south-east of the survey area during this period may be due to the rapid decline in rainfall as one moves further inland from the Orontes valley. The 300mm isohyet runs approximately along the edge of the 625-650m contour line and there are no sites beyond this throughout the Late Chalcolithic period. On the basis of Figure 7.2 one might assume that this was not yet a tell dominated landscape but it is also possible that landscape transformation processes associated with the dense settlement recorded in later periods coupled with natural deflation across the SSA has resulted in the smaller, lower tells typical of the Late Chalcolithic elsewhere in the region being flattened. These sites would now appear as soil marks with little topographic expression on satellite imagery and as dispersed scatters of ceramic material in the field. As far as phase based distinctions can be made, there appears to be a high degree of continuity throughout the 4th millennium with most sites occupied across the Late Chalcolithic, Late Chalcolithic-EBA Transition and EBA phases. There are a small number of Late Chalcolithic-EBA sites which do not have clear Late Chalcolithic-EBA Transition or Generic EBA ceramics but without a more precise understanding of the ceramic sequence it is difficult to assess whether these were contemporary with either of the other phases.

The SHR Southern Survey Area in the 3rd Millennium

As in the 4th millennium, distinctions between phases in the 3rdmillennium are problematic. The Generic EBA phase which begins in the 4th millennium can be considered to continue throughout the 3rd millennium, whilst it is occasionally possible to distinguish EBIV phase occupations dating to the second half of the 3rd millennium given sufficiently large collections and the presence of appropriate type fossils such as the so-called Hama goblets. The MBA phase is rather easier to identify, although it is difficult to separate MBA and LBA assemblages leading to a generic MBA-LBA phase similar to that used in the Amuq. Again, interpretation of the occupation at Tell Nebi Mend is reliant on extrapolation from the Trench VIII sequence which included clear early EBA and EBIV ceramics (Philip 2002; 214), whilst the uncertainties surrounding SHR_254 persist. During the EBA a third large site, Tell Nebi Noah on the Orontes, is recorded as 22 hectares. The site was occupied during the late Neolithic and Early Chalcolithic periods as well as the EBA, but was extensively reworked during the 2nd millennium through the construction of a rectangular rampart. Surface collection of the site revealed small amounts of prehistoric ceramic material but the extent of the earthmoving activities which must have occurred to produce the 2nd millennium lay-out render these meaningless in relation to likely occupation or activity areas. For the purposes of this study, I have assigned 5 hectares to the prehistoric and EBA phases at Tell Nebi Noah as the significant numbers of sherds recovered suggest a reasonably large settlement. In terms of both site hierarchy and settlement pattern the EBA in the SSA seems to represent a continuation of the Late Chalcolithic (Figure 7.17 and Figure 7.18). This is partly a result of the nature of the dataset, particularly the absence of site sub-divisions which might show changes in site size over time, and chronological continuity which means certain sites can only be assigned to a single phase covering large parts of both the 4th and 3rd millennia.

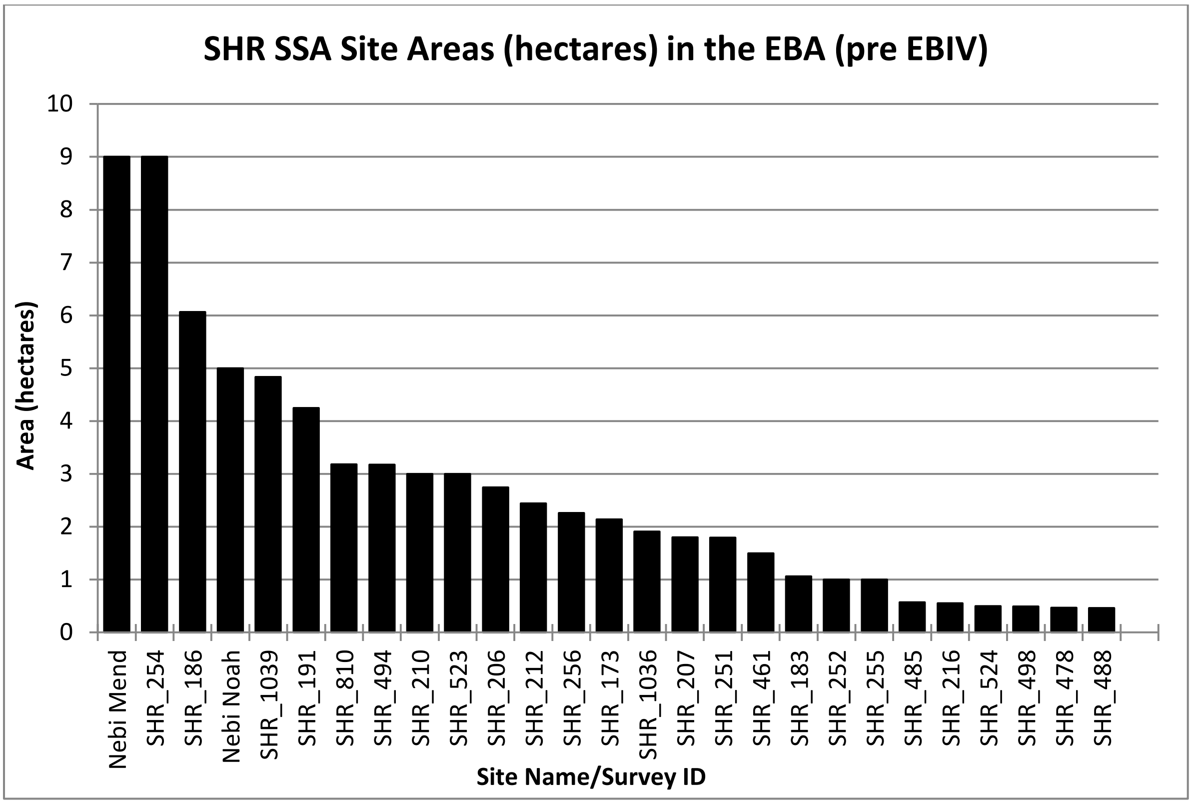


Figure 7.17: SHR SSA Site Areas (hectares) in the EBA phase (Generic-EBA excluding EBIV phase sites)

However, where chronological subdivisions are possible, they support a characterization of small scale and long-lived tell-based settlement located along the Orontes and the wadis further east in a similar pattern to the 4th millennium, and an absence of larger sites beyond Tell Nebi Mend and SHR_254 (Figure 7.19). All but one of the sites of the Generic EBA phase also included clear EBIV types, whilst there is evidence for a slight expansion in the number of sites in the EBIV. This expansion coincides with the foundation of the regional capital at Qatna a few kilometres to the north-east of the SHR, although the precise relationship between this development and the local population of the SSA, and particularly possible elites located at Tell Nebi Mend, is ambiguous. By the MBA, we have a clearer picture of the political geography of the western sub-region through the Mari letters and other textual sources. The site of Qadesh, considered to be Tell Nebi Mend, is first mentioned during this period in relation to a rebellion suppressed by the king of Qatna, Ishki-Addu (Ziegler 2007; 314), who also founded a military base in the area bearing his name, Dur-Ishkhi-Addu, tentatively related to the fortress at Tell Nebi Noah (Philip 2007; 240), or perhaps sites further to the north such as Tell Qatina (Philip, pers. comm. 2012). Again, it is not certain that these two sites were occupied simultaneously but the textual sources provide the first unequivocal evidence for a major settlement along the Orontes. Away from the river, the rural landscape remains relatively stable, although total settlement drops slightly, and two possible alignments of tells sites are visible running east-west. The three tells in the northern alignment are all high and conical shaped suggesting the presence of significant ramparts. Similarly, a southern alignment appears to exist which includes the two unsruveyed tells, although this is rather more speculative given that we do not know their periods of occupation.

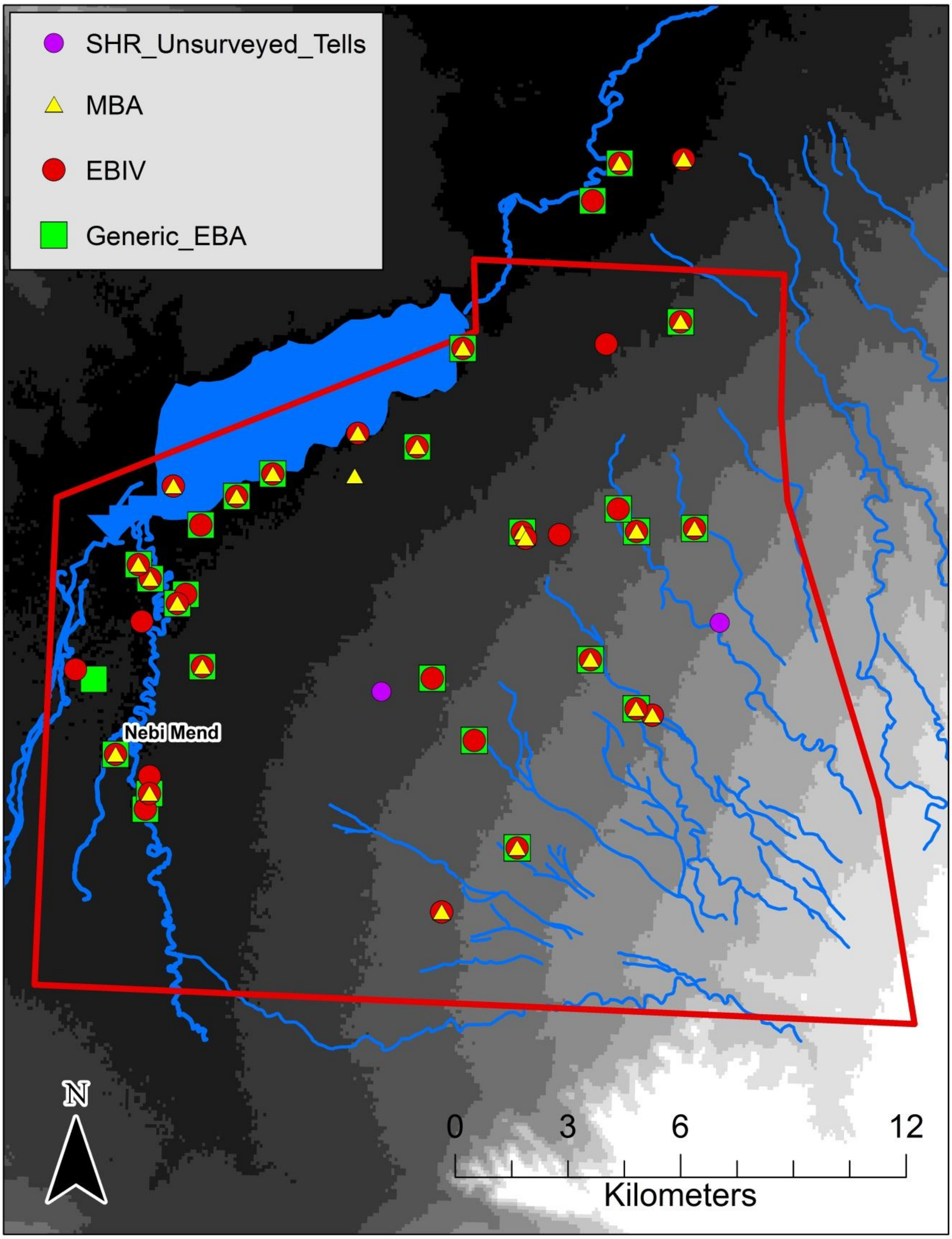


Figure 7.18: Site locations for the Generic Early Bronze Age, EBA IV and MBA periods, along with the two unsurveyed tells in the SHR. Background: 25m interval contour map derived from SRTM acquired February 2000

Neither alignment follows either clear wadi systems or local topography, and both may be linked to developments at Qatna, which reached its maximum extent during the MBA and represents one of the most important sites in Western Syria, as well as Tell Nebi Noah (Philip 2007; Ziegler 2007). Despite this relatively minor reorganisation, the MBA represents a phase of continuity from the EBA landscape of tells, a pattern which, like the Amuq, continued until the end of the Iron Age.

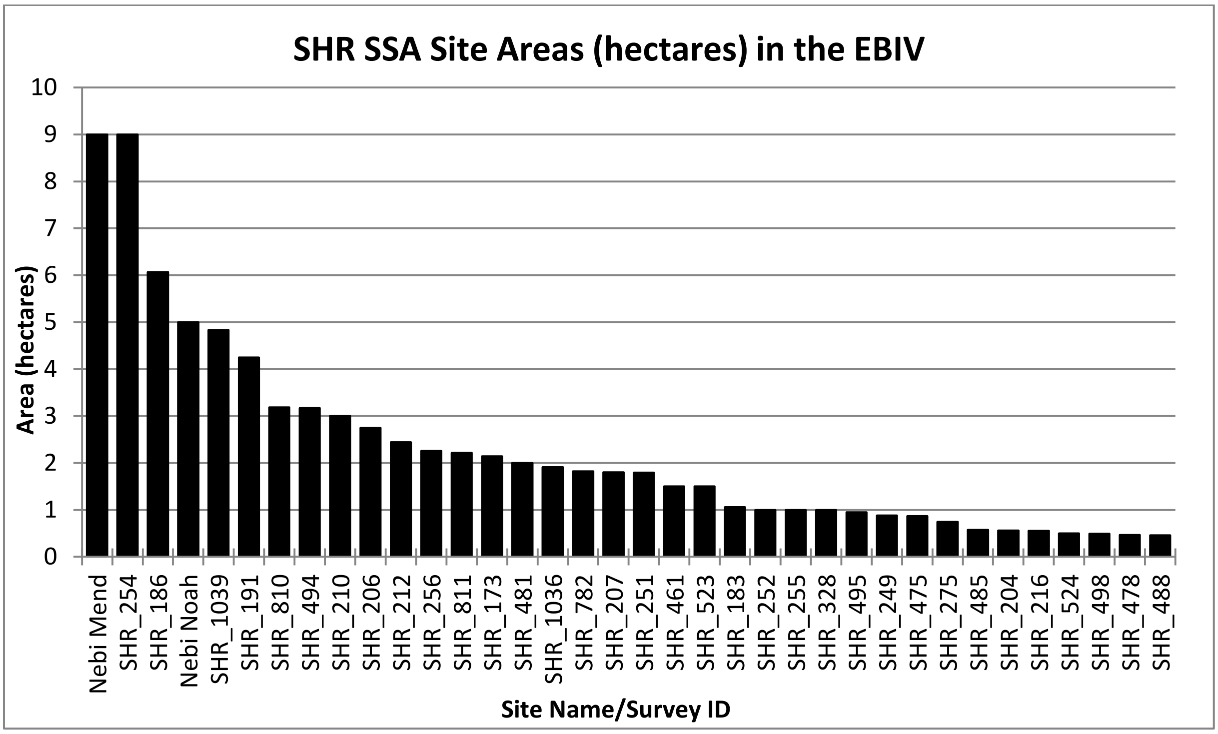


Figure 7.19: SHR SSA Site Areas (hectares) in the EBIV phase

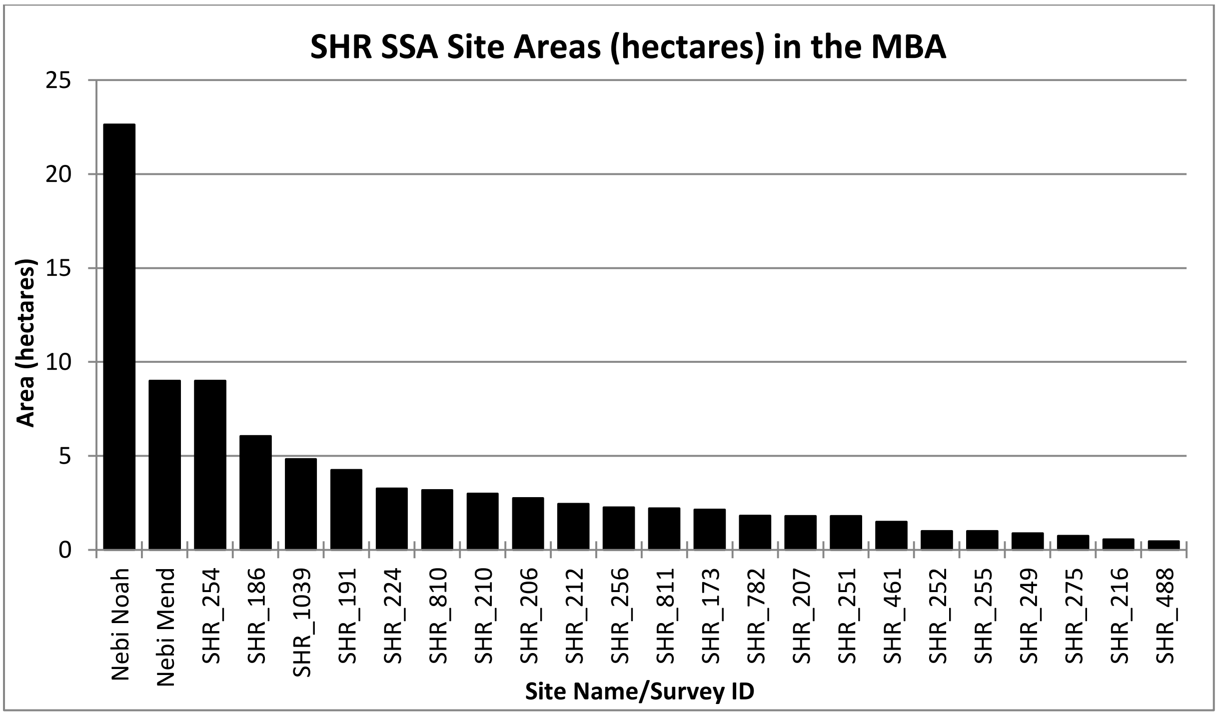


Figure 7.20: SHR SSA Site Areas (hectares) in the MBA

Settlement Trends in the SHR Southern Survey Area

Chronological ambiguities in the SHR are clearly visible in the graph of percentage relevance (Figure 7.21). All of the shorter phases, with the exception of the MBA, have significant amounts of lower percentage certainty occupation as a result of sites which could not be dated to the same level of precision. Even the longest phases available include a high degree of ambiguity due to their partial overlap with preceding phases. The Late Chalcolithic-EBA phase (LCH_EBA on the graph), for example, is inflated by the generic Chalcolithic phase and the Pottery Neolithic-Chalcolithic (PNEO-CH on the graph). Partial overlaps between the Late Chalcolithic phases and the EBA account for the high values between 0 and 40% in all of the phases covering this period. During the later periods there is a higher degree of precision. The MBA is fairly well identified, with only a very few sites dated to the wider MBA-LBA phase, whilst the LBA includes sites dated to the MBA-LBA Transition (1600-1400) which chronologically lies wholly within the LBA (1600-1200), and also the LBA-IA Transition. Overall the percentage relevance graph is not particularly helpful in the direct interpretation of the settlement record of the SHR SSA but does help to clarify some of the chronological issues involved.

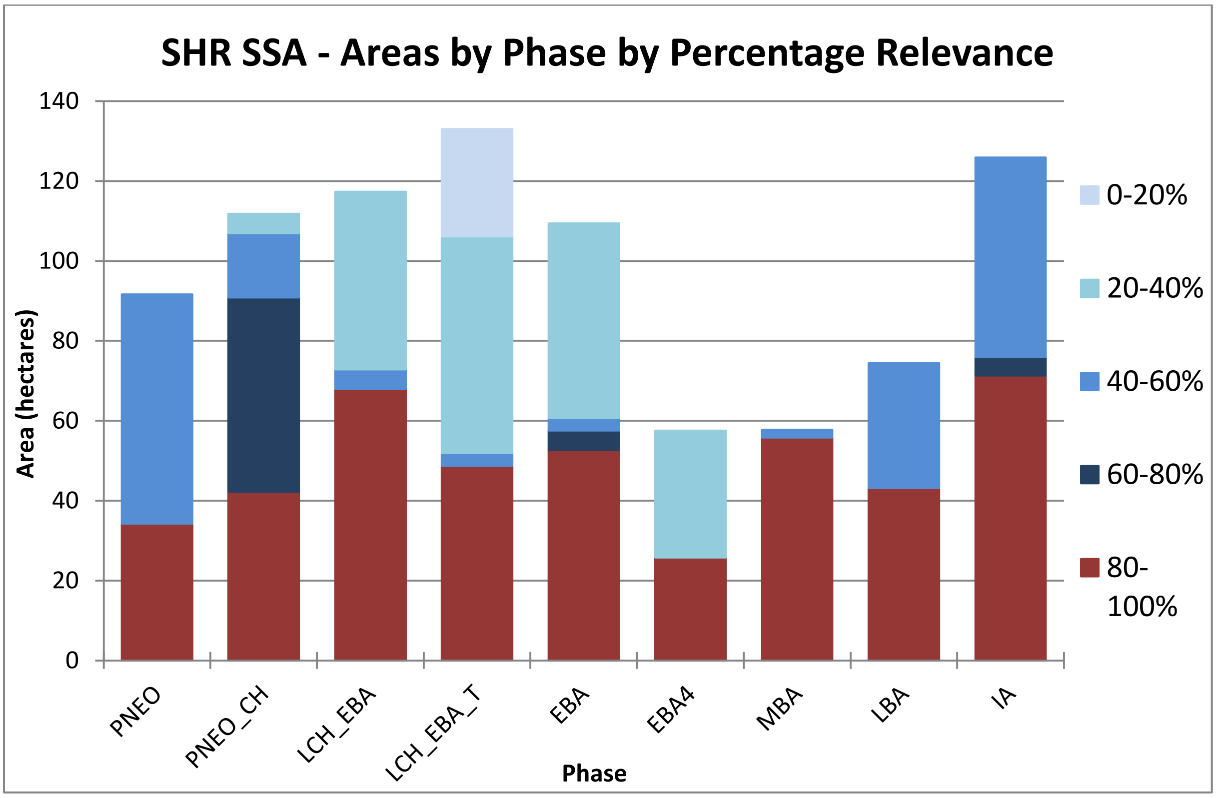


Figure 7.21: SHR SSA Settled Area by Phase by Percentage Likelihood of Occupation

In the SHR, the timeblocks graph is an invaluable way of visualising settlement trajectories because the major overlaps between phases can be filtered out, although the longer phases do have a smoothing effect on the graph and serve to mask smaller fluctuations. The lower figures for the late sixth and early fifth millennia are probably close to the true figures but may also be due to the burial of these layers in the core of major tells. The higher values for the preceding centuries are an artefact of the long-lived Pottery-Neolithic phase and represent a classic example of the problem of contemporaneity, whereby settled area is raised through the conflation of successive occupations into a single longer phase.

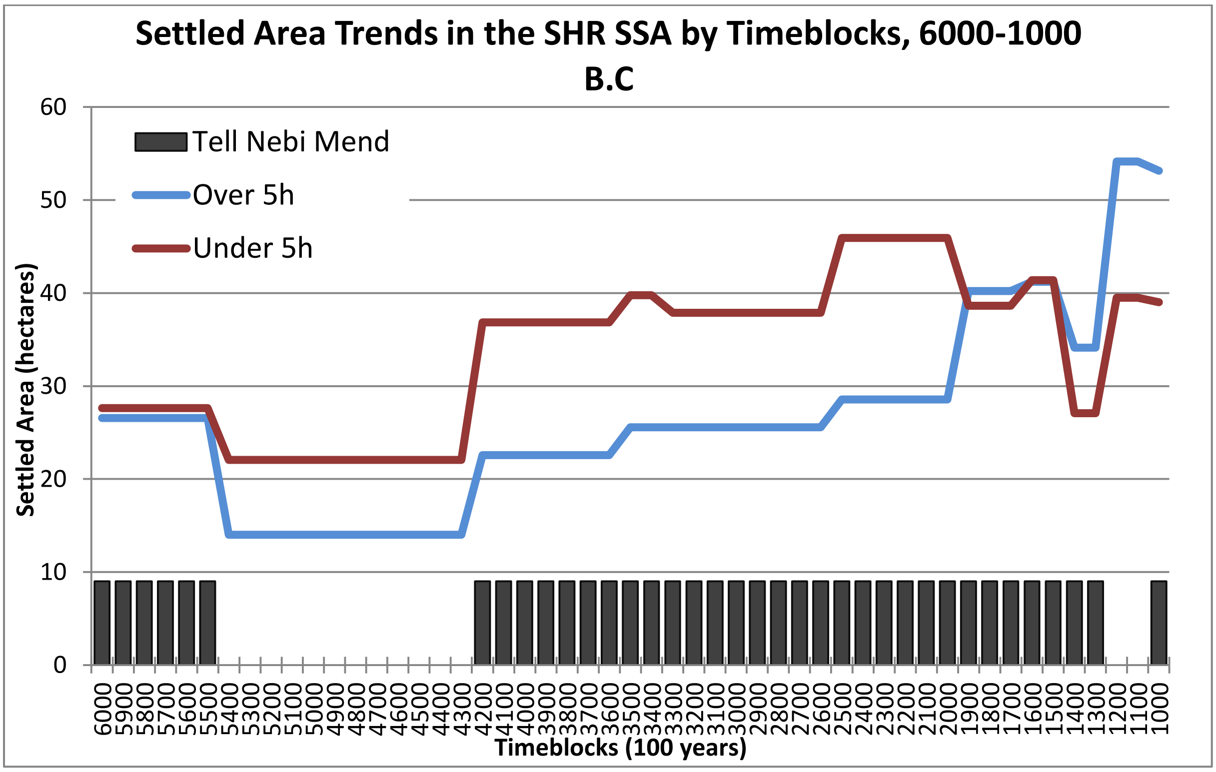


Figure 7.22: Settled Area Trends in the SHR SSA by Timeblocks, 6000-1000 B.C

Even accounting for smoothing effects, the total settled area during the 4th and 3rd millennia remains remarkably stable, with only a slight increase in the smaller sites during the EBIV period. As in the Amuq, the medium and small sites follow a similar trajectory, suggesting a lack of settlement hierarchy. Without a more nuanced understanding of developments at Tell Nebi Mend it is difficult to make any statements about the processes which led to its development. However, the stability of rural settlement up to and including the MBA argues against the expansion of the site having a significant impact on local populations. It is similarly difficult to discern evidence for changes in rural organisation brought about by the urban development at Qatna, even though the latter can be more securely dated to the later part of the 3rd and early 2nd millennium. It is possible that the slight rise in settled area during the EBIV phase visible in Figure 7.22 may be related to both these phenomena but any interpretation of the precise links between the urban and rural landscapes at this time remains speculative.

Comparative Long Term Trends in SHR Southern Survey Area and Amuq Valley

As in the other sub-regions, the best way to make comparisons between the SHR and AS is by taking into account survey area and analysing settlement density. The total surveyed area for the

SHR is taken from published sources (Philip et al. 2002b; 3, Table 1), giving a figure of 400km^2. The Amuq presents a slightly more complicated case as the limits of survey were never explicitly stated. For the purposes of this study I have defined the survey area by drawing the smallest possible polygon which incorporates all of the sites recorded. This approach provides a minimum possible survey area of 535km^2. It is likely that this is an underestimate since one would assume some survey would have been undertaken outside the defined area which did not recover sites. However, the density of sites within the survey area would suggest that extensive survey in the surrounding areas would have yielded more sites, meaning the GIS-defined area cannot be significantly greater than the true figure. In the following discussion, however, it should be noted that the density values for the AS may be slightly inflated due to the underestimation of the survey area.

Figure 7.23 shows the long term total settlement densities for the SHR SSA and the AS for the period between 6500 BC and 1900 AD. In general there is a very good correlation between the two surveys, both in terms of overall trends and settlement density at any given point. The three structural transformations described by Casana in the Amuq (2007) are also visible in the SHR, with the lower densities of the pre-Late Chalcolithic dispersed village period giving way to a tell dominated landscape in the Bronze and Iron Ages and a massive increase in settlement during the Hellenistic and particularly the Roman periods. This pattern is also visible in the tell and flat site counts discussed above (Figure 7.2 and Figure 7.3). The very high values for the Islamic period in the SHR can in part be attributed to the presence of ceramic specialists for this period in the field resulting in more type fossils being distinguished, particularly from Byzantine types, although they may also reflect a real concentration of settlement. Comparison of settlement patterns in the two surveys show further similarities. Both include a single larger site throughout the Late Chalcolithic, Bronze and Iron Ages, with no clear settlement hierarchy amongst the other settlements and sites concentrated on the Orontes and larger wadi systems. Even the size of Tell Nebi Mend and the successive central places in the Amuq at Tells Kurdu, Imar, Tayinat and Atchana are roughly comparable at between 13 and 20 hectares, at least until the occupation at the lower town of Tell Tayinat in the Iron II phase. The greatest difference between the surveys occurs during the later Late Chalcolithic, EBA and MBA. It should be noted that any biases in site recovery for these periods are more likely to affect the Amuq than the SHR SSA due to the geomorphological processes mentioned above, and therefore that we may be underestimating the difference between the two. Possible explanations for this disparity include the abundance of resources offered by marshland environments in the Amuq which are less likely to have been present in the SHR area, and also the opportunities afforded to the Amuq as a nexus of connectivity between Anatolia, inland Syria and the coast. Finally, the constrained geographical nature of the Amuq, surrounded by high mountains, may have served to concentrate population on the plain.

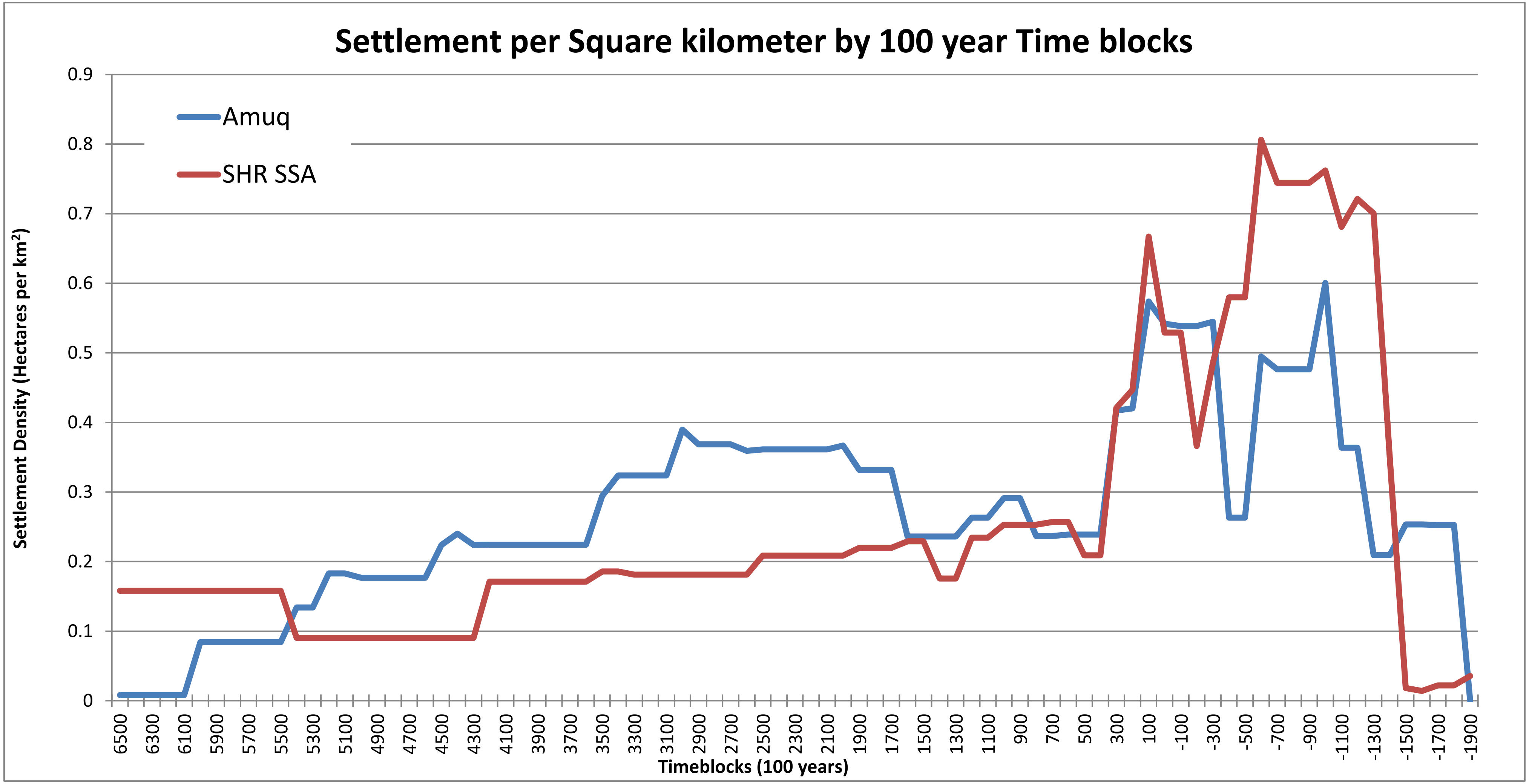


Figure 7.23: Settlement per km^2 in the AS and SHR SSA by 100 year time blocks

It is interesting that during the Hellenistic and Roman periods, when these upland areas began to be occupied, the settlement densities are far more equal. During the Classical periods both survey areas can be characterised as hinterlands relating to major cities, Antioch in the case of the Amuq and the Hellenistic-Roman cities of Laodicea ad Libanum and Emesa, sited at Tell Nebi Mend and the modern city of Homs respectively, in the case of the SSA. The enormous settlement expansion visible in both surveys in Figure 7.23 involved large scale landscape reorganisation, including site dispersal and agricultural intensification. This phenomenon is also visible in the wider area during this period (Casana 2012), examples being the canalisation of the Orontes and draining of marsh areas in the Ghab Valley (Casana 2003b), situated between the SHR and the Amuq, and evidence for cadastration in field boundaries to the south and east of Homs (Van Liere 1958-59).

The Wider Orontes Valley

The correlations in the settlement trajectories of the SHR SSA and AS pose questions regarding the intervening sections of the Middle and Lower Orontes. Several surveys provide evidence for comparison, one in the area between Rastan and Hama (Bartl and al-Maqdissi 2007), three in the Ghab Valley (Courtois 1973; Graff 2006; Fortin 2007) and one in the Rouj basin (Iwasaki and Tsuneki 2003). Unfortunately the majority of these data are only available through descriptive syntheses within larger publications, rendering direct quantitative comparison with the SHR and AS datasets impossible. Discussions of site detection and collection methodologies are also lacking. The northern part of the Orontes was also systematically investigated through analysis of CORONA imagery and Russian and Syrian maps as part of the Vanishing Landscapes Project. By combining this dataset with the limited survey data available we can begin to compare major trends across the Orontes Valley. The Vanishing Landscapes data also allow us to compare the size of the largest sites. The major centres in both the Amuq and SHR are relatively small in comparison to the Middle Euphrates and Jazira sub-regions, as well as Ebla and Qatna in the plains to the east of the valley itself, and it is worth investigating whether this pattern is visible throughout the Orontes corridor.

In general, the trends evident in the SHR SSA and the Amuq are also visible in the wider valley. Bartl and Maqdissi report a low density of settlement in the Chalcolithic period, dated as between 6000 and 3500 B.C, and in the EBI-III phases before a significant rise in the EBIV, when most tells were occupied and several larger ‘urban’ sites emerge. The EBIV pattern continues through the MBA, LBA and Early IA, followed by a similar expansion and ruralisation of settlement in the Classical period (Bartl and al-Maqdissi 2007; 245-248). Continuity of settlement from the EBIV phase onwards at the tell sites means we cannot be sure in which phase they reached their maximum extent, but the largest pre-IA sites do not exceed 20 hectares, and are therefore comparable to Tell Nebi Mend and Tayinat/Atchana. The Rouj basin survey focused exclusively on tell-based settlement and did not systematically record ceramics which post-dated the EBA. Settled areas are not provided but site counts suggest an increase in settlement between the Late Chalcolithic and the EBA (Iwasaki and Tsuneki 2003; Appendix 1). Unfortunately no sub-divisions within the long EBA phase were made and so it is not possible to be more specific about the timing of this expansion. Analysis of CORONA imagery in the Rouj suggests that none of the tell sites exceed 10 hectares. Finally, surveys in the Ghab Valley provide limited evidence for settlement expansion in the EBA. Both Courtois and Fortin identify a number of sites occupied at some point in the EBA and MBA and suggest that this represents an increase in settlement from the Late Chalcolithic (Courtois 1973; Fortin 2007), although it should be noted that their focus on larger tell settlements may have biased the sample against the discovery of more ephemeral and earlier occupations. Graff's study demonstrates a clear rise in total settled area and site numbers during her combined EBIV-MBAI phase in comparison to the earlier EBA (Graff 2006; 114-128) but the small size of the ceramic collections obtained for each site mean that less obvious type fossils for the earlier periods may have been missed. With one exception, all of the sites so far surveyed in the Ghab appear to be less than 25 hectares in size, both from field data, where available, and on the CORONA imagery. The exception is Tell 'Acharneh, which appears as large as 60 hectares on the CORONA depending on the mission used and the subjectivity of the interpreter, but is certainly over 40, and may correspond to the 2nd millennium city of Tunip (Klengel 1995). According to Courtois, the entire mounded area measured 1200m in length and between 500 and 650m in width, giving an area of between 47 and 61 hectares, and comprises an upper citadel and a lower town to the south, predominantly covered by a modern village (Courtois 1973; 63). Courtois also notes that surface collection at the site yielded ceramics from all phases between the 4th and 1st millennia but recent excavations by a Canadian team have not recovered remains earlier than the early EBA on the citadel mound and suggest that the lower town was first occupied in the EBIV phase (Fortin 2006; Cooper 2006b). However, we should be cautious in assuming the entire site was occupied during the EBIV given the substantial MBA, LBA and IA deposits which overlay the EBA layers.

Despite the problems and uncertainties associated with survey data, the limited information available for the wider Orontes valley matches the trends visible in the Amuq and the SHR SSA. It seems clear that the EBA, and most probably the EBIV phase, represents an important shift towards urbanisation but that this shift occurred within a fairly stable landscape of tell based settlement. The 20 hectare tell appears to represent a real ceiling in terms of settlement size, with Tell Acharneh the only possible exception in the entirety of the Middle and Lower Orontes before the IA, and clear settlement hierarchies are not visible. This relatively small scale urbanism should not be taken as evidence that the societies occupying the Orontes Valley were less complex than those further east. Excavations and geophysical research at the 18 hectare site of Tell Qarqur in the northern part of the Ghab Valley have revealed large areas of monumental architecture, including temples and sophisticated fortification walls dating to the EBIV phase (Dornemann 2003; Casana et al. 2008). Indeed, the steep-sided morphology of many of the larger tells throughout the valley sugget that fortifications were common features of these early settlements, although it is not possible to date their construction without excavation. In order to assess the causal factors behind the 20 hectare ceiling, we need to first examine the evidence for large scale urbanism in Western Syria.

Large Scale Urban Centres in Central Western Syria: Ebla and Qatna

Ebla and Qatna represent the two largest sites in Western Syria during the Bronze Age and both are situated on the plains to the east of the Orontes Valley (Figure 7.1). The earliest remains so far recovered from Ebla date to the early part of the EBA, but the city probably only attained truly urban proportions during the EBIV period when it reached at least 56 hectares (Matthiae 1981; Milano 1995; 1220). This figure includes only the confines of the substantial ramparts of the site and does not take into account the much larger surrounding area of discolouration visible on satellite imagery (Figure 7.24). Recent analysis of multiple CORONA images by Dr Sébastien Rey in the FCP suggests the actual size may be upwards of 100 hectares. Morphologically Ebla resembles the citadel cities of the Middle Euphrates and Upper Khabur basin, with a high citadel mound containing several monumental structures such as the famous EBIV Palace G complex, and a lower town surrounded by a massive fortification wall. Our understanding of the Eblaite state, and the early history of northern Mesopotamia in general, has been improved immeasurably by the discovery of an enormous number of texts from the Palace G complex, collectively known as the Royal Archives. During the approximately 50 year period covered by these texts Ebla appears to have been one of three major cities competing for dominance of the entirety of Northern Mesopotamia, along with Mari (Tell Hariri) and Nagar (most probably Tell Brak) (Archi and Biga 2003). The city served as the capital for an expansionist proto-imperial state which stretched from the Euphrates in the east to the coast in the west, before being destroyed at the end of the EBIV phase, either by its rival Mari or during the Akkadian imperial campaigns into Northern Syria (Astour 2002). After this destruction Ebla was briefly abandoned before the north and eastern parts of the site were resettled and a new palace constructed which lasted into the early MBA when the entire site was abandoned (Matthiae 2006). Unfortunately, no survey has been undertaken in the immediate surroundings of the site, whilst excavations have concentrated on exposing broad exposures of monumental architecture rather than vertical stratigraphic sequences. We therefore have very little archaeological evidence regarding the processes which led to the development of the urban centre. However, the texts do provide an important insight into the economy of the Eblaite state, and particularly the importance of textile production and livestock holdings. Estimates of the number of sheep and goats held by the Eblaite state and its population based on the textual sources vary between 2 million (Pettinato 1991) and 670,000 (Milano 1995) and sufficiently impressed Gelb for him to describe Ebla as 'an empire built on the back of simple shepherds' (Gelb 1982; 3, cited in Gelb 1986). Even to sustain the lower estimate for livestock numbers would have required a huge area of land, certainly far larger than an equivalent economy based on cultivated surpluses, and this has profound implications for the organisation and structure of both the institutions of the Eblaite state and its surrounding landscape. This will be discussed further in the Chapter 8.

In contrast to Ebla, excavations and survey data carried out at and around the other large western urban centre, Qatna, provide a fairly detailed account of its development. The site was first occupied in the LC 4 period and there is evidence for a small EB III occupation in the upper town (Morandi Bonacossi 2007a). EBIV remains have been found in every trench opened on the high mound, and Morandi Bonacossi has speculated that the site may have been as large as 25 hectares during this phase (Morandi Bonacossi 2007b; 59). Seal impressions on storage jars, evidence for centralised storage areas and granaries, as well as elite burials, provide hints of social complexity and perhaps bureaucracy (Morandi Bonacossi 2003; 2007a; 2007b). Survey in the region around Qatna demonstrates a massive jump in settlements at this time, from 2 sites in the Late Chalcolithic and earlier EBA phase to 17 in the EBIV (Morandi Bonacossi 2007b; 63).

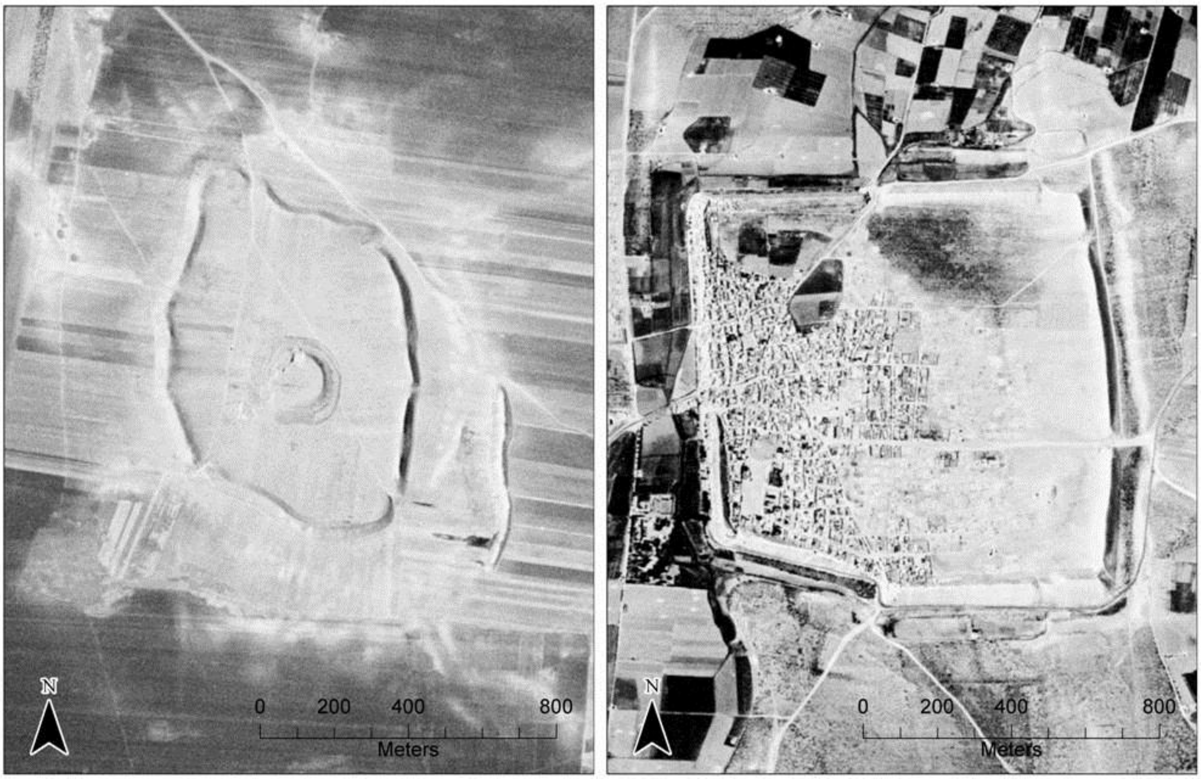


Figure 7.24: The two largest pre-Iron Age urban centres in Western Syria, Ebla (left) and Qatna (right). Corona 1107 acquired 25/07/1969

These sites are all tells of between one and two hectares and are spread evenly along the major wadi systems either side of Qatna itself. In the succeeding MBA phase the number of sites drops to 13, again all under two hectares, most probably as a result of the massive expansion of Qatna to approximately 110 hectares (estimated from satellite imagery, see Figure 7.24). The entire site was substantially reorganised, with a large square fortification wall replacing the circular shape of the preceding settlement and enclosing part of a local spring-fed lake. A royal palace was also constructed, along with an elite cemetery and a 'factory-like' ceramic production area (Morandi Bonacossi 2007a; 73). In short, at the beginning of the MBA Qatna established itself as a major capital of western central Syria, a role which it was to retain for much of the 2nd millennium[33].

Cycles of Settlement in the Eastern Steppe

The presence of both Ebla and Qatna clearly demonstrate that the factors which constrained site size in the Orontes Valley were not in operation further east. It is striking that both cities reached urban proportions during the same phase, the EBIV. Although we do not yet have evidence for the impact this urbanisation had on the Ebla region, the rapid expansion of settlement in the area surrounding Qatna mirrors that seen in the citadel cities of the Middle Euphrates, and can also be seen in the wider steppe area. Survey in the steppe zone covering an area of some 7000km^2 between Aleppo and Homs shows clear cycles of settlement, with the limits of occupation expanding eastwards into the marginal zone during certain periods and contracting almost to the Orontes Valley during others (Geyer and Calvet 2001; Geyer et al. 2004-2005; Geyer et al. 2007). Prehistoric occupation in this zone is very rare, at least after the Neolithic, and Chalcolithic settlement is completely absent. During the earlier part of the EBA (EBI-III) there are still very few sites, before a massive expansion in the EBIV phase. Settlement then recedes for the entire period between the MBA and the IA, expands slightly in the Hellenistic phase and then expands again during the Roman and particularly the Byzantine periods (Geyer et al. 2007). Plotting the limits of settlement over time on a single map demonstrates that the Roman and EBIV settlement limits are very similar, whilst the Byzantine push extends much further east, and all three included areas which are not settled even today, despite modern agricultural and irrigation technologies (see Geyer and Calvet 2001; 59, Fig. 2). The EBIV limit is partially delineated by a unique feature in Mesopotamia, the so-called Très Long Mur (Very Long Wall) or TLM. This metre-wide structure extends from the slopes of the Anti-Lebanon Mountains in the Beqa'a Valley out into the steppe before turning north for more than 200km and terminating at a possible fortified structure (Geyer et al. 2007; Geyer et al. 2010). Dating such features is extremely difficult but stratigraphic relationships with a cemetery and field boundaries show that it must predate both the Roman

[33] It is possible that Qatna may have been a 'hollow city' during the later MBA, acting as an administrative centre but with a very low permanent population, before a revival and return to a densely settled urban environment at the start of the LBA. See Morandi Bonacossi (2007a) for discussion of this issue and Lyonnet (1998) for a similar argument regarding circular sites in the western Jazira.

and Islamic periods. The width of the wall and the absence of any kind of fortified structures except at the northern-most point argue against a defensive purpose for its construction, and it is more likely to have been some form of symbolic marker, perhaps marking the division between sedentary and nomadic populations (Geyer et al. 2010).

Regardless of its specific purpose, the TLM represents a significant landscape investment in an area previously devoid of settlement. The EBIV steppe sites reported by Geyer are typically large and surrounded by a fortification wall, and are generally situated in areas favourable to agriculture with access to the limited water resources available and the greatest soil depth. However, in such a marginal environment animal husbandry must have played a significant role in an subsistence, to the degree that it may be considered an agro-pastoralist economy (Geyer and Calvet 2001). In addition to those surveyed by Geyer and his team, several other large circular sites have also been discovered, including Tell es-Sour, Tell Sh'eirat and Al-Rawda, all of which were first occupied in the EBIV and abandoned by the beginning of the 2nd millennium (al-Maqdissi 2007; Castel and Peltenburg 2007; Castel 2007b).

Figure 7.25: Tell es-Sour (left) and Tell Sh'eirat (right). Note the clear ramparts on both images. Left image: Corona 1038 acquired 22/01/1967. Right Image: Corona 1107 acquired 25/07/1969

Tell es-Sour and Tell-Sh'eirat, situated in the steppe immediately to the east of Qatna, are both approximately 30 hectares[34] (mapped from Corona imagery) and are morphologically very similar,

[34] Tell Sh'eirat may be slightly larger as the northern edge is obscured by a modern village on both Corona and modern imagery. There is also a clear area of discolouration around the site which may indicate ancient activity, including settlement (see Figure 7.25Figure 7.25).

comprising a sub-circular outer rampart and relatively flat inner town (Figure 7.25). These sites are likely very similar to the EBIV settlement at Qatna, prior to the MBA reconstruction of the latter, although more research is required to elucidate their precise characteristics. In this regard the evidence from the morphologically similar, although at 12 hectares slightly smaller, site of Al-Rawda is informative. Here a programme of excavation and geophysical survey has revealed a radial pattern of streets dividing densely built domestic structures and at least three religious complexes, surrounded by a fortification wall (Gondet and Castell 2004; Castel and Peltenburg 2007). A number of hydraulic features, including terraces, dykes and cisterns, designed to manage and capture surface run-off from the seasonal flooding of the wadi al-'Amur (Moulin and Barge 2005), surround the site and represent a significant investment in the landscape. Despite this investment, as with the other round cities in the steppe Al-Rawda was abandoned at the end of the EBIV and never reoccupied (Castel 2007b). This rapid abandonment, combined with the highly organised and planned nature of the settlement, has led the excavators to propose that the site was founded by some form of central authority, most probably either at the level of a state such as Ebla or as a local response to state development elsewhere (Castel and Peltenburg 2007; Castel 2007a).

Conclusion

Two major trends are visible in the landscapes of the Western Syrian sub-region during the Late Chalcolithic and EBA. In the Orontes Valley small centres emerged during the 4th millennium, and perhaps even earlier in the Amuq, within a landscape of small villages. Sites such as Tell Imar in the Amuq, Tell Nebi Mend in the SHR and Tell Qarqur in the Ghab may have reached 15 hectares during this period and were protected by fortification walls. Rural settlement increased during the EBA to form a dense landscape of small, probably fortified tells situated along the Orontes and its larger tributaries, a network which lasted some three thousand years until it finally broke down at the end of the IA. This long term stability was based around a number of centres, again including Tell Nebi Mend and Tell Qarqur, as well as Tell Tayinat in the Amuq and several larger sites in the lower Ghab Valley. None of these sites exceeded a ceiling of 20 hectares, despite the fact that some, such as Tell Tayinat, were of sufficient importance to appear in the Ebla archives and clearly had a degree of political control over the surrounding area (Welton 2011). Where it is possible to make chronological distinctions, there does appear to be a slight rise in settlement during the EBIV phase, and perhaps some signs of reorganisation in the MBA. However, the overwhelming impression remains one of continuous stable settlement over several thousand years from the beginning of the Late Chalcolithic to the end of the IA, before the last in a series of structural transformations in landscape organisation occurred during the Hellenistic-Roman period. This can be contrasted with the steppe zone immediately to the east of the valley, which experienced a series of comparatively rapid expansions and contractions of settlement. Practically deserted during the Chalcolithic and earlier EBA phases, during the EBIV this area saw the emergence of fairly large but short-lived centres such as Tell Sh'eirat, Tell es-Sour, Al-Rawda and perhaps Qatna, with only the latter lasting into the MBA as a rather different type of site. This phenomenon mirrors that of the *kranzhugeln* on the other side of the Euphrates (see Chapter 6), a process similarly linked to the emergence of state-level institutions and new forms of social organisation (Kouchoukos 1998). In this context the position of Ebla at the confluence of the stable Orontes Valley and fluctuating steppe zones is highly significant, especially given the textual evidence for an economy dominated by textile production and livestock holdings (Gelb 1986). In order to examine these relationships further we need to bring together the three sub-regions into a single unit of analysis.

Chapter 8: Discussion

Introduction

The preceding three chapters have dealt with the nature of the evidence of the individual surveys in the FCP and the wider sub-regions and sought to establish a reasonable level of comparability in the datasets. After an examination of the results this reanalysis has generated, this chapter brings the data together to compare trends in settlement and landscape use across the region in the 5th, 4th and 3rd millennia. I argue that region-wide trends are visible throughout this period, and that these can best be explained by reference to a general model of societal and urban development which holds across Northern Mesopotamia and the Northern Levant. I will then place these trends in a wider context, examining the cycles of settlement and landscape transformation processes which have led to the attenuation of the archaeological record since the EBA.

Re-examining the FCP Surveys

The preceding reanalysis of the individual surveys demonstrates the power of combining and re-interpreting survey data using remote sensing and GIS software, particularly for the older surveys where remote sensing was not widely used in the original research and those surveys which were only partially completed in the first instance (see Chapter 3). Through the discussions of the individual surveys it has been possible to clarify ambiguities between the published sources and grey literature such as field notebooks and site plans in more detail. In the main, each of these reanalyses has largely confirmed the interpretations made in the original publications, whilst also explaining how the data has been rendered comparable for the discussion of broad scale trends attempted in this chapter. Importantly, the high quality of the original surveys has resulted in few new sites being discovered through remote sensing alone, except for those found in the TBS (see Chapter 6). One might expect to have discovered new sites in the two oldest surveys which did not make use of high resolution satellite imagery, the NJS and the KHS, as well as the other survey which was conducted at a relatively low intensity, the TS. However, in the NJS the use of a high quality 1 metre contour map and the near ubiquitous mounding of all sites discovered both in the field and on the imagery meant there were no candidates for addition. In the northern Middle Euphrates the low quality of the Corona, the fact that high resolution modern imagery was not available due to the flooding of the river valley after the construction of the Atatürk Dam and the unobtrusive nature of many of the tells (see Chapter 5) hampered the recognition of previously undiscovered sites within the survey areas. The other surveys were all conducted with the use of Corona and other high resolution data meaning that, with the exception of the TBS, reanalysis within the areas of intense investigation had relatively little to add.

Beyond the simple discovery of sites missed in the field, the main contributions of the reanalyses provided in this thesis lie in the combination of surveys to investigate larger continuous (or near continuous) settlement systems and the contextualisation of surveys within wider landscapes and areas using satellite imagery. Combining the KHS and TS surveys allowed for interpretation to go beyond the original publications (Wilkinson 1990; Algaze et al. 1992) and demonstrate the relationships between Titriş, Kurban Höyük and sites outside both survey areas such as Lidar and Samsat. Taking the data from both surveys together highlights the proliferation of smaller settlements in the middle and later EBA and the move from the river valley to the plains to the south east, as well as the expansion of the medium-sized sites. Similarly, the combination of the NJS and THS datasets allows for the investigation of the potential relations between the two largest sites, Tell al-Hawa and Tell Hamoukar, as well as a wider contextualisation of the system and its relations to the Eastern Khabur triangle. In particular this has shown that the abandonment of the south-western part of the survey area in the NJS may have more to do with the expansion at Hamoukar than developments at Hawa. For the TBS, although the new sites discovered are difficult to interpret it has been shown that they are probably later than the 3rd millennium and therefore do not have significant implications in relation to the published interpretations. In the Middle Euphrates, analysis of satellite imagery demonstrated the presence of a significant level of settlement away from the survey areas which were concentrated on the river valley. This is particularly clear for the LCP, where the longevity of tell occupation within the survey allows for robust extrapolation to the surrounding landscape, but can also be seen in the steppe zone further to the south around Tell es-Sweyhat. The discussions of the LCP and SHR datasets also represent the most up-to-date syntheses of these surveys during the 4th and 3rd millennia currently available, although publications dealing with both in more detail are imminent. Reanalysis of the Amuq has led to greater period division, although the dataset remains rather problematic, and largely confirmed the trend for long term stability punctuated by significant settlement shifts argued for in recent publications (Casana and Wilkinson 2005a; Casana 2007; 2012). Having discussed the surveys in some detail in the preceding chapters, we can now turn to interpretations at a regional level with greater confidence in the data upon which these are based.

Demographic Cores in the Late Chalcolithic

The northern Mesopotamian landscape during the Late Chalcolithic can be characterised as a series of discrete areas of dense settlement in well watered basins and river valleys. For the FCP surveys there is a clear correlation between high settlement densities during the Late Chalcolithic and stability into the EEBA and MEBA/LEBA phases (Figure 8.1). There is also a marked spatial pattern, with the eastern Khabur basin area of the NJS and THS and the Orontes Valley covered by the AS and SHR exhibiting the highest densities and the Middle Euphrates exhibiting the lowest, and a trend towards lower densities as one approaches the zone of uncertainty. The high values and fluctuation for the THS, and to a lesser extent the SS, are related to the survey size, with the growth of large centres at Tells Hamoukar and Sweyhat having a disproportionate effect on density change when divided by the smaller survey area values. Similarly, the large site of Tell Hawa, at 50 hectares at least three times the size of the next largest Late Chalcolithic site in the FCP surveys, raises the NJS value. If we assume that sites of this size were exceptional in the region, with only Tell Brak and the southern extension at Hamoukar attaining areas of more than 15 hectares during this period, we can consider a general density for the eastern Khabur basin of between 0.2 and 0.3 sites per km^2, closer to those seen in the western sub-region. This is still slightly higher than the density seen in the TBS, however, and suggests a real difference between the eastern and western Jazira. The exceptional size of Brak, Hawa and Hamoukar, and the very different morphologies and inferred settlement types they appear to represent, pose a number of questions regarding the nature of urbanism in the Jazira sub-region (see Chapter 6).

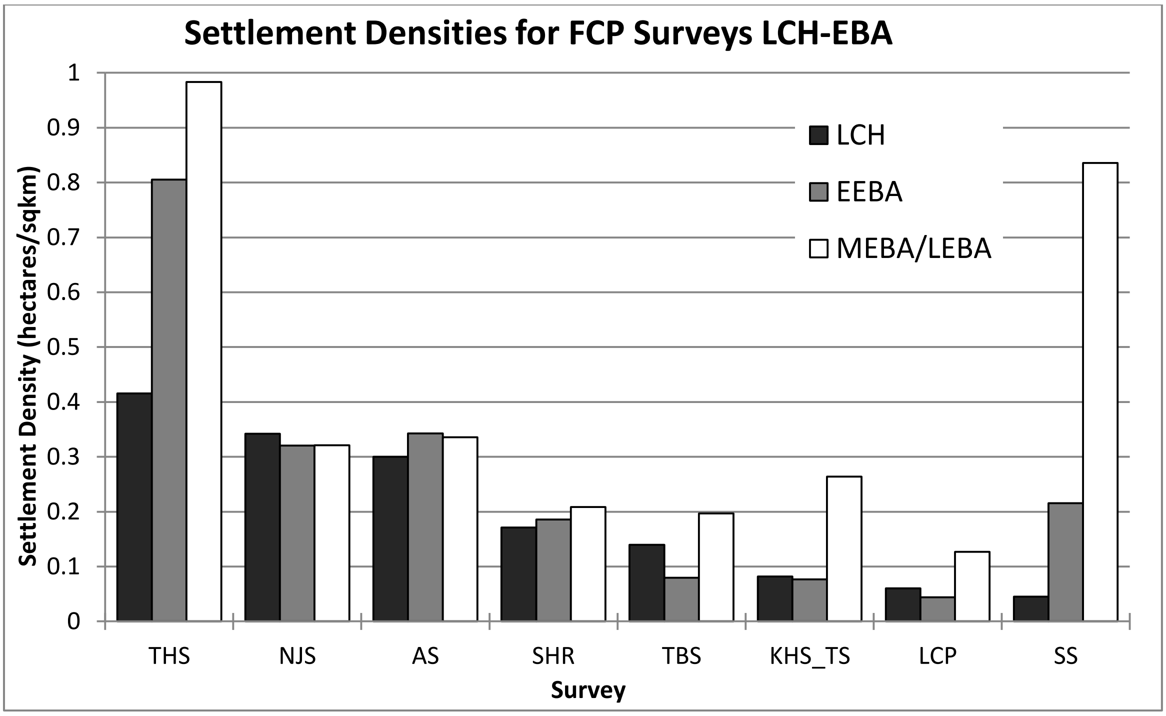


Figure 8.1: Settlement Densities for the Surveys in the LCH, EEBA and MEBA/LEBA phases arranged in order of LCH settlement density

Given the presence of the three largest sites in the region and the largest area of continuous high settlement density, one might assume that the Jazira represents the dominant core[35] area in the Late Chalcolithic. However, the high densities of settlement in the West, as well as the presence of a number of large sites up to 15 hectares in size distributed across the wider landscape (

Figure 8.2) argue for a more complex picture.

[35] See Chapter 1 for a discussion of the terms core and periphery and their use in this study

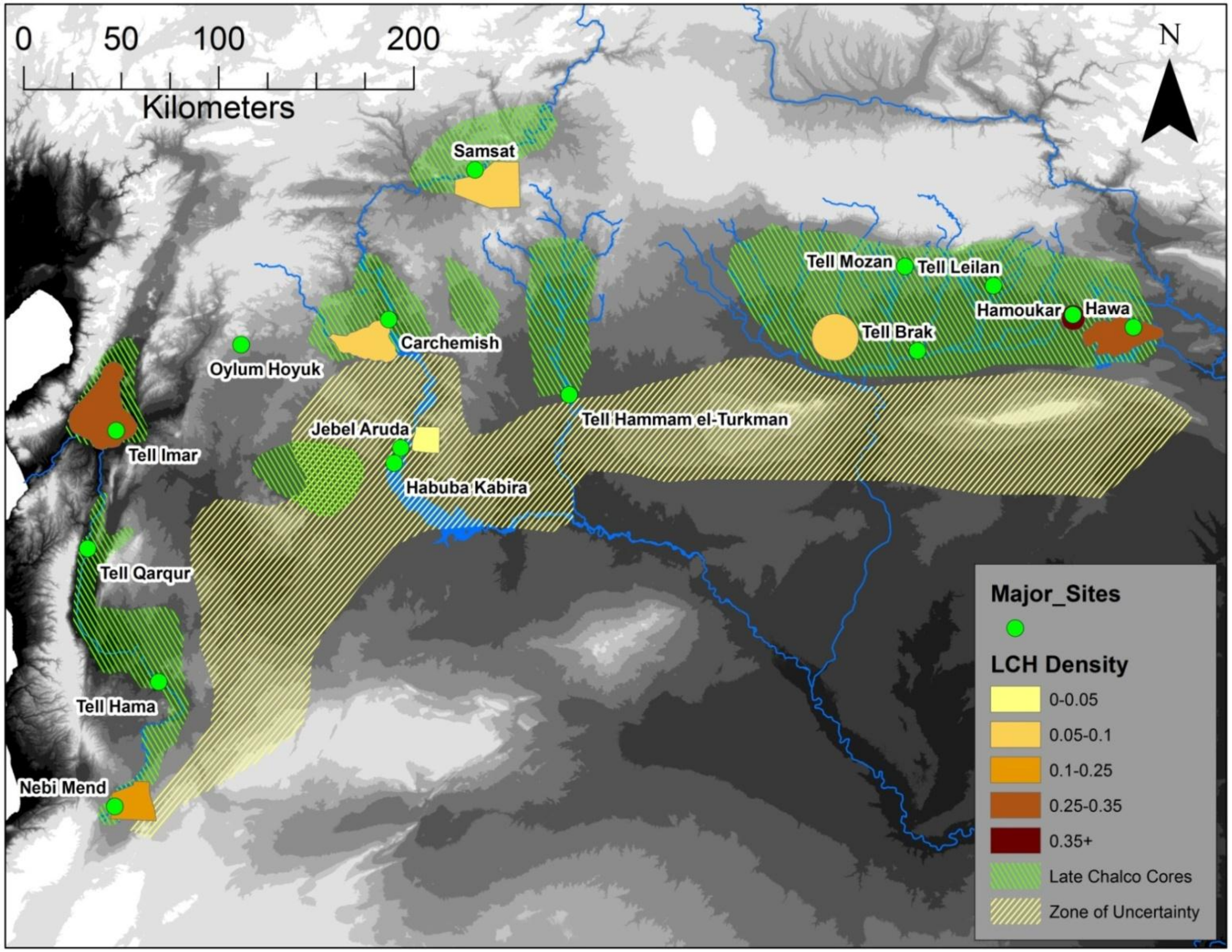


Figure 8.2: Map of Settlement Densities in the FCP Surveys and Late Chalcolithic Core Areas extrapolated from these and other surveys. Background SRTM DEM, 100m contour intervals

These larger sites are associated with the denser areas documented in the surveys and generally exist within networks of small villages with no visible settlement hierarchies beyond the distinction between centre and village. Beyond the FCP survey areas described in Chapter 5-7, possible core areas include the Harran plain and upper Balikh valley, the Saruj basin, the Jabbul plain and the Ghab. Surveys of all of these areas have revealed a pattern of small village settlements (Wilkinson 1998; Schwartz et al. 2000; Creekmore 2008; 111), with larger settlements visible at Tell Hammam et-Turkman, Tell Imar, Tell Qarqur and perhaps Tell Hama and Tell Nebi Mend. Oylum Höyük in the Afrin Valley may represent a further Late Chalcolithic hub but no survey has been published covering the surrounding area. Where investigated, these smaller centres reveal some evidence for societal complexity, such as the city walls visible at Tell Imar (Casana and Wilkinson 2005a), a monumental building at Hammam et-Turkman (Meijer 1988) and numerous seals and sealings[36] discovered at Samsat (Özgüç 1992). These finds mirror the indicators of social complexity found at LC 1-2 Brak and the pre-Uruk levels at Hamoukar. Despite the increased size of the centres in the Jazira, the settlement pattern is still one of small evenly spread villages, and there are no intermediate levels in the settlement hierarchies. We might, then, envisage Brak and Hawa as exceptionally large versions of an essentially similar phenomenon of gradual urban development at important nodes in the landscape visible throughout the region during the Late Chalcolithic. Quite why these particular centres, along with the southern extension at Hamoukar, reached such size at this time is impossible to answer at present. It is possible that the long-distance trade networks, evidenced at Hamoukar by obsidian sourcing and the possible presence of route systems associated with the settlement patterns of the NJS and THS (see Chapter 6), may have provided greater incentives to congregate in larger agglomerations. A greater flow of material goods may have drawn in more people. In this regard the presence of far larger populations in the surrounding broad plain of the Jazira relative to those in the smaller basins may be of some importance in explaining the differences in size of the major centres, providing both a higher demand for traded goods and a demographic context for large scale agglomeration. Unfortunately, we do not have sufficient chronological control to assess the impact the development of such centres had on their surroundings, although the ongoing survey of the hinterland of Tell Brak may provide some answers.

[36] Ur (2010b; 15) notes that seals and sealings cannot be equated with independent institutions, bureaucracies or proto-states, since they existed from the Neolithic period and were probably used at the household as well as the institutional level. However, sealing practices clearly do provide evidence for the restriction of access over certain material goods to a sub-category of a group, and therefore of social differentiation in some form. Evidence from Late Chalcolithic Arslantepe suggests that a sophisticated system of sealing practices designed to control the collection and distribution of goods existed during the Late Chalcolithic (Wright 2000), and it is not unreasonable to assume that the large numbers of seals discovered at Samsat, Hamoukar (Reichel 2002) and Brak represent similarly complex systems.

The Uruk Expansion in the FCP

As discussed in Chapter 1, in contrast to the Late Chalcolithic period, numerous studies have dealt with the Uruk expansion at a regional scale in response to Algaze's framing of the problem through the World Systems Theory hypothesis (Algaze 1989; 2005 [1993]) and some scholars have argued that more detailed studies at a local level are required to further the debate (Nissen 2001; Rothman 2004; 107; Ur 2010a). As such, this study has relatively little to add to the discussion regarding the nature of the interaction between local Late Chalcolithic and Uruk groups in the fourth millennium beyond those discussed at the sub-regional level in Chapters 5-7. The clearest pattern to emerge across the surveys is, ironically, one of complexity. Within the NJS and THS, KHS-TS and to some extent the LCP, Uruk contact seems to have been prolonged and multi-faceted. Sites of different sizes with varying ratios of Uruk to Late Chalcolithic pottery are visible, from those which exhibit an entirely southern ceramic assemblage to those with only a few Uruk sherds. It is also highly likely that a significant proportion of the sites with Local Late Chalcolithic assemblages persisted into the Uruk period. The percentage settlement graphs presented for each survey in Chapters 5 and 6 (Figure 5.17, Figure 5.27, Figure 5.38, Figure 6.17, Figure 6.18, Figure 6.36) show that Uruk period settlement was relatively low in comparison to the preceding and following phases. If the Uruk was a phase in its own right, it would represent a significant and short-lived decline in otherwise broader patterns of stable settlement, a scenario which is certainly possible but seems intuitively unlikely, especially given our present understanding of the ceramic assemblages of the period (see Chapter 4).

The very low level presence of southern ceramics in the TBS mirrors the relatively lower level of Late Chalcolithic sites in the western Jazira compared to the NJS and THS. In the western sub-region, Uruk ceramics are even scarcer, and the mechanisms by which they may have reached this area even more equivocal. Hints of long distance overland routes running east-west are visible in the alignments in both the NJS-THS and the LCP, whilst the paired sites along the Euphrates in the Carchemish, Birecik and Samsat sectors may indicate a desire to control river crossings and river trade. Again, many of these crossings predate the Uruk contact period and the precise relationships which resulted in these mixed assemblages remain unclear. The Uruk expansion also marks the first forays of settlement outside the Late Chalcolithic cores and into the zone of uncertainty since the Ubaid period. Four small sites were occupied in the Middle Khabur valley to the south of Brak whilst a cluster of sites appeared in the great bend of the Euphrates south of the SS centred on Habuba Kabira-sud and including Jebel Aruda and Sheikh Hassan. The significance of this initial expansion will be discussed below.

Intensification and Extensification in the Early Bronze Age

The trajectories of settlement in the EBA can be considered to involve three interlinked processes. These include the nucleation and intensification of settlement in the core zones, the massive spread of settlement into the zone of uncertainty and the emergence of numerous large urban centres in both zones. Again, within the FCP there are clear regional variations. Figure 8.3 shows the percentage change in settlement between the Late Chalcolithic and Early EBA and the Late Chalcolithic and Mid/Late EBA periods for each of the FCP surveys.

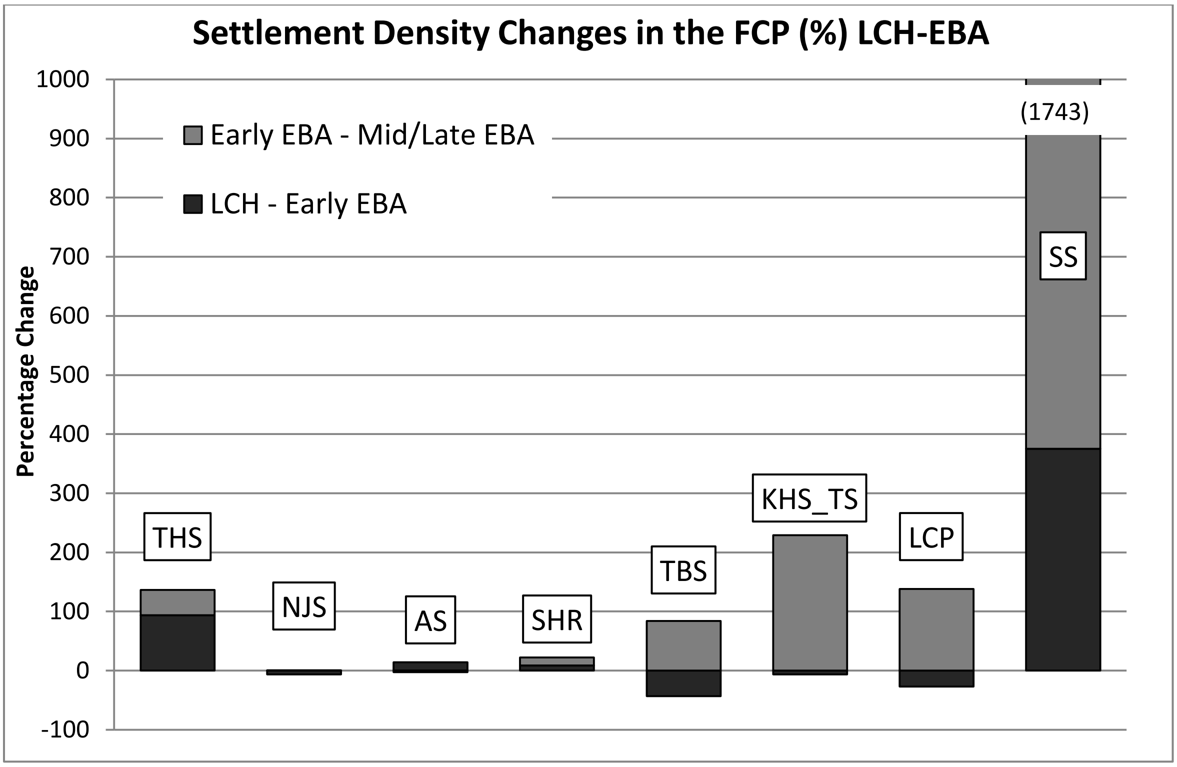


Figure 8.3: Settlement Density Changes in the FCP between the Late Chalcolithic, Early EBA and Mid/Late EBA phases

The size of the overall bar therefore shows the total change between the Late Chalcolithic and the Mid/Late EBA. With the exception of the THS, the Late Chalcolithic core areas of the NJS, AS and SHR experienced very little change throughout the EBA. A slight decrease occurred in the TBS into the Early EBA followed by an increase into the Mid/Late EBA, with the latter being almost entirely accounted for by the development of Tell Beydar. Similarly, the massive rise between the Late Chalcolithic and the Early EBA in the THS can be directly related to the expansion of Tell Hamoukar at the end of the latter period. In contrast, the Middle Euphrates surveys all experienced significant increases in settlement during the later EBA. The massive expansion in the SS is inflated in comparison to the other surveys due to the small size of the survey and the subsequent dominance of Tell es-Sweyhat, but the general pattern is real. The relatively small changes in settlement density in the core zones mask significant changes in the lay-out and organisation of settlement. In the east, this takes the form of nucleation and intensification. Although the total settled area in the NJS remains reasonably constant, the number of sites decreased from 73 to 38 between the Late Chalcolithic and the Ninevite V period as the south-western part of the survey area was abandoned, most likely through a desire to create a pastoral resource. Overall settlement levels were maintained, however, as a number of medium sized centres emerged to form a three tiered settlement hierarchy. Such sites are missing from the THS but this is likely to be related to the size of the survey (see Chapter 6). Small and medium sized tells can be mapped from imagery in the vicinity of the NJS-THS area, and it is highly likely that they were occupied during the EBA. Similarly, in the TBS the dispersed pattern of Late Chalcolithic villages gives way to a dense landscape of high tells which can be mapped across the landscape between Tell Beydar and Tell Brak during this period (Sallaberger and Ur 2004 and chapter 6). In all three surveys in the Jazira there is some evidence that the development of large urban centres in the middle of the EBA involved the abandonment of surrounding small sites, and by inference the drawing in of local populations (see Chapter 6). It is difficult to assess how far this pattern can be presumed for the other urbanised sites in the Jazira at this time. Surveys around Leilan suggest a steady increase in settlement throughout the EBA prior to the famous collapse at the end of the third millennium and no survey has been conducted around Tell Mozan.

Evidence from off-site features also demonstrates a trend towards agricultural intensification, specifically the development of hollow ways and the scatters of battered sherds across the landscape taken as evidence for ancient manuring (Wilkinson 1982; 1994; Ur 2003; Wilkinson 2003; 117; Ur and Wilkinson 2008). Hollow ways may have begun to form as early as the Late Chalcolithic in specific areas of the Jazira such as Tell Brak (Wilkinson et al. 2010), but they are predominantly associated with EBA, and particularly Later EBA, sites. Extensive sherd scatters are visible in the NJS and THS, as well as in the Middle Euphrates at Titriş and Sweyhat. In general these have been linked to the emergence of larger urban centres and the compound catchment settlement patterns associated with them (Wilkinson 1994). Such landscape features are less visible in the western sub-region (see below for discussion of this issue), where the primary evidence for increased settlement comes from the infilling of previously unsettled areas. New sites were founded in the northern and eastern parts of the Amuq plain and across the SHR. In the Amuq, this phenomenon may be related to the influx of material culture, and perhaps people, of the Early Transcaucasian Culture (ETC) (Batiuk 2005), but it also fits into the wider trend. In part as a result of the chronological uncertainties, the dispersal followed by the urbanisation trend seen in the east is not visible in the Orontes Valley. Although the location of the main site in the Amuq shifts slightly from the Middle and Late Chalcolithic sites of Tell Kurdu and Tell Imar to the Orontes and Tell Tayinat (and in the second millennium Tell Atchana), the size of the largest settlements remains fairly constant throughout the Valley at between 15 and 20 hectares. Importantly, there are no middle level sites in the west before the MBA.

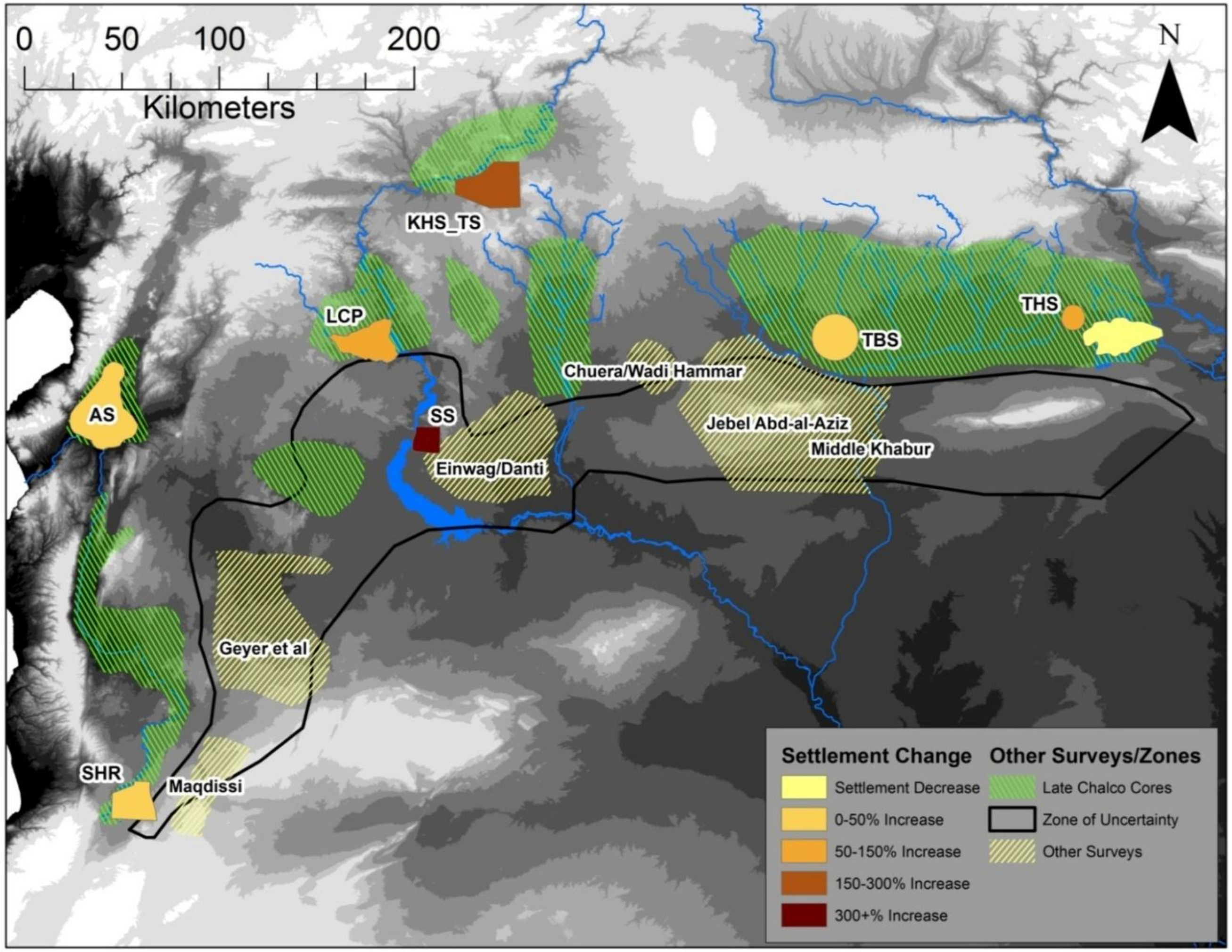


Figure 8.4: Settlement change in the FCP surveys between the Late Chalcolithic and Later EBA. Also location of surveys showing increased settlement in the EBA

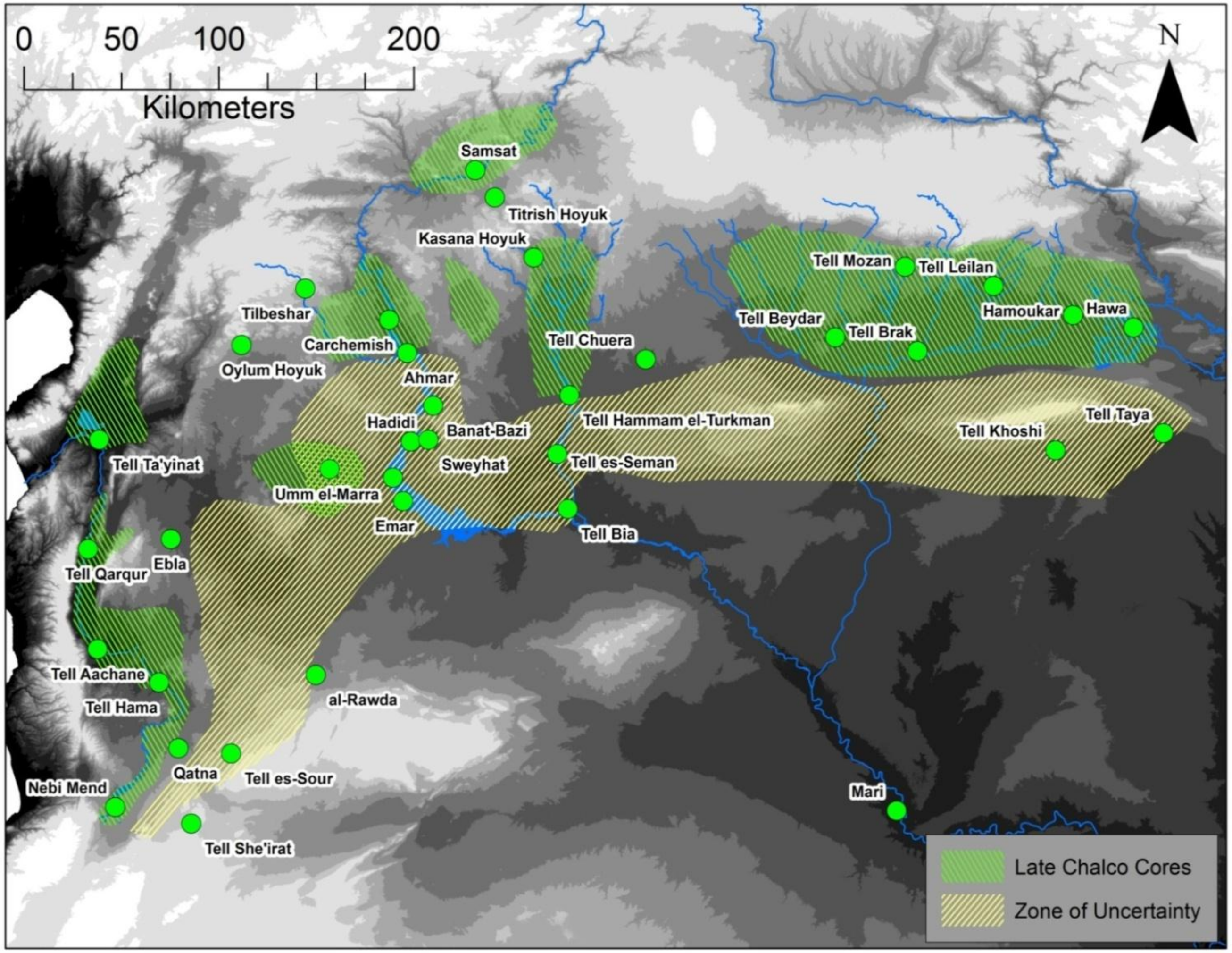


Figure 8.5: The relationship between key sites in the 'second urban revolution', long term core areas and the 'zone of uncertainty'

In fact, the only area where a three tiered hierarchy emerges outside the Jazira is in the KHS-TS zone, where sites along the river such as Lidar and Kurban fluctuated in size in step with the centre at Titriş (see Chapter 5). Unfortunately we have very little information regarding the foundation and development of the largest city in the West during the EBA, Ebla, situated on the plains to the east of the Orontes.

Evidence for extensification and settlement expansion is visible across the zone of uncertainty in the EBA (Table 8.1 and Figure 8.4). Absolute figures for the area between the Middle Euphrates and the Balikh are unavailable, whilst the generic EBA period used in the the Wadi Hammar and Chuera surveys does not allow for comparison in the timing of expansion with the other surveys (see Chapter 6). Initial small settlements begin to appear along the Euphrates and in the steppe to the east immediately after the Uruk period, including Tell Hadji-Ibrahim and Tell Sweyhat, and a similar pattern of small scale settlement is visible in the Middle Khabur and Jebel Abd-al-Aziz from the EJ I (see Chapter 6). All of these areas had been either deserted or extremely sparsely settled during the preceding millennia long Late Chalcolithic phase. Although outside the zone of uncertainty, the foundation of Titriş Höyük on the plain to the south east of the Euphrates away from the Late Chalcolithic/Uruk centre at Samsat may be taken as part of a similar phenomenon. With the exception of the Middle Khabur, all of these areas experienced a growth in settlement into the Middle EBA, with Sweyhat expanding to some 15 hectares and several large *kranzhugeln* of 30 hectares or more developing in the Jebel Abd-al-Aziz (Kouchoukos 1998; 368-369, Table 7.4). This period also saw the development of citadel cities in the Middle Euphrates and Balikh, including Titriş and Carchemish in the north and Tell Hadidi, the Banat-Bazi complex, and Tell es-Seman, within the zone of uncertainty (Figure 8.5).

In contrast to the trajectories of urban hinterlands in the Jazira and Orontes Valley, where survey has been conducted around the citadel cities there is no evidence for the abandonment of smaller sites in favour of the emerging centre. In fact, for Sweyhat and Titriş the opposite is true; expansion in the centre was closely correlated with a rise in settlement in the hinterland and the foundation of new sites. The situation is slightly more complicated at Carchemish, where the apparent growth from 4 to 40 hectares occurred with seemingly very little impact on the surrounding landscape. However, in all three Middle Euphrates cases (Titriş, Sweyhat and Carchemish), urbanisation resulted in significant rises in population as well as settlement reorganisation, a process which is not visible in the Jazira or Orontes regions. In the east, the Middle EBA represents the high point of steppe colonisation. The *kranzhugeln* were probably abandoned after the EJ III phase, whilst the Middle Khabur settlements slightly earlier, with very few settlements found in the subsequent phases (Hole 1997). However, settlement along the Middle Euphrates continued and even expanded into the Late EBA. This period also saw the beginning of expansion into the western steppe zones to the east of the Orontes Valley, contemporary with the emergence of Ebla, Qatna, Rawda and the other large sites east of Homs. Little evidence is available for the relationship between this expansion and the dry-farming plains between the Orontes Valley and the zone of uncertainty, but survey around Qatna demonstrates a similar pattern to the citadel cities, with growth at the centre paralleled by that in the hinterland. This second expansion came to an end at the beginning of the second millennium with the abandonment of Sweyhat and the sites in the western steppe.

Date BC	Middle Khabur	Jebel Abd-al-Aziz	Wadi Hammar/ Chuera Survey	Middle Euphrates-Balikh (Danti, Einwag)	Sweyhat Survey	Geyer Surveys	Maqdissi Survey
3000							
2900							
2800		EJ I-II		'Some' Early EBA	Initial expansion EEBA		
2700	EJ I-IIIa						
2600							
2500		EJ IIIa+b	'EBA' Only		Growth in MEBA		
2400							
2300				'Mostly' Late EBA			
2200						EB IV	
2100					Maximum Settled Area in LEBA		EB IV-MBA I
2000							
1900							

Table 8.1: Surveys and Settlement Data summary for the Zone of Uncertainty during the EBA, with surveys arranged from East to West. Shading reflects density of settlement in comparison to other periods within survey. Text refers to periods used in surveys

Pastoralism and Textile Production

It seems, then, that the third millennium represents a period when social, political and ecological conditions allowed for the rapid colonisation of the zone of uncertainty along with intensification in the core areas. This wave of settlement was spatially and temporally diverse, with the Middle Euphrates the only constantly occupied area flanked by an initial expansion in the east and a later one in the west, and was contemporary with the emergence of large urban centres across the region. We can link this to the shift from flax to wool as the main raw material in textile production, and the resulting increase in the importance of pastoralism (McCorriston 1997). This shift would have had profound effects in *both* agricultural and pastoral zones, since a decline in flax production would have allowed areas of agricultural land which had previously been given over to linseed to be used for other crops. Specialised wool production developed in southern Mesopotamia during the later part of the fourth millennium and wool bearing sheep may have arrived in the north through the Uruk expansion (McCorriston 1997; Kouchoukos 1998), although there is some debate on this issue[37]. Faunal and botanical remains, as well textual sources, provide evidence for an 'economic restructuring' in the North Mesopotamian economy at the beginning of the third millennium (Zeder 1998b; 2003; 170) to which we can now add evidence from survey.

Within the zone of uncertainty, the clearest faunal evidence for the growing importance of pastoralism comes from the Middle Khabur sites. Here, assemblages demonstrate a gradual shift from a diversified subsistence strategy including sheep, goat, pig and cow, as well as wild animals, to a specialised pastoral assemblage dominated by ovicaprids (Zeder 2003). At the same time, barley also becomes the dominant staple crop throughout the area to the south of Brak (McCorriston and Weisberg 2002). A similar parallel increase in ovicaprid and barley production in the zone of uncertainty is visible in the Middle Euphrates (see Chapter 5) and perhaps at Rawda in central Syria. This pattern can be seen in the modern exploitation of the steppe zone, where the use of barley as a fodder crop has resulted in a wave of settlement into more marginal environments (Treacher 2000), a system also proposed for the Middle Khabur during the early third millennium (McCorriston 1995). Evidence for the specific importance of textiles to the Mesopotamian economy also comes from textual sources. Unfortunately the earliest expansion into the steppe predates the arrival of writing in northern Mesopotamia. However, texts from the southern Mesopotamian city of Uruk dating to the end of the fourth millennium document the return of sheep to the city which had been maintained by professional shepherds in the previous year. Green (1980) infers from the relatively equal proportions of male and female animals that these were exploited for wool as opposed to meat or other secondary products, a conclusion supported by occasional references to sheep preceded by the logogram for wool. The practice of

[37] Pastoralism has a long history in the Fertile Crescent, dating back at least 9000 years (Hammer 2012). However, the initial utilisation of so-called secondary products (milk, wool, traction etc) is much harder to date. Analysis of lipid remains present in pottery from a number of sites in south-eastern Europe, and the Fertile Crescent suggest milk may have been collected and stored as early as the 7th millennium B.C, far closer to the earliest domestication of cattle than was first thought (Evershed et al. 2008). Evidence for wool production is rather more equivocal since the material itself very rarely survives in the archaeological record. We are therefore reliant on a combination of textual and iconographic sources and the interpretation of faunal remains. Given the nature of the evidence, the 4th millennium date for appearance of evidence for wool bearing sheep and written sources capable of describing them appears as more than a coincidence. Evidence for the presence of wool bearing sheep prior to the (proto-) historical periods comes from western Iran, where high ratios of sheep to goat and the broader age range of animals have been interpreted as evidence for wool production (Bokonyi 1977; Davis 1984). The dating of these assemblages is ambiguous but may be as early as 5000 B.C and is certainly before 3600 B.C. Similar results have also been obtained for Tell Sabi Abyad in the Balikh Valley in Syria, where the high proportion of animals over 4 years old may relate to wool production in levels dated to 6200 B.C, although it may also reflect a more general pattern of herd security (Russell 2010; 273). Importantly, all three studies argue that wool production was part of a mixed economic strategy, and probably occurred at a fairly small scale. This can be compared to evidence from the Northern Fertile Crescent in the 3rd millennium, when the growing proportion of sheep is visible in faunal remains across the region and is of sufficient scale to suggest a genuine shift in pastoral practice (Green 1980; Zeder 2003). At the present time there are simply too few well dated faunal assemblages to make similarly general assertions regarding wool production prior to the EBA.

entrusting animals to shepherds for long periods is also attested in the texts from Tell Beydar during the mid-third millennium, and in Ur III texts from Drehem in southern Mesopotamia (Firth and Nosch 2012). Sheep were returned to Beydar at specific points in the year to be counted and plucked (Sallaberger 2004), suggesting the actual manufacture of textiles occurred in or close to the urban centre. The clearest example of the importance of textiles comes from the Ebla archives, which document significant trade in finished textile products as well as the vast numbers of livestock discussed in Chapter 7. Again, certain groups are given responsibility for sheep and goat owned by the state for long periods of time.

'The Fibre Revolution'

The economic and social consequences of the combined extensification and intensification of production visible in the third millennium would clearly have been significant and must have had an impact on the emergence of urban centres and states. As Carneiro has stated, 'if a society does increase significantly in size, and if at the same time remains unified and integrated, it must elaborate its organisation' (1967, cited in Rothman 2004; 97). Fundamentally, the export of part of the productive economy, i.e. textile manufacture, to previously underused areas and the consequent possibility for the increase of agricultural production in the cores would result in greater overall productivity in both areas; essentially an economic boom. It is highly likely that production was organised at a household level throughout the 4th and 3rd millennium (Stein and Blackman 1993) meaning the distinct labour and spatial needs of agricultural and pastoral productive strategies may have led to increasing specialisation and perhaps social differentiation. Increases in surplus staple (food) products in the core areas may have resulted in both population increases and specialised craft production such as weaving (McCorriston 1997; 527).

The transportable nature of both sheep and goat flocks and manufactured textiles would also allow for trade and exchange on a scale altogether different to that seen in earlier periods. This can also be related to the use of domesticated equids for beasts of burden. It is likely that equids such as the donkey were first domesticated towards the end of the 4th millennium (Grigson 1995; 2006; 233) and must have had a significant impact on the mobility of goods and people as they became more ubiquitous in the 3rd millennium. One of the key restraining factors in the development of urbanism in Northern Mesopotamia compared to that in the Southern Mesopotamia may have been the inability to transport bulk staple products such as cereals due to the lack of navigable canals (Algaze 2005; 2008). The development of large scale sheep and goat herding, the commodification of durable light-weight textiles and the widespread use of equids as pack animals may have provided an alternative to this waterborne trade in staples. Furthermore, Sherratt (2004b) has argued that textiles had a wider significance as one of the earliest developments of a certain class of added-value goods between basic staples and precious metals which functioned as socially desirable commodities whilst still remaining reasonably accessible. Manufacture of these products required a series of specialised processes whilst the products themselves allowed for distinction between groups and individuals through their differential ability to acquire them. Similar processes of social elaboration may also take place within pastoral communities, as has been inferred for the eastern zone of uncertainty. Here the original pastoralist settlers in the Middle Khabur gradually divided as a highly specialised pastoral strategy emerged in the steppe further west around the Jebel Abd-al-Aziz (Kouchoukos 1998). In the Middle Euphrates, there is evidence for the transferral of storage activities from individual villages such as Tell Hadji Ibrahim to the centre at Sweyhat during the early part of the third millennium, interpreted as evidence for economic and possibly political centralisation (Danti 2000; 304-5).

Risk and Institutions

It is notable that the greatest extension of settlement in the zone of uncertainty occurred at the same time as the development of urban centres across the region during the middle and later part of the EBA. That this relationship is not merely conincidental is suggested by the discrepancies between the timing of the eastern and western expansions. In the east, the maximum extent of the *kranzhugeln* occurred during the middle of the third millennium coterminous with the growth of urbanism in the Jazira (Hole 1997; Kouchoukos 1998), whilst in the west the settlement expansion visible in the steppe occurred slightly later, in the EB IV (Table 8.1), coterminous with the maximum extent of Ebla (Geyer and Calvet 2001; Geyer et al. 2010). This may be related to concepts of risk and reward. Agriculture in the zone of uncertainty is by definition an inherently risky venture and, as I have shown above, remained a vital part of subsistence strategies in the steppe as a source of food for both human and animal consumption. These risks may have been too great for individual households or kinship groups to survive and it was not until the emergence of higher level institutions capable of bearing the losses accrued in dry years that settlement could develop further (Wilkinson et al. 2012). Evidence for a certain level of institutional involvement in urban developments within the zone of uncertainty comes from the structured pattern of many of the sites, particularly the citadel cities of the Middle Euphrates (Chapter 6), the round cities in the western steppe (Chapter 7), and possibly even the *kranzhugeln*.

The precise institutional formulations of the city-states in Northern Mesopotamia during this period remain unclear. Models of early urban polities range from those emphasising the corporate and heterarchical nature of social relations (Porter 2002a; 2002b; Stein 2004) to those which envisage a highly centralised society in which all power resided in the hands of a circumscribed elite (Weiss 1986; Weiss et al. 1993). Sitting between these two extremes is the Patrimonial Household Model proposed by Schloen (2001). Based on textual sources, Schloen argues that Mesopotamians conceived of their own society as a series of households, both real and metaphorical, with the house of the king or god as the overarching ideological symbol binding the entire society. This model is particularly applicable to Ebla (Schloen 2001; 283; Ur 2010b), in part due to the vast body of textual evidence available, and would have allowed for the integration of pastoral groups at different scales and spatial distances over time. Overall, however, it is difficult to say very much about the specifics of interaction between the inhabitants of the zone of uncertainty, the cities within that zone and those in the core areas. By the later third millennium we can infer from the textual sources of Tell Beydar and Ebla that a form of specialised pastoralism had emerged with what might be described as a commercial relationship to the larger third millennium centres, but how far this is representative of a wider trend remains a mystery. It is likely that a large part of the total pastoral economy was not directly linked to the management of flocks owned by urban based institutions or elites, but was rather composed of more independent individuals and groups trading in animals and finished products through other means.

The Decline of Sedentary Settlement in the Steppe

The decline of settlement in the zone of uncertainty, like its emergence, occurs at different times in different places. In the east, the *kranzugeln* and Middle Khabur sites are almost entirely abandoned by the beginning of the EJ IV (2400-2200B.C.) perhaps as a result of the disruption caused by the Akkadian invasion (Kouchoukos 1998). A second hypothesis is that the (semi-) sedentary pastoralists were replaced by fully mobile and nomadic groups leaving little archaeological traces in a process linked to the emergence of the Amorite identity (Wossink 2009). Finally, an abrupt climate change event may have caused settlement collapse across the region (Weiss et al. 1993; Weiss 1997). All three processes may have acted in some combination. In the Middle Euphrates and Western steppe, settlement decline was rather later, perhaps occurring in the early part of the MBA, but was similarly drastic. This argues against the climate change hypothesis since one would expect such a significant event to impact settlement across the region. In fact both Sweyhat and the sites of al-Rawda, Tell es-Sour and Tell Sh'eirat to the west of Homs reached their maximum size *during* the apparent climate event, and intriguingly after the destruction of Ebla (Zettler 1997c). It is possible that new polities grew up to service demand for textiles which had previously been satisfied by the monopolistic Eblaite state. These small-scale polities, in keeping with the boom and bust nature of settlement in the zone of uncertainty, were short-lived. By the Middle Bronze Age evidence from the Mari texts suggests a broad swath of central Syria, including the whole of the zone of uncertainty and parts of the western Jazira such as the TBS, was occupied by wide ranging pastoral groups (Lyonnet 2004; Wossink 2009; 115).

Hubs and Upstarts: Trajectories of Urbanism in the Late Chalcolithic and EBA

To sum up, we can discern three distinct trajectories of urban development and agglomeration during the fourth and third millennium. Beginning in the Late Chalcolithic, and possibly in the preceding Middle Chalcolithic/Ubaid in the eastern Jazira and Amuq, a network of small central 'hubs' emerged across Northern Mesopotamia and the Northern Levant. These centres developed over millennia within dense networks of subsistence villages and their location at control points in the landscape suggests they may have arisen as nodes in wider exchange networks relating to obsidian and precious metals. In the Jazira, three sites, Brak, Hamoukar and Hawa, reached far larger proportions during this period, but their form and lay-out suggests they are part of a fundamentally similar phenomenon to the smaller centres elsewhere in the region. Many of these small centres continued into the EBA, when a new form of rapidly expanding and contracting 'upstart' urbanism emerged in the Middle Euphrates, the zone of uncertainty and the Jazira. I have argued here that this new form was related to a boom in economic production brought about by the shift from flax to wool as the raw material for textile production, the resulting development of a new form of agro-pastoral subsistence, and institutions capable of organising it, as well as a huge increase in trade and exchange. The importance of access to the steppe during this period is highlighted by the absence of such centres from the northern part of Orontes Valley. In the Ghab and Amuq, access to the steppe was curtailed by upland areas of the Jebel an-Nusayriyah and Massif Calcaire. Settlements in this zone reached a ceiling of some 20 hectares in the EBA, only a small increase in the maximum size in the Late Chalcolithic, whilst the 100 hectare city of Ebla developed in the plain to the east.

Cities defined as "upstarts" can be categorised into two further groups. On the one hand, those that developed in the densely occupied core zones such as the Jazira through a reorganisation of settlement. Many of these sites, such as Hamoukar, Leilan and Mozan, were already substantial settlements in the Late Chalcolithic, but increased in size by an order of magnitude during the EBA. This rise in population was fuelled by a decline in rural populations in the surrounding area (see Chapter 6, Figure 6.20 and Figure 6.37 for FCP data on this trend for Tell Hamoukar and Tell Beydar). The second form of upstart occurred outside the previous cores and was concentrated in the Middle Euphrates and within or close to the zone of uncertainty. Here, boom and bust urban settlements were founded on trade routes and in areas which were very sparsely settled in the preceding periods (see Figure 5.18 and Figure 5.39 for FCP data examples related to Titriş and Sweyhat). There is strong evidence for centralised organisation in the planning of these cities, but whether they were founded under the direction of regional powers such as Ebla (Castel and Peltenburg 2007) or by local indigenous populations (Kouchoukos 1998) remains unclear. This system came to an end during the last third of the EBA and the beginning of the MBA. The destabilising effect of the Akkadian influence and changes in climate are both cited as possible factors in this decline, although the continued presence of settlement in the Sweyhat enclave and the Western Steppe argue against abrupt changes and mono-causal explanations. Local tensions between elites and wider populations may also have played a part (Pfälzner 2010), particularly as textile exchange and production may have been increasingly institutionalised to off-set the risks involved. Sedentary settlement continued in the densest areas of the Late Chalcolithic core zones, with significant increases in settlement visible in the NJS and Leilan regions. Long-lived hubs such as Samsat and Carchemish remained significant urban centres into the later Bronze, Iron and even Classical ages, whilst some sites which had begun as upstarts, such as Qatna, became hubs for later periods. The zone of uncertainty, however, did not support sedentary settlement again until the period of the later territorial empires during the second half of the Iron Age.

Long Term Settlement Trends in the Northern Fertile Crescent

The expansion and contraction of urban centres and settlement during the 4th and 3rd millennia is one cycle in the history of the Northern Fertile Crescent. Elucidating wider trends at a regional level is a legitimate research aim in itself, but also allows us to examine the relationship between processes of landscape formation and transformation in the archaeological record. Figure 8.6 compares the settlement density trends between the amalgamated sub-regional data discussed in Chapters 5-7. The Middle Euphrates includes the KHS, TS, LCP and SS data, although not the ULT (see Chapter 5), the Jazira includes the NJS, THS and TBS whilst Western Syria is comprised of the Orontes Valley surveys, the AS and SHR. Densities are calculated by summing the combined total occupied area of each set of surveys and dividing this figure by the combined surveyed areas in square kilometres (see Table 5.3 for the Middle Euphrates, Table 6.1 for the Jazira and Chapter 7, page 275 for Western Syria). The stable, dense settlement in the core zones of the Jazira and Orontes Valley during the Late Chalcolithic, EBA and MBA is clear. One can also see the extent to which the urban developments in the Middle Euphrates during the EBA represent a distinct shift from the preceding long term low levels of settlement, and that their decline resulted in a return to similarly low densities. During the period of the later territorial empires, a shift occurs in the relative settlement in the three sub-regions. In the Jazira, settlement fluctuated during the Iron Age, peaking in the Neo-Assyrian period, but was relatively low during the Classical Age. The west, in contrast, saw a massive explosion of settlement in the Hellenistic, Roman and Byzantine periods, at the same time as a second expansion into the western steppe (Geyer 2001; Geyer et al. 2007). In the Middle Euphrates, settlement densities increased in the Iron Age, although a good proportion of this is related to the growth at Carchemish which affects the figures for the whole region, before again expanding in the Late Roman and Byzantine periods.

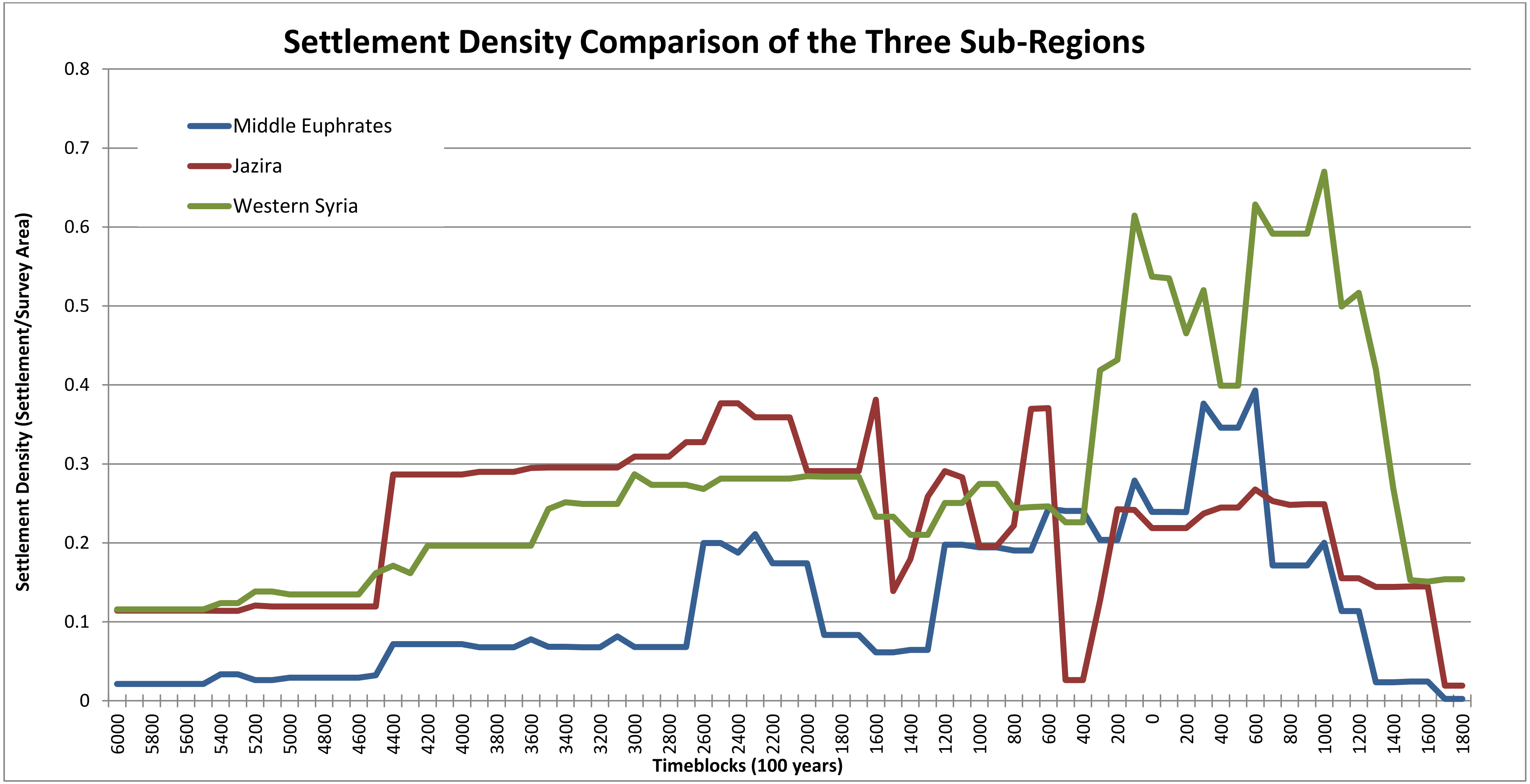
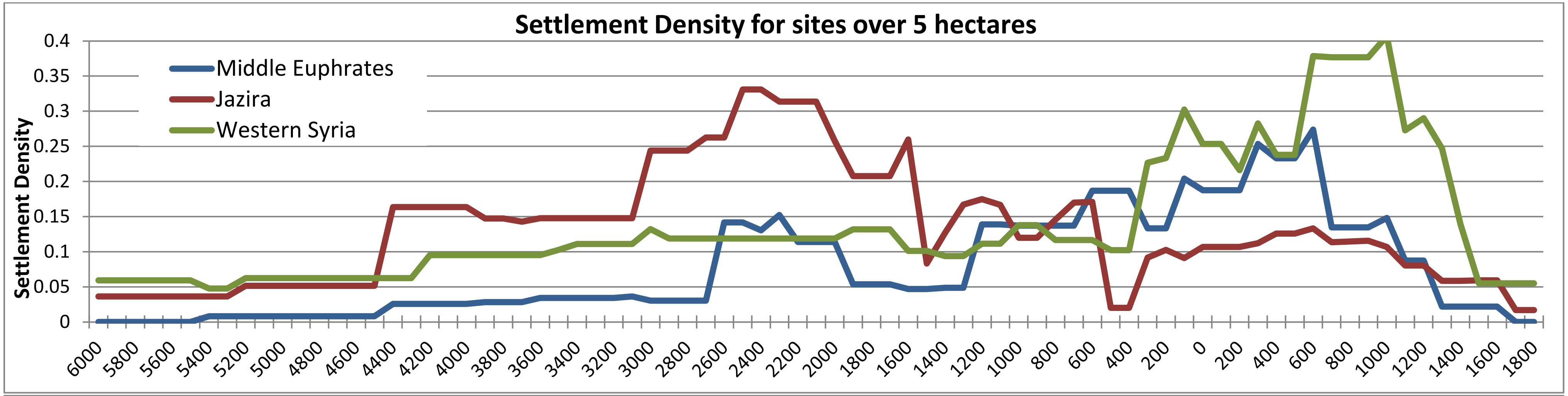


Figure 8.6: Settlement densities for the Middle Euphrates, Jazira and Western Syria Sub-Regions from 6000BC-1800AD



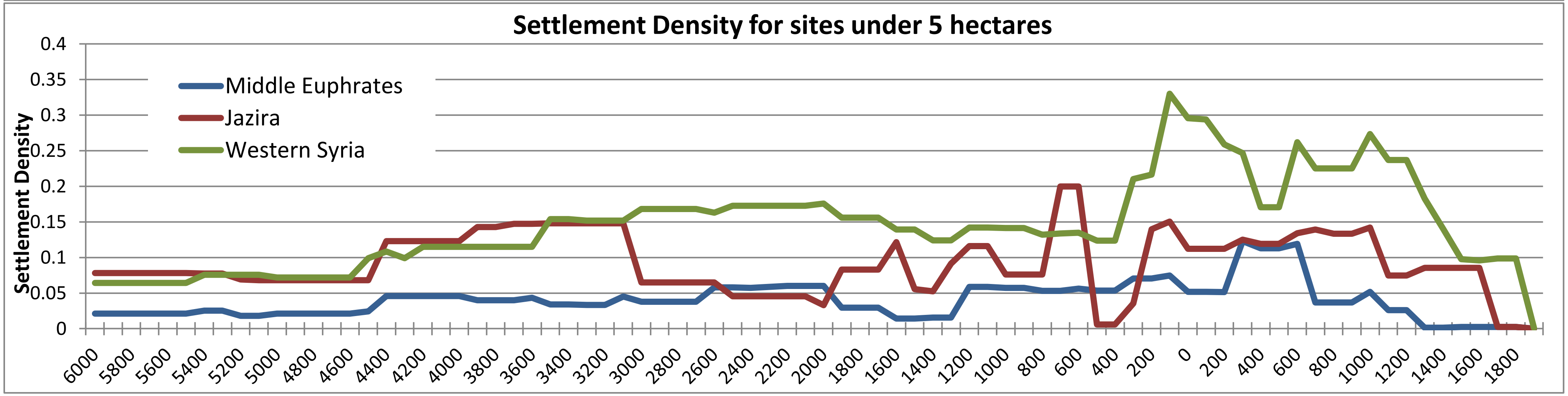


Figure 8.7: Comparative settlement densities for sites over 5 hectares and under 5 hectares in the Middle Euphrates, Jazira and Western Syria Sub-Regions from 6000BC-1800AD

Stability and the Role of the Small Tell

In contrast to the boom and bust nature of the urban developments, and also the medium sized sites in the Jazira and KHS-TS during the third millennium, small rural settlements show a remarkable continuity through time. This is visible in Figure 8.7, in which the total settlement densities given in Figure 8.6 are shown divided between sites which never exceed 5 hectares and sites which do. In the Middle Euphrates and the Western sub-regions there is relatively little change in total settlement in the smaller sites for almost 4000 years between the Late Chalcolithic and the end of the Iron Age. In the Jazira, a slight dip is visible during the EBA, reflecting the abandonment of the area between Hamoukar and Hawa in the NJS. The fluctuations visible in the larger sites are far greater, particularly in the EBA for the Middle Euphrates and the Jazira. As well as density comparison, we also have evidence for the stability of settlement patterns during a given or stipulated period. Figure 8.8 shows the percentage of sites in each survey which were newly founded divided by millennium, whilst Figure 8.9 shows the same data displayed by sub-region. This data is displayed in thousand year intervals due to the long term nature of the evidence and the chronological differences between the phases used in the individual surveys. Both datasets show a peak of new foundations in the 6th millennium B.C, followed by a long period of stability with few new sites founded during the 4th and 3rd millennia B.C, and a gradual rise during the later periods.

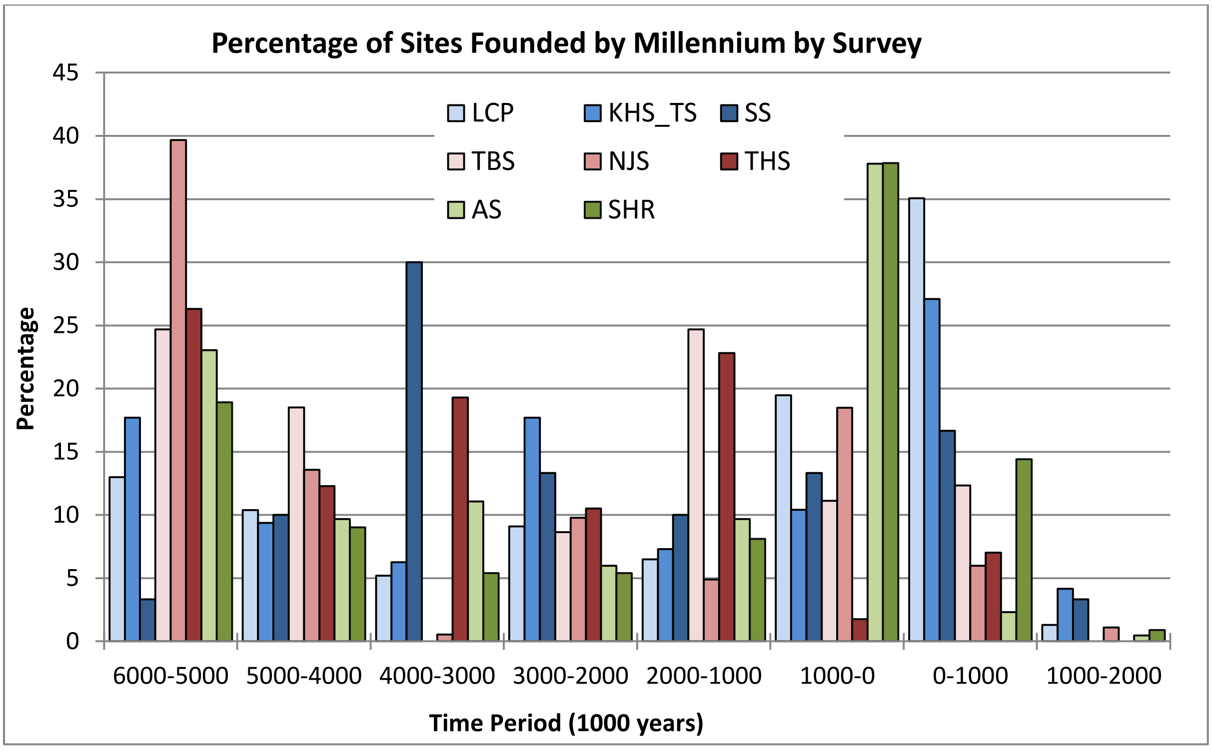


Figure 8.8: Percentage of Sites Founded by Millennium by Survey

Notable exceptions occur in the Middle Euphrates, with a peak in new foundations in the SS occurring towards the end of the 4th millennium when settlement expanded into the steppe, and a rise in the KHS-TS in the 3rd millennium as a result of a similar expansion into the area surrounding Titriş (Figure 8.8). The data for the THS is also rather more equivocal than that of the other surveys, and again this can be related to the relatively small size of the survey, resulting in individual sites having a greater effect on the figures. Given that this data is constructed using the chronological phases used in each survey, it could be argued that the seeming longevity of sites in the three sub-regions might be a reflection of the length of individual phases. Longer phases would result in the absence of trends within phases visible in other surveys which were able to make more sub-divisions. Although this is certainly a problem, and one which is very difficult to correct, we can investigate its effects to some degree by comparing the survey themselves.

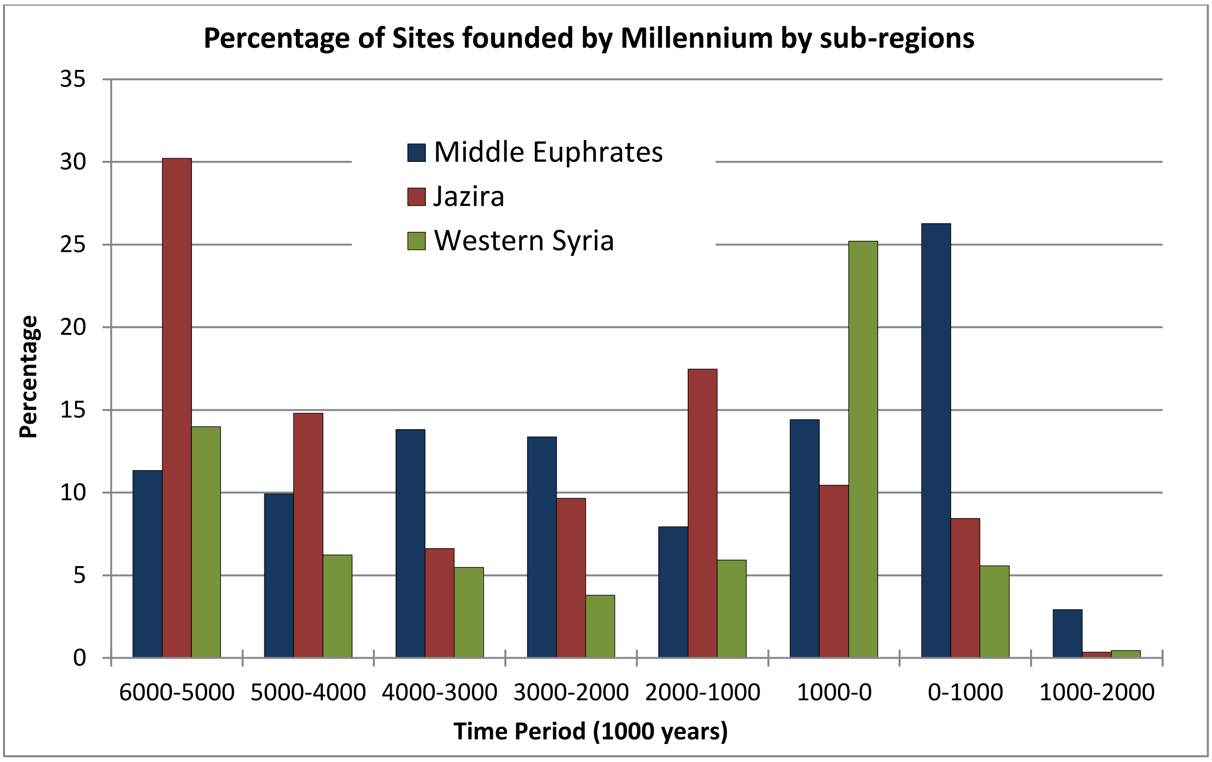


Figure 8.9: Percentage of Sites Founded by Millennium by Sub-Region

As shown in Chapter 4 (Table 4.2), the Western sub-region had far longer phases than the Jazira and Middle Euphrates, with the latter also having slightly shorter phases than the former. If the calculations of settlement longevity were related to phase length then we would expect sites in the West to be occupied for a longer period on average. However, as can be seen in Figure 8.10, the highest average settlement duration occurs in the KHS-TS and LCP, the two surveys with the lowest average phase length (Chapter 4, Table 4.2), suggesting the pattern of settlement continuity is real. The two Western surveys are next, with the Jazira surveys and the SS showing the lowest average settlement duration. The relatively short-lived settlement in the SS reflects its position within the zone of uncertainty and the resulting fairly rapid cycles of settlement expansion and contraction.

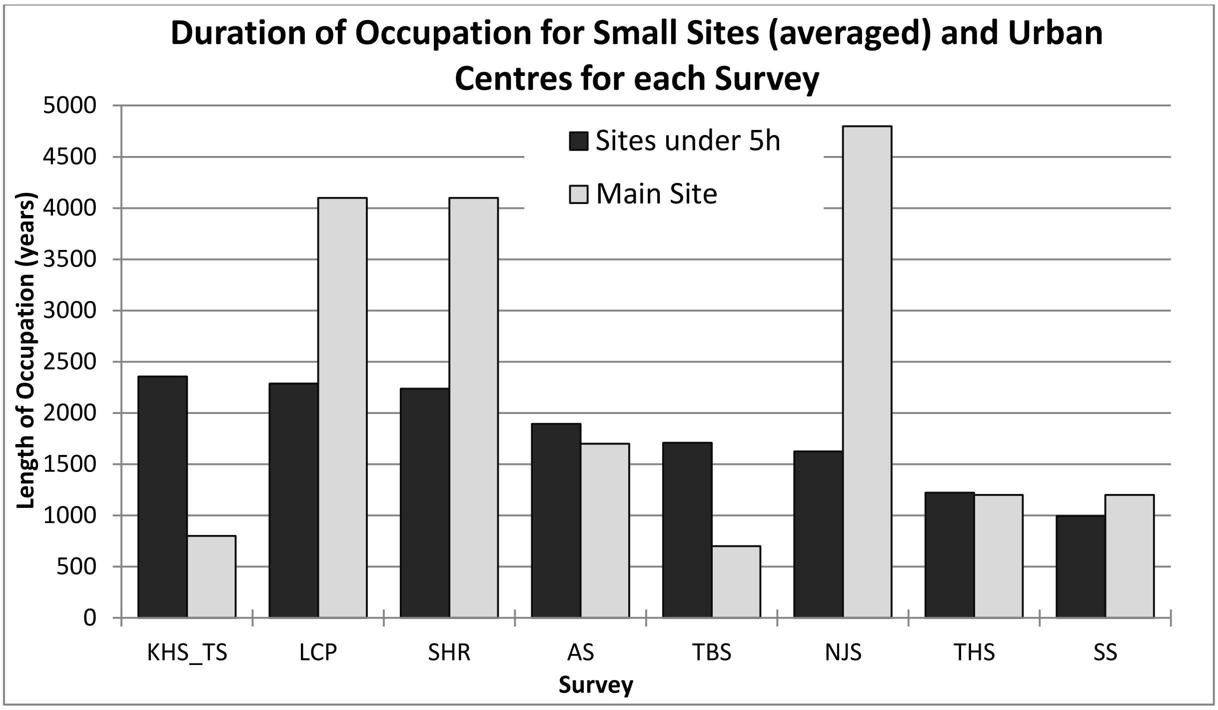


Figure 8.10: Duration of Occupation (years) of the Small Sites (averaged by survey) and the Urban Centres in each survey

Taken together, the density, settlement foundation and average duration of occupation data suggest the presence of an extraordinarily long-lived system of small scale stable occupation of a limited number of sites which developed over the 5th millennium and structured the landscape for the next 3-4000 years. It is this settlement pattern which resulted in the formation of the 'landscape of tells' visible across the region today (see Wilkinson 2003; Chapter 6). The longevity of this system suggests that the conditions under which it developed and was maintained held for a similarly long period. Recent scholarship on this subject has emphasised the structuring properties of land tenure and community relations in maintaining nucleated settlement (Archi 1990; Renger 1995; Wilkinson 2003; Casana 2003a; 2007; Wilkinson et al. 2012). Wilkinson (2010), for example, draws an analogy with the *musha'* systems which operated across the Middle East in the 19th century and perhaps earlier, in which agricultural land was organised communally by the village and assigned to individual farmers on a yearly basis, often through the drawing of lots. This practice discouraged village inhabitants from moving out into the surrounding area and also had important consequences for the maintenance of social relations and cohesive communities. Once founded, the prominence of tells within the landscape may also have led to the development of significant symbolic and social 'place-value' relating to cultural and collective memories, as has been argued for Eastern Europe (Chapman 1997) and the tell monuments at Tell Banat (Porter 2002a; 2002b). Textual sources from both Alalakh and Ebla demonstrate that villages and their agricultural lands were perceived as unified wholes for tax and land grant purposes (Casana 2007; Wilkinson 2010). Faunal remains from one such site, Gritille in the Samsat-Lidar sector of the Middle Euphrates, suggest a conservative culling strategy designed to maximise resilience (Stein

1987; 2005). This can be compared with that seen at the nearby site of Kurban Höyük, where prime age sheep and goat appear to be missing from the archaeological record and may have been exported to the local centre at Titriş (Wattenmaker 1987; 1998). It is possible that Kurban, at 6 hectares firmly in the second level of the three tiered hierarchy surrounding Titriş at this time, may have been more integrated into the local tribute providing economy, whilst Gritille retained a greater degree of autonomy and stability. This example provides a hint as to the relationship between the long term stable system of small sites predicated on low risk agricultural strategies and the fluctuating systems of the larger centres which engaged in high risk and high reward strategies resulting in cycles of expansion and contraction.

The Timing of the Great Dispersal

The structural transformation which resulted in the breakdown of the tell-based system of nucleated sites is visible across Northern Mesopotamia, as well as the Southern Levant (Marfoe 1979), and resulted in a spread of settlement across the landscape, termed 'The Great Dispersal' (Wilkinson 2003; Chapter 7). The settlement density and site foundation data detailed above (Figure 8.6 and Figure 8.9) demonstrate that the dispersal occurred first in the Jazira, during the Late Bronze Age and Iron Age and peaking in the Neo-Assyrian period, then in the West and the Middle Euphrates during the Hellenistic and Roman-Byzantine periods respectively[38]. Again, the causal mechanisms behind this dispersal, or perhaps these dispersals, remain somewhat obscure, especially since they must in part reflect a change in the conditions which produced tell landscapes which are themselves poorly understood. Changes in systems of land tenure may have played a role, especially the shift from communally owned land to private small holdings, as well as the influence of larger markets and long distance exchange networks (Casana 2003a; 2007). The significant reorganisation and dispersal of settlement which occurred during the Hellenistic and Roman periods across much of Western Syria and the Levant has been linked the granting of land to new settlers, particularly army veterans (De Giorgi 2007; 196), and new power structures and forces of political integration (Marfoe 1979). Evidence for both of these processes is visible in the practice of centuriation, in which large square land divisions of a certain size were imposed over the more ancient field systems, representing a complete break from the kinds of field patterns recorded before (Van Liere 1958-59). Whilst it has been argued that such impositions are largely untenable in the long term as their very foreignness means they rely on a strong and centralised kind of power (Wainwright and Thornes 2004), centuriated land divisions are still visible in field systems to the South-East of Homs in aerial photography dating to the 1950s (Van

[38] Although the Hellenistic period immediately precedes the Roman-Byzantine periods they fall into two separate millennia when displayed as in Figure 8.8 and Figure 8.9 (see Chapter 4), meaning the gap between the Western dispersal and the Middle Euphrates dispersal appears larger than it is. Given the uncertainties in the ceramic chronologies used and the timings of the settlement density changes visible in Figure 8.6 it is not unreasonable to assume a roughly coterminous expansion in the both areas, although there does appear to have been a further expansion in the Middle Euphrates a little later.

Liere 1958-59) and CORONA imagery of the mid-1960s, demonstrating their continued presence as a structuring principle in the landscape. There also appears to be a relationship between settlement dispersal and the development of large territorial empires. This has been linked to the practice of enforced resettlement of populations from outside the region and the desire to maximise agricultural productivity (Wilkinson et al. 2004; Ur 2010a; 163). Increased security may render nucleation for the purposes of defence superfluous, and in fact the break-up of centres which could be potential staging posts for political revolt is in the interests of the ruling elite. Linking dispersal to the levels of coercive power attained by the Later Territorial Empires can in part account for the east to west pattern seen across the FCP, with the Jazira incorporated into the Neo-Assyrian Imperial heartland far earlier than the West and the Middle Euphrates were conquered by the Seleucids and Romans. However, the beginnings of dispersal in the Jazira predate the rise of the Neo-Assyrians, whilst both the Western and Middle Euphrates sub-regions were incorporated into the Persian Empire before the Hellenistic-Roman period, suggesting other factors must have been involved. New technologies such as irrigation and water management systems, iron tools and terracing must also have played a role.

Landscape Transformations[39] and the Later Territorial Empires

The relative trajectories of the three sub-regions after the EBA have profound implications for the preservation of both sites and landscape features. In Chapter 2 I argued that by comparing and contrasting signature landscapes at a regional level, we could investigate the aspects of earlier landscape which have been lost. The signature landscape for the EBA is best represented in the Upper Khabur basin by the pattern of mounded sites surrounded by hollow ways and low density sherd scatters. This configuration was well preserved up to the industrialisation and mechanisation of agricultural practices in the second half of the 20th century. Hollow ways are clearly visible on CORONA imagery and older aerial photographs and some features are still occasionally visible even in the present day. This can be contrasted with the Middle Euphrates and Western sub-regions. Hollow ways are present in the Middle Euphrates and the Qoueik plain but are in general much rarer and more ephemeral the further west one goes, and are completely absent in the Amuq and SHR. Current understandings of hollow way formation processes emphasise the repeated movement of animals and people through constrained pathways between agricultural fields (Ur and Wilkinson 2008; Wilkinson et al. 2010; Ur 2010a). One would therefore expect hollow ways to be associated with long-lived tell-based settlement. However, as noted above, the 'landscape of tells' (Wilkinson 2003; 100) in the Jazira began to disperse at the end of the EBA, with settlement shifting to lower towns and flat sites (see Chapter 6). In contrast, the occupation of tells continued up until the Iron Age in the Middle Euphrates and the Hellenistic

[39] The present analysis deals only with pre-modern landscape transformation processes. The impact of more recent changes within the FCP is the subject of a forthcoming PhD dissertation by Emma Cunliffe

period in the Amuq and SHR (see Chapter 7). We can explain this disparity in three ways. Firstly, it may be that hollow ways never formed around tells in the west due to differences in environment or geomorphology. This seems unlikely given the presence of hollow ways in the Middle Euphrates (Wilkinson et al. 2004), the Qoueik plain and even in Khuzestan (Alizadeh et al. 2004), although it is certainly the case that the relationship between hollow way formation and specific soil types is not yet fully understood. A second explanation would be that the long duration of settlement at small tells resulted in gradual shifts in routes taken through the fields, meaning hollow ways would have gradually widened until they were indiscernible from the landscape itself. Whilst this is certainly possible, it remains unlikely since we can distinguish hollow ways at sites such as Brak which have probably been in use for millennia (Wilkinson et al. 2010). A third explanation is that landscape transformation processes associated with the high densities of settlement in the west resulted in the attenuation of the archaeological record in those areas.

The level of landscape change in the west during the Classical and Islamic periods was completely unprecedented anywhere in the northern Fertile Crescent. New forms of land tenure and agricultural intensification were introduced alongside irrigation and terracing technologies, whilst the spread of settlement meant that almost every part of the lowland landscape would have been within reach of cultivation, and therefore of ploughing. Furthermore, settlement expansion into the upland zones may have contributed to the erosional events discussed in Chapter 2. As mentioned above, processes of settlement dispersal occurred much earlier in the Jazira, beginning in the second millennium during the Late Bronze Age and peaking during first millennium in the Neo-Assyrian period (see Figure 8.8 and Figure 8.9). However, they did not have the same destructive effect. This may be related to the early date of the settlement peak and the relative density of settlement to that seen in the west. The Neo-Assyrians were clearly capable of large scale landscape projects, as evidenced by the highly complex canal systems around the capital cities at Nimrud and Khorsabad (Ur 2005). However, large scale imperial projects were only occasionally undertaken outside the imperial heartland and the traditional irrigation landscapes of southern Mesopotamia. It is the ubiquity of agricultural intensification and landscape transformation which makes the Roman-Byzantine occupation of western Syria so destructive to earlier features. During the Parthian, Sasanian and Early Islamic periods, equivalent to the Hellenistic, Roman, Byzantine and Early Islamic in the west, the Upper Khabur basin was far less densely settled than areas further to the west, whilst there was relatively limited investment in infrastructure compared to the large scale irrigation and agricultural projects visible in the Diyala region and Southern Mesopotamia more generally (Adams 1981). It is this distinction which has led to the incredible preservation of archaeological sites and features in the present day landscapes in the east in comparison to those in the Middle Euphrates and the west.

Chapter 9: Conclusion

Introduction

This study has attempted a regional scale comparative examination of changing patterns of settlement and landscape use in the Northern Fertile Crescent. I have argued that landscape survey data are particularly amenable to analyses of broad trends at very large spatial and temporal scales, and that the vast amount of data available, combined with recent advances in computers and other technologies, mean that such analyses are now possible, at least at a preliminary level. The project has demonstrated the challenges as well as the value of integrating various datasets, including those derived from landscape surveys, satellite imagery and cartographic sources, into a single interpretive framework. Through a multi-scalar examination involving individual surveys, sub-regions and at the regional level I have investigated settlement trajectories from the 5th to the 3rd millennium, proposed a model for the development of urban centres during the EBA and placed this development in a wider context of landscape change. In this concluding chapter I provide a brief summary of the principal conclusions of this study in relation to the aims set out in Chapter 1 and also suggest some avenues for future research.

Data Integrity and Scale

Recognising the sorts of patterns brought out in this thesis requires the integration of data from a variety of sources into a comparable framework. The datasets which result are often extremely large and incorporate a wide range of information collected in a variety of different ways. Dealing with these datasets presents a series of challenges. The amount of information involved requires the development of methods for retaining an understanding of data quality throughout the process of interpretation. Whilst one person may be able to hold in their mind information on all of the sites within an individual survey, it is not possible to retain the same level of detail for the thousands of sites recorded from survey, imagery and cartographic data across the Northern Fertile Crescent. In the FCP, we have sought to mitigate this problem through concepts such as 'certainty' and 'precision' which summarise the level of confidence assigned to a particular datum. Although clearly reductive, these concepts represent a pragmatic response to the sheer scale of the task at hand, as well as allowing for the comparison of data from different sources. This concern with both pragmatism and comparability is also present in the new ways of dealing with chronological phases developed in this thesis, including the percentage relevance and time block graphs. The percentage relevance system allows us to quantify the relationship between phases, whilst time blocks represent a powerful tool for recognising trends through time and space and circumventing differences in terminology. Combining these methods with the sorts of correction techniques developed for survey data by Dewar and others could provide further refinements to comparative models at a regional level. Overall, it is worth stressing that in the absence of these relatively simple methods it would not be possible to interrogate such a large amount of data.

Stability and Change from the 5th to the 3rd Millennium: The Fragile Crescent

Comparison of survey and excavation data across the Northern Fertile Crescent reveals a series of urbanisation processes during the 5th, 4th and 3rd millennium which vary over space and time. To some degree, the cycles of civilisation model proposed by Ur (2010b) for the Jazira holds for the other two sub-regions, the Middle Euphrates and Western Syria, with an initial expansion of settlement and development of centres during the Late Chalcolithic and Uruk periods, a general return to ruralisation and lower levels of complexity in the first half of the EBA and a second growth in the Middle and Late EBA which subsided in the last part of the 3rd millennium. However, there are some significant differences in local timings, the scale of the centres which developed and the impact these developments had on surrounding populations. In the east, very large sites appear fairly early within networks of small villages, with Tells Hamoukar, Brak and Hawa reaching at least 50 hectares prior to the 'Uruk expansion' and the latter two attaining a considerable mass as well. In the Middle Euphrates and the West major centres such as Samsat Höyük, Tell Hammam et-Turkman, Tell Imar, and Tell Qarqur are also visible in densely populated basins but seem to have reached a ceiling in terms of size of between 15 and 20 hectares. Where excavated, these centres reveal evidence for social complexity, including monumental architecture, city walls and evidence for sealing practices, in periods which predate the arrival of Uruk ceramics and, by inference, significant interaction with Southern Mesopotamia. The Uruk expansion itself had clearly varying impacts in different areas, with the Western sub-region and the western Jazira experiencing very low levels of interaction, at least as far as can be inferred the amounts of southern pottery visible. We can be more confident of significant Uruk 'contact' in the eastern Jazira and the Middle Euphrates but the precise forms this took, and the changes which may have occurred over the roughly 600 year period, are at present difficult to interpret. It is increasingly clear, however, that Uruk ceramic traditions did not completely replace local Late Chalcolithic assemblages, and therefore that some proportion of the sites with wholly local assemblages may have continued to be occupied into the second half of the 4th millennium.

The decline in complexity posited for the Early EBA is most clear in the Jazira, and it seems likely that in the Middle Euphrates and the West many of the smaller Late Chalcolithic hubs continued to be important local centres. By the middle of the EBA, new centres were emerging across the region. Again, there are marked differences between the three sub-regions. In the Jazira, the largest sites reached between 100 and 120 hectares and sat at the top of settlement hierarchies of three or more tiers. In the Middle Euphrates, a new form of large urban settlement, the citadel city, emerged, with sites such as Tell es-Sweyhat, Tell Hadidi, Carchemish and Titriş Höyük reaching between 40 and 50 hectares, whilst in the Orontes Valley there appears to have been a ceiling close to that of the Late Chalcolithic level, with only one site, Tell 'Acharneh in the Ghab, likely to have been larger than 20 hectares. Cross-cutting the trajectories visible at a sub-regional level there is a region-wide pattern of increased settlement in the steppe 'zone of uncertainty' over the course of the EBA, along with reorganisation and intensification of land-use in the 'zones of stability'. The timing of this expansion in the three sub-regions appears to correlate with the growth and maximum extent of urbanisation. Settlement first developed along the Middle Khabur, followed by the *kranzhugeln a*nd Middle Euphrates sites during the middle part of the EBA and finally the expansion of settlement recorded by Geyer and colleagues to the south and east of Ebla (Geyer and Calvet 2001; Geyer et al. 2007). I have argued in this study that a combination of factors, including the shift from flax to wool as the raw material used in the production of textiles, the domestication of equids and the development of social institutions capable of bearing risks at a large scale, provided both the incentive and the means for this expansion of occupation into this steppe zone, and that this in turn had profound transformative effects on the societies of the region as a whole. The emergence of specialised herders attested in the earliest textual sources may have led to increased social differentiation in both class and gender roles, whilst the new opportunities for trade and exchange afforded by lightweight and durable textiles and other secondary products, as well as the simple fact that larger areas were brought into the productive sphere, would have resulted in an economic boom. Such an interpretation helps to explain the different patterns visible in the east and west, since the Jazira and Middle Euphrates benefited from far easier access to the zone of uncertainty than the sites within the Orontes Valley which were constrained by the uplands in the north and rainfall patterns resulting in a far narrower zone of uncertainty in the south. Thus the only large city certain to have existed in the west during the EBA was Ebla, situated to the east of the mountains and on the very edge of the zone of uncertainty.

The decline in this system can be explained as the result of inherent tensions within it. Settlement in the zone of uncertainty was by definition a risky venture and would have been severely impacted by even very small climatic events, anthropogenic deterioration through practices such as overgrazing and changes in the overall political economy. The reliance on the mitigation of risk by institutions necessitated strong elites, usually based in cities, capable of maintaining control, at the same time as increasing economic specialisation and the physical separation of different parts of society in the landscape would have promoted local autonomy. Finally, political instability as a result of increased competition between nascent states may have played a role. The textual and archaeological evidence for the conflict between Ebla and Mari and the subsequent Akkadian expansion, along with the destruction layers at Brak and Hamoukar, provide evidence for high level conflicts towards the end of the 3rd millennium which must have caused disruption in trade and exchange networks, weakened the ability of elites to maintain control and impacted the daily lives of both urban and rural populations. Some combination of these factors appears to have led to the demise of the fragile system of EBA urbanism by the end of the 3rd millennium.

The interpretations advanced here are of necessity provisional, and there are a number of avenues which merit further research. Obviously more excavations and surveys of a wide variety of sites and landscapes, as well as more localised environmental data, would allow the proposed model to be tested more rigorously. There is also a pressing need, particularly in the west, for the development of more sensitive ceramic chronologies capable of providing the temporal resolution needed to answer questions on a human time-scale. Such chronologies may be applied in surveys but can only be generated through the sequencing of ceramic material excavated from multi-period sites in combination with radiometric dating programmes. In terms of survey, the investigation of more diverse types of landscape, such as the basalt zone in the SHR, may provide further information which can be incorporated into the model. One might expect the push into the zone of uncertainty to result in declines in the use of upland landscapes as localised small scale herding gave way to specialised stock raising at an industrial scale. This can be discerned to some extent in the SHR (Philip and Bradbury 2010), and should be visible in other areas. Similarly, it would be useful to make further comparisons with the trajectories of settlement in the wider Fertile Crescent, particularly the Southern Levant and perhaps also northern Iraq. On the basis of similar climatic and topographic features, we can assume that these areas would themselves have had different levels of access to steppe landscapes comparable to the zone of uncertainty and may have been drawn into similar systems. The relatively narrow zone of uncertainty available in the Southern Levant, for example, may explain the small size of the largest centres there and the decline in settlement at the end of the EB III, at the same time as settlements were expanding to the north. On a more theoretical level, the relationship between risk, institutions and subsistence practices is worthy of more consideration. Although it is difficult to envisage how such interconnections might be investigated archaeologically, there is a wealth of data relating to modern pastoral and agricultural groups operating in marginal environments which I have only touched upon in this thesis and which may provide further potential analogies to past situations.

Landscape Transformations and Structural Transformations

A central conclusion of this study is that the preservation of sites and features across the Northern Fertile Crescent shows clear variability, and that this can be related to long term settlement histories. Understanding the relationship between signature landscapes and the processes which may have erased the sites and features within them requires an understanding of the structural transformations which brought about landscape change. I have argued that we can identify and describe a signature landscape for the EBA which includes mounded sites, multiple hollow ways and low density sherd scatter, but that this landscape only exists in the present day in parts of the Upper Khabur basin. How far this combination can be posited to have existed in the past across the entire region is unknown but traces of hollow ways are visible across the Middle Euphrates and in the Qoueik plain and sherd scatters have been recorded at a number of sites including Sweyhat and Titriş Höyük. The EBA landscape represents the apotheosis of an incredibly durable network of evenly spaced small tells which developed in the stable core zones during the Chalcolithic period, and even earlier in areas such as the LCP, and survived for several thousand years almost unchanged. The breakdown of these systems into more dispersed settlement patterns shows some variation, occurring first in the Jazira during the Late Bronze and Iron Ages, then in the Middle Euphrates during the later Iron Age and Classical periods and finally in the West. If we understand the processes of landscape attenuation to begin when a structural transformation occurs, such that the new forms of occupation begin to obliterate the old, one would expect the Jazira to have the fewest traces of the EBA signature landscape, since the shift to a dispersed pattern happened far earlier there than in the Middle Euphrates and in the West. However, the evidence suggests there has been greater attenuation in the west than the east, with no clear hollow ways or sherd scatters and fewer mounded sites in the Orontes Valley. I have attributed this pattern to the differential impact of the Later Territorial Empires, and particularly the contrast between the Hellenistic, Roman, Byzantine and Early Islamic occupations in the west and the Parthian, Sasanian and Early Islamic occupations in the east. The density and level of dispersal of settlement in the west was far greater than that seen in the east during this period and in fact represents the peak of settlement anywhere across the region before the present day. Settlement also spread into upland areas and the steppe. As a result, almost the entire lowland landscape would have been ploughed, whilst the removal of vegetation from upland areas probably accelerated aggradation and alluvial deposition in the valleys. In contrast, the Jazira was relatively sparsely settled after the Neo-Assyrian period and the flat topography of the plain prevented widespread alluvial reworking or significant deposition.

Two of the most obvious areas for future research in the understanding of millennial landscape change which have emerged from this thesis relate to the incredible long term stability of the small tell sites and the reasons behind the differences in the timing of the so called 'Great Dispersal' (Wilkinson 2003). These two research areas are interrelated, since the structural transformation which resulted in the dispersed landscapes must be seen as the result of a breakdown of the socio-economic system which had promoted tell-based settlement. At the present time, we are adept at recognising these patterns of landscape change but are rather less able to explain them. This is partly due to the nature of the evidence. Our understanding of the day-to-day workings of small tells is hampered by the lack of excavations, in part a reflection of the long recognised bias in Near Eastern archaeology towards investigations of the largest sites

(Schwartz and Falconer 1994). The small tells which have been excavated may not be entirely representative of the settlement type for a variety of reasons. Rescue projects in advance of the construction of hydro-electric dams have created a bias in our sample towards sites associated with major rivers. Other sites, such as Jerablus Tahtani or Tell Hadji Ibrahim, are situated very close to settlements which became major centres (Carchemish and Tell es-Sweyhat respectively), a proximity which may have effected their development. Excavations of the sorts of small conical tells visible across the zone of stability through satellite imagery and in the field are sorely lacking, and could add much to our understanding of this phenomenon. The relationships between communal social organisation, land tenure practices and settlement structures seem to be a productive area of research, along with ideas of path dependency and 'place value'. The correlation between the Later Territorial Empires and a dispersed landscape pattern is also worth examining, especially given the contrasting fortunes of areas under the control of different empires for similar periods of time.

Towards a Multi-scalar Comparative Archaeology

This thesis has demonstrated that regional scale analysis is both possible and productive. Phenomena such as the incursion into the zone of uncertainty during the EBA or the sequential timing of the Great Dispersal are simply not visible at the level of individual surveys, let alone sites, and yet both provide evidence for socio-political changes which must have had profound effects on the lives of past populations. Landscape archaeology, with its long term perspective and overtly spatial approach, is in a unique position to investigate processes which operate at a regional scale, especially when combined with the prospection and visualisation powers of satellite imagery and GIS. However, the generation of regional scale interpretations and archaeological narratives requires both new methods and new theories. Despite the invocations of Alcock and Cherry in the quotation which began this thesis, there have been remarkably few attempts to develop methods for the integration of data from disparate survey datasets, let alone incorporate satellite imagery. This is still disappointing. More generally, there is a need for archaeology to develop its own theories on the relationships between the scales at which social phenomena can be observed. Landscapes are the products of the actions of individual agents on their environments and yet patterns may emerge within them which hold over vast areas for many thousands of years. Our explanations for change in the past must reflect this tension between the local and the regional across both time and space.

Appendix 1: Comparison of areas for sites with dimension data and GIS polygon data in the LCP (see Chapter 3)

Site (Major ID)	Area from GIS	Area from Length and Width Ellipse Calculation	GIS - Elipse (Difference)
LCP_11_0_0	0.57	0.50	0.07
LCP_12_0_0	0.06	0.04	0.02
LCP_13_0_0	0.52	0.50	0.02
LCP_14_1_0	0.22	0.19	0.03
LCP_14_2_0	0.16	0.13	0.03
LCP_15_0_0	0.82	0.79	0.03
LCP_16_0_0	2.45	1.30	1.15
LCP_17_0_0	0.45	0.24	0.21
LCP_20_0_0	0.14	0.14	0.00
LCP_23_0_0	0.64	1.30	-0.66
LCP_24_0_0	1.12	0.38	0.74
LCP_26_0_0	0.45	0.28	0.17
LCP_27_0_0	0.28	0.27	0.01
LCP_28_0_0	0.71	0.69	0.02
LCP_29_0_0	1.34	1.01	0.33
LCP_30_0_0	0.15	0.12	0.03
LCP_31_0_0	0.52	0.82	-0.30
LCP_32_0_0	0.03	0.02	0.01
LCP_33_0_0	0.12	0.06	0.06
LCP_34_0_0	0.2	0.16	0.04
LCP_35_0_0	1.73	1.77	-0.04
LCP_36_0_0	0.24	0.12	0.12
LCP_37_0_0	2.84	1.32	1.52
LCP_38_0_0	0.69	0.64	0.05
LCP_39_0_0	0.68	0.64	0.04
LCP_4_0_0	1.74	0.59	1.15
LCP_40_0_0	0.46	0.20	0.26
LCP_41_0_0	0.88	0.77	0.11
LCP_42_0_0	0.39	0.31	0.08
LCP_43_0_0	0.23	0.20	0.03
LCP_45_0_0	0.32	0.24	0.08
LCP_48_0_0	0.22	0.13	0.09
LCP_49_0_0	0.15	0.03	0.12
LCP_5_0_0	0.97	0.88	0.09
LCP_51_0_0	1.26	1.16	0.10
LCP_52_0_0	3.41	3.92	-0.51
LCP_53_1_0	2.32	0.99	1.33
LCP_54_1_0	0.09	0.13	-0.04
LCP_54_2_0	0.32	0.35	-0.03
LCP_55_1_0	0.14	0.08	0.06
LCP_56_0_0	0.3	0.44	-0.14
LCP_57_0_0	0.18	0.16	0.02

LCP_58_0_0	0.24	0.13	0.11
LCP_59_0_0	0.47	0.95	-0.48
LCP_6_0_0	2.97	1.77	1.20
LCP_62_0_0	11.78	9.33	2.45
LCP_64_0_0	0.45	0.39	0.06
LCP_65_1_0	2.45	1.57	0.88
LCP_66_0_0	0.58	0.32	0.26
LCP_69_0_0	0.67	0.86	-0.19
LCP_70_0_0	0.31	0.14	0.17
LCP_73_0_0	0.58	0.55	0.03
LCP_74_0_0	0.38	0.38	0.00
LCP_75_0_0	2.37	2.42	-0.05
LCP_76_0_0	0.42	0.42	0.00
LCP_77_0_0	5.66	6.15	-0.49
LCP_8_0_0	0.79	0.82	-0.03
Average	**1.06**	**0.88**	**0.18**

Appendix 2: Glossary of Terms for Categories, Data Sources and Unique Data Types used in the FCP database (see Chapter 3)

Glossary of Terms for Categories

Category	Definition	Example
Current Landcover	Observed physical cover on the earth's surface (FAO definition). Current is defined as when the record was made	Low Scrub
Current Landuse	Observed utilisation of spatial unit when the observation was made	Pasture
Error	Record to indicate that the data contains an error which has been recognised and now ammended	
Geology	Background lithology of the area in most cases this is recording the surface lithology and NOT the geological age or sub-strata	Basalt/Limestone
Geomorphological Context	Topographical and environmental siutuation of spatial unit. This context is a result of land formation processes (i.e. The formation of river terraces) which may or may not be on-going	Slope, River Terrace, Alluvial Fan
GIS Modification	Record to indicate that a change has been made in the GIS. Recorded to retain data change	
Interpretation	Thoughts we have about the attributes of the spatial unit i.e. How sure we are about the archaeological significance/boundary/archaeological function	Certainties
Literature Reference	Indication that the spatial unit has been described or mentioned in a written source	
Map Feature	Spatial unit appears on map/legend as distinctive feature	Placename, Enclosure, Antiquity symbol
Non-Site	Indicates that the unit has been assessed as having no archaeological relevance	
Object Data	Records associated with any type of artefactual data i.e. pottery	Pottery (Diagnostic), Metal
Off Site Feature	Information about an archaeological entity recorded off-site i.e. An installation on the side of the road	Altar(s), Press Weight (Unclassified)
Photography	Any records where a photographic image has been taken (i.e. non-satellite imagery)	Photograph (Site), Photograph (Object)
Postdepositional Impact	Records the affects of any post-occupation activity (i.e. recent) at a site	Animal Disturbance, Bulldozing
Site Feature	Information about an archaeological entity recorded at a site	Tell or Mounded Structure, Cairn(s), Soil Colour Difference
Site Morphology	Description of the physical attributes of a site i.e. Shape and size	Dimensions, Blocky, Round
Soils (Off-Site)	Information about the soils from non-site contexts	Clay, Loam, Silt
Soils (On-Site)	Information about the soils from site contexts	Clay, Loam, Silt
Survey Methodology	Records the ways in which the site has been surveyed (both in the field and desk based)	Desk Based Assessment, Field Walking, GPS Mapping (Site Extent)
Typology	Old Category retained as back-up. Not to be used	Khirba

(Redundant)		

Glossary of Terms for Data Sources

Data Source	Definition
ARB Satellite Geology	Geology defined by A Beck from satellite imagery
Bell (Unspecified)	Getrude Bell Report/Literature
Bonacossi (Report)	Any report produced by Bonacossi et al. On the Qatna region
Corona Mission 1107 (1969)	Corona Satellite Imagery including year produced
Corona Mission 1108 (1969)	Corona Satellite Imagery including year produced
Corona Mission 1110 (1970)	Corona Satellite Imagery including year produced
Corona Mission 1111 (1970)	Corona Satellite Imagery including year produced
FCP Interpretation	Interpretation made by members of the FCP Team
Fortin (Report)	Any report produced by Fortin et al. On the Ghab region
French Maps 1:50k (1933)	Maps produced by the French in 1933
Google Earth (DigitalGlobe Dec 2004)	Google Earth imagery including year produced and sensor of imagery
Google Earth (DigitalGlobe June 2008)	Google Earth imagery including year produced and sensor of imagery
Google Earth (DigitalGlobe May 2003)	Google Earth imagery including year produced and sensor of imagery
Google Earth (DigitalGlobe May 2004)	Google Earth imagery including year produced and sensor of imagery
Google Earth (DigitalGlobe Sept 2003)	Google Earth imagery including year produced and sensor of imagery
Google Earth (DigitalGlobe Sept 2006)	Google Earth imagery including year produced and sensor of imagery
Google Earth (GeoEye July 2009)	Google Earth imagery including year produced and sensor of imagery
Google Earth (GeoEye June 2010)	Google Earth imagery including year produced and sensor of imagery
Google Earth (SPOT Dec 2004)	Google Earth imagery including year produced and sensor of imagery
Google Earth (SPOT Oct 2004)	Google Earth imagery including year produced and sensor of imagery
Google Earth (unspecified)	Google Earth imagery including year produced and sensor of imagery
Hole (Reports)	Any report produced by Hole et al. On the Jezirah (Jebel Abd'al Aziz) region
Ibanez (Reports)	Any report produced by Ibanez et al. On the western Homs region
Ikonos Multispectral (2002)	Ikonos Imagery including pan-sharpened
Ikonos Panchromatic (2002)	Ikonos Imagery including pan-sharpened
Ikonos Pan-sharpened (2002)	Ikonos Imagery including pan-sharpened
Iwasaki (Report)	Any report produced by Iwasaki et al. On the Rouj region
JAA (Field Visit)	Jebel Abd'al Aziz field visit
KH7 Imagery (1966)	KH7 Imagery including year produced
KHS (Field Visit)	Kurban Hoyuk Survey field visit
King (Reference)	Geoff King reports on Homs Citadel
Kouchoukos (Report)	Any report produced by Kouchoukos et al. On the

	Southern Jazira region
Kudlek (Database	Database of Kudlek et al. On the Western Jazira region
Landsat ETM (14 Jan 2000)	Landsat imagery including year produced and sensor of imagery
LCP (Field Visit)	Land of Carchemish Survey Field Visit
Major_ID GIS	Record of changes to GIS Shapefile
Maqdissi (Reference)	Any report produced by Maqdissi et al. On the Southern Central Syria region
Marfoe (Report)	Any report produced by Marfoe et al. On the Beqaa Valley region
Multiple Data Sources	Data obtained from a variety of data sources
NJS (Field Visit)	North Jazira Survey Field Visit
No evidence	No data collected
Ottoman Maps 1:100k (1932)	Maps produced by the Ottomans in 1932
Pruss (Database)	Database of Pruss et al. On the Western Jazira region
Pruss (Report)	Any report produced by Pruss et al. On the Western Jazira region
Russian Aerial Photographs	Russian Aerial Photographs
Russian Maps (MORE DETAIL)	Maps produced by the Russians (PROVENANCE)
SHR (Database)	Homs Survey Database
SHR (Field Visit)	Homs Survey Field Visit
SHR (Unspecified)	Unattributed Data from Homs survey
SHR Interpretation	Interpretation made by members of the SHR Team
SS (Field Visit)	Upper Lake Tabqa Survey (Sweyaht Survey) Field Visit
Syrian Maps 1:25k	Map produced by the Syrians (Scale)
Syrian Maps 1:50k	Map produced by the Syrians (Scale)
T (Field Visit)	Tabqa Survey Field Visit
TCH (Field Visit)	Tell Chuera Survey Field Visit
Thalmann (Reports)	Any report produced by Thalman et al. On the Akkar region
TS (Field Visit)	Titrish Hoyuk Survey Field Visit
Unspecified	Unspecified Data Source
Vanishing Landscapes	Data collected by the Vanishing Landscape team
Yener (Reports)	Any report produced by Yener et al. On the Amuq region

Glossary of Terms for Unique Data Types

Unique Data Type (Category: Data Type)	Definition
Unique Data Type	Definition
Current Landcover : Bare Tell	Tell with limited/no vegetation cover
Current Landcover : Low Scrub	Low cover of wild vegetation
Current Landcover : Water Body	Lake, Pond, River, Wadi
Current Landuse : Arable	Unclassified Cereal Cultivation
Current Landuse : Buildings (Modern)	Modern Buildings
Current Landuse : Dam	Dam
Current Landuse : Dry Arable	Dry Farming Cereal Cultivation
Current Landuse : Fallow	Formerly Cultivated Land
Current Landuse : Fruit/Olive Grove	Fruit or Olive Trees
Current Landuse : General Agricultural Use	Unspecified Agricultural Use
Current Landuse : Grazing (Unclassified)	Unspecified land for animals
Current Landuse : Horticulture	Gardens: Legumes and other vegetables, small holdings

Current Landuse : Military Use	Military Base or installation
Current Landuse : Modern Graves	Modern burial area
Current Landuse : Modern Settlement	Modern buildings currently used for occupation. i.e. An occupied Village
Current Landuse : Modern Structure(s)	Modern buildings which may or may not be occupied by people
Current Landuse : Orchard (Unspecified)	Cultivated edible tree crops
Current Landuse : Rough Grazing	Rough scrub land for animals
Current Landuse : Tree Plantation (non-edible)	Cultivated non-edible tree crops e.g. Conifer, Eucalyptus
Current Landuse : Unploughed	Formerly cultivated land not currently ploughed
Geology : Basalt	Basalt lithology
Geology : Basalt: Poorly drained	Water retaining Basalt lithology (Soils)
Geology : Basalt: Well drained	Free draining Basalt lithology (Soils)
Geology : Limestone	Limetone Lithology
Geology : Marl (Unspecified)	Marl Soils (Unspecified location)
Geology : Marl/Wadi Silts	Wadi Silts in Marl Soils
Geology : Marl: Irrigated Northern	Irrigated Marl Soils (SHR Northern Survey Area)
Geology : Marl: Irrigated Southern	Irrigated Marl Soils (SHR Southern Survey Area)
Geology : Marl: Northern	Marl Soils (SHR Northern Survey Area)
Geology : Marl: Southern	Marl Soils (SHR Southern Survey Area)
Geology : Marl: Thick Southern	Deep Marl Soils (SHR Southern Survey Area)
Geology : Marl: Thin Southern	Shallow Marl (SHR Southern Survey Area)
Geology : Unclassified	Holding Recor, Unspecified Geology
Geomorphological Context : Alluvial Fan	Fanned alluvial deposits from river/wadi
Geomorphological Context : Alluvial Plain	Plain of alluvial deposits
Geomorphological Context : Alluvium	Alluvial sediment
Geomorphological Context : Bluffs	Steep headland
Geomorphological Context : Cliff Top	Cliff top
Geomorphological Context : Comments	Comments on the Geomorphology
Geomorphological Context : Degrading Outcrop	Eroding/weathered stone outcrops
Geomorphological Context : Flat (Topography)	Flat ground
Geomorphological Context : Flood Plain	Flood plain of river/wadi
Geomorphological Context : High Spur	High promontory of land
Geomorphological Context : Hill	Slopes of bounded rise (i.e. Hill)
Geomorphological Context : Hilltop	Summit of bounded rise (i.e. Hilltop)
Geomorphological Context : Lake Edge	Next to lake
Geomorphological Context : Low Rise	Slightly raised area in relation to surrounding landscape
Geomorphological Context : Low Spur	Low promontory of land
Geomorphological Context : Lower Slope	Lower slope of raised area (inc. Hill, ridge etc.)
Geomorphological Context : Middle Slope	Middle slope of raised area (inc. Hill, ridge etc.)
Geomorphological Context : Plain (Unclassified)	Open fairly flat relatively smooth land. No further details.
Geomorphological Context : Plateau	High tabular plain (i.e. like a table-top)
Geomorphological Context : Ridge	Elongated raised area
Geomorphological Context : River Terrace	Step of land formerly adjacent to river. Relic of former flood plain.
Geomorphological Context : Slope	Land with demonstrable gradient
Geomorphological Context : Spur (Unclassified)	Promontory of land. No further details
Geomorphological Context : Swales	Low-lying land between ridges

Geomorphological Context : Terrace	Step of land adjacent. Unknown origin.
Geomorphological Context : Upland	Large area of raised land
Geomorphological Context : Upper Slope	Upper slope of raised area (inc. Hill, ridge etc.)
Geomorphological Context : Valley (Unclassified)	Elongated depression which may or may not contain a water source (ie. River, spring, wadi). No further details
Geomorphological Context : Valley Bottom	Flat area at base of Valley
Geomorphological Context : Wadi Bottom/Banks	Channel and adjacent banks of wadi
Geomorphological Context : Wadi Fan	Fanned deposits from wadi
Geomorphological Context : Wadi Terrace	Step of land formerly adjacent to wadi. Relic of former flood plain.
GIS Modification : Comments	Comments on any GIS Modification which has been made to spatial unit corresponding to given Major ID
GIS Modification : Desk Based Assessment	Record to indicate that an assessment has been made concerning the GIS Modification
GIS Modification : Error	Records that there is an error with the spatial GIS unit corresponding to the given Major ID
GIS Modification : EX_BONACOSSI	Old Bonacossi Site Reference recorded here as reference/back-up record
GIS Modification : EX_IBANEZ	Old Ibanez Site Reference recorded here as reference/back-up record
GIS Modification : EX_YENER	Old Yener Site Reference recorded here as reference/back-up record
GIS Modification : FORTIN_NO_NUMBERS	Old Fortin Site Reference recorded here as reference/back-up record
GIS Modification : NEW	Record that a new site has been addded to the GIS layers
GIS Modification : SHR_CHANGE	Record that a change has been made to a SHR GIS Shapefile
GIS Modification : Unclassified	Record that a change has been made to the GIS Shapefile
GIS Modification : UPDATE 0_0	Record that indicates a change has taken place with the Major ID (i.e. The unit has been renumbered)
Interpretation : Archaeological Significance	Level of confidence that the spartal unit is of archaeological interest (i.e. Not modern of natural) (See DL Methods). Definite, High, Medium, Low, Negligable, Non-Site
Interpretation : Boundary Certainty	Level of confidence that the GIS polygon reflects the intended boundary of the spatial unit (See DL Methods). Definite, High, Medium, Low, Negligable
Interpretation : Geographical Precision	Level of confidence that the GIS polygon reflects the intended location of the spatial unit (See DL Methods). Definite, High, Medium, Low, Negligable
Interpretation : No Supporting Evidence	Record to show changed (downgrading to non-site) interpretation based on further investigation
Interpretation : Overall Site Certainty	Overall level of confidence reflecting a combination of boundary certainty, geographical

	precision and archaeological significance. Definite, High, Medium, Low, Negligable
Interpretation : Preservation Assessment	Subjective assessment of degree of intactness
Literature Reference : Khirba Placename	Placename containing 'Khirba' from literature
Literature Reference : Literature	Unspecified publication, normally field report but could include grey literature
Literature Reference : Original Survey ID	Recorded survey ID from original literature or fieldwork
Literature Reference : Other Placename	Placename from literature not including categories below
Literature Reference : Place Name (Translation)	Translation (transliteration) of placename from other language (Arabic, Turkish, Kurdish etc) from literature
Literature Reference : Qalaat Placename	Placename containing 'Qalaat' from literature
Literature Reference : Qasr Placename	Placename containing 'Qasr' from literature
Literature Reference : Rujm Placename	Placename containing 'Rujm' from literature
Literature Reference : Seer Placename	Placename containing 'Seer' from literature
Literature Reference : Tell placename	Placename containing 'Tell' from literature
Literature Reference : Tepe Placename	Placename containing 'Tepe' from literature
Literature Reference : Um Placename	Placename containing 'Um' from literature
Literature Reference : Waar Placename	Placename containing 'Waar' from literature
Map Feature : Antiquity Symbol	Antiquity Symbol on map
Map Feature : Contour	Contour lines on map suggest archaeological feature (e.g. Small rounded mound may be a tell)
Map Feature : Enclosure(s)	Stone enclosures drawn on map. Often recording Irregular Clustered Structures
Map Feature : Hydrological Feature	Ancient or modern features related to water recorded on map. E.g. Canals. Dams, Irrigation features
Map Feature : Khirba Placename	Placename containing 'Khirba' from map
Map Feature : Map Feature	Feature drawn/depicted on map interpreted as of interest e.g. Field systems
Map Feature : Other Placename	Placename from map not including categories below
Map Feature : Place Name (Translation)	Translation (transliteration) of placename from other language (Arabic, Turkish, Kurdish etc) from map
Map Feature : Qalaat Placename	Placename containing 'Qalaat' from map
Map Feature : Qasr Placename	Placename containing 'Qasr' from map
Map Feature : Rujm Placename	Placename containing 'Rujm' from map
Map Feature : Seer Placename	Placename containing 'Seer' from map
Map Feature : Tell placename	Placename containing 'Tell' from map
Map Feature : Tepe Placename	Placename containing 'Tepe' from map
Map Feature : Um Placename	Placename containing 'Um' from map
Map Feature : Waar Placename	Placename containing 'Waar' from map
Non-Site : Animal Pens	Modern/Recent enclosures used for animals
Non-Site : Background Landscape (Test)	Abstract area chosen for SHR background sample survey
Non-Site : Natural Feature	Landscape feature identified as possibly archaeological but determined to be natural in origin. E.g. Stone outcrop
Non-Site : Settlement	Modern settlement
Non-Site : Unclassified	Feature defined at some point as of interest but

	now reclassified
Object Data : Animal Bones	Animal Bones (pre-modern)
Object Data : Basalt Artefact	Basalt artefact. No further classification
Object Data : Basalt Artefact (Initial Counts)	Basalt artefact (Initial counts prior to specialist analysis)
Object Data : Basaltic Pottery (Initial Counts)	Basalt tempered pottery (Initial counts prior to specialist analysis)
Object Data : Bone (Initial Counts)	Uncategorised bone (Initial counts prior to specialist analysis)
Object Data : Chipped Stone	Chipped Stone (Lithics)
Object Data : Chipped Stone (Diagnostic)	Chipped Stone (Lithics) (Diagnostic)
Object Data : Chipped Stone (Initial Counts)	Chipped Stone (Lithics) (Initial counts prior to specialist analysis)
Object Data : Coins	Coins (pre-modern)
Object Data : Conglomerate (Initial Counts)	Conglomerate stone present, no further details (Initial counts prior to specialist analysis)
Object Data : Diagnostic (Reclassified)	Unclassified artefact where date has been reassessed
Object Data : Diagnostic (UNCERTAIN)	Possibly dated unclassified artefact
Object Data : Diagnostic (Unclassified)	Dated unclassified artefact
Object Data : Figurine	Figurine
Object Data : Glass	Glass
Object Data : Glass (Diagnostic)	Dated Glass
Object Data : Glass (Initial Counts)	Glass (Initial counts prior to specialist analysis)
Object Data : Human Bones	Human Bones (Pre-modern)
Object Data : Kiln Slag	Waste material from kiln
Object Data : Late Pottery (Initial Counts)	Post Iron Age pottery (Initial counts prior to specialist analysis)
Object Data : Limestone (Initial Counts)	Limestone (Initial counts prior to specialist analysis)
Object Data : Metal	Metal artefact
Object Data : Metal (Initial Counts)	Metal artefact (Initial counts prior to specialist analysis)
Object Data : Non-Pottery Finds	Non-pottery artefacts (no further details)
Object Data : Object Comment(s)	Comments on object data at a given location
Object Data : Petrographic Samples	Petrographic Sample from pottery taken
Object Data : Photograph (Finds - Lab)	Artefact Photographs Post-Field Visit
Object Data : Photograph (Finds - Petrography)	Artefact Photographs Petrography Record
Object Data : Pipe (Diagnostic)	Dated Smoking Pipe
Object Data : Pipe (Initial Counts)	Smoking Pipe (Initial counts prior to specialist analysis)
Object Data : Pottery	Pottery Present
Object Data : Pottery (Diagnostic)	Dated Pottery
Object Data : Pottery (Initial Counts)	Pottery (Initial counts prior to specialist analysis)
Object Data : Sherd Diagrams	Object Drawn, should always have file attached unless lost/corrupted
Object Data : Slag (Initial Counts)	Waste material from material processing (glass, metal, lime etc)
Object Data : Tesserae	Mosaic fragment
Object Data : Tile	Ceramic Tile (floor, roof etc)
Object Data : Tile (Initial Counts)	Ceramic Tile (Initial counts prior to specialist analysis)

Object Data : Worked Stone (Unclassified)	Modified stone artefacts including dressed stone, basins etc
Object Data : X_Diagnostic (Survey Original)	Original Survey Date reassessed (See Diagnostic (reclassified))
Off Site Feature : Altar(s)	Altar not associated with a site
Off Site Feature : Architectural fragment(s)	Fragments of building/structure not associated with a site
Off Site Feature : Basin(s) (Crushing)	Basin used for crushing e.g. Olives, grapes etc not associated with a site
Off Site Feature : Basin(s) (Unclassified)	Basin of unknown function not associated with a site
Off Site Feature : Burial: Sarcophagus	Sarcophagus not associated with a site
Off Site Feature : Cairn(s)	Stone mound (burial/non-burial/clearance) not associated with a site
Off Site Feature : Channel	Anthropogenically constructed/altered linear water feature not associated with a site
Off Site Feature : Cistern(s)	Anthropoghenically constructed/altered water storage not associated with a site
Off Site Feature : Column(s) (Ksegbe)	Column (Ksegbe style) not associated with a site
Off Site Feature : Column(s) (Unclassified)	Column (Unclassified Style) not associated with a site
Off Site Feature : Crusher	Part of installation used for crushing, often associated with crushing basin not associated with a site
Off Site Feature : Dam	Anthropogenically constructed water constraining feature not associated with a site
Off Site Feature : Dolmen(s)	Burial monument formed by uprights and a capstone not associated with a site
Off Site Feature : Field System	Complex of field boundaries forming coherent and discrete unit not associated with a site
Off Site Feature : Field Wall(s)	Field boundaries not forming a coherent and discrete unit not associated with a site
Off Site Feature : Gaming Stone	Modified stone used for games, often including indentations and worked areas not associated with a site
Off Site Feature : Hydrological Feature	Ancient or modern features related to water E.g. Canals. Dams, Irrigation features not associated with a site
Off Site Feature : Inscription	Inscribed stone artefact not associated with a site
Off Site Feature : Milestone	Inscribed or worked stone often associated with routeway marking distance not associated with a site
Off Site Feature : Millstone (Hourglass)	Worked stone used for milling processes (hourglass style) not associated with a site
Off Site Feature : Millstone (Unclassified)	Worked stone used for milling processes (unclassified style) not associated with a site
Off Site Feature : Monoliths	Worked/modified stones (standing stones) not associated with a site
Off Site Feature : Press (Unclassified)	General installation used in pressing processes not associated with a site
Off Site Feature : Press Bed	Base/Floor of press not associated with a site
Off Site Feature : Press Weight (Kasfa Screw)	Weight used in pressing processes (Kasfa Screw

	style) not associated with a site
Off Site Feature : Press Weight (Sarfud Type)	Weight used in pressing processes (Sarfud style) not associated with a site
Off Site Feature : Press Weight (Unclassified)	Weight used in pressing processes (Unclassified style) not associated with a site
Off Site Feature : Qanat(s)	Sunken shaft canal or channel not associated with a site
Off Site Feature : Quarry	Area of material extraction e.g. Stone, not associated with a site
Off Site Feature : Quern/Grindstone	Worked stone used for grinding/processing of plant remains not associated with a site
Off Site Feature : Road(s) or Track(s) (Archaeological)	Ancient routeway including roman roads and hollow ways not associated with a site
Off Site Feature : Rotary Mill	Installation involving rotating worked stone used for milling processes not associated with a site
Off Site Feature : Sculpture	Modified stone depiction not associated with a site
Off Site Feature : Section	Vertical exposure (archaeological and non-archaeological horizons) not associated with a site
Off Site Feature : Stele(ae)	Modified stone slab, ussually commemorative not associated with a site
Off Site Feature : Tomb (Unclassified)	Burial structure (unknown style) not associated with a site
Off Site Feature : Unclassified	Unknown Installation not associated with a site
Off Site Feature : Well	Shaft from surface to water source not associated with a site
Photography : Photograph (Geomorphology)	Photograph of background geomorphology
Photography : Photograph (Geo-Referenced)	Photographs with associated GPS points and cardinal directions. For use in geocorrection
Photography : Photograph (Ground Truth)	Photographs recording on and off site soils (Ant Beck)
Photography : Photograph (Installation)	Photograph of Installation
Photography : Photograph (Landscape)	Photograph of surrounding landscape
Photography : Photograph (Object)	Photograph of artefact(s) taken in the field
Photography : Photograph (Panorama)	Panoramic photograph of surrounding landscape
Photography : Photograph (People and Fieldwork)	Photographs of fieldwork, team members and locals
Photography : Photograph (Section)	Photographs of vertical exposures (archaeological and non-archaeological)
Photography : Photograph (Site)	Photographs of spatial units classified as sites
Photography : Photograph (Square)	Photographs of sample units
Photography : Photograph (Structure)	Photographs of structures
Photography : Photograph (Unspecified)	Photographs (unspecified subject)
Photography : Photography (No File)	Photograph from non-digital source i.e. not linked to database
Postdepositional Impact : Alluvial Aggredation	Obscured/covered by alluvially deposited material
Postdepositional Impact : Animal Disturbance	Fauna e.g. burrowing etc causing site degradation/destruction
Postdepositional Impact : Archaeological Excavation	Archaeologically documented excavation
Postdepositional Impact : Bulldozing	Mechanised vehicles causing spatial unit

	degradation/destruction
Postdepositional Impact : Field Clearance	Clearance (non-mechanised) causing spatial unit degradation/destruction
Postdepositional Impact : Fluvial Erosion	Wadi/River causing spatial unit destruction/removal
Postdepositional Impact : Fruit/Olive grove	Planting of fruit/olive grove
Postdepositional Impact : General Agricultural Use	Agriculture
Postdepositional Impact : Grazing (Unclassified)	Animal grazing
Postdepositional Impact : Imported Soil	Obscured/covered by soils brought in from elsewhere
Postdepositional Impact : Industrial	Modern industry (e.g. Sulphur factory)
Postdepositional Impact : Infrastructure Development	Modern infrastructure (e.g. Railways, pipelines, electricity etc.)
Postdepositional Impact : Irrigation (Center Pivot)	Irrigation (center and pivot style)
Postdepositional Impact : Irrigation (Channel)	Irrigation (channel style)
Postdepositional Impact : Irrigation (Unclassified)	Irrigation (unclassified style)
Postdepositional Impact : Lacustrine Deposition	Obscured/covered by lake deposits
Postdepositional Impact : Military Use	Military installations causing spatial unit degradation/destruction
Postdepositional Impact : Modern Settlement	Modern settlement (occupation)
Postdepositional Impact : Non-Archaeological Excavation	Non-Archaeologically documented excavation e.g. Looting, gravel/manure extraction etc
Postdepositional Impact : Other Construction Activity	Non-occupational construction e.g. Animal pen
Postdepositional Impact : Ploughing (Deep)	Ploughing below depth of topsoil
Postdepositional Impact : Ploughing (General)	Ploughing (unclassified depth)
Post-depositional Impact : Quarry	Material extraction
Postdepositional Impact : Reforestation	Planting of non-edible trees
Postdepositional Impact : Road(s) or Track(s) (Modern)	Modern routeways
Postdepositional Impact : Structural Decay	General spatial unit long-term degradation
Post-depositional Impact : Terracing	Land re-arranged into terrace system
Postdepositional Impact : Unclassified	Impact of unknown cause
Postdepositional Impact : Water Erosion	Removal of spatial unit element(s) by water action
Postdepositional Impact : Wind Erosion	Removal of spatial unit element(s) by wind action
Site Feature : Agricultural Installation	Feature associated with unspecified agricultural processes associated with a site
Site Feature : Altar(s)	Altar associated with a site
Site Feature : Architectural fragment(s)	Fragments of building/structure associated with a site
Site Feature : Basin(s) (Crushing)	Basin used for crushing e.g. Olives, grapes etc associated with a site
Site Feature : Basin(s) (Unclassified)	Basin of unknown function associated with a site
Site Feature : Birka(s)	Enclosed anthropogenically construted/modified depression normally used for storing water associated with a site

Site Feature : Burial: Cemetery	Designated area/group of burials
Site Feature : Burial: Sarcophagus	Sarcophagus associated with a site
Site Feature : Burial: Shaft Tomb(s)	Below ground burial structure accessed by shaft
Site Feature : Burial: Structure (non-cairn)	Above ground built burial feature (not including cairns) e.g. Mausoleum
Site Feature : Cairn(s)	Stone mound (burial/non-burial/clearance) associated with a site
Site Feature : Cave	Natural and anthropogenically modified recesses in rock
Site Feature : Channel	Anthropogenically constructed/altered linear water feature associated with a site
Site Feature : Cistern(s)	Anthropoghenically constructed/altered water storage associated with a site
Site Feature : Column(s) (Ksegbe)	Column (Ksegbe style) associated with a site
Site Feature : Column(s) (Unclassified)	Column (Unclassified Style) associated with a site
Site Feature : Comments	Gerneral comments on site features
Site Feature : Complex of Low Mounds	Group of low mounds considered to form part of the same site
Site Feature : Complex Topographic Mound	Mound with multiple distinct topographic areas
Site Feature : Crusher	Part of installation used for crushing, often associated with crushing basin associated with a site
Site Feature : Dam	Anthropogenically constructed water constraining feature associated with a site
Site Feature : Depression	Concave feature, multiple possible causes e.g. Collapsed cisterns, extraction pits etc
Site Feature : Dolmen(s)	Burial monument formed by uprights and a capstone associated with a site
Site Feature : Earthwork	Feature constrtucted from piled earth/mud
Site Feature : Enclosure Wall	Wall delineating the boundary of an enclosure
Site Feature : Enclosure(s)	Individual/Group of discrete built units interpreted as enclosures which have not been further classified i.e. Into Rectilinear vs. Circular/sub-circular.
Site Feature : External Ditch	Ditch surrounding spatial unit
Site Feature : External Paving	Area of flat stones surrounding spatial unit
Site Feature : External Revetment	Stones/wall definingm edge of spatial unit
Site Feature : Field System	Complex of field boundaries forming coherent and discrete unit associated with a site
Site Feature : Field Wall(s)	Field boundaries forming a coherent and discrete unit associated with a site
Site Feature : Gaming Stone	Modified stone used for games, often including indentations and worked areas associated with a site
Site Feature : Hydrological Feature	Ancient or modern features related to water E.g. Canals. Dams, Irrigation features associated with a site
Site Feature : Inscription	Inscribed stone artefact associated with a site
Site Feature : Internal chambers	Discrete areas within individual structural unit
Site Feature : Irregular / subcircular group of structures	Irregular / subcircular group of structures
Site Feature : Irregular / subcircular single structure	Irregular / subcircular single structure

Site Feature : Kiln(s)	Kiln(s)
Site Feature : Large Circular Enclosure(s)	Large Circular Enclosure(s)
Site Feature : Lower Town	Associated area of activity/occupation to mounded site (normally late)
Site Feature : Milestone	Inscribed or worked stone often associated with routeway marking distance associated with a site
Site Feature : Millstone (Hourglass)	Worked stone used for milling processes (hourglass style) associated with a site
Site Feature : Millstone (Unclassified)	Worked stone used for milling processes (unclassified style) associated with a site
Site Feature : Monoliths	Worked/modified stones (standing stones) associated with a site
Site Feature : Number of Internal/External Features	Count of features associated with spatial unit
Site Feature : Platform	Anthropogenically built foundation/base for construction
Site Feature : Press (Unclassified)	General installation used in pressing processes associated with a site
Site Feature : Press Bed	Base/Floor of press associated with a site
Site Feature : Press Weight (Kasfa Screw)	Weight used in pressing processes (Kasfa Screw style) associated with a site
Site Feature : Press Weight (Sarfud Type)	Weight used in pressing processes (Sarfud style) associated with a site
Site Feature : Press Weight (Unclassified)	Weight used in pressing processes (Unclassified style) associated with a site
Site Feature : Qanat(s)	Sunken shaft canal or channel associated with a site
Site Feature : Quarry	Area of material extraction e.g. Stone, associated with a site
Site Feature : Quern/Grindstone	Worked stone used for grinding/processing of plant remains associated with a site
Site Feature : Ramparts	Defensive earthwork
Site Feature : Rectilinear / Square group of structures	Rectilinear / Square group of structures
Site Feature : Rectilinear / Square single structure	Rectilinear / Square single structure
Site Feature : Road(s) or Track(s) (Archaeological)	Ancient routeway including roman roads and hollow ways associated with a site
Site Feature : Rotary Mill	Installation involving rotating worked stone used for milling processes associated with a site
Site Feature : Rubble Concentration	Mass of loose stone associated with a site
Site Feature : Scatter	Flat Concentration of artefactual material dispersed across the surface associated with a site
Site Feature : Sculpture	Modified stone depiction associated with a site
Site Feature : Section	Vertical exposure (archaeological and non-archaeological horizons) associated with a site
Site Feature : Soil Colour Difference	Variation in ground-surface colour distinct from surrounding area associated with a site
Site Feature : Standing Architecture (Archaeological)	Above ground pre-modern buildings
Site Feature : Stele(s)	Modified stone slab, usually commemorative associated with a site

Site Feature : Structural Feature(s)	Unidentified in-situ construction remains i.e. Walls, aligned blocks etc.
Site Feature : Tell (Circular)	Circular (from above) mounded unit
Site Feature : Tell (Conical)	Specific morphology mounded unit traingular profile i.e. Symetrical steep sides and pointed summit
Site Feature : Tell (Flat Top)	Mounded unit with tabular flat top (i.e. Table top)
Site Feature : Tell (Kranzhuegel)	Specific morphology mounded unit central mound and outer earthworks
Site Feature : Tell (Low)	Low mounded unit generally less than 5m in height
Site Feature : Tell (Ovoid)	Mounded elongated circular/sub-circular unit
Site Feature : Tell (Rectilinear)	(Sub) Square/Rectangular mounded unit
Site Feature : Tell (Shallow-Sided)	Mounded unit with low gradient profile
Site Feature : Tell (Shouldered)	Mounded unit with flattened mid/upper slopes and raised summit
Site Feature : Tell (Slopes)	Slopes of tell
Site Feature : Tell (Steep-Sided)	Mounded unit with high gradient profile
Site Feature : Tell (Summit)	Summit/Upper slopes of tell
Site Feature : Tell or Mounded Structure	Mounded unit (generic) NB. All sites with a Site Feature : Tell (*) should also have a Tell or Mounded Structure record
Site Feature : Terracing	Land modification to produce multiple stepped flattened areas
Site Feature : Tomb (Unclassified)	Burial structure (unknown style) associated with a site
Site Feature : Unclassified	Feature of archaeological significane recorded at site however form is unclear/unknown
Site Feature : Well	Shaft from surface to water source associated with a site
Site Feature : Wine Press (Unclassified)	Press used for processing (crushing) of grapes for wine
Site Morphology : Blocky	Matrix of large blocks (stone structures)
Site Morphology : Circular	Circular spatial unit
Site Morphology : Cobbly	Matrix of intermixed stone cobbles (rounded stones) and smaller boulders (stone structures)
Site Morphology : Dimensions	Height, Width, Length, Area - see Data Comments for specific attributes
Site Morphology : Flat (Site Morphology)	Non-mounded
Site Morphology : Height < 5m	Height < 5m
Site Morphology : Height > 25m	Height > 25m
Site Morphology : Height 10 -15m	Height 10 -15m
Site Morphology : Height 15-20m	Height 15-20m
Site Morphology : Height 20-25m	Height 20-25m
Site Morphology : Height 5-10m	Height 5-10m
Site Morphology : Irregular	Irregular shaped spatial unit (i.e. Not recognisable polygon)
Site Morphology : Low Rise	Slight area of mounding asociated with spatial unit, may or may not be archaeological. Often associated with soil colour difference
Site Morphology : Ovoid	Elongated circular/sub-circular shaped unit
Site Morphology : Rectangular	Rectangular shaped spatial unit

Site Morphology : Rectilinear	(Sub)Square or Rectangular spatial unit
Site Morphology : Rubbly	Matrix of intermixed large boulders and smaller stones (stone structures)
Site Morphology : Soil-filled	Matrix of intermixed of small stones/cobbles and soil (stone structures)
Site Morphology : Square	(Sub)Square spatial unit
Soils (Off Site) : Clay	Soils >30% Clay
Soils (Off Site) : Clay Loam	Soils <30% Clay, <50% Sand <50% Silt
Soils (Off Site) : Loam	Soils <20% Clay , <50% Sand, <50% Silt
Soils (Off Site) : Sand	Soils >85% Sand
Soils (Off Site) : Sandy clay	Soils >50% Sand, >30% Clay
Soils (Off Site) : Sandy Clay Loam	Soils >50% Sand, 20-30% Clay
Soils (Off Site) : Sandy Loam	Soils 80-85% Sand, <20% Clay
Soils (Off Site) : Silty Clay	Soils >50% Silt >30% Clay
Soils (Off Site) : Silty Clay Loam	Soils >50% Silt, 20-30% Clay
Soils (Off Site) : Silty Loam	Soils >50% Silt, <20% Clay
Soils (Off Site) : Unclassified	Attributes of soil noted but no formal classification
Soils (On-Site) : Clay	Soils >30% Clay
Soils (On-Site) : Clay Loam	Soils <30% Clay, <50% Sand <50% Silt
Soils (On-Site) : Loam	Soils <20% Clay , <50% Sand, <50% Silt
Soils (On-Site) : Sand	Soils >85% Sand
Soils (On-Site) : Sandy clay	Soils >50% Sand, >30% Clay
Soils (On-Site) : Sandy Clay Loam	Soils >50% Sand, 20-30% Clay
Soils (On-Site) : Sandy Loam	Soils 80-85% Sand, <20% Clay
Soils (On-Site) : Silty Clay	Soils >50% Silt >30% Clay
Soils (On-Site) : Silty Clay Loam	Soils >50% Silt, 20-30% Clay
Soils (On-Site) : Silty Loam	Soils >50% Silt, <20% Clay
Soils (On-Site) : Unclassified	Attributes of soil noted but no formal classification
Survey Methodology : Desk Based Assessment	Analysis of spatial unit from non-field location e.g. Satellite imagery interpretation, literature etc
Survey Methodology : Driving Visit	Spatial unit briefly attended and noted but not thoroughly investigated
Survey Methodology : Evidence Collected	Artefact(s) removed from spatial unit
Survey Methodology : Evidence Quantified	Artefact(s) counted on or off-spatial unit
Survey Methodology : Field Collection Attempted	Artefact pick-up carried out, no material discovered
Survey Methodology : Field Visit	Spatial unit attended and field analysis carried out
Survey Methodology : Geomorphological Survey	Field assessment/recording of geomorphological features at spatial unit
Survey Methodology : GPS Mapping (Features)	Features within spatial unit mapped using a GPS e.g. cairns
Survey Methodology : GPS Mapping (Site Extent and Features)	Overall spatial extent of and features within spatial unit mapped using a GPS
Survey Methodology : GPS Mapping (Site Extent)	Overall spatial extent of spatial unit mapped using a GPS
Survey Methodology : Ground Truth of Imagery	Spatial unit identified from imagery source and verified in the field
Survey Methodology : No GPS Survey	GPS not used in field visit
Survey Methodology : No Site Visit	Spatial unit not visited

Survey Methodology : Non-Transect	Spatial unit is not a transect (summary record)
Survey Methodology : Pickup (10m x 10m)	Artefacts collected by dimensions and sample method (specified)
Survey Methodology : Pickup (2m diameter; non-sieved)	Artefacts collected by dimensions and sample method (specified)
Survey Methodology : Pickup (2m diameter; sieved)	Artefacts collected by dimensions and sample method (specified)
Survey Methodology : Pickup (2m x 2m x 0.2m sieve)	Artefacts collected by dimensions and sample method (specified)
Survey Methodology : Pickup (4m x 1m x 0.2m sieve)	Artefacts collected by dimensions and sample method (specified)
Survey Methodology : Pickup (Shovel)	Artefacts collected by dimensions and sample method (specified)
Survey Methodology : Pickup (Surface Extent)	Artefacts collected by dimensions and sample method (specified)
Survey Methodology : Pickup (Systematic non-sieved)	Artefacts collected by dimensions and sample method (specified). n.b. Systematic includes any kind of specifically defined/quantifiable sub-divisions
Survey Methodology : Pickup (Transect)	Spatial unit walked in lines, number of individuals and spacing recorded
Survey Methodology : Pickup (Unspecified)	Artefacts collected, collection unit not recorded
Survey Methodology : Planning (Total Station)	Mapping of spatial unit carried out by total station survey
Survey Methodology : Sounding	Small-scale trench/sondage excavated
Survey Methodology : Spatial Unit Description	Written description of spatial unit
Survey Methodology : Specialist Evidence Collected	Diagnostic artefacts collected from spatial unit
Survey Methodology : Specialist Evidence Quantified	Diagnostic artefacts quantified

Appendix 3: Glossary of Periods and Start and End dates used in the FCP Database

Note that due to the structure of the database and the nature of the calculations made, years B.C. are presented as positive numbers and years A.D. are presented as negative numbers.

Start Date	End Date	Unique Period Code	Name
2500000	90000	**LPAL**	*Lower Palaeolithic*
2500000	8500	**PAL**	*Palaeolithic*
90000	45000	**MPAL**	*Middle Palaeolithic*
45000	18000	**UPAL**	*Upper Palaeolithic*
18000	10500	**EPAL**	*Epipalaeolithic*
18000	4000	**EPAL_CH**	*Epipaleolithic-Chalcolithic*
18000	1900	**PPAL_Lithic**	*Post-Paleolithic (Non-Diagnostic Stone)*
10500	8500	**EPAL_PPNEO_T**	*Epipalaeolithic-Neolithic Transition*
10000	8700	**PPNA**	*Pre-Pottery Neolithic A*
10000	6800	**PPNEO**	*Pre-Pottery Neolithic*
8700	6800	**PPNB**	*Pre-Pottery Neolithic B*
8500	5400	**NEO**	*Neolithic*
6800	6000	**EPNEO**	*Early Pottery Neolithic*
6800	5400	**PNEO**	*Pottery Neolithic*
6800	3500	**PNEO_CH**	*Pottery Neolithic-Chalcolithic*
6500	6000	**HASS**	*Hassuna*
6000	5400	**LNEO**	*Late Neolithic*
6000	5200	**HALAF**	*Halaf*
6000	4400	**PRE**	*Prehistoric*
5400	5000	**ECH**	*Early Chalcolithic*
5400	3500	**CH**	*Chalcolithic Levant*
5400	3100	**CH_FCP**	*Chalcolithic FCP*
5200	4400	**UBAID**	*Ubaid*
5000	4400	**MCH**	*Middle Chalcolithic*
5000	3500	**MCH_LCH**	*Middle Chalcolithic-Late Chalcolithic*
4800	4000	**LUBAID_ELCH**	*Late Ubaid-Early Chalcolithic*
4500	3500	**LCH**	*Late Chalcolithic Levant*
4500	1900	**LCH_EBA**	*Late Chalcolithic-EBA*
4400	3900	**LC1_2**	*Late Chalcolithic 1-2 (Santa Fe)*
4400	3100	**LCH_FCP**	*Late Chalcolithic FCP*
4200	2500	**LCH_EBA1_3**	*Late Chalcolithic-EB1-3*
4200	3300	**LCH_EBA_T**	*Late Chalcolithic-EBA Transition*
3900	3600	**LC3**	*Late Chalcolithic 3 (Santa Fe)*
3600	3300	**LC4**	*Late Chalcolithic 4 (Santa Fe)*
3600	3000	**URUK**	*Uruk*
3500	3000	**EBA1**	*EBA 1 Levant*
3500	2700	**EBA1_2**	*EBA 1-2 Levant*
3500	2500	**EBA1_3**	*EBA 1-3 Levant*
3500	1900	**EBA**	*Early Bronze Age Levant*
3500	1600	**EBA_MBA_LEV**	*Early Bronze Age-Middle Bronze Age Levant*
3500	1200	**EBA_LBA**	*Early Bronze Age-Late Bronze Age*
3100	2600	**EEBA_FCP**	*Early EBA FCP*
3100	2600	**ETM**	*Early Third Millennium*

3100	1900	**EBA_FCP**	*EBA FCP*
3100	1600	**EBA_MBA_FCP**	*EBA-MBA FCP*
3000	2700	**EBA2**	*EBA 2 Levant*
3000	2600	**KKW**	*Khirbet Kerak Ware*
3000	2500	**NINV**	*Ninevite V*
3000	2000	**TM**	*Third Millennium*
2700	2500	**EBA3**	*EBA 3 Levant*
2600	2400	**MEBA_NME**	*Middle EBA Northern Middle Euphrates*
2600	2300	**MEBA_SME**	*Middle EBA Southern Middle Euphrates*
2600	2200	**MEBA_LEBA_NME**	*Middle-Late EBA Northern Middle Euphrates*
2600	1900	**MEBA_LEBA_SME**	*Middle-Late EBA Southern Middle Euphrates*
2500	2000	**LTM**	*Late Third Millennium*
2500	1900	**EBA4**	*EBA 4 Levant*
2400	2200	**LEBA_NME**	*Late EBA Northern Middle Euphrates*
2300	1900	**LEBA_SME**	*Late EBA Southern Middle Euphrates*
2200	1900	**EBA_MBA_T**	*Early Bronze Age-Middle Bronze Age Transition FCP*
2000	1500	**KHA**	*Khabur*
2000	1200	**SM**	*Second Millennium*
1900	1600	**MBA**	*Middle Bronze Age*
1900	1200	**MBA_LBA**	*Middle Bronze Age-Late Bronze Age*
1900	1000	**MBA_IA1**	*MBA-IA 1*
1900	700	**MBA_IA1_2**	*MBA_IA 1-2*
1900	300	**MBA_IA**	*Middle Bronze Age-Iron Age FCP*
1800	1700	**MBA2**	*MBA2*
1600	1400	**LBA1**	*LBA 1*
1600	1400	**MBA_LBA_T**	*Middle Bronze Age-Late Bronze Age Transition*
1600	1400	**NUZI**	*Nuzi*
1600	1200	**LBA**	*Late Bronze Age*
1600	1200	**LBA1_2**	*LBA 1-2*
1600	300	**LBA_IA**	*Late Bronze Age-Iron Age*
1400	1200	**LBA2**	*LBA 2*
1400	1200	**LLBA**	*Late Late Bronze Age*
1400	1000	**LBA_EIA**	*Late Bronze Age-Early Iron Age*
1400	1000	**MASS**	*Middle Assyrian*
1400	700	**LBA_IA1_2**	*LBA-IA 1-2*
1200	1000	**IA1**	*Iron 1*
1200	1000	**LB_EIA_SB**	*Late Bronze-Early Iron Transition (Bourke)*
1200	900	**IA1_2A**	*Iron 1-2A*
1200	800	**EIA_FCP**	*Early Iron Age FCP*
1200	700	**IA1_2**	*Iron 1-2*
1200	550	**IA**	*Iron Age*
1200	550	**IA1_3**	*Iron 1-3*
1200	330	**IA_FCP**	*Iron Age FCP*
1200	300	**FM**	*First Millennium*
1200	160	**IA_EHEL**	*Iron Age-Early Hellenistic*
1200	0	**IA_HEL**	*Iron Age-Hellenistic*
1000	900	**IA2A**	*Iron 2A*
1000	700	**IA2**	*Iron 2*
1000	550	**IA2_3**	*Iron 2-3*
900	700	**IA2B**	*Iron 2B*
900	550	**IA2B_3**	*Iron 2B-3*

800	550	**LASS**	*Late Assyrian*
800	550	**MIA_FCP**	*Middle Iron Age FCP*
700	550	**IA3**	*Iron 3*
700	300	**IA3_PER**	*Iron 3-Persian*
700	150	**IA3_HEL**	*Iron 3-Hellenistic*
550	330	**LIA**	*Late Iron Age (FCP)*
550	300	**PASS**	*Post Assyrian*
550	300	**PER**	*Persian*
550	150	**PER_HEL**	*Persian-Hellenistic*
300	160	**EHEL**	*Early Hellenistic*
300	50	**HEL**	*Hellenistic*
300	0	**SEL**	*Seleucid*
300	-50	**HEL_EAD**	*Helenistic-Early Decades AD*
300	-150	**HEL_EROM**	*Hellenistic-Early Roman*
300	-400	**HEL_ROM**	*Hellenistic Roman*
300	-640	**CL**	*Classical*
300	-640	**HEL_BYZ**	*Hellenistic-Byzantine*
160	50	**LHEL**	*Late Hellenistic*
160	-50	**LHEL_EAD**	*Late Hellenistic-Early Decades AD*
160	-150	**LHEL_EROM**	*Late Hellenistic-Early Roman*
160	-300	**LHEL_LROM**	*Late Hellenistic-Late Roman*
50	-150	**EROM**	*Early Roman*
50	-300	**ROM_GEN**	*Generic Roman*
50	-400	**PARTH**	*Parthian*
50	-640	**PARTH_SAS**	*Parthian-Sasanian*
50	-640	**ROM_BYZ**	*Roman-Byzantine*
50	-1070	**ROM_EISL**	*Ronam-Early Islamic*
0	-50	**EAD**	*Early Decades AD*
-50	-1400	**ROM_ISL**	*Roman-Islamic*
-150	-300	**MROM**	*Mid Roman*
-300	-400	**LROM**	*Late Roman*
-300	-640	**LROM_BYZ**	*Late Roman-Byzantine*
-300	-640	**SAS**	*Sasanian*
-300	-1070	**LROM_EISL**	*Late Roman-Early Islamic*
-300	-1070	**SAS_EISL**	*Sasanian-Early Islamic*
-400	-640	**BYZ**	*Byzantine*
-400	-1070	**BYZ_EISL**	*Byzzantine-Early Islamic*
-400	-1260	**BYZ_ISL**	*Byzantine-Islamic*
-640	-800	**ISL1**	*Islamic 1*
-640	-800	**UMM**	*Ummayyad*
-640	-1070	**EISL**	*Early Islamic*
-640	-1070	**ISL1_2**	*Islamic 1-2*
-640	-1300	**EISL_MISL**	*Early Islamic-Middle Islamic*
-640	-1500	**ISL_PR**	*Islamic (Paul Reynolds)*
-640	-1900	**ISL**	*Islamic*
-800	-1070	**ISL2**	*Islamic 2*
-800	-1150	**ISL2_3**	*Islamic 2-3*
-800	-1260	**ISL2_4**	*Islamic 2-4*
-800	-1400	**ISL2_5**	*Islamic 2-5*
-1070	-1150	**ISL3**	*Islamic 3*
-1070	-1260	**ISL3_4**	*Islamic 3-4*
-1070	-1300	**MED**	*Medieval*

-1070	-1300	**MISL**	*Middle Islamic*
-1070	-1400	**ISL3_5**	*Islamic 3-5*
-1070	-1700	**MISL_LISL**	*Middle Islamic-Late Islamic*
-1150	-1260	**ISL4**	*Islamic 4*
-1150	-1400	**ISL4_5**	*Islamic 4-5*
-1260	-1400	**ISL5**	*Islamic 5*
-1260	-1700	**MAM_OTT**	*Mamluk-Ottoman*
-1300	-1900	**LISL**	*Late Islamic*
-1400	-1550	**ISL6**	*Islamic 6*
-1500	-1900	**OTT**	*Ottoman*
-1550	-1700	**ISL7**	*Islamic 7*
-1700	-1900	**ISL8**	*Islamic 8*
-1700	-1900	**M_L_OTT**	*Middle Ottoman -Late Ottoman*
-1900	-1950	**ISL9**	*Islamic 9*

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