Rural Byzantine Landscapes and Societies: New Approaches to Characterisation and Analysis

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Abstract

Landscapes are intricate, complex and multi-layered products of social dynamics and cultural practices within specific environments. Over the past decade researchers have advanced the study of the perceptions and experiences of past people by studying the organization of social space. The growing international recognition of landscape studies highlights the neglect of landscape in contemporary Byzantine studies. It is vital that Byzantine studies consider new approaches to the organisation of landscape and how it is experienced, in order to move beyond a dehumanised history reliant on the discussion of historically-recorded political events. This thesis addresses these issues, analysing space as an expression of social identity, and increasing our understanding of the interplay between Byzantine rural society and eastern Mediterranean landscapes.

The heart of this thesis is a detailed historic analysis of the spatial composition of the landscapes of two contrasting case-studies, Pisidia (Turkey) and the Troodos Mountain foothills (Cyprus). To achieve this retrogressive landscape analysis and Historic Landscape Characterisation has been implemented. These modern techniques map the historic processes that shape the landscape. These methods are combined with the results of ceramic survey to provide further chronological definition to the historic landscape study. This is a unique and innovative methodology that has not been previously attempted in historic landscape analysis. This methodology draws on both high-quality research generated by international research teams (Sydney Cyprus Survey Project and Pisidia Survey Project) and original fieldwork by the author. This explores the relationships between Historic Landscape Character and the ceramics found within the landscape.

The results of this thesis have revealed new historical landscape narratives, demonstrating how the combination of methodologies revealed a much richer history than each technique alone would provide. This detailed framework of the past allows a more comprehensive exploration of the influence of landscapes on the experience and perceptions of people in the past.

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Chapter 1

Thesis Rationale

1.1 Byzantine Studies

Byzantine culture has been described as holding the 'key to the development of the modern world' (Angold 2002: 1), but Byzantine studies have yet to engage with many theoretical approaches and analytical methods that have yielded rewards elsewhere (Hodder 2012a; Muir 2000; Preucel and Mrozowski 2010; Robertson *et al*. 2006). Byzantine studies of the past few centuries have been relatively outmoded and overly conventional in their methods and interpretations in comparison to other disciplines (Kourelis 2003: xxviii). Byzantium can be said to have suffered from this negative assessment since the Enlightenment period (James 2010: 1). Edward Gibbon's celebrated work in six volumes *The History of the Decline and Fall of the Roman Empire* (1776; 1781a; 1781b; 1789a; 1789b; 1789c), played a prominent role in the development of the intellectual understanding of the history of Mediterranean culture during the Roman and Byzantine periods. In this work, Gibbon promoted a negative image of the Byzantine period by portraying it as an era of decline and contrasted it with the Roman period, which he considered the high point of Mediterranean culture. Gibbon's attitude and the Victorian values of his contemporaries such as William Lecky (1869) resulted in the perception of the Byzantine world as the 'tragic epilogue to the glory of Rome' (Athanassopoulos 2004: 82).

Struggling beneath the burden imposed by Gibbon's portrayal of the history of Byzantium (James 2010: 1) as a superstitious, corrupt and intolerably foreign dark age, past students of Byzantium have focused almost exclusively on the political history of the Byzantine Empire, described by Lecky as 'a monotonous story of the intrigues of priests, eunuchs and women' (1869: 13-14). Liz James has described this problem in her recent publication as a result of the eagerness of previous scholars to judge Byzantium against Modern western ideals (2010: 1), which cannot relate favourably to the actions and attitudes demonstrated in the Byzantine Empire. Over the past couple of decades, however, Byzantine studies have expanded and begun to explore more stimulating ideas. This has included such divergent themes as emotions in Byzantium (Hinterberger 2010), attitudes to new and unborn babies (Davies 2010), Byzantine book culture and literacy (Holmes and Waring 2002; Waring

2010) and Byzantine views of God and the universe (Cunningham 2010) alongside more traditional studies.

Although Byzantine studies have begun to explore a wide range of new and exciting ideas over the past few decades, Byzantine archaeology has fared less favourably. Effie Athanassopoulos believes that the existence of written records for the Byzantine era has ‘relegated this segment of the past to history’ (2004: 81) as opposed to archaeology. As a result Byzantine archaeology has gained little scholarly interest in comparison to Mediterranean archaeologies of preceding periods (Crow 2008: 47) and it has yet to engage with many approaches and methods that have yielded rewards for other historical periods. Furthermore, due to the early attitudes towards Byzantium, a great deal of Byzantine archaeology at notable sites has been destroyed by antiquarians and early archaeologists who excavated through Byzantine layers to investigate earlier deposits such as those from the Classical or prehistoric periods. Regrettably the unrecorded removal of Byzantine layers was a common practice until the late 1970s (Athanassopoulos 2004: 82) and in some areas there is still a problem of Byzantine layers being ‘rushed through’ by archaeologists who are inexperienced and uninterested in the archaeology of the Byzantine period in order to expose earlier layers more rapidly.

Early 20th century conservative approaches to Byzantine archaeology such as Ormonde Dalton’s *Byzantine Art and Archaeology* (1911), have often taken traditional art historical approaches to material culture. Dalton’s work was intended to be an overview of Byzantine art, however, on reflection it is simply a catalogue of selected early Christian art. The manuscript is primarily descriptive and focuses upon artistic style rather than function. The majority of the objects recorded in the text are elite artefacts from museum collections that only have vague contextual provenances, and everyday material culture is completely ignored within the commentary. Early 20th century Byzantine archaeology approaches to architecture have also been conventional. *The Thousand and One Churches* (1909) by Sir William Ramsay and Gertrude Bell is a worthy piece of antiquarian scholarship. The site plans and photographs recorded in this work are invaluable records of early Christian church buildings, however, despite the rigour of the raw data, there is very little interpretation of the unusual collection of buildings at this unique site. This attitude is seen in many works on Byzantine architecture. Stephen Hill’s more recent publication on *The Early Byzantine Churches of Cilicia and Isauria* (1996), has a more modern feel and does include a discussion of the development of ecclesiastical architecture during the fourth to sixth centuries and an examination of major monuments at sites such as Alahan and Meryemlik. But it too, is essentially still only a catalogue of early Byzantine churches. These catalogues are needed: as Mark Johnson *et al*. state, the 'monographic examination of a building may now seem quaint and recherché for other periods of architecture, but for Byzantium it remains an absolute necessity' (2012: 11). This is because Byzantine architecture and Byzantine material culture on a wider scale have not been as extensively documented as other periods. However, if Byzantine archaeology does not attempt to do more than this it will not progress and will instead continue to lag behind the archaeological developments seen in the study of other periods of culture. Investigation of the context within which the material culture of the Byzantine period is found is one area that is particularly limited.

A noticeable element in much of the major works of Byzantine archaeology is the prevalence of Christian artefacts and architecture. Christian artefacts and architecture are more often the focus of investigation than any other aspect of Byzantine culture. It is rare that the material culture of the secular life of common people is considered rather than the material culture of the elite or the religious. This can be considered significantly detrimental to the full understanding of Byzantine society however, it is also important to be aware that it is through Byzantine Christian archaeology that more complex themes of social interaction and the individual are considered, for example; Simon Coleman and Jas Elsner's influential exploration of liturgy and movement at the pilgrimage site of Mount Sinai (1994), or Mark Jackson's article on the pilgrimage experience in Anatolia which considers human sensory experience (1998).

Those scholars who have meticulously recorded Byzantine material evidence have been less successful in integrating the information gained from material culture into the grand narratives of the period or incorporating the results with the historical documentation of the period. These two sources, archaeological and historical records, when compared often produce different accounts and both would greatly benefit by the combination or juxtaposition of the other narrative. On the whole, with a few exceptions (Coleman and Elsner 1994; Crow 2009; Crow *et al.* 2008; Jackson 1998; Nesbitt 2007), Byzantine archaeology has remained conventional and uninspiring; and in the cultural sphere of the Mediterranean, Byzantium 'is one of the least known societies from an archaeological viewpoint' (Athanassopoulos 2004: 82). Despite this, a vast variety of archaeological evidence relating to the Byzantine world has been recorded, does survive and remains to be studied by archaeologists. The underlying problem of Byzantine archaeology is, however, not only a lack of interest in the topic by scholars, but the uninspiring and conservative approaches taken by those who do study the period. It is therefore vital that Byzantine archaeology considers new approaches both theoretical and methodological in order to move beyond a dehumanised history which relies on the discussion of historically-recorded political events.

In particular, the growing international recognition of landscape studies highlights the neglect of landscape in contemporary Byzantine archaeology. International initiatives such as the European Landscape Convention, the new International Landscape Archaeology Conference, held first in 2010, and the importance of landscapes in the UNESCO World Heritage List, emphasise how integral landscape analysis has become to 21st century archaeological investigation. Landscapes are intricate, complex and multi-layered products of social dynamics and cultural practices. People do not just live on the land: they live through a series of meaningfully constructed landscapes (Vavouranakis 2006: 237) and their perceptions shape how they see the environment, and the environment, in turn, shapes cultural perceptions of the landscape (Ashmore and Knapp 1999: 6). As Roymans states, 'to grasp a culture in its real dimension one should look to identify the perception and organisation of its space' (1995: 2). Understanding landscape and studying the organisation of a culture's social space is integral to understanding perceptions and the cultural behaviour of past peoples. This is fast becoming a major characteristic of modern archaeological and historical studies.

This thesis addresses these issues by analysing space as an expression of social identity and improving our understanding of the interplay between Byzantine rural society and the eastern Mediterranean landscape c.400-1500 AD. This thesis recognises the importance of studying landscape and aims to enhance Byzantine archaeology by developing a landscape-focused approach to investigating the past. The project will complement recent international studies (Given and Knapp 2003; Vandeput and Köse n.d.) and combine modern technical methodologies with theoretical approaches focussed on routines and experiences of inhabiting landscapes, to create a piece of work that aims to significantly influence the direction of future investigation in Byzantine archaeology.

1.2 What is Landscape?

Landscape archaeology is a refreshing and useful approach that needs to be employed more extensively in the study of Byzantium. Before this thesis can consider the Byzantine landscape, however, we have to first explore the meaning of the term landscape. Landscape can be illusive, difficult to define and hard to assess (Kaplan 1985: 161). As a result, the question 'what is landscape?' is an issue that many academics have found hard to resolve.

The origins of the English expression 'landscape' are thought to stem originally from an Anglo Saxon term which referred to an area of land ruled by a feudal lord, such as a river valley or range of hills (Calder 1981: 6). This term fell out of use and the word did not appear again until the 16th century when the modern form of the term was re-introduced into the language of 'painterly depiction' (Ingold 2011: 126) by Dutch artists who used the word as a technical term in reference to paintings of rural scenery (Schama 1995: 10). This had a major impact within the artistic world that swiftly moved to other disciplines. In 1577 William Harrison's *Description of Elizabethan England* was published as part of the Holinshed Chronicles and from this point 'onwards, a new awareness of the aesthetic nature of landscape emerged as a new kind of topographical writing flourished' (Jackson 1986: 80).

The Romantic poets and writers of the following period 'were in [a] large measure responsible for the ways we still read meaning into landscape [today]' (Cosgrove 1990: 3). William Wordsworth is one such writer whose poetic descriptions of landscape influenced the development of the term. Wordsworth wrote one of the first ever English guidebooks; a topographical description and reflection on the Lake District (1810). Central to this guide is the primacy of the gaze or view. In the Romantic tradition the term landscape refers to a visual prospect, of a place or space with a sub-text of the 'picturesqueness' (Hirsch 1995: 2). Denis Cosgrove has also considered Romanticism and landscape in his studies of John Ruskin (1979; 1982; Cosgrove and Thornes 1981), whose work Cosgrove believes forged a theory of landscape and social morality which was resurrected in 'New Romanticism' (1990: 3).

Mikhail Bakhtin describes the evolution in the way landscape was perceived during the Romantic period in his essay the *Forms of Time and of the Chronotype in the Novel* (1986). In this essay Bakhtin considers the new attitude of this period as a result of physical labour no longer being the only arena in which man encountered nature, therefore ‘nature itself ceased to be a living participant in the events of life’ (*ibid*. 217). As a result landscape became a setting for action which ‘was fragmented into metaphors and comparisons serving to sublimate the individual and private affairs and adventures, not connected in any real or intrinsic way to nature itself’ (*ibid*.). On reflection of these Romantic origins, the term landscape can therefore be said to relate ‘not so much to an actual environment but to a way in which that environment is visualised’ (Forbes 2007, 10).

Today we know that the expression ‘landscape’ does not only represent the physical picturesque referred to by the early Dutch painters. We can also see that Bakhtin’s ideas of nature and landscape, although relevant to early literature, cannot explain the further complexities that have developed. Even certain early Romantic writers recognised that landscape was more than this. Daniel Defoe, author of *Robinson Crusoe* (1719) explicitly linked the character of the landscape with the character of the society and culture inhabiting it (Rogers 1989: 198) paving the way for early ideas about landscape and culture. Over the last few centuries the term ‘landscape’ has developed in meaning to denote a vast and complex variety of ideas which make it difficult to define simply. With the increased use of the word ‘landscape’ and its development into what has been regarded as ‘perhaps the single most important word in the geographic language’ (Hartshorne 1939: 325), late 19th century and early 20th century geographers began to consider the complexity of the term’s multitudinous meanings.

This debate is discussed in detail by Richard Hartshorne, a prominent participant in the deliberations over the nature of geography, in his article *The Nature of Geography: A critical survey of current thought in the light of the past* (1939: 173-412). In this essay two main elements were recognised by Hartshorne as the customary meanings for the expression ‘landscape’. He described these two meanings as being either ‘appearance of land as we perceive it or simply a restricted piece of land’ (*ibid.* 326). This statement proposes that the two customary meanings for the expression are that landscape can refer to an area of the land of unspecified size that has homogeneity in its morphology or that it can refer to the observable features of mixed morphology in a specified but arbitrary area. Alexander von Humbolt is said to have been the first to ascribe to the first of the two meanings, describing landscape as ‘der totale character einer Erdgegend’ (the total character of an earth region) (cited in Wiens and Moss 2006: 366), whereas Nicole Branton reflects that 'the landscapes in landscape archaeology may be as small as a single household or a garden or as large as an empire' (2009: 51). This is counter to the idea that landscape is a measurement of area to be used in a manner similar to the term 'region'. During his analyses Hartshorne himself determined that the term 'landscape' 'while having something to do with an area of land, it is not the same as an area' (1939: 327). Hartshorne defined landscape as the external visible, or touchable, surface of the earth (*ibid*. 344) and he excluded the air, the ocean, underground mines, and the soil beneath vegetation from his definition, though he did include moveable objects (*ibid*. 339-340). Hartshorne also opposed the idea of the perception of landscapes by senses other than sight, such as sound, smell and feel, on the basis that 'in an empirical science of geography there is little need for any of the concepts of "landscape" as sensations' (*ibid*. 344).

This thesis disputes this opinion. Landscape and the variations within it can be perceived by a blind person or one with sight, albeit in a different manner. All senses should be included in an analysis of how people perceive the landscape as these other senses are felt at the same time as sight is experienced. This is now a much more popular attitude within modern archaeological thought and over the past decade, a number of articles and chapters in edited volumes have explored sensory approaches. These scholars have stressed a need to re-embody and re-sensualize the past (Joyce 2005; Meskell 1996). This thesis will explore how different sensory perceptions affect an individual's experience of landscape and how that landscape can have an effect on sensory perceptions. Exploration of past soundscapes is possibly the most recognised of the sensory approaches. This is an approach that has been advocated by anthropologists such as Marilyn Strathern (2000). Drawing on the views of the theorist Alfred Gell (1995), Strathern notes that landscapes become primarily auditory in situations of thick forest which removes the primacy of visual view (2000: 50). Natural places have also been considered in relation to noise, distortion, amplification, and echo (Holmberg 2005; Loose 2008). These noise effects have been explored in relation to monuments, with scholars offering evidence to suggest that they were meant to be both heard and seen (Devereux and Jahn 1996; Watson and Keating 1999). Sensory approaches have also considered touch (MacGregor 1999), and Stephen Houston and Karl Taube (2000) have demonstrated the importance of smell in ancient Mesoamerica. Sensory experiences also have physiological effects on the body and so can further stimulate other senses. Bert D'Arragon (2000) notes the significant changes that are felt by all of a person's senses as they descend into caves; changes which would affect their overall perception of the environment. This reflects the growth of understanding that such approaches can provide valuable insights into past societies. This approach cannot provide definitive answers, but it does encourage analysis of the complex relationships between people and the world they live within. The landscape analysis undertaken by this thesis will utilise these approaches to add further depth to the landscape analysis by considering an individual's perceptions while they experience different aspects of a landscape, for example the different perceptions experienced when walking along a routeway, looking at a field system or navigating village.

Carl Sauer, an American geographer and contemporary to Hartshorne, was one of the first significant proponents of this way of thinking and an influential scholar in the development of the concept of cultural landscape. Sauer believed in the 'establishment of a critical system which embraces the phenomenology of landscape, in order to grasp in all of its meaning and colour the varied terrestrial scene' (1925: 320). 'Cultural landscape' is a term the German geographer Otto Schlüter is credited with having first used in the early 20th century (Denevan and Mathewson 2009: 46). In his writings Schlüter defined two forms of landscape: the Urlandschaft (natural landscape) and the Kulturlandschaft (cultural landscape) (1899a; 1899b; 1903; 1920a; 1920b). This is based on the idea of the existence of a natural landscape untouched by human influence on which humans acted. Sauer nurtured this idea, regarding landscape study as an inquiry into how the first form, natural landscape developed, into the second form, cultural landscape. Sauer stated that 'The cultural landscape is fashioned from a natural landscape by a cultural group. Culture is the agent, the natural area is the medium, the cultural landscape is the result' (Sauer 1925: 343). This statement stresses culture as the force in manipulating the visible physical landscape.

The debate around cultural landscape developed, for the first time in the academic arena, the concept that the term 'landscape' could refer to more than simply what is visible. Despite the development of these ideas, including the recognition that sensory perception plays a key role in the interpretation of landscape, the complexities of the term 'landscape' still make it a difficult word to define. The actual meaning of the word is still at the forefront of debate and modern archaeologists still consider the views advanced by these early geographers when researching landscapes today. Matthew Johnston, a leading landscape archaeologist and theorist, describes the essential meaning of the term landscape as:

- The land itself made up of the humanly created features that exist objectively across space and their natural context.

- How the land is viewed by people and the cognitive systems and processes of perception (Johnson 2007: 3-4).

Like Hartshorne in the early 20th century, Johnson believes that part of the problem with studying landscape is that scholars have not always been careful to distinguish between these two ideas (*ibid.* 4). Landscape in Johnson's second point is a way of seeing and a way of thinking about the physical world. Johnson believes that 'This particular way of thinking and seeing is, in many conceptions of the subject…what transforms the "land" and its study into "land-scape"' (*ibid.*). This provides an important starting point for this thesis.

Tim Ingold worries that the use of the suffix 'scape', with its origins in Dutch landscape painting, has led generations of scholars to mistake the connotations of the suffix for a particular scopic regime (2011: 126). Ingold argues that the resemblance of the word to the Greek *skopos* meaning the target of the bowman, or the mark to which he aims is entirely coincidental and the suffix 'scape's' real origins lie in the old English *sceppan* or *skyppan* which means to shape (*ibid.*). Therefore, we should consider that, during the first use of the term landscape, it would have had associations with shaping the land, and 'the land was scaped by the people who, with foot, axe and plough, and with the assistance of domesticated animals, trod, hacked and scratched their lines into the earth, and thereby creating its ever-evolving texture' (*ibid.*). This means that both shape and shapers should be contemplated when defining what the term landscape means.

This thesis is concerned with all the elements of landscape discussed above. In order to avoid confusion it is important to explain clearly how the term landscape is used. Rachel Kaplan comments that to 'say that the landscape is a visual resource is to admit to the integral tie between the physical aspects of the landscape and the human experience of it' (1985: 161) and as soon as this happens and human experience becomes a feature in the concept of landscape, 'we are courting complexities' (*ibid.*). This is true, but those complexities cannot be removed - just as human experience cannot be removed.

- The term landscape in this thesis will therefore refer to the combined visible features, whatever they may be, both natural and man-made, that make up the surface of the land.
- There is no link between the term landscape and the size of an area. When referring to the landscape of a case study this text is referring to the surface of the earth

within the specified area of the case study. This area of the landscape is not defined by its physical components such as a valley or a mountain or the idea that homogeneous configurations of land are self-contained landscapes. The area of the landscape of each case study is simply defined by arbitrary geographical coordinates.

- The term will not be used to imply any aesthetic qualities to the land and what can be considered an unattractive military base or beautiful terraced hillside adjacent to each other within a case-study area are both part of the landscape of the case study.

This thesis does, however, accept that there is a relationship between the physical aspects of the landscape and human sensory perception and experience. When discussing the more complex and theoretical issues in the later chapters of this thesis, the term landscape will still only define the physical surface of the earth, but this physical landscape will be considered in light of Johnson's second point (2007: 4) and Ingold's ideas of land shape and shapers (2011: 126), as a complex combination of tangible features that are a conduit and consequence of experience and perception. This thesis recognises that physical observable landscapes are composed of culturally constructed and experienced places, therefore lived experience can be seen to manifest itself material in the physical environment. This thesis will investigate the physical manifestations of lived experience in Chapter 8.

There are lots of practical reasons to investigate landscapes. At the simplest level we first have to find sites before they can be studied (Cherry 2004: 23) and the best way to do that is to look at the landscape. But the study of landscape is an important aspect of archaeological investigation of past cultures for more fundamental reasons. The landscape itself is a source of information. As Nico Roymans asserts, landscapes are intricate, complex and multi-layered products of social dynamics and cultural practices and to fully understand a culture it is necessary to identify the perception and organisation of its space (1995: 2). Landscape is made up of a series of culturally constructed and experienced spaces. Space like landscape is a difficult concept to define and is often simplified to quantifiable attributes such as size and shape, but experienced space is much more than these quantifiable characteristics (Altenberg 2003: 22). Bernard Knapp and Wendy Ashmore use three terms to divide the main components they see as space: constructed space (to define physical means and the constructed ways in which people engage with their landscape), conceptualized space (to define space that dictates the meanings, relationships and interactions people lay on landscape) and ideational space (to define how people comprehend the imagined and emotional perspectives individuals place on their landscapes) (1999: 10-12). James Delle has converted these three components into the following more easily understandable and relatable terms: material space, created by people through physical means or through the establishment of definitions, descriptions and rules of how the space should be used, social space, which dictates a person's relationship with others and with material space, and cognitive space, which determines how people comprehend their social and material spaces and identify appropriate ways of conducting themselves in the different environments they occupy (1998: 37-9).

Space and therefore landscape 'forms the framework of our existence' (van Fraassen 1985: 3), and is consistently interwoven with the process of expressing meaning derived from the human mind and formed according to the functional or cognitive ideal (Altenberg 2003: 24; Harvey1989: 239). Landscape is a lived experience, as expressed by Ingold (2011: 126), organised in relation to the actions that are conducted within it. People do not just live on the land: they live through a series of meaningfully constructed landscapes, ranging from the personal and mundane to the political, economic, ritual, and exceptional (Vavouranakis 2006: 237). As a result of this, meaning can be found in the patterns of social relationships that leave discrete yet intricate and often difficult to distinguish marks on the landscape (Baker 1992) with settlements, roads, monuments and earthworks forming the framework for human social cognition. Through the ordering of spaces within the landscape we experience our role and place in society (Bourdieu 1977). Within space we define our own places. As Christopher Tilley argues, the idea of place is a cultural and social construction, its meaningfulness maintained through human activity (1994: 217). This thesis will investigate the physical manifestations of lived experience which can be seen in everyday landscape features such as, pilgrimage routes, sacred spaces, trade routes, pathways, field systems, villages, monuments and temporary shelters.

People create characteristic individual spaces that can be seen reflected in the material record which varies culturally (Zubrow and Dalypp 1998: 161). These can differ according to class and social status. For example higher status can be reflected in large household space or prominent location in a settlement. The importance and status of the church is frequently seen reflected in the size and prominent placement of churches in the Byzantine world (Green 2008). Through the symbolism implicit in the organisation of settlements and landscapes, day-to-day social interactions can be observed. The acquisition of these cognitive maps by successive generations transforms this space into a communicator of cultural knowledge, 'serving as what some neo-Darwinians call a "replicative" device, as well as a stabilizing force on the culture' (Donald 1998: 181). As Ingold has said, 'Through living in it, the landscape becomes a part of us, just as we are a part of it' (Ingold 1993: 154). If society is viewed as a dialectic relationship between the agency of people and social structures (Ashmore and Knapp 1999: 6), the landscape is both the conduit and the consequence of it. It is therefore extremely important to study the landscape and the organization of past peoples' social space in order to understand better their perceptions and experiences. Over the past decade this concept has rapidly become a substantial aspect of modern archaeological investigation with cosmological and cognitive approaches growing in popularity (Ashmore and Knapp 1999; Bradley 1998, 2000; Delle 1998; Nash 1997, 2000; Roymans 1995; Tilley 1994).

This thesis will investigate the physical manifestations within the landscape of lived experience. This will involve considering the processes that lie behind the development of these landscapes and assessing social, cultural, political and economic forces, including Byzantine beliefs about cosmology, the role of enduring architecture on successive generations and the importance of routines of daily life in shaping the landscape. This will require the consideration of manifestations of human interaction with the landscape, like pathways, pilgrimage and trade routes, from which perception and experience of the Byzantine landscape inhabitants can be inferred. For example a Byzantine pilgrimage route that purposely passes a specific landscape feature or monument rather than taking the most time effective route, implies the landscape feature or monument had importance. This choice of route would have had an effect on the perception and experience of a Byzantine individual traveling along the pilgrimage route, which would be different to the experience and perceptions of the individual if the route had not taken them past the important landscape feature or monument. This can be explored in relation to trade routes where economic factors have effects upon the routeways and therefore the people using them. This can also be explored in relation to everyday pathways which can be considered, for example, in light of the needs of a farm worker. This form of exploration also takes into account that different people will have different reactions to the landscape dependent on the factors influencing their actions and attitudes.

The locations of monuments, villages and sacred spaces, will also be considered in this thesis with the hypothesis that places are chosen for specific motivations which effect experience and perception of the landscape. This thesis will considered the perception of Byzantine peoples at all stages in a space's lifecycle. For example monuments will be considered in light of the motivation that drew people to build the monument in its location, the perception and experiences people had while the monument was utilised in that location and the experiences and perception of the people after the monument had gone out of use. The experiences and perceptions will be different during the different stages of the monuments life.

This thesis will also consider areas within the landscape used for cultivation and industry, and areas not used for any activities. Land use will affect an individual's physical experience of the landscape as the appearance of the land is altered to suit its use, while it can also imply different perceptions of the value of the landscape. The choice to use an area for a particular purpose, whether it be for agriculture or other uses, suggest a valuation of the area from which both perception and experience can be unravelled. Copper mines for example may be considered more valuable than agriculture for some cultures, but for others agriculture would have been important. An area of landscape reserved for a sacred activity, despite its value if used for another purpose, can also tell us a lot about a cultures perceptions and experiences. This thesis will use theoretical concepts explored in the following chapter to explore the different aspects of the landscape of the two case-study areas which can be seen as physical manifestations of human experiences. The intention of this thesis is to unite archaeology, landscape and Byzantium; too often separated into distinct disciplines.

1.3 Thesis Aims and Objectives

The principal aims of this thesis are:

- To develop new methodologies for analysing rural Byzantine historic landscapes.
- To apply a unique combination of archaeological theory and innovative methodological approaches to existing and newly created data.
- To develop new perspectives on rural Byzantine social organisation and landscape change in the eastern Mediterranean.

In order to achieve these aims, the core of this thesis is a detailed historic analysis of the spatial composition of the settlements and landscapes of two contrasting case-study areas; Pisidia in southern Turkey, and the Troodos Mountain foothills in the Nicosia district of

Cyprus. To achieve the detailed historic analysis of the spatial composition of the two study areas, this thesis applies the modern techniques of retrogressive landscape analysis and Historic Landscape Characterisation (HLC), now frequently employed in western European landscape archaeology (for Denmark see Møller 2004; for England see Aldred and Fairclough 2003; for Germany see Ermischer 2002; for Iceland see Aldred 2007; for Scotland see Dyson-Bruce *et al*. 1999) and recently pioneered in Byzantine archaeology by Dr Sam Turner of Newcastle University and Professor Jim Crow of Edinburgh University (Crow *et al*. 2011; Crow and Turner 2009; Turner and Crow 2010). An innovative approach has been specifically developed as part of this thesis, which utilises the results of archaeological ceramic survey when carrying out the HLC. This new method provides a further level of chronological definition to the historic landscape analysis of each case-study area. Geographical Information Systems (GIS) are used to implement the techniques and combine the multiple data types generated. A significant part of this thesis's research was conducted in the field where first-hand observations of the landscape took place and in the instance of the Pisidian case-study area, archaeological landscape survey was conducted expressly for the purposes of this project. The results of these two case-study areas are analysed in light of the aim to develop new perspectives on rural Byzantine social organisation and landscape change in the eastern Mediterranean. Consideration will be taken of specific physical manifestations of lived experience such as pathways through the landscape, pilgrimage and trade routes, landscape features, monuments, villages and sacred spaces, field systems and land use patterns. These will all be analysed in light of theoretical methodologies which believe experience and perceptions of past people can be captured in the framework of the landscape. This thesis also approaches the questions of whether it is possible to uncover the Byzantine landscape in sufficient detail and if the HLC methodology can effectively be employed in these eastern Mediterranean regions.

1.4 Case Studies

The core of this thesis is a detailed historic analysis of the spatial composition of the settlements and landscapes of two contrasting case-study areas. **Figure 1.1** locates these two case studies in the area of the eastern Mediterranean. The first case study is located approximately 35 kilometres north-east of Antalya on the border between Pisidia and Pamphylia. The landscape of the region is one of rough, rocky mountains, steep forested hills in the north and flat fertile plains interspersed with villages in the south. The second case study is located in the foothills of the Troodos Mountains in Cyprus south-west of Nicosia. 'Mediterranean islands [like Cyprus] present historically conservative settings in which situational and environmental factors are emphasized and great cultural contrasts can exist over short distance' (Rautman 2005: 453). As an island, Cyprus is isolated from the rest of the eastern Mediterranean by the sea; this suggests that Cyprus may present distinctive HLC types. However, Cyprus is no further than 320 kilometres in distance in a south-easterly direction from the Pisidia case-study area and there is clear evidence for trade and cultural exchange between southern Turkey and Cyprus throughout history. Each of the case studies will be provided with more detailed background information in Chapter 6 and Chapter 7 respectively. The Pisidia case study is the larger of the two and has had less archaeological investigation carried out in the area. The main aim of this HLC will be to provide new information on the landscape as a result a first-hand survey will be conducted in this area. The Troodos case study has had extensive archaeological investigation carried out on the area, therefore the main aim of this case study is to explore the methodology of the HLC technique. By means of these case-study areas, it is hoped that the differences and similarities between the Troodos case study in Cyprus and the Pisidia case study in southern Turkey will be highlighted. This will provide an insight into the regional diversities in the use, development and consequence of the landscape and therefore any regional differences in the perception of the landscape.

1.5 Thesis Structure

To present this research, this thesis is divided in to eight chapters. Chapter 1 sets the scene for the main body of research by explaining the problem that this thesis wishes to resolve and the manner in which this will be done. This chapter investigates why it is essential to study the landscape in order to fully appreciate the lives of past peoples and sets down the aims and objects of the project. Chapter 2 then examines how the discipline of landscape archaeology developed. Chapter 3 critically reviews archaeological survey methodologies and existing literature on Byzantine landscapes. This chapter then investigates the lack of consideration of the landscape as a whole in eastern Mediterranean archaeological surveys. Chapter 4 discusses how the HLC technique developed and what this process entails, before Chapter 5 explains in detail the methodology that is used to investigate the landscapes of the two case studies.

The next two chapters make up the main body of research. Chapter 6 contains the HLC of the Pisidian case-study area and Chapter 7 contains the HLC of the Troodos case-study area. Each case study chapter contains an introduction to the location of the area and an explanation of why the area was chosen as a case study. This is followed by a history of human activity in the area. This draws on high-quality research generated over the last 15 years by international research teams including the Sydney Cyprus Survey Project (SCSP) (Sydney Macquarie University, Glasgow University), and the Pisidia Survey Project (PSP) (British Institute at Ankara, Hacettepe University, Newcastle University); the latter of which has yielded data from a group of early Byzantine kiln sites which represent a unique discovery that will provide extremely valuable insights into uses of the rural landscape. All of this information provides an excellent basis for a much-needed synthesis and analysis of early Byzantine landscapes. Each case study then includes a record of the sources of data used in each historic landscape study which differ across each case study. This background information is then followed by descriptions of the focus studies carried out in each case-study area. These focus studies aid the determination of the HLC types, which are then described and in most cases accompanied by visual examples. The results of the HLC for each case-study area are then presented. This includes large-scale images of the final HLC. The raw data for each HLC case study can also be found in the accompanying CD (**Appendix 2.2**) which contains shapefiles for each HLC viewable in ArcGIS or ArcGIS Reader. The results of each case study are then analysed in order to decipher how the results of the HLC have helped interpret the landscape development of each case-study area. This provides a framework for the Byzantine landscape configuration, which is in turn explored to uncover new intelligence on the inhabitants of the rural Byzantine landscape.

Chapter 8 provides a comparative discussion of the results of the two HLCs, discussing the conclusions about the development of the physical landscape of each case-study area and looking at the differences in the landscape character of each region. This is followed by an examination of the changing spatial relationships detected and an exploration of the organisation of Byzantine social space by applying new theoretical paradigms that have only been extensively explored in relation to western Europe. This will involve considering the processes that lie behind the development of these landscapes and assessing social, cultural, political and economic forces, including Byzantine beliefs about cosmology, the role of enduring architecture on successive generations and the importance of routines of daily life in shaping the landscape. Conclusions about the perceptions of the landscape during the Byzantine period are then presented. Chapter 8 then analyses the effectiveness of the methodologies used in the thesis revealing how modern techniques can provide an excellent framework for ways in which the landscape was structured and organised in the past. This reports on how effective retrogressive landscape analysis, HLC and archaeological landscape survey was in each case-study area and contemplates whether certain landscape types are better suited to these methodologies. This section also discusses the data types used in each case-study area and how they affected the HLC results. In particular the innovative use of archaeological landscape survey to aid HLC is evaluated in detail. The thesis concludes with a discussion of the future of historic landscape studies and the potential of the methodologies used in the thesis to revolutionise future investigations.

Chapter 2

Background to the Method: Landscape Archaeology

2.1 Introduction

The previous chapter defined why landscapes are an important source to study in order to gain an insight into the Byzantine past. This chapter is concerned with landscape archaeology. Landscape archaeology, by its nature, is concerned with perception and experience. It investigates relationships between the physical elements of the land and how people navigate landscapes, conceptually and through lived experience (Seibert 2006: xvi) and it recognises how people's perceptions shape how they see the environment, and how the environment, in turn, shapes cultural perceptions of the landscape (Ashmore and Knapp 1999: 6). Before this thesis can carry out its analysis of the landscape of the two eastern Mediterranean case-study areas, it is necessary to discuss the discipline of landscape archaeology in order to provide a solid background to contextualise the methodologies that this thesis will use and draw attention to the areas of landscape archaeology that need more development. This chapter does not aim to provide an extensive in depth review of the discipline. Instead, this chapter aims to provide a fundamental understanding of the development of the main theories, techniques and approaches of landscape archaeology. This will provide a background to the methodological approach of this thesis. Section 2.2 will begin with a discussion of what landscape archaeology is.

2.2 Landscape Archaeology

The relationship between early topographers and antiquarians in the development of landscape studies has been well discussed by many scholars (Daniel and Renfrew 1988; Johnson 2007: 16-17; Trigger 1989: 47–52). Travellers' accounts and early topographers have inspired much archaeological work and have been a valuable source of information acknowledged and used in later traditions (Gkiasta 2008: 41). Strictly archaeological observation of the landscape is very different. Archaeology has been analysing spatial relationships and through them providing insight into the activities, and social relations of past cultures for as long as the discipline itself has been studied (Kroll 1991: 1). However, the early archaeological research which first studied the spatial arrangements of artefacts, architecture and archaeological features recorded the spatial information for functional purposes only. For example, the location of an artefact was recorded to date a building and the walls of a building planned to provide a picture of the structure. The spatial relationships between objects and features which were incidentally recorded during this process were not originally conceived of as being an insight into either socio-cultural systems as is believed by today's functionalist and processualist archaeologists, nor were the spatial arrangements of artefacts thought to be imbued with multifaceted socio-cultural meanings, as many post-processual archaeologists believe to be the case today (Seibert 2006: xiii) and which will be explored by this thesis.

The term 'landscape archaeology' first came into use in Britain in the mid-1970s (Fleming 2006: 267). The term was instigated by Mick Aston and Trevor Rowley (1974) who wanted to 'forge a link between field archaeology … and the infant study of landscape history' (*ibid.* 11). However, landscape archaeology as a distinct sub-discipline of archaeology, albeit without the title, developed much earlier when archaeologists began to recognise that to get a balanced view of how past cultures developed and functioned one needed to understand the ecosystems, geology and cultural record of the culture in question. This requires the recording of not only major historic sites like those of Hagia Sophia, Ravenna and Ephesus but the more discrete records of past peoples such as rural settlements, flint scatters and a general understanding of the ecological and geological development of an area. This resulted in the development of archaeological approaches that moved beyond individual sites or finds to consider relationships at a landscape level (Turner forthcoming 2012). Today landscapes have come to be of significant importance to many archaeologists. This can be seen in the increased publication of landscape archaeology textbooks (David and Thomas 2008; Muir 2000).

Today landscape archaeology 'means many things to many people' (Chapman 2006: 11). This is exemplified in the following definitions of landscape archaeology. The following quotes provide an introduction to what landscape can mean to a variety of academics in different archaeological disciplines.

> 'Landscape archaeology can be said to be the archaeology of "place"' (Anschuetz *et al*. 2001: 159).
>
> 'landscape approaches are concerned with spatial, not necessarily ecological or economic, relationships. While similar to settlement archaeology and ecological archaeology, landscape approaches model places and spaces as dynamic participants in past behaviour, not merely setting (affecting human action), or artifact (affected by human action)' (Branton 2009: 51).

> ‘an approach, especially in archaeological survey, where the unit of analysis is the artefact rather than the site….[It] recognises that many of the material consequences of human behaviour are ephemeral and will not conform to standard definitions of sites, and documents the distribution of humanly-modified material across the landscape’ (Bahn 1992).

> ‘Landscape archaeology places humans into a broad context where they are seen to have been in a state of continuous interaction with the environment’ (Greene 1995: 51).

> ‘concerned with both the conscious and the unconscious shaping of the land’ (Metheny 1996: 384).

These definitions are all different in tone and emphasis. This is a result of how all landscape archaeologists’ interpretations are deeply affected by their theoretical positions, interests and knowledge (Johnson 2007). As Johnson states, despite the fact that ‘We are all students of the past; [and] archaeologists all claim to have a common goal, the study of human beings.… the way in which archaeologists have come to understand landscapes in different areas of the globe is, at least at first sight, utterly different’ (*ibid*. xxii). This has not always been fully appreciated or acknowledged (Turner forthcoming 2012). Timothy Darvill states that the ‘greatest significance of all landscape archaeology is the way it has replaced the focus on single tightly defined sites with an interest in much bigger areas that are more closely matched with the physical scale at which human societies operate’ (2003: 221). Landscape archaeology is all of these things. Landscape archaeology studies the landscape in all its meaning with all its implicated complexities. Landscape archaeology differs from the wider discipline of archaeology due to its lack of emphasis on excavation, its breadth of scale and its ability to look at the overall picture. It is this ability to look at the overall picture that makes landscape archaeology a perfect tool to be utilised by this thesis to try to unravel some understanding of Byzantine society in this thesis’ two case-study areas.

In Paul Bahn’s description from the Collins dictionary of *Archaeology* quoted above, it is important to note the emphasis on archaeological survey which is often inter-exchanged with landscape archaeology but does not necessarily mean the same thing. It is therefore, important in this chapter to define the differences between landscape archaeology, and landscape survey. Landscape survey is a technique used by archaeologists to discover historic sites and record information about the location, distribution and composition of human culture across a specified area of land. ‘The aim of archaeological surface [landscape] survey is to locate and relate in a diachronic perspective all remains of human activity across a landscape; it thus operates on a broad temporal and regional scale' (Alcock 1993: 33). However, archaeological landscape survey is rarely able to collect all remains of human activity as stated by Alcock in the above quote. This usually consists of a systematic survey of the area using varied archaeological methods such as field walking and monument recording to detect patterns in the distribution of material culture visible on the surface of the ground. Most commonly, this refers to the recording of ceramic material, but it can include surface artefacts such as lithics or metal work. This is a technique that will be conducted as part of the primary research of this thesis and results of previous archaeological surveys will also be investigated and presented in Chapters 6 and 7. Chapter 3 explores archaeological landscape survey with a particular emphasis on the Mediterranean region. Landscape archaeology covers a wider field of investigation. It is not simply concerned with the investigation of surface material and it involves the systematic investigation of a specific area using a wide variety of practical and scientific techniques, for example geophysical investigation, aerial prospection or the above-mentioned method of archaeological landscape or surface survey.

2.3 The Development of Landscape Archaeology

Landscape archaeology is by nature an interdisciplinary concept and the strength of influence from the humanities, the biological and physical sciences, and the social sciences has significantly shaped its development and approaches (Turner forthcoming 2012). It was during the 19th century that these first foundations of systematic study of the past began. One of the first theoretical ideologies to impact upon landscape archaeology and archaeology in general was the concept of culture history (Lyman *et al*. 1997: 1). This concept groups archaeological sites and artefacts into distinctive cultures, distinguished by factors such as patterns of craftsmanship, pottery styles, and burial practices (*ibid*.). Cultural historians believed that each culture had a set of customs controlling human behaviour and viewed the past as a collection of populations, categorised by their variations and by their influences on each other (Burke 2008). The development of culture historical archaeology has been described as 'a response to growing awareness of geographical variability in the archaeological record at a time when cultural evolutionism was being challenged… [and there was a] growing nationalism and racism, which made ethnicity appear to be the most important factor shaping human history' (Trigger 2007: 211). The culture history movement emphasised the importance of describing facts and classifying finds (Gamble 2001: 23), a methodology which is still very important to landscape archaeology today, and in particular to ceramic survey, as will be seen in

Chapters 6 and 7 of this thesis. Culture history has been described as the 'default setting for most archaeological inquiry' (*ibid*. 22). We will see later the more recent theoretical approach of post-processual archaeology which is favoured by this thesis' approach, also emphasises the significance of repeated patterns in material culture. This thesis will consider patterns seen in the landscape features, like routeways and fields systems, and patterns in the spread of material culture across the landscape, echoing the approach of culture history. This makes culture history one of the underpinning theoretical concepts of landscape archaeology and although not all modern landscape archaeology adheres solely to these ideas, culture history has played a part in the advancement of the discipline.

In the early 20th century, little or no training was available in archaeology, so scholars who studied landscapes usually had backgrounds in other disciplines, such as geography or cartography (Turner forthcoming 2012). Cyril Fox is thought to have set the stage for the later development of landscape archaeology with his study of the archaeology of the Cambridge region (1923) by employing a geographical approach to studying settlements and the relationships between past societies of these settlements and their environments. The language used in this study is very geologically deterministic but it also touches on the human aspect and decision process behind settlement choice location. Fox continued this approach and applied it to all of Britain with his book *The Personality of Britain* (1932). Fox's choice of title is particularly appreciated by this thesis because it suggests the landscape has personality and this thesis's following chapters will explore how landscape can have different character types dependent on the historic development and the human interaction with the land.

A better known influence in the development of landscape archaeology of the historic periods is the work of the economic and landscape historian William Hoskins. Hoskins (1955) worked within an intellectual paradigm set out by Wordsworth, which complimented Wordsworth's descriptions of the Lake District. These romanticist views undoubtedly played a significant part in Hoskins' thought processes (Johnson 2007: 33). Much of this influence is indirect. Hoskins' works, particularly the pioneering book *The Making of the English Landscape* (1955) which demonstrated the impact of human activity on the development of the English landscape, had a great impact on the awareness of historic landscapes. This work has been described by current scholars as 'a pace-setting and revolutionary statement of historical geography which has been hugely influential on the historical study of the environment in England' (Purcell 1997). Hoskins' work has also influenced scholars of the Mediterranean, as will be discussed below. Hoskins was a contemporary and a great influence upon the work of a number of landscape historians and archaeologists who went on to dominate historic landscape archaeology in the 1950s and 1960s, such as Maurice Beresford, John Hurst, and O. G. S. Crawford, who is discussed later (Johnson 2007: 34). In *English Landscapes: How to read the man-made scenery of England* Hoskins promotes the idea of landscape as a palimpsest and referred to scenery as a complex coded system to be deciphered (1973). Hoskins wrote 'The English landscape itself, to those who know how to read it right, is the richest historical record we possess' (1955: 14). Since then, study after study has shown how much can be learnt from landscapes when investigated in this light (Aston 1985: Bowden 1999; Muir 2000). This approach can be termed as landscape analysis, based on considerations of observable data and investigating trends within it (Chapman 2006: 12). Hoskins' success in communicating results to a wider audience began to influence wider agendas such as planning and landscape management, and an increasing awareness of the values of landscape features such as hedgerows and historic buildings developed (Turner forthcoming 2012). Hoskins' work is integral in the development of the landscape analysis approach this thesis will use. Hoskins' ideas on how the landscape can be unravelled through investigation and interpretation of landscape features gradually developed into the technique of retrogressive landscape analysis, a technique that is described in detail in Chapter 5 and is heavily used in this thesis's study of the two eastern Mediterranean case studies. As we will see in the following discussions, many more of the various methods instigated by Hoskins and his contemporaries are also still widely used today (*ibid*.). However, Johnson (2005) has argued that work in this tradition does not engage with theory and is not sufficiently self-reflexive. He comments that Hoskins in particular wrote evocative, nostalgic histories but failed to engage with important issues such as colonialism or the exercise of power (*ibid.* 114-9).

A contemporary of Hoskins and an influential landscape archaeologist of the early 20th century was O.G.S. Crawford. Crawford was the pioneer of aerial archaeology and author of early publications on the value of the technique (1923; 1928; 1929). Aerial archaeology was one of the most significant early developments in landscape archaeological investigation, a technique that is essential to the methodology used in this thesis which relies heavily on the use of aerial and satellite imagery in its landscape analysis. The advantages of this technique were significant as large sites could be viewed accurately and wholly. In addition to this, certain types of archaeological features were found to be more easily visible from the air than the ground through phenomena such as crop marks, shadow marks and soil marks (Riley 1982). Surveyors recorded the earthworks and visible features, and developed ways to present and map them (Bowden 1999). Crop marks are not a new idea however. As Crawford and Keillor point out, 16th century British antiquarian William Camden describes crop marks in a field of corn marking the lines of ancient streets.

> 'But now has eras'd the very tracks and to teach us that cities dye as well as men, it is at day a corn field, wherein the corn is grown up, one may observe the droughts of streets crossing one another, and such crossings the commonly call St. Augustine's cross' (cited in Crawford and Keillor 1928: 37).

This is an excellent example of how people in the past recognised the history of the landscape which would have affected their perceptions and attitudes. Extensive aerial photography coverage of Britain and Europe was a side effect of the importance placed on aerial surveillance by the military during both the First and Second World Wars (Bourgeois and Meganck 2005; Stichelbaut 2006). These military photographs provided a birds-eye view of the landscape allowing archaeologists to discover and record archaeological sites visible from the air. Crawford was significantly the first to use the oft repeated analogy between the landscape and a palimpsest. According to Crawford, the landscape is like:

> '…a document that has been written on and erased over and over again; and it is the business of the field archaeologist to decipher it. The features concerned are of course the field boundaries, the woods, the farms and other habitations, and all the other products of human labour; these are the letters and words inscribed on the land. But it is not always easy to read them because, whereas the vellum document was seldom wiped clean more than once or twice, the land has been subject to continual change throughout the ages' (1953: 51).

This idea influenced the development of the retrogressive landscape analysis technique. Other early proponents of aerial archaeology include Roger Agache in France (1961), Alexander Kennedy in Jordan (1925), Antoine Poidebard in Syria (1928), and Derrick Riley in Britain (1944). The investigation of the landscape and the archaeological features that could be seen within it through aerial imagery became one of the most significant areas of landscape archaeological research. With the advancement of modern technology, satellite imagery became a source for aerial archaeology (Parcak 2009: 18). War again played a part in the advancement as the Cold War instigated the development of the US space imaging program with CORONA, ARGON and LANYARD systems taking photography between 1960 to 1972 (*ibid*. 19). The full extent of this imagery was not fully realised until it was declassified. CORONA imagery will be discussed in more detail in Chapter 5 as a source of information for the HLCs of the case-study areas without which this thesis's research would not be possible. With the advent of space technology, focus moved to the multispectral capabilities of aerial photography (Agache 1968). This developed into the study of spectral reflections of soil and vegetation to reveal archaeological features. These advancements led to the application of multispectral Landsat satellites in the 1980s and the use of LiDAR (Light detection and radar) for archaeological purposes. Sarah Parcak's volume *Satellite Remote Sensing for Archaeologists* explores in detail the development of these technologies and their applications for archaeology (2009). Today, extremely high-level remote sensing data is available which can provide imagery, radar, and topography height data of the landscape. Recent applications of remote sensing data will be discussed in more detail later in this chapter.

A prominent British historian whose work had a major impact upon the development of landscape archaeology in Britain and the Mediterranean was Oliver Rackham, an acknowledged authority on the British countryside, especially trees, woodlands and wood pasture. Rackham's work *The History of the Countryside* (1986) was a seminal work on the mapping of the 'ancient' and 'planned' countryside of England that epitomised the 'exciting fusion of landscape archaeology, local history, historical geography and historical botany' (Rippon 2007: 2) of the 1980s. Rackham also published extensively on the ecology of Crete in Greece. His volume co-written with Jennifer Moody *The Making of the Cretan Landscape* (1996), asserts clearly Rackham and Moody's adherence to Hoskins' methods. The foremost statement of the volume is that 'The key to the past lies in the functioning of the present landscape' (*ibid.* 10). Mediterranean landscape archaeology, as we will explore in more detail in Chapter 3, has developed from the western tradition of survey archaeology which was influenced deeply by the Hoskins school of thought. Therefore, Mediterranean archaeology, especially in Greece, often takes a holistic approach to landscape (Purcell 1997). However, Hoskins' methods had not been applied as competently and comprehensively to the Mediterranean prior to Rackham and Moody's study of Crete. The volume, like Hoskins' *The Making of the English Landscape* (1955), provides detailed, easily understandable discussions about the ecology, landscape features, people, climate and more of the landscape of Crete and although written as an insular island study, many of the observations can be applied to other Mediterranean landscapes. As Nicolas Purcell has stated, 'No other work so lucidly conveys the quiet revolution of the last twenty years in our understanding of how the history of Mediterranean landscapes has worked' (1997). This volume and Rackham's later work with Alfred Grove *The Nature* *of Mediterranean Europe* (2003) is also influential in Mediterranean landscape studies which will be explored in Chapter 3 and has had a major impact upon the development of the landscape analysis methods used by this thesis and described in Chapter 5.

In the 1960s, during the same period that satellite remote sensing was being introduced and Rackham's theories of landscape were developed, processualism emerged. This was a school of thought which used the 'hypothetico-deductive-nomological' method. This greatly affected Anglo-American archaeology and played a big part in the advancement of landscape archaeology. It was during the processualist movement that many of the landscape archaeology techniques used in this thesis were developed. The academics that fostered this school of thought were from varied academic backgrounds and held different beliefs, which means that processual archaeology cannot be defined as a single mind-set or approach. However, a unifying factor among processual archaeologists was their critique against the culture-historical approach (Flannery 1972: 102-107) and an interest in the processes of cultural change, thus the selection of the name 'processual'. The most distinguishing elements of processual archaeology are a positivist view (belief in empirical truth), a functionalist approach (social phenomena explained in terms of the relationship and contribution to maintenance of the society), an interest in the systems and processes of social change, and acceptance of universal frameworks of culture (Darvill 2003: 154, 260, 335; Binford 1965: 203-210). Processualist archaeology espoused overtly scientific methodologies within the discipline and readily incorporated aspects of other scientific disciplines (Forbes 2007: 15). Processualism put great emphasis on the disciplines of ecology, and geology (Watson 2008: 31). Harry Godwin's work on reconstructing past landscapes and environments using microfossil remains of plants, particularly pollen (Godwin 1975), paved the way for future advances in environmental archaeology. This form of investigating past landscapes through natural environmental remains has become a significant part of modern archaeological landscape studies.

One of the most important contributions of the processualist school to landscape archaeology was the advancement of regional survey. This was a technique that had already developed prior to processualism, but one which was advanced greatly by the processualist school's interest in how past humans interacted with their environments and the processualist focus on systematic and quantitative spatial methodologies (Turner forthcoming 2012). A problem with the processual approach is that the division of artefacts and activities into sub-systems is a far too simplistic way of studying material culture.

Julian Thomas states that scientific approaches ‘will never succeed in producing the understandings of the past which we require’ (1996: 88–9). Material culture can include multi-layered meanings and the processual approach fails to decode these meanings. Although there is much that can be criticised of the processualist approach, development of regional survey implemented the crucial recognition that ‘archaeology was more than the study of artefacts and that individual sites should be placed in a wider setting’ (Forbes 2007: 15). This developed new ways to create and analyse maps of ancient settlement patterns (Hodder and Orton 1976). Chapter 3 discusses in more detail processual pioneers of early settlement pattern approaches and their relationship to the development of archaeological survey methods which effected the development of this thesis’s methodology. Processual approaches to settlement archaeology are explored in Kwang Chang’s *Settlement Patterns in Archaeology* (1972).

In the 1960s, the phrase ‘American archaeology is anthropology or it is nothing’ (Willey and Phillips 1958: 2) was adopted as a processualist’s manifesto. Influential members of the processualist school such as Lewis Binford, David Clarke and Colin Renfrew declared that archaeology should not only be more scientific but also use an anthropological approach (Johnson 1999: 20). Binford promoted empirical methods of investigating the past and stated that processual archaeology should attempt to explain observed phenomena (1965: 203-210). One of the processual school’s most substantial components was the use of ethnographic analogy and middle range theory. Middle range theory was employed by archaeologists to connect universal and high-level social theories to scientifically observable patterns, and to study how site formation reflects human behaviour (Darvill 2003: 260; Greene 1995: 172). Binford developed this idea and began to apply anthropological methods in archaeology (Binford 1978). He believed that artefacts can be explained within the single framework of cultural change and argued that archaeology provides the tools to study evolutionary changes of societies (Binford 1962; Binford and Binford 1966). Ethnographic analogy can be a very useful tool for investigating the past landscape and land use and is considered in this thesis in Chapter 8; however, one must be particularly aware of the dangers in using analogies. Peter Peregrine explores the pros and cons of this approach (1996). With an ethnographic analogy approach we interpret the past from a contemporary framework (Duke and Wilson 1995: 6), but it cannot be assumed that human behaviour in the modern period, whatever the physical circumstances of the peoples in question, can be directly compared to a past culture or a culture in another environment (*ibid.* 5-6).

In the 1980s and 1990s, the problems with the processualist approach of the 1970s to landscape archaeology led to a reaction against the school of thought (Watson 2008). The impetus for this change in landscape archaeology came from the social sciences, particularly from geography (Turner forthcoming 2012). From the early 1970s, social scientists and geographers had begun to critique approaches that appeared to lack interest in social processes and social theory, and did not appreciate that landscapes were not neutral containers but contested spaces (Olwig 2004; Tilley 1994: 9). Cultural geographers began to believe that understanding how landscapes are perceived was integral to understanding how people relate to the world (Cosgrove 2006: 50; Widgren 2004: 457-8). They saw the concept of landscape as related to 'ways of seeing' (Widgren 2004: 457) rather than physical structures and their interrelations in the landscape. Denis Cosgrove and Stephen Daniels described landscape as 'a cultural image, a pictorial way of representing, structuring or symbolising surroundings' (1988: 1). To them, landscape was always changing, constantly negotiated and culturally constituted (Turner forthcoming 2012).

The movement that developed in archaeology was post-processualism. This is a catch-all term for a group of archaeological approaches and should in reality be referred to as a group of archaeologies based on a wide range of theoretical perspectives including post-structuralism, hermeneutics and phenomenology (Shanks 2009). This movement was led by archaeologists such as Michael Shanks, Christopher Tilley and Ian Hodder. Post-processualists questioned processualism's scientific approach by stating that all archaeologists are biased by their own personal opinions and therefore a purely scientific approach to archaeology was impossible. Post-processualists instead accepted their own fallibility and analysed not only the material remains they excavated, but also themselves, their attitudes and opinions. Influenced by Pierre Bourdieu (1977) and Anthony Giddens (1984) post-processualists highlighted how people shaped life by developing archaeologies that interpreted agency, structure and practice (Turner forthcoming 2012). Post-processualism attempted to understand how people experienced the past by adapting theoretical paradigms to the landscape. Phenomenology was one of these approaches which became a popular framework among post-processual archaeologists for understanding landscapes. Phenomenology was derived from the ideas of Martin Heidegger (1972) and Edmund Husserl (see Welton 1999), and was principally developed and applied in archaeology by Tilley (1994): 'The key issue in any phenomenological approach is the manner in which people experience and understand the world' (*ibid.* 11). Phenomenology focuses on the relationship between 'being' and 'being-in-the-world'. The 'gap' between the person and the rest of the world is bridged with perception, observation, seeing, hearing, feeling, bodily actions, emotion and awareness (*ibid.* 12). This thesis will explore this in Chapter 8 considering patterns of landscape features, the role of enduring architecture on successive generations and the importance of routines of daily life in shaping the landscape through the creation of physical manifestations of experience such as pathways, pilgrimage routes and villages. Tilley (2008) provides a review of phenomenological approaches to landscape archaeology.

Not all archaeologists accept post-processual approaches and some believe that the preoccupation with perception has led, in some cases, for archaeological projects to become more about performance or cultural production than archaeological investigation (Fleming 2006: 268). Phenomenological approaches have also been criticised for focusing on monuments 'rather than more ephemeral traces of human activity' (Knapp and Ashmore 1999: 4). Andrew Fleming has explored critiques of post-processualist approaches in detail (2006). As Shanks points out, post-processualism is mainly an academic phenomenon found in university departments (2009: 134). Outside of this environment few field archaeologist would consider themselves purely post-processualist even if their work is permeated with post-processual ideas (*ibid.*). However, as Widgren states, the juxtaposition of processual and post-processual approaches to landscapes is not necessary (2004: 464). Instead, dialectic synthesis between these two academic traditions should be found. The empirical study of the morphology of the landscape, settlement patterns, and other raw data from landscape studies is equally important for the comprehension of a landscape, as is the consideration of individual perception and experience of the landscape. One of the attractions of landscape archaeology is that it can encompass the extremes of both processualist approaches and post-processualist approaches (Wilkinson 2006: 335).
This thesis advocates this view, using systematic methodologies developed from a processualist mind-set to collect and study data about the landscape, while combining the analysis of the data with post-processualist thinking to explore how the data may allow us to discover new insights into the landscape and the human experience of the people living within the landscape.

Current archaeology has been said to have reached a new maturity after catching up with other disciplines (Hodder 2012a: 3). Adding to this maturity is a new phase of reflexivity and critique (*ibid.* 11). Rising concern over human impacts on local and global ecologies in many ways is the impetus for this new work (Heilen 2005: 31; Turner forthcoming 2012). Over the last few years, scholars have increasingly come to understand that 'the material things they study are important elements in networks of relationships that can be analysed to understand and explain people's experience of the world' (Turner forthcoming 2012). Scholars like Nigel Thrift (2007) and Sarah Whatmore (2006) are developing practical geographies that engage with the material world in order to overcome the structural divide between 'nature' and 'culture'. This builds on research in science and technology studies, philosophy and studies on relationships between actants (Latour 2005; Law 2004). Researchers such as Oliver Harris and Tim Sørensen (2010) have begun to rethink emotion and material culture using 'affect', an idea that originated in geography (Clough 2007: 2) as a way to help understand people's embodied engagements with the world and their experience of being entangled with it. Overwhelmingly archaeologists today are exploring this idea of entangled relationships between people and things, the past and the present, and how they all change over time (González-Ruibal 2007; Webmoor and Witmore 2008: Witmore 2007). Hodder argues that the interrelationship of humans and things is a defining characteristic of human history and culture (2012b). In his recent publication *Entangled: An Archaeology of the Relationships Between Humans and Things* (*ibid*.), Hodder provides a critical review of the contemporary perspectives from materiality, material culture studies, phenomenology, evolutionary theory, behavioural archaeology, cognitive archaeology, human behavioural ecology, actor network theory and complexity theory. This volume investigates the intricacy of human relationships with material things and demonstrates how humans and societies are entangled in the preservation and continuation of material worlds (*ibid.*) a fact that will be explored in Chapter 8 of this thesis's in relation to the two case-study areas.

Technical landscape archaeological techniques have also reached a new level in the 21st century. Now more than ever, modern computerised technology is being used in new and innovative ways to advance the understanding of landscape history. Early aerial archaeologists would be amazed by the quality and ease of access to remote sensing data. Applications like Google Earth, which provide free imagery of the entire world, allow anyone to carry out aerial prospection as long as consideration of the limitations are taken into account (Beck 2006). Today remote sensing data is being used in exciting new ways by archaeologists such as Carrie Hritz and Tony Wilkinson (2006), and Jason Ur (2003). The use of LiDAR is more exploited with new ways being developed to survey earthworks and landscape features under natural vegetation coverage such as woodland (Devereux *et al.* 2005; 2008). Satellite imagery is also being used to manage landscapes and has been a significant influence on heritage management through damage and destruction assessment (Contreras 2010). Satellite data such as this is now used frequently on large-scale projects (Philip *et al*. 2002). Technical advances have been seen in field equipment with laser scanning, state-of-the-art total stations and ground penetrating radar and other forms of geophysical equipment which can detect what is under the ground non-invasively. Landscape archaeology and landscape survey have also been improved by the utilisation of Global Positioning Systems (GPS) and the use of GIS. GIS allows researchers to test hypotheses quickly and establish spatial statistical significance (Armstrong *et al.* 2009), increasing the inferential rigour of archaeological studies (Lake and Woodman 2003: 693). GIS can also help us understand the range of variation of social organisation and space (Allen *et al.*1990). GIS has also been explored in relation to how it can be used to explore perception (Witcher 1999) and the topography of the mind (Llobera 1996). The advantage of GIS for landscape archaeology is its 'ability to characterise rather than to categorise phenomena' (Hu 2011: 86). As a result, GIS can help rigorously test assumptions about social evolution (*ibid*.). Many of these technical developments in landscape archaeology will be utilised in this thesis's landscape analysis in Chapters 6 to 8 alongside the many theoretical approaches discussed in this chapter.

2.4 The European Landscape Convention and Landscape Archaeology

The trend towards interpretative perspectives and the importance of perception seen in the theoretical approaches to landscape described above have been reinforced by recent developments in landscape policy (Turner forthcoming 2012). The main impetus for this is the European Landscape Convention, also known as the Florence Convention. This convention describes 'landscape' in human terms as:

> 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (CoE 2000: Article 1).

This convention promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues. This introduces a Europe-wide concept centring on the quality of landscape protection, management and planning of the entire landscape, not just outstanding areas. Through this groundbreaking approach and broad scope, it complements the Council of Europe's and UNESCO's heritage conventions. The development of these European actions has meant the increased recognition of the importance of landscape studies. In England and other European countries, the European Landscape Convention has had significant impact upon landscape archaeology methodologies as well as landscape management and heritage policies (Fairclough and Rippon 2002). In this thesis' case-study regions of Turkey and Cyprus, the influence is less obvious but there is noticeable impact.

The convention was adopted on 20th of October 2000 in Florence, Italy by 17 nations and came into force on 1st of March 2004 (CoE 2012). The convention can be joined by all member states of the Council of Europe and for accession by the European Community and European non-member states. It is the first international treaty to be exclusively concerned with all dimensions of landscape. Turkey was one of the original signatories and Cyprus signed the treaty on the 21st of November 2001with the treaty coming into force on the 1st of October 2006; Britain did not sign the treaty until 21st of February 2006 (*ibid.*). All members of the convention must abide by the following general measures:

a) Recognise landscapes in law as an essential component of people's surroundings, an expression of the diversity of their shared cultural and natural heritage, and a foundation of their identity.
b) Establish and implement landscape policies aimed at landscape protection, management and planning.
c) Establish procedures for the participation of the general public, local and regional authorities, and other parties with an interest in the definition and implementation of the landscape policies mentioned in paragraph b above.
d) Integrate landscape into its regional and town planning policies and in its cultural, environmental, agricultural, social and economic policies, as well as in any other policies with possible direct or indirect impact on landscape. (CoE 2000: Article 5).

Only Cyprus, Croatia and Wallonia in Belgium have formally adopted the European Landscape Convention definitions of landscape within law (Jones and Stenseke 2011: 18). Specific measures that must be followed by member states include specified awareness, education and training measures, and identification, assessment, and landscape quality implementation procedures. Parties must also undertake to co-operate, in the consideration of the landscape dimension of international policies, and to enhance the effectiveness of measures taken under other articles of this convention. The signatories are also expected to encourage transfrontier co-operation on a local and regional level and, wherever necessary, prepare and implement joint landscape programmes. The details of these measures are listed in Articles six to nine of the European Landscape Convention (CoE 2000). The convention also established a Council of Europe Landscape Award, which the Council's Committee of Ministers can award to a local or regional authority or a non-governmental organisation, within a single or on a transfrontier basis, that has instituted a policy or measures to protect, manage and/or develop their landscape, which have proved lastingly effective and can thus serve as an example to other territorial authorities in Europe (CoE 2008). The award aims to help stimulate local agencies in encouraging and acknowledging exemplary landscape management (*ibid.*).

The second Europae Archaeologiae Consilium Symposium (March 2001, Strasbourg) was devoted to landscape management in recognition of the European Landscape Convention. Arising from the symposium, the book *Europe's Cultural Landscape: archaeologists and the management of change* (Fairclough and Rippon 2002), highlights the important archaeological and historical depth of the European landscape, which is sometimes overlooked by decision-makers in comparison to ecological and aesthetic aspects. The volume describes opportunities and obstacles that affect landscape management, and suggests how heritage managers can support the European Landscape Convention by promoting landscape as a core element of Europe's common inheritance. The key message of this manuscript is that archaeologists need to take account of the growing democratic interest in the landscape, and to work alongside other disciplines in pan-European landscape projects.

Michael Jones and Maria Stenseke have written a commentary on *The European Landscape Convention: Challenges of Participation* (2011). In this volume, they present on-going research into public participation in landscape conservation, management and planning. Jones and Stenseke also examine the theory of participation and the lessons that can be learnt from specific examples and investigate the degree to which the European Landscape Convention provisions have been implemented. This volume does not contain a chapter exploring Turkey or Cyprus' experiences, but it does have a chapter that explores Greek cultural landscapes (Terkenli 2011), and some ideas on the relationships between Greeks and the landscape can be applied to Cyprus and other areas of the Mediterranean. The problems and experiences discussed can also be related to both Cyprus and Turkey.

Cyprus is one of the few countries to fully adopt the European Landscape Convention definitions of landscape in law (Jones and Stenseke 2011: 18). One of the main steps undertaken by Cyprus as a result of the European Landscape Convention is the initiation of a project to map the landscape character of Cyprus known as the Cyprus Landscape Map (Enotiades 2010). This grew out of a proposal developed during a workshop on Landscape Character Assessment held in November 2007 (*ibid*.). The Landscape Character Assessment techniques used by this project are based upon those developed by British academics. In Turkey, there is 'no official legal status about landscape planning' (Uzun *et al.* 2011: 553). However, Turkey formed a Landscape Protection Department under the Ministry of Environment and Forestry in 2003 (TC. 2012). One of the primary tasks of this department is to develop a guideline to be used in defining the landscape characteristics of Turkey under the scope of the European Landscape Convention. There is also a working group on implementing the European Landscape Convention in Turkey consisting of ministry staff and university academics (Gönül 2009). Attempts have been made in particular in relation to water management (Şahin 2007) and forestry to integrate the requirements of the European Landscape Convention and carry out co-operative works. Recently, environment plans have been made by the Ministry of Environment and Forestry on the provincial level at a scale of 1:100,000 (Müderrġsoğlu and Uzun 2012). One recent approach that has been undertaken by Turkey to fulfil the European Landscape Convention is the instigation of Landscape Character Assessment at national, regional and local scales. This has been carried out to date on a primary case-study area of the Konya closed basin to demonstrate the applicability of the methodology used (Uzun *et al.* 2011). This Landscape Character Assessment technique is discussed in further detail in Chapter 4. This work shows that the European Landscape Convention has affected Turkish attitudes to landscape conservation, but as can be seen in reports to the European Landscape Convention (Gönül 2009; Dostbil 2010), this influence is mainly focused in the area of Landscape Architecture with little to nothing having been implemented in relation to the historic landscapes or landscape archaeology.

2.5 Summary

This chapter has explored the development of landscape archaeological methods and theoretical approaches in order to provide a context for this thesis' approach to the historic landscape analysis of the two case-study areas. One of the problems exposed by the discussion above has been that cultural geographers' representational understandings have moved apart from landscape historians' empirical ones (Turner forthcoming 2012). The future of landscape archaeology is in the combination of techniques and the merging of theory and technological practice. To bring these approaches back together methodological and theoretical ideas need to be used in conjunction with each other. In the UK, HLC has been developed to accommodate these ideas. For landscape archaeologists, finding ways to broaden the disciplines and the people we engage with is crucial (Turner forthcoming 2012). This thesis will combine modern technical methodologies with theoretical approaches, both discussed in this chapter, to create an important piece of work that will influence the direction of future investigation into Byzantine archaeology. The employment of HLC on Cypriot and Turkish landscapes will also have a contributory factor to their implementation of the European Landscape Convention principles.

This thesis will investigate the physical manifestations of lived experience, considering pathways, monuments, sacred spaces, landscape features, field systems and villages which provided a framework of the Byzantine landscape from which perception and experience of the Byzantine landscape inhabitants can be inferred. Theoretical approaches such as those discussed above are not new in the world of archaeology but have rarely been approached in relation to Byzantine landscapes or indeed Byzantium. The limited exceptions can be seen in late Antique archaeology (Lavan and Bowden 2003) and in a more recent movement by a small group of scholars to increase new approaches in Byzantine archaeology. The 2011 Society for the Promotion of Byzantine Studies Symposium on *Byzantine Experience* is an example of this (Jackson and Nesbitt forthcoming 2013). In order to move beyond a dehumanised history as suggested at the beginning of this chapter, these forms or approaches need to be explored in order to expand our knowledge of the Byzantine world.

Chapter 3

Background to the Method: Archaeological Landscape Survey

3.1 Introduction

The previous chapter introduced landscape archaeology in general. This chapter investigates the development of archaeological landscape survey. This will begin with an introduction to archaeological landscape survey and the development of the techniques in general before focusing in particular on survey in the eastern Mediterranean. An introduction to the methods and techniques used in archaeological landscape survey in the eastern Mediterranean will be provided, as will an assessment of the merits of survey techniques. Chapter 3 will also include a discussion of the limited extent to which landscapes have been considered as whole entities on archaeological surveys in the eastern Mediterranean. As well as discussing current problems in eastern Mediterranean landscape survey archaeology, the discussion will also critically review existing literature on Byzantine landscapes and present the current problems regarding approaches to landscapes in Byzantine studies. This chapter will provide a context for the archaeological landscape survey results that will be used by this thesis in relation to the case-study areas of Pisidia and the Troodos Mountain foothills. The aims of this chapter are to provide a rationale for the choice of archaeological landscape survey techniques used in the primary data collection in the Pisidia case-study area and to explain the rationale for the methods of analysis carried out on the landscape survey results as part of the HLC of both case-study areas. Chapter 2 previously established the differences between the broader discipline of landscape archaeology and the more specific technique of landscape survey.

3.2 Archaeological Landscape Survey

Early surveys were, by modern standards, very modest in their research aims and are perhaps best described as reconnaissance surveys. Very early surveys were primarily written as travel biographies which documented obtrusive sites and attempted to associate them with places recorded in ancient texts (Buckingham 1821; Burckhardt 1822). Gradually surveys did become more focused on presenting the work as scholarly research (Condor 1881; 1889). Many surveys used epigraphic evidence to locate places, civic territories and roads to build up a historical geography; the pioneer of this method in Asia Minor was Sir William Ramsay (1890). The products were often gazetteers of sites which might be more closely associated with projects such as the British Sites and Monuments Record of the 1990s, rather than with what we now understand to be modern archaeological landscape surveys. Surveys in the Mediterranean still need to collect information on inscriptions and site location, but this kind of traditional field prospection is very different from modern archaeological landscape survey whose research focus is systematic survey and data collection. There are some early surveys which can be considered to have held more significant research aims such as Leslie Spier's survey at Zuni Ruins in 1916, which was concerned primarily with establishing a chronology from surface collected ceramics (1917: 207-331). This work has been recognised as etymologically pioneering (Kintigh 1981: 467).

More systematic approaches were gradually developed so that, by the 1930s, a significant body of survey work was being carried out (Ammerman 1981: 65). One of the turning points in the history of archaeological landscape survey was Willey's 1946 pioneering survey of the Viru Valley in Peru (Willey 1953: 453; Willey 1974: 149-178). He believed that settlements reflected both a society's natural environment and technological sophistication, but also revealed the influences of social interaction and control through which the culture is maintained (1953: 1). Willey recognised the potential of settlement pattern studies to provide new understanding into a wide variety of human activities that were influenced by cultural and ecological factors (Sifuentes and White 2001). Additionally, Willey is also thought to have been the first to utilize 1:10,000 scale aerial photographs to facilitate site plotting (McNabb 2011) which was used to great advantage by later archaeologists and is now a common phenomenon. Günder Varinlioğlu has used aerial balloon images to map Byzantine settlements in southern Turkey (2007), which have successfully been mapped to a comparable standard using Google Earth imagery (Green 2008).

John Cherry noted that 'landscape reconnaissance has always been part of archaeology: one has to first find a site before being able to excavate it' (2004: 23). In archaeological landscape survey, the unit of analysis is the artefact rather than the site. Most commonly, this refers to the recording of ceramic material but it can include surface artefacts such as lithics or metal work. Ceramics are particularly useful in landscape survey because they have been studied well and typological chronologies have been established allowing for a level of dating to be incorporated into the results of a survey. The early landscape surveys that created gazetteers of sites found through the exploration of the landscape, collected grab samples of ceramics sherds visible on the surface of the ground within the area of the suspected site with the main aim of providing the site with a provisional date. Statisticians William Cochran, Frederic Mosteller and John Tukey describe a grab sample as ‘what you can get by grabbing a handful’ (1954: 13) with no thought to a sampling strategy. There are many problems associated with this kind of methodology. Grab sampling is however very different from the techniques used in modern archaeological landscape survey which is much more systematic. Grab sampling lacks any boundary definition and has no regulation in the size of the collected sample or the size of the area sampled. The problems with such samples have been well understood for decades. During the 1970s, many ‘processual’ archaeologists adopted more rigorous approaches which were critical of the unquantifiable grab samples that were impossible to amalgamate with other systematically collected data (Mattingly 2000: 9).

Artefacts and particularly ceramics collected in archaeological landscape survey are not used simply to date a known settlement, but to discover new areas of historic activity and to provide information about the location, distribution and composition of human culture across a specified area of land through time. Susan Alcock states that the aim of archaeological landscape survey ‘is to locate and relate in a diachronic perspective’ (1993: 33) remains of human activity across a landscape operating on a broad temporal and regional scale. This usually consists of a systematic survey of the area using field walking to detect patterns in the distribution of material culture, usually ceramic sherds, visible on the surface of the ground (Banning 2002). How it is important to note that an archaeological landscape survey that only records the artefacts found across the land should not be considered a true landscape survey if the landscape itself is not recorded. The main form of archaeological landscape survey used today is the transect line, also known as the traverse or tract line. This technique requires the landscape area selected for survey to be divided by lines usually spaced equidistantly apart. A surveyor then walks along each line recording or collecting artefacts found on the surface of the ground (Mattingly 2000: 8) and hopefully taking note of the landscape feature both natural and man-made. These lines are often also separated into divisions of regular size along their length. This allows the material found along the lines to be located more precisely. Both the Kythera Island Project (Bevan and Harlan n.d.) and the Antikythera Survey Project (Bevan and Conolly n.d.) are examples of large-scale modern Mediterranean archaeological landscape survey projects that use this technique effectively. The other common survey technique is survey by unit, also known as grid or quadrant. This technique collects or records material within a specified area (Mattingly 2000: 8). Within the specifically defined area, material can be collected in full or sampled from along traverse lines, but these lines are not used to locate the material. The Göksu Archaeological Project in southern Turkey uses the unit technique. The units of collection are defined by field boundaries as demonstrated by the survey unit plans (**Figure 3.1**). The SCSP in Cyprus also used field boundaries to define survey units in combination with other strategies and project-defined units in areas where there were no field systems (Given and Knapp 2003). The results from both of these methodologies are affected by the recording strategy for the material found within the transect or unit area. Clive Orton explores sampling strategy and the pros and cons of both techniques in detail in his volume of *Sampling in Archaeology* (2000). David Mattingly has also explored both of these techniques. In Mattingly's opinion the transect technique is the most effective collection strategy to gain the most rigorous analytical results, especially when used in conjunction with GIS. Unit collection is also regarded as successful if the units are regular defined grids, but these are recognised as being time consuming and difficult to set out (2000: 8). The problem Mattingly identifies with irregular and field bounded units is that small sites located in large units or units that have been heavily ploughed may be overlooked as background noise unless a concentration is noted by the surveyors (*ibid*.).

A very common and useful result of landscape survey which provides important information about human activity is the discovery of new areas of activity that may require more investigation. We might imagine, for example, that a Byzantine cemetery has been discovered but that the settlement formerly associated with it remains unknown to archaeologists. A way to locate this settlement would be to carry out a systematic survey of the landscape around the burial area. It is highly likely that the recording of relative ceramic densities or the recoding of unnatural landscape feature would reveal the location of the settlement. In this manner, but on a much larger scale, the Pylos Regional Survey Project recorded twice as many new sites as was previously known prior to the survey being carried out (Davis *et al.* 1997: 391). Such a method will undoubtedly recover more sites but no matter how intensive or systematic, one cannot assume that survey can find all of the historic activity in an area (Banning 2002: 227).

Ceramics can often be used to go beyond dating and locating sites in the landscape to telling us about the kinds of sites and the activities conducted there. For example, a settlement site would be expected to have a variety of ceramics of different types and forms that fulfil all the different purposes that ceramics would have been required to fulfil in a settlement. However, ceramic production sites may have vast quantities of the particular types of ceramics they were producing (Vandeput *et al.* 2010a). Another example would be the differences you would expect between the ceramics found at a small rural farmstead or a rich villa. It is important however, that the function of sites is not only based on the ceramics; sites should always be considered in the light of the landscape and other contributory factors.

As large-scale and regional archaeological survey developed, it became clear to many surveyors that in many areas artefacts were not restricted to sites, but could be found in varying quantities between sites. This emphasised that the 'whole of the landscape was an arena for human activity, not simply the settlements' (Forbes 2007: 15). This was an idea supported by many prominent archaeologists (Cherry *et al*. 1991: 20-28; Dunnel and Dancey 1983; Mee and Forbes 1997: 39-40). In this siteless survey, the archaeologist looks for variation in the density of artefacts across the whole landscape with no judgments made in regard to places of more or less importance (Galaty 2005: 301). To be effective this form of survey requires a full-coverage survey strategy where the surface of a whole region or study area is targeted (Fish and Kowalewski 1990). Some surveys such as the Southern Argolid Project took siteless survey further by emphasising the importance of blank areas in understanding past peoples' interactions with the landscape (Jameson *et al*. 1994). Siteless survey has reinforced the importance of site formation processes which distribute and redistribute artefacts throughout a constantly changing landscape. Many of these forces are governed by behavioural as opposed to geological processes (Galaty 2005: 301). This thesis is particularly interested in what is taking place in-between what are traditionally recognised as sites and the reasons that ceramics are found across the landscape. It is also concerned with other kinds of human activity which also leaves traces on the landscape such as the construction of terraces, walls, roads, buildings and the planting of trees and different kinds of crops.

There are many reasons why ceramics might be found in places other than traditional sites and these may relate to the activities taking places in these spaces. It has been suggested that low-density artefact concentrations found outside of known settlements may be the result of the manuring fields in the past (Given 2004a). This is a consequence of ceramic sherds being discarded in household rubbish and then spread over a cultivated area as fertiliser. Manuring has been said to create artefact halos around archaeological sites (Bintliff and Snodgrass 1988; Cherry *et al*. 1991; Davies and Astill 1994; Wilkinson 1982;

1989). Some scholars have considered this to be a problem because it distorts the results of ceramic distribution and may hide the existence of significant sites. However, the discovery that manuring was practised in an area is as important a piece of knowledge about the landscape's occupants, as any other piece of information. Michael Given has described the mapping of ancient cultivation by means of detecting residual artefact spreads from manuring as having the potential to be one of the great success stories of intensive survey (2004a: 13). Manuring can inform us about how areas of land have been cultivated in the past. This can provide a deeper understanding of agricultural methods and gives an insight into an activity that would have been carried out by individuals. From this, much can be inferred about the routines of people doing that activity. Manuring involved an intense physical experience for the individual carrying out the process. Archaeologists can therefore infer to some degree ideas about the perceptions that this individual had of their landscape through their very physical engagement with it.

Elizabeth Fentress (2000), however, is critical of the manuring hypothesis in general. Fentress agrees with Alcock *et al*. (1994) that the manuring model is overplayed and not the only explanation for the halo sherd effect or background noise. They propose that it may not be legitimate to import models of northern European practice to the Mediterranean. There is no critique of the hypothesis that large settlements would require the removal of animal and human waste and that this would have likely been used as fertilizer, however the assumption that ceramic waste and other domestic rubbish would be included in that waste, she argues, is fundamentally weak (Fentress 2000: 46). Studies have also shown that Roman farming activities in particular are more articulated than previously considered with separate manure pits and rubbish disposal areas (Carandini 1985; Regoli 1985). Alcock *et al.* (1994) have suggested that the most likely areas to have been extensively manured in smaller settlements and farmsteads would have been the vegetable gardens rather than the wider fields. However, Juliet du Boulay in her *Portrait of a Mountain Village* (1994) records the collection of fertiliser from a Greek village for use on the fields which increased the fields' ability to produce two crops a year which was done until the introduction of modern fertilisers in the 1950s.

The factors explored above do suggest that to rely entirely on the idea that all background noise or sherd halos are the result of manuring is too simplistic. Other ideas of deposition for these observations have also to be taken into account. Ethnographic studies of modern Italian villages suggest that household rubbish, without manure, could have been dumped in random areas (Fentress 2000: 46) and thus would gradually dissipate if ploughed through. This form of dumping can also been seen in rural areas of Turkey. Likewise, modern villagers may collect manure and rubbish to spread on their fields which can become mixed with ancient and modern ceramics. This newly deposited ceramic may then be found in the course of survey and thought to indicate the presence of an archaeological site or some kind of past behaviour (Galaty 2005: 301). David Pettegrew (2001) argues for an entirely new interpretation of low density ceramic and tile scatters which he believes can represent habitation indicators that archaeologists in the past have rarely interpreted as evidence for habitation. Pettegrew proposes that these scatters represent accumulated debris generated by repeated behaviours of habitation, discard, recycling and abandonment (*ibid.*). These forms of habitation may include seasonal temporary dwellings or shelters (Fentress 2000: 47) or represent activity points in the landscape as opposed to strictly habitation sites. These activity points may be areas that are used as rest points along a roadside much like the modern truck stop or shaded eating areas used by field workers.

The problem with exploring these depositional processes is that many surveys still do not relate their survey data to the features in the landscape which might help contextualise the deposition. In many of these cases, survey results are presented overlain on basic line maps which only highlight major features. For example the Göksu Archaeology Project's survey results from 2004 (**Figure 3.1**) are presented almost entirely without context, an archaeological landscape survey who's results seem to have forgotten the landscape. Only the main roads and a few random point locations are marked. The ceramic results are presented in field defined units, but the boundaries of fields that have not been surveyed, as well as pathways, streams and topography, are not represented. The inclusion of features such as these could provide deeper understanding of the results. The consideration of ceramics in conjunction with other methodologies can link ceramics to their landscape context. This is why this thesis is using the new and innovative method of combining ceramic survey data with the results of a HLC and in particular, the results of retrogressive landscape analysis. Retrogressive analysis will present all the landscape features that the Göksu Archaeology Project's results, discussed above, did not. This will provide a further level of understanding and increase the potential contribution of the ceramic results by setting the findings within a spatial context that may make a big difference to interpretation. This is aided by modern technology such as GPS and GIS which advance survey recording by allowing the location of artefacts to be recorded and visualised in real world maps with much greater accuracy and ease (Chapman 2006: 31-32).

The increased use of GIS has also allowed a more experimental and straightforward analysis of the results of the survey which would otherwise be much more difficult. A rigorous methodology for the analysis of the results is of course as important and closely related to the methodology for the collection of the data. The types of questions asked of survey data can be very varied. A few examples include questions on regional interaction (Bolger *et al.* 2004), trade (Vroom 2004), chronology (Roberto *et al.* 1985), settlement patterns and settlement hierarchy (Baird 2004). Survey data has been used to estimate settlement size, population and duration. The pros and cons of survey data for answering these questions have been studied in detail (Webb and Frankel 2004; Witcher 2011). The contribution of survey data to understanding demographic trends have been explored by John Bintliff and Kostas Sbonias (2000b). It is important to note however that all survey techniques are driven by their final aims, for example some surveys may only ever aim to plot sites of different periods on a map.

The following section describes the continued development of landscape survey from a Mediterranean point of view. Describing the growth of Mediterranean landscape survey and evaluating the pros and cons of how the techniques are utilised in the Mediterranean today.

3.3 Archaeological Landscape Survey in the Mediterranean

Alcock and Cherry describe the growth of interest in survey projects as 'one of the most striking changes in the practice of archaeology' (2004: 1) in the Mediterranean area. In the Mediterranean, only a 'handful' of surveys took place before the 1970s, after which there was a great growth in survey projects (*ibid.* 24). This is clearly illustrated by Cherry's oft-published graph representing the number of articles related to survey work from a selected number of journals that were published during the period from 1966 to 1999 (**Figure 3.2**) and his graph portraying the growing number of archaeological projects in Greece (**Figure 3.3**). A similar growth is apparent across the world, as Cherry demonstrates in regard to America (**Figure 3.4**). The same trend can be seen in the publications of survey related articles in *Anatolian Studies* between 1951 and 2010 (**Figure 3.5**). Despite these results, the Mediterranean did not come late to the idea of a regional approach to archaeological investigation as has been suggested by Blanton (2001: 627). The Mediterranean in fact has a long tradition of topographical investigation often lead by amateurs as described by Barker (1996).

Hector Catling is one example of an early Mediterranean archaeologist who, as the first Archaeological Officer of Cyprus in 1955, began a survey project to record the landscape and archaeology of the island of Cyprus. Short reports of Catling's survey were published in the *Annual report of the Director of Antiquities* (Megaw 1956; 1957; 1958; 1959; 1960) with Catling publishing articles on wider issues such as Bronze Age settlement patterns as a result of the survey data (Catling 1962). This project was similar to the British Sites and Monuments Record, but despite the limitations in such gazetteers of sites as discussed in Chapter 1, this project was one of the earliest large-scale endeavours in not just the Mediterranean but the world (Cadogan 2004: 22). As Gerald Cadogan states, Catling's archaeological survey of Cyprus was a brilliant and pioneering idea, the record and finds of which remain for us to study today (*ibid.*). The work accomplished by Catling was of considerable importance to Cyprus and the results of his fieldwork formed the basis for a unique research facility which has assisted and stimulated much of the later archaeological investigation of Cyprus (Hadjisavvas 2004). Influentially for this thesis' study, the instigation of the archaeological survey of Cyprus resulted in the identification of several archaeological sites in the Troodos case-study area.

In Turkey, archaeological study began with early antiquarians recording standing remains and collecting ceramics. William Ramsay and Gertrude Bell are two such figures whose work on standing remains has been influential to later investigations (Bell 1906; Ramsay 1890; Ramsay and Bell 1909). In the 20th century, general surveys were carried out by James Mellaart (1954; 1955) and David French (1967; 1969). These surveys recorded the location of archaeological sites and collected ceramic samples for dating evidence. These surveys were unsystematic (Thomas 2007: 45) and mainly focused on prehistoric evidence (Özdoğan 2008: 147), but they did provide an abundant amount of information on the location of archaeological sites in Turkey. The most famous of Mellaart's findings is that of Çatalhöyük which he excavated in the 1960s (1962; 1963; 1964; 1966). The British Institute at Ankara still houses ceramics from these surveys and others dating from work carried out as early as the 1940s in the ceramic and archaeological collections which can be viewed online or consulted in the library's resources room (BIAA n.d). Rob Witcher (2008) has been exploring the value of legacy data from early surveys in relation to Italian projects using GIS to reinterpret the data.

Carried out in the 1960s and published in 1972, The University of Minnesota's Messenia Expedition was a very important and influential work (McDonald and Rapp 1972). William McDonald rightly claimed that the surveys carried out were the most intensive and exhaustive of their time (*ibid.*). It was also one of the first projects to investigate an entire region (Shelmerdine 1998). This project was one of the instigators of the increase in survey projects in the Mediterranean recognised by Cherry (2004: 1). The report was extremely interdisciplinary in nature as characterised by the diverse academic backgrounds of the 17 contributing authors. Although criticised for the structure of the report which was thought not to live up to its potential (Boardman 1974), the new methodology for investigating the landscape in an extensive and interdisciplinary manner was revolutionary. It revealed that landscape investigation by comprehensive surveys of this sort was likely to provide more information about past societies than expensive excavation.

After 'tentative beginnings' (Osborne 2004: 87) survey archaeology had become of central interest to Mediterranean archaeologists, with the result that in 1981 a major conference, 'Archaeological Survey in the Mediterranean Area' was held in Athens (Keller and Rupp 1983). The early 1980s saw lively discussion about field methods, including questions of selection of areas for survey. There are a variety of reasons behind the increase in survey projects over excavations. Survey was of course more cost effective and it was easier for foreign academics to get permits for non-invasive survey in Mediterranean countries. This is still the case in many of these countries today. A second motivation can be seen as a result of the 'shift from uncritical evangelical enthusiasm in the 1960s and 1970s to more realistic and pragmatic, yet also more complex views of both limits and potentials' (Cherry 2004: 23). Ultimately this more critical reflection derived from the fact that academics had begun to see the weaknesses and limitations of data collected for site gazetteers and the potential which led to the 'methodological experimentation and reflexive self-criticism of a kind not often encountered in relation to excavation data' (Alcock and Cherry 2004: 3). In the 1970s, in concurrence with the development of post-processualist thought, Ian Hodder brought the dissatisfaction felt by many scholars into focus by emphasizing the role of the archaeologist as the interpreter (Collins and Molyneaux 2003: 7). A site should be seen not just as a distribution of material culture to be described and quantified but a text to be read and interpreted (*ibid.*).

Landscape survey has recognised disadvantages such as its unsuitability for investigating the individual event, a unique place, or specific relationship (Alcock 1993: 34), but the development of survey was also undoubtedly partly due to the nature of survey methodologies to reveal general and long term trends in residential preference, agricultural activity and demographic behaviour (*ibid*.). Survey also excels in examining change in the long-term and encompasses the material results of a wide range of human behaviour (*ibid.*) allowing survey to be used to address the questions and research interests of a wide variety of scholars. The 'new wave' (Bintliff 1994) surveys of the past few decades are extremely interdisciplinary and Alcock and Cherry provide a comprehensive list of the features of these new wave surveys that set them apart from earlier surveys in many of their articles (Alcock and Cherry 2004: 3; Cherry 1994; 2004: 28). Cherry's 1983 article 'Frogs round the pond' has been described as the 'coming of age of regional survey' (Forbes 2007: 16).

Undertaken in the 1980s, the Southern Argolid Project (Jameson *et al.* 1994) can be considered one of the earliest projects to include geologists and anthropologists and to publish considerations of the co-evolution of the landscape and human settlements rather than only focusing on settlement patterns (Forbes 2007: 16). The aim of this project was to investigate 'all periods of human settlement, including the contemporary, in a particular regional environment' (Jameson 2000: xi). This includes 'how the region was settled and its resources exploited over a period of some 50,000 years, what were the processes of change, and what was the interaction between those who lived there and their environment' (*ibid.*). The Nemea Valley Archaeological Project (Wright *et al.* 1990) is another interdisciplinary project that began in the 1980s to study a landscape in the north-east Peloponnese of Greece. The aim of this project was to document and explain the changing nature and extent of settlement and land use. The project employed geomorphological and ecological investigations, the study of historical archives, ethnoarchaeological and anthropological studies of recent settlement, intensive ceramic survey and archaeological excavation (*ibid.*). These projects reflect a paradigm shift in the 1980s towards processual multidisciplinary regional studies (Kardulias 1994: 5). The Methana Survey also conducted in the 1980s and published in *A Rough and Rocky Place: The Landscape and Settlement History of the Methana Peninsula, Greece: Results of the Methana Survey Project* (Mee and Forbes 1997) had a similar focus to the Southern Argolid Project. The Methana Survey Project employed geomorphologists and geologists to analyse the physical features of the landscape. The survey methodology described is an instructive guide to the balance between ideal sampling techniques and available time and resources in a difficult landscape (*ibid.* 33-41). One of the most significant discussions in this survey was the recognition of background noise in survey results as discussed earlier in this chapter.

Terracing is also discussed in depth in this survey and this project was the first to have an investigation specifically devoted to churches which is an important complement to other archaeological data. The inclusion of churches is significant as they are important features in the landscape and their existence would have impacted upon the daily lives of the landscape's inhabitants.

These surveys have reflected the ideas expressed by Rackham and Moody in the *Making of a Cretan landscape* (1996), which as discussed in Chapter 1, made a very important contribution to understanding the agricultural landscape of the Mediterranean. These surveys were the best of their time and helped to influence the development of many modern survey techniques. Today, surveys are even more advanced. The Antikythera Survey Project is one example of an extremely rigorous interdisciplinary project that employs strong systematic methodologies for its data collection and also explores its data in comprehensive and experimental ways (Bevan and Conolly n.d.). The primary survey carried out as part of this thesis' investigation of the Pisidian case study is based on the Antikythera Survey Project methodology. Other survey data used to analyse this thesis's case-study areas vary in intensity. The SCSP is rigorous and systematic in its data collection, whereas the PSP has been less systematic in its approach to data collection.

Overall, landscape archaeology in the Mediterranean, 'has faced considerable opposition, has been used unevenly, and has tended to be methodologically diverse' (Blanton 2001). As a result, cross-regional comparison and broad sweep synthesis of landscape surveys have been slow to emerge. The European Union funded POPULUS project, however, attempts to address this issue by developing a rational set of standards for Mediterranean and European landscape archaeology, in particular settlement pattern archaeology. Alcock and Cherry saw the development of this project and its five publications on *The Archaeology of Mediterranean Landscapes* (Bintliff and Sbonias 2000a; Francovich *et al.* 2000; Gillings *et al*. 2000; Leveau *et al*. 2000; Pasquinucci and Trément 2000) as a dramatic progression in survey in the Mediterranean (2004: 4). The problem with the POPULUS project is that it is attempting an impossible task. As Martin Millett (2000: 94) comments, it would be almost impossible to achieve standardised survey across Europe and inappropriate to place methodological uniformity on all projects. It would be more practical to insist on careful and explicit explanations of methodologies by each project so that the survey data can be fully understood in order to help facilitate comparisons. Millett's basic hypothesis, that survey probably cannot be standardised and it would be inappropriate to do so (*ibid.*), is prudent as complete standardisation would prevent some very interesting and informative work from taking place due to the larger funding a standardised system would require. However, some manner of guidelines should be instigated that would be considered as good academic practice to follow. This would reduce the bad practices that still occur in archaeological survey today due to a simple lack of understanding. It is one problem to say that the surveys cannot be compared because the methodologies they use are different; it is an entirely different and larger problem for surveys to be carried out in a manner where the results garnered are not even useful to the original project due to inexperience and ignorance. One of the results of the growth of archaeological survey and the recognition of the importance of survey in understanding the wider picture has been that many projects do try to carry out landscape survey. In many regions, landscape survey is almost expected as part of any archaeological investigation. Unfortunately, these projects carry out these surveys without fully understanding the techniques and often fall into the grab sampling pitfalls explained earlier. In these cases, often no true findings can be gathered from the data and even internal project comparison cannot take place. If projects that use survey as a technique were to use a scientific systematic approach instead of grab sampling and they were to clearly explain the methods in use, different methodologies would not be as significant a problem and inter-project comparison to certain degrees would be possible (*ibid.*).

3.4: Overview of Archaeological Landscape Survey and Landscape Study

One of the most significant problems of archaeological landscape survey is that even with the best surface conditions, the effectiveness of the collection and recording process of the survey technique varies according to long-term land use, landscape topography, weather conditions and the experience of the surveyors (Galaty 2005). For example, arable agriculture will first expose and then destroy artefacts such as ceramics and valley soils can move down slope forming a build up over archaeological deposits (Shennan 1985: 35). Experimental programs have put forward the view that the relationship between visibility and artefact recovery is linear, but it is not relative so a ten per cent drop in visibility does not produce a ten per cent drop in artefact recovery (Schon 2002); this means that a simple correctional factor will not work. As a result, archaeological survey projects such as the SCSP and the Leiden-Ljubljana Ancient Cities of Boeotia Project have begun conducting their own experiments in artefact recovery in order to establish baseline measures for what surveyors may fail to record in fluctuating conditions (Bintliff *et al.* 2009; 2010; Given *et al*. 1999; Given and Knapp 2003). Consequently, it is unrealistic to expect 100 per cent recovery or respective results of artefacts. This makes it imperative that survey methodologies record not only the quantification of ceramic types recovered, but also the conditions and context within which they were found in order to provide as much transparency of results as possible.

Another main problem of survey data is the difficulty of combining and comparing it. The progress looked forward to in Cherry's article 'Frogs round the pond' (1983) has not been fulfilled. Cherry argued for intensive survey projects working around the Mediterranean to produce insights into the development of human societies by comparing and synthesizing data. The problems of Mediterranean survey in today's academic climate have been discussed in detail by the multiple articles in Alcock and Cherry's edited volume *Side by Side Survey* (2004). Despite its benefits, regional survey has followed the processualist tradition and looked mechanistically at human populations, considering human interaction with the landscape as an inevitable feedback system (Forbes 2007: 17). Processualists, like settlement archaeologists, have treated the landscape as inherently natural and therefore predominantly separated from human concerns (Trigger 1989: 280-282). This approach has problems for our understanding, for example, of the choice of human habitation sites, as this approach would only consider access to resources, with no place for considering irrationality and religion (Forbes 2007).

Another of the major problems of Mediterranean survey is that, not only is it not considering more complex ideas, in some cases it is also not being carried out to the standard that would be wished. In addition, certain periods are still often overlooked by surveys. Until recently, post-Classical Greece has been viewed by most scholars as not worthy of study (Alcock 1993). Alcock (*ibid.*) believes that this says more about academic prejudices than about the realities of Roman Greece. Generally, this is the case for the Byzantine period in the rest of the eastern Mediterranean, with few exceptions (Bintliff 2007; Given and Knapp 2003). As a result, there were not many people working in these areas and so there are fewer specialists and as a result there is less knowledge about this period. The Medieval period in the west and Britain has been intensively studied, but in the Mediterranean the Classical period has dominated interest. The Roman period also garnered interest but the Byzantine and later periods have been neglected, with the exception of the late Antique period. Byzantine ceramics have only just begun to be comprehensively studied, with investigations into regional (Poblome *et al.* 2000) and local wares (Armstrong 2012; Vroom 2003) only recently being instigated in the past few decades (Armstrong 2008: 430). This is a problem in survey, as there are very few experts in Byzantine, Ottoman or later ceramics. Even on large-scale, well-funded surveys, other period ceramic specialists are often relied upon to process Byzantine and later period ceramics. This is a serious problem that must be rectified. Today there are more people working on the Byzantine period and there is some excellent research going on in Byzantine studies, resulting in a new surge of Byzantine Masters courses and Ph.D. theses, but this still needs to be further addressed. One of the problems with investigating Byzantine activity is the change to the ceramic repertoire at the end of the seventh century A.D. (Dr Mark Jackson, pers. comm.). Following this change, it is difficult to recognise human activity when using ceramics. This has been a problem for most survey reports, which often avoid the situation by ending ceramic analysis at 650 A.D. and instead begin to use Ottoman defters for the next 1500 years, with a few exceptions such as John Binliff's work in Boeotia (1996; 2007; Bintliff and Snodgrass 1985; Bintliff *et al*. 2009; 2010). Traditionally, research has proposed a 'dark age' for this period, suggesting that previously prosperous late Roman sites were abandoned (Gabrieli *et al.* 2007: 791). However research in both Cyprus (*ibid*.) and Pisidia (Vanhaverbeke *et al*. 2009; Vionis *et al*. 2009) suggest that this 'dark age' may have been extenuated by the methodologies of projects which have relied on identifying material culture found typically in the Roman period such as fine ware ceramics which are less prevalent in later centuries.

Mediterranean landscapes have a lot to teach us about the people who lived within them, but as we have seen here Mediterranean landscape studies have yet to engage consistently with many of the approaches and analytical methods that have yielded rewards elsewhere. Archaeological surveys are moving in the right direction but much more needs to be done.

3.5 Summary

This chapter has provided a context for the archaeological survey results that will be examined in the analysis of the case-study areas, by exploring the development of archaeological landscape survey, in particular in the Mediterranean. This chapter has also highlighted the problems of archaeological survey and the limitations in how landscapes have been considered in the Mediterranean, including problems associated with the study of Byzantine ceramics. However, this chapter has also recognised the fortunate move to improve the understanding of landscape in recent studies. This has imparted the reasoning behind this thesis's choice of survey techniques used during primary data collection in Pisidia and the motivation for the analysis of the survey results as part of the HLC of both case-study areas. The following chapter will present the HLC technique, which will be applied to the case-study areas in order to address some of the problems of Mediterranean landscape investigation raised in previous chapters.

Chapter 4

Background to the Method: Historic Landscape Characterisation

4.1: Introduction

Chapter 1 discussed how intricate, complex and multi-layered the dialogue between landscape and human society can be. The fundamental importance of landscape in the development of human history, therefore, necessitates a process that can record and analyse this complexity. The previous chapters have discussed the importance of using modern methodological approaches in new and innovative ways to study the landscape and learn about past peoples. Historic Landscape Characterisation, also known as HLC, is an archaeological method developed to document and study the intricacies of landscapes in a multifaceted manner. This chapter will provide an explanation of the meaning of the term 'Historic Landscape Characterisation' and give a history of the technique's development. This will also include a critical review of recent applications in Europe and a discussion of their outcomes and how they have been used to aid landscape understanding and landscape management.

4.2 The Development of Historic Landscape Characterisation

Historic monuments and archaeological sites have been well investigated by archaeologists. However, the landscape within which we live has often been neglected. The development of HLC began when archaeologists began to recognise that although individual monuments might be well protected, approaches to conserve, manage and understand the landscape were inadequate (Fairclough 1999: 1). HLC is a technique developed by English landscape archaeologists in the late 1980s as a response to the deficiencies within the contemporary approaches of this period to acknowledge the importance of the broader historic landscape. Conventional methods for recording and analysing historic landscapes utilise archaeological databases, such as the Historic Environment Record (HER), the UK's main archaeological recording method. HERs are held by County Councils, District Councils or Unitary Authorities whilst selected major historic towns and cities are covered by Urban Archaeological Databases (UADs). A HER or UAD is a series of linked computer databases that store information on known archaeological sites, monuments and find spots. A HER is continually updated with new information supplied by archaeologists, historians, researchers, metal detectorists and the general public. In the Mediterranean, countrywide projects such as TAY, The Archaeological Settlements of Turkey Project, provide 'a chronological inventory of findings for the cultural heritage of Turkey' (TAY 1998) and aim to provide an assessable data pool and a scientific reference base. In Turkey, paper records are also kept in local museums for sites in their jurisdiction. In Cyprus, the Museum Directorate also keep paper records for each known archaeological site. On a larger scale MAGIS, The Mediterranean Archaeology GIS Project, is an inventory of regional survey projects that have been and are being carried out in the greater Mediterranean region (Foss and Schindler 2008). Finally, MedArchNet, The Mediterranean Archaeological Network, is an online atlas, cyber-infrastructure and portal-based science environment which aims to cultivate a network of international archaeological sites, from prehistory to the early 20th century to provide a world model for cultural heritage research, management and presentation (MedArchNet 2009).

Archaeological databases and GIS such as those used by these projects are extremely useful, can be very sophisticated and provide fundamental tools for archaeological research, landscape management and planning. They should also be appreciated for their employment of modern technological developments and the state of the art database technology they apply to archaeological data. It is essential that modern techniques such as these are utilised as tools for archaeological research, but ultimately these projects are still gazetteers of archaeological sites. Surveys or other archaeological data and the archaeological information they contain is usually geographically restricted to simple points, polygons or lines on a map. This form of data recording disconnects an archaeological feature from its surrounding landscape. This is problematical for recording large-scale archaeological activity and the multitude of landscape features that can be contained within the landscape. The European Landscape Convention discussed in Chapter 2 has emphasised that it is essential to study landscape in its entirety (CoE 2000). Restricting archaeological investigation to data recorded as points, lines and polygons cannot enable this.

The growth in the appreciation of the historic value of landscape during this period led to the 1990 White Paper *This Common Inheritance,* which recognised that landscape helps form our sense of identity and that what we see today is a result of centuries of interaction between man and nature (DoE 1990: 96). This paper invited English Heritage and the Countryside Commission for England to consider how to effectively and appropriately manage the landscape's historic dimension, while allowing continued development. The response to this was a policy statement issued in 1991 (Fairclough 1991: 5-7) suggesting that a new methodology for assessing historic landscapes could be developed, built on the belief that all areas of the country's landscape are historic and should be developed. The 1991 policy statement recommended that the new method must include:

- all historical elements of the landscape, not just features traditionally classed as historically important.
- enable comparison between the different historic characters of different landscape areas to aid planning and resource allocation.
- provide a methodology for defining and evaluating manmade features in the landscape.
- inform and assist local management conservation decisions at all levels.
- be able to be used equally by landowner, local or governmental authorities and English Heritage, for the national and local identification, understanding and grading of the historic landscape. (*ibid*. 7).

In addition to this policy statement a consultation paper was also issued in 1991 (EH 1991) which sought views from a wide range of interested persons. This consultation paper explored the terms historic environment and historic landscape, considered methods to identify historic landscapes and assess the importance of individual landscape features. This consultation paper also discussed the necessity for landscape to continue to evolve and change and debated the desirability for specialised designation of landscape (*ibid*.). The purpose of this work 'was to define areas of landscape deemed to be more historic and, therefore, more worthy of preservation than the surrounding areas' (Darlington 2000: 1). This resulted in a list similar to the English Heritage *Register of Parks and Gardens* (EH 2010) of special historic interest.

The response to both of these papers was 'largely supportive' (Fairclough 1999: 3) and this attitude was officially endorsed by government planning policy PPG15 in 1994 (DoE and DNH 1994). This advocated that the 'whole of the landscape, to varying degrees and in different ways, is an archaeological and historic artefact' (*ibid.* para. 6.40) and stated that landscape would be more effectively managed through assessment of the whole landscape character rather than attempting to define selected areas. This greatly aided the eventual development of HLC. The 1991 policy statement and consultation paper were swiftly followed by the instigation of the English Heritage Historic Landscape Project. This was a research study carried out by Cobham Resource Consultants, the Oxford Archaeology Unit and several subcontractors to investigate the current approaches to defining historic landscapes (McNab 1999: 18). The results of this research and development project were published in *Yesterday's World Tomorrow's Landscape* (Fairclough *et al*. 1999). The objective of the project was to carry out a series of experimental research projects (Chadwick 1999: 38-42; Freke 1999: 31-37; Masters 1999: 43-47; Newman 1999: 24-30) covering a variety of circumstances in order to compare their methods and approaches, from which the future methodology for defining historic landscapes could be developed (McNab 1999: 18).

The most common type of approach explored was expert led techniques, where experts identified areas within the landscape considered important. This form of approach was rejected because it suggested that it was appropriate to select key areas worthy of investigation rather than evaluating individual components within the whole landscape, which was not compatible with the main aims of the project (McNab and Lambrick 1999: 52-53). The project revealed that no single method of historic landscape analysis then in existence was suitable. The project concluded that it would be much better to devise a comprehensive method to assess the historic landscape character of the entire English landscape (Fairclough *et al*. 1999). In particular, a register recording specific historic landscapes that relied upon experts identifying areas of significance was determined to be a disadvantage. Instead it 'recommended that a new, rapid and robust, approach should be identified that could deliver multiple objectives and serve multiple uses' (Aldred and Fairclough 2003: 6) and it raised awareness that all of the landscape has an historic value which could be used in combination with other forms of archaeological and landscape assessment.

The value of using complimentary methodologies was explored in the discussion paper *Views from the Past – historic landscape character in the English countryside* (CC 1994a). This paper promoted the value of using archaeological perspectives to understand the cultural landscape as a humanly formed construct. The late publication of *Yesterday's World Tomorrow's Landscape* (Fairclough *et al*. 1999) enabled the publication to place the historic landscape assessment methodology it had developed into the context of new ideas on sustainable development set out in the English Heritage discussion paper, *Sustaining the Historic Environment: New Perspectives on the Future* (EH 1997). *Yesterday's World Tomorrow's Landscape* also allowed a fuller account of the links between historic landscape assessment and the broader frameworks of the Countryside Character Map.

Produced in 1996, the Countryside Character Map classified 159 Character Areas for the whole of England. This was updated in 2005 to create the Character of England Landscape, Wildlife and Cultural Features Map, which provides a picture of the differences in landscape character at a national scale (CA and EH n.d). *Yesterday's World Tomorrow's Landscape* also allowed links to be drawn with the Landscape Character Assessment technique, which categorises an area of land by the environmental characteristics that the land exhibits (CA and SNH 2002) and the Brian Roberts and Stuart Wrathmell (1995) preliminary report of English Heritage's *Atlas of Rural Settlement in England,* which maps historic landscape features recorded from aerial imagery (Roberts and Wrathmell 2000).

The ideas instigated by the Historic Landscape Project were put into practice with a historic landscape analysis of Bodmin Moor in Cornwall, undertaken by Cornwall Archaeology Unit with the support of English Heritage, The Countryside Commission and Cornwall County Council (CC 1994b). Building upon the principles set out in *Yesterday's World Tomorrow's Landscape* (Fairclough *et al*. 1999) and adapting procedures used by the Landscape Character Assessment technique for an archaeological perspective, HLC was developed. The variety of the historic landscape features and the former survey and assessment projects in Bodmin Moor resulted in the development of a detailed understanding of the character and evolvement of the historic landscape. Following this test HLC, a general historic landscape assessment of the whole of Cornwall was undertaken (CCC 1996) (**Figure 4.1)**. This pioneering programme founded the standards for further HLC projects to follow and helped define the guiding principles of HLC (Herring 1998: 12). Cornwall's original HLC techniques have been adapted by local authorities and heritage agencies throughout Britain and Europe. The methodology developed by Cornwall was based on an extensive, methodical collection of data that was then mapped, analysed and interpreted (CCC 1996). This methodology has been described by Peter Herring in *Cornwall's Historic Landscape: Presenting a Method of Historic Landscape Character Assessment* (1998). The guiding principles of this new methodology for analysing the historic landscape were:

- The whole landscape, in the present day should be characterised.
- The method should use an archaeological approach to interpret HLC.
- The method should use a pre-defined classification to map discrete areas of HLC.
- The method should identify the most dominant HLC of an area, not all the HLC types visible.

- The method should consider all parts of the landscape with the same value.
- The method should allow visible time-depth over long periods.
- The method should be straightforward, consistent, repeatable and verifiable.
- The method should be objective, as far as it was possible, with areas of subjectivity made transparent when not possible.
- The method should use present-day 1:25000 OS maps as a primary base.
- The results should use a common, easily understandable method of presentation and language for users and provide a starting point for further research (*ibid.*).

Many of the principles listed above are used by current HLC projects. It can be said that all 'HLC projects in England and beyond descend to some extent from Cornwall's' (Aldred and Fairclough 2003: 7). The methodology and basic principles that this thesis will use to create and analyse the HLC of the case-study areas is based on the original principles developed by this early Cornwall HLC.

4.3 What is Historic Landscape Characterisation?

The basic principle of HLC is that the entire world is a continuous and multifarious historic landscape (CCC 2004) and that all semi-natural habitats are part of the historic environment, therefore there is no part of the landscape that can be said to not have a definable historic character. Unlike traditional archaeological recording methods, HLC recognises that all elements of landscape, not just specific sites, have historical significance. The HLC technique is a methodology that examines the groupings and patterns of all historic features within the landscape to determine the predominant HLC of an area. Historic landscape features can be any manmade feature visible in the landscape, such as field boundaries and terraces. Historic landscape features can also include historic features that are only visible through crop markings or natural features such as woodland known to have a historic character - for example a copse used to accommodate quarry for hunting animals such as boar or dear. Susan Oosthuizen (2006) decodes the historic landscape features of the Cambridgeshire rural landscape in a very informative article. The methodology then uses generalising mapping techniques to characterise individual areas of the landscape into a finite number of pre-determined HLC types (Turner 2006: 390). Each of the pre-determined character types has a detailed description of the forms of historic landscape features that are required to be visible in an area for it to be categorised as that particular HLC type. **Figure 4.1** presents the 1994 HLC of Cornwall. In this image, you can see that the landscape has been divided up into different areas of historic landscape character types, each of which are represented by a different colour.

One of the major factors of a HLC is how it classifies the landscape into these HLC types. There are two main ways in which landscape character types can be chosen; prescriptive and descriptive. A prescriptive method allocates areas based on how they best fit into predefined character types. This method can be seen in the Cornwall project (CCC 1996). A descriptive method assigns character attributes to an area without initially assigning interpretations of the landscape character. Then with the use of GIS the attribute data can be interrogated and the HLC types developed from the analysis. This attribute only based approach can be seen in the Somerset HLC (Aldred 2001). The current trend is towards the use of both methods in combination (*ibid*.). This combination of methods will be used by this thesis.

The sources used by a HLC to determine what historic features are within a landscape in order to carry out either method differs dependent on what sources are available for the study area. Ordnance Survey maps are the most common source used in British HLC. Historic maps are also used regularly in the HLC process. **Figure 4.2** portrays a HLC map alongside an Ordnance Survey map that was used to generate the HLC map. Historic maps are used in two main ways. The first is to reconstruct prior historic landscapes as independent time slices within the HLC that have no connection to the modern landscape (*ibid.* 24). **Figure 4.3** shows an example of HLC time slicing. This image shows the dramatic change in the character of the area over a 160-year period. The second method for using historic maps is to create a model of the historic landscape from the present day landscape. This method builds a picture of the landscape's development through time by using the map sources, which it recognises as intrinsically linked to the present character of the landscape. This method does not create time slices that are independent of the previous and prior features. The current trend in HLC creation is towards this method (*ibid.*). The use of historic maps will be a major distinction between previous HLCs and the methodology used by this thesis as historic maps are not as readily available for the case-study areas. Aerial photography and horizontal geo-referenced images can also be used as base maps. Historic photography can also help develop recent time-depth within a HLC. This thesis will use Google Earth imagery as a base map. This will mean that the employed methodology will test if an effective HLC can be created without a major map source. HLC has previously been pioneered in the Mediterranean region with a heavy reliance on aerial imagery (Crow and Turner n.d.). Documentary sources, archaeological excavation and archaeological survey reports can also be used to aid HLC decisions and help add time-depth. Retrogressive landscape analysis is a methodology that unravels the chronological construction of manmade features in the landscape. This technique is particularly useful in aiding HLC type determination. Retrogressive landscape analysis is described in more detail in Chapter 5.

HLC is a very useful way of visualising the different areas within the landscape and their relationships with one another. This is particularly the case for non-specialised audiences as it can present lots of information in a distilled, easy to read format. With this process, the whole landscape's historic nature can be visualised unlike the traditional dots on a map method. The HLC method is particularly good at highlighting areas of activity or inactivity, unusual areas and periods of change. **Figures 4.4** and **4.5** present how HLC can be used to portray only selected HLC types, like industry (**Figure 4.4**) or residential areas (**Figure 4.5**). Many types of sources can be incorporated into this methodology which makes HLC a very flexible approach which can be developed as the landscape develops and can be constantly reinterpreted as new evidence comes to light.

4.4 Expansion of the Historic Landscape Characterisation Method

Following the success of the Cornwall project a 'first wave' (Aldred and Fairclough 2003: 7) of HLC projects began in England. These HLC projects followed the principles of *Yesterday's World Tomorrow's Landscape* and Cornwall's HLC methodology, but expanded the HLC procedure through new experimentation. The experimentation undertaken by the first wave projects put greater reliance upon historic maps leading to greater objectivity. However, it is important to note that this can result in less focus on the surviving landscape (*ibid*.). The first wave projects also expanded the use of documentary sources and included more time-depth and previous land use in the HLC classification types. In addition to this, the first wave projects introduced period, phase and process maps and increased the use of time slice historic mapping (*ibid.* 8). The first wave projects also attempted to reflect local identity as recommended by *Yesterday's World Tomorrow's Landscape* (Fairclough *et al*. 1999: 55). Most significantly for the development of the technical procedure, these first wave maps were the first to start using the newly available GIS (Aldred and Fairclough 2003: 7).

The introduction of GIS had a huge impact upon the advancement of HLC. A GIS is an information system that collects, stores, analyses, manages and presents data geographically (Longley *et al.* 2005). In essence, it combines the functionality of a multi-relational database with spatial graphic projection and image editing tools. GIS enables users to pose interactive queries, analyse spatial information, edit data and visually present the results of these operations (*ibid.*). A GIS is an ideal tool for the creation, manipulation, presentation and storage of HLC data, making it much easier and quicker to compile HLCs and create interactive maps. Because of its analytical capabilities GIS also facilitates more complex queries and analysis (Fairclough and Wigley 2006). **Figure 4.6** presents a pie chart displaying the results of a query into the comparative sizes of industry related HLC types within a larger HLC project. GIS applications also allow different time-depths to be displayed and allow HLC to be more easily accessible by the public as the information can be accessed through an interactive portal (Fairclough 2002a). It is now common practice for multiple data about a single spatial entity to be stored in a GIS (Aldred and Fairclough 2003: 25). This allows greater determination in HLC interpretations and provides greater transparency by allowing the landscape attributes and the reasoning behind the decision to classify an area as a particular HLC type to be recorded. GIS greatly influenced the transformation of the HLC method from a prescriptive classification led technique to a descriptive attribute based technique (*ibid.* 7-8). The HLC of the two Mediterranean case studies undertaken for this thesis has been compiled within a GIS using a combination of the prescriptive and descriptive methodologies. An original classification technique was carried out as the basis of the HLC with the addition of attributes added to each character zone, allowing for the adaption of the classification after the attributes are analysed. Chapter 5 explains this methodology in detail.

These early HLCs began the ‘healthy diversity of development and method’ (*ibid.* 1) that can be seen in the growth and improvement of HLC over the past 15 years. Fairclough *et al.* (1999) describe four waves in the development of the HLC practice during the late 1980s and early 1990s. The rapid development and variety in experimentation by these early HLCs provided the catalyst for the consolidated methodology illustrated in the national HLC review *Historic Landscape Characterisation Taking Stock of the Method* (Aldred and Fairclough 2003). This review was commissioned by English Heritage to evaluate the development of HLC and its varied methods in order to define current best practice from the different elements that lie across several projects chosen from these early HLCs (*ibid.* 1). The main technique of this review was based on a compare and contrast exercise of the methodologies of existing projects against predefined comparison areas. Through the use of questionnaire results, project designs, reports and discussions with project officers, the review concluded that although there was a need to standardise the terminology used and provide greater transparency within the projects, their core aspects were strong and weaknesses were only found in peripheral areas (*ibid*.). However, one main problem with the projects was that they lacked full written methodologies. One point this review emphasised was that there was a need to acknowledge more forcefully the fact that HLC is an interpretive process and therefore the results will differ dependent on circumstances. The review *Historic Landscape Characterisation Taking Stock of the Method* put forward the *Historic Landscape Characterisation: Template Project Design* (Fairclough 2002b), the use of which it hoped would reduce the few problems it had recognised (Aldred and Fairclough 2003: 39). This template is the basis upon which the methodology used in this thesis is founded. The review adopted the following principles for an effective HLC to follow:

- To study the present day landscape as material culture.
- The most important characteristic of landscape is its time-depth.
- Concerned with the landscape as a whole not just sites within it.
- All the landscape is considered equally.
- Semi natural and living features are also characteristics as well as archaeological features.
- Characterisation is a matter of interpretation.
- People's views of the landscape are an important aspect of character (*ibid.*).

These principles are the same as those adopted by the European Union Culture 2000 network, European Pathways to the Cultural Landscape (Trube n.d.). These principles are extremely similar to the original principles put forward by the Cornwall HLC with the exception that the Cornwall HLC was explicitly interpretive and the addition of the last two principles. These two additional points recognise the importance of human interpretation and perception in the analysis of landscapes. This thesis will incorporate these two additional principles in the HLC methodology of the two eastern Mediterranean case studies.

HLC is now a key English Heritage programme with most of England now covered by this form of analysis. At the point of writing this thesis, only a few counties were not covered by a HLC project and one of these last few to be instigated, Tyne and Wear, had just appointed staff members to begin its HLC. HLC has become a key English Heritage programme and is now endorsed as a leading method for managing change in the historic environment (Aldred and Fairclough 2003: 1). HLC ideas are now embedded into the planning process, originally through PPG15 in the early 1990s (DoE and DNH 1994). This was replaced by PPS5 (DCLG 2010) and this has recently been superseded by the National Planning Policy Framework (EH 2012). This framework follows European Landscape Convention principles and incorporates HLC in its policy. HLC was developed at the same time as the European Landscape Convention and has similar aims and approaches (Turner 2006: 385). A wider European context is set out in *Europe's Cultural Landscape* (Fairclough and Rippon 2002) and English Heritage is helping to contribute to and extend HLC experience in European projects such as the European Union Culture 2000 network in the European Pathways to the Cultural Landscape whose book, *Pathways to Europe's Landscape* (Clark *et al.* 2003), promotes HLC. As Chapter 2 discussed, the European Landscape Convention has had a major impact on the ways in which the landscape is studied and the value placed on landscapes across the world.

The principles of HLC are now being extended to cover towns (EH n.d., a). Greater Manchester's Urban Historic Landscape Characterisation Project is one such example (**Figures 4.3, 4.4, 4.5**). Such projects see the HLC programme moving from a broad landscape context into a more detailed survey of urban areas (Winterburn 2008: 37). HLC has also been adapted to a coastal and marine environment with Historic Seascape Characterisation (HSC). England has instigated a historic seascapes programme of projects to develop a nationally applicable method for assessing and mapping the historic character of the present coastal and marine environment (EH n.d., b). **Figure 4.7** presents the Sea Surface Sub-Characterisation types of the Irish Sea (English Sector) HSC project (Turner and Newman 2011). HLC has now been extended to the Mediterranean by Dr Sam Turner of Newcastle University and Professor Jim Crow of Edinburgh University through their research programme *Unlocking Historic Landscapes in the Eastern Mediterranean* (Crow and Turner, n.d.), the aim of which is to adapt and test HLC in this part of world. This is an important project as it has led the way for this thesis's study. The project aimed to explore how new cost-effective methods can be used to understand Mediterranean landscapes on a large-scale. It aimed to investigate how rural Aegean landscapes have been shaped by social and economic life over the last 1500 years and discover if the changes detected are comparable in the two contrasting case studies of the Greek island of Naxos and a coastal area of Thrace in Turkey (*ibid.*). The results of the HLCs of Naxos (**Figures 4.8**) and

Thrace (**Figure 4.9**) this project have provided a deeper understanding of the development of the landscape of each of the case-study areas. The project's investigation has highlighted particular landscape histories and revealed how the methodologies such as retrogressive landscape analysis can be used effectively in a Mediterranean environment to explore Byzantine landscapes. The exploration of these landscapes using HLC methodologies has illustrated that HLC is possible in a Mediterranean environment. The data types used by this project will be similar to the data types available for this thesis's HLC study areas. The project has demonstrated how the lack of historic mapping heavily relied upon in British HLC is not a detriment to the final HLC results. This ensures that the data sources available for this thesis's study areas will be favourable for HLC. The project's successful HLCs are available on the Archaeological Data Service (Crow and Turner 2010).

4.5 Review of the Historic Landscape Characterisation Method

HLC as a landscape archaeology method is a particularly advantageous tool with which to study landscapes because it 'recognises that landscape is ubiquitous, that it is fundamentally about perception, and that it can be seen in many different ways' (Turner 2006: 385). HLC investigates all the landscape, not just sites or areas of importance. It recognises that all parts of the landscape have historical significance which is the result of human activity and use over time. This is important to landscape studies as past cultures cannot be fully understood by just studying specific sites; the whole of the culture's interaction with the world has to be explored and this includes all the landscape. Understanding which areas of the land were not used is as important as understanding those that were used, and so the landscape has to be investigated in its entirety. Instead of using point data to plot individual sites on a map HLC interprets the whole landscape as a continuous coverage based on variations in historic development. HLC brings the historicity of the landscape to the fore (*ibid.* 390). HLC seeks to present time-depth and historicity across the whole landscape presenting today's landscape character in light of history's long chain of events (Aldred and Fairclough 2003). This also includes the ability to add time-depth and time slices. HLC is a form of landscape archaeology that enables understanding and representation of landscapes in relation to their historical development (McNabb and Lambrick 1999: 54). However, HLCs like conventional archaeological inventories are still rooted in an understanding of landscape as material culture and can be used to inform both landscape management and research (Turner 2006: 385). HLC enriches understanding by allowing us to explore specific contexts (*ibid.* 393).

HLC however does have its drawbacks. The top down approach of HLC and its focus on the character of *present* landscape can mean that later phases of the landscape can erase the earlier phases suggesting an area has no historic past character (Williamson 2007: 67). As a result Tom Williamson asks the question can prehistoric field systems have gone through several phases throughout history, for example separated into strips, kept as open field and then at some point become enclosed (*ibid.*). This, however, is why time slice HLC mapping was developed so that these past HLC types can be presented. Another drawback to the HLC methodology can be seen in the definition of areas of HLC. In a HLC map the boundary between a HLC type is clear cut, however in real life different landscape characters merge into each other (*ibid.* 67). This is a problem, but for the purposes of HLC this problem is marginal when compared to the value of the methodology. HLC can be said to make assumptions about date (Austin 2007: 103); however if the dating given for a HLC type in a HLC is explained with accountable reasoning this is not a problem. HLC does not attempt to give detailed histories about the entire landscape; it is a technique that generalises. HLC has also been criticised for relying on too little information when categorising HLC. For example, some areas may have similar shaped fields that would place them in the same characterisation type but their real character may be very different due to a different type of flora or topography (Williamson 2007: 63). The HLC in this thesis attempts to avoid these problems by using as much information as possible about the landscape and including not just historic features, but also topography, geology and vegetation within the HLC classifications.

The grouping of historic landscape features and the determination of historic landscape character type is a partly subjective process informed by the physical landscape and determined by an individual. This raises the problem of consistently identifying areas in the correct categories. The same person may categorise things inconsistently, or differences can occur between different researchers. Sometimes it may be difficult to choose between several suitable HLC types and time-depth can further complicate this process. However, the role of the individual in creating a HLC can also be seen as an advantage. HLC can influence present perspectives by situating landscapes in past history (Turner 2006: 393). The European Landscape Convention recognised the importance of people’s perceptions of landscape and that HLC is ultimately about the current perception of the landscape by an individual, albeit aided by a strict set of principles. If this is understood and made transparent, it can be an advantage to HLC. HLC can be used to investigate use of space in a theoretical manner or highlight trends in landscape use over time. Different interpretation of HLCs by persons of different backgrounds and culture of the same piece of land would make an interesting study. It would be possible due to the flexible nature of HLC and the modern use of GIS to include different interpretations with a HLC. HLC will not 'give a false impression of objectivity' (Austin 2007: 104) as some have suggested, if the methodology and rationale behind the HLC categorisations of type and date are clearly explained. This highlights the value and implications of HLC as an approach that extends beyond archaeological applications and potentially provides a mechanism to facilitate communications between academic and professional disciplines concerned with landscape and amongst different groups of the public (Turner 2006: 386). HLC has been criticised because it shows the landscape in plan, whereas in reality people experience landscape from the ground, therefore suggesting that HLC cannot truly represent experience (Williamson 2007: 69). However, although the results of a HLC may be presented in plan, many different elements as discussed above, including ground truthing and perception, can be included in the creation of those results, challenging Williamsons argument. The multi-dimensional nature of HLC allows it to be adapted to specific areas and include a range of differing perspectives. This helps us break free from traditions that have focused research in certain areas (Turner 2006: 393).

Tom Williamson, however disagrees and has stated that HLC in its current form is visually too clumsy to capture complexities of landscape and fails in its stated aim of capturing and recording local and regional distinctiveness (2007: 64). David Austin agrees that HLC in its current form provides only the outline of the landscape and does not capture the true complexity of the landscape (2007: 104). One reason to criticise the technique is that there is no standard methodology or uniform vocabulary used for HLC despite the attempts of various guidelines and templates. Therefore, it is difficult to compare data because different HLCs use differing methodologies (Williamson 2007: 65). People from different academic backgrounds using different terminologies exacerbate this. Williamson also points out another significant problem of the HLC technique, which is that many studies that use HLC tend to ignore previous landscape investigations. He argues that 'HLC exercises have frequently been marred by a failure to engage with pre-existing research, and with wider academic discourse relating to the landscape' (*ibid.* 64). This is a problem but one which will be difficult to address, as different landscapes need different approaches and different projects will have different aims.

The deficits of HLC highlighted above do not affect the potential of the technique. This thesis will avoid such problems and attempt to go beyond the minor deficiencies portrayed. A critique of HLC has been that it relies too much on map sources and that it does not engage with other investigations. This thesis will engage with all investigations. Importantly this thesis is utilising a unique technique to advance the HLC methodology by incorporating ceramic and landscape survey results. HLC does simplify the landscape but that is part of its usefulness. It is not to be taken as a complete landscape evaluation. It is most important to remember that HLC is simply one of many methods to be used to explore landscape rather than the only one.

4.6 Future Potential of Historic Landscape Characterisation

The value and potential of HLC for use in the Mediterranean is significant. Previous work has too often focused on specific sites. HLC can counter this over reliance allowing the landscape to be studied in its entirety. Previous landscape surveys have been limited. The landscape needs wholesale investigation that HLC can provide. The ability of HLC to incorporate vastly different data types allows it to be carried out on areas of differing topography, historic background and previous research. A particular advantage to the study of the eastern Mediterranean by foreign scholars is that the method is not invasive and can be carried out through purely desk-based analysis if wished. Although some form of ground truthing is needed this can be carried out in many counties without the need for a research permit allowing people like Ph.D. students to carry out research of areas where they may not have been able to in the past. As a result, it is also a cost effective technique and although expensive satellite imagery can be used, freely available sources are suitable.

Importantly the rich history in the eastern Mediterranean has been under threat from modern expansion and new farming methods. The coastline of southern Turkey has dramatically changed over the past 50 years with vast new building complexes being built. Further inland, new agricultural changes are in effect with bulldozed terraces becoming common. In Cyprus, quarries and dams are affecting the landscape and destroying much of the past historic character. The potential of HLC is to be able to record these areas or change and predict areas for management; this is very much in the style of the European Landscape Convention. In Britain, HLC is often only used for land management purposes but it has much more potential. HLC is now moving forward and people are beginning to explore and think outside the box as to how it can be applied and to use new sources, such as ceramics. As suggested by this thesis, HLC can be used to explore perceptions by recording experience and human interaction with the landscape. If HLC can provide a framework of landscape then this can inform investigations into daily lives.

4.7 Summary

This chapter has explored the development of HLC and the potential of the method. As the chapter has presented, HLC is an excellent way to visualise information about the historic nature of the landscape in a manner that is easy to understand, easy to use and relatively easy to create, using desk-based techniques. The use of GIS adds further ease to the interrogation of HLCs. This also allows HLCs to be continually updated as new information comes to light or the landscape changes. HLC can be easily combined with other archaeological or management resources such as HERs. It can be used predictively and for landscape management to determine areas likely to be affected by modern development or to determine areas where certain historic activity is likely to have been carried out. HLC can provide a forum for debate and discussion about the value of the landscape. The potential of this method for studying Mediterranean landscapes is great and the combination of techniques used by this thesis is groundbreaking and will test new inclusions of survey data. The following chapter will present the methodology used to carry out the HLC and historic landscape analysis of the two case-study areas.

Chapter 5

A New Method of Historic Landscape Characterisation

5.1 Introduction

The previous chapter has discussed how HLC is an effective form of analysis for landscape investigation and landscape management. This thesis will carry out HLC of two case-study areas in the eastern Mediterranean. Each of the case studies aim through a mainly desk-based programme of GIS mapping and analysis, to achieve an archaeological understanding of the historical and cultural development of the current landscape. Each case study will identify the material remains of human activity in the past at a landscape level in order to demonstrate how these activities formed the landscape as it is seen today. Like all forms of characterisation, the two HLCs will then offer a broad-brush overview of the complex historic environments of each case-study area. The resultant HLC will form a permanent and renewable database. This will present new information that will deliver a better understanding of the historic landscape. This information will unravel the history of the landscape and help us gain a better understanding of the lives of the inhabitants of the landscape with a particular emphasis on the lives of the Byzantine inhabitants.

Both of the case-study areas were chosen for their distinct landscape character, the accessibility of survey data for the area and the availability of high quality Google Earth imagery. They were also chosen because they are in relatively close proximity to each other, yet appear to have had different histories of development. The results of each HLC will be compared and contrasted with each other, but it is also essential that each HLC is a freestanding project, un-reliant upon the other. The two HLCs of the case-study areas are therefore presented in two individual chapters of this thesis. This will allow the effectiveness of the different sources and methods used by the two case studies to be compared. The fact that each case study can stand alone as an individual piece of scholarship will allow for the detailed investigation of each area by scholars who are not concerned with the connections to the other case-study area. This will also allow the HLC of each case study to be manipulated and queried individually and any changes made to one case study would not have to affect the other.

The creation of a HLC is a complicated process which is made up of many component stages. This chapter will describe in detail the elements that make up the extremely comprehensive process used by this thesis to create each of the HLCs of the eastern Mediterranean case-study areas.

5.2 Base Maps

As Chapter 4 discussed a HLC requires a base map on which to work. The first stage in the creation of both of the HLCs begins with the creation of this base map. Map based sources from both the present day and the past are the most common type of base maps found in the analysis of previous HLC projects. However, the Pisidia case-study area does not have accessible map data available at a suitable scale. The reason for this is mainly related to security limits on the availability of detailed maps to foreign citizens or persons working on non-governmental projects in Turkey. In Pisidia the minimum scale maps available are 1:25000 road maps which are not detailed enough to provide a comprehensive base map; however, they have been used for other purposes such as geographical rectification and place name investigation. Access to much more detailed local cadastral plans was possible for the Troodos case-study area but the lack of suitable map data for the Pisidia case-study area has resulted in the base map for each of the eastern Mediterranean HLCs being composed from rectified Google Earth imagery (Google Earth n.d.) for consistency purposes.

Google Earth is a free computer program which maps the Earth by superimposing satellite and aerial imagery on to a virtual globe. This is the most well-known public gateway to satellite imagery (Parcak 2009: 45). Imagery from Google Earth varies in resolution from 0.1 to 30 meters dependent upon the area. For both of the study areas the resolution is below 15 meters. Using Google Earth imagery as a base map will mean that this methodology will test if an effective HLC can be created without a major map source. This has been attempted by the *Unlocking Historic Landscapes in the Eastern Mediterranean* project in Turkey and Greece using IKONOS satellite imagery as part of the only other HLC project that has been carried out in the eastern Mediterranean region (Crow and Turner n.d.). The Google Earth imagery was downloaded using Google Earth Satellite Maps Downloader (Smith 2010). This software tool downloads multiple bitmap images of a selected area, defined by easting and northing co-ordinates that relate to each case-study area. Google Earth uses global GPS coordinate system WGS84. This tool then merges the multiple bitmap images into a large image covering the entire case-study area. This final bitmap image is simply a large raster image which needs to be manually assigned real-world coordinates when input into the GIS software used to compile the HLC. The GIS software used is the Environmental Systems Research Institute's ArcGIS 9.3 software (ESRI n.d.). This is a Windows compatible suite of systems consisting of a group of GIS software products and several integrated applications which perform spatial analysis and allow the creation, visual presentation and interrogation of multi-layered maps. This geo-referencing process requires the real world coordinates for the corners of each image to be added using the 'add geo-reference point' tool in the ArcMap 9.3 application of the ArcGIS 9.3 software collection. The co-ordinate system used by each case study was WGS1984 decimal degrees.

The image is then rectified to reduce any distortion of the Google Earth image resulting from the image acquisition process. These distortions can arise from such things as the sensor's plane tilt, variations in sensor altitude, Earth curvature, lens distortion and terrain relief (Ruzgiene *et al.* 2011: 1451). Google Earth themselves do rectify their imagery (Parcak 2009: 45; Assc. Prof. Mustafa Türker, pers. com.) but to gain more accuracy additional rectification was required. Rectification is the 'process of transforming from the image system i.e. rows and columns of pixels in a regular pattern, to the desired world coordinate system' (Alderson 2010: 2). This requires the pixels to be redistributed throughout the original image using a resampling technique that re-assigns new values to the pixels to represent the original image in its new location (Wolf and Dewitt 2000). The Google Earth imagery used for the case studies was rectified to a group of control points with known co-ordinates that can be located on the Google Earth imagery. Ground control points should be visible all year round, preferably be manmade like a road junction or the corner of a large building and be in areas of high contrast in the imagery (Schowengerdt 2007). The co-ordinates of the ground control points 'can come from a variety of sources, either another pre-georeferenced image or a map, but are often from a ground control survey, as these can provide the most accurate results' (Alderson 2010: 2). In this thesis the control points are taken from a combination of map data, landscape survey data and primary collection of reference points using a hand held GPS. Each case study will detail what sources were used for the control points.

The rectification process for each case-study area was carried out using the 'geo-referencing' tool in ArcMap 9.3. This tool attaches new co-ordinates to the selected control point locations and automatically redistributes the pixels within the image. This thesis uses the resampling methodology cubic convolution; ‘this approach extends upon bi-linear interpolation by using the sixteen surrounding points and performing an averaging technique to calculate the output pixel value’ (*ibid. 3*), rectifying the Google Earth imagery to ground control points. The ‘purpose of this technique is to compute an image to world transformation matrix that defines the relationship between the input image and output image’ (Campbell 2002). Unfortunately the process of ortho-rectification which ‘involves the removal of distortions introduced into imagery as a result of the topographical nature of the ground at the point of capture’ (Alderson 2010: 3) could not be carried out as height data was not available to a suitable resolution for either of the case-study areas. However, Google Earth would have carried out this process during their rectification process.

To check that a compound error had not occurred during the rectification process tests were carried out. These tests found that boundaries and landscape features GPS surveyed during ground truthing matched up near perfectly to the rectified satellite imagery. **Figure 5.1** portrays a survey area on the outskirts of the *polis* of Pednellisos in Pisidia where the terraces and boundaries have been GPS surveyed and overlain on the satellite imagery. The polylines created by the GPS survey of the terraces are indicated in light blue and black highlights the GPS polylines of modern boundary fencing. This image reveals the accuracy of the rectification of the satellite imagery as the polylines of the GPS survey show very little deviation from the lines of the terraces and boundaries in the imagery. The level of error in this system has been proven very small - less than one meter in many cases. However, areas of higher error are likely to be found in areas of extreme topography such as mountainsides. These are also often areas where no control points can be located. However, the level of error is certainly low enough to have no adverse effects on the HLC methodology.

5.3 Scale

Investigation of HLC has observed that scale can be a major factor in an effective HLC. There are two types of scale: perception and digitisation (Aldred and Fairclough 2003: 26). Perception is the scale at which the HLC is perceived by a viewer. The scale at which the HLC is first perceived can influence the classification of the landscape. It is important that this scale is not too small as this can result in the HLC becoming too complicated and the main aim of the HLC method is to generalise the character of the historic landscape. Too large a scale, however, can also detract from the HLC as it can become too general and not provide enough information about the differences between areas. Perception scale needs to be taken into account when creating the HLC and the intended presentation output considered. For example, both of this thesis' case studies are different in size, but as one of the methods of presenting the results is through publication of printed map imagery, the largest map output for both case studies is limited to A4. Therefore when creating the HLC it has to be taken into account that the largest case study has to be able to be clearly perceived at this maximum size, although more detail can be investigated through the accompany interactive GIS files.

However, it is digitisation scale that ultimately affects the scales at which the historic landscape can be perceived. Digitation scale is the scale at which the HLC is drawn or digitised on the screen and at which the data and attributes are captured (*ibid.*). In the UK, the use of Master Map has resulted in Ordinance Survey map scales often being used (*ibid*.). In this thesis' case studies there is no standardised map with an associated map scale available to be used by the HLC. The case-study areas are also smaller than the traditional large-scale HLC seen carried out across Europe, which tend to characterise the landscape of a whole county or region. Therefore, the scales used by this thesis's HLCs will be much smaller and more detailed than commonly seen. Due to the lack of map data, the scale will be based on the resolution of the Google Earth imagery. The Google Earth imagery for the two case-study areas was downloaded from Google Earth Satellite Maps Downloader (Smith 2010) at a zoom level of 16, which equates to a resolution level of 10 - 15 meters.

5.4 Sources

The sources of information about the historical landscape of each case study are integral for the HLC investigation. Both of the eastern Mediterranean HLC case studies will use a collection of different sources to determine the historic character of the landscape. Each case study chapter will list what resources will be used in order to carry out the HLC. This will include specific details on the Google Earth base map, such as the date the image was taken. One of the significant benefits of Google Earth imagery is its recent time-depth. Google Earth is constantly updated with the most recent satellite imagery available used as the primary layer in the Google Earth software. However, Google Earth also makes available 'historic' imagery from when the software was instigated up until the present. This means that for both of the case-study areas there are several images available covering the past decade. Not only does this show recent changes to the landscape it also often shows images of the landscape during different seasons. This reveals the landscape and the landscape features in different conditions, which can affect the visibility of crop marks. Multiple images of different dates can also reveal landscape features that are under crop in one image but not in another, which may ultimately effect the interpretation of the HLC.

In both case studies further time-depth has be gained by consulting decommissioned CORONA satellite photography taken in 1963 by the Central Intelligence Agency Directorate of Science and Technology during strategic surveillance originally used for reconnaissance and to produce maps for United States of America intelligence agencies (USGS n.d.). This satellite imagery was decommissioned by executive order of the American government in 1995 and is now available from the United States Geological Survey website (*ibid.*). The CORONA satellites orbited the Earth at altitudes from 165 kilometres to 460 kilometres and the imagery had a resolution between six and 150 meters (Parcak 2009: 52). The declassification of military satellite photography has 'great potential value for archaeology' (Philip *et al*. 2002: 109). The CORONA imagery provides a picture of the 1960s landscape, revealing the changes to the landscape during the intensification of farming and the growth of villages that has taken place over the last fifty years, revealing a landscape of less 'urban industrial clutter' (Wilkinson 2000: 228) than the modern landscape, as David Kennedy has explored in relation to the Euphrates valley (1998) and Jason Ur in Mesopotamia (2003). CORONA imagery has become valuable to archaeologists because of its high resolution, low cost and ease of access (Parcak 2009: 53). The Corona imagery for each case-study area was received as a bitmap file that was then geo-referenced into its real world co-ordinates within ArcMap 9.3. The geographical co-ordinates provided with the imagery were approximated through mathematical calculations based on camera operation and satellite. This can affect the accuracy of the coordinates according to the precision of information used for their derivation (USGS n.d.). Therefore, further rectification and position checks were conducted on the imagery to make sure that it correctly matched the survey areas. Each individual HLC chapter will discuss the quality and further details of the CORONA imagery used.

The map data used in each HLC is also described in further detail in each HLC chapter. As discussed above only Turkish National 1:25,000 topographical maps are available for the Pisidia case-study area. Local cadastral maps of the region were consulted, however, they have very little detail and no specific field parcel information. In Cyprus however, copies of cadastral plans for the majority of the case-study area were available to view at the Cyprus American Archaeological Research Institute. Therefore, these are used successfully as sources of information for landscape development in the focus studies of the Troodos HLC.

Documentary sources and archaeological sources such as survey find spot data and excavation data will also be used to help determine the character of the historic landscape and to add time-depth to the interpretations and are documented accordingly in each case study chapter. Any archaeological landscape work that has already been carried out in the case-study area will also be referred to, with particular reference to large-scale work that will support the HLC.

The above sources are all traditional sources used to aid HLC interpretation. This thesis will go beyond the traditional HLC methodologies. Byzantine studies cannot advance without experimenting with new methodologies. To do this archaeological landscape survey results will be incorporated into the HLC methodology. Both of the case-study areas have been the focus of archaeological survey (Given and Knapp 2003; Vandeput and Köse n.d.). From these archaeological surveys information on site locations and landscape features have been used as seen in traditional HLC methodologies; however, in addition to this both of the case studies will incorporate the ceramics survey results. Combining ceramics survey with HLC has not been attempted before. The aim of this innovative approach is to investigate if there is a relationship between HLC type and the ceramics found in the area. This will also allow areas traditionally thought of as not historic to reveal a character that is not visible from traditional HLC, which relies heavily on map and aerial imagery. In the Troodos case study the ceramic survey results carried out over a long period by others were consulted, but in the case of the Pisidia study area primary data collection was undertaken by the author. Each case study chapter will document in detail the archaeological landscape survey resource that it uses to aid the HLC.

In addition to the above sources, each case study was visited and ground truthing carried out for the sole purpose of confirming or helping identify the HLC of the landscape. Each case study chapter will describe the extent of this ground truthing, providing details on when it was carried out and under what conditions and will record how it was used in the HLC process.

5.5 Retrogressive Landscape Analysis

One way in which the morphology of the landscape is analysed before the HLC is undertaken through retrogressive landscape analysis. Retrogressive landscape analysis is a technique that unravels the physical and chronological relationships between different elements in the historic landscape by studying the relationships of 'horizontal stratigraphy' between cultural features such as pathways and field boundaries, to establish the order in which they were created (Crow and Turner 2009: 168). This means that the varied sources of information about the landscape are investigated to determine how the landscape features developed. Like how wall sequences are determined in archaeological investigation, landscape features such as boundaries, terraces and walls are examined to determine if they have any relationships such as overlaying, underlying or abutting features which suggest a chronology for the creation of the features. **Figure 5.2** presents a sequence of images that uses this technique to deconstruct the landscape above Kozan Köyü in Pisidia. The first image in the sequence highlights all the features within the landscape (roads, streams, boundaries, terraces), the images then move through the chronology of the landscape features removing those features that overlay others. In the second image the roads have been removed as they appear to overlay the landscape features. In the third image the modern boundaries noticeable for their very straight alignments have been removed. The fourth image in the sequence removes more overlaying boundaries to reveal the earliest features in the chronology which are a series of terraces.

This process of retrogressive landscape analysis can be carried out repeatedly across all landscape features to discover a relative chronology for their construction. This is a technique that has early origins but has not been recognised as a particular methodology until recently. William Roy first depicted time-depth in his plan of Chew Green in Northumberland by using a shading convention to depict his interpretation of the chronological sequence of overlaying features (Bowden and McOmish 2011: 25). Flinders Petrie also explored this technique and suggested that the relationship between Roman roads and landscape features would enable a deconstruction of the chronological features of the landscape (1878: 170). Today retrogressive landscape analysis is often carried out on British projects, although occasionally under different names, and it is popular with the Royal Commission on the Ancient and Historical Monuments of Scotland, the Royal Commission on the Ancient and Historical Monuments of Wales, English Heritage and field surveyors. Oosthuizen describes the development of this technique and lists in detail the methods of deconstructing the landscape in regards to the Cambridgeshire landscape

(2006: 77). This includes an investigation of the historic relationships between overlaying and underlying, abutting and aligned features (*ibid*.). This form of study has been described as part of the particularly British tradition of landscape investigation (Bowden and McOmish 2011) and it is only applied in a limited form in the eastern Mediterranean.

This method does not provide dating evidence for a landscape as terraces and field boundaries are notoriously difficult to date (Gibson and Wilkinson 1994), but when particular features within such landscapes can be dated it is possible to map out the chronological development of the landscape more exactly. For example, a landscape feature may contain within it some form of material evidence that can be dated. In Pisidia, the fabric of a water mill contains fifth century pottery in the mortar (**Figure 5.3**), providing us with a *terminus post quem* for the walls construction sometime after the fifth century pottery was produced. Another example would be a stone terrace which has a datable tree growing from it (**Figure 5.4**), which would imply that the terrace was already in existence before the tree started to grow and was most likely abandoned and no longer being maintained by this point. This dating method is described by Oliver Rackham and Jennifer Moody in regards to discovering *terminus ante quem* for when terraces were abandoned in Crete by counting the annual rings of invading trees (1996: 143). This type of relative dating has also been used to date terraces to the early Byzantine period in Naxos, Greece. In this case a retrogressive landscape analysis of the landscape revealed that early Byzantine churches were situated on top of terraces providing *terminus ante quem* for when the terrace could have been constructed (Crow *et al.* 2011). Other sources such as the descriptions of antiquarian travellers, hagiographic sources and archaeological reports can also be consulted during retrogressive landscape analysis. For example descriptions or sketches of early travellers can provide *terminus post quem* or *terminus ante quems* for landscape features they describe (Green forthcoming 2013) and survey or excavation reports may date features archaeologically.

5.6 Archaeological Landscape Survey Data

The two HLC case-study areas have been the focus of archaeological survey, but they use archaeological survey data in different and distinctive ways. The archaeological survey projects in each area also record different types of material and collect the data in different ways. Therefore, each case-study will detail the archaeological survey data and the way it is used individually. However, both surveys will incorporate ceramic data into the HLC methodology. This is an innovative approach that has not been attempted in the sphere of

HLC. The primary aim of this process is to investigate the relationships between HLC type and the ceramics recorded in the area. The information gathered from this approach will be utilised to provide a new dimension to the HLC understanding of the landscape's development. Incorporating survey data will help add time-depth and strengthen chronologies. In the Troodos case study the ceramic survey data that will be consulted has been collected over a period of time by the SCSP (Given and Knapp 2003). In the case of the Pisidia case-study the primary ceramic data collection was undertaken by the author over the summer of 2011 (Green and Duggan in prep.).

5.7 Focus Studies

Both of the case-study areas have five focus studies that are distinctive in their HLC. These focus studies are areas within the case-study area that have been chosen for their distinctive ability to portray the development of the landscape within that area. Focus studies are analysed in detail using a variety of archaeological techniques. The historic development of each focus study is explored and presented through descriptive narrative and map imagery. Retrogressive landscape analysis plays a major part in the investigation of the landscape of each focus study. The focus studies play a major role in the process of defining the HLC types.

5.8 Defining Historic Landscape Character

The following describes how a piece of land is classified into a HLC type. The first stage of the process is to determine the HLC types themselves. Traditionally there are two main methods for how this is done - the classification led approach and the attribute led approach. Both methods have their advantages, as discussed in Chapter 4. The two case studies undertook for this thesis use a mixture of both classification and attribute led approaches. As the HLC polygons are created (this process is described below in section 5.9) a pre-determined HLC type is classified to it immediately. This has the advantage of a comprehensive HLC being completed as soon as the polygons are drawn allowing immediate results analysis. This classification led method is appropriate for this form of HLC because there is only one data analyst and the case studies are small, therefore it is possible for all the case study landscape to be well known and understood prior to the HLC classification. This method requires that the pre-determined HLC types be decided upon first. The definitions of the pre-determined HLC types are based upon modern land use and the dominant historic character of the landscape's current form. After careful consideration the landscape is broken up in to the broad categories of 'Field', 'Terrace', 'Rough

Ground', 'Woodland', 'Industry', 'Settlement' and 'Water'. These types are then subdivided into relevant HLC categories. Using the sources available for both of the eastern Mediterranean case studies, the landscape morphology within each of these broad areas is interpreted and analysed and detailed descriptions are made of the areas of the landscape that appear to have different dominant HLC types. The use of GIS has meant that there has been a tendency for HLC projects to move away from detailed textual narratives of HLC types. This has led to the weakening of HLC in some cases and is a trend that should be reversed. Detailed descriptions are useful for users of the HLC and can include the reasons that a HLC type was chosen. The HLC descriptions in this thesis are very detailed and include both a description and in most cases visual examples of the HLC type. They also often include a description of the way in which the landscape character has evolved into its present form and a list of standard landscape features attributes that are found within the HLC type. In addition to the current HLC classification given to every area of the landscape, in some cases previous HLC types can be identified. For example when an areas current HLC type is characterised by a modern dam but CORONA imagery identifies the area as fields prior to the dam's construction, a prior HLC type would also be recorded for this area. This can be repeated more than once resulting in several HLC levels for one area. These have been referred to in the thesis as prior HLC types and in the results and analysis of each HLC case study they will be referred to as prior HLC levels two, three, four and five, with the current HLC being level number one. This creates deeper time-depth and understanding of landscape development. This will allow all areas that have at some point in the past been a certain HLC type to be brought together and displayed in a single map irrespective of later landscape changes. This can also be used to highlight areas of change, loss and erosion while still allowing the present day landscape to be characterised. This prevents the temptation to give priority to degraded examples of HLC types and reduces value judgements as to which types of HLC are more important. The flexible nature of GIS will allow individuals to examine and manipulate the final data set to produce their own queries about the landscape features.

The attribute led method also has many advantages that this thesis does not want to lose, therefore a sophisticated set of attribute features will be attached to each polygon. The attributes that are attached to the polygon include objective morphological observations of landscape features, survey findings and interpreted information about the past landscape character. These attributes reflect the specific historic landscape features that characterise each polygon (e.g. aspects of field pattern, presence of abandoned activity, roadways). The pre-defined classification acts as a frame for more in depth classifications which can utilise the landscape attribute information. This will also allow alternative classifications and thematic analysis to be carried out and if needed character type descriptions can be changed. Attribute information, for example, will allow all areas with a single attribute type, no matter what the HLC type to be queried. This method also allows the input of data from future research, data collection or any other types of study.

5.9 Database and Polygon Creation

The previous section described how the HLC types were ascertained and the methodology used to establish which areas of the landscape were to be categorised into which HLC type. Following this, the main element of a HLC is the creation of the polygons used to represent the different HLC zones. The decision making process for each polygon is not recorded in this thesis but each area is assessed using the available sources and retrogressive landscape analysis to determine which HLC type it best fits. Once the decision is made about what HLC type to categorise a parcel of land into, a polygon is draw directly into ArcMap 9.3 by tracing around the area seen on the Google Earth imagery base map. The polygon drawing process uses the 'create new feature' tool in ArcMap 9.3, which attaches a series of point co-ordinates to the polygon as it is created.

The area covered by a single polygon is defined by landscape divisions. Features such as landscape boundaries, roads, rivers, topographic changes and distinct landscape character changes become the outlines of polygons. As section 5.3 on scale discussed there is also a maximum and minimum size limit for each polygon. One of the main reasons that a maximum size is set is because, although an extremely large area may be categorised as a single HLC type, there may be different landscape attributes that can be seen in the overall area. If all the landscape feature attributes are linked to one polygon it would suggest that the entire area had all these attributes. This may then suggest a different overall HLC type for the area than what it actually is. These attributes when grouped together cause confusion, but when the area is divided into smaller zones, they are isolated individual attributes which do not affect the overriding general HLC type.

After each polygon has been drawn it is automatically assigned an individual identification number. This number is entered into a Microsoft Access 2010 database for each case-study area and the HLC types and attributes for each polygon are recorded. **Table 5.1** presents the fields of the HLC database with descriptions.

FIELD NAME	FIELD DESCRIPTION
ID	Database ID
GIS ID	Polygon ID
Broad Type	Broad Landscape Character Category
HLC 1	Current HLC type
Date 1	Date attributed to HLC 1
Confidence 1	Probable or possible level of confidence of HLC 1
Source 1	Main source of information for HLC 1 decision
HLC 2	HLC type prior to HLC 1
Date 2	Date attributed to HLC 2
Confidence 2	Probable or possible level of confidence of HLC 2
Source 2	Main source of information for HLC 2 decision
HLC 3	HLC type prior to HLC 2
Date 3	Date attributed to HLC 3
Confidence 3	Probable or possible level of confidence of HLC 3
Source 3	Main source of information for HLC 3 decision
HLC 4	HLC type prior to HLC 3
Date 4	Date attributed to HLC 4
Confidence 4	Probable or possible level of confidence of HLC 4
Source 4	Main source of information for HLC 4 decision
HLC 5	HLC type prior to HLC 3
Date 5	Date attributed to HLC 4
Confidence 5	Probable or possible level of confidence of HLC 4
Source 5	Main source of information for HLC 4 decision
Pattern	Pattern of landscape character, i.e. continuous or irregular
Field/Terrace Type	Type of field or terrace, if any exist
Boundary Type 1 Dominant	Construction type of boundary, if any exist
Boundary Type 2 Dominant	Dominant shape of boundary, if any exist
Boundary Type 2 Secondary	Secondary shape of boundary, if any exist
Slope	General character of topography, i.e. Steep slope
POIs	Code number of POIs found with polygon, if any exist
Feature 1	Landscape attribute found within polygon
Feature 2	Landscape attribute found within polygon
Feature 3	Landscape attribute found within polygon
Feature 4	Landscape attribute found within polygon
Feature 5	Landscape attribute found within polygon
Feature 6	Landscape attribute found within polygon
Feature 7	Landscape attribute found within polygon
Feature 8	Landscape attribute found within polygon
Feature 9	Landscape attribute found within polygon
Feature 10	Landscape attribute found within polygon

Table 5.1: HLC database field descriptions.

The grey shading represents fields that are compulsory, while plain white fields are optional. The data from the Microsoft Access 2010 database is attached to each polygon by using the 'join' tool in ArcMap 9.3. This tool merges the GIS created database, which contains the polygon location data, by linking it to the Microsoft Access 2010 HLC database via the individual identification number of each polygon. The accompanying CD (**Appendix 2.2**) contains the resultant shapefiles for each case study. The database is created in Access 2007 rather than directly within the GIS, because it is easier to manipulate, add data or change information within an external database without immediately altering the GIS files. The GIS can then be updated by relinking the database using the 'join' tool. Using an Access 2007 database also allows the HLC data to be presented in other forms, for example bar or pie charts can be used to present percentages of each HLC type with a case-study area.

5.10 Data Presentation, Use and Storage

The main products of the HLCs are two GIS database that can be analysed within ArcGIS 9.3 and Microsoft Access 2010. The resultant GIS of the HLC of both case study areas has been analysed and queried. The results of the analysis of the two HLCs will be presented in written form within individual case study chapters with reference to multiple map output images. Each of the case study results will be presented and studied individually before the results of both case studies are compared in a later chapter. Each case study will be structured in the following way.

- **Introduction**

  This will include a brief introduction to the HLC, a recap of the main project aims in light of the particular case study and any additional case study specific aims and objectives.

- **Location and Geography**

  This will define the area covered by the HLC, specifying the region it is located within and detailing the extent in kilometres. This will also include a detailed description of the case-study area's landscape, focusing on the geology, topography and landscape character.

- **Historical Context**

  This will communicate the historical background of the HLC case-study area, referring to the existing historical and archaeological investigations that have been carried out in the case-study area.

- **Sources**

  This will report the sources used to analyse the landscape. In particular, this will include a detailed discussion of the ceramic survey data used by each case study and the ground truthing carried out.

- **Focus Studies**

  This will describe the historic landscape development of the focus-study areas within the case-study area. Each focus study will be investigated using retrogressive landscape analysis.

- **Historic Landscape Character Types**

  This will provide detailed descriptions of each HLC type that has been identified in the case study area.

- **Historic Landscape Characterisation Results**

  This section will present the HLC results. This will include a written description of the results of the HLC and maps demonstrating the conclusions that have arose from each HLC on analysis.

- **Analysis**

  This will discuss the results of the HLC in detail, analysing the trends that the HLC disclosed and answering the aims and objects of the case study.

- **Summary**

  This section will summarise the content of the case study chapter.

The two case studies will be investigated as a whole in the remaining chapter. This will include a comparative analysis of landscape development and a summary of the assessment stage of the project and the successfulness of the HLC method utilised, followed by recommendations for further work, including potential for further analysis and research. The shapefiles and associated data found on the accompanying CD (**Appendix 2.2**) will be made available on the Archaeological Data Service website (ADS 2012) following the completion of the thesis. This will allow public access to the data. Any additions to the HLC will be updated on the Archaeological Data Service archive.

Chapter 6

Pisidia HLC Case Study

6.1 Introduction

This chapter will begin by introducing the Pisidia case-study area, locating it in its geographical position and setting the area into its historical context. Following this the sources used to determine the HLC types will be presented, before each HLC type is looked at in detail. This in depth study of each HLC type will highlight the rationale behind the definition and determination of each HLC type allotted to an area, based upon the attributes and features found within each area of landscape. The results of the HLC will then be presented with the aid of GIS generated maps and analysed. In particular, the results of the PSP and the intensive ceramic survey undertaken as part of this thesis's investigation will be considered in comparison to the HLC results. This chapter will conclude with an evaluation of the information that this analysis provides about how the landscape developed and how the Byzantine inhabitants made use of it. This in turn will provide an insight into how the Byzantines may have experienced and perceived the landscape they inhabited.

The first case study for this thesis is located in Turkey in the western Taurus Mountains between the Mediterranean Sea and the edge of southern Anatolian plateau. Anatolia has been the focus for much investigation and has a rich and varied history, but as yet Byzantine Anatolia has only been studied in real detail by Stephen Mitchell in his 1993 volume *Anatolia Land Men and Gods Volume. I: The Celts in Anatolia and the impact of Roman rule*. Research on the life of its inhabitants, particularly in remote rural areas, is virtually non-existent (Ciggaar 2009: 259). One of the aims of this thesis is to provide new insights into the rural Byzantine world through the general study of the wider landscape. Pisidia, as a region within Anatolia, has suffered in particular from an ancient bias towards the classical inhabitants of the region who have been considered illiterate, wild, unruly and barbaric (Mitchell 1993: 7). As a result there has been less scholarly interest in the region and Pisidia has become what some have referred to as an archaeological backwater (Russell 1997: 537). Prior to the 1980s when the PSP was instigated, information about the region relied upon the century old 1880s survey excavations led by Viennese art historian Karl Graf von Lanckoronski (Lanckoronski *et al.* 1880; 1892). The volumes that resulted from these investigations are extremely professional and of a standard beyond their time, but they were never intended to be an end to investigation. Other work on the region before 1980 was limited, but there are several worth mentioning. These include the research on the Pisidian Roman colonies carried out in the 1950s by Barbara Levick (1958), the collection of Pisidian inscriptions by the prolific George Bean (1959; 1960), and an early 1970s rescue excavation carried out by Istanbul University and led by Professor Jale İnan at the site of Cremna (1971) later to be excavated by Mitchell (1995; Mitchell and Waelkens 1986; 1987).

The PSP was instigated in 1982 with an investigation of Pisidian Antioch and directed by Mitchell (Mitchell and Waelkens 1998). In 1985, the project visited the site of Sagalassos and confirmed the enormous potential for archaeological research. Sagalassos is located above the village of Ağlasun in the northern regions of Pisidia south-west of Lake Eğidir and west of Lake Burdur (**Figure 6.1**). The PSP undertook excavations and surveys (Waelkens 1993) of this large site until the 1990s, when Sagalassos and its territory became the focus for its own large-scale research project directed by Marc Waelkens (SARP n.d.). The Sagalassos Archaeological Survey Project is one of the biggest archaeological projects in Turkey. This survey project is the most substantial archaeological investigation in the region of Pisidia and it has produced many influential findings. Today the PSP is a multidisciplinary regional survey project where the author of this thesis has been fortunate enough to have worked in 2009, 2010 and 2011. This association provided access to currently unpublished data collected by the PSP in recent years. This data will be used in this chapter to explore the locations of different types of features, sites and artefacts within their landscape context. The information provided by the PSP will provide vital material to aid the decision making process of categorising the areas of the landscape into their correct HLC types.

The lack of previous investigation and the current existence of the PSP make the Pisidia region an ideal location for conducting a HLC that will provide valuable new information. In addition to this, the PSP has recently discovered evidence for production sites of red slip pottery that is consistent with late Roman D Cypriot Red Slip Ware (Vandeput *et al*. 2009; Vandeput *et al*. 2010a; Vandeput *et al*. 2010b; Vandeput *et al*. 2011). The discovery of these production sites is extremely important. If chemical analysis can confirm that the clay used in the production of these ceramics is the same as that of the ceramics previously found on Cyprus, where a production centre has never been found, our perspective on the trade routes of this area of the eastern Mediterranean will change, not only in relation to the ceramic trade but many other trade goods, because pottery can be proxy evidence for other less archaeologically visible items (Jackson *et al*. forthcoming 2012). This makes the region of Pisidia a particularly interesting case study to contrast against the Cypriot Troodos case-study area where other trade goods, notably copper, were being produced.

6.2 Location and Geography

The political borders of Pisidia have changed on several occasions over the centuries (Bromiley 1995: 874) and Pisidia was not formed as an independent province until the time of the Roman emperor Diocletian. It is therefore best to treat Pisidia as a 'geographical concept' (Bracke 1993: 15). The region of Pisidia is composed of the mountainous lofty ridge of the western Taurus Mountain Range, between the high Phrygian Plateau and the coastal plain of Pamphylia, bounded by Lycia, Caria, and Phrygia in the west, and Isauria and Cilicia in the east. The case-study area is 20 kilometres in length (north-south) and ten kilometres in width (east-west), covering a total of 200 square kilometers. This area is located on the southern border between Pisidia and Pamphylia to the north-east of the city of Antalya approximately bounded by the following co-ordinates: North-west corner 37.244402° latitude, 30.872408° longitude, south-east corner 37.065099° latitude 30.978822° longitude (**Figure 6.1**). It is 'very difficult to draw the exact borderlines between Pamphylia and Pisidia' (Işın 1998: 111), therefore it is possible that some of the southern area of the case study is actually part of the ancient region of Pamphylia. However, because the area falls under the remit of the PSP permit, the case study is referred to by the name of Pisidia to avoid confusion. The two regions may present distinctive HLC types owing to different historic processes affecting the land in differing ways. This may be useful for the PSP, one of whose main aims is to discover the extent of the region of Pisidia and identify the extent of the boundary between the two neighbouring regions.

The case-study area is located approximately 300 kilometers north-west of the Troodos Mountain Foothills study area in Cyprus (**Figure 1.1**). The landscape of the region is one of rough, rocky limestone mountains, steep forested hills and fertile plains interspersed with villages and ancient sites. The case-study area is divided into a series of distinct regions and ecological zones. The most prominent zone is the series of cool rocky mountain ridges in the north divided by small, fertile yaylas (upland pastures). The calcareous composition of these mountains guarantees an abundant supply of water to the lower plains (Jackson *et al*. forthcoming 2012). The ancient Pisidian cities, mostly founded on the slopes, benefited greatly from this. One of the southernmost mountains of the Taurus located approximately 75 kilometres north-east of Antalya, known as Bodrum Kaya, has three peaks. The western slope of the central peak which is over 900 metres above sea level, houses the ancient settlement of Pednelissos. South of Pednelissos the geography becomes less extreme and the steep mountains are replaced by gently sloping hills, alternating with large flat areas of open ground. These hillsides can be terraced and the open ground cultivated, but this is not consistent across the whole case-study area. South of this is the distinctive change to the flat fertile plain associated with the province of Pamphylia. This change is highlighted by the Kuçukaksu River which cuts across the case-study area from east to west before joining the Aksu River travelling south. At present, only the bottoms of the valleys, the lower hillsides and the plain are inhabited and cultivated while the steeper slopes and summits are covered by pine forests, but in antiquity the upland areas were much more intensively exploited, as shown by the archaeological evidence recorded by the PSP (Vandeput *et al*. 2009: 2010a: 2011).

The southern part of the case-study area enjoys a typical Mediterranean climate, with mild rainy winters and warm dry summers. Styze Bottema and Henk Woldering (1984: 126-128) illustrate this clearly in their maps depicting the average temperature and precipitation levels in the region for January (**Figure 6.2, 6.3**) and July (**Figures 6.4, 6.5**). The lowland plain is cultivated with a variety of crops such as grains and cereals, and various fruits and vegetables. The highland slope areas are particularly suitable for olive cultivation and have become more exploited in recent years. As the land rises into the Taurus Mountains at the north of the study area, the warm climate of the south fades and it becomes too cold for olive cultivation. The lowland hills at the edge of the plain could possibly have been used for the cultivation of vines in the past as the PSP has found evidence of grape press beds (**Figure 6.6**) for the production of wine.

The uncultivated mountains are covered in Aleppo pine, Turkish pine and dry oak woodlands (van Zeist *et al*. 1975) (**Figure 6.7**). In the high mountains, yayla can be found. These mountain pastures are richly watered from mountain rains, therefore the irrigated soil is very suitable for growing fruit and for animal husbandry. Many of the yayla are used as seasonal retreats from the heat of the coastal plain and for the pasture of animals in the summer. Xavier de Planhol (1958) explores in detail the nomadic and pastoral lives of the inhabitants of the region. The principal products of the region, recorded by ancient authors, were salt from near to Aspendos (Pliny *Natural History* 31. 39), root iris (*ibid.* 21. 19), *storax* from the resin of the Turkish sweetgum tree (*ibid.* 12. 55) which this is still collected by locals in a traditional manner using specifically produced local ceramics, and medicinal wine from the town of Amblada in the border zone between Pisidia and Pamphylia (Strabo *Geography* 12. 7.). The PSP has also found evidence to suggest significant ceramic production in the area (Vandeput *et al.* 2010a; 2011). Strabo also comments on the vast trees of olives (*Geography* 12. 7.), which is reflected in the vast areas of abandoned terraces now claimed by forest and amount and variety of possible olive press remains recorded by the PSP (**Figure 6.8**). Similar products are known from Cyprus suggesting similar landscape and climate.

6.3 Historical Context

Evidence from flint scatters at sites such as Panemoteichus shows that the regions of Pisidia and Pamphylia have been inhabited since the Palaeolithic (Mitchell 1999: 174). Palaeolithic and Mesolithic sites have been more commonly found in Pamphylia (Waelkens *et al*. 1997: 231), although the Pisidian regions have evidence of significant human activity in the early prehistoric period. Toward the end of the Pleistocene, the receding western Pisidian lakes provided fertile alluvial soils which later became one of the first permanent settlements in Anatolia (*ibid*.), Sites such as Haçilar near Burdur, seem to have developed as early centres of food production and obsidian tool making (Fagan 2004: 245).

Based on scriptural evidence, the area now known as Pisidia was part of the area known as the Arzawa region in the Hittite period (Bryce 2012: 17). **Figure 6.9** shows how Pisidia was located at the south-eastern extreme of this region. This figure also shows the site of Parḫă located just south-west of the HLC study area. This became the Classical site of Perge. Hittite records also refer to a mountain site of Salawassa, which has been identified with the site of Sagalassos (Waelkens 2000: 11; Burney 2004: 40). The region's pre-Classical past, although less known, was not necessarily less occupied as Mellaart's excavations at Haçilar to the south-west of Burdur Lake, north of the HLC case-study area exemplifies (Mellaart 1970). This is also supported by the Refik Durus excavations at Kuruçay Höyük (Garfinkel 2003: 123), where the earliest levels are contemporary with level six of Anatolia's most famous prehistoric site Çatalhöyük (Hodder 2005). However, in the HLC area little is known of the early occupants.

Following the collapse of the Hittite Empire in the 12th century, Pisidia came nominally under rule of a Neo-Hittite state but remained largely independent (Bryce 2009: 503). In the sixth century, the Persians conquered Anatolia and divided the area into satrapies, but they too were unable to maintain full control and Pisidia managed to maintain a level of independence (*ibid.* 561). It is clear from Xenophon's texts that Pisidians continued to disobey and rebel against the Persian leaders (Briant 2002: 730); however, the Persians seemed to have been reluctant to destroy Pisidians' freedom since they were an invaluable source of mercenaries (Sekunda 1992: 24).

The ethnicity of the inhabitants of Pisidia has been somewhat debated. Stephen Mitchell and Geoffrey Greatrex (2000) have explored this in their edited volume *Ethnicity and Culture in Late Antiquity*. However it was not ethnicity, but the geography of the region that defined how Pisidia and its inhabitants were viewed by others. Classical authors such as Ephorus (c. 400-330) described Pisidians as being the people of the mountainous areas and the Pamphylians people of the coast, listing the two regions as separate nations (Rawlinson 1862: 323). This shows that the geographical distinction between the two regions was established at an early period. Despite whether the Pisidians were considered ethnically similar or not to their coast dwelling Pamphylian neighbours, ancient Greek texts always portray Pisidians as barbaric, warlike and dangerous people who frequently harassed the adjoining countries, governed by tyrants and following a predatory mode of life (Strabo *Geography* 12. 7). This is a classic portrayal of a peripheral people which maybe based more on ignorance and self-interest rather than fact. There is some truth, however, in William Ramsay's argument that the areas in the interior of Asia Minor remained more 'oriental', whereas the coastal areas were strongly under Hellenistic influence (Ramsay 1890: 23-26). The contrast between Pamphylia and Pisidia was more likely formed due to complex socio-economic reasons. There is no conclusive evidence that Pisidians were any less civilised than the Pamphlylians, but their harsher mountain environment may have given them less resources to spare on cultural activities. One of the reasons that they may have been considered an uncivilised population is that the Pisidian language is poorly represented, but is assumed to be a member of the Anatolian branch of Indo-European languages (Shafer 1950: 243). The relatively small amount of epigraphic evidence from the region that has been found has led to comments that the Pisidians were illiterate and backward (Horsley 1999). Pisidian was probably one of several languages that was spoken across the region in different areas (Shafer 1950: 246). Despite Pisidia's independence from the rest of Anatolia's regions, it formed a component of the geopolitical structure of Classical Asia Minor, as suggested by the roads that have been discovered crossing the region (Mitchell 1998: 240), not off the beaten track but 'On the contrary it was an inescapable component of the geopolitical structure of classical Asia Minor' (*ibid*.). Major cross-regional routes and roads connecting the cities which were often paved show the capacity of the region's cities 'to organise such an excellent regional communications network even in unpromising and difficult terrain' (*ibid.*).

Pisidia between the fourth century B.C. and the sixth century A.D. was a region of city states (*ibid.* 238). The first cities of Pisidia emerged as self-governing communities in the Hellenistic period and became archaeologically visible through public building activity between the third and first centuries B.C. (*ibid.* 241). During the third and early second centuries B.C. there is evidence to suggest Pisidian populations outgrew local resources for unknown reasons, resulting in large-scale emigration and the founding of new city states (*ibid.* 243). The main Classical city in the HLC area is Pednelissos. Hierokles assigns Pednelissos to the province of Pamphylia (*Synecdemos* 681.12), but its location suggests otherwise. The city is thought to have formed a small state by itself, and was often involved in war with neighbouring Selge (Polybius *Histories* 5. 72). Eight Byzantine churches can be found across the ancient city and its necropolis, revealing that the city continued to thrive in the early Christian period. Much of the PSP research in its early years focused on large settlements (Aydal *et al.*1997; Mitchell 1994; Vandeput and Köse 2001; 2002). There is less known about rural Pisidia as rural landscapes and settlements have generally not been the focus of investigators. Rural settlements are also usually less well preserved than urban centres and harder to identify. In addition to this rural sites are very difficult if almost impossible to date due to a lack of artefactual material and an absence of stylistic architectural additions that can be dated typologically. The reuse of these sites at later periods often also adds to the difficulty of dating a rural site by obscuring the origins of the site.

In 333, Alexander the Great on his journey east to Persia conquered the Pisidian city of Sagalassos north of the case-study area (Loots *et al.* 2000: 597), but the city of Termessos to the west of the case-study area in a mountainous location resisted (Rice 1993: 234). The effect of Alexander's defeat of Sagalassos and the attack on Termessos would have been felt across the wider region as it would have affected trade, movement and inter-city relationships. Following Alexander's death in 323 Pisidia experienced a period of instability where the leadership of the area changed hands numerous times with Pisidia eventually coming under control of Seleucus I of the Syrian Seleucids c. 301 (Simkins 2002: 348). Under the Seleucids, Greek colonies were founded across the area of Pisidia and attempts were made to Hellenise the local population (Mitchell 1993: 85). However, the Hellenistic kings were never in complete control of the region and the area was contested by the Attalids of Pergamon and invading Celts from Europe (*ibid.* 55). Pisidia eventually succumbed to the control of the Attalids as a result of the Treaty of Apamea prompted by Roman pressure (Loots *et al.* 2000: 596). The Attalid rulers left a lasting mark on the region with the foundation of Antalya in neighbouring Pamphiliya which rose to be a strong port city (*ibid*. 25; Aydal *et al* 1997: 168-169). On the death of the last king of Pergamon in 133, Pisidia was bequeathed to Rome as part of the province of Asia (Mitchell 1998: 241). Following the re-establishment of Roman power the area was colonized with veterans from the Roman legions in an attempt to maintain control (Levick 1958: 35). Information on the Roman army in this area of the Empire is very limited due to the scarcity of studies on the Roman army in Anatolia (Onur 2009). The increase in population and the addition of new cultures to the region would have had an effect on agricultural activities as well as settlement development.

Pisidia was important in the early spread of Christianity as St. Paul, it is recorded, travelled from Paphos, via Perga and then on through the study area to the city of Pisidian Antioch, returning there again and travelling back to Perga and Attalia (*Acts* 13; *Acts* 14. 21-25), instigating Antioch as a centre of Christianity in Anatolia. The supposed route Paul travelled is still used by pilgrims today and crosses the northern part of the case-study area cutting directly through the city of Pednelissos. In 311 A.D., after the Emperor Constantine's acceptance of Christianity, Antioch played an important role as a metropolitan city (Mitchell and Waelkens 1998). The development of Christianity may have had a significant impact of the landscape of the Pisidian HLC case-study area. With the new religion came new sacred spaces, new church buildings, new sacred pilgrimage routes and new attitudes to the landscape which differed greatly to those of the previous polytheistic religions.

During the late Roman period and the beginning of the Byzantine period the area is thought by most to have been mainly influenced by a period of raids and attacks by conquering Slavs from the north and Arabs form the west, like the rest of Anatolia. Plagues and earthquakes also added to the disruption often quoted by scholars (Mitchell 1999: 142). This instability is thought to be the cause of a ‘dark age’ where trade, material culture and urban life declined. The material culture in the HLC area is also limited during this period. However, as Athanasios Vionis *et al*. (2009) state, a different story is emerging from the analysis of ceramic assemblages from the excavations at Sagalassos, which suggest more continuity in the urban life of the settlement than was previously thought. This can also be seen in a rural context (Vanhaverbeke *et al.* 2009). One of the significant things noticed by Hannelore Vanhaverbeke and her co-authors is that the production centres of ceramics changed in the seventh century moving away from Sagalassos further into rural territory, perhaps to be closer to the villages they were supplying (2009: 180). This may be significant to the development of the HLC region where production centres have been found on the low lying areas near arable land away from any large centres. It is likely that although outside influences would have been felt in the study area, they may have had only a marginal effect on the lives of the rural inhabitants whose primary activities would have been agricultural.

In the 11th century the Seljuk Turks conquered most of Anatolia and founded the Seljuk Sultanate. Pisidia was intermittently under the Byzantine Empire and Seljuk rule until 1176, when Manuel Comnenos was defeated, stabilising Turkish rule of the area (Vanhaverbeke and Waelkens 2003: 131). The society and economy of the countryside was little changed by the Seljuks, who simply replaced Byzantine officials with a new Turkish elite (Pitman 1988). One of the most significant results of this conquering would have been the eventual conversion of the rural population to Islam and the imposition of a new language. The gradual cultural conversation of the population will have also gradually affected the landscape of Pisidia as with the religion would come new attitudes about areas of sacred space. The new Ottoman Empire c. 1320 but little is known about the Ottoman rule of this area (*ibid.*). At the beginning of 13th century, the fertile lands of lower Pisidia and the Pamphylia Plain became the wintering location for the Teke Türkmen. These tribes infused the culture and belief systems from Central Asia into the local peoples, developing new forms of cultural expression, an example of which are the motifs seen on Pisidian and Pamphylian tombstones (Seyirci and Topbaş 1996). Across Anatolia it is likely that the settled population, as opposed to the nomad population, was comparatively sparse, and that the number of towns was proportionately small, but the towns that did exist were likely to have been primarily engaged in agricultural production and local marketing. (Faroqhi 1990). In the later part of the 16th century there was a growth in towns that may have been the result of a population increase, or the blossoming of local and interregional trade (*ibid.*). While the rapid population growth of the 16th century is well established

(McGowan 1981), research on various parts of the empire, including Anatolia, suggest an opposite phenomenon from the turn of the 17th century onwards (Özel 2004). Little work has actually been done on Pisidia as a region during this period. Throughout the Byzantine and Ottoman periods it is likely that a strip field system was operated. Xavier de Planhol (1958) provided a good example of such a situation when he observed the creation of open field systems in Anatolia by farmers who were not acquainted with European experiences.

In the mid-19th century, William Smith could state that Pisidia is little visited by travellers and the mountainous areas of Pisidia were inhabited by the Karamanians, a wild and rapacious people of which little is known (Smith 1854). Pisidia like the rest of Turkey came under the authority of the Turkish republic on 29th October 1923 formally ending the defunct Ottoman Empire. Today the landscape is one of small dispersed villages in the forested mountains, often seasonally occupied, with a more populated fertile agricultural plain which is beginning to be increasingly exploited. However, despite a very recent increase in population the figures in the ancient sources for fighting men from the region are evidence of much higher population figures in the fourth and third centuries B.C. than currently (Mitchell 1998: 238).

6.4 Sources

To create a HLC, a comparative and analytical investigation of all available sources for the area must be carried out. The following section of this chapter provides a description of the main sources used to inform the decision making process involved in the creation of the Pisidian HLC.

6.4.1 Turkish National and Regional Maps

For the Pisidia case-study area, maps of the region were available for reference. These maps are Turkish National 1:25,000 topographical maps provided for the use of the British Institute at Ankara and the PSP, therefore they cannot be published in an official form outside of this thesis. These maps are at such a scale that only a little information can be gained from them for determining landscape character as they do not include much detail above the location of settlements, the contours of the region and the roads and rivers. The most they depict of the land type itself is to indicate which areas at the point of drawing in the 1970s were forested and which were not. **Figure 6.10** depicts the maps that cover the study area with the HLC case-study area outlined providing an example of the detail provided by these maps. One aspect of the maps that was useful in determining HLC type was the contours that indicated the level of ground slope, which was a determining factor in HLC categorisation in relation to terracing. The pathway, road and river lines portrayed on the maps were also helpful in ascertaining changes to them over the past 40 years and most significantly the road junctions and substantial buildings were used to provide geo-rectification control points on which the satellite imagery was rectified.

In addition to the 1:25,000 National maps, local cadastral maps of the region were also consulted at the regional cadastral office in Serik. However, unlike in other regions of Turkey where detailed maps of land parcels are available, in the region of Pisidia the cadastral plans were drawn up in the 1950s, 20 years before the more detailed cadastral planning began. Consequently they have very little detail and no specific field parcel information. This is unfortunate for the HLC of the region as they could have provided excellent information about the cultivated landscape and the construction and division of it in the 1970s before more industrial activities began. In other regions where these plans are available they will have great potential for use in HLC.

6.4.2 Google Earth Imagery

For the Pisidia study region, recently collected Google Earth imagery dating from 2003, 2004, 2005, 2009 and 2011 is an extremely important data source for the HLC. Despite the existence of the 1:25,000 National maps the imagery provided much more detail as it is of a much higher resolution, therefore it provides a base map from which the HLC polygons can be drawn. **Figure 6.11** depicts the Google Earth imagery of the region. The imagery was downloaded using Google Earth Downloader (Smith 2010) and rectified using the 1:25000 national maps and GPS points taken for that purpose. This methodology is described in detail in Chapter 5 alongside technical details about Google Earth imagery.

6.4.3 CORONA Satellite Imagery

This source provides images of the 1960s landscape. This significantly provides information on the field systems and landscape features which have undergone change or destruction during the intensification of farming and the growth of rural villages that have taken place over the last 40 years, revealing a landscape of less ‘urban industrial clutter’ (Wilkinson 2000: 228) than the modern landscape. The CORONA satellite imagery used to aid the HLC for the Pisidia case-study area is taken from satellite photographs taken in August 1961. This satellite imagery was provided with geographical reference points of its extent using reference system WGS1984 and loaded into ArcGIS 9.3. The methodology used and more information on CORONA satellite imagery is provided in Chapter 5. **Figure 6.12** depicts the satellite imagery for the case-study area. Unfortunately the imagery for this region can only provide limited information as parts of it are blurred and other areas are covered with cloud. The resolution is also poor making it hard to determine features and divisions of fields in certain areas (**Figure 6.13**).

6.4.4 Pisidia Survey Project (PSP)

The PSP was instigated in 1982 by Stephen Mitchell and is currently under the directorship of Dr Lutgard Vandeput (British Institute at Ankara). The PSP has concentrated on investigating the architectural and epigraphic remains of urban settlements in Pisidia. The work carried out by the PSP over the past three decades has resulted in an increased understanding of the development of the ancient *poleis* in western Pisidia (Mitchell 1998). In recent years the PSP has concentrated on a multidisciplinary survey of the well-preserved mid-Hellenistic to early-Byzantine remains of the ancient *polis* of Pednelissos (Vandeput and Köse 2006; Vandeput and Köse 2008b; Vandeput *et al*. 2004). Ceramics from surveys indicates occupation mainly from the second century B.C. to the seventh century A.D. with concentrations between the first century B.C. and the first century A.D. and fourth and seventh centuries A.D. (Jackson *et al*. forthcoming 2012). This investigation has made it possible to distinguish the diversity in the development of Pisidian city centres. Research on the architectural ruins in the surrounding area considered to be the territory of Pednelissos started in 2007 (Vandeput and Köse 2008a). This area covers the majority of the Pisidia case-study area. **Figure 6.14** depicts the area within the region that the permit authorised by the Turkish government's department of culture and heritage sanctioned for archaeological survey by the PSP. The HLC presented in this chapter does not cover the entirety of this region as the area would be too large to attempt to effectively investigate with the time and resources available for this thesis. However, the HLC may be extended to cover the entire area as part of the final publication of the PSP.

One of the main reasons for carrying out a survey of the territory of Pednelissos is to improve the poor understanding of the economic basis on which the cities in Pisidia thrived for a period of more than 1,000 years (Jackson *et al*. forthcoming 2012). Over the past five years the PSP has located and mapped new archaeological sites in the region, ranging from large settlements like that of Koca Mehmetler Asarı (Vandeput *et al.* 2010a; 2010b; 2011) to the location of the remains of olive presses (Vandeput *et al.* 2010b; 2011), ceramic production sites (Jackson *et al.* forthcoming 2012; Vandeput *et al*. 2009) and lithic scatters (Green 2012). The methodology used by the PSP is very different to the one undertaken by the SCSP and more reminiscent of earlier survey projects described in Chapter 3. The methodology requires that the PSP team travel to sites and find spots that have been located by a local guide from their local knowledge. The site can be anything within the landscape that the local guide has recognised as being 'old', such as architectural *spolia* re-used within modern buildings, mosaic remains, or intense scatters of ceramics or ancient buildings. When at the location of the site or find spot the geographical position is recorded using a GPS. **Figure 6.14** also presents these Point of Interest (POI) find spots. A detailed description of each POI, whether it is a site or artefact, is documented in a survey diary. This often includes measurements of the building or artefact and photographs of the area. In addition to the description, grab samples of ceramics are collected to provide relative dates for the occupation or use of the site. If further investigation is deemed necessary by the PSP management, more detailed planning may take place using a total station. The problems with this form of survey have been explored in Chapter 3. In particular to note is the problem with find spot size as in the GPS a single find and an entire site are recorded as a single point on a map. The reliance on local knowledge rather than the conduction of a systematic survey can lead to potentially important archaeological evidence being missed due to a lack of understanding of the evidence's importance by local residents of the region.

The results of the survey's work during the past five years show very clearly that the area looked entirely different in Antiquity from today. Remains of housing and extensive remains of terracing have been found in currently uninhabited and uncultivated areas. Many isolated olive oil production workshops have been noted by the PSP. Some are tower-shaped, built from well-cut ashlar masonry and are almost square in plan. Others are built on levelled areas of rocky outcrops using unworked boulders and the production installations are cut into the bedrock. In addition, these numerous fragmented elements of press installations show that olive oil and possibly wine was at least part of the local production.

The discovery of several ceramic production sites by the PSP has been of particular importance for the development of investigation for this thesis and the understanding of trade in the eastern Mediterranean. Four production sites were discovered by the PSP during the 2008 field season and recognised as potential production sites by the extremely high concentrations of ceramics and the existence of waster sherds at each site (Vandeput and Köse 2008b). As a result of the discovery of these potential production sites this author joined the PSP in 2009 to manage a team of Newcastle University students directed by Dr Mark Jackson, whose aim was to investigate these sites. This investigation included a geophysical survey of three of the sites chosen for their topographic suitability, using magnetometry, resistivity and ground penetrating radar, by a team from the Institute of Geosciences and Geophysics at Kiel University. The aim of this geophysical survey was to record kilns and associated buildings so that a ceramic survey can be contextualised within a plan of the site. Geophysical survey at all three sites revealed strong indications of kilns as exemplified in the magnetometer results of Kadirgürü Mevkiisi (**Figure 6.15**).

In addition to the geophysical survey a detailed ceramic survey of two sites was carried out. These surveys used an intensive survey methodology where a grid was laid out over the area and artefacts collected and quantified according to the grid. Diagnostic ceramics, moulds, stamps, and wasters were drawn, photographed and quantified and a new typology acknowledging known types but including greater detail was created. **Figure 6.16** presents the results of the ceramic survey of Kadirgürü Mevkiisi. In this image the number of ceramic sherds recorded clearly increase in the areas where kilns have been identified by the geophysical results. When studied in detail these ceramics were identified as common Cypriot Red Slip Ware forms, originally termed Late Roman D Ware by Frederick Waagé at Antioch (1948). This is the most common late Roman fine ware found on many sites in the eastern Mediterranean and Cyprus (Jackson *et al*. forthcoming 2012.) and for the past 40 years, it has been thought to have been made in Cyprus (Hayes 1972: 371; Meyza 2007: 13). The discovery of possible Cypriot Red Slip Ware production sites in Pisidia strengthens earlier suggestions that Anatolia may have been where the vast quantities of Cypriot Red Slip Ware found across the eastern Mediterranean might have originated (Fırat 2000: 36: Hayes 2001: 277; Poblome *et al.* 2001: 119-126).

Ceramic fabric samples and local clay samples were also collected and exported for scientific analysis in order to verify that this is the same fabric as that typically referred to as Cypriot Red Slip Ware. This scientific investigation which is comparing the Pisidian ceramics with examples found on Cyprus is still ongoing. The implications of this discovery if the scientific analysis does confirm the fabric as Cypriot Red Slip Ware found on Cyprus will have great significance. Similar products may have been made in both Pisidia and Cyprus, but we can determine that Cyprus and southern Turkey must have been very closely interrelated and actively trading in ceramics and other products on a scale not previously appreciated (Jackson *et al*. forthcoming 2012). This discovery should also prompt scholars working at sites all over the eastern Mediterranean region to question whether southern Turkey and not Cyprus was in fact the origin of much of their Cypriot Red Slip Ware (*ibid.*). In addition to this a further implication is that other less durable goods also might have followed the same trade routes as the ceramic which has survived to form part of the archaeological record (*ibid.*).

A smaller Newcastle team returned to the PSP in 2010 to investigate a further site through detailed ceramic survey. During the past three years a total of seven ceramic scatters have been successfully identified and confirmed as production sites. The sites are located within a few kilometres of each other between the village of Haciosmanlar in the north and the town of Gebiz in the south of the HLC study area. Four of the sites are located north of the Kuçukksu River. A fifth site is located at Kadirgürü Mevkiisi immediately north-east of Gebiz and south of the river. Two further sites are located to the north and west of Gebiz. Each of these sites is located in the southern lowland area of the HLC study region in similar landscape types. All sites discovered to date seem to be isolated production units and are located at a distance from the nearest known ancient settlement. All seven sites are situated on raised locations such as hill tops or slopes and in the immediate vicinity of a water source and close to a then navigable river on which the ceramic products may have been floated on rafts down to the coast for further transportation near to water sources.

6.4.5 Intensive Landscape Survey for the Pisidia Survey Project (2011)

As a result of taking part in the PSP 2009 and 2010 seasons, over the course of the 2011 season this author led a team of four undergraduate and four postgraduate students from Newcastle University to undertake systematic survey of ten Survey Units (**Figure 6.17, Table 6.1**). The survey handbook created for the surveyors, which included step by step guides to the survey methodology and ceramic processing methodology can be found in **Appendix 1.1.** The accompanying CD found in **Appendix 2.2** contains all the data recorded by this intensive survey in Access 2007, shapefile and comma delimited text files.

SURVEY UNIT	SITE NAME	CO-ORDINATES	DATE	TRANSECTS
SU_01	Göllü Tepesi	37° 5'22.70"N 30°56'24.78"E	29-30 June 2011	TRANS_001 to TRANS_023
SU_02	Tespili Tepesi	37° 5'49.80"N 30°57'2.01"E	July 2011	TRANS_001 to TRANS_023
SU_03	Kazallı Mahalessi	37° 5'43.33"N 30°55'1.73"E	July 2011	TRANS_001 to TRANS_023
SU_04a	Kozan Köyü	37°13'15.36"N 30°55'36.41"E	July 2011	TRANS_001 to TRANS_023
SU_05	Pednelissos	37°12'42.78"N 30°56'14.37"E	July 2011	TRANS_001 to TRANS_023
SU_06	Koca Mehmetler Asarı	37° 7'9.94"N 31° 1'51.59"E	July 2011	TRANS_001 to TRANS_023
SU_07	Serik Yaylasi	37° 8'39.35"N 31° 1'42.46"E	July 2011	TRANS_001 to TRANS_023
SU_08	Kıselik Mevkiisi	37°10'56.48"N 30°57'39.14"E	July 2011	TRANS_001 to TRANS_023
SU_09	Avdalli Tepesi	37° 7'30.33"N 30°53'4.00"E	July 2011	TRANS_001 to TRANS_023
SU_10	Kireç Yıkığı Mevkiisi	37° 8'3.91"N 30°53'20.23"E	July 2011	TRANS_001 to TRANS_023

Table 6.1: Survey Unit information.

This fieldwork was carried out to complement other aspects of the PSP and to facilitate the investigation into how the complex landscape of the region has developed through time by studying surface artefacts and the environment in which the artefacts were found in a systematic and intensive manner. This chapter will use the results of this survey to inform the HLC and retrogressive landscape analysis of the region.

Ceramic survey data has never been incorporated into HLC analysis before. This thesis is the first piece of academic work to do so. Each Survey Unit was specifically chosen because of its distinctive HLC type and in some cases, because it had also been previously identified by the PSP as an area where further investigation would be of interest. As a result two of the survey unit areas are not within the HLC area, but were investigated to answer questions posed by the wider PSP. Despite being outside the survey area the investigation of the areas will aid the HLC, because the landscape types that these areas are situated in are also to be found within the HLC study area. Therefore the information provided by the investigation of the Survey Units will aid the overall analysis of the landscape of the region.

The objectives of this survey were:

- To record and process a representative sample of ceramic and other artefacts present on the surface in each Survey Unit.
- To confirm the landscape character type and record the current surface cover and landscape topography of each Survey Unit.
- To record the extent and the relationships of terraces and field boundaries within each Survey Unit.
- To collate a digital dataset that will provide a platform for spatial analysis and allow the archaeological material recorded to be investigated at a variety of different levels.

To achieve these objectives three survey methodologies were employed. The main and most frequently applied was a well-established intensive survey technique known as transect walking. This technique involved dividing each Survey Unit into straight lines spaced ten meters apart with each transect line divided into ten meter divisions (**Figure 6.18, 6.19**). This is a technique developed from the survey methodology used by the Antikythera Survey Project (Bevan and Conolly n.d.). The surveyors walked along the line of each ten meter transect division, recording the amount of un-diagnostic ceramic sherds and tile fragments observed within a one meter radius of themselves, on specially designed transect record sheets - an example of which can be found in the student handbook in **Appendix 1.1.** The surveyors were also required to collect and bag any diagnostic ceramic or lithics found in each ten meter transect division for further processing. Small finds such as metal objects were recorded individually and GPS points were taken to record the specific location of these artefacts. The surveyors also recorded the surface coverage, land type and rated the visibility within each ten meter transect division using pre-chosen categories which each surveyor was provided with on laminated reference cards. A list of the data categories can be found in the survey handbook in **Appendix 1.1**. This methodology is time consuming but it enables a more detailed spatial analysis of the recorded material than is possible with less rigorous methods. Alongside the traditional field walking recording and collection requirements the landscape character type of each Survey Unit was identified and the environment was recorded and photographed, including any archaeological features such as standing masonry. Field boundaries and terraces were also recorded using GPS, as discussed in Chapter 5 (**Figure 5.1**), with any relationships documented and features that used modern materials or building methods noted.

The diagnostic ceramic collected during the survey was identified and processed by the Newcastle University team supervised by Maria Duggan (PhD Student, Newcastle University) under the management of this author. Each sherd was identified, classified and recorded (**Figure 6.20, 6.21**) in an Access 2007 database created by this thesis's author (the survey handbook in **Appendix 1.1** contains a step by step guideline of the ceramic processing procedure). The records collated in this database can be investigated at a variety of scales, from the Pisidia area as a whole, down to each individual 10 meter transect division. The data can then be presented in a variety of formats such as pie charts or bar graphs. The Access 2007 database was then linked to an ArcGIS 9.3 database using the 'join' tool in the same manner as described in Chapter 5 for the creation of HLC polygons. The resultant shapefiles can be found on the accompanying CD (**Appendix 2.2**). This enabled the processed ceramic to be spatially plotted. The multi-relational nature of the Access 2007 database combined with the ArcGIS 9.3 software allows questions such as those regarding density, type or date to be comparatively explored across the spatial area of each Survey Unit or across the Survey Units as a whole. **Appendix 2.1** contains the relational table for this database (**Table A2.1**). **Table 6.2** records the broad date categories used in the identification process; these will be refined using the form type allocated to each sherd prior to publication of the final report.

Classification Period	Date Range
Pre Hellenistic	Pre 312 B.C.
Hellenistic	312 – 50 B.C.
Roman	50 B.C. – A.D. 330
Early Roman	100 B.C. – A.D. 200
Mid Roman	A.D. 200 – 450
Late Roman / Early Byzantine	A.D. 450 – 800
Byzantine	A.D. 800 – 1453
Seljuk	A.D. 1071 – 1243
Ottoman	A.D. 1453– 1900
Modern	A.D. 1900– Present Day
Uncertain	N/A

Table 6.2: Broad date range classifications for ceramic identification.

SU_01

The first area chosen to be surveyed is located south-west of the settlement of Gebiz in the low-lying agricultural plain (**Figure 6.17**). The Survey Unit transects surround a mound feature named Göllü Tepesi, which after investigation was found to contain remains of stone buildings. The east side of this mound had been cut into by the construction of a road revealing deep stratigraphy containing early Byzantine ceramics suggesting it to be a Tepe, with the raised ground not being completely natural. The overall HLC character of the Survey Unit is Ottoman ‘Irregular Field’, based on previous strip fields. The Google Earth imagery, which provides the background to the result figures (**Figures 6.22 – 6.26**), reveals that the areas surveyed were cultivated with low crops and both pomegranate and olive groves, and the surrounding fields were used to cultivate cereals. The fields that were surveyed were chosen because they were the only ones suitable for successful survey, because the late harvest of 2011 had made the adjacent fields impossible to field-walk. The results of the survey revealed a higher concentration of ceramics and tile nearer to the mound. **Figures 6.22** presents the results of the quantity of body, diagnostic and tile sherds recorded across the transects, by means of pie charts sized according to the quantity of sherds recorded in each transect division. As can be seen from the pie charts, the quantity of ceramics recorded is higher towards the mound. The majority of the diagnostic ceramics from this survey unit were early Byzantine (**Figure 6.23**). The overriding ceramic class found in the area was red slipped ware (**Figure 6.24**) and the vessel types recorded were primarily mixed table wares (**Figure 6.25**). These results do not reveal any areas of specific activity or vessel preferences. From these ceramic results it can be inferred that the area experienced human activity in the early Byzantine period and there was probably a small settlement or farmstead located on the mound in the centre of the Survey Unit. There were no ceramics of a date later than early Byzantine found in the Survey Unit, suggesting the site may have been abandoned after this period. However, the close proximity to an abandoned Ottoman mosque, which can be seen in the bottom right of the results figures, reveals otherwise. This suggests that the lack of material evidence from later periods is a result of some other factor rather than abandonment, such as a different attitude towards or availability of ceramics in the later periods. The analysis of the landscape features also suggests a significant degree of post-Byzantine development for the current field system, confirming this theory. There were no small finds and only two lithics discovered in this Survey Unit.

SU_02

The second area to be surveyed is located south of the settlement of Gebiz in the low-lying agricultural plain beside the main road running from the coast to Gebiz (**Figure 6.17**). The overall character of the Survey Unit is of Ottoman ‘Irregular Broken Strip’. The Survey Unit transects run north-south across an area of unused open ground which contained what was identified as a ploughed out mound feature named Tespili Tepesi by the local farmers.

This mound has had several illegal excavations carried out upon it revealing the remains of stone buildings and early Byzantine ceramics. The north side of this mound has been ploughed out so that it is a gentle slope. The south side has a more dramatic angle of decent into an area of marshy grass lands that are impossible to survey (**Figure 6.26**). The central area of the mound also has a low level of visibility for survey due to an increase in low scrub bushes. The existence of these bushes and the fact that the area is not used for agriculture suggests that there is a heavy concentration of stone probably relating to buildings in this area. **Figure 6.27** and **figure 6.28** present the results of the visibility and surface coverage respectively. These figures highlight the changes in vegetation and visibility across the Survey Unit. These results can be seen to correlate with each other. Where there is more scrub the visibility is poorer and where the surface coverage is grass or gravel the visibility is better. **Figure 6.29** and **figure 6.30** portray the density of bodysherds and tile fragments respectively across the survey area. These figures reveal a higher concentration of ceramics and tile in the centre of the mound and less in the outer areas. The ceramics found in the area were predominantly early Byzantine (**Figure 6.31**). From these ceramic results it can be inferred that the buildings associated with the mound were occupied in the early Byzantine period. The lack of earlier or later dated ceramics suggests that the area was not used before or after the abandonment of the early Byzantine mound. Analysis of the class of the ceramics (**Figure 6.32**) and the vessel types (**Figure 6.33**) reveals that the diagnostic sherds were mainly open vessel slip wares. There were no field boundaries or terraces to GPS survey in the immediate vicinity of the Survey Unit, however, the location of the illegal trenches and exposed buildings were surveyed. There were no small finds and no lithics discovered in this Survey Unit.

SU_03

The third Survey Unit surveyed is located south-west of the settlement of Gebiz (**Figure 6.17**). The overall character of the Survey Unit is of Byzantine to Ottoman ‘Strip Field’. The Survey Unit transects run roughly east-west along several strip fields in an undulating area called Kazallı Mahalessi. This area is divided into strip fields of varying widths with varying crops cultivated within them. The fields chosen to be surveyed were selected due to the potential visibility of surface finds. This included recently ploughed fields and fields used for fruit tree cultivation. Many of the surrounding fields were cultivated with grains or cereals and due to the late harvest field walking was impossible in these areas. **Figure 6.34** records the visibility of the area. In this figure the Google Earth imagery background reveals an interesting light coloured soil and crop mark running through the two fields surveyed north of the main road that runs through the survey area. These markings were found to be natural areas of dryer rockier ground indicating the top of a raised knoll (**Figure 6.35**). The visibility grading given to the landscape in this area can be seen to reflect the better visibility and the less vegetation drier areas provide. Despite the better visibility the density results for both body and diagnostic sherds and tile fragments presented by pie chart reveal a higher concentration of material found in the lower areas towards the road (**Figure 6.36**). **Figure 6.37** shows that a significant amount of lithics were discovered in the north-western fields. This is significant as there were only 23 lithics found across all ten Survey Units (**Figure 6.38**). The lithics attributed to this Survey Unit are the most advanced in workmanship. However, these lithics have not yet been examined by a specialist and therefore have not been officially identified or dated. It is possible that they identify prehistoric activity in the area, but it is also possible that they are related to Medieval or Ottoman farming practices. It is only in the last 50 years that wooden threshing boards impressed with flint blades have gone out of use in the area; many of which are still found in farmyards (**Figure 6.39**). Locals in the area also still exhibit their ability to make flint tools (Pers com. Mehmet Tekin). The diagnostic ceramics recorded in this Survey Unit were mainly early Byzantine (**Figure 6.40**). There is no knowledge to be gained from spatial analysis of the location of the class and vessel types of these sherds therefore the results have been presented in graph form only (**Figure 6.41, 6.42**). These graph show that like the other Survey Units the primary class type is red slipped ware and the vessel types are mainly table ware forms such as dishes.

These results may imply that the surrounding area was occupied during the Byzantine period and that these fields were farmed. It is possible that this spread of low density Byzantine sherds may be the result of manuring practice as there is no evidence of Byzantine buildings or activity in the immediate vicinity. It is also possible that the road was an earlier Byzantine routeway, accounting for the higher concentrations of ceramics in this area. However, this could also be a result of the landscape's sloping topography. The lack of later sherds suggests that there was no later activity in the area, however analysis of the shape and construction of the strip fields suggests otherwise.

SU_04

The results of the fourth area (**Figure 6.17**) to be surveyed have been separated into two parts as the Survey Unit is divided into two distinct areas slightly separated from each other. These areas are also of distinctly different HLC types, but are both are within the immediate vicinity of Kozan Köyü and therefore not officially two separate Survey Units.

SU_04a

The first part of the fourth area to be surveyed is located to the south-west of the settlement of Kozan Köyü. The area was chosen because of its overall character of Ottoman Abandoned Field. The Survey Unit transects run roughly east-west across the field system. This area is divided into irregularly sized rectangular fields with terraced boundaries. These boundaries were GPS surveyed in order for a retrogressive landscape analysis to be carried out upon them (see section 6.6.2). These fields contain a mixture of uncultivated grasses, old olive groves and newly planted olive groves bounded by stone walls and terraces. The overall recovery of ceramic material in the area was low (**Figure 6.43**). In comparison to the other Survey Units the recovery in this area even when combined with the records of SU_04b (**Figure 6.44**) was the lowest despite it being one of the larger Survey Units. This can partially be accounted for as a result of the visibility in these fields being low (**Figure 6.45**). The low ceramic recovery and poor visibility is likely a result of the ground not having been ploughed in a significant period of time. There is only one area where there is a notable concentration of ceramic recorded in the south-east of the Survey Unit (**Figure 6.43**), this is likely to be related to the visibility in this area improving. The low ceramic count in these areas may also be a result of the survey area's distance from the modern settlement which is likely to be the site of earlier occupation (**Figure 6.46**). The dates of the diagnostic sherds that were identified were early Byzantine (**Figure 6.47**). The low count of the collected sherds means that nothing can be deduced from the vessel type or the vessel class. The low level of Byzantine ceramics and the lack of both earlier Hellenistic sherds and later Ottoman sherds in this survey, despite the proximity to the large Hellenistic city of Pednelissos (one and a half kilometre away) and the village of Kozan Köyü (half a kilometre away) which was occupied during the late Ottoman period, is unusual. The lack of ceramics from these periods may suggest a different use of the landscape or a different attitude towards the use and disposal of ceramic rubbish during the periods before and after the early Byzantine period.

SU_04b

The second part of the fourth area to be surveyed is located to the north-east of the settlement of Kozan Köyü. The area was chosen because of its overall character of Ottoman 'Abandoned Contour Terrace'. The Survey Unit transects run roughly north-south along the terraces. This area is divided into irregularly sized contour terraces that are constructed on a steep slope of Bodrum Kaya. These terraces were GPS surveyed in order for a retrogressive landscape analysis to be carried out upon them. These terraces were mainly abandoned with only the occasional new olive tree planted upon them (**Figure 6.48**). The stone terrace boundaries were unkempt and in a state of great degradation. The overall recovery of ceramic material in the area was low but not as low as in SU_04a. The areas higher up the hillside of this Survey Unit had a significantly higher proportion of ceramic material recorded than the lower area and it was only in this area that diagnostic sherds were recovered (**Figure 6.49**). Notably in the higher area there was a significant proportion of tile fragments recorded to the south of the area. This is undoubtedly related to the remains of a building (**Figure 6.50**) that was discovered adjacent to the survey unit (indicated in red in **Figure 6.49**), of possible Hellenistic date (Dr Lutgarde Vandeput pers. comm.). However, no Hellenistic ceramic material was found during this intensive survey. The dates identified for the ceramics found in this survey area were a mixture of Roman and early Byzantine (**Figure 6.51**). The building was also associated with a paved roadway (**Figure 6.52**) which probably led to the *polis* of Pednelissos. The class of the ceramic recorded from this Survey Unit when identifiable was limited to slipped table ware (**Figure 6.53**) and the vessel types were mainly uncertain (**Figure 6.54**).

SU_05

The fifth Survey Unit is located to the south-west of Pednelissos (**Figure 6.17**). The area was chosen because of its character of Ottoman ‘Abandoned Contour Terraces’ with a prior HLC type of Hellenistic ‘Contour Terrace’. **Figure 6.55** shows surveyors surveying these terraces. This area is divided into irregularly sized contour terraces with stone boundaries. These boundaries were GPS surveyed in order for a retrogressive landscape analysis to be carried out upon them (see section 6.6.1) (**Figure 6.56**). **Figure 6.56** also highlights areas of known buildings and monuments in the area. The surface coverage of uncultivated grass and new olive groves resulted in mixed visibility (**Figure 6.57**). The overall recovery of ceramic material in the area was high particularly in the central area of the Survey Unit as the pie charts in **figure 6.58** reveal. This can be related to the close proximity of the city of Pednelissos. Because **figure 6.58** is too crowded for any patterning to be identified, **figures 6.59, 6.60** and **6.61** present the density of tile fragments, body and diagnostic sherds found across the Survey Unit. **Figure 6.59** reveals a higher density of tile fragments were recorded near known buildings. A similar pattern was noticeable in **figure**

6.60 but this pattern was not as clear in relation to the diagnostic sherds presented in **figure 6.61.**

The majority of the diagnostic ceramics collected were dated to the early Byzantine period (**Figure 6.62, 6.63**) which was surprising considering the longevity of the site. The results of the ceramic class type do not suggest any areas of particular activity (**Figure 6.64**) and they are mainly slipped table wares (**Figure 6.65**). The vessel types also do not suggest any areas of particular activity (**Figure 6.66**) and the majority of the vessel types are open basins, bowls and casserole dishes (**Figure 6.67**). However, there is more variety in vessel types at this Survey Unit than the previous Survey Units.

SU_06

Survey Unit six is located to the west of Koca Mehmetler Asarı (**Figure 6.17**). This is not in the HLC case-study area, but the analysis of the survey results and the investigation of the landscape features in this area are useful for comparative analysis and will be used in the future expansion of the HLC area for the PSP's final report. The area was chosen as a result of the PSP's wish to investigate the surrounding landscape of the settlement of Koca Mehmetler Asarı. It was a useful study for the Pisidia HLC, because of the area's abandoned contour terraces contained within walled boundaries which are also associated with threshing floors and numerous buildings of various dates. **Figure 6.68** shows the survey transects west of Koca Mehmetler Asarı which is shown in plan. There are two distinct areas of survey which will be explored individually to enable the results to be clearly presented. In **figure 6.68** threshing floors are highlighted in red. The Survey Unit transects run roughly north-south over the terraces. These boundaries like those in the other Survey Units were GPS surveyed in order for a retrogressive landscape analysis to be carried out upon them. The surface coverage of the area was relatively good with scrub grass and gravel making up most of the abandoned terrace coverage. The overall recovery of ceramic material in the area was good. This can be related to the close proximity of the settlement of Koca Mehmetler Asarı. The tile fragments, bodysherd and diagnostic counts in both the northern area (**Figure 6.69)** and the southern area (**Figure 6.70**), reveal higher densities of ceramics recorded in areas close to known buildings. The majority of the diagnostic ceramics collected for both areas were dated to the early Byzantine period (**Figure 6.71, Figure 6.72**), which again was surprising considering the longevity of the site of Koca Mehmetler Asarı. The ceramic classes for the north and south areas of the

Survey Unit (**Figure 6.73, Figure 6.74**), and vessel types (**Figures 6.75, 6.76**) do not suggest any areas of particular type activity.

SU_07

Survey Unit seven is located in a yayla known by the locals as Serick Yaylasi (**Figure 6.17**). This Survey Unit is also not in the HLC case-study area. However, the analysis of the area will be useful for comparative analysis with other upland areas in the HLC case-study area and will be used in the future expansion of the HLC area for the PSP's final report. The area was chosen due to the PSP's wish to investigate the location of a Byzantine church and surrounding buildings. The survey transects run roughly east-west and were placed to cross directly over the church. The ground visibility of the area was good with either scrub grass or stone covering most of the area (**Figure 6.77**). The analysis of all types of ceramic material shows a high concentration of ceramic across the church site (**Figure 6.78**), with the higher levels of bodysherds found in the area of the early Byzantine church apse. (**Figure 6.79**) and highest levels of tile fragments recorded across the church and the buildings to the south of the church (**Figure 6.80**).

The apse area of the early Byzantine church is also the location of a much smaller late Byzantine church. The un-datable tiles may then relate to this period building. However, all the diagnostic ceramic material recorded was dated to the early Byzantine period (**Figure 6.81**). There was however, a significantly smaller amount of diagnostic material recorded than bodysherds and tile fragments (**Figure 6.82**). The small amount of diagnostic sherds make it impossible to determine if there were any areas of particular activity by the ceramic class (**Figure 6.83**) or vessel types (**Figure 6.84**). Several small finds were found in this area none of which can be securely dated. One of the finds appear to be a *pithos* sherd that has been shaped into a circular object perhaps to be used as an amphora stopper (**Figure 6.85**).

SU_08

The eighth survey area, known as Kıselik Mevkiisi, is located north of the settlement of Gebiz in the mountain foothills (**Figure 6.17**). The Survey Unit transects surround a Hellenistic tower feature. The overall character of the Survey Unit is of Ottoman 'Abandoned Contour Terrace' with a prior 'Contour Terrace' HLC type level. The areas surveyed were uncultivated with low scrub and grass and visibility was general low (**Figure 6.86**). The terraces were probably associated with the Hellenistic tower. There were no small finds or lithics discovered in this Survey Unit. The results of the survey revealed a higher concentration of ceramics and tile nearer to the tower (**Figures 6.87**). However, the majority of these ceramics were early Byzantine in date (**Figure 6.88**). From these ceramic results it can be inferred that the area was only occupied in the early Byzantine period. However, the standing remains reveal this not to be the case. **Figures 6.89** and **6.90** portray the ceramic class and vessel type respectively. The most notable factor of these figures are the cooking ware identified, as very little cooking ware has been identified across all the Survey Units (**Figure 6.91**).

SU_09

The ninth area chosen to be surveyed is located north-west of the settlement of Gebiz in the low-lying agricultural plain (**Figure 6.17**). The Survey Unit transects surround a mound feature named Avdalli Tepesi, which after investigation was found to contain the remains of stone buildings. The overall character of the Survey Unit is of Ottoman 'Contour Terrace' surrounded by 'Irregular Rectangular Field' HLC type, based on previous strip fields. The areas surveyed were cultivated with low crops or pomegranate groves. The Google Earth imagery, which provides the background map to the results figures, reveals how the surrounding fields circle the mound. The fields that were surveyed were chosen because they were the only ones able to be successfully field walked. The late harvest of cereals in 2011 and the wet winter resulting in extremely high grass (**Figure 6.92**) made other fields impossible to field walk. The tile fragments and the bodysherd and diagnostic sherd results of the survey revealed a higher concentration of ceramics and tile nearer to the mound (**Figure 6.93**). Interestingly more diagnostic sherds were found at the west side and more tile fragments at the east side. The majority of the diagnostic sherds were early Byzantine (**Figure 6.94**). From these ceramic results it can be inferred that the area was occupied in the early Byzantine period. This Survey Unit was the only unit to have evidence of Hellenistic activity seen through the ceramic recovery. However, the landscape revealed no evidence of further Hellenistic material. There were no ceramics of a date later than the early Byzantine ceramics found in the Survey Unit. However, the landscape analysis of the area suggests that the landscape underwent complex post-Byzantine development. **Figure 6.95** portrays the ceramic class results and **Figure 6.96** presents the vessel types. These results suggest that no further information on the landscape can be gained other than that slipped table wares were the most common as in all the Survey Units.

SU_10

The final area chosen to be surveyed is located north-east of SU_09 in the low-lying agricultural plain (**Figure 6.17**) and is known as Kireç Yıkığı Mevkiisi. This Survey Unit was chosen because of the mixture of HLC field types in the area. **Figure 6.97** reveals the visibility grading given to the Survey Unit. **Figure 6.98** reveals the differences in environment across these different field types which affected this visibility. In the central field now the use of the field has changed from cereal cultivation to pomegranate cultivation in the years since the 2009 Google Earth imagery was taken. The survey of this area also revealed that the eastern area has been recently bulldozed to create new contour terraces (**Figure 6.99**). The bulldozed cuts through the landscape revealed remains of buildings and floors in the stratigraphy (**Figure 6.100**). The tile fragments and bodysherd and diagnostic sherd density results reveal a higher concentration of material to the east (**Figures 6.101**). This is likely to be partly the result of the recent bulldozing revealing new sherds. However, it is also likely that this is a direct result of the fact that the bulldozing happened to have cut through what appears to have been a Byzantine farmstead or a small settlement. The fields to the west of this Survey Unit, despite their close proximity to this site, have a much lower concentration of ceramics. As these fields would have likely been part of the settlement's agricultural territory, these results imply that a strong manuring activity was not taking place in the area, as a higher ceramic spread would have been expected. The majority of the ceramics were of the early Byzantine period (**Figure 6.102**). There were no ceramics of a date later than the early Byzantine ceramics found in the Survey Unit. But like SU_09, the landscape analysis of the area suggests that the landscape has complex post-Byzantine chronology. **Figure 6.103** portrays the variety in the ceramic class and **figure 6.104** presents the very mixed variety of vessel types found in this Survey Unit. There were no lithics discovered in this Survey Unit but several small finds were recorded including an as yet undated coin.

Intensive Target Areas

The second methodology was undertaken to fulfil the interests of the director of the PSP, Dr Lutgard Vandeput. This methodology involved collecting a systematic sample of artefacts from Intensive Target Areas. These areas were ten meter square grids located in areas of interest where transect walking was not possible due to the surface coverage of the area. All the surface material within these grids was recorded using the same collection and recording methodology as the transect technique. This methodology located artefacts to within ten meters of their actual position allowing this methodology to integrate with the transect divisions technique and so facilitate spatial comparisons.

Koca Mehmetler Asarı Survey

A third survey methodology was also carried out at Koca Mehmetler Asarı in Survey Unit six. Koca Mehmetler Asarı is a settlement that has been the recent focus of the PSP. This was not in the original remit of the survey but the opportunity arose to survey the site with the aim of discovering datable ceramics and to carry out a comparative analysis of vessel types found in different areas of the settlement. Therefore a methodology was developed that was intended to provide as rigorous and systematic an approach as was possible given the time and resources available. It was not possible to set up a grid system so surveyors collected material within defined areas of roughly similar size across the site. Each area was mapped and the diagnostic material collected from within it. This enabled the creation of a digital dataset that had a level of internal consistency and to some degree was compatible with the Survey Unit transects and the Intensive Target Areas. **Figure 6.105** presents the density of bodysherds recorded across the settlement showing several areas with high ceramic concentrations. There is potential with this methodology to help aid detailed Historic Urban Characterisations, where distinctive areas on a much smaller scale within a settlement are categorised by the function and utility of the buildings and artefacts found. However, in the case of Koca Mehmetler Asarı this methodology unfortunately provided little aid in determining HLC due to the limited diagnostic sherds recorded. As can be seen in **figure 6.106** there was no evidence of typological distinctions between vessels found in different areas and there is little more to be determined about the ceramics other than that they are mainly of early Byzantine date despite the antiquity of the site (**Figure 6.107**).

Brief Analysis of Intensive Landscape Survey Results

Analysis of the diagnostic ceramics across all the Survey Units reveals the strong dominance of early Byzantine material (**Figure 6.108**), in particular red slipped wares, as seen in **figure 6.91**, of primarily open bowl, basin and dish forms (**Figure 6.109**). The extensive recovery of early Byzantine material suggests a very different and more intensively populated landscape in the Byzantine period than at present. The lack of earlier and later material is interesting. And at first consideration it would imply that during these periods the landscape was not occupied. However, as the evidence of earlier and later material exists in other forms, like landscape features as we will see later, other explanations must be considered. These may include different attitudes to the disposal of ceramic material in different periods, different materials being used instead of ceramics at other periods or different survival rates for ceramics from other periods. The primacy of red slipped wares across the survey units may for example be a result of these ceramics surviving better than cooking wares. However, the close proximity of several production sites which were producing these particular forms may mean they were in greater use in this area because they were more readily available.

6.4.6 Ground Truthing

Ground truthing of the landscape of the Pisidia study region is one of the main sources of information for determining its HLC. Ground truthing refers to the physical inspection of the landscape itself through personal visits to the landscape. Ground truthing was first carried out in 2009 during the ceramic survey carried out by Newcastle University (Vandeput *et al.* 2009; 2010a). During the 2010 PSP summer season, further detailed investigation of the landscape was carried out through site visits to differing landscape character areas. In each area visited photographs were taken and detailed descriptions of the landscape compiled. Specific details such as crop types and tree types discovered allowed a further level of detail and richness to be added to the HLC descriptions. This ground truthing when combined with the other sources helps to comprehensively identify the HLC. The ground truthing continued during the 2011 summer PSP season. Ground truthing carried out in 2009 and 2010 in the region helped clarify the methodology used in the 2011 intensive survey (section 6.4.5) and provided suitable preparation of the expectation of the kinds of features that could possibly need to be recorded and the kind of terrain the surveyors would face.

6.4.7 Additional Sources

In addition to the sources described in detail above other records such as past archaeological investigations like those by Bean (1959; 1960) and Levick (1958), ancient texts and local inhabitants were consulted to aid the HLC and to add depth to the analysis.

6.5 Focus Studies

Focused investigation of selected areas help develop the history of the region and provide an overall understanding of the development of the landscape. Each of the focus studies chosen in the Pisidia case-study area have been chosen for their ability to draw attention to the development of their landscape and portray the main characteristics of HLC types. These focus-study areas (**Figure 6.17**) are analysed in detail using a variety of archaeological techniques and presented through descriptive narrative and both photographic and map imagery.

6.5.1 Pednelissos

The focus study area of Pednelissos is located on the upper western slopes of Bodrum Kaya. The focus study area includes the ancient city of Pednelissos. **Figure 6.110** depicts the city's location on the mountain side. The core of the Hellenistic public city centre consists of an agora and an adjacent market building. This core is currently covered with trees but the area is highlighted in red in **figure 6.110**. The agora is an artificially created square, supported by a substantial substructure along the north, south and west sides. The traditional market building is situated on the western side of the agora. The area has been altered continually during its lifetime. In the north-eastern corner of the agora is an early Christian basilica, one of eight churches found in the city, which shows that it continued to thrive in the Byzantine period. However there is no evidence that the city was occupied at any time after this. The central complex of the city is surrounded by streets running in parallel north-south lines with intersecting streets running east-west up the slope of Bodrum Kaya to create a regular pattern. The outstanding preservation of the city and the presence of the Byzantine churches reveal that the centre of the city remained a focal point throughout the settlement's lifetime.

The other public monuments from the Imperial period are mainly located to the west of the city centre. Here are a bath building with an adjacent monumental staircase and a large podium temple, indicated in purple in **figure 6.110**. Survey has confirmed that the area was densely occupied with monumental buildings which are no longer visible on the surface (Vandeput and Köse 2003; 2004a; 2004b). The city never appears to have spread beyond the city walls in the north and the south, indicated in blue. However, large stretches of the western curtain have been completely destroyed and incorporated into dwellings during the later period of the city's occupation. A necropolis flanks the approach roads on both the north and the west sides of the ancient city highlighted in orange. To the south-east of the city just outside the fortification walls is a sanctuary dedicated to the god Apollo, highlighted in pink.

The main focus of this focus study is the land south-west of the city. Retrogressive landscape analysis of the area shows that significant aspects of the landscape were formed at the same time as the city. For example the large well-constructed terraces immediately outside the city are connected to the city walls and likely date to the same construction phase as these walls and the south gateway as they provide the support for the routeway associated with the gateway. A close up of the retrogressive landscape analysis shows how these terraces are then abutted by other terraces showing the relative dates of construction (**Figure 6.111**). **Figure 6.112** also shows through retrogressive landscape analysis how the terraces south of an early Byzantine church complex relate to the formation of the foundations for the church. In this figure the church complex is highlighted in orange with the terraces related to the church curving around it indicated in blue. These terraces do not post-date the church as they are part of the foundations and support for the building. The terraces in the immediate vicinity indicated in green abut against these terraces or the church feature implying they are of the same date or later. The terraces highlighted in brown are again of a later date as can be seen by their relationships to the terraces in green. The black lines in this retrogression indicate modern boundaries. The overall retrogressive landscape analysis of this focus study reveals that the current landscape features are of significant antiquity and have been altered very little since the Byzantine period until the modern boundaries were constructed. There is strong evidence for the Byzantine occupation of this city in the form of eight churches. One of the churches was reduced in size following the trend of the 12th century (Vandeput and Köse 2004a; 2004b; 2006). This reveals the long standing nature of the occupation of the settlement. However, the ceramics are confined to the early Byzantine period (Vandeput and Köse 2004a; 2004b; 2006). As we know from the 2011 intensive survey of the south-eastern outer area of Pednelissos (SU_05), the ceramics recorded in this area were also primarily early Byzantine but retrogressive landscape analysis of the area indicates probable later activity.

6.5.2 Kozan Köyü

Kozan Köyü is located below Pednelissos on the south-western slopes of Bodrum Kaya. This focus-study area is made up of a small dispersed settlements and its surrounding agricultural land is situated in a small valley (**Figure 6.113**). Very little is known about the history of the village except what can be gleaned from local oral history and archaeological evidence. The current settlement pattern of the village is relatively dispersed in comparison to the neighbouring villages in the region where the buildings tend to be clustered close together. This could be because very few of the inhabitants in the village actually live in the village all year round. In the past few decades the village has become a summer retreat for families that now live closer to the coast. These families are descendants of the previous village inhabitants and there appears to be a strong reluctance for people to sell land in the area, even if it is not cultivated and rarely visited. Of particular interest when considering how past inhabitants viewed the landscape is to take note of how the current local people view their environment. There is a strong sense of community in the area. When describing the landscape features such as terracing the locals often report that ‘we built that’ or ‘we didn’t build that, but we used that’. When referring to ‘we’ they do not mean themselves or even their immediate family but any resident in the village or their ancestors. As a community they have a sense of identity that is not connected with the ancient inhabitants of the region. The current communities view the landscape in relation to its productivity, beauty and tradition. But the ancient monuments are often viewed with detachment, with the standing remains of ancient cities described as ‘more old stones’. The ancient inhabitants of the landscape are considered foreign and are seen with dispassion.

Many of the standing buildings in the village are of significant age and can be considered to be a few hundred years old (**Figure 6.114**). These building are quite substantial and built of stone foundations with timber framed additional storeys. This is a design where in the past animals could have been kept in the lower areas. Many of the buildings have been adapted and changed over the years but still retain older features. There are also a few modern concrete buildings in the area, one of which was a school. This building is now redundant and any children living in the area during the school term are sent to a larger regional school. Associated with each household is an area of land used as gardens for cultivating vegetables and fruit. However there is relatively little, large-scale cultivation left in the area. What remains of large-scale cultivation tends to be olives which require little attention and can be left for the majority of the year when the locals are not in residence. Even these areas will not provide much more than needed by a large extended family. In the past, however, the landscape was much more extensively cultivated. North-west of the village there is a large open area of field systems that represent strong evidence for a long-lived cultivation and adaptation of the landscape. The current landscape shows evidence of fields divided up at different periods and using different methods; from scrub fences, to piled rocks and proper stone terracing. The fields around this village have been classified as abandoned fields in the HLC in reference to their construction and restricted use.

Figure 6.115 shows a retrogressive landscape analysis of the area. This analysis shows the depth of development of the landscape. In the top half of the image very straight lines can be seen crossing older field boundaries and dividing older fields. The very straight nature of these boundaries suggests they are the most recent change to the landscape. Ground truthing of the area confirms this and **figure 6.116** reveals that these straight boundaries are small piles of stones in a line marking out a new alignment and probably confirming ownership of the land. This area has no detail on the cadastral maps like the rest of the region, but the red paint found at the end of each boundary suggests that these have been professionally surveyed recently. These new fields have been planted with olives and are between two and five years old.

In the south of the focus-study area field boundaries are marked out using a similar method of clearing the land of stones and piling them up in straight lines. In the case of the boundaries in the southern area however, these have been created at an earlier date as scrubs are already growing in and around the boundary piles and they are broken and the fields no longer contain any crops. The retrogressive landscape analysis of this area suggests that it has experienced a long period of human manipulation. It is certainly likely that the land in the valley was exploited by the city of Pednelissos in the past. In this southern area of the focus study the remains of stone columns have also been used to divide fields as can be seen highlighted in **figure 6.117**. This suggests that there was probably a significant ancient building in the area as although it is possible that the columns come from Pednelissos it would have been a large task to move them and the motivation for such a move is uncertain. There are also large ashlar stones in this area and some of the houses in the village have large ashlar block foundations. So it is possible there was a building of sorts from the columns, possibly a sanctuary or a villa, in the area that has now been completely destroyed and the remains appropriated as building materials in the village.

The village has a mosque of uncertain date however datable grave stones in the graveyard indicate that there was Muslim occupation of the area in the Ottoman period. There is a stream that surfaces in the north-western area of the valley alongside of which irrigation channels have been constructed and appear to be of some antiquity. This stream is located beside a house that has maintained earlier terracing. From conversations with locals it was pointed out the terracing of small irregular stone work was constructed within the collective memory of the village. The terraces are located close to houses, in between older terraces or in areas not previously terraced. This helps with the suggested typological idea that the large well cut terraces of large ashlar blocks on a large-scale and close to ancient monuments could possibly be Hellenistic. The smaller terraces, thinner in size and built of smaller irregular rocks but still neat and often well maintained, are of more recent date and the smaller regular cut block terraces are possibly Byzantine or medieval in origin. Above the stream on the steep hillside of Bodrum Kaya is a significant amount of terracing. **Figure 6.118** shows the retrogressive landscape analysis of this area with only the earliest terrace features highlighted to represent the earliest possible known construction of terraces in the area. The terraces along the side of the mountain are steep and not maintained, although the occasional new row of fruit or olive trees can sometimes be seen planted along a single random terrace. Terraces cover the west side of the mountain until the mountainside becomes too steep and rocky to be terraced. At the top of the series of terraces is a small flattened area, beside which are the remains of a large ashlar built building. North-east of the building the remains of a stone paved road can be found. This road would likely have led to Pednelissos. The terraces around this building most probably date to the time of the building's construction as there is evidence of relationships between the top terraces and the building. From the area of the spring a steep narrow pathway leads up the mountain side to the north of this terracing. There is no evidence of this pathway being paved until it enters the city of Pednelissos, along a sarcophagus lined pathway in the north-west. This path is currently marked by red and white paint to indicate the route of St Paul's way. There is a modern bulldozed trackway from the village that approaches the city of Pednelissos from the south. This may have destroyed evidence of an earlier pathway approaching Pednelissos from a less steep direction. The results of the survey of this area (SU_04) suggest only significant activity in the early Byzantine period. However as this focus study has shown, the landscape analysis suggests a very different history with substantial levels of activity in several periods.

6.5.3 Kazallı Mahalessi

This focus study is located to the south-west of the town of Gebiz. The landscape of this area is one of undulating hillsides. This area is dominated by strip fields. The form of these strip fields suggest that they are of considerable antiquity, as is discussed in relation to the HLC types later. The retrogressive landscape analysis of the area (**Figure 6.119)** shows that these early strip fields (indicated in pale brown) developed by having their boundaries, which are only raised ground and scrub, straightened. They have in some cases been merged to make wider fields, and they have begun to be cropped into rectangular fields (indicated in dark brown) as is normal with the development of the landscape in this region. However, this has only happened on a few occasions leaving the original fields relatively well intact. Nothing is known about this area's history from historical documents and oral history of the area cannot tell us much more than that the fields are 'old'. Survey and ground truthing of the area also revealed relatively little information. No *spolia* were found in the area and no evidence of a settlement. However, the intensive ceramic survey of the strip fields as noted in the description of SU_03 did find a significant proportion of lithics in the area, which have not been analysed by an expert as yet but could either be the result of very early activity in the area, or the result of stone farming tools used during the Medieval and Ottoman period. Early Byzantine ceramics were also found in these fields in low quantities which could suggest that some form of manuring was carried out in the area as no other evidence of activity has been found in the vicinity. To the east of the strip fields in an area of current open fields. **Figure 6.120** also highlights that these areas were also developed from strip fields in the past, with the current open fields highlighted in green and the crop marking from previous strip fields in red.

6.5.4 Göllü Tepesi

This focus study area is located south of Gebiz on the plain. The landscape in this region is mainly flat with occasional naturally raised areas. Göllü Tepesi is a small circular mound**.** This mound has been investigated with ground truthing and the surrounding area surveyed. The ground truthing revealed that the mound has remains of stone buildings hidden under the undergrowth growing on the mound. To the north of the mound a road has been cut into the mound's side revealing significant stratigraphy which contains early Byzantine ceramic material. The intensive survey of the area (SU_01) shows that early Byzantine ceramics were found in the surrounding fields and that the concentration increased towards the mound. As discussed in section 6.4.5, the existence of an abandoned mosque reveals activity of Ottoman date in the area.

The fields that surround Göllü Tepesi have been investigated with retrogressive landscape analysis (**Figure 6.121**). This retrogressive landscape analysis shows how the landscape of the area has developed over time. The earliest of the field boundaries are highlighted in pale grey with the most modern boundaries in black. Crop marks of earlier boundaries are indicated by dashed lines. This image shows the complexity of the landscape and how the original strip fields were gradually broken down and modernised into the landscape we can see today. However, the landscape still retains many of the older field boundaries and pathways and the character of the area has no regular pattern and is instead constructed from the amalgamation of many different field shape, sizes and dates.

6.5.5 Avdalli Tepesi and Surrounding Area

This focus study area is located north of the Kuçukaksu River in the flat fertile plain. This plain is only broken by the irregular natural mounds and areas of raised ground like that of Avdalli Tepesi. The history of this particular area is undocumented, but there is archaeological evidence in the area of settlement on the top of the mound and on the top of another similar raised area to the north-east. These settlements are thought to at least date back to the early Byzantine period from the results of ceramic surveys in the area. The landscape of this focus study can be seen to have developed around these settlements. Avdalli Tepesi is circled by contour terrace fields and other fields radiate away in strip field formation from the settlements. The retrogressive landscape analysis (**Figure 6.122**) of the area depicts how this strip field landscape developed into its current form of irregular broken strip fields. In this image the boundaries are highlighted in shades of grey. The darker the boundary the later the boundary’s construction. The dashed lines highlight crop markings of previous boundaries.

6.6 Historic Landscape Character Types

6.6.1 Overview

The following section will describe the HLC types for Pisidia. The retrogressive landscape analyses of the focus studies above directly affect the determination of the HLC types. Both the Troodos and the Pisidian HLC may use similar HLC classifications, but the description of each HLC type may differ in each region. In the case of certain HLC types, they may be abundant in one region and not found at all in the other. As described in Chapter 5, the HLC types will be presented split into seven broad categories; ‘Field’, ‘Terrace’, ‘Rough Ground’, ‘Woodland’, ‘Settlement’, ‘Industry’ and ‘Water’. **Table 6.3** lists all the HLC types within each of these broad categories, further divided by the historic period that the HLC type is thought to portray.

	MODERN	OTTOMAN	OTTOMAN-BYZANTINE	EARLY BYZANTINE	HELLENISTIC
FIELD	- Strip Field (a) - Irregular Angular Field - Open Field - Regular Clearance Field - Sinuous Clearance Field - Riverside Irregular Field	- Abandoned Field - Irregular Broken Strip Field - Irregular Rectilinear Field - Irregular Field	- Strip Field (b)	- Rectilinear Field (b)	
TERRACE	- Contour Terrace (a) - Step Terrace	- Abandoned Contour Terrace	- Ottoman - Contour Terrace (b)	- Lynchet - Contour Terrace (c)	- Contour Terrace (d)
ROUGH GROUND	- Woodland Clearance - Riverside Rough Ground - Mountain Scrub - Low Scrubland - High Scrubland - Fire Recovery Scrubland				
WOODLAND	- Sparse Natural Woodland - Natural Woodland	- Forested Abandoned Terrace - Natural Forest			
SETTLEMENT	- Linear Settlement (a) - Dispersed Settlement (a) - Cluster Settlement (a)	- Linear Settlement (b) - Dispersed Settlement (b) - Cluster Settlement (b) - Nucleated Settlement (a)			- Production Centre - Nucleated Settlement (b)
INDUSTRY	- Woodworks - Gravel Quarry - Abandoned Quarry - Quarry				
WATER	- River				

Table 6.3: Pisidia HLC types.

Table 6.4 presents the date ranges represented by each historic period. There is no date range prior to the Hellenistic period as there are no HLC types allocated to an earlier period. Each of the HLC types will be provided with a detailed description and photographic examples representing the nature of the HLC type. Each HLC type description will also present information on the Pattern, Field/Terrace, Boundary Type, Dominant Boundary Character, Secondary Boundary Character, Slope, Main Feature Attributes and Other Feature Attributes of the HLC type in table format allowing for an additional quick referencing system. The meanings of each category can be found in Chapter 5. In addition to the primary current HLC where a previous HLC can be discerned with a reasonable level of confidence, prior HLC types can be recorded for a single area. However, in many cases, it has not been possible to suggest what the prior HLC might have been. The decision making process for each polygon is not recorded in this thesis but each polygon is assessed using the available sources and retrogressive landscape analysis to determine which HLC type it best fits.

PERIOD NAME		DATE RANGE
	Modern	A.D. 1923– Present Day
Ottoman	Late Ottoman	A.D. 1700 – 1923
	Early Ottoman	A.D. 1453 – 1700
	Byzantine	A.D. 800 – 1453
	Early Byzantine	A.D. 330 – 800
	Roman	50 B.C. – A.D. 330
	Hellenistic	312 – 50 B.C.

Table 6.4: Date divisions for the HLC types.

6.6.2 Field Systems

One of the largest HLC type broad categories in Pisidia is defined by the pattern created by the field systems being the dominant HLC of an area. There are a large variety of distinctive field systems that can be individually characterised and identified through various archaeological techniques, such as retrogressive landscape analysis. Retrogressive landscape analysis helps to ascertain the relative date of a system, dependent on the distinguishing features of the fields. The boundaries between the fields are in general marked only by areas of raised scrub similar to that seen in Turner and Crow’s Thracian historic landscape study (2010). The raised ground of the Pisidian boundaries are never more than half a meter in height and most commonly much lower than this, although the scrub can grow to a much greater height. These raised boundaries appear insubstantial, but it is clear that in many parts of the study area they are of considerable antiquity as revealed by retrogressive landscape analysis and interpretation of crop marks from remote sensing.

Modern

The HLC types within this Modern group refer to areas where the prevailing characteristics are derived from 20th century manipulation of the landscape for intensive agricultural purposes. These field systems are generally regular in shape with very straight boundaries, suggesting they may have been created using modern survey techniques. Despite this overriding characteristic some of boundaries can have origins in an earlier period and have simply been re-organised in the 20th century.

- Strip Field (a)

This HLC type defines areas of long, narrow, strips of fields that lie adjacent to each other in blocks of various sizes with extremely straight boundaries (**Figure 6.123**). It is unlikely that modern fields would now be created as strip fields as it is a less effective farming method following the introduction of modern machinery. Therefore these fields are most likely to be modern straightened, re-interpretations of earlier Byzantine or Ottoman traditional strip field patterns, which were originally created due to the requirements of the farming techniques of these earlier periods. This Modern 'Strip Field' HLC type is very similar to the Modern strip field HLC type of the Thracian HLC (Crow and Turner n.d.). This study is the only other HLC to have been carried out in Turkey. The Modern strip fields of this HLC type are often found in lower lying, flatter areas as can be seen in the photograph of **figure 6.124**. These fields are also found close to a water source where irrigation can be easily constructed (**Figure 6.125**) and in areas not too distant from occupied settlements. In **figure 6.123** Modern strip fields can be seen in the centre of the image, clearly distinctive from the surrounding fields. In the image the outer boundaries of the block of strip fields respects a road boundary to the south, which possibly is a Modern re-interpretation of an older road or boundary. However, the boundary to the north of the block is likely to be a more recent construction, as Google Earth imagery taken in the spring of 2004 rather than the summer of 2009, reveals through crop markings that the strip fields continued on the same alignments into the fields above (**Figure 6.126**). This confirms the suggestion that these types of field systems have an earlier origin. These fields are not particularly common in the HLC area. This means that the Modern strip fields with their extremely straight boundaries are very distinctive. Further south, outside of the study area where the ground becomes a wider open plateau with fewer undulations, these fields become extremely common. These fields are used for a mixture of crops, mainly grain and cereals, but as **figure 6.127** shows they can also be used for cultivating fruit trees. The boundaries in these fields are most commonly simple raised areas of uncultivated ground with the occasional scrub. In some case the boundaries can also be made up of cut irrigation ditches. Modern strip fields are also often associated with greenhouses as can be seen in **Figure 6.125**. The long rectangular western field in SU_10 would be typical of this HLC type as but it is within a wider field system of Ottoman 'Irregular Broken Strip Field' HLC type.

Pattern :	Regular
Enclosure :	Strip Field
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat
Main feature attributes:	- Strip Field - Raised Scrub Boundary - Rough Roadway
Other feature attributes:	Irrigation Channel, Grove

Table 6.5: Modern – 'Strip Field' attributes.

- Irregular Angular Field

This Modern HLC type refers to areas of variously sized fields whose dominant features are that they have very straight boundaries on at least three sides creating an irregular but angular field pattern (**Figure 6.128**). Through retrogressive landscape analysis and crop marking analysis it is clear that the majority of these fields follow the alignment of earlier post medieval or medieval strip field patterns that have been amalgamated and shortened in length to create more regular rectilinear and square field shapes. Therefore it is common that a previous HLC type can be reasonably determined for the preceding period, which is usually Byzantine or Ottoman 'Strip Field', though in some cases evidence of earlier origins have been lost. The straight sides and angular corners of these irregular fields are the result of further modernisation, thereby strengthening their modern character. This 'Irregular Angular Field' HLC type is often found in low lying, flat areas, close to a water source suitable to feed irrigation channels. Irrigation is usually in the form of large irrigation channels of concrete (**Figure 6.129**) or small concrete aqueducts (**Figure 6.130**). These have been constructed since the 1963 CORONA imagery was taken. This HLC type is also usually found not too far from an occupied settlement, similar to Modern 'Strip Field' HLC types. As a result this HLC type is often found close to a tarmac road or served by plentiful rough roads and trackways. The irregular angular fields of this HLC type are often used for the cultivation of fruits such as strawberries and melons. These fields are often also associated with greenhouses, with a greenhouse occupying one end of a previously larger strip field reducing the remainder of the field to a squarer shape. The boundaries of these fields are made up of raised scrub with the occasional wire fence. In some cases the scrub boundaries may contain clearance rocks. These fields are slightly more common in the Pisidian HLC study area than the Modern ‘Strip Field’ HLC type, and it appears that this was one of the most frequent ways earlier field systems were modernised.

Pattern :	Irregular
Enclosure :	Irregular Angular
Boundary Type:	Raised Scrub Boundary
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Shallow
Main feature attributes:	- Irregular Angular Field - Rough Roadway - Road - Raised Scrub Boundary
Other feature attributes:	Greenhouse, Rough Trackway, Irrigation Channel.

Table 6.6: Modern – ‘Irregular Angular Field’ attributes.

- Open Field

This Modern HLC type refers to areas of fields whose dominant features are their large size and irregular boundaries found in areas of shallow sloping and undulating land (**Figure 6.131**). These fields are used for the large-scale cultivation of cereals and grains. The boundaries related with these fields are infrequent but when they exist they are sinuous and of raised scrub. Most commonly the outer boundaries of these open fields are created by the beginning of woodland. **Figure 6.132** shows the general character of the wide unbounded fields after they have been harvested, with the occasional raised scrub boundary indicated in red. The fields within this ‘Open Field’ HLC type may have been formed from the amalgamation of smaller sinuous fields. In some cases this is attested to by crop markings.

Pattern :	Open
Enclosure :	Open
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Sinuous
Boundary Character Secondary:	Straight
Slope:	Shallow
Main feature attributes:	- Open Field - Rough Trackway - Raised Scrub Boundary
Other feature attributes:	Road, Sinuous Clearance Field, Scrub, Irrigation, Byzantine Ceramic, Regular Field, Rough Roadway.

Table 6.7: Modern – ‘Open Field’ attributes.

- *Regular Clearance Field*

This HLC type refers to areas of fields that have been claimed in the modern period for agricultural land. Areas of this 'Regular Clearance Field' HLC type are often located at the bottom of small scrubland valleys, on top of raised scrub ground or occasionally in areas of woodland. The dominant feature of this HLC type (aside from the locations they are situated in) is the irregular sinuous outer boundary of the fields, contrasted with regular internal divisions creating small rectangular fields as can be seen in **figure 6.133**. It is possible that these areas were once cultivated in the past but there is no evidence of this remaining. The internal boundaries of these fields are, like the majority of field boundaries in the Pisidian case-study area, made up of raised grass scrub. In the case of this HLC type the fields are usually used to cultivate cereals, grains and vegetables. Areas of this 'Regular Clearance Field' HLC type are usually isolated, but they are accessible by rough tracks or roadways and can on occasion contain farmsteads and greenhouses. Due to the location of these fields, irrigation channels are unusual but can exist in a smaller form.

Pattern :	Irregular
Enclosure :	Regular Clearance
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Sinuous
Slope:	Flat, Shallow, Undulating
Main feature attributes:	- Regular Clearance Field - Rough Trackway - Rough Roadway, - Raised Scrub Boundary
Other feature attributes:	Sinuous Clearance Field, Scrub, Road, Walled Boundary, Farmstead, River Gravel, Greenhouse, Irrigation Channel, Step Terrace, Byzantine Pottery Production.

Table 6.8: Modern – 'Regular Clearance Field' attributes.

- *Sinuous Clearance Field*

This HLC type refers to areas of fields whose dominant features are their irregular shape and sinuous boundaries (**Figure 6.134, 6.135**). This 'Sinuous Clearance Field' HLC type is the result of land being claimed in the modern period for agriculture. The fields that characterise this HLC type are located on top of raised scrub ground, at the bottom of small scrubland valleys and occasionally in areas of woodland. These 'Sinuous Clearance Field' HLC zones are located in isolated areas only accessible by rough track and roadways. Due to the location and the un-ordered nature of these fields, irrigation channels are not found in these areas. These fields differ from those of the 'Regular Clearance Field' HLC type in that they do not have straight or regular internal divisions. If they do have internal divisions they are sinuous and constructed from raised scrub and in some cases cut tree branches. These cut tree branches are to prevent the sheep and goats that graze in the surrounding areas eating the crops within the field. The crops grown in these fields are usually cereals, grains and vegetables. It is possible that like the 'Regular Clearance Field' HLC type areas of this HLC type were cultivated in the past, but there is no material evidence of this.

Pattern :	Irregular
Enclosure :	Sinuous Clearance
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Sinuous
Boundary Character Secondary:	Straight
Slope:	Flat, Shallow, Undulating
Main feature attributes:	- Sinuous Clearance Field - Rough Roadway - Rough Trackway - Raised Scrub Boundary
Other feature attributes:	Road, Greenhouse, Abandoned Contour Terrace, Scrub, Contour Terrace, Irrigation Channel, Aqueduct.

Table 6.9: Modern – 'Sinuous Clearance Field' attributes.

- Riverside Irregular Field

This 'Riverside Irregular Field' HLC type refers to areas of fields located on the ground of old river beds, after the river has altered course. These are found alongside large river banks that have been claimed in the Modern period for agricultural land or on land that is no longer next to a river but was once a river bed in the past. These areas may have been riverside meadow in the past, but in common with other parts of Europe (Crow and Turner 2009; Turner and Crow 2010), this land is losing its traditional use and is being sown with arable crops or is becoming overgrown with scrubby vegetation. The dominant feature of this HLC type is the very flat land that it can be found within and the fact that the land is rich in river gravel. Aside from the location the fields that dominate this HLC type are distinguished by their irregular pattern. The fields are usually used to cultivate cereals, grains and vegetables and are made up of straight sided boundaries, but can be of any shape. The alignments of these fields change often, making the field pattern appear very irregular (**Figure 6.136**). It is possible that these areas were cultivated in the past as they often seem to take strip field form. However, neither crop mark analysis, nor retrogressive landscape analysis can confirm this because the pattern is too complicated and random to unravel. It is possible that the location of these fields on old river beds may mean that at different periods in time the land was used and then the river changed, resulting in extremely irregular field patterns because the amount of fields above the river level continually changed. The field boundaries found within this 'Irregular Riverside Field' HLC type are made up of raised scrub like the majority of field boundaries in this case study. In the case of these fields this scrub is usually only made up of long grass and on occasion small piles of river gravel. Due to the location of these fields beside a water source irrigation channels are common in both large and small forms which cross the area to take the water to less irrigated areas.

Pattern :	Irregular
Enclosure :	Riverside Irregular
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat
Main feature attributes:	- Riverside Irregular Field - Riverside Gravel - Raised Scrub Boundary - Rough Trackway.
Other feature attributes:	Rough Roadway, Scrub, Irrigation Channel.

Table 6.10: Modern – 'Riverside Irregular Field' attributes.

Ottoman

The following HLC types describe the field system category types whose dominant characteristics derive from agricultural landscape features that date to the Ottoman period in Pisidia's history. These fields are characteristically less regular in shape and have more sinuous boundaries than the Modern field systems that have been reshaped in the 20th century. Some of the boundaries and landscape features within these systems may also have origins in the Byzantine period.

- Abandoned Field

The 'Abandoned Field' HLC type refers to areas of fields whose dominant features are the square and rectangular field shapes, made up of curved boundaries that combine to make an irregular patterned field system (**Figure 6.137**). These fields can also be terraced with the field being a normal size but the one next to it being on a lower step of no more than a meter in height. This may be a purposeful construction but it may also have been affected by natural erosion of slightly sloping fields. These fields are usually associated with a settlement and Ottoman or Byzantine contour terraces. These fields are dated to the Ottoman period because it was then that they were last modified and abandoned, but retrogressive landscape analysis reveals that they probably did have an origin in the Byzantine period or earlier. As can be seen in the Kozan Köyü focus study and SU_04a, the original and probably earlier boundaries of these fields are made up from abandoned and unmaintained stone walls and scrub, with earlier fields being divided up and new, less substantial boundaries being created out of *spolia* and rocks. **Figure 6.138** shows how the alignment of the abandoned field boundaries can be seen by the olive trees and scrub bushes that have grown around the abandoned stones. These fields could have been used until a hundred years ago, but were probably abandoned by the Modern period. The fields were probably used for a mixture of crops but from the remains of old wild olives and the unmaintained remains of olive groves of large old trees we can say that olives at least were grown in these types of fields.

Pattern :	Irregular
Enclosure :	Abandoned Field
Boundary Type:	Stone Wall
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Sinuous
Slope:	Medium
Main Attributes:	- Abandoned Field - Sinuous Clearance Field - Rough Trackway - Walled Boundary - Abandoned Contour Terrace
Other Attributes:	Woodland, Byzantine Ceramic, Farmstead, Columns, Grinder, Raised Scrub Boundary, Ditched Boundary, Scrub, Mosque, Muslim Graveyard.

Table 6.11: Ottoman – 'Abandoned Field' attributes.

- Irregular Broken Strip Field

The 'Irregular Broken Strip Field' HLC type refers to areas of fields whose character is dominated by the long thin nature of traditional strip fields which have been broken down into shorter more square or rectangular field shapes. These fields, however, unlike modern strip fields have not been broken up in any regular formation and in many cases the curved lines of the original strip field are still evident alongside extremely straight modern boundaries, as can be seen in **figure 6.139**. The most distinctive factor of these fields is their irregular pattern, highlighted in **figure 6.140**. Retrogressive landscape analysis suggests these types of fields were formed prior to the modernisation of the straight boundaries, therefore suggesting at least an Ottoman date for their construction. These fields are found in flat, low lying areas close to a water source and are often irrigated by concrete aqueducts and irrigation channels that cut across the older boundary lines. The close proximity to the river may account for the irregular nature of the fields, as the river banks as they changed over time may have resulted in new fields being added at different angles into the spaces created by the changing water, in a similar way to how the 'Irregular

Riverside Field' HLC type was formed. The boundaries of these fields are mainly made of raised scrub, but in some cases ditched boundaries and streams that bounded earlier field systems remain. These fields are currently used to cultivate a mixture of cereals, grains and vegetables as well as olives and fruit trees and in some cases greenhouses may have been built in the fields. SU_02 is found within an area of this HLC type.

Pattern :	Irregular
Enclosure :	Broken Strip
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat
Main Attributes:	- Broken Strip Field - Rough Trackway - Raised Scrub Boundary - Rough Roadway - Irrigation Channel,
Other Attributes:	Walled Boundary, Farmstead, Ditched Boundary, Scrub, Building, Mosque, Tepe, Byzantine Ceramic.

Table 6.12: Ottoman – 'Irregular Broken Strip Field' attributes.

- Irregular Rectilinear Field

This HLC type delineates areas of fields whose dominant features are the sinuous boundaries that enclose roughly rectilinear or square fields as depicted in **figure 6.141**. The focus study of Avdalli Tepesi and surrounding area exhibits this HLC type. These fields are found in lowland, flat areas close to a water source and are often used for the less intensive cultivation of select crops. The boundaries are composed of raised scrub, small hedges and ditches. The fields system is very similar to the post-Medieval fields found in Naxos (**Figure 6.142**) (Crow and Turner n.d.), which would align with the Ottoman period in this Pisidian study area. The stratigraphic evidence of the Pisidia landscape provided by retrogressive landscape analysis suggests that probable Byzantine strip fields underlie this pattern of fields. This too is similar to the Naxos fields which are based on earlier Medieval fields (*ibid.*). A strip pattern can often be seen below this form of fields which means that in most cases these areas have a secondary HLC type of Byzantine 'Strip Field' recorded. This Pisidian'Irregular Rectilinear Field' HLC type has been dated to the Ottoman period, because this is likely to be the period when the preceding strip fields were broken up. This dating is backed up by comparisons to other landscape analyses in France (Chouquer 1993: 102) and England (Herring 2006) and the Mesara plain in Crete, such as Rackham and Moody's study which suggested a concurring date and formation process for very similarly constructed fields (1996: 147-9). Bevan *et al*. (2003: 220) have also tentatively suggested Byzantine or Medieval origins for similar semi-regular field patterns in Kythera.

Pattern :	Irregular
Enclosure :	Irregular Rectilinear
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Curved
Boundary Character Secondary:	Straight
Slope:	Flat
Main feature attributes:	- Irregular Rectilinear Field - Rough Trackway - Ditched Boundary - Raised Scrub Boundary - Rough Roadway
Other feature attributes:	Irrigation Channel, Farmstead.

Table 6.13: Ottoman – 'Irregular Rectilinear Field' attributes.

- *Irregular Field*

This HLC type describes fields whose dominant features are sinuous boundaries creating irregular shaped fields, as can be seen in **figures 6.143 and 6.144.** These fields are found in lowland, flat areas close to a water source and are often used for the less intensive cultivation of select crops. These fields are dated to the Ottoman period based on retrogressive landscape analysis which shows modern features overlaying them and earlier medieval systems underlying them with the Ottoman period features being of the strongest character, in a similar manner to the 'Irregular Rectilinear Field' HLC type. The boundaries of these fields are raised scrub, small hedges and ditches. Unlike the 'Irregular Rectilinear Field' HLC type, however, the field system of this HLC type has not been developed in a roughly regular pattern. This could be a result of development beginning at a later date, more gradual development or even a result of the more undulating landscape. Retrogressive landscape analysis of these areas has enabled many of the areas characterised as this HLC type to also be allocated a secondary HLC type of Byzantine 'Strip Field'.

Pattern :	Irregular
Enclosure :	Broken Strip
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat
Main Attributes:	- Irregular Fields - Rough Trackway - Raised Scrub Boundary - Rough Roadway
Other Attributes:	Walled Boundary, Farmstead, Ditched Boundary, Scrub, Building, Mosque, Tepe, Byzantine Ceramic.

Table 6.14: Ottoman – 'Irregular Field' attributes.

Byzantine - Ottoman

Through retrogressive landscape analysis and comparison with other Mediterranean landscape studies of similar arable areas (Bevan and Connoly n.d; Bevan *et al.* 2003; Crow and Turner 2009; Crow *et al.* 2011; Grove and Rackham 2003; Rackham and Moody 1996; Turner and Crow 2010), the following HLC types have been dated to the Byzantine to Ottoman period.

- ***Strip Field (b)***

This HLC type refers to fields that preserve the shape of long, narrow, strips of fields that lie adjacent to each other (**Figure 6.145**). This HLC type, unlike the Modern 'Strip Field' type, is characterised by fields that have more irregular sinuous boundaries with the typical curve characteristic of early strip fields (**Figure 6.146**) and often follow the gentle contours of the ground. The length and the width of these fields vary both between fields and along the course of these fields. These fields may have lost some boundaries through amalgamation of adjacent fields, but not to the same extent as Modern 'Strip Field' areas. These fields can be seen in the Kazallı Mahalessi focus study and SU_03. This HLC type has been dated to the Byzantine to Ottoman due to comparisons with similar Medieval fields, which suggest by analogy that strip fields with similar morphology can probably be dated to the same period (Crow *et al.* 2011). Due to the different time period divisions in the east it is possible that these fields could have originated any time from the Byzantine period to the early Ottoman period. A more exact date is not available from the evidence and though these fields are likely to be older rather than younger, a broad date range of Byzantine to Ottoman has been recorded. These fields are characteristically strip shaped and have more sinuous boundaries than the field systems that have been reorganised in the 20th century.

Pattern :	Regular
Enclosure :	Strip
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Curved
Boundary Character Secondary:	Straight
Slope:	Flat
Main feature attributes:	- Strip Field - Raised Scrub Boundary - Rough Roadway
Other feature attributes:	Byzantine Ceramic, Lithics, Irrigation Channel, Road.

Table 6.15: Byzantine - Ottoman – 'Strip Field' attributes.

Byzantine

The following HLC categories define the areas of the landscape whose dominant characteristic derives from the agricultural landscape of the Byzantine period.

- Rectilinear Field (b)

This HLC type defines rectilinear and square shaped fields found in the upland areas of the Pisidian HLC study. The fields of this HLC type are constructed from curved stone wall boundaries that combine to make an irregular patterned field system. These fields can also be terraced with the field being a normal size but the field next to it being on a lower step of no more than a meter in height. These fields are usually associated with a settlement like those seen at the focus study of Kozan Köyü (**Figure 6.147**). This HLC type is only designated to an area in the Pisidia HLC study area as a secondary HLC type allocated as the HLC type that precedes Ottoman 'Abandoned Fields'. These fields are likely to date to the late Byzantine period as retrogressive landscape analysis reveals that they predated the Ottoman 'Abandoned Fields' and appear to have significant longevity.

Pattern :	Irregular
Enclosure :	Rectilinear Field
Boundary Type:	Stone wall
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Sinuous
Slope:	Medium
Main feature attributes:	- Rectilinear Filed - Rough Trackway - Walled Boundary - Byzantine Ceramic
Other feature attributes:	Contour Terrace, Ditched Boundary, *Spolia*.

Table 6.16: Byzantine – 'Rectilinear Field' attributes.

6.6.3 Terraces

Another of the major broad HLC categories in Pisidia is that of terraces. Terraces are created to make it possible to cultivate hillsides and steep mountain sides and this broad HLC type is dominant in the north of the Pisidia study region where the landscape becomes mountainous. Scholars have suggested that in addition to creating flat areas on which to grow crops, terraces also help cultivation by redistributing sediment, increasing root penetration, improving water retention and controlling erosion, and by removing stones from the soil which can then be used to make the terrace walls (Rackham and Moody 1996: 142). They are several principle terraces types; braided terraces, step terraces, contour terrace, check-dams, terraced fields and modern terraces (*ibid.* 140-5; Grove and Rackham 2003: 108). The method of determining when terraces could have been created is a hotly debated topic (Price and Nixon 2005: 670), but through archaeological techniques such as retrogressive landscape analysis, typological analysis, investigation of PSP data and comparison to other Mediterranean terrace studies, the terraces in the Pisidia HLC study area have been tentatively dated to certain historic periods dependent on the distinguishing features of the terrace system. Romana Harfouche (2007) has reviewed recent research across the Mediterranean and has outlined a methodology for dating terraces by excavation, and presents a range of case studies with particular emphasis on southern France in the late Iron Age and Roman periods. However the terraces in Pisidia have to rely on dating evidence available from survey investigation, although there is some suggestion that terraces in the region could be dated roughly through typology. Through ground truthing, oral history and comparison of terraces that have stratigraphic relationships with datable features, it is possible to state that, generally, Byzantine terraces are well built from irregular fairly large stone work, and that Modern terraces are of a less stable construction usually using smaller stones and which are often broken pieces of earlier terraces. Hellenistic terraces are also well constructed but of a much more substantial size and on occasion, regular cut blocks are even used in their construction and on occasion the polygonal style of arrangement of large stones can be seen. This method of dating though is not reliable. Instead through analogy with examples elsewhere in the Aegean, and by retrogressive landscape analysis of focus studies around Pisidia, the terraces of the region have been divided into three terrace types; 'Contour Terrace', 'Step Terrace' and 'Lynchet' based on Rackham and his collaborator's principal types (Rackham and Moody 1996: 140-5; Grove and Rackham 2003: 108). Terraces can be seen in the Google Earth imagery but the CORONA imagery is not of a high enough resolution to make out terraces. This makes the Google Earth imagery generally the primary source for categorising these areas, but with ground truthing and the PSP data used in conjunction with this source.

Modern

Some archaeological investigations have suggested most terraces and boundaries in the Mediterranean have only recent origins (French and Whitelaw 1999; Lee 2001), but investigation of the Pisidian landscape has suggested otherwise. Despite this there are areas of terrace in the Pisidia HLC region that are modern in date and character. These are typically more regular in form, a factor which has been said to hint at a later date (Crow *et al.* 2011: 127).

- Contour Terrace (a)

This HLC classification describes parallel terraces that follow the contours of the landscape (**Figure 6.148**). These terraces are often cut by a bulldozer and either left without any support, or support is created using traditional methods but Modern materials such as concrete blocks and are often found close to Modern buildings. These terraces are uncommon but can be seen in SU_10.

Pattern :	Irregular
Enclosure :	Contour Terrace
Boundary Type:	Cut Terrace, Stone Terrace(Mainly cut)
Boundary Character Dominant:	Contour
Boundary Character Secondary:	None
Slope:	Medium
Main Attributes:	- Contour Terrace
Other Attributes:	Rough Trackway, Rough Roadway, Road, Greenhouse, Farmstead, Scrub, Maintained Terrace, Regular Clearance Field

Table 6.17: Modern – ‘Contour Terrace’ attributes.

- Step Terrace

This HLC classification refers to large roughly parallel terraces created by bulldozing in the 20th century. Grove and Rackham describe these terraces as false terraces (2003: 109). These terraces cut across the landscape often irrespective of the topographic contours in order to create broad flat areas for cultivation fields (**Figure 6.149**). The height of the steps between the terraces can be over two meters and they do not have supporting walls. Instead they are often left so that they will eventually erode into a slope. This intensive and destructive process destroys all traces of earlier landscape character and can even destroy entire archaeological sites. However, compared to many other parts of the Mediterranean, the Pisidia case-study area has been lucky, and although bulldozed terraces have been found in Pisidia, so far it is not to any great extent and is often only one or two individual terraces within a much larger landscape that has a stronger dominant characterisation.

Pattern:	Regular
Enclosure:	Step Terrace
Boundary Type:	Cut Terrace, Stone Terrace
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Contour
Slope:	Medium, Shallow
Main Attributes:	- Step Terrace - Rough Trackway,
Other Attributes:	Greenhouse, Farmstead, Scrub, Abandoned Contour Terrace, Road, Aqueduct.

Table 6.18: Modern – ‘Step Terrace’ attributes.

Ottoman

The following HLC Type is dated to the Ottoman period. Ottoman terracing is hard to distinguish from other terraces because, as it has been said above, it is extremely difficult to date terraces very accurately. However, there has been evidence found on the Greek Islands of Kea where terraces have been identified by their stratigraphic association to a pre-18th century date (Whitelaw 1991: 405-10) suggesting that Ottoman terraces could have existed. Price and Nixon have also argued that terraces are common from the Byzantine to Turkish era in the Sphakia region of Crete (2005: 674-5) and late Medieval visitors to the Aegean noted the presence of terraces (Harfouche 2007: 153).

- Abandoned Contour Terrace

This particular HLC type is characterised by the dominant feature of abandoned stone contour terraces. This 'Abandoned Contour Terrace' HLC type are found in upland areas on hillsides and are distinguished by stone constructed terraces that follow the contour of the landscape (**Figure 6.150**). Olives are the most likely crop cultivated on the terraces as many are in areas where the larger amounts of water needed for fruit trees would be inaccessible. These terraces are narrow and unlikely to have been used for any other crops between the olives. SU_04b is found within an area of this HLC type. These stone walls were originally well built but have begun to degrade due to lack of maintenance (**Figure 6.151**). Often the grazing of sheep and goats on abandoned areas of terracing lead to significant destruction. This HLC type has been classified as Ottoman as it was probably during this period that they became abandoned and fell into their current unmaintained state. It is likely that they were constructed at some point in the Byzantine period, although in some cases there is evidence of even earlier origins. Those areas that have evidence for earlier origins have prior HLC types recorded. Occasionally certain areas of this HLC type, although not maintained, are periodically used by modern inhabitants as can be seen in SU_04b, where an area of abandoned contour terraces has been planted with a casual row of olive trees. There is no respect for the terrace alignment in this reuse and if used for crops the terrace wall often begins to be ploughed out. But in these rare cases of use the general character of the terrace is still unmaintained and abandoned.

Pattern :	Irregular
Enclosure :	Abandoned Contour Terrace
Boundary Type:	Stone Terrace
Boundary Character Dominant:	Contour
Boundary Character Secondary:	None, Straight (None significantly more common)
Slope:	Shallow, Medium, Steep (Medium significantly more common)
Main Attributes:	- Abandoned Contour Terrace - Walled Boundary - Rough Trackway - Rough Roadway
Other Attributes:	Road, Greenhouse, Irregular Field, Abandoned Building, Farmstead, Abandoned Straight Terrace, Sinuous Clearance Field, Temple, Byzantine Ceramic Production, Threshing Floor, Hellenistic Building, Ancient Stone Paved Road, Castle, Press Stone, Byzantine Wasters, Sarcophagus, Grinder, Spring, Gateway, Hellenistic Tower, Building, Byzantine Ceramic, Scrub, Hamlet, Straight Terrace, Maintained Terrace.

Table 6.19: Ottoman – 'Abandoned Contour Terrace' attributes.

Byzantine – Ottoman

The following HLC type has been dated to the Byzantine to Ottoman period. This is a broad period classification and it is quite common for terraces in the Pisidia area to be categorised under this date range, because many of the terraces that have been abandoned or those that are still used have features that could be dated to either the Ottoman or the Byzantine period. There is no exact dating available to terraces that can only be investigated by survey methods. Therefore those that have no specific evidence of stratigraphic relationships to any pre-Modern datable features can only be said to not date to the Modern period (it is also unlikely but not impossible that they date to the Roman or Hellenistic period). Therefore this broad classification of Byzantine to Ottoman is the only one that can be stated with confidence.

- Contour Terrace (b)

This HLC type describes areas of the landscape whose main distinguishing feature, like the Ottoman 'Contour Terrace' HLC type, is that the area is crossed with parallel stone terraces that follow the contours of the landscape (**Figure 6.152**). SU_08 is located in an area of this HLC type. Olives are the most likely crop cultivated on the terraces as many are in areas where the larger amounts of water needed for fruit trees would be inaccessible. These terraces are narrow and unlikely to have been used for multiple crops. These terraces are located upon hillsides and use dry-stone walls to support the terrace and are dated to some point in the Byzantine to Ottoman period, as described above. One of the ways in which these terraces are dated is by the growth of large olive trees out of the terrace itself. The age of the tree then means the terrace must have existed before the tree began to grow. This form of dating has been used to date terraces at Phoinix-Loutro which were dated by tree-rings to the Hellenistic period (Rackham and Moody 1996: 86).

Pattern :	Irregular
Enclosure :	Contour Terrace
Boundary Type:	Cut Terrace, Stone Terrace(Mainly cut)
Boundary Character Dominant:	Contour
Boundary Character Secondary:	None
Slope:	Medium
Main Attributes:	- Contour Terrace
Other Notable Attributes:	Rough Trackway, Rough Roadway, Farmstead, Scrub, Maintained Terrace.

Table 6.20: Byzantine - Ottoman – ‘Contour Terrace’ attributes.

Byzantine

The following HLC types are dated to the Byzantine period usually as a result of PSP findings. Archaeologists working on the Greek island of Kythera have also identified terracing that dates to the Byzantine or medieval era (Bevan *et al.* 2003).

- Lynchet

This HLC type distinguishes areas of the landscape that have been manipulated by large parallel terraces that cut straight across a small valley (**Figure 6.153**). These terraces use stone walls to support the terrace which is created through sediment build up on the upper sides. These terraces are dated by their form and comparisons to other Mediterranean regions to the Medieval period.

Pattern :	Regular
Enclosure :	Lynchet
Boundary Type:	Stepped Ground
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Contour
Slope:	Medium
Main Attributes:	- Lynchet
Other Attributes:	Contour Terrace, Rough Trackway, Rough Roadway, Building, Walled Boundary.

Table 6.21: Byzantine - Lynchet attributes.

- *Contour Terrace (c)*

This HLC type refers to terraces that virtually always follow the contour of the landscape and are always supported by well-constructed dry-stone walling of regular sized stones. Through the analysis of the terrace construction and retrogressive landscape analysis these terraces are dated to the Byzantine period, most likely the early Byzantine period. Olives are the most likely crop cultivated on the terraces. These terraces are narrow and unlikely to have been used for multiple crops. This particular HLC type is only ever a secondary HLC type preceding later HLC characterisation types. One significant feature of these Byzantine terraces is that they are also often bounded by stone walls (**Figure 6.154**). This HLC type can be seen in SU_06 and SU_04b. The terraces at the Pednelissos focus study also have Byzantine period phases.

Pattern :	Irregular
Enclosure :	Contour Terrace
Boundary Type:	Stone Terrace
Boundary Character Dominant:	Contour
Boundary Character Secondary:	Straight
Slope:	Medium
Main Attributes:	- Contour Terrace - Walled Boundary - Byzantine Ceramic - Rough Trackway,
Other Attributes:	Rough Roadway, Ancient Paved Road, Hellenistic Building.

Table 6.22: Byzantine – ‘Contour Terrace’ attributes.

Hellenistic

The following HLC types are dated to the Hellenistic period. Some historians argue that the lack of literary terms referring to terraces in Classical texts should be taken to reflect an absence (Foxhall 1996; Foxhall *et al.* 2007). This claim is contradicted by scholars who claim there is archaeological evidence for Classical terraces and therefore suggest historians widen the parameters of their search for relevant terms (Harfouche 2007: 44-8). The evidence of Pisidia would agree with this as there is clear evidence of stratigraphic links between classical buildings and terraces. Price and Nixon (2005) have attempted to address both the historical and archaeological evidence and based on readings of ancient texts and fieldwork on Crete: they put forward the view that terracing was relatively common in the ancient world. The most convincing evidence for classical terracing comes from the island of Delos, where terraces are associated with the remains of classical farmsteads. The island is also supposed to have been deserted from the early Byzantine period until the mid-20th century meaning they could not be of a later date (Brunet 1990).

Terraces have also been confirmed to have existed in prehistory across the Mediterranean (Betancourt and Hope Simpson 1992) and in the Near East.

- Contour Terrace (d)

This HLC type refers to terraces that virtually always follow the contour of the landscape and are always supported by well-constructed dry-stone walling of regular sized stones. Through the analysis of the terrace construction and retrogressive landscape analysis these terraces are dated to the early Hellenistic period. Due to the difficulty in dating terraces and the fact that they were probably also used, repaired, altered and developed during the later Byzantine period it is unclear when they originated. The focus study of Pednelissos is an excellent example of this HLC type.

Pattern :	Irregular
Enclosure :	Contour Terrace
Boundary Type:	Stone Terrace
Boundary Character Dominant:	Contour
Boundary Character Secondary:	Straight
Slope:	Steep, Medium
Main Attributes:	- Contour Terrace - Hellenistic Building,
Other Attributes:	Paved Stone Road.

Table 6.23: Hellenistic – ‘Contour Terrace’ attributes.

6.6.4 Rough Ground

This broad HLC category refers to areas of the landscape that are currently unused or unsuitable for the cultivation of crops. Unlike many other Mediterranean areas of rough ground like those seen in the Naxos HLC (Crow *et al.* 2011) the areas in Pisidia do not have any evidence of earlier fields systems visible.

Modern

All the following ‘Rough Ground’ HLC types are classified as Modern, either because they have been recently created as is the case of the ‘Fire Recovery Scrubland’, or because a date cannot be determined for the origin of the rough ground. Unlike trees, small scrub bushes and plants do not have a longevity that can be vaguely determined by their size and structure.

- Fire Recovery Scrubland

This HLC type is found in upland areas that was previously categorised as ‘Natural Forrest’ HLC type. These HLC areas of ‘Fire Recovery Scrubland’ are distinguished by open areas of low scrub that have grown after fire has destroyed the natural forest (**Figure 6.155**). These results in all areas that are classified as 'Fire Recovery Scrubland' also have a secondary HLC type of 'Natural Forest'. These areas have similar attributes to areas of 'Natural Forest' and may also contain evidence of earlier features that may allow a third HLC that preceded the 'Natural Forest' to be determined. In some areas the scrub has been interrupted by the planting of small new pine trees.

Pattern :	Continuous
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium
Main feature attributes:	- Scrub - Rough Trackway
Other feature attributes:	Rough Roadway, Sinuous Clearance Field, Stone Wine Press Feature, Fortification Wall, Castle, Gateway.

Table 6.24: Modern – 'Fire Recovery Scrubland' attributes.

- High Scrubland

In Pisidia, the HLC classification of 'High Scrubland' refers to areas found on remote hillsides and mountains that are often too steep or inaccessible for agricultural purposes. These areas characteristically consist of loose rocky ground with small scrub bushes and the occasional tree (**Figure 6.156, 6.157**). These areas are either not utilised at all or are used for the grazing of animals.

Pattern :	Continuous
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, Steep
Main feature attributes:	- Scrub - Rough Trackway
Other feature attributes:	Sinuous Clearance Field, Road, Rough Roadway, Sparse Natural Woodland.

Table 6.25: Modern – 'High Scrubland' attributes.

- Low Scrubland

This HLC classification refers to patches of rough ground found in low land areas often slightly removed from settlements. These are often found on the tops of areas of raised ground surrounded by fertile flat agricultural land or on the slopes as the flat plain meets the hills (**Figures 6.158, 6.159**). These are characteristically grassy areas with low scrub and small bushes that can be used as pasture for the grazing of livestock such as goats and sheep. These areas often are associated with rough roadways and track but hardly ever tarmac roads.

Pattern :	Continuous
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, Shallow, Undulating
Main feature attributes:	Scrub
Other feature attributes:	Road, Rough Roadway, Rough Trackway, Farmstead, Rock Cut Feature, Sinuous Clearance Field, Greenhouse, Abandoned Building, Hamlet.

Table 6.26: Modern – 'Low Scrubland' attributes.

- Mountain Scrub

This HLC classification refers to rocky barren areas found on the tops of mountains that are steep and inaccessible (**Figure 6.160, 6.161**). These areas characteristically consist of loose rocky ground with small scrub bushes and the occasional tree. These areas are even unsuitable for the grazing of animals such as goats and sheep because there is little for them to graze upon. In some cases, areas of 'Mountain Scrub' may have evidence of earlier occupation such as ruins of fortifications, allowing secondary HLC types to be identified.

Pattern :	Continuous
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Extreme
Main feature attributes:	- Scrub
Other feature attributes:	Rough Trackway, Fortification Wall, Ancient Stone Building, Firetower, Gateway, Cistern.

Table 6.27: Modern – 'Mountain Scrubland' attributes.

- Riverside Rough Ground

The 'Riverside Rough Ground' HLC type is defined by grassy scrub areas preserved along the course of rivers and streams (**Figures 6.162, 6.163**). These areas are often also distinguished by piles of river gravel and stony beaches. There is no evidence that these areas are used for any purpose by the inhabitants in the area other than possibly as watering points for their cattle.

Pattern :	Continuous
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat
Main Attributes:	- Rough Ground - Riverside Gravel
Other Attributes:	Rough Trackway, Irrigation Channel.

Table 6.28: Modern – 'Riverside Rough Ground' attributes.

- Woodland Clearance

This HLC type is on hillsides that have previously been Natural Forrest. These areas are distinguished by open areas of rough ground often with rough roadways and cut terraces. These areas are the result of the Natural woodland or Forest having been cleared by foresters in order to harvest the wood for logs. **Figure 6.164** shows an area that has been cleared, **figure 6.165** shows the same area prior to the clearance. The first image reveals how the heavy machinery that is used to reap the landscape is extremely destructive. If an earlier landscape feature existed the machinery would leave no trace of it. These areas currently show no evidence replantation and it is possible that they may be terraced or just left for the forest to eventually reclaim the area naturally. All these areas classified as 'Woodland Clearance' have a prior HLC type of 'Natural Forest' or 'Natural Woodland'.

Pattern :	Irregular
Enclosure :	Sinuous Clearance
Boundary Type:	Cut Terrace
Boundary Character Dominant:	Sinuous
Boundary Character Secondary:	n/a
Slope:	Medium
Main Attributes:	- Sinuous Woodland Clearance - Road - Cut Terrace
Other Attributes:	Rough Trackway, Scrub.

Table 6.29: Modern – 'Woodland Clearance' attributes.

6.6.5 Woodland

'Woodland' is a large HLC broad category in the Pisidia case-study area, as much of the northern area of the study region is wooded. In some areas it is possible to determine the historic character of the landscape below the tree coverage and in some cases terracing is visible, but without detailed ground survey it is hard to characterize the woodland areas of Pisidia in to more detailed character types than those described below. There are no large areas of plantation in the Pisidia HLC area although there are many of these areas in the surrounding landscape distinguished by pine trees planted in regular rows over the last 60 years for wood harvest. However, the natural woodland and forest of the HLC study region is known to be harvested and very recently areas of scrub have been replanted with young trees, but these areas are mainly characterised by the more dominant features of the 'Fire Recovery Scrubland' category.

Modern

The following HLC types have been identified as Modern in date because the trees are not as old and do not grow as densely. Therefore, it is possible that these HLC types originated in the Modern period. Although there is a possibility that certain areas of this natural woodland could date back much further than the Modern period.

- Natural Woodland

This HLC type refers to areas of the landscape which are covered by trees that have grown naturally and mainly consisting of a variety of smaller pine, prickly oak and yaprak (**Figures 6.166**). This natural woodland is less dense than natural forest and is often where sheep and goats are left to gaze, reducing the density of the undergrowth. This 'Natural Woodland' HLC type is penetrated by certain roads and tracks, and farmsteads within the woodland are not uncommon. Unlike the 'Natural Forest' HLC type, described below, this HLC type is found in the lower lying areas of the Pisidian HLC study area, often being located not too distant from agricultural land and on the shallower hill slopes.

Pattern :	Continuous
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, Shallow, undulating.
Main feature attributes:	- Woodland - Rough Trackway
Other feature attributes:	Road, Rough Roadway, Sinuous Clearance Field, Stone Cut Tomb, Aqueduct, Wine Press, Fortification Wall, Tower, Gateway, Farmstead, Cistern, Stone Quarry.

Table 6.30: Modern – 'Natural Woodland' attributes.

- Sparse Natural Woodland

This HLC classification refers to the sparse natural woodland that has grown naturally and can be found in small patches in the lowland areas (**Figure 6.167**). The trees within this HLC zone are often smaller hardier trees such as prickly oak and wild olive. This Sparse

‘Natural Woodland’ is less dense than ‘Natural Forest’ and is often where sheep and goats are left to gaze, reducing the density of the undergrowth. This woodland is penetrated by roads, trackways and sinuous clearance fields too small to be part of their own HLC type.

Pattern :	Continuous
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, Shallow, Undulating.
Main feature attributes:	- Woodland - Rough Trackway
Other feature attributes:	Road, Rough Roadway, Sinuous Clearance Field.

Table 6.31: Modern – ‘Sparse Natural Woodland’ attributes.

Ottoman

The following HLC types have been dated to the Ottoman period because the trees that distinguish the HLC types are well established and can with some certainly be said to predate the Modern period. This makes the Ottoman period the latest period within which they could have originated, although there is a possibility that certain areas of this natural woodland could date back much further than this.

- Natural Forest

This HLC type refers to areas of the landscape which are covered by trees that have grown naturally and mainly consisting of a variety of red pine, wild olives, prickly oak and yaprak often with dense undergrowth (**Figures 6.168**). This HLC type is found in the higher more mountainous areas of the Pisidia HLC study area on the steeper hill slopes. This natural forest is penetrated by certain roads and tracks, and the occasional farmstead and sinuous clearance field may be encompassed with a larger HLC zone of the ‘Natural Forest’ type as it is the overriding characteristic. The trees characterised by this HLC type have been well established in the area for many years and can with some certainty be said to predate the Modern period. This makes the Ottoman period the latest period within which they could have been originally established and therefore this HLC type has been identified as Ottoman in date. However, it is likely that certain areas of this natural forest could date back much further than this. We know from historic accounts that the area of Pisidia was considered wild and unwieldy; this would fit well with a heavily forested area. However, in other areas the natural forest has reclaimed extensive stretches of earlier features like Pednelissos and its terraces, suggesting it has to have come later than the abandonment of these terraces. Where terraces are definitely known, the landscape has been characterised as ‘Forested Contour Terrace’, but there will be areas within the natural forest that also have earlier features but the dense nature of the forest and difficulty of access to certain areas due to the inhospitable terrain will mean these early features have not yet been recognised. However, the flexible nature of the GIS will allow for changes at a later date if these features are found.

Pattern :	Continuous
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, Steep, Shallow
Main feature attributes:	- Forest - Abandoned Contour Terrace
Other feature attributes:	Road, Rough Roadway, Rough Trackway, Sinuous Clearance Field, Paved Stone Road, Walled Boundary, Ancient Stone Building, Maintained Contour Terrace, Church, Byzantine Ceramic.

Table 6.32: Ottoman – ‘Natural Forest’ attributes.

- Forested Abandoned Terrace

This HLC type refers to areas of the landscape where the natural forest has reclaimed extensive stretches of earlier abandoned contour terraces (**Figure 6.169**). The trees characterised by this HLC type have been well established in the area for many years and can with some certainty be said to predate the Modern period. This makes the Ottoman period the latest period within which they could have been originally established. The forest that covers the contour terraces is made up of a variety of pine, wild olives, prickly oak and yaprak, often with dense undergrowth, exactly as the ‘Natural Forest’ HLC type. The contour terraces that have been reclaimed by the forest are stone built terraces with the width of the terrace dependent on the steepness of the slope. These terraces are in an unmaintained condition with some surviving better than others. The terraces are notoriously difficult to date but are usually all well made of stone blocks. However, the construction of these terraces can differ with both large ashlar blocks used and smaller irregular stones. When ceramic has been found in relation to these terraces it always dates to the early Byzantine period. However evidence of associated buildings has led to the belief that at least in some cases the terraces are older and may date to the Hellenistic period. This HLC type is always preceded by a secondary HLC type of ‘Contour Terrace’ of varying dates representing the pre-forested period when the terraces were not abandoned. These HLC areas, like those of the ‘Natural Forest’ HLC type, are penetrated by roads and tracks with an occasional farmstead and sinuous clearance field encompassed with the HLC zone.

Pattern :	Irregular
Enclosure :	Abandoned Contour Terrace
Boundary Type:	Stone Terrace
Boundary Character Dominant:	Contour
Boundary Character Secondary:	n/a
Slope:	Medium
Main feature attributes:	- Woodland / Forest - Abandoned Contour Terrace
Other feature attributes:	Road, Rough Roadway, Rough Trackway, Sinuous Clearance Field, Paved Stone Road, Walled Boundary, Ancient Stone Building, Maintained Contour Terrace, Church, Byzantine Ceramic.

Table 6.33: Ottoman – 'Forested Abandoned Terrace' attributes.

6.6.6 Settlement

The historic settlement pattern of the Pisidian HLC area comprises of small settlements, both occupied and abandoned. There are also abandoned historic cities in the region. The settlements in the region have been subdivided by their historical character and their structure. All the occupied settlements have seen some growth in the 20th century with new buildings added to the earlier village cores which appear little changed from the 1960s CORONA imagery.

Modern

The following HLC categories describe currently occupied settlements whose character is determined by structures that have been created in the Modern period and have no obvious evidence of earlier occupation. However, it must be remembered that these settlements could have earlier origins that are just not evident in the current character of the settlement.

- Cluster Settlement (a)

This 'Cluster Settlement' HLC type is determined by the manner in which the buildings cluster together in a small formation along irregularly placed streets divided by both small and large gardens (**Figure 6.170**), the larger of which are more like small fields and are usually spread around the settlement, while the smaller are spaced between the buildings. These settlements have a main tarmac road which connects them to the surrounding region. The 'Cluster Settlement' HLC type differs from the 'Nucleated Settlement' HLC type by its smaller size. Cluster settlements are small and therefore too small to have a nucleated core. These settlements are often no more than several households clustered together.

Pattern :	Irregular
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat, Shallow, Medium
Main feature attributes:	- Cluster Settlement - Road - Buildings - Irregular Street - Field Gardens or Small Gardens - Rough Roadway - Rough Trackway
Other feature attributes:	Greenhouse, Irrigation Channel, Raised Ground, Walled Boundary

Table 6.34: Modern – ‘Cluster Settlement’ attributes.

- Dispersed Settlement (a)

This ‘Dispersed Settlement’ HLC type is determined by the manner in which the buildings are spread out over a large area and do not cluster together in a small formation (**Figure 6.171**). The buildings are located along irregularly placed spidery streets surrounded by fields. These settlements have a main tarmac road which connects them to the surrounding region and often have greenhouses interspaced between the housing.

Pattern :	Irregular
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow
Main feature attributes:	- Dispersed Settlement - Road - Buildings - Irregular Street - Field Gardens - Rough Roadway - Rough Trackway
Other feature attributes:	Greenhouse, Irrigation Channel, Contour Terrace.

Table 6.35: Modern – ‘Dispersed Settlement’ attributes.

- Linear Settlement (a)

This ‘Linear Settlement’ HLC type is determined by the manner in which the buildings are aligned along an often straight main street (**Figure 6.172**). Both small and large gardens can be found along the back of the buildings. These settlements have a main tarmac road which connects them to the surrounding region.

Pattern :	Irregular
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow
Main feature attributes:	- Linear Settlement - Road - Buildings - Main Street
Other feature attributes:	None

Table 6.36: Modern – 'Linear Settlement' attributes.

Ottoman

The following HLC categories describe currently occupied settlements whose character is determined by structures that have been created in the Ottoman period. These settlements have some Modern buildings which are usually found on the outskirts of the settlement area and do not influence the overriding characteristic of the earlier Ottoman period settlement. It is important to note that these settlements could have earlier origins that are not evident in the current character of the settlement.

- Nucleated Settlement (a)

This 'Nucleated Settlement' HLC type is determined by the manner in which the buildings cluster together around a core, along irregularly placed streets divided by both small and large gardens (**Figure 6.173**), the larger of which are more like small fields and are usually spread around the settlement, while the small are spaced between the buildings. These settlements are larger than cluster settlements and they always contain at least one mosque. Like the other settlements in the region, areas of this 'Nucleated Settlement' HLC type area associated with a main tarmac road which connects these areas to the surrounding region. This HLC type is dated to the Ottoman period by the existence of datable Ottoman buildings within the settlement.

Pattern :	Irregular	
Enclosure :	n/a	
Boundary Type:	n/a	
Boundary Character Dominant:	n/a	
Boundary Character Secondary:	n/a	
Slope:	Flat	
Main feature attributes:	- Nucleated Settlement - Irregular Street - Buildings	- Small or Field Gardens - Mosque - Rough Trackway
Other feature attributes:	Raised Ground.	

Table 6.37: Ottoman – 'Nucleated Settlement' attributes.

- ***Cluster Settlement (b)***

This 'Cluster Settlement' HLC type, like the Modern 'Cluster Settlement' HLC type, is determined by the manner in which the buildings cluster together in a small formation along irregularly placed streets divided by both small and large gardens the larger of which are more like small fields and are usually spread around the settlement, while the small are spaced between the buildings. This HLC type however can be dated to the Ottoman period by the Ottoman buildings within the settlement.

Pattern :	Irregular
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow, Medium
Main feature attributes:	- Cluster Settlement - Buildings - Irregular Street - Field Gardens or Small Gardens - Rough Roadway - Rough Trackway - Raised Ground - Abandoned Contour Terrace
Other feature attributes:	Road, Walled Boundary, Mosque, Scrub

Table 6.38: Ottoman – 'Cluster Settlement' attributes.

- ***Dispersed Settlement (b)***

This 'Dispersed Settlement' HLC type is determined by the manner in which the buildings are spread out over a large area and do not cluster together in a small formation. The buildings are located along irregularly placed spidery streets surrounded by fields. These settlements have a main tarmac road which connects them to the surrounding region.

Pattern :	Irregular
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow, Flat (Mainly Shallow)
Main feature attributes:	- Dispersed Settlement - Rough Roadway - Rough Trackway - Field Gardens - Buildings - Irregular Street
Other feature attributes:	Mosaic, Abandoned Contour Terrace, Raised Ground, Walled Boundary, Step Terrace, Mosque, Threshing Floor, Strip Field.

Table 6.39: Ottoman – 'Dispersed Settlement' attributes.

- Linear Settlement (b)

This 'Linear Settlement' HLC type is determined by the manner in which the buildings are aligned along an often straight main street. Both small and large gardens can be found along the back of the buildings. These settlements have a main tarmac road which connects them to the surrounding region.

Pattern :	Irregular
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow
Main feature attributes:	- Linear Settlement - Main Street - Small Gardens - Road - Buildings
Other feature attributes:	Rough Roadway, Rough Trackway, Greenhouse, Raised Ground, Mosque.

Table 6.40: Ottoman – 'Linear Settlement' attributes.

Hellenistic

The following HLC categories describe settlements whose character is determined by structures that have been created in the Hellenistic period. These settlements are currently abandoned and characterised by large ashlar block built buildings.

- Nucleated Settlement (b)

This 'Nucleated Settlement' HLC type is determined by the manner in which the buildings radiate away from a central core and are situated within a fortified wall. The streets in these settlements are regular and straight and there are specific areas of sacred space in the form of sanctuaries and *necropoleis*. The focus study of Pednellissos is the largest example of the Hellenistic 'Nucleated Settlement'HLC type in the Pisidian case-study area. Other Hellenistic settlements in the area are extremely small and significantly less well preserved.

Pattern :	Irregular
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Undulating
Main feature attributes:	- Nucleated Settlement - Gateway - Byzantine Ceramic - Ancient Stone Building - Rough Trackway
Other feature attributes:	Grinder, Olive Press, Greenhouse.

Table 6.41: Hellenistic – 'Nucleated Settlement' attributes.

- *Production Centre*

This HLC type classifies the structures and surrounding landscape features of an ancient production centre for wine or olive oil. These are often located on hillsides and associated with wide scale terracing. These settlements are more like focal points for work activity than actual areas of long-term habitation. The main characteristics of these settlements are the structures to carry out the production of items, such as wine press bases or olive presses and associated buildings. These are often fortified structures or located in extremely inaccessible areas. These structures may have had a long life and continued in use at later dates.

Pattern :	Irregular
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium
Main feature attributes:	- Nucleated Settlement - Rough Trackway - Ancient Stone Building - Grinder or Press,
Other feature attributes:	Gateway, Fortification Wall, Cistern, Tower, Byzantine Ceramic.

Table 6.42: Hellenistic – 'Production Centre' attributes.

6.6.7 Industry

This broad HLC type will be used to map industrial developments. This can include the waste areas adjacent to industrial developments such as quarries and gravel collection areas. Areas of industry like ceramic production sites that are not large enough to be characterised alone will be include within other HLC types and the industry activity recorded in the feature attributes.

Modern

The following HLC types have been classified as Modern areas of industrial activity. These areas are considered Modern as there is no evidence of earlier activity. There are only Modern industry HLC types to be seen in the broad industry category. This is not because there has only ever been Modern industry carried out in the region, but because the areas of historic industry when known are large enough or of significant distinction to override another HLC zone.

- Quarry

This HLC type refers to modern stone quarries that can be found in the region. The quarries are located in both lowland and upland areas and are characterised by large deep machine made cuts into the ground (**Figure 6.174**). They are often also associated with Modern tarmac roads and areas for the collection or pilling of quarried stone, as well as modern buildings and machinery as can be seen in the centre of **figure 6.174.**

Pattern :	Continuous
Enclosure :	Quarry
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat
Main feature attributes:	- Quarry - Rough Roadway
Other feature attributes:	None

Table 6.43: Modern – 'Quarry' attributes.

- Abandoned Quarry

This HLC type refers to areas of modern stone quarry that have been abandoned in recent years. These quarries are located in lowland areas and are characterised by large deep machine made cuts into the ground. They are often also associated with Modern tarmac roads and areas for the collection or pilling of quarried stone. However, unlike the Modern 'Quarry' HLC type these areas have now been abandoned and the land has begun to be reclaimed back and the quarry has filled with water. Google Earth imagery taken in 2005 (**Figure 6.175)** in 2011 (**Figure 6.176**), show how quickly this can change.

Pattern :	n/a
Enclosure :	Quarry
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Undulating
Main feature attributes:	- Quarry - Rough Roadway - Road
Other feature attributes:	None

Table 6.44: Modern – 'Abandoned Quarry' attributes.

- Gravel Quarry

This HLC type refers to the modern gravel quarries that collect gravel from riversides. These are always found beside a river and are characterised by their large distinctive piles of white gravel as indicated in **figures 6.177** and **6.178**. This Modern 'Gravel Quarry'

HLC type usually has several modern building associated with the quarry as well as both tarmac and rough roadways which are used by the heaver gravel collecting machines.

Pattern :	n/a
Enclosure :	Quarry
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat
Main feature attributes:	- Gravel Quarry - Road - Building - Riverside Gravel - Rough Roadway
Other feature attributes:	None

Table 6.45: Modern – 'Gravel Quarry' attributes.

- Woodworks

This Modern HLC type refers to areas in the landscape that have been reserved for the working and collecting of wood (**Figure 6.179**). The main characterisation of this HLC type is a wide open space where the logs can be piled and a collection of large buildings where the working of the wood takes place. These areas are served by modern tarmac roads and within them they are criss-crossed with rough roadways. These are distinctly a product of the modern period. There are very few of these HLC zones in the Pisidia HLC study area but they are more common across the region of Pisidia. The Woodworks harvest the forest in the area, although not currently considered plantation but in fact mostly natural. There is a slow move to replant trees across the region after they have been cut down or in some areas this is being done in areas of fire destroyed forest.

Pattern :	n/a
Enclosure :	Woodworks
Boundary Type:	Fence
Boundary Character Dominant:	Straight
Boundary Character Secondary:	n/a
Slope:	Flat
Main feature attributes:	- Woodworks - Rough Roadway - Road - Log Piles - Building
Other feature attributes:	None

Table 6.46: Modern – 'Woodworks' attributes.

6.6.8 Water

This HLC broad category refers to bodies of water that can be found in the HLC area. In the case of the Pisidia HLC area there is only one distinctive 'Water' HLC type distinguishable.

Modern

The following HLC type has been classified as Modern despite the body of water possibly having ran the same course at other periods of time. Earlier water courses are hard to identify and establish and the current body of water's path is the only course we can be certain of. Therefore the HLC type can only be certainly classified as from the modern period.

- River

This HLC type refers to rivers that flow through the HLC area (**Figure 6.180**). To be distinguished as a river, the body of water has to be over two meters in breadth. Rivers or streams smaller than this are included within other HLC types and are not distinguished as individual HLC types. This HLC type encompasses the Aksu River and its tributary the Kuçukaksu River and the bridges and dams that cross these bodies of water. This HLC type can also include pools created when the river slows and the waste areas adjacent to river banks that contain gravel beaches which at certain times of the year may be under water (**Figure 6.181**).

Pattern :	n/a
Enclosure :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow
Main feature attributes:	- Riverside Gravel
Other feature attributes:	Bridge, Dam.

Table 6.47: Modern – 'River' attributes.

6.7 Historic Landscape Characterisation Results

The HLC of Pisidia classified the entire case-study area into HLC types of the current landscape. In addition to this the study also recorded the HLC types prior to the current HLC types in areas where this could be determined with some confidence. This allows time-depth to be added to the HLC results. This is particular useful today as Modern agriculture and development increasingly destroys all evidence of previous historic character. The results of the HLC are presented in the form of HLC maps (**Figures 6.182 –**

6.190), and as database and shapefiles on the associated CD (**Appendix 2.2**). Below the HLC results are described in detail.

In the northern part of the study area the main HLC types classified fall under the broad category of 'Woodland', with the broad category of 'Terraces' generally covering valley sides and the transition areas between the mountains and the plain. The HLC types that generally are used to classify the plain area are within the broad classification of 'Fields'. These distinctions are not surprising and follow logical assumptions of how the landscape would be used in the current period. The HLC begins to be seen when we introduce the full classification results in **Figure 6.182.** This image shows the greater complexity of the landscape's development. In this image you can see that the HLC zones are significantly related to the geology of the landscape, with the differences in HLC between the mountainous terrain and the flat plain being distinctly pictured.

The Aksu River runs in a north-westerly direction from the south of the Pisidia study area until it splits into smaller tributaries. The tributary Kuçukaksu River then veers sharply east to continue in a north-easterly direction. These rivers can be clearly seen indicated in blue in **figure 6.182** until the Kuçukaksu River becomes too small a body of water to be seen in the HLC results. The point at which the Aksu River breaks into tributaries and the Kuçukaksu River veers to the east can also be seen as a defining point in the landscape, with the nature of the HLC zones changing distinctly between the areas to the north and south of the river after this point. South of the river there is much more variety found, with 11 different HLC types identified from within the broad category of 'Field' ('Irregular Rectilinear Field', 'Riverside Irregular Field', 'Irregular Field', 'Irregular Angular Field', Modern 'Strip Field', Byzantine - Ottoman 'Strip Field', 'Open Field', 'Sinuous Clearance Field', 'Regular Clearance Field', 'Rectilinear Field', 'Abandoned Field'). Whereas north of the river there are only four broad 'Field' category types identified, with 'Irregular Rectilinear Field' being the most prevalent and with 'Regular Clearance Field', 'Sinuous Clearance Field' and 'Abandoned Field' being the more scarce and sporadic. Although both north and south areas of the Kuçukaksu River have different characteristics they appear to currently represent similar periods in time. **Figure 6.183** presents the period classifications for the range of the HLC types in the Pisidia study area. The areas in the plain, both north and south of the Kuçukaksu River, appear to be a mixture of Modern and Ottoman in current character with a particular concentration of Modern types being found closest to the Aksu River. This correlates with the fact that this area appears to have undergone the most change over time. This area is also the area with the most greenhouse constructions. The high proportion of modern fields along the Aksu River side may be a result of the availability of better irrigation and possibly more fertile land. The HLC types that are dated to the Modern period are mainly of a fairly recent date showing the rapid modernisation and the great chance of future development and change that is likely to spread across the study area.

The background of these Modern and Ottoman ‘Field’ HLC types has significant time-depth. **Figure 6.184** shows the results of level two HLC types in the Pisidia case-study area. This presents the HLC types that have been identified as preceding the current HLC types. The white polygons in this image represent the areas that have not been identified as having an identifiable prior level two HLC type. This figure reveals that a large proportion of the fields of varying HLC types have a prior level two HLC type of Byzantine – Ottoman ‘Strip Field’. This shows that these areas have significant antiquity and would have most likely been exploited in the Byzantine period. There is also a large proportion of Byzantine – Ottoman ‘Contour Terraces’ visible in this image, which will be discussed below. **Figure 6.185** presents the period classifications for the level two HLC types. In this image, in areas where a previous HLC type has not been identified, the date for the current HLC type is presented. **Figures 6.186** and **6.188** present the third and fourth level HLC types but no other HLC types were identified for the plain area of the Pisidia study area. **Figures 6.187** and **6.190** present the dates for these HLC levels.

The transition point between the flat plain and the mountainous areas begins in the west at about the mid-point of the Pisidia study area, crossing the study region in an east-westerly direction, before turning downwards in a south-easterly direction in the east of the Pisidia study area. This downward turn represents the mountains extending down into the plain and this can be clearly seen in **figure 6.182**, where the HLC zones on the right of the image are mainly HLC types associated with hillsides and mountains. The transitional zone is characterised by ‘High Scrubland’ and ‘Low Scrubland’, ‘Forested Abandoned Contour Terrace’, ‘Natural Woodland’, ‘Regular Clearance Field’ and ‘Contour Terrace’ of varying dates. ‘Contour Terrace’ HLC types of varying dates are found in the transitional zone because these areas are neither flat nor too steep to be terraced. The terracing continues in the valleys. One main valley line created through geology can be seen travelling down from the north-eastern corner of the Pisidia study area.

The mountainous area is distinctly visible in the north of the transition zone area dominated by the dark green colouring of the 'Natural Forest' HLC type, with the 'Natural Woodland' and 'Sparse Natural Woodland' types found in lower areas. As **figure 6.183** shows, the northern area of the Pisidia study region with its less hospitable terrain has less Modern HLC than the south of the study area. In the north, Ottoman is the most prevalent date range for the HLC types in this area.

Areas of 'Forested Abandoned Terrace' are found along the sides of the valleys, as are areas of 'Abandoned Contour Terrace' which are a significant HLC type in the northern area, in particular along the eastern side of the study region. The large area of polygons classified as 'Abandoned Terrace' and 'Abandoned Contour Terrace' reveal that a significantly larger proportion of the landscape in this area was cultivated in the past in comparison to the present. The areas of 'Natural Forest' in the northern area of the study region also have been noted that they could cover with their dense vegetation more abandoned terraces than are currently known of. This can be considered particularly likely when the find spots of the PSP are compared with the areas which have recognised abandoned terraces. This comparison reveals that the find spots are all mainly located in the east of the study region coinciding with the areas of recognised abandoned contour terrace. The PSP could have the majority of their finds spots in this region because in the west there is nothing to find, or they could have been biased in their survey strategy. As there was no systematic procedure followed by the survey, this is a considerable possibility that cannot be overlooked as it would also affect the identification of the HLC types as the survey data from the PSP has been a substantial reference source.

Areas of 'Contour Terrace' can be seen to date to different periods, as revealed in **figures 6.185**, **6.187,** and **6.190** which portray levels two to four of the prior HLC types. The results figures reveal that all the 'Contour Terrace' types are found in areas suitable for terracing. One significant point to note is that certain areas on the southerly areas of hillside may be terraced. Other forms of terrace HLC types such as 'Step Terrace' are rare, but they are beginning to be seen in areas which are not too inaccessible, which suggests that this may be a significant move in the future of the landscape. Areas most at danger are probably those north of the river in regions where the landscape is raised.

The results of the HLC reveal areas of 'Rough Ground' such as 'Mountain Scrub' on mountain tops and 'Riverside Scrub' beside the river. These areas are parts of the landscape that are not useful for other purposes. However, Low and High Scrubland can be in areas that can be cultivated and a move is being made to reclaim these areas. The landscape in the future is likely to become more exploited. For example, Modern ‘Sinuous Clearance Field’ and ‘Regular Clearance Field’ HLC types can be seen to have eaten into areas of previous ‘Natural Forest’ and ‘Rough Ground’. These areas that are appropriated by the clearance fields are often in transitional areas that could be considered liminal and reveal a move towards an increase in cultivation of land for crops. The only other area of ‘Rough Ground’ relates to areas that have been destroyed by fire, and are found within areas of ‘Natural Forest’. ‘Industry’ is not very significantly represented in the HLC results though activity in the region is likely to increase in the future.

The results of the HLC reveal that settlements are scattered quite frequently and rather well spaced out in the southern half of the Pisidia study area. These settlements are of different types with no one particular type identifiable as the most common. The least common however can be identified as Modern ‘Linear Settlement’ which are found adjacent to Modern field types. The settlement pattern in the northern half of the Pisidia study area is different. Here settlements are rarer, they are smaller on the whole, and have less modern influences within them. These settlements are also usually found in the eastern side of the study area along the valleys. Most of the settlements in the whole of the study area are likely to be of some antiquity but mostly they have been dated to the Ottoman period for lack of conclusive evidence.

One of the most significant things to note about the HLC results presented in **figure 6.190** is that overall, despite the intensification of farming methods and the modernisation that the region has undergone in the past few decades, a significant proportion of the landscape has a historic character that pre-dates the Modern era. **Figure 6.183** shows that the majority of the current landscape character is dated to the Ottoman period or Modern period with the Ottoman period being slightly more widespread. Very little of the HLC types classified in the current HLC results of the Pisidia study area have been confidently dated to a period earlier that the Ottoman era. This reveals that Ottoman period landscape features dominate the current character of the Pisidia study region. However, it is important to note that many of the HLC types may have earlier features but that the dates cannot be confidently established. **Figure 6.189** presents the final results of the HLC with all the prior HLC levels visualised. This portrays the earliest HLC type level upon the later

HLC type levels. This allows us to see which areas of the landscape have the most history. Essentially this figure presents the earliest known HLC type of each polygon.

6.8 Analysis

Analysis of the HLC results has provided a lot of stimulating information about the development of the Pisidia case-study area's landscape. One of the most significant results that the HLC portrays is that the landscape has significant features within its current configuration of considerable longevity; a depth of history that had not been previously been considered.

The Byzantine landscape is clearly represented in the character of the current landscape. From the results we can with some confidence state that the landscape in the plain was cultivated in the Byzantine period and it seems highly likely this area was the prime agricultural land. The significant evidence of this land being used in the Byzantine period suggests that the settlements too were occupied. These settlements were likely to have been small cluster settlements that were inhabited by those people that cultivated the land. These would have been small rural villages and the evidence for a significant town in the area is scant. The lives of the inhabitants of these settlements that worked these lands would have revolved around the seasonal calendar. Evidence from the intensive survey has revealed the possibility that manuring was an activity that was carried out by these inhabitants. There are however, no known remains of any Byzantine churches in the area which is unusual. However, it is possible that any building was appropriated by later mosques or the materials were used for *spolia*. The other consideration is that the farmers built in wood or mud brick.

The Byzantines in this area were also craftsmen, producing red slipware ceramics. The production sites are scattered across the southern half of the Pisidia study area, often located near water sources, in areas less suitable for agriculture and near to a clay source. The identification of these production sites provided a lot of new information about the rural life of the Byzantine inhabitants. What was an unknown and considered relatively insignificant area of landscape during the Byzantine period is now an area of major significance in the trade of the eastern Mediterranean and beyond. The production of the ceramic wares would have had a significant impact upon all the inhabitants of the area if not directly then indirectly from the more available trade goods, the monetary income in the region and down to simply the great availability of ceramic vessels. The intensive survey of the study area and the PSP's high concentrations of early Byzantine ceramics certainly suggest a different attitude towards ceramic vessels in the Byzantine period than the previous and later periods. The landscape developments prior to the Byzantine period and the evidence of significant earlier Hellenistic remains across the study area suggest that there was a not insignificant population in the region. However, the Byzantine ceramics dominate to the extent that very little else is found. This is not just that the Byzantine material is more visible as the intensive survey was extremely careful of following a systematic strategy and collecting every sherd found, not just the easily identifiable sherds. This means that there must be some reason for the high concentration of ceramics that is a result of different attitudes or activities taking place in the Byzantine period. One reason maybe that the ready availability of ceramics from the nearby production sites made ceramic vessels more disposable. Another reason may be that in earlier and later periods, ceramics were handled with more reverence and care or that rubbish was disposed of differently. A more likely reason is that in the periods prior to and following the Byzantine era, other forms of materials were used instead of ceramics. This in itself can provide a lot of insight into both Byzantine and other period inhabitants of the landscape.

The HLC has revealed that the majority of the land cultivated in the flat fertile plain to the south of the study area was also cultivated in the past. In the northern area a different story is revealed. In the northern mountainous area the landscape in the past was much more exploited than in the present. The evidence of the contour terraces which can be dated in some cases as far back as the Hellenistic period, shows that the landscape was adapted to provide as much profitable land as possible. The remains of grinder stones and press beds in the higher regions point to the area being a significant olive oil production region. The large scale of the terracing suggests that in the past the main product cultivated was olives unlike in the modern period, when the main products are vegetable, fruit and grain crops. The amount of terraces in the area would seem to suggest if the vast majority were used to cultivate oil that the production was on an industrial scale for the purposes of trade, rather than to only supply the local populations. The olive oil presses are interestingly found in areas much higher than the terraces, on top of hilltops and crags and in easily defendable and very inaccessible locations. This suggests the population felt the need to protect the production sites of olive oil to the disadvantage of convenience. This reveals a lot about the mind-set of the populations in the higher regions. These people were either particularly cautious or were protecting their livelihoods from raiders.

The need for protection felt by the Byzantine inhabitants is further proclaimed by the existence of what appears to be a wine production site on the lower hillsides in the transitional zone to the plain. The large industrial-scale press-beds next to a castle and fortified by many towers suggest that there was instability as suggested by the written records in the region during the Byzantine period. The existence of the wine production site and the correlation of the location of the nearby terraces on the more southerly facing slopes suggest that in the lower and warmer hillsides vines may have been grown as opposed to olives. Just the evidence of the various crops produced in the region, highlighted by the HLC and emphasized by the relationships between PSP find spots and the landscape character types identified, produce an interesting and much more in depth narrative for the history of the region. When looking at the current HLC in detail (**Figure 6.182)** it is possible to see that overall the landscape was much more cultivated and used in the past than in the current period.

The distinctive differences between the northern half of the study area and the southern half can be explained by the geology, but the difference in settlement pattern may help add weight to the suggestion that the areas north and those south of the river may have belonged to different territories in the past and therefore developed slightly differently under the different administrative systems.

The historical records for the region lack detail and the results of ceramic survey alone suggest a dislocation of population. However, the landscape study provides clear markers of surviving landscape components extending back through the centuries. When considering the ceramic results gathered from the survey units a different story is told to that of the HLC. The ceramic survey results suggest a limited period of activity restricted to the early Byzantine period. However when compared to the landscape analysis results, as we have seen in the focus studies there is a much longer and more complicated history. This reveals an extremely significant point that this thesis wants to highlight, which is that ceramic surveys should not be carried out without landscape analysis and that ceramic surveys can add extra depth to HLC and the understanding of landscape development. In contrast to the historic lack of information, this research suggests a richer history that previously considered for the areas. The ceramics for the survey suggests that Byzantine activity was widespread. Often, like in case of SU_01 and SU_10, there are higher quantities of Byzantine ceramics in areas close to settlement or production. This research has demonstrated that through a combination of HLC, retrogressive landscape analysis and ceramic survey it has been possible to reveal the greater diversity and time-depth apparent across the complex landscape of the Pisidia study area.

Chapter 7

Troodos HLC Case Study

7.1 Introduction

HLC can be undertaken at any scale and for a range of different applications (Turner and Crow 2010: 220). This HLC of the Troodos study area aims to develop a better understanding of the organisation and spatial composition of the landscape and its development through time in comparison to the Pisidia study area in southern Turkey. The HLC will provide a framework for how the landscape was structured in the past, which will then be used to explore people's perceptions and experiences of the landscape. To create the HLC of the Troodos study region, a comparative and analytical investigation of a variety of sources was carried out. This chapter will begin by introducing the Troodos case-study area, locating it in its geographical position and setting the area in its historical context. Following this a comprehensive explanation of the sources used to determine the HLC types will be presented, before each HLC type is looked at in detail. This in depth explanation of each HLC type will highlight the rationale behind their definition based upon the attributes and features within each area of landscape. The results of the HLC will then be presented and analysed with the aid of GIS generated maps. In particular, the survey results of the SCSP will be considered in comparison to the HLC results. This chapter will conclude with an evaluation of what information this analysis provides about how the landscape developed and an exploration of the potential implications of these results for our understanding of how the Byzantine inhabitants lived. This in turn will provide an insight into how the Byzantines may have experienced and perceived the landscape they inhabited.

The second case study for this thesis is located in the foothills of the Troodos Mountains in Cyprus west of Nicosia (**Figure 1.1**). 'Mediterranean islands [like Cyprus] present historically conservative settings in which situational and environmental factors are emphasized and great cultural contrasts can exist over short distance' (Rautman 2005: 453). As an island, Cyprus is isolated from the rest of the eastern Mediterranean by the sea; this suggests that Cyprus may present a distinctive historic character. However, there is clear evidence for trade and cultural exchange between southern Turkey and Cyprus throughout history (Abulafia 2011; Gabrieli *et al.* 2007; Knapp 1997, Mango 2009). This is particularly apparent in the case of early Byzantine ceramics, e.g. Late Roman D ware as mentioned in relation to Pisidia (Armstrong 2009; Jackson *et al.* forthcoming 2012). These factors make Cyprus an interesting region to locate a study area for a comparative HLC. By means of this study area I hope to highlight the differences and similarities between the landscape development of the Troodos case-study area and the Pisidia case-study area. This will provide an insight into the regional diversities in the use and development of the landscape and may suggest regional differences in the perception of the landscape. This area of the Troodos Mountain foothills was chosen as a specific case-study area within Cyprus because it was the focus for an intensive archaeological survey conducted by the SCSP (Given and Knapp 2003). The data collected by this survey project has been made publically available at the Archaeology Data Service allowing easy access (Knapp and Given 2003). Information provided by this survey project will provide vital material to aid the decision making process of categorising areas of the landscape into HLC types. As discussed in the introduction to this thesis, this is a new method that has not been used before to aid HLC interpretation. In addition to the SCSP data, this area also has excellent high resolution, freely available, Google Earth imagery as well as CORONA satellite imagery, which is important for this thesis' HLC methodology as discussed in Chapter 5.

7.2 Location and Geography

Cyprus is the 'largest and most remote of the Byzantine islands' (Rautman 2005: 453).It lies in the eastern Mediterranean approximately 75 kilometres from the southern Turkish coast and 100 kilometres from the coast of Syria. Cyprus' 640 kilometre coastline offers many safe harbours and is composed of prominent indented and rocky capes, separated by wide open bays with long sandy beaches. The general proximity to the mainland and the convenient summer currents offer the island valuable maritime routes (Karageorghis 1982a: 12). The most striking features of Cyprus' physical geography are the two large parallel mountain ranges, the Kyrenia and the Troodos. These mountain ranges 'divide the landscape into a series of distinct regions and ecological zones' (Rautman 2005: 453). The Kyrenia Mountain Range extends for about 160 kilometres, parallel to and just inland from the northern coast. Between the coast and the Kyrenia Mountain Range is a narrow fertile plain, with largely evergreen vegetation such as olive, carob and citrus trees. South of the Kyrenia Mountain Range lies the flat low-lying Mesaoria Plain, which means 'between the mountains'. This plain stretches from Morphou Bay in the west to Famagusta Bay in the east. The Mesaoria Plain is intensively cultivated and is the principal cereal-growing area of Modern Cyprus (Papachristodoulou 1976). Occasional patches of woodland can also be found on this plain, in which eucalyptus and various types of acacia, cypress, and lowland pine trees grow. South of the Mesaoria Plain is the Troodos Mountain Range, which consists of a rocky mass known for the presence of ophiolite, a section of the Earth's oceanic crust and upper mantle that has been pushed up and exposed creating a unique physical landscape (**Figure 7.2**). The Troodos Mountain Range runs for 80 kilometres from the western side of the island, stretching from west-north-west to east-south-east and is covered by forests of Turkish pine, dwarf oak, cypress, and cedar trees. The Troodos case-study area is located on the edge of the Troodos mountain range where Turkish pine, olive trees and Palestine oak are common (**Figure 7.3**). The highest point of the island now known as Mt Olympus is located in this range, from which 'the island may be overlooked nearly in its whole extension' (Holmboe 1914: 2). From this point the mountains decrease in size in all directions and are characterised by their steep sided valleys sculpted by the erosion of water (*ibid.*). The majority of Cyprus' famous copper mines are situated in the eastern and western extent of the Troodos Mountain Range (*ibid.* 7).

The Troodos Mountain Range eventually flattens out into broad undulating open plains of fertile marly soil, enriched by the alluvial deposits of seasonal rivers and rivulets running to the coast (*ibid.* 3, 8). Natural fresh water supplies on Cyprus are scarce and often seasonal with the majority of water sources originating from the Troodos Mountain Range. 'Cyprus is a semi-arid country exposed to the whims of a low unevenly distributed and unreliable rainfall pattern' (MA 1984: 19). The climate of Cyprus is typical of the eastern Mediterranean region with a strongly marked seasonal rhythm. The summers are hot and dry and the winters rainy (**Figures 7.4 and 7.5**), on which the agriculture and water supplies depend. During the ancient period the island is known to have had a very hot climate with many medieval travellers complaining of the heat (Oberhummer 1903: 192-193). The scarcity of water would have been an important factor in the location of settlements and have a major effect on agriculture. The Troodos HLC study area lies in the northern foothills of the Troodos Mountains where the forested slopes of the lower valleys meet the flatter arable land of the Mesaoria Plain. This is a landscape of wild rocky mountains, green forested slopes and arable valleys dotted with tiny villages and ancient sites. The case-study area is 5 kilometres in length (north-south) and 12 kilometres in width (east-west), covering a total of 60 square kilometres approximately bounded by the following co-ordinates: North-west corner 35.052070° latitude, 33.115206° longitude, south-east corner 35.006661° latitude 33.246770° longitude (**Figure 7.1**). A

Strabo described Cyprus as ‘second to none of the islands’, being rich in wine, oil and grain and possessing extensive copper mines at Tamassos’ (*Geography* 14.6.5). Pliny the Elder praised the wine of Cyprus above all others (*Natural Histories*), which must have been exported as he never visited the island (Kondoleon 1994: 326). This suggests many of the suitable areas for vine growing must have been cultivated. The foothills of the Troodos study region would have been suitable for this. Cyprus is also famous for the timber produced for shipbuilding (Metcalf 2009: 64) and copper from her mines (Constantinou 1992). The Troodos HLC case-study area has a long and rich mining history (Given 2005; Given and Knapp 1999). Cyprus’ natural and agricultural resources have been exploited for millennia and the long dialogue between the people and the land has created a particularly rich historical landscape.

7.3 Historical Context

Humans have been interacting with the Cypriot landscape from the pre-Neolithic era (Ammerman *et al*. 2006; 2007; 2008; Knapp 2010: 80). The early period of Cypriot history has been explored in detail by Bernard Knapp (2010). In the Troodos case-study area the first evidence for human interaction with the landscape is found in two lithic scatters dating to the pre-Neolithic period (a more specific date is not available) in the east of the study area near Politiko and at Agrokipia to the west of the Troodos study area, both of which were found by the SCSP who have classified both scatters as work areas rather than evidence of settlement (Given and Knapp 2003: 264). It was during the Neolithic period in south-eastern Turkey that the invention of agriculture was revolutionising human society from groups of nomadic hunter-gatherers into sedentary communities of farmers (Sherratt and Wilkinson 2009: 201). This led to a rapid increase in population and consequently emigration which gradually disseminated the new techniques. These emigrants colonized Cyprus from the beginning of the Neolithic period (Karageorghis 1982a: 11) and began the more perceptible human interaction with Cyprus’ landscape. The Troodos case-study area lies some distance from the known Neolithic settlements located close to the southern coast (*ibid.* 16); however, there is evidence of late Neolithic occupation in the Troodos study area. The SCSP found evidence near the village of Mitsero in the west of the study area for a single late Neolithic site, located on a prominent hilltop, near to a major river valley good for agriculture and near to indigenous areas of pine trees which would provide fuel and an area for hunting woodland creatures (Given and Knapp 2003: 265). Despite evidence for the advancement of society from the earlier Neolithic period very little human impact on the landscape is visible today and no evidence of the Chalcolithic period has been found in the Troodos study area, despite the presence of copper mines at a later date. This does not mean that there was no activity in the area, only that it is not evident to us today.

From the Bronze Age, Cyprus found herself 'at the nexus of longstanding communication routes across the east Mediterranean' (Rautman 2005: 453). Extreme changes took place on Cyprus during the transition to the early Bronze Age (Knapp 2008: 133). A radically new settlement pattern developed as town centres with monumental architecture appeared, new burial customs developed in which social status is evident, new ceramic styles and metalwork appear and Cypro-Minoan writing comes into being. A new material culture was created and the economy altered (*ibid.*). Einar Gjerstad (1977) proposes that this new material culture had its origins in Anatolia based on the similarities between red polished wares. Parallels for imported ware to Cyprus during this period have been found in Konya and Cilicia in southern Turkey (Karageorghis 1982a: 41). The location of early Bronze Age settlements show that early Bronze Age Cypriots had a preference for living near irrigated arable land. A Bronze Age clay model of a plough (**Figure 7.6**) emphasizes the importance of agriculture and the sophistication of their technology (*ibid.* 46). In the Troodos case-study area two early Bronze Age sites are known, at Ergates and Episkopia (Given and Knapp 2003: 266). The latter is situated on a small knoll in view of the valley and it has rich agricultural resources, however the former site is unusually located on a conglomerate ridge top of limited stability not within view of arable land (*ibid.*). The island continued to thrive during the Bronze Age due to the Cypriot dynamism in the use of metallurgy (Karageorghis 1982a: 48). The exploitation of the copper mines led to more interest in the island from outside and more trade (Karageorghis 2002: 11). Religion in the early Bronze Age is attested by models of walled circular open air sanctuaries with people engaging in activity centred around a triad (**Figure 7.7**). This suggests that sanctuaries may have functioned as focal points in the landscape. In the middle Bronze Age the island was widely occupied with only the mountainous region not exploited (Karageorghis 1982a: 50). Forts become more visible in the landscape during the middle Bronze Age, suggesting an increase in political rivalry and warfare. The locations of these fortresses suggest there were hostilities between the west and east of island (Karageorghis 2002: 26). The horse was introduced at the end of the middle Bronze Age which would have revolutionized transportation and consequently the perception of the landscape by its inhabitants (*ibid.* 78).

The late Bronze Age was a period when complete cultural uniformity of the island was achieved (Karageorghis 1982a: 61) with the antagonism of the middle Bronze Age period giving way to increasing homogeneity. Inland settlements grew, harbour towns became increasingly sophisticated and there was general prosperity. The main features of the Bronze Age landscape would have been fortresses in naturally defensible areas, religious sanctuaries composed of large circular walled areas, small rural settlements constructed of mud-brick buildings that melt into the landscape and large urban centres with ashlar fortifications and monumental buildings. Copper mines and quarries would also have marked the landscape. A late Bronze Age smelting site is situated at Politiko Phorades to the south-east of the study area (Given and Knapp 2003: 268). The material culture recorded by the SCSP in the Troodos case-study area suggests an unequal exchange with a regional centre of unknown location during this period (*ibid.* 267). Outside Cyprus late Bronze Age conditions were not calm; the collapse of the Mycenaean Empire and the government in major centres such as the Peloponnese had far reaching repercussions (Karageorghis 1982a: 82). There is evidence that new Achaean settlers brought new vigour to the already flourishing culture of Cyprus (Karageorghis 1982b: 54) which led to the foundation of Greek kingdoms covering most of the island. During this period Cyprus was often the bone of contention between great powers due to her strategic location and rich copper deposits (Karageorghis 1982a: 11). A natural disaster probably brought the Bronze Age period in Cyprus to an end (*ibid.* 112) with most of the major cities being abandoned and new centres built.

The early Iron Age in Cyprus saw new cultural innovation with the introduction of Greek religion (*ibid.* 114) and the transition to iron working, possibly brought by Achaean settlers (*ibid.* 113). Massive immigration was seen during this period 'transforming Cyprus in to a predominantly Greek speaking land' (Coldstream 1982: 58). During this period Cyprus experienced increased wealth, prosperity and good relations with Anatolia, Greece and the Near East (Karageorghis 1982a: 115). The influx of Phoenicians to the island (Coldstream 1982: 62) was responsible for the restoration of trade routes and cultural contacts that had been severed during the fall of the late Bronze Age civilisations.

In 709 Sargon II of Assyria erected a *stela* at Kitium recording the fact that seven Cypriot kings had paid him homage (Curium, Paphos, Marion, Soli, Lapithos, Salamis, and Amathus); subsequent Assyrian documents speak of a further four tributary kingdoms (Kitium, Kyrenia, Tamassos, and Idalium) (Tatton-Brown 1982a: 73). The city of

Tamassos is located within the Troodos study area where the village of Politiko is now situated. During this period the Troodos study area experienced an intensification of agriculture, with the fertile valley areas heavily exploited and a growth in industry (Given and Knapp 2003: 276, 273). Copper production sites and slag piles have been found by the SCSP in the east and north-west of the Troodos study area, indicating an intensification of industry. The writer Theophrastus (*On Stones*) describes the production of charcoal used in the smelting process, which may not have left any physical evidence, but is another activity that is likely to have been taking place in the region. The SCSP also found ceramic production sites at Ayios Mnasson in the Troodos study region which may have been associated with an important religious sanctuary at Tamassos (Given and Knapp 2003: 273). During this period life revolved around the city of Tamassos (*ibid.* 277) and the important religious sanctuary that developed here, which derived its significance from the surrounding land (*ibid.*), situated in a typical location on a prominent hill looking out over the agricultural landscape (*ibid.* 275). A red slip bowl found at Tamassos shows that trade had penetrated into the interior of the island by this point. Assyrian rule lasted until c. 663 and for the next hundred years Cyprus enjoyed a period of complete independence and development until c. 569 when the Cypriot kingdoms recognized Egyptian Pharaoh Ahmose II as their overlord (Tatton-Brown 1982a: 75).

In 521 Cyprus came under Persian rule (*ibid.* 77). During the fifth and most of the fourth century Cyprus remained under Persian rule despite Greek attempts to gain control of Cyprus' rich landscape resources. However, after the victory of Alexander the Great over Darius III in 333, the Cypriot kings rallied to Alexander and assisted him at the siege of Tyre (Tatton-Brown 1982b: 104). The landscape at this point was dominated by mud brick towns and cities where even the large defensive walls were mud brick with freestanding votive monuments and temples in larger towns (Tatton-Brown 1982a: 81). During this period the Troodos case-study area had declined in activity with less material culture from this period found by the SCSP (Given and Knapp 2003: 277). After Alexander's death his successors fought for control of Cyprus. The victor was Ptolemy I of Egypt and Cyprus remained a Ptolemaic possession, ruled by a governor-general until it was annexed by the Roman Republic in 58 B.C. (Tatton-Brown 1982c: 119). Under Ptolemaic order the sanctuary at Tamassos, which had been destroyed in the fifth century, was rebuilt (Wright 1992: 123). As Cyprus lost its independence the urban areas became more cosmopolitan (Tatton-Brown 1982c: 119). Monumental cities were built during this period which made a dramatic impact on landscape with large-scale ashlar theatres, public buildings and temples dominating landscape. These cities are still one of most visible features in modern Cyprus' landscape. During this period Cyprus was included in the Anatolian province of Cilicia. During the Roman period nucleated settlement most probably prevailed over rural Cyprus (Karouzis 1977: 21). The Troodos HLC study area experienced a steady growth, but the lack of amphora sherds found during the SCSP may suggest that there was little bulk movement of goods to the region (Given and Knapp 2003: 278).

Christianity was introduced to Cyprus when the apostle Paul, accompanied by St. Barnabas, a native of the Cypriot Jewish community, preached in Cyprus and converted the proconsul Sergius Paulus (*Acts* 13:17), fundamentally altering Cyprus (Hunt 1982a: 129). Local tradition claims that the city of Tamassos within the Troodos case-study area was visited by St Paul in A.D. 45 where he ordained a young man named Iraklidhios who became the first bishop of Tamassos. Tamassos was a town of modest size in the Byzantine period (Metcalf 2009: 259, 265). However, Hierocles the Grammarian, in his *Synecdemus,* lists Tamassos as the second in his dioceses list. This attribution of seniority may be a result of the prestige of the tomb of St Iraklidhios.

By the time of Constantine the Great, Christians may have constituted the majority of the population. After the division of the Roman Empire in 395, Cyprus remained subject to the Byzantine Empire. Throughout the Archaic to late Roman period the Cypriot landscape would have been scattered with dispersed farmsteads comparable to the pattern seen across Greece (Alcock 1993: 18). The late Roman period settlement pattern was 'influenced by the need for efficient resource exploitation' (Rautman 2005: 455). Cyprus was 'a dynamic landscape that looked to its broad plains, rising valleys, and forested slopes to sustain local inhabitants and meet external demands' (*ibid.* 453). The most rural activity that took place on Cyprus was during the late Roman period when a complex network of settlements covered the island (*ibid.* 461) and the Troodos study region benefited from the development of a growing road system (Given and Knapp 2003: 281). However, the SCSP found little evidence of activity from the seventh century onwards until the 13th century in the material record (*ibid.* 283), despite the location of an important religious site in the region.

The Byzantine period in Cyprus has been described as made up of three ages, beginning with the great prosperity of the late Roman period, moving into a swift decline triggered by Arab raids, followed by a period of improvement (Metcalf 2009). The archaeological record shows Cyprus to have been a flourishing commercial and agricultural province with a densely settled rural landscape (McClellan and Rautman 1995: 85). There is a largely consistent picture of Byzantine rural settlement across the island (Rautman 2005: 454). The basic pattern is about a dozen larger major cities on the coast that are linked by water and a highway that runs around the island. These cities are connected to smaller rural settlements in the coastal plains and mountain foothills which are in turn connected to smaller farmsteads and hamlets located in more upland regions. Landownership during the early Byzantine period was dominated by landlords levying heavy taxes on the population (Karouzis 1977: 22). Monasteries like that of St Iraklidhios in the Troodos case-study area were often large landowners (*ibid.* 23).

The volume of external commerce grew in the sixth century and peaked around 600 (Rautman 2005: 457). An important product exported from Cyprus was grain as the local soil and climate and dispersed settlement pattern were ideal for this, which would have been important to Constantinople (*ibid.*). Villages and farms grew steadily in the fifth and sixth centuries reflecting the successful land use practices and trade networks, then the decline described by David Metcalf appears sharply in the material record around the times of the Arab campaigns in c. 650 (*ibid.* 454 - 455).

These raids have been described as particularly devastating (McClellan and Rautman 1995: 86). The Arab campaigns left Cyprus in a precarious position between east and west. Theophanes writes that up to 170,000 Cypriots were removed as Arab prisoners (Cameron 1996: 31-32). There was a break in direct rule from Constantinople in 688 when Justinian II and the Caliph Abd al-Malik signed an unusual treaty neutralizing the island to end the Arab invasions (Metcalf 2009: 450). For almost 300 years Cyprus was a kind of joint dominion of the Byzantine Empire and the Caliphate (Gregory 2003: 283). From the end of the seventh century onwards ‘little is known of the Byzantine period in Cyprus’ (Gibson 2005: 10). Evidence for village life is scarce through this Dark Age as in other areas of the Mediterranean and ‘sites that can be attributed to this co-regency period are few’ (Gabrieli *et al.* 2007: 791). One of the reasons suggested for this is a decline in population (Rautman 1998: 83-4). At this point in time there is an abrupt change, with coastal sites decreasing or being completely abandoned and few traces of human activity are found in the Cypriot countryside between the eighth and tenth centuries (Gregory 2003: 283; McClellan and Rautman 1995: 86). There was also a demise in traditional networks, reflected by the small quantity of Aegean pottery that had previously been plentiful (Gabrieli *et al.* 2007: 791;

Hayes 1972; 1980: 379-380). This suggests a new self-sufficiency, which is confirmed by an increase in local wares (Rautman 2005: 458). The occurrence of red slip wares also declines in the mid-seventh century (Gabrieli *et al.* 2007: 791). This may suggest it too was an import strengthening the new theory of its production in Pisidia. Some scholars have gone as far as to say this is an aceramic period of Cypriot culture (Gibson 2005: 11), though several studies contradict this view point (Gabrieli 2007; Gabrieli *et al.* 2007; Hayes 1980; 2003; Megaw 1971; 1988). It is also unlikely that the Cypriot countryside was entirely depopulated (McClellan and Rautman 1995: 86). A ninth century hagiographic account of the life of St Demetrianos describes a variety of settlement types revealing a diverse rural landscape (Rydén 1993). It is likely that the population did decrease somewhat, that there was a shift to using local wares (Rautman 1998: 83-4) and that Cypriot farmers did drastically reduce production from large-scale exportation to small scale local subsistence strategies (McClellan and Routman 1995: 86), with the result that the people in this period are less visible in the archaeological record. This is likely exacerbated by ceramics not being accurately identified (Gregory 2003: 283) as explored in Chapter 3.

The Byzantines took complete control of the island from the Arabs in 965 (Iacovou 1998: 20), but contemporary authors say little about the period (Rautman, 2005, 459). Following this a series of mountain fortresses along the north coast of the island were built (Iacovou 1998: 20) to give early warning of raiders. Secure inland headquarters were created at Nicosia (Dumper and Stanley 2007: 276). Byzantine architecture of Cyprus is little known even by Byzantine scholars. It developed a dramatically distinctive regional style different to the rest of the Byzantine Empire (Ćurčić 1999: 71). The period that followed was one of modest prosperity with a growth in large inland estates, churches and monasteries in the in the late 11th and 12th centuries (Rautman 2005: 454).

In c.1185 Isaac Comnenus rebelled and proclaimed himself ruler of Cyprus (Iacovou 1998: 21). Isaac resisted attacks from the Byzantine emperors but in 1191 engaged in hostilities with an English Crusader fleet under King Richard I and was defeated and the island seized (*ibid.*). The Cypriots resolved to regain their independence and revolted. Richard I could not spare troops to hold the island by force, so in 1192 he presented the island to Guy of Lusignan, the dispossessed king of Jerusalem (*ibid.*). Guy invited families that had lost their lands in Palestine after the fall of Jerusalem to settle in Cyprus (Edbury 1991: 12-20) and thereby laid the basis for a new elite and established a western style feudal society

(Hill 1948). The Byzantine landowning classes disappeared and wealth was extorted from the peasant class (Karouzis 1977: 27). This feudal system of landownership tied peasants to land preventing them from moving (*ibid.* 26). From the Lusignan period onwards maritime trade again became increasingly important (Gibson 2005: 12) and the Latin Church was established in Cyprus (Karouzis 1977: 27). Lusignan rule survived until the island was ceded to the Republic of Venice by the widow of the last Frankish king (Iacovou 1998: 21).

Most of the institutional and social structure that characterised the earlier period of independence remained during the Venetian period (Arbel 1998: 161) with peasants living on feudal estates (Arbel 1996: 183-188), but the Cypriot peasant classes experienced even worse conditions under Venetian rule (Karouzis 1977: 28). Fiefs from the Frankish period were retained but land changed from hereditary ownership to appointure (*ibid.*). The main impact on the landscape which is visible archaeologically was made by fortifications (Arbel 1998: 166). During this period cotton production was central to the economy for export (*ibid.* 162-3). Cyprus remained a Venetian possession for 82 years until its capture in 1488 by the Ottomans (Iacovou 1998: 23).

In 1570 a Turkish invading force landed in Cyprus and began more than three centuries of Ottoman rule (*ibid.*). Although more documentation is available, little is known about the archaeology of the Ottoman period (Given 2000: 215). Systematic published ‘excavations of Ottoman sites in Cyprus are almost non-existent’ (*ibid.* 216). Some scholars have argued this was a time of little progress (Karouzis 1977: 30) but as Given (2000) has demonstrated the Ottoman period in Cyprus was very rich and varied and there were several progressive acts instigated by the Turks. Taxation was high and could total a fifth of a farmer’s income (İnalcık 1973: 128), but rather than oppressing rural life this obligation ‘stimulated a rural economic system that was often intensive, efficient and sophisticated’ (Given 2000: 228). During this period the Latin Catholic Church of the Crusader and Venetian rulers was expelled and the Orthodox hierarchy restored (Karouzis 1977: 30). The Catholic buildings were confiscated and converted into mosques, or sold to the Orthodox Church. Catholics on the island were given the choice of conversion either to Islam or Orthodoxy (Hill 1952: 308). A census was instigated (Karouzis 1977: 30) and a new timar system introduced using tithes to levy tax (*ibid.*). Although this was superficially similar to the feudal system there were fundamental differences. Feudal tenure was abolished and the Greek peasantry acquired inalienable and hereditary rights to land (*ibid.* 31).

During the Ottoman period a number of soldiers and craftsmen from Anatolia were settled on the island. This policy was pursued until by the 17th century with 20-30,000 Muslim Turks settled amongst a population of about 150,000 Greek Cypriots (Gazioğlu 1990: 28; Hill 1952: 20). Despite this influx of people the Turkish rule left few footprints on the landscape of the Troodos study area as the Ottomans were not interested in adorning Cyprus with buildings (Hunt1982b: 208). The Ottoman period saw Cyprus divided into six districts, each with their own administrative council. Ottoman tax records are a major source of information for the period. The first cadastral plans which are an important source for land division were created for tax purposes in the 1850s (Karouzis 1977: 30). Villages were administered by local Muhtars (headmen) and the Ottomans relied upon the pre-existing power structure of the island (Gibson 2005: 12). There were several different types of rural sites commonly seen in Ottoman Cyprus such as villages, farmsteads and temporary field shelters. These have been explored in detail by Given (2000). These sites were linked together by a complex system of exchange and the activities of life varied according to the seasons (*ibid.* 215). Modern maps reveal village territories to be between one kilometre and three kilometres across and it is believed this closely resembles the Ottoman pattern (*ibid.* 222). As seen in the Troodos villages today, tax records show that Ottoman landholdings were fragmented and spread over a large area; this would make travel to and from these dispersed allotments a part of daily activity (*ibid*.).

In the 17th century many of the island's profitable crops, such as sugar, were ruined by American competition and taxation was extremely heavy during this period (Karouzis 1977: 31). Throughout the Ottoman period there was a series of armed tax-revolts which often united both Greeks and Turks (Given 2000: 219). The 17th and 18th centuries are notable for a population decrease (Papadopoullos 1965). Travellers in this period describe abandoned villages and other indicators of a reduction in population (Barsky 1996; Cobham1908; Mariti 1909). In 1821 revolts broke out all over the Greek-speaking provinces of the Ottoman Empire and the Turkish governor of Cyprus received permission from the Sultan to launch a crackdown which effectively destroyed the Greek Cypriots' chance of joining the Greek rebellion (Hill 1952: 124-127). After the peace of 1830, the Ottoman Sultan made an attempt to reform the administration of the Empire. Following this the population grew and there was an improvement in economic and social conditions (Given 2000: 219).

In 1878 the Cyprus Convention between Britain and the Ottoman Empire was signed which provided that Cyprus, while remaining under Turkish sovereignty, should be administered by the British government (*ibid.*). Britain's aim in occupying Cyprus was to secure a base in the eastern Mediterranean in return for a British guarantee to secure the Sultan's Asian possessions from Russia (Hill 1952: 300). **Figure 7.8** is an 1878 agricultural map of Cyprus suggesting that the Troodos case-study area was in an area of general waste ground. However, the focus studies explored below suggest otherwise. With Cyprus' sudden and peaceful absorption into the British Empire, British travellers visited Cyprus. Sir Samuel Baker (1879) describes the woods, forest and fields of Cyprus in his book *Cyprus As I Saw it in 1879*. In 1914 Cyprus was formally annexed and given the status of a British crown colony in 1925. There was little opportunity at this time to redevelop the island but taxation was reduced to half of the previous period (Karouzis 1977: 35). The economic basis of the island during the following period was based upon the cultivation of cereals, wine, silk and cotton and other various fruit and vegetables for export (Given 2000: 219). The influence of Europe was felt with the textile industry encouraging the growth of cash crops like mulberry trees for silk worm cultivation (Given and Hadjianastasis 2010: 53). However, the mechanisation of agriculture and the improved communications of the 1920s and 1930s had the most impact on the rural landscape (Given 2000: 210). The field systems changed as there was now no need for long strip fields that were conducive to animal led ploughs. In the mid-1950s a land consolidation section was established by The Department of Agriculture in an attempt to exchange plots of land between landholders, to solve the problem of landholders owning numerous small plots of land inefficiently dispersed over large areas (MA. 1984:15-17). This however, was never fully implemented (*ibid*) and many landholders still own small dispersed plots. In February 1959 the British government and representatives of the Greek Cypriot and Turkish Cypriot communities accepted the Greek-Turkish compromise. In 1960 treaties that made Cyprus an independent republic with Britain retaining sovereignty over military bases at Akrotiri and Dhekélia were ratified.

7.4 Sources

To create the HLC of the Troodos region, a comparative and analytical investigation of a variety of sources was carried out. The following section lists each of the sources used to inform the HLC. Some of these sources are the same as or similar to the sources available for the Pisidia case-study area. However unlike the Pisidia case study the sources available for the Troodos HLC are more comprehensive and detailed.

7.4.1 Cypriot Maps

For the Troodos case-study area, as in the Pisidia case-study area, 1:50,000 topographical maps of the region were available for reference. However, as this HLC uses the SCSP data, which created field maps from 1963 aerial photographs provided by the Cyprus Department of Lands and Surveys geo-referenced to control points derived from the 1:50,000 topographical maps and from GPS data, it was decided not to use the original topographical maps directly to avoid any variances. Instead the SCSP digitised shapefiles of the roads, rivers and field boundaries (units), available for download alongside other survey data at the Archaeology Data Service (Knapp and Given 2003), were used as a very basic form of map background (**Figure 7.9**) and for the geo-rectification process of both the CORONA and Google Earth imagery.

Cadastral maps, exemplified in **Figure 7.10,** that record land divisions for taxation and landownership records at a scale of 1:40 metres were also available for most of the Troodos case-study area, but not all. These maps were also of varying dates compiled between 1923 and 1998. As a result of the incomplete coverage, varied dates and the fact that these maps were only accessed as copies rather than originals they were not chosen to be used as base maps for the HLC. These cadastral maps however are extensively used in the focus study analysis and are consulted in the HLC determination process.

7.4.2 Google Earth Imagery

As Chapter 5 explored and Chapter 6 exemplified Google Earth is an invaluable and much under-exploited resource for archaeologists (Beck 2006). For the Troodos case-study area Google Earth imagery downloaded using Google Earth Downloader (Smith 2010), dating from May 2005, February and June 2008 and July and August 2010, as well as the most recent May 2011 imagery, are an important source for the HLC of the area. This imagery is of high resolution and is extremely detailed for the Troodos case-study area. These images provide a base map (**Figure 7.11**) from which the HLC polygons can be defined. This base map is geo-rectified using the digitised shapefiles from the SCSP. Chapter 5 describes the methodology used to geo-rectify these images in order to provide a base map for the HLC.

7.4.3 CORONA Satellite Imagery

As discussed in Chapter 5, CORONA satellite imagery provides information on the field systems and landscape features which have undergone change or destruction during the intensification of farming and the growth of rural villages over the last 50 years. The CORONA satellite imagery consulted for the Troodos case-study area is comprised of one image from June 1963. This image was uploaded into ArcGIS 9.3 and geo-rectification was carried out upon it against the SCSP shapefiles. **Figure 7.12** shows the CORONA satellite photograph and highlights the Troodos case-study area. **Figure 7.13** shows the image quality in a close up. This image was more informative than the Pisidia case-study area's CORONA imagery, which was found to be of a lower resolution and had clouds obstructing the view of several parts of the case-study area.

7.4.4 The Sydney Cyprus Survey Project (SCSP)

An extremely useful resource for the creation of the Historic Characterisation of the Troodos region is the data collected by the SCSP. The SCSP devoted five seasons of intensive archaeological fieldwork (1992-1997) to survey 65 square kilometres in the north-central foothills of the Troodos Mountains. The primary goal of the survey was to examine the relationships between the production and distribution of agricultural and metallurgical resources and analyse the varying configurations of society (Given and Knapp 2003). In contrast to the more basic PSP, the SCSP took an extremely integrated approach to the social landscape, considering it from archaeological, historical, geomorphological, geobotanical and archaeometallurgical perspectives, providing new insights into the interpretation and collection of archaeological survey data. This survey has been considered a model for research in the eastern Mediterranean (Fischer-Genz 2004: 206). The results of the survey are published in *The Sydney Cyprus Survey Project: Social approaches to regional archaeological survey* (Given and Knapp 2003) and on the project website (Knapp *et al.* n.d.). The survey data is also freely available online at the Archaeology Data Service (Knapp and Given 2003). The data deposited at the Archaeology Data Service by the SCSP consists of GIS compatible shapefiles, delimited text files and database files containing the data from field walking of 1550 survey units (*ibid.*) (**Figure 7.14**).

The SCSP methodology integrated several interdisciplinary approaches and techniques, including archaeological field walking, archaeological survey, planning and mapping, archaeometallurgy, geomorphology and soil science, historical and archive research, geobotanical research, satellite imagery and ethnography to create a detailed archaeological landscape study (*ibid.*). Using a systematic intensive survey strategy, the SCSP field walked 50 metre wide transects in a north-south direction across the survey area at 500 metre intervals. The project then used spatial information incorporated into a GIS to determine topographic, geological and land use factors that may have affected the frequency of cultural materials found. The data collected by this survey project allows this thesis to incorporate valuable artefact and ceramic statistics into the Troodos HLC, allowing a new dimension to be added to the HLC study. The SCSP ceramic collection data consists of GIS shapefiles with attached database information that records the number of sherds for each survey unit and the classification and date of these sherds. The following table lists the time period categories used by the SCSP. Note the varying date ranges for example Medieval and Medieval-Modern depending on the exactitude with which the artefact could be identified.

CODE	PERIOD NAME	DATE RANGE
EP	Early Prehistoric	9000-2500 BC
PeB	Prehistoric Bronze Age	2500-1700 BC
PoB	Protohistoric Bronze Age	1700-1000 BC
PH	Prehistoric (EP-Geometric)	9000-750 BC
Geo	Geometric	1050-750 BC
Ar	Archaic	750-475 BC
GA	Geometric to Archaic	1050-475 BC
Cl	Classical	475-312 BC
GAC	Geometric to Classical	1050-312 BC
AC	Archaic to Classical	750-312 BC
He	Hellenistic	312-100 BC
ClHe	Classical to Hellenistic	475-100 BC
ER	Early Roman	100 BC-AD 300
HER	Hellenistic to Early Roman	312 BC-AD 300
RL	Late Roman	AD 300-750
REL	Early-Late Roman	100 BC-AD 750
Byz	Byzantine	AD 750-1191
Med	Medieval	AD 1191-1571
Ott	Ottoman	AD 1571-1878
Mod	Modern	AD 1878-2000
MM	Medieval to Modern	AD 1191-2000
HA	Historical Antiquity (Ar-LR)	750 BC-AD 750
Hi	Historical (Ar-Mod)	750 BC-AD 2000
PC	Post Classical (He-Mod)	312 BC-AD 2000
Unk	Unknown	9000 BC-AD 2000

Table 7.1: SCSP codes and dates for chronological periods.

When the ceramic data collected is analysed it is interesting to note for this project that there is a low amount of Byzantine period ceramics. **Figure 7.15** illustrates by pie chart the relative percentages of ceramics recorded across all the survey units, classified by their date. In this pie chart the orange of the Byzantine (A.D. 750 – 1191) category can barely be seen between azure blue of Historical Antiquity (750 B.C. – A.D. 750) and the light blue of Medieval (A.D. 1191 – 1571). This may be a result of trade as explored by Armstrong (2009) or a lack of ceramic material in use during this period. It may also be the result of a problem in the ability to identify sherds as Byzantine, rather than an actual lack of ceramics dating to the Byzantine period. This may also be a problem for other periods, but it is particularly noticeable in the Byzantine period and may possibly be the result of there not being enough typological information on the ceramics of the Byzantine period in this region as explored in Chapter 3. Early Byzantine (or late Roman A.D. 300 – 750) ceramics are more common as can be seen by the light green category in **figure 7.15**. The SCSP also recorded information about the survey area's geology, land use, surface type and surface modification. This provides valuable information for the decision making process during the desk-based analysis of the HLC of the Troodos case-study area. For example **figure 7.16** shows the areas that the SCSP classified as terraced. **Figure 7.17** displays the stability categories of the survey area which as being unstable land and therefore unsuitable for agriculture. All this provides useful information for the HLC process.

The SCSP also conducted block surveys of Special Interest Areas (SIA) (**Figure 7.18**), which were chosen for their extensive evidence of early industrial, agricultural or settlement activities (Knapp and Given n.d.) and Places of Special Interest (POSI) (**Figure 7.19**), which were chosen because they exhibited obtrusive remains or densities of artefacts (*ibid.*). These in depth study areas allow further details of the HLC of the region to be identified. This thesis does not intend to re-evaluate all the SCSP material, or provide an exhaustive historic analysis of all areas of this landscape as the SCSP has already successfully done this. This thesis will instead use all the available data collected by the SCSP to classify the landscape during the decision making process of the HLC.

7.4.5 Ground Truthing

Ground truthing was carried out in the Troodos case-study area in a very different manner from that of the Pisidia case-study area. In Pisidia the ground truthing took place over a series of seasons concurrently with the HLC type determination process. In Pisidia the ground truthing was very integral to the interpretation of the HLC types due to the limits of the survey data collected in the area. In the Trodoos case-study area, the SCSP, as described above, had carried out a very intensive interdisciplinary investigation of the area. This allows a desk-based assessment to be much more effective. Therefore this thesis decided to test the HLC method as a purely desk-based approach using the survey data, cadastral plans and the various types of imagery available as a basis for the HLC research. Ground truthing was then carried in June 2012 after the HLC had been completed. The aim of this ground truthing was to test the HLC types and the HLC descriptions that had been compiled. An analysis of the findings of the ground truthing is provided in Chapter 8.

7.4.6 Additional Sources

Other sources such as the descriptions of antiquarian travellers (Barsky 1996; Cobham 1908; Mariti 1909), ancient hagiographic sources (Rydén 1993), travellers' drawings and maps (Barsky 1996; Papavassilis 2007), archaeological reports and surveys (Buckholz and Untiedt 1996) and government records (MA 1984; Papachristodoulou 1976; Papadopoullos 1965) were also consulted where relevant and available.

7.5 Focus Studies

The HLC types for the Troodos case-study area were developed through the investigation of focus-study areas (**Figure 7.11**). Focused investigation of selected areas helps the understanding of the history of the region and provides case studies of the development of the landscape. These focus-study areas are analysed in detail using a variety of archaeological techniques and presented through descriptive narrative and imagery. However, the detailed SCSP report has resulted in the focus studies being of less importance in the Troodos case-study area than in the Politiko HLC, because the SCSP report covers a much larger area in much more detail.

7.5.1 Politiko

The focus study of Politiko is located in the east of the Troodos case-study area. Politiko has a lot of information known about its historical development due to its previous incarnation as the ancient city of Tamassos and its later role as the centre of a bishopric. As the focus study is the village itself and surrounding agricultural land a short history of the settlement is appropriate. The first evidence for human interaction with the landscape surrounding Politiko can be dated to the pre-ceramic Neolithic period where a lithic scatter provides evidence for a task specific workplace (Given and Knapp 2003: 182-183). By the middle Bronze Age tomb material recorded by the SCSP attests to more extensive occupation in the area (*ibid.*) with human manipulation of neighbouring areas beginning to be evident through the remains of mining and metal work (*ibid.* 133). The prehistoric sites found in the immediate landscape of Politiko are located in uphill areas on the southern and western outskirts of the study area. The flat fertile plain to the north and east, which was well cultivated in later periods, presumably sustained the prehistoric settlements in the area. Evidence of an agricultural settlement was also found on a small hill to the west of Politiko, a site that was also re-established as a farm in the 13th to 14th centuries (*ibid.* 274). The modern village of Politiko is located upon the site of ancient Tamassos. At its height Tamassos would have been a large and vibrant city reaching to the Katouris River (*ibid.* 127). This would have been a landscape of successive sacred spaces with three sanctuaries located within the immediate vicinity of the settlement (Buckholz 2010). The remains of the temple to Aphrodite can be seen on the eastern extent of modern Politiko and not far from here lies a necropolis housing the Tomb of the Kings. The other sanctuary was situated on what would have been the outskirts of Tamassos and also has evidence of an associated necropolis (Given and Knapp 2003: 122–123). This site is now the location for the Ayios Mnason monastery which suggests the appropriation and continuation of the sacred spaces in this region across time.

The settlement activity declined in the Hellenistic and early Roman periods, but again peaked during the late Roman period (*ibid.* 277–284). The picture again changes in the Byzantine period with a decline in activity (*ibid.* 285). The city, however, was not entirely in decline. The settlement's Christian spaces were already well defined by the Byzantine period and the area had a significant Christian population from a very early date. As described above, local tradition claims that Tamassos was visited by the Christian apostle Paul in A.D. 45, when he ordained a young man named Iraklidhios who became the first bishop of Tamassos. Iraklidhios is said to have first taught from a small cave (Hackett 1901: 379) with the assistance of his friend Mnason for whom the monastery of Ayios Mnason is named. The exact date of this monastery's construction is not known but the name and appropriation of the sanctuary hint at an early date. When the monk Vassili Bars'kyj visited the area in 1735 the monastery was well established (Barsky 1996; Severis 2000). A second monastery dedicated to Iraklidhios is located on an adjacent hill-top south of Politiko (**Figure 7.20**). Features of this complex can be dated to the fifth century with the present church built in the 15th century, known to be situated on the remains of a ninth century basilica. The monastery contains a 14th century mausoleum where a trapdoor leads to an underground tomb said to be the original burial place of Iraklidhios (Knapp *et al.* 2003). A third church is located on the southern edge of the modern settlement of Politiko, dedicated to Saint Theodore. The current building was successively renovated in 1777, 1888 and most recently in 2001 but local tradition suggests the first church on the site was constructed at the beginning of the second century (Pers. comm. Vasiliki Georgiou). The evidence suggests that these three sites would have been the main areas of sacred space and that significant activity was taking place in the settlement throughout the Byzantine period. The exact date when Tamassos became Politiko cannot be determined, but it is known that the bishop's seat based here was still referred to by the name of Tamassos until 1222 after which the seat was annulled (Jeffery 1918: 211). This appears to be a defining moment in the area's history; with the demise of the episcopal headquarters, the city of Tamassos seems to end. In its place the village of Politiko begins.

One of the first records of the settlement as Politiko was in the 15th century by Voustronios (*The Chronicle of Georgios Voustronios*). Another report can be found by Archimandrite Kyprianos in the *Chronological History of the Island of Cyprus* first published in 1788 in Venice which refers to Tamassos as today called the village Politiko. Little is known of Politiko during this period and the same can be said for later centuries. Over the past few centuries Politiko has developed from being an agricultural settlement with only a few families to a village with hundreds of people now resident. After the arrival of the British in 1878 the village went through a slow but steady increase of population.

Figure 7.21 presents the retrogressive landscape analysis of Politiko. The boundaries of fields are highlighted in shades of grey, the darker the shade the more recently created the boundary. The bold black line highlights rivers. The thicker dashed line that crosses the river at the top right of the image and runs in a straight line towards the settlement of Politiko is a modern road that cuts through the fields, revealing that it was built after the field system was established. The thinner dashed black lines show pathways that respect the field boundaries, indicating that they are either contemporary with, or later than, the field systems. In the top right-hand corner of the image light grey lines reveal fields arranged in narrow strips, a common Medieval and Byzantine period agricultural method found throughout Europe and the Mediterranean (Turner and Crow 2010: 216-229). These strip fields were subsequently shortened and combined together to create more rectangular fields appropriate for the advance in agricultural techniques and the change to cash crops. This process of retrogressive landscape analysis can be carried out repeatedly across all landscape features to discover a relative chronology for their construction. Sources used to help aid the retrogressive landscape analysis included CORONA satellite imagery and the 1923 cadastral map of the village revised in 1990 (**Figure 7.22**). The CORONA satellite image of Politiko shows that the village was slightly smaller and that the bridge over the river had not yet been built. However, the image also shows that the outlaying field system is similar to today's system and reveals relatively little change from the 1960s, indicating that by the 1960s the fields had already been converted into the irregular rectilinear field system visible today.

Other sources such as the descriptions of antiquarian travellers, hagiographic sources and archaeological reports were also consulted during this analysis. Of particular note is a drawing by the monk Bars'kyj created during his 1753 visit, which shows a road leading up to the monastery of Ayios Iraklidhios coming from the west (**Figure 7.23**). In **figure 7.24** the line of this road, which had to have been created before the drawing in 1753, is indicated in red. In the modern Google Earth image it is obvious that this is no longer the main approach. Instead a road leading to the monastery from the north, indicated by a blue line, is the principal approach. This road is absent in Bars'kyj's drawing signifying that it was probably constructed after 1753. The 18th century drawing also depicts an olive grove and two field boundaries north of the monastery. Comparison with the modern Google Earth imagery suggests that they have not altered significantly over the last 260 years.

Using retrogressive landscape analysis it is possible to determine that the current landscape originated in an early period, with significant recent alterations. These include the straightening of field boundaries and the amalgamation or truncation of strip fields as modern cash crops were introduced, which no longer required long strip fields for ease of ploughing. From the retrogressive landscape analysis it is also possible to state that the roads in the area generally follow long established pathways through the landscape (the most efficient and less arduous routes) while respecting the field systems until very recently when modern roads began to cut across them.

The data collected by the SCSP project also allows the incorporation of valuable artefact and ceramic statistics into the analysis of the area (**Figure 7.25**). For example the SCSP ceramic collection results from the plain north of Politiko village reveal a long history of activity in the area. This ceramic material, when classified by period, largely consisted of Geometric to Classical ceramics spread evenly across the plain. Ceramics from the Hellenistic and Roman periods are sparser and less evenly spread, and the Medieval to Modern material is greater in density but more irregular in distribution (Given and Knapp 2003: 198–199, 271–273). This suggests that the Geometric and Classical spread is the result of manuring. Gradual distribution over time due to ploughing is an unlikely explanation for the even spread of material as field boundaries would have restricted the dispersal. A manuring process is more likely, because the large contemporary metropolis of Tamassos would have produced a large quantity of rubbish for disposal. The later material is less likely to have resulted from manuring as during Tamassos's decline, more time effective and less costly methods of manuring like animal grazing, as seen across the Mediterranean today, were likely used. Further details on the area of this focus study can be found in the SCSP report (*ibid*).

7.5.2 Mitsero

This focus study is located in the west of the Troodos case-study area. This area is characterised by the distinctive remains mining has left on the landscape. The village is a POI for the SCSP and detailed discussion of this can be found in the project's report (ibid. 109-118). The emphasis of this focus study is the mining aspect of the landscape character. Before mining operations began in the 1930s, the village and its surroundings were typically based upon an agricultural economy (ibid.113), but evidence for prior exploitation of the landscape's minerals is apparent through ancient slag heaps (ibid. 96-103). Copper was a product mined in the larger Troodos area for centuries (Constantinou 1992; Holmboe 1914). The SCSP carried out a survey of the area to the north of Mitsero. Most of this area is situated on well watered arable land presently cultivated with cereals and fruit trees (Knapp et al. n.d.). The first clear evidence of human occupation indicated by the SCSP dates to the Archaic period (Given and Knapp 2003: 110) with significant late Roman period activity (ibid. 102). **Figure 7.26** illustrates the SCSP ceramic collection by date north of the village. This reveals a mix of datable ceramics but a strong percentage of late Roman through to the Modern day. When the Hellenic Mining Company re-instigated mining in the 1930s many of the villagers gave up full time agricultural activity to work for the company. Mining activity continued in the area until the 1980s when the Hellenic Mining Company ceased to exploit the site (Knapp et al. n.d.). The mines now lie unused and decaying (**Figure 7.27**). The open cast mining led to permanent changes in the landscape, with large spoil heaps and scarred land. The only mining that still takes place in the area is the extraction of sand north-west of the village (**Figure 7.28**). Retrogressive landscape analysis of the areas surrounding the village reveals only a little about the chronological development of the fields surrounding the village. These fields were generally small terraced fields with boundaries of scrub. Recent activity can also be seen in the creation of modern step and contour terraces north of the village.

7.5.3 Loura Olastras

This focus study is located south-east of the village of Klirou in the flat agricultural plain. The nearby village of Klirou has been investigated by the SCSP. The fields of this focus-study area (**Figure 7.29**) have been investigated using retrogressive landscape analysis (**Figure 7.30**). This retrogressive landscape analysis has revealed a complex landscape. The boundaries in the analysis have been shaded to indicate the order of the construction of the field boundaries. The retrogressive landscape analysis differs from the cadastral plan seen in **figure 7.29** as it reveals that although the landscape is divided into very small plots in some cases these are cultivated as large plots. There are also plots that have not been cultivated from some time. The retrogressive landscape analysis clearly shows modern roads cutting through the box fields, which appear to follow a fairly regular alignment. Their appears to be two distinctive alignments that the box fields are created from. In the lower right area of **figure 7.30** a distinctive repetitive alignment runs through the fields with a slight curve running roughly north-east to the south-west. These alignments can also be seen in an area of smaller field divisions in the cadastral plan. The second distinctive alignment is that of very straight boundaries running roughly parallel to the modern road in a north-south direction. These appear of a more modern date due to the very straight nature of the boundaries. However, it is likely that there were some boundaries running in this direction prior to the straightening. The retrogressive landscape analysis also highlights the changing nature of the water drainage streams. In this area there is no direct correlation to suggest that earlier strip fields have been amalgamated and divided to create these fields. This is not considered likely in this area as the alignment of the fields does not spread out from the settlement as is often found with strip fields. Despite small thin strip fields existing within the larger field system, they are not in alignment with each other. This does not preclude the possibility that the flat plain was cultivated in strips during its past, just that the landscape features in this area cannot clearly distinguish this activity from the modern remains. The fields therefore can only be dated to the Ottoman period as no further dating evidence can be incorporated into the retrogressive landscape analysis. This Ottoman date for the box shaped field systems found in this focus-study area would link well the historical evidence of local cultivation of fruit trees and possibly mulberry trees. The SCSP ceramic results for the area indicates significantly more time-depth that is not evident in the landscape features with a significant proportion of the ceramics recorded being of pre Byzantine date (**Figure 7.31**).

7.5.4 Adelphi Forest

This focus study is located on the edge of the Adelphi Forest south of Mitsero.

The pine dominated woodland is located in a raised area adjacent to the Mesaoria Plain. As the cadastral plan of the area made in 1924 and revised in 1990 reveals, there is very little evidence of human impact upon this area apart from occasional roads and tracks (**Figure 7.32**). The Google Earth imagery of the area reveals recent villas have been built in the woodland which were not visible on the 1960s CORONA satellite imagery of the focus-study area (**Figure 7.33**). This woodland is under the authority of the Cypriot Forestry Commission. However, sheep and goats can occasionally be found grazing in this area. No evidence of prior archaeological activity has been recorded in the area by the SCSP but investigation of other areas of the Adelphi forest have discovered a number of ancient archaeological sites, previously not thought to exist (Burnet 2004). It is therefore possible that the forest hides further historic evidence.

7.5.5 *Mathiatis*

This focus study is located west of the Maroulenas River in the south of the focus-study area. The dominant features within the landscape of this area are the remains of contour terraces. This area is now covered in modern scrub and not used for agricultural purposes as can be seen in the Google Earth image of the area (**Figure 7.34**). The CORONA imagery also shows that this area was not cultivated in the 1960s. The cadastral maps however do show land ownership of individual parcels and they also indicate occasional terrace lines (**Figure 7.35**). However the cadastral map does not indicate all of the lines visible in **figure 7.34**. This is likely to be the result of the terraces being worn away and unused in the Modern periods and only showing as earthworks from aerial imagery. There is little known about activity in these areas but at some point in the past these areas were cultivated perhaps for vines. There is no way to date these terrace remains but it can be suggested with some confidence from the retrogressive landscape analysis and their considerable degradation that they can date to no later than the Ottoman period and it is possible that they are of much greater antiquity. The SCSP ceramic results for the area indicate little activity and the identifiable ceramics date to the Ottoman period (**Figure 7.36**).

7.6 Historic Landscape Character Types

7.6.1 Overview

The following section will describe the HLC types for the Troodos case-study area. As described in Chapter 5 the HLC types presented are split into seven broad categories; ‘Field’, ‘Terrace’, ‘Rough Ground’, ‘Woodland’, ‘Settlement’, ‘Industry’ and ‘Water’. **Table 7.3** lists all the HLC types within each of these broad categories, further divided by the historic period that the HLC type is thought to portray. **Table 7.2** presents the date ranges represented by the historic periods the HLC types have been divided into. There is no identifiable HLC type dating to a period prior to the Hellenistic era.

PERIOD NAME		DATE RANGE
Modern		A.D. 1900 - Present Day
Ottoman		A.D. 1570 - 1900
Medieval	Venetian	A.D.1453 - 1570
	Frankish	A.D. 1185 - 1453
Byzantine	Mid-late Byzantine	A.D. 965 - 1453
	Joint dominion	A.D. 688 – 965
	Early Byzantine	A.D. 333 - 688
Roman		A.D. 58 - 333
Hellenistic		325 B.C. - A.D. 58

Table 7.2: Date divisions for the HLC types.

As in the Pisidia case study, each HLC description will provide a detailed account of the nature of the HLC type, including information on the Pattern, Field/Terrace Type, Boundary Type, Dominant Boundary Character, Secondary Boundary Character, slope, main feature attributes and other feature attributes that are required to be present for an area to be classified as a particular character type, alongside images representing the HLC type and its features. In addition to the current HLC type, previous HLC types are recorded where they can be discerned. The decision making process for each polygon is not recorded in this thesis but each polygon is assessed using the available sources and retrogressive landscape analysis to determine which HLC type it best fits.

	MODERN	OTTOMAN	MEDIEVAL	BYZANTINE	HELLENISTIC
FIELD	- Strip Field (a) - Irregular Field - Sinuous Clearance Fields - Open Fields - Irregular Valley Fields	- Box Fields - Strip Fields (b) - Contour Terrace Field	- Strip Field (c)		
TERRACE	- Step Terrace - Contour Terrace (a)	- Abandoned Contour Terraces - Contour Terrace (b)			
ROUGH GROUND	- Riverside Scrub - Waste - Scrubland Terrace - Scrubland - Quarried Scrubland				
WOODLAND	- Natural Woodland - Sparse Woodland	- Grove - Natural Woodland (b)			
SETTLEMENT	- Military Base - Linear Settlement - Nucleated Settlement (a) - Cluster Settlement - Dispersed Settlement (a)	- Nucleated Settlement (b) - Monastery (a)	- Nucleated Settlement (c) - Monastery (b)	- Nucleated Settlement (d) - Monastery (c)	- City
INDUSTRY	- Open Cast Mine - Abandoned Mine - Mined land - Industry				
WATER	- Dam				

Table 7.3: Troodos HLC types.

7.6.2 Field Systems

The most common HLC categories of the Troodos study area are distinguished by the dominating presence of features associated with agriculture. There are a variety of distinctive field systems in the Troodos case-study area that can be independently characterised. By utilising the techniques of retrogressive landscape analysis to study the various sources of information about the landscape the distinct field systems have been connected to specific historic periods. The historic periods recognised within the broad HLC classification of 'Field Systems' are Modern, Ottoman and Medieval. Each HLC type is distinguished by a name that represents the most common characteristic of the overall field system, such as strip fields or open unbounded fields. The boundaries of the field systems are varied, but in general they are marked by raised scrub similar to that seen in Pisidia rather than walls or fences. These raised boundaries appear fragile, but it is clear from retrogressive landscape analysis and crop mark interpretation that in many parts of the study area these boundaries are of significant age.

Modern

The HLC types that are assigned to this historic period represent areas within the landscape where the prevailing characteristic is derived from 20th century agriculture. These HLC types are distinguished by regular shaped fields with very straight boundaries, indicating that the boundaries were probably defined by modern survey methods. The boundary construction of these modern field systems tends to be straight wire fences, simple raised grassy banks, or vegetation boundaries made up of sunflowers or small scrub bushes. Despite the overriding modern characteristics some of the boundaries can have origins in earlier periods and previous field systems may be detectable beneath the modern framework. This may allow prior HLC types to be determined beneath the modern HLC category.

- ***Strip Field (a)***

This HLC type defines long narrow fields that lie adjacent to each other in blocks of various sizes with extremely straight boundaries. These field systems are found in the lower lying flat areas of the Mesaoria Plain. These fields are often found close to a water source and in areas not too distant from occupied settlements. These fields are most likely to be modern re-interpretations of earlier Ottoman or Medieval strip fields, as seen in the Pisidia HLC. This HLC type can also be seen in the Pisidia case-study area and it has also been identified in Thrace (Crow and Turner n.d.), both of which strengthen this HLC type's identification as Modern in character with a prior strip field background. This HLC type is still extremely rare in the Troodos study area. **Figure 7.37** portrays modern strip fields with their very straight boundaries.

Pattern :	Regular
Field Type:	Strip Field
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat
Main feature attributes:	- Strip Field - Raised Scrub Boundary - Rough Roadway
Other feature attributes:	Irrigation Channel.

Table 7.4: Modern – 'Strip Field' attributes.

- ***Irregular Field***

This sub-classification refers to areas of fields whose dominant features are their large size, and irregular shape. These fields are found in lowland areas and near settlements and are often used for intensive cultivation of crops such as corn. These fields are often created through the amalgamation of smaller fields of earlier origin, but through the reinterpretation of the boundaries and ploughing they have lost their earlier characteristics. **Figure 7.38** shows large irregular fields found close to the settlement of Agrokipia. These fields are irregular in shape but the boundaries tend to be straight where possible. These characteristics as associated with modern cultivation and the reclamation of land for modern mechanised agriculture often on outlying areas further from settlements. Areas of this HLC type may have earlier origins evinced by the retrogressive landscape analysis of the boundaries, but the overriding characteristics are modern. Areas where earlier origins are identifiable have prior HLC types recorded. Areas which have more hedge like boundaries and remaining trees are more likely to have identifiable prior HLC types.

Pattern :	Irregular
Field Type :	Irregular Field
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat, Undulating, Shallow.
Main feature attributes:	- Irregular Field - Raised Scrub Boundary - Rough Roadway
Other feature attributes:	Roadway, Hedges, Trees.

Table 7.5: Modern – 'Irregular Field' attributes.

- ***Sinuous Clearance Fields***

This HLC type differs from the above classifications by the sinuous boundaries of these irregularly-shaped fields. This HLC type is mainly found in upland locations on hillsides in remote areas. This 'Sinuous Clearance Field' HLC type has often been created through the reclamation of unused scrub. **Figures 7.39** and **7.40** are classic examples of this HLC type. The boundaries making up these fields are often small scrub covered mounds or there is no physical boundary at all; the cultivated area simply ends and becomes scrubland. These fields do not appear to have any evidence of earlier cultivation in their current form, but it is possible that earlier field or terrace systems did exist in the area. **Figure 7.39** shows the faint traces of an earlier field system which must have undergone an extensive period of abandonment prior to the sinuous clearance field. This HLC type is also found in the Pisidia case study.

Pattern :	Irregular
Field Type :	Sinuous Field
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Sinuous
Boundary Character Secondary:	Curved
Slope:	Undulating, Shallow, Medium.
Main feature attributes:	- Sinuous Field - Raised Scrub Boundary - Rough Roadway
Other feature attributes:	Strip Fields Remains, Abandoned Contour Terrace, Farmstead.

Table 7.6: Modern – 'Sinuous Clearance Field' attributes.

- ***Open Fields***

This HLC type is characterised by large open spaces used for cultivation of crops (**Figure 7.41**). The fields of this HLC type have no uniform shape. The boundaries of any prior field systems have been destroyed by modern farming practices. These fields may have been the result of the governmental attempt to amalgamate fields in the late 20th century. This HLC type is mainly close to settlements. The boundaries making up these fields are often modern fences. This HLC type is similar to the 'Open Field' HLC type found in Pisidia, but it has noticeable differences in its location and history.

Pattern :	Irregular
Field Type :	Open Field
Boundary Type:	Fence
Boundary Character Dominant:	Sinuous
Boundary Character Secondary:	Curved
Slope:	Undulating, Shallow, Flat.
Main feature attributes:	- Open Field - Fence - Rough Roadway
Other feature attributes:	Road.

Table 7.7: Modern – 'Open Field' attributes.

- ***Irregular Valley Fields***

This HLC type is found in the small valley areas to the north-east of the Troodos study area. This HLC type is distinguished by irregular shaped fields, but unlike the extremely sinuous boundaries of the modern clearance fields they do try to adhere to a form of organisation dividing the valleys into step like fields (**Figure 7.42**). These fields have significant boundaries made up of hedgerows or small banks and cleared stones creating low terraces. These fields are not visible in the CORONA satellite imagery so must have been created during the intensification of agriculture and the growth in population in the area over the last 50 years.

Pattern :	Irregular
Field Type :	Irregular Valley Field
Boundary Type:	Terrace
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Shallow, Medium.
Main feature attributes:	- Irregular Valley Field - Terrace Boundary - Rough Roadway
Other feature attributes:	Raised Scrub Boundary, Hedge, Farmstead.

Table 7.8: Modern – 'Irregular Valley Field' attributes.

Ottoman

The following HLC types which are categorised as belonging to the Ottoman period are defined by dominant characteristics that result from post-Medieval agriculture and have not subsequently been altered enough for the HLC type to be classified as Modern. These fields are characteristically less regular in shape and have more sinuous boundaries than the field systems that have been re-shaped in the 20th century. However, some of the boundaries within these systems may have their origins in the Medieval period or earlier. Where this is recognised a prior HLC type will also be recorded for the area.

- ***Box Fields***

This HLC type defines areas of square or slightly rectangular box like fields that lie adjacent to each other in blocks of various sizes (**Figure 7.43).** The fields have straight boundaries and are most likely created in the Ottoman period. These field systems are often found in lowland flat areas close to a water source, where irrigation can be easily constructed and in areas not too distant from occupied settlements (**Figure 7.44**). Today the fields are mainly used for the cultivation of grain or olives with occasional fruit trees and fruits such as strawberries and melons. The boundaries of these fields are mainly constructed from raised scrub, with the occasional small hedge or line of trees. These trees are often olive or fruit trees and probably are the remains from the field's previous life as an orchard or olive grove. It is also possible as seen in the retrogressive landscape analysis and crop mark analysis of the Loura Olastras focus study that these box like fields have experienced alteration over time. However, it cannot be determined that these fields are re-interpretations of Medieval fields such as strip fields which were adapted to create box fields suitable for small family plots or groves for Ottoman farming styles. In **figure 7.30** retrogressive landscape analysis shows how the rectangular fields can be seen in the centre of the cadastral map image and the related strip field shapes can be seen highlighted by the dashed grey lines. When this is recognised a prior HLC type is allocated. These field systems are often found in lower lying, flatter areas close to a water source, where irrigation can be easily constructed and adjacent to occupied settlements. These fields are similar to the coaxial field system seen in the HLC study of Thrace (Crow and Turner 2009) (**Figure 7.45**). These fields have similar boundaries and are likely to have similar histories however the coaxial alignment of these fields marks them as a slightly different character than these Troodos box fields which have more 90 degree angles. The Pisidian HLC has no comparative HLC type to 'Box Fields'.

Pattern :	Regular
Field Type :	Box
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat
Main feature attributes:	- Box Field - Raised Scrub Boundary - Rough Roadway - Farmsteads - Trees - Grove
Other feature attributes:	Irrigation Channel, Hedge, Roadway, Scrub.

Table 7.9: Ottoman – 'Box Field' attributes.

- ***Strip Fields (b)***

This HLC type refers to fields that preserve the shape of strip fields used in the Ottoman period and have not been re-shaped in the 20th century. This HLC type unlike Modern 'Strip Field' HLC type have more irregular boundaries made up from low scrub with the typical curve characteristic of early strip fields and often follow the gentle contours of the ground. This HLC type may have lost some boundaries, but not to the same extent as the Modern 'Strip Field' HLC type. Through retrogressive landscape analysis these fields have been classified as Ottoman rather than Medieval as an earlier origin cannot be fully determined but Medieval or earlier origins are possible. These fields are found in lowland areas close to a water source and are often used for the less intensive cultivation of select crops. This HLC type is rare in the Troodos case-study area.

Pattern :	Regular
Field Type :	Strip Field
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat, Shallow, Undulating.
Main feature attributes:	- Strip Field - Raised Scrub Boundary - Rough Roadway
Other feature attributes:	Irrigation Channel, Grove, Roadway.

Table 7.10: Ottoman – 'Strip Field' attributes.

- ***Contour Terrace Field***

This HLC classification is distinguished by parallel terraces that follow the contours of the landscape. This HLC type is similar to Ottoman 'Contour Terrace' but the terraces are much wider and the terrace often shallower in order to encompass whole fields. This HLC type is found close to modern buildings on shallow sloping or undulating land.

Pattern :	Regular
Field Type :	Contour Terrace Field
Boundary Type:	Cut Terrace
Boundary Character Dominant:	Curved
Boundary Character Secondary:	Straight
Slope:	Shallow, Undulating.
Main feature attributes:	- Contour Terrace Field - Cut Terrace - Rough Roadway
Other feature attributes:	Farmstead, Road.

Table 7.11: Ottoman – 'Contour Terrace Field' attributes.

Medieval

- ***Strip Field (c)***

This HLC type refers to fields that preserve the shape of strip fields used in the Medieval period. Like the Ottoman 'Strip Field' HLC type these areas have more irregular boundaries made up from low scrub with the typical curve characteristic of early strip fields and often follow the gentle contours of the ground. This HLC type is fairly rare and always found as a prior HLC type. These fields are found in lowland areas close to a water source and settlements.

Pattern :	Regular
Field Type :	Strip Field
Boundary Type:	Raised Scrub
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat, Shallow, Undulating.
Main feature attributes:	- Strip Field - Raised Scrub Boundary - Rough Roadway
Other feature attributes:	Irrigation Channel.

Table 7.12: Medieval - Strip Field attributes.

7.6.3 Terraces

The following HLC categories in the Troodos case-study area are defined by landscape terracing being the dominant historic characteristic of an area. Terraces are created to make it possible to cultivate hillsides and steep mountain sides. As discussed in the Pisidia HLC, scholars have identified several principal terrace types (Grove and Rackham 2003: 108; Rackham and Moody 1996: 140-5). Dating terraces is extremely difficult, but through retrogressive landscape analysis, typological analysis, investigation of survey data and comparison to other Mediterranean terrace studies, the terraces in the Troodos case-study area have been tentatively dated to certain historic periods dependent on the distinguishing features of the terrace system. Unlike the terraces seen in the Pisidia case-study area, terraces in the Troodos case-study area are rarely built with stone supporting walls and are rarer. Despite the SCSP classifying much of the study area as having agricultural terracing, evidence for this does not dominate the HLC character of the area, resulting in less of the case-study area being categorised into a terrace related HLC type. Where terracing is identified as a dominant character it is usually in the more mountainous areas to the south-west.

Modern

As discussed in the Pisidia case study some archaeological investigation has suggested most terraces and boundaries in the Mediterranean have only recent origins (French and Whitelaw 1999; Lee 2001), but investigation of the Pisidian landscape has suggested otherwise. However, in the Troodos case-study area, where terracing is more normally identified as cut ground without supporting walls, terraces are often identified as Modern in character. These terraces are either very regular in form or have a large cut that indicates the use of heavy machinery to create the terrace.

- ***Step Terrace***

This HLC classification refers to large roughly parallel terraces created by bulldozing in the 20th century. These terraces cut across the landscape without reference to the topographic contours, to create broad flat areas for cultivation in fields or olive groves. The height of the steps between the terraces can be over two metres and these modern terraces do not have supportive walls. Instead they are often left so that they will eventually erode into a slope. This intensive and destructive process destroys all traces of earlier landscape character and can even destroy entire archaeological sites. **Figure 7.46** illustrates this form of terracing.

Pattern :	Regular
Terrace Type :	Step Terrace
Boundary Type:	Cut Terrace, Stone Terrace (Mainly cut)
Boundary Character Dominant:	Straight
Boundary Character Secondary:	None
Slope:	Medium
Main Attributes:	- Step Terrace
Other Attributes:	Rough Roadway, Road, Greenhouse, Farmstead, Scrub.

Table 7.13: Modern – Step Terrace attributes.

- ***Contour Terrace (a)***

This HLC classification is distinguished by parallel terraces that follow the contours of the landscape. These terraces can use traditional methods with modern materials such as concrete blocks, to create shallow stepped terraces, or they can simply be cut steeply into the landscape like the step terraces. These can be found close to modern buildings on steep hillsides or on flatter land which has been reclaimed recently from forestation. The destructive nature of these terraces is highlighted in pre and post terrace creation (**Figures 7.47, 7.48**).

Pattern :	Irregular
Terrace Type :	Contour Terrace
Boundary Type:	Cut Terrace
Boundary Character Dominant:	Contour
Boundary Character Secondary:	None
Slope:	Medium
Main Attributes:	- Contour Terrace
Other Attributes:	Rough Trackway, Rough Roadway, Road, Greenhouse, Farmstead, Scrub, Maintained Terrace, Regular Clearance Field.

Table 7.14: Modern – 'Contour Terrace' attributes.

Ottoman

The following HLC types have been dated to the Ottoman period. There is no exact dating available for terraces. These HLC types have been identified as Ottoman in date by their stratigraphic relationship to Modern features or by documentary sources dating them to earlier than the modern period. However, it is possible that the terraces that dominate the character of these areas were established in an earlier period.

- ***Abandoned Contour Terraces***

This particular HLC type is characterised by the dominant feature of cut ground contour terraces (**Figure 7.49**). This HLC type is found in areas of raised hilly ground. The Mathiatis focus study is found within an area of this HLC type. These terraces are irregular in size and shape and often resemble the braided terrace type seen in Naxos (Crow *et al.* 2011). This HLC type is very different to the 'Abandoned Contour Terrace' HLC type of the Pisidia case study. Originally fairly well-built the terraces of this HLC type have now begun to degrade due to lack of maintenance and their construction style, but not as degraded as those seen in the 'Scrubland Terrace' HLC type. Grazing of sheep and goats in these areas may have added to the natural degradation of the terraces. These areas have been classified as Ottoman as it was probably during this period that they were abandoned and fell into their current unmaintained state. Areas that have evidence for earlier origins possibly relating to monasteries or settlements have prior HLC types recorded.

Pattern :	Irregular
Terrace Type :	Abandoned Contour Terrace
Boundary Type:	Cut Terrace
Boundary Character Dominant:	Contour
Boundary Character Secondary:	None
Slope:	Shallow, Medium
Main Attributes:	- Abandoned Contour Terrace - Rough Trackway - Rough Roadway -Trees
Other Attributes:	Stream, Hedge, Step Terrace, Road, Grove, Abandoned Building, Farmstead, Irregular Field, Scrub.

Table 7.15: Ottoman – 'Abandoned Contour Terrace' attributes.

- ***Contour Terrace (b)***

This HLC classification describes parallel terraces that follow the contours of the landscape. These terraces are mainly created from cut ground and occasionally use dry stone walls to support the terrace. This HLC type is dated to the Ottoman period through retrogressive landscape analysis. This HLC type has often been abandoned for long periods of time.

Pattern :	Irregular
Terrace Type :	Contour Terrace
Boundary Type:	Cut Terrace, Stone Terrace (Mainly cut)
Boundary Character Dominant:	Contour
Boundary Character Secondary:	None
Slope:	Medium
Main Attributes:	- Contour Terrace
Other Attributes:	Rough Trackway, Rough Roadway, Road, Greenhouse, Farmstead, Scrub, Sinuous Clearance Field.

Table 7.16: Ottoman – 'Contour Terrace' attributes.

7.6.4 Rough Ground

The following HLC categories refer to areas of the landscape that are currently unused or unsuitable for agricultural purposes. In some areas previous field systems may be evident.

Modern

The following Rough Ground HLC types are identified as belonging to the Modern period because they have been recently created or abandoned. These areas are often open areas covered with sparse vegetation of scrub and grasses. Unlike trees, small scrub bushes and plants do not have a longevity that can be vaguely determined by their size and structure. Areas of rough ground within the landscape are also categorised as Modern if their actual origin cannot be determined, making the current HLC classification the only identifiable HLC type.

- ***Riverside Scrub***

This HLC classification is defined by grassy areas of land preserved along the course the small rivers and streams (**Figure 7.50**). In common with other parts of Europe, much of this land is losing its traditional use for grazing animals and is either being sown with arable crops, or is becoming overgrown with scrubby vegetation and woodland as in this HLC type (Crow and Turner n.d.).

Pattern :	Irregular
Field/Terrace Type :	N/A
Boundary Type:	N/A
Boundary Character Dominant:	N/A
Boundary Character Secondary:	N/A
Slope:	Medium, Shallow, Undulating.
Main Attributes:	- Riverside Scrub - River - Scrub - Trees
Other Attributes:	Rough Trackway, Rough Roadway, Road.

Table 7.17: Modern – 'Riverside Scrub' attributes.

- ***Waste***

This categorisation classifies patches of waste land, unused in the modern day and without evidence of prior use. This can be the waste areas adjacent to major roads, river banks and industrial developments such as quarries and gravel collection areas.

Pattern :	Irregular
Field/Terrace Type :	N/A
Boundary Type:	N/A
Boundary Character Dominant:	N/A
Boundary Character Secondary:	N/A
Slope:	Flat, Shallow.
Main Attributes:	- Waste Land
Other Attributes:	Road

Table 7.18: Modern – 'Waste' attributes.

- ***Scrubland Terrace***

HLC classification refers to patches of low land areas of rough ground often found in currently remote areas distant from larger settlements. These are characteristically grassy areas with low scrub and small bushes that can be used as pasture for the grazing of livestock such as goats and sheep. Underlying these open areas there is archaeological evidence for earlier abandoned and much degraded terraces and field systems (**Figure 7.51**). These survive as earth works and occasionally walls and are found through investigation of the survey results, retrogressive landscape analysis and aerial photographs. This reveals that these areas would have been used for agricultural purposes at least from the Ottoman period and probably much earlier, but with the decline of traditional management these areas have become increasingly overgrown. This HLC type differs from 'Abandoned Contour Terrace' because the degradation of the features has made them less prominent. Where prior HLC types can be securely identified they are recorded with each polygon.

Pattern :	Irregular
Terrace Type :	Contour Terrace
Boundary Type:	Cut Terrace
Boundary Character Dominant:	Contour
Boundary Character Secondary:	None
Slope:	Medium, Shallow, Undulating.
Main Attributes:	- Scrubland - Contour Terrace
Other Attributes:	Rough Trackway, Rough Roadway, Road, Farmstead, Sinuous Clearance Field.

Table 7.19: Modern – 'Scrubland Terrace' attributes.

- ***Scrubland***

This HLC type refers to areas that characteristically consist of grassy and rocky ground with small scrub bushes and occasional trees (**Figure 7.52**). These areas are usually distant from settlements. This HLC type is either not utilised by the local population or it is used only for the grazing of animals.

Pattern :	Irregular
Field/Terrace Type :	N/A
Boundary Type:	N/A
Boundary Character Dominant:	N/A
Boundary Character Secondary:	N/A
Slope:	Medium, Shallow, Undulating.
Main Attributes:	- Scrubland
Other Attributes:	Rough Trackway, Rough Roadway, Road, Farmstead, Scrub, Sinuous Clearance Field, Regular Clearance Field.

Table 7.20: Modern – 'Scrubland' attributes.

- ***Quarried Scrubland***

This HLC type is characterised by the abandoned results of mining activities which are visible in piles of spoil and mine cuts in the ground that has grown over with scrub (**Figure 7.53**). This HLC type is common around the village of Mitsero.

Pattern :	Irregular
Field/Terrace Type :	N/A
Boundary Type:	N/A
Boundary Character Dominant:	N/A
Boundary Character Secondary:	N/A
Slope:	Medium, Shallow, Undulating.
Main Attributes:	- Quarried Scrubland - Spoil Heaps - Ground Cuts
Other Attributes:	Rough Trackway, Rough Roadway, Road.

Table 7.21: Modern – 'Quarried Scrubland' attributes.

7.6.5 Woodland

'Woodland' is a small HLC category in the Troodos study area. In some areas it is possible to determine historic landscape features below the tree coverage such as terracing. Due to the nature of wood coverage it is hard to characterise these areas into more detailed HLC types than those described below. Plantation in the area is known to have taken place however it is not in the straight regular rows but often on cut terraces as shown in a Cypriot Ministry of Agriculture photograph of terraces for tree plantation (**Figure 7.54**).

Modern

The following HLC types have been identified as Modern in date because the trees are not old and do not grow as densely suggesting they originated in the Modern period or because there are identifiable sources indicating the date of the plantation of the woodland. However, it is possible that the character of these areas were also wooded at an earlier period.

- ***Natural Woodland***

This HLC classification is distinguished by natural woodland mainly consisting of a variety of pine and oak trees and is less dense than the ‘Natural Forest’ HLC type of the Pisidian HLC. This HLC type is found in upland areas not the plain, and is occasionally penetrated by certain roads, tracks and farmsteads or Modern villas can be found within it. This HLC type is illustrated in the Adelphi Forest focus study.

Pattern :	Continuous
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, Shallow, Undulating.
Main Attributes:	- Woodland - Rough Trackway
Other Attributes:	Road, Rough Roadway, Sinuous Clearance Field.

Table 7.22: Modern – ‘Natural Woodland’ attributes.

- ***Sparse Woodland***

This HLC classification refers to areas of woodland where the tree coverage is much sparser than that seen in the ‘Natural Woodland’ HLC type. This is often found in lower areas. The trees in this HLC type are often smaller hardier trees such as prickly oak. Sheep and goats can be found grazing in these areas (**Figure 7.55**).

Pattern :	Continuous
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, Shallow, undulating.
Main Attributes:	- Sparse Woodland - Rough Trackway
Other Attributes:	Road, Rough Roadway, Sinuous Clearance Field.

Table 7.23: Modern – ‘Sparse Woodland’ attributes.

Ottoman

The following HLC types have been dated to the Ottoman period because the features that distinguish them are well established and can with some certainly be said to predate the Modern period. This makes the Ottoman period the latest period within which they could have originated, although there is a possibility that certain areas of the following HLC types could date back further than this. Documentary sources are often the main contributory information for these areas.

- ***Grove***

This HLC classification is distinguished by orchards or groves of trees which are usually olive trees. These are laid out on flat land in regular rows and well irrigated. The Bars'kyj image of St Iraklidhios monastery drawn in the 18th century and seen in the focus study of Politiko is an example of an Ottoman grove (**Figure 7.23**). These HLC types may date back earlier than available evidence can identify.

Pattern :	Regular
Field/Terrace Type :	Box
Boundary Type:	Raised scrub, Walled.
Boundary Character Dominant:	Straight
Boundary Character Secondary:	Curved
Slope:	Flat, Shallow.
Main Attributes:	- Grove - Rough Trackway
Other Attributes:	Road, Rough Roadway.

Table 7.24: Ottoman – 'Grove' attributes.

- ***Natural Woodland (b)***

This HLC classification is distinguished by natural woodland mainly consisting of a variety of pine and oak trees that can be dated with some certainty to the Ottoman period using the sources available to this thesis. This HLC type is found in upland areas not the plain, and is occasionally penetrated by certain roads and tracks.

Pattern :	Continuous
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, Shallow, Undulating.
Main Attributes:	- Natural Woodland - Rough Trackway
Other Attributes:	Road, Rough Roadway, Sinuous Clearance Field.

Table 7.25: Ottoman – 'Natural Woodland' attributes.

7.6.6 Settlement

The settlement pattern of Cyprus comprises cities, towns, villages, farmsteads and villas, both occupied and abandoned. In the Troodos case-study area the main settlement HLC type is nucleated settlement. There is evidence of other types of settlement in the area such as abandoned historic cities and small farmsteads and temporary settlements, however, in many cases these are not distinctive enough in the landscape to be identified as a settlement HLC type and are often amalgamated into field HLC types. All the occupied settlements have seen some growth in the 20th century with new buildings added to the earlier village cores which appear little changed from the 1960s CORONA imagery.

Modern

The following HLC categories describe currently occupied settlements whose character is determined by structures that have been created in the Modern period. However, it must be remembered that these settlements could have earlier origins that are just not evident in the current character of the settlement.

- ***Military Base***

This HLC type is characterised by the Modern Military installation found west of the village of Klirou. This HLC type is made up of modern military buildings and large open tarmacked spaces (**Figure 7.56**).

Pattern :	Regular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat, Shallow.
Main feature attributes:	- Road - Regular Streets - Tarmacked open spaces - Buildings
Other feature attributes:	Heliport.

Table 7.26: Modern – 'Military Base' attributes.

- ***Linear Settlement (a)***

This HLC type is characterised by the way in which the settlement is aligned along a straight main street as seen in the Pisidia HLC. Both small and large gardens can be found along the back of the buildings. These settlements have a main tarmac road which connects them to the surrounding region.

Pattern :	Irregular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat, Shallow, Medium
Main feature attributes:	- Linear Settlement - Buildings - Regular Street - Road
Other feature attributes:	Small Gardens, Rough Roadway, Rough Trackway Greenhouse, Irrigation Channel.

Table 7.27: Modern – 'Large Nucleated Settlement' attributes.

- ***Nucleated Settlement (a)***

This HLC type is determined by the manner in which the buildings cluster together around a nucleated core, along irregularly placed streets divided by both small and large gardens. The latter are often more like small fields and are usually spread around the settlement while the former are spaced between the buildings. These nucleated settlements have expanded in the Modern period to cover more ground along the line of the main roads to the settlement. This may make them appear less nucleated, but the core of village life in these settlements still revolves around a settlement centre. These large settlements hold a population of over 1000 and have more than one church. The settlement of Politiko which is part of the Politiko focus study has been classified as this HLC type.

Pattern :	Irregular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat, Shallow, Medium
Main feature attributes:	- Cluster Settlement - Road - Buildings - Irregular Street - Field Gardens or Small Gardens - Rough Roadway - Rough Trackway
Other feature attributes:	Greenhouse, Irrigation Channel, Raised Ground, Walled Boundary.

Table 7.28: Modern – 'Nucleated Settlement' attributes.

- ***Cluster Settlement (a)***

This HLC type is determined by the manner in which the buildings cluster together in a small formation around a central nucleus as seen in the Pisidia HLC. The streets of these settlements are general irregularly located with any organised regular street planning occurring on the outskirts of the settlement. The population of these settlements tend to be under about 500 and they always have at least one church located in a central or prominent position.

Pattern :	Irregular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat, Shallow, Medium
Main feature attributes:	- Cluster Settlement - Road - Buildings - Irregular Street - Field Gardens or Small Gardens - Rough Roadway - Rough Trackway
Other feature attributes:	Greenhouse, Irrigation Channel, Raised Ground, Walled Boundary.

Table 7.29: Modern – 'Small Nucleated Settlement' attributes.

- ***Dispersed Settlement (a)***

This HLC type is characterised by the manner in which the buildings are spread out over a large area and do not cluster together in a small formation as seen in the Pisidia HLC. The buildings are located along irregularly placed spidery streets surrounded by fields. These settlements have a main tarmac road which connects them to the surrounding region and may have greenhouses, gardens and fields interspaced between the housing.

Pattern :	Irregular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow
Main feature attributes:	- Dispersed Settlement - Rough Roadway - Road - Rough Trackway - Buildings - Irregular Street - Field Gardens
Other feature attributes:	Greenhouse, Irrigation Channel, Contour Terrace.

Table 7.30: Modern – 'Dispersed Settlement attributes'.

Ottoman

The following HLC categories describe currently occupied settlements whose character is determined by structures that have been created in the Ottoman period. These HLC types are often prior HLC types with modern settlement HLC type above. The areas are often slightly smaller than the modern settlements. It is important to note that these settlements could have earlier origins that are not evident in the current character of the settlement.

- ***Monastery (a)***

This HLC type identifies Monastery complexes that can be identified as having buildings of mainly Ottoman in date. The St Iraklidhios Monastery discussed in the Politiko focus study is an example of this HLC type.

Pattern :	Regular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, High.
Main feature attributes:	- Road - Courtyard - Buildings - Church
Other feature attributes:	Grove

Table 7.31: Ottoman – 'Monetary' attributes.

- ***Nucleated Settlement (b)***

This category describes currently occupied settlements whose character derives from the period before the British control of Cyprus. This HLC type is determined by the manner in which the buildings cluster together around a small core along irregularly placed streets. These are very similar in formation to modern and earlier period nucleated settlements. The streets are broken up by small gardens and groves. These settlements are larger than cluster settlements and would have contained at least one mosque or church, the remains of which may or may not be recognisable. Like the other settlements in the region this Nucleated Settlement HLC type includes a main road which connects the settlement to the surrounding region. Politiko is an example of the 'Nucleated Settlement' HLC type. The prior HLC type the current HLC type of Politiko is Ottoman, due to the Ottoman remains in the village.

Pattern :	Irregular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat
Main feature attributes:	- Nucleated Settlement - Buildings - Small or Field Gardens - Irregular Street - Rough Trackway
Other feature attributes:	Raised Ground, Mosque.

Table 7.32: Ottoman – 'Nucleated Settlement' attributes.

Medieval

The following HLC categories describe settlements whose character is determined by structures that have been created in the Medieval period.

- ***Monastery (b)***

This HLC type identifies Monastery complexes that can be identified as having been in use during the Medieval period. The St Iraklidhios Monastery discussed in the Politiko focus study is an example of this HLC type. This HLC type is only designated as a prior HLC type.

Pattern :	Regular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, High.
Main feature attributes:	- Road - Buildings - Courtyard - Church
Other feature attributes:	Grove

Table 7.33: Medieval – 'monastery' attributes.

- ***Nucleated Settlement (c)***

This category describes settlements whose origins can be established as dating to the Medieval period. This HLC type is determined by the manner in which the buildings cluster together around a small nucleus along irregular streets. These settlements are similar to earlier Byzantine settlements and always contain at least one church. Like the other settlements in the region these settlement have a main road which connects them to the surrounding region. The focus study of Politiko has a recorded Medieval history and evidence of Medieval activity in the form of the Agios Iraklidhios monastery. This allows Politiko to be also classified as Medieval 'Nucleated Settlement' as a prior HLC type.

Pattern :	Irregular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat
Main feature attributes:	- Nucleated Settlement - Buildings - Irregular Street - Small or Field Gardens - Rough Trackway
Other feature attributes:	Raised Ground, Church.

Table 7.34: Medieval – 'Nucleated Settlement' attributes.

Byzantine

The following HLC categories describe settlements whose character is determined by structures that have been created in the Byzantine period.

- ***Monastery (c)***

This HLC type identifies Monastery complexes that can be identified as having been occupied in the Byzantine period. The St Iraklidhios Monastery discussed in the Politiko focus study is an example of this HLC type. This HLC type is only designated as a prior HLC type.

Pattern :	Regular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Medium, High.
Main feature attributes:	- Road - Buildings - Courtyard - Church
Other feature attributes:	Grove

Table 7.35: Byzantine – 'Monastery' attributes.

- ***Nucleated Settlement (d)***

This category describes currently occupied settlements that can be identified as having been established during the Byzantine period. This HLC type is determined by the manner in which Byzantine buildings cluster together around a small core along irregularly placed streets. These settlements are larger than cluster settlements seen in the Pisidia HLC study area and they always contain at least one church. Like the other settlements in the region these settlements have a main road which connects them to the surrounding region. The focus study of Politiko has a Byzantine history recorded which allows the area to also be categorised as Byzantine 'Nucleated Settlement' as a prior HLC type.

Pattern :	Irregular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Flat
Main feature attributes:	- Nucleated Settlement - Church. - Buildings - Rough Trackway - Small or Field Gardens - Irregular Street
Other feature attributes:	Raised Ground.

Table 7.36: Byzantine – 'Nucleated Settlement' attributes.

Hellenistic

The following HLC categories describe settlements whose character is determined by structures that have been created in the Hellenistic period.

- ***City***

This category describes settlements that were established during the Hellenistic period. This HLC type is determined by the manner in which the buildings radiate away from a central core and are situated within a fortified wall. The streets in these settlements are regular and straight and there are specific areas of sacred space in the form of sanctuaries and *necropoleis*. This HLC type distinguishes itself as a city by the existence of public buildings such as sanctuaries and agora. Therefore the location of this HLC type relies heavily on archaeological material and historic records. The city of Tamassos which is detailed in the focus study of Politiko is the only example of the Hellenistic 'City' HLC type in the Troodos case-study area.

Pattern :	Irregular
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Undulating
Main feature attributes:	- Nucleated Settlement - Fortifications - Rough Trackway - Temple - Ancient Stone Building - Necropolis
Other feature attributes:	None

Table 7.37: Hellenistic – 'City' attributes.

7.6.7 Industry

The HLC types in this category are characterised by some form of industrial development. This can include the waste areas adjacent to industrial developments such as quarries and gravel collection areas. Areas of industry like ceramic production sites that are not large enough to be characterised alone have been included within other HLC types and the industry activity recorded in the feature attributes.

Modern

The following HLC types have been classified as Modern areas of industrial activity. These areas are considered Modern as there is no evidence of earlier activity. This is not because there has only ever been Modern industry carried out in the region, but because the areas of historic industry when known about are large enough or of significant distinction to override another HLC zone.

- ***Open Cast Mine***

This HLC type refers to Modern mines that can be found in the Troodos HLC study region. This HLC type is located in both lowland and upland areas and characterised by machine made cuts into the ground. They are often also associated with tarmac roads and areas for the collection or piling of quarried stone and gravel, Modern buildings and quarrying machinery. These HLC areas are mainly found in the area around Mitsero as illustrated in the Mitsero focus study.

Pattern :	Continuous
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow
Main feature attributes:	- Mine - Spoil Heaps - Rough Roadway
Other feature attributes:	Road.

Table 7.38: Modern – 'Open Cast Mine' attributes.

- ***Abandoned Mine***

This HLC type is characterised by mines that have been abandoned in recent years. These HLC types are located in lowland areas and are characterised by large deep machine made holes in the ground (**Figure 7.57**). These areas have now been abandoned and the Mine often fills with water. They are often also associated with tarmac roads and areas for the collection or pilling of quarried stone. These mines were dug between the early 1920s and the modern day.

Pattern :	Continuous
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow
Main feature attributes:	- Mine - Spoil Heaps - Rough Roadway
Other feature attributes:	Road.

Table 7.39: Modern – 'Abandoned Mine' attributes.

- ***Mined land***

This HLC type is very similar to the ‘Open Cast Mine’ HLC type with the exception that it does not have any large deep quarried areas. This land is made up shallow machine made cuts into the ground and heaps of spoil (**Figure 7.58**).

Pattern :	Continuous
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow
Main feature attributes:	- Mine - Spoil Heaps - Rough Roadway
Other feature attributes:	Road.

Table 7.40: Modern – ‘Mined Land’ attributes.

7.6.8 Water

This HLC broad category refers to bodies of water that can be found in the HLC area.

Modern

The following HLC type has been classified as Modern despite the body of water possibly having ran the same course at other periods of time.

- ***Dam***

This HLC type represents the Modern concrete dams and related reservoirs created in the Troodos case-study area for water control and irrigation purposes. **Figure 7.59** shows an example of a concrete dam and the reservoir of water that has built up behind it. **Figure 7.60** shows a series of Google Earth images of Maroulenas River in the Troodos case-study area. The series of images starts with a 2003 image of the river before a dam has been built, the next image is a 2005 image of the river just after construction has begun, the next image is from 2008 showing the completed dam and the body of water built up behind in. The final image is the most recent Google Earth image from 2010 showing an increase in water level since 2008.

Pattern :	n/a
Field/Terrace Type :	n/a
Boundary Type:	n/a
Boundary Character Dominant:	n/a
Boundary Character Secondary:	n/a
Slope:	Shallow
Main feature attributes:	- Dam - Riverside Gravel - Large body of water
Other feature attributes:	Bridge.

Table 7.41: Modern – 'Dam' attributes.

7.7 Historic Landscape Characterisation Results

The HLC of the Troodos case-study area classified the entire region into HLC types of the current landscape. In addition to HLC types of the current landscape the study also recorded HLC types of the landscape prior to the current HLC type where this could be determined with confidence. This allows time-depth to be added to the interpretation of the landscape. The results of the HLC are presented in the form of HLC maps (**Figures 7.61 – 7.72**) and as shapefiles which can be found on the associated CD (**Appendix 2.2**).

The broad HLC classification types are presented in **figure 7.61.** This reveals that the majority of the landscape in the case-study area is either 'Field' or 'Rough Ground'. The 'Field' HLC types are unsurprisingly located in the flatter areas and the 'Rough Ground' HLC types are located in the more rugged terrain. The areas of 'Industry' are limited to areas in the north with 'Woodland' HLC types limited to the south and the west. 'Settlement' HLC classifications are restricted to communication routes and valleys. These distinctions are not surprising and follow logical assumptions of how the landscape would be used in the current period. The greater complexity of the landscape's development begins to be seen when we introduce the full HLC classification results.

The current HLC of the Troodos case-study area (**Figure 6.62**) reveals several distinctive groupings of HLC types. These types are related closely to the geology and topography of the landscape. In the north-west of the study area the HLC types are related to mining, with a significant amount of land covered by the 'Quarried Scrubland' HLC type. In the south-west of the Troodos case-study area the HLC types are related to 'Scrubland' and 'Woodland'. The Maroulenas River can be seen clearly by the 'Riverside Scrub' HLC type running from the north to the south of the study area with the 'Dam' HLC type at

Klirou clearly indicated by blue. East of the Maroulenas River there is a significantly large proportion of ‘Field’ HLC types. Surrounding the village of Klirou, indicated by the plum colour of the ‘Nucleated Settlement’ HLC type in the centre of the case-study area and the lighter pinks of ‘Dispersed Settlement’ and ‘Linear Settlement’, are ‘Box Field’ and ‘Irregular Field’ HLC types. All the areas of ‘Box Field’ are found in low lying flat areas near to settlements. ‘Irregular Field’ HLC areas are also found in low lying areas, but these areas are often on the outskirts of the ‘Box Field’ HLC areas, in more undulating land. A large amount of the eastern side of the case-study area is classified as ‘Scrubland’, with intermittent ‘Sinuous Clearance Field’. In the north the ‘Scrubland’ is also broken by ‘Irregular Valley Field’.

Figure 7.63 presents the current HLC type polygons by date. The image shows that the current landscape is dominated by Modern or Ottoman landscape features with no other current HLC type dated to an earlier period. In **figures 7.64, 7.66, 7.68. and 7.70** the prior HLC types are presented by level. These images reveal that there are areas in the landscape where further time-depth can be determined. Unlike the Pisidian case study fewer areas in the Troodos case study have been allocated a prior HLC type. This does not mean that the landscape has less history, just that the landscape features visible today cannot provide enough information to determine a prior HLC type. For example in the Pisidia case study there were large areas that could be characterised as Modern ‘Natural Forest’ with a prior HLC type of ‘Contour Terrace’: this can be firmly identified as the terraces still remain in the landscape. In the Troodos case study the SCSP may have found significant evidence of activity through ceramic assemblages, but due to the lack of physical features the character of the area and the extent of the activity cannot be determined with enough certainty. **Figure 7.64** of the HLC level two shows that there are several areas of the landscape where a prior HLC type can be determined. This reveals most about the ‘Contour Terrace’ HLC types in the south-west and the ‘Industry’ areas in the north-west associated with mining. **Figure 7.65** presents the dates for this level of HLC types and shows that the main HLC types in this level are dated to the Ottoman period. The area around Politiko is dated to the Medieval and the areas of ‘Industry’ are still dated to the Modern period. This reveals that in the areas of ‘Industry’ more change has taken place in recent years than in other areas where the second HLC levels can be dated much earlier date revealing less change. The level three HLC types only reveal a little more time-depth (**Figure 7.66**). These HLC polygons reveal small areas of earlier ‘Cluster Settlement’ HLC types, and an earlier ‘Monastery’ HLC type and a few earlier agricultural HLC types are identifiable.

The date results for this level (**Figure 7.67**) show that these HLC categories are related to the Medieval period with one small area of Byzantine activity. The level four HLC types (**Figure 7.68**) reveal more again about the depth of the historic settlements. **Figure 7.69** presents the date rage of these level four HLC types which dates them all to the Byzantine period. The final HLC level, five, reveals one area of Hellenistic activity (**Figure 7.71**) in the form of the 'City' HLC type of Tamassos (**Figure 7.70**). **Figure 7.72** presents all the HLC types with the earliest HLC types overlain on the more modern.

7.8 Analysis

One of the main aims of this thesis is not only to provide information on the development of the landscape over time but to specifically investigate the Byzantine period landscape. In contrast to the Pisidian case-study area the Troodos HLC, despite the detailed records available, has not provided as much detail on the Byzantine landscape. This is a result of the limited age of the current landscape features which are unable to provide insights into the past landscape configuration of the case-study area. As a result, retrogressive landscape analysis and HLC cannot elucidate as much about the Byzantine landscape as the Pisidia case-study area. This means that in the Troodos case-study area the Byzantine landscape is not as dominantly represented in the HLC results across the area. In areas where archaeological investigation and historical records are more limited, such as the fields in the plain east of Klirou, the landscape features cannot be confidently dated to a period earlier than the Medieval era, and examples of this are limited. This means that the landscape cannot be classified as an earlier HLC type. However, from the SCSP results and the analysis of the historic background of the Troodos case-study area in general, we can state with confidence that earlier agricultural activity did take place. The historic landscape analysis of the Troodos case study has revealed through the results of the SCSP that the fertile plains were the focus of large-scale estate agriculture in the Roman period with significant evidence of industrial scale copper production (Given 2004b: 165). The SCSP results also provide detail of the later Medieval and Ottoman agricultural landscapes which in contrast were characterised by small individual fields like the 'Box Field' HLC type. The Byzantine landscape is also exposed in specific areas, such as the Politiko focus-study area, where the significant historical records aid the HLC. The existence of hagiography and historic records of various churches in the case-study area suggests that the original churches in these locations may have been established in the Byzantine period, which were then occupied and developed in the Medieval and Modern eras. This suggests that the settlements associated with these churches were also occupied. The lack of mid to late

Byzantine ceramics found by the SCSP may suggest a reduced population from the Roman period but not a complete abandonment, and it is more likely the lack of ceramics are due at least in part to other factors. By implication we can determine that the Byzantine landscape and the Byzantine inhabitants experienced the change from the large scale estate farming methods to the smaller individual plots. We can also suggest that the Byzantine landscape was likely to have been occupied by small rural villages inhabited by the people that cultivated the land. The lives of the inhabitants of these settlements that worked these lands would have revolved around the seasonal calendar. Evidence from the SCSP has revealed the possibility that manuring was an activity that was carried out by the inhabitants (Given and Knapp 2003: 309).

There is also the possibility that the Byzantines exploited the natural minerals in the area through mining. Roman mining in the area is certain and can be seen in the HLC types around Mitsero and the SCSP have conducted extensive investigation in to Ottoman mining in the area (Given 2000). This allows a greater depth of information to be added to the HLC types related to Industry in the case-study area.

Unfortunately the historic landscape analysis of the Troodos case-study area sheds little new light on Byzantine activity in the area. But this is most likely a result of the invisibility of Byzantine landscape features and the lack of recognition of Byzantine material culture, rather than a lack of activity. The excellent nature of the SCSP has already provided the landscape with a detailed investigation of the area's history and development, therefore the HLC will be of more influence as an example of HLC practice for landscape management purposes. However, overall analysis of the HLC results in combination with the SCSP results provide a more comprehensive analysis of the overall history of the area than either provide alone. The SCSP highlights through ceramic data the evidence of early historic activity in the area, whereas the HLC through analysis of the current landscape features provides evidence of activity in the more recent past. Together the HLC and the SCSP data provide a framework for understanding the past landscape and therefore the people that inhabited it.

Chapter 8

Final Analyses

8.1 Comparative Analysis

Both of the HLC case-study areas are effectively freestanding projects, the results of which can be explored separately. This chapter will explore the two case studies together, beginning with a comparison of the two case-study areas. This will be followed by an exploration of Byzantine perceptions of the landscape, a consideration of the HLC methodology and finally a discussion of the future potential of the HLC method.

When compared the HLC results of the two case-study areas highlight the very different nature of the current landscapes and the historic development of the two areas. The landscape of the Pisidia case-study area is divided into two distinctive zones, the mountainous north and the agricultural plain of the south. The plain is dominated by irregular field systems based upon Byzantine fields. The mountainous north is dominated by various types of woodland and abandoned terraces, also based upon a Byzantine agricultural system that exploited the mountains much more extensively than the Modern inhabitants. In the Pisidia HLC the areas of Modern influence upon the landscape are quite limited, but when apparent they are extremely notable and have often destroyed any earlier landscape character.

In the Troodos case study there is less variation in HLC types than in the Pisidian case study. There is also a less dramatic change geographically across the area of the Troodos case study. This may have an effect on the variety of HLC types in this case study compared to the Pisidian case study. The Troodos case study also has significantly fewer areas classified as woodland HLC types and significantly more areas of ‘Rough Ground’ HLC types, perhaps because there are fewer mountainous areas conducive to woodland growth in the former. The increased proportion of ‘Rough Ground’ can also be considered partly a result of the higher concentrations of areas that are neither flat fertile plains good for agriculture nor mountainous woodland. However, in the Pisidia case-study area there is evidence of a significant move to cultivate these ‘Rough Ground’ areas, an activity that is less obvious in the Troodos case study, which suggests a different attitude towards the landscape or less of an economic need to cultivate these areas.

Despite the similarity in crops grown in both case-study areas the field types are very different. In the Troodos case-study area the 'Box Field' HLC type found in the low lying plains is one of the most common HLC types. Unlike the irregular field systems of Pisidia these fields are much more regular with straight boundaries and a regular size covering flat fertile plains. This is likely to be partly the result of the flatter land in the Troodos case-study area in comparison to the more undulating landscape of Pisidia and partly the result of a very different historic landscape development in the two areas.

Unlike Pisidia, the Troodos field systems do not exhibit previous Byzantine characteristics and appear to have been created largely in the Ottoman period. The Troodos case-study area appears to have an overall character more influenced by 18th and 19th century advancements in farming and trade than the Pisidia case-study area which appears to have experienced less change during this period, but more recent change with more modern irrigation systems, modern greenhouses, bulldozed terraces and modern fields. In the Troodos case-study area the Klirou Dam and the Modern roads and buildings are the only significant evidence of very recent changes to the landscape. Overall the HLC of Pisidia reveals a long history evident in the construction and development of the landscape features still visible in the landscape. The HLC of the Troodos case-study area in Cyprus does not reveal the same level of time-depth visible in the current landscape. In the Troodos case study Modern and Ottoman HLC types are dominant, revealing that visible landscape features with earlier origins are limited, whereas in the Pisidia case study there are a significantly larger amount of earlier HLC types.

However, there are certainly areas within the Troodos case-study area where landscape features are of significant age, but these features are limited. There are also other areas where features may be of significant age such as the areas of 'Abandoned Contour Terrace' HLC type, but there is no evidence with which to corroborate this. Unlike the Pisidia case-study area, however, the prior archaeological and historical investigations in the area, primarily carried out by the SCSP, are extremely informative and provide evidence of a landscape with an extensive historical past, which is just not evident in the landscape features of the area. The Troodos case study provides less evidence for the exploitation of all types of the landscape in the past than the Pisidia case study. For example in the Troodos case study there is a significant area of rough ground or wilderness that appears to have not been exploited whereas evidence in the Pisidia landscape suggest that very little of the landscape was left to be rough land in the past. This will partly be the result of the different landscape types and the instability and high levels of erosion experienced in the Troodos case study.

Despite the relative closeness of the two case-study areas and the evidence of trade between southern Anatolia and Cyprus (Armstrong 2009; Jackson *et al.* forthcoming 2012), the results of the historic landscape analysis of each area reveals very different landscapes. Despite experiencing similar histories during certain periods of time and on occasion being under the same rule, the HLC shows that the landscapes of each case-study area have undergone very different forms of development that are not the sole result of the differing geology. The different attitudes and actions of the inhabitants of each area have resulted in very different landscape features being evident in the Modern landscape. In Pisidia these have maintained much of their ancient form. In the Troodos the current landscape features have relatively recent origins which have obscured any previous historicity of the landscapes. This suggests a different experience and perception of the land by the inhabitants despite the movement of populations from southern Anatolia to Cyprus at various points in history.

Both historic landscape analyses were useful. The Pisidia HLC provided more new information than the Troodos case study but the Troodos case study highlighted a period that has been less investigated. Some of the few similarities between the two case-study areas are in the Modern 'Sinuous Clearance Field' HLC type and the nucleated form of the settlements. The following sections of this chapter will explore how the HLCs can suggest ideas on the perceptions and experiences of the Byzantine inhabitants of both Pisidia and the Troodos case-study areas.

8.2 Landscape and People

As explained in Chapter 1, it is important to study landscape because people do not just live on the land: they live through a series of meaningfully constructed landscapes, ranging from the personal and mundane to the political, economic, ritual and exceptional (Vavouranakis 2006: 237). Understanding this landscape can lead to an understanding of the people themselves a concept developed from the post-processual movement discussed in Chapter 2. Phenomenology also discussed in Chapter 2 plays a major part in the following analysis of the two case-study areas, as this approach focuses on the relationship between 'being' and 'being-in-the-world'. The suggestions given in this thesis of how people may have experienced the landscape are mainly subjective and cannot be definitively determined. But from considering how just a few HLC types may have been experienced a whole new avenue of exploration using HLC is opened up. HLC could even be used, because of its flexible nature, to include a suggested 'experience' layer in the HLC itself. Results like those discussed above provide a framework for how the landscape was physically organised. From this, why the landscape was ordered in this way and what this organisation can tell us about the perceptions and experiences of the people living in and travelling through the landscape can begin to be explored. As Chapter 1 described analysis of the pathways, landscape features, monuments, fields systems, scared spaces and villages, which are the physical manifestations in the landscape of human experience, can tell us a lot about past perceptions of the landscape, and the meanings and values of particular landscape features and the experiences they create can be implied and enlightened upon.

The results of the historic landscape analysis of the Troodos case-study area confirms that this was a populated area where the lives of the Byzantine inhabitants would have revolved around the seasonal changes and labours associated with growing crops as in rural locations which can be inferred from the ceramic and other archaeological evidence discussed in Chapter 7. Through the historic landscape analysis which utilised the HLC and archaeological survey results, it has been determined that the main agricultural areas are located in bowls of low lying land. Settlements are located looking out over the field systems. The fields in these plains may have been organised in strips as found across Europe (Chouquer 1993: 102; Herring 2006) and in other areas of Anatolia (de Planhol 1958) and the Mediterranean, although there is no distinct evidence for this in the current landscape features. The Byzantine fields were likely to have been used to cultivate grain and vegetable crops.

With the physical framework provided by the historic landscape analysis it is possible to begin to explore Byzantine experience of this landscape types. Exploration of this can begin by considering physical experience. Stratham (2000), Gavin MacGregor (1999) and Houston and Taub have demonstrated the importance of sound, touch and smell respectively on experience. All physical senses should be considered when contemplating experience in order to re-embody and re-sensualise the past (Joyce 2005; Meskell 1996). The location of the fields and the homes in nucleated settlements discovered by the landscape analysis of the area means that many inhabitants would regularly experience physical travel as they walked to and from the fields each day. The evidence of material culture spread across the fields in the form of ceramics show that these areas were utilised in the Byzantine period even though the physical form of the fields can only be inferred. The journey to the fields would have elicited specific physical experiences dependent upon the routes taken. This can be inferred from phenomenological studies and ethnographic analysis of other cultures as discussed in Chapter 2. These experiences would change dependent upon the routes taken and the time when the journey was undertaken. For example a journey in the dark would elicit a very different physical response to the landscape, which would be much harder to see in the dark, than the response elicited by the same journey in the day time. The direction of travel along the route would also elicit a different experience. The journey of the Byzantine field labourer may have been a more tiring experience when, returning home after a day of labour they would often have to climb a slight hill to the settlements that the landscape analysis identified as often being in raised locations, than they would have experienced when travelling away from home in the other direction.

Inhabitants leaving the settlement of Politiko would have travelled down the hill following the path of the stream. This pathway has been identified by retrogressive landscape analysis of the current landscape which suggests that an ancient pathway that may have originated in the Byzantine period. Following the path from the village the Byzantine labourer would exit the town from the south east and then travel toward the fields in the surrounding plain, moving from the ‘Cluster Settlement’ HLC area to the ‘Box Field’ HLC area. This would have taken people past familiar landmarks and would have provided a narrative for their journey. The people who lived in these landscapes would be extremely familiar with the landscape; they would recognise every tree and landscape formation of the countryside in which they live. The historicity of the landscape encapsulates memories by virtue of familiarity from repeated interaction with the landscape memories become engrained within it (Ingold 1993: 152-154). The memories evoked by the landscape would affect the experience of the place. As the traveller passed through different HLC types different experiences would be felt. This is expected as each HLC type is physically different in its appearance and topology. One landmark that would have been imbued with collective memory would be the ancient necropolis of Tamassos, an area classified as ‘Sacred Space’ in the HLC. As Crawford and Keillor point out, ancient societies were well aware of the remains of ancestral societies even when the remains of these societies were just simple crop marks (Crawford and Keillor 1928: 37). Therefore this necropolis would have been a significant part of the landscape experience of the Byzantine inhabitants of Politko. This is further attested to by the fact that the land had not been reclaimed despite the fact that the landscape analysis suggests surrounding slopes had been claimed for agricultural proposes by being terraced, further compounding the implication that the Byzantine people placed importance on respecting the dead and perceived the area to be a special space. The perceptions and experiences that can be suggested for this area can be linked to all HLC areas of ‘Sacred Space’.

With the destination of the fields spread out in an open manner the Byzantine labourers travelling to them possibly perceived a sense of the importance of human control over the natural landscape to create the ordered fields systems. When returning home, they would have to retrace their path back to the village, which in the distance may be indicated by the beginning of smoke from cooking fires or the twinkling if candle light as the sun sets. This may have been considered welcoming and safe, and the height of the village above the fields, although maybe an exertion to climb, might be perceived as a safe haven, a place of rest before the next day of hard labour. These experiences can therefore be considered in relation to other ‘Box Field’ and ‘Cluster Settlement’ HLC types.

The exploration of experience can be taken further to consider how the physical senses may have inspired particular feelings in a worker, as has been explored by Jackson in relation to pilgrimage journeys (1998). This could be explored by considering major themes of current theoretical studies such as the significance of place (Tilley 1994). In the case of Politiko the landscape analysis found the settlement to have been located in a specific landscape feature raised above the rest of the fields, but with protecting hills to the north. The location of the settlement in this particular space would have affected how the occupants of the settlement would have experienced the landscape. The locations of the settlements in both HLC case studies were found to often be in spaces allowing a view of the agricultural land. These locations may have evoked a sense of protection over the extremely important agricultural resources. They were certainly chosen for a reason as other locations had the same access to agricultural land and water but were not chosen. The raised ground away from the agricultural land as seen at Politiko could be seen as a less favourable location when a village in the middle of the agricultural land may have been more convenient. Therefore, suggesting the location was extremely important and the height was likely to be a motivating factor in the settlements location.

When the Byzantine inhabitant of the village of Politiko looked out to the east, to the areas of ‘Rough Ground’ HLC types, diffident perceptions might have been instigated than those felt when looking at the ‘Fields System’ HLC types. This might have been seen as a wild area, less safe and organised that then agricultural land that has been tamed by human interactions with it. The order and control of the systematic field systems might have been seen as a stamp of control and authority over nature. Which in some areas of rough ground would still be dangerous and hostile, hot and dry and in the case of the areas the landscape analysis studied to the east of Politiko dangerous and susceptible to land slippage. The terraces in these areas could be seen not only as a necessary economical advantage by extending the agricultural area available to be cultivated, but also a way of imposing human control on an area previously seen as dangerous, wild and un-useful. Travel though these areas would appear to have not been common, as the results of the survey and HLC suggest there were no pathways traversed through these areas. These areas would have been inhabited by a different class of people, such as shepherds who would also inhabit the areas of woodland.

Differences in people’s lifestyles will have effected their perceptions and experiences. A shepherd’s view would be very different from how an agriculturalist would view the world from their home in a village. The townsfolk would view the agricultural land as the most important areas. Shepherds would view the areas they graze their animals as the most important. They too would look on this with different sense of pride or power. The shepherd may look more favourably at natural land and wilderness as it is compatible with their job, an agriculturalist would perhaps consider wilderness less favourably as it has to be tamed to benefit their job. Water too would be viewed with a different perception dependent upon the person. A farmer would view water sources in light of his fields, how to provide fresh water for his family, and how it can be manipulated to cultivate the fields. A shepherd would look for areas to water their herds, and would probably look less favourable on the manipulation of water if it reduced the areas of water accessible to their flock. Experiences suggested by the above discussion can be highlighted by the HLC study. For example an area identified as HLC ‘Woodland’ would be likely to be inhabited or made use of by a certain type of person who would experience certain things in particular ways. This knowledge can be incorporated into HLC determination so that HLC type areas can also be associated with suggested inhabitants for an area. HLCs in the future could include the suggestion of how an inhabitant of a ‘Woodland’ HLC area could view themselves but also view the outer world.

The significance of place can also be explored in relation to the sacred spaces revealed in the HLC. From the landscape study we know that the sacred spaces were in high locations, and as discussed above earlier areas of pagan sacred space were still visible and would have been known about. How did the occupants of the landscape experience these sacred spaces? It could be suggested that their locations were chosen because memory of the previous pagan sites was experienced. Appropriation of this type can be seen across the ancient world (Bayliss 2004; Saradi-Mendelovici 1990; Speiser 2001). The dominant locations may indicate that the occupants of the settlement experienced a sense of pride in the building and chose the location to show this off (Green 2008). The initial choice is then perpetuated by later generations. The location itself may also have provided the settlement with a communal sense of protection. Were sacred spaces located in these visible places out of reverence? In particular how these locations affected the experience of procession, an important part of Byzantine liturgy, can be suggested. The locations uphill would have had a physical effect on the senses and the experience of the processors and the route of the procession would have held different meanings to each individual as the route past areas special to them such as their home (Jackson 1998). We know from the retrogressive landscape analysis of Politiko that the pathway to the 'Monastery' HLC area changed over time. This change would have had an effect on the experience of the procession, as different sensory perceptions would be created as different routes were followed and different memories would be triggered as different building and monuments were passed. Procession and pilgrimage was very important in the Byzantine period so this would have been perceived as important. The pathways in general may have been considered important to pass by specific places not just take the most economical route. Superstition and faith played a role in everyday life therefore it is not unlikely that an everyday routine like walking to the fields every day would become imbued with meaning.

In the Pisidia case-study areas sacred space are also located in high places, and the churches that were surveyed in the case study area were also associated with towns. The church in SU_07, although not in the case-study area, was also located on an important route way, isolated and high. The implication is that height and isolation were important considerations when locating sacred spaces in Pisidia as in the Troodos region of Cyprus. In Pisidia there is little evidence left of church buildings in the now Muslim villages, but the locations of these settlement sites are likely to date to an early period and the evidence of the occasional mosaic suggests richly decorated buildings, which might be associated with now destroyed churches. It is also common for sacred space to appropriate prior areas of sacred spaces, therefore it is likely that the Pisidian churches of the Byzantine period were located in centres of towns with the advantage of a raised position.

During the Roman period the agricultural activity of the inhabitants of the Troodos case-study area would have been single entities in a much larger enterprise ruled over by a large estate (Given 2004b: 175). By the Medieval period this had changed and the inhabitants would have experienced small scale peasant agriculture (*ibid*). The Byzantine inhabitants would have experienced this change. It is possible that the change may have been achieved in one event or over a period of time. Memory of the large estates may have influenced the experiences and attitudes of the later inhabitants. A sense of community may have been experienced by the Byzantine population and it is possible that to meet tithes and taxes, neighbours would help each other in the agricultural activities and in turn this may suggests an experience of dependence. Juliet Du Boulay’s (2009) ethnography of rural village life in Greece, although not Cypriot or Turkish, is an excellent source of information for understanding community relations in a small Mediterranean 20th century rural village. As discussed in Chapter 2 ethnographic analogy can be a very useful tool for investigating the past landscape and land use. Another area of potential for exploration from the HLC is the roadways and networks. Roads and paths cross spaces and are indicators of how movement and interaction within the landscape took place as explored by Erin Gibson (2005).

Using the focus study of Politiko from the Troodos HLC as a case study for exploration, we can analyse how the landscape framework provided by the retrogressive landscape analysis and the HLC can provide important information in analysis of the experiences of the settlements inhabitant’s. As discussed above from the retrogressive landscape analysis we can say that the Byzantine approach to the settlement of Politiko was probably from the north beside the river. Knowing this allows us to ask how a traveller to the monastery of Ayios Iraklidhios would experience this approach. They would first travel through the organised field system following the contour of the land. What would they think of this? Would they consider the crops? Would they see people working the fields? Would they even be interested or would they be focused on the settlement? They would be able to see the settlement and probably the monastery as they approach. Would they have experienced a sense of anticipation? How would this journey affect them physically as they travel up hill to the settlement? These are just a few questions we can ask. Roads and pathways facilitate movement to the settlement and the monastery may have been a pilgrimage destination or at least a focus for clergy so frequent travellers to the site would not be unexpected. With pilgrimage a very different form of movement and different forces are at play and different senses are often manipulated by pathways (Jackson 1998).

The HLC and retrogressive landscape analysis shows that this land was in use for a long period and therefore traditions and perceptions associated with how the landscape was used and how it was viewed would be passed down through the generations of local inhabitants of an area (Ingold 1993). This means that the landscape would have been imbedded within the collective memory of past ancestors and their experiences of the land (Wasserman 2002). The historic landscape analysis of Pisidia can equally provide information that can improve our understanding of Byzantine experience of the landscape. The landscape of Byzantine Pisidia was more heavily exploited than the Modern day landscape and it is fair to assume the lives of the inhabitants of the case-study area would have been agriculturally focused and revolved around seasonal agricultural activities. The olive trees likely to be found on the northern terraces would have required little upkeep, but the terraces themselves would have required constant maintenance. A large amount of initial labour would also have been required to construct the extensive terracing. This terracing may have been constructed in one initial burst of energy, or it might have been built over a series of years gradually expanding through the landscape. The relationships seen in the terracing suggest that fairly large localised areas were likely to have been constructed together with later additions. For example the terracing surrounding the settlement of Koca Mehmetler Asarı appear to follow a regular pattern and construction technique and retrogressive landscape analysis shows limited later additions. This form of terraced agriculture is different from the crops grown in the lowlands and would have provided a different experience and attitude towards daily life. The majority of the terraces are narrow and unlikely to have been used for multiple crops, which are also not seen in the Modern landscape. In the northern area of the case study, travel to work on these terraces would have resulted in a very different experience and possibly more exertion than for those who travelled to work in the less mountainous low plains.

In both cases, settlement was probably in the form of nucleated or small cluster settlements rather than dispersed settlements, so daily travel to the fields was experienced in both areas. Life would have been full of hard work. In the plain, vegetable crops and grain or cereals were grown. These would be maintained by inhabitants of small local settlements located in raised areas. Overlooking the agricultural land they were responsible for perhaps imbuing a sense of protection by the people that lived there. Modern irrigation is needed to adequately service these areas and evidence of past watermills is known. It is likely that in the Byzantine period some form of irrigation may have been practised to allow for the growth of the crops. This would have given the inhabitants a further respect for the life given by water. The watermill would have processed the agricultural goods and may have represented the control of resources (Oleson 2008). Temporary seasonal settlements or rest points for the day labourers were likely. Here the workers would rest in the heat and possibly contemplate the landscape surrounding them. The mountains would have been visible from the plain and only on occasions of bad weather or extreme heat haze would the mountains be obscured. There permanence would make them an important aspect of people’s lives. They may have been associated in the thoughts of the inhabitants of the plain with the monumental cities of the past that were located in the mountains, or with the pagan gods of the past that were often worshipped in high places (Bradley 2000). The inhabitants of the plain may also have considered the people that lived their different to themselves, possibly wilder, or they may even have associated the mountains with a sense of danger possibly from bandits known to have inhabited the higher areas.

The land was likely to have been owned by individual local inhabitants of independent villages, a common Byzantine circumstance (Harvey 2009). The ceramic production sites found in Pisidia appear to be small nucleated rural workshops as is typical in late Antiquity rather than estate production (Jackson *et al.* forthcoming 2012). The historic landscape analysis of the Pisidia case-study area brought to light a particularly telling piece of information that suggests that the people experienced some form of fear or apprehension, which resulted in them locating their olive oil production sites in high inaccessible areas possibly to protect against raiding. They would consider the landscape a source of wealth and livelihood, but also a source of protection. The people of Pisidia would also have been aware of the form of the ancient sites of their ancestors. Pednelissos was full of Hellenistic buildings and the site continued in use in the Byzantine period. The city was likely to have been a central point of administration for the area as seen in the past. The location of Pednelissos overlooking the rest of lower Pisidia could have imbued a sense of protection or possible wariness on the inhabitants of the region.

Sacred spaces relating to the Byzantine period are limited but by analogy with other areas pagan sites were often appropriated as seen in Cilicia (Bayliss 2004) and across the Byzantine world (Saradi-Mendelovici 1990; Speiser 2001). This is seen in Pednelissos. In the small settlements churches would have been found as seen in Cilicia (Green 2008; Varinlioğlu 2007) and other areas of the Empire (Ellis 2005; Gerstel 2005). It is possible that these were later appropriated as the site of mosques which now obscure all earlier evidence of activity. The route of St Paul reveals that the area may have been traversed by pilgrims following his path. How they may have viewed the different areas along this route could be explored similar to Simon Coleman and Jas Elsner's study of Mount Sinai (1994).

This thesis has only explored the landscape's influence on Byzantine experience and perception, however as the results show a lot is learnt about other eras of history. In some cases more has been learnt about the landscape of eras other than the Byzantine period through these historic landscape analyses. Similar analysis and exploration therefore can be applied to investigate the experiences and perceptions of people of the past from other periods. Overall this thesis has attempted to show how GIS based methods such as HLC can be used to help decipher the complex and multi-layered products of social dynamics that are encapsulated in landscapes. Thesis has sought to show how once these methodologies reveal the framework of the landscape, they can in turn provide the foundation for exploring how the organisation of that space influenced the experience of people in the past, and how people's perceptions, experiences and social actions influenced the creation of the landscape. Experience differs cross culturally. Landscape studies do allow us to see real people in the past and by unravelling the modern landscape and attempting to consider the Byzantine landscape, we can begin to understand what the Byzantines would have seen. We can then begin to explore how the Byzantines may have experienced that landscape. This form of exploration is essential to improving the future understanding of Byzantine rural society and allows a more rounded understanding of the past. By exploring people's views of landscape we begin to make the understanding of how the landscape developed relevant to today's society and to the further understanding of the past world. Space is a lived experience organised in relation to the actions that are conducted within it and through the ordering of space we experience our role and place in society. Historic landscape analysis provides a good way to begin to approach this with the potential for much further use than it has been in this thesis. Section 8.4 below will address some of these possibilities.

8.3 Methodological Review

Both of the case studies aim, through a mainly desk-based programme of GIS mapping and analysis, to achieve an archaeological understanding of the historical and cultural development of the current landscape. Overall the methodology used by this thesis effectively produced two historic landscape analyses, the results of which have provided new understandings about the landscape development of each case study. The following discussions will review and evaluate in detail the methodology used in this thesis to investigate the landscape of each case study. Each aspect of the methodology detailed in Chapter 5 will be reviewed individually.

The use of a base map created from Google Earth imagery was a particularly effective part of the methodology. A base map is required for all HLCs and with the limited maps available for the case-study areas, the choice to use the freely available Google Earth imagery was a successful one. The Google Earth imagery, as discussed in Chapter 5, was carefully rectified with ground control points and throughout the HLC process no major rectification errors were recorded. The use of the Google Earth imagery directly within the GIS on which the polygons for the HLC was drawn also speeded up the polygon creation process. Basing the scale at which the HLC was created upon the resolution of the Google Earth imagery of each case study, allowed a greater level of detail than if based on 1:50,000 maps. The scales at which each HLC has been created has been effective in creating HLC polygons that are both detailed in HLC type division, while generalising the HLC to a degree that allows a general overview of the HLC area to be presented.

The sources used in each HLC differed according to the information available to each area. This was a positive methodological choice as it allowed both HLCs to be as detailed as possible. A decision could have been made to only use similar sources which may have made case-study area comparisons fairer. However, using all the sources available for both areas allowed both HLCs to be a comprehensive standalone project. Carrying out ground truthing was particularly worthwhile in the Pisidia case study where there has been less archaeological investigation of the landscape. The Troodos case study experiment, however, highlighted that ground truthing is not an essential process to carrying out a successful HLC. The Troodos case-study area ground truthing allowed more detail to be added to the HLC type descriptions by confirming the vegetation common in each HLC type, but overall the ground truthing did not contradict or change any of the interpretations of the HLC. This provides a solid example of how HLC can be successfully carried out without ground truthing if extensive historical and archaeological investigation has already been undertaken. This is a particularly useful conclusion as it reveals the potential of desk-based HLC which will be explored in more detail in section 8.4.

The use of focus studies to investigate particular areas of the landscape that display various dominant characteristics is a particularly effective way of portraying the landscape development of an area which can then be linked to an HLC type description. However, a more intensive selection of focus studies or an overall landscape investigation without the need for focus studies would be an even more effective methodology if the resources were available.

Retrogressive landscape analysis was carried out on all the suitable focus studies and was particularly informative for unravelling the structural organisation of the landscape and providing a relative chronology for the landscape features. This technique was used to aid the HLC type determination for each polygon where landscape features were visible and interrelated. This methodology proved extremely useful in the HLC categorisation process. Alone retrogressive landscape analysis reveals that the landscape of both case studies is made up of a complicated arrangement of features with clear markers of surviving landscape components extending back over several centuries. This reveals the significant longevity of the landscape features which in some cases can be traced back to very early origins. In the case of Pisidia this methodology was more effective as in general the current landscape features appear to have a longer history than those on Cyprus.

This thesis has highlighted that retrogressive landscape analysis is particularly effective when used in combination with archaeological landscape survey data. As mentioned in Chapter 3, one of the common landscape survey techniques has been to use fields as survey units. This form of landscape survey lends itself well to incorporation with retrogressive landscape analysis because the boundaries of the field are the limits of the survey areas. When retrogressive landscape analysis is considered in conjunction with ceramic survey results, ceramic sherds found in what appears to be a random spread across a group of fields with some fields having sherds in them and others not having sherds, may be found to have a pattern related to age and development of the field boundaries.

This availability of the SCSP data and PSP data was very valuable for the overall understanding of the landscape of each case study. The incorporation of the results from both surveys into the GIS where the HLC was being created allowed a quick and effective cross referencing of the findings from the ceramic surveys and the landscape features. The intensive survey of ten key survey units in Pisidia was extremely informative and provided a wealth of new information about the Pisidian landscape. The intensive landscape survey method described in Chapter 6 and **Appendix 1.1**, was successful and effectively informed the HLC. The survey results fed into the overall PSP investigation and generated original data for the region of southern Anatolia. However, the use of ceramic survey date to aid HLC was not taken to its fullest advantage by this thesis. Problems as well as success were experienced when trying to incorporate HLC, retrogressive landscape analysis and survey data. HLC and retrogressive landscape analysis work extremely well together, as do survey data and retrogressive landscape analysis as can be seen in the focus study areas, but the incorporation of the ceramic data into the HLC process was not as effective. There is much more potential to more closely integrate HLC and ceramic survey data. The limitations on the size of the Pisidia survey, which was restricted as a result of time, money and resources to ten areas, meant that there was not enough coverage to fully incorporate ceramic data into the categorisation process for each HLC area. As a result, although the HLC type descriptions could discuss the ceramics types expected to be found within a HLC type, when categorising each area in Pisidia, there was so few areas that had ceramic information it necessitated that categorisations had to be determined solely on their landscape features without ceramic data. There was also no opportunity to test if an areas HLC type could be dramatically changed when the ceramics are taken into consideration. In the case of the Troodos case-study area the limitations of using survey results from a project which had not originally collected the data with a HLC analysis in mind, meant that less could be done with the survey data than would be possible if a systematic survey and HLC project was developed. In this case the collection strategy of the survey, like in Pisidia, limited ceramic data to specific areas resulting in a similar problem to the Pisidia area where the ideal potential of ceramic data inclusion in HLC analysis is higher than what was able to be achieved. An ideal project, which will be discussed in section 8.4, would allow wide scale ceramic analysis of the landscape across all HLC types as opposed to the main key HLC types.

The technical HLC method was found to be both practical and functional. Directly drawing the HLC polygons into a GIS above the Google Earth base map was an effective technique. The polygon drawing process was easy and attaching data to the GIS was straightforward and without errors. The additional data attached to each GIS polygon in addition to the current HLC type included previous HLC types, sources, confidence of category and information on the landscape features found within the polygon, was productive and allows analysis to continue to be carried out. The results of each case study can be found presented in both printed figure format and on the accompanying CD (**Appendix 2.2**). This allows both immediate reference through the printed maps and more detailed exploration through the electronic files. This means the research conducted for this thesis will continue to be accessible for future investigation into the case-study areas.

The HLC method in general has been found to be a useful and flexible way of visualising the different areas within the landscape and their relationships to one another, particularly for a non-specialised audience (Maccines 2004). HLC's ability to consider all the landscape, not just individual sites or areas of importance, recognises that all parts of the landscape have historical significance. It is a form of landscape archaeology that enables understanding and representation of landscapes in relation to their historical development (McNabb and Lambrick 1999: 54), and it can be used for multiple purposes from predictive modelling, to landscape management, or the theoretical investigation of the use of space. HLC provides a spatial framework that allows different disciplinary perspectives and different sources to be brought to bear on particular questions about the past. HLC can also be developed as the landscape develops and can be constantly reinterpreted.

Combined with the results of the retrogressive landscape analysis, further time-depth can be gained and the characterisations can become stronger. Retrogressive landscape analysis' landscape chronologies can also be used to aid HLC in creating time-slice HLCs of the landscape at certain points in time. Through the combination of HLC and retrogressive landscape analysis it is possible to reveal the diversity and time-depth apparent across the complex terraced and enclosed landscapes. One of the key factors of landscapes is that they change, a process that will continue in the future (CoE 2000). HLC-based studies not only help archaeologists understand past landscapes, but also help planners and landscape managers shape future landscapes (Turner 2006). Understanding how places have developed in the past provides the knowledge landscape managers need to move beyond simply regarding cultural landscapes as 'traditional', with no appreciation of time-depth or historical processes. Better information about past changes and previous landscape character will help them decide what types of change are most appropriate for the future (Bolòs 2010; Turner and Fairclough 2007).

The results of the Pisidian ceramic survey alone suggested a landscape of only early Byzantine and modern occupation. However the results of the HLC and the retrogressive landscape analysis reveal that this is not the case. The retrogressive landscape analysis reveals that the landscape has been exploited on a significant scale from the Byzantine period until the modern day. This means that the reasons for the large amount of early Byzantine ceramics have to be considered in more detail in light of this information. In the Troodos case study the limited Byzantine material has to also be considered in light of the information that suggests some areas of the landscape did see significant Byzantine activity and pottery identified as Medieval and late Roman was identified. Alone the ceramic survey, HLC and retrogressive landscape analysis methodologies reveal weaknesses, but combined together they allow new interpretations to be developed about the past occupants of the landscape. This, in turn, provides the foundation for exploring how the organisation of that space influenced the experience of people in the past, and how people's perceptions, experiences and social actions influenced the creation of the landscape. The HLC alone would provide suitable information about each case study, but incorporating an exploration of experiences and people's perceptions in the historic landscape analyses advances the scope of HLC and is beneficial to further understanding Byzantine landscapes.

8.4 Future Potential for Historic Landscape Characterisation

In the immediate future there is potential for the HLC of the Pisidia HLC to be extended to cover all the PSP survey area. This is expected to be carried out in order for it to be included in the PSP final report. There is also potential for this to then be extended to the entire Pisidia region or for comparison HLC to be carried out in other southern Anatolian regions. For example the Göksu Valley where the Göksu Archaeological Project has carried out investigations would be a prime area as there is excellent Google Earth imagery available and raw survey data to explore. The Troodos HLC could be similarly extended to cover neighbouring regions in Cyprus. The limited size of the island and the relationships with England would make the island of Cyprus an excellent place to extend HLC to an entire country outside of England. The HLCs of the two case-study areas are significant to the involvement of both Turkey and Cyprus with the European Landscape Convention discussed in Chapter 2, particularly as HLC is a method of landscape study that promotes a view of landscape in line with the European Landscape Convention (CoE 2000). This thesis's historic landscape analysis of the Pisidia and the Troodos case-study areas will hopefully pave the way for the use of the HLC methodology in future historic landscape analyses in both countries. Future publication of these HLCs and the depositing of the HLC shapefiles for each case-study area at the Archaeology Data Service will help to promote this.

Extension of the HLC method in Turkey and Cyprus would have a significant potential impact upon landscape management and planning. HLC, as explored in Chapter 3, can play an influential role in shaping or influencing decisions on planning proposals and modern development. The results of the HLC of Pisidia in highlight the potential use of HLC to discover areas of historic value at risk of potential destruction by modern development. This was observed in Pisidia, where areas of modern fields have destroyed older field systems and modern bulldozed terracing has destroyed historic material. In the case of one of the ceramic production sites discovered by the PSP, there is a possibility that the development of modern greenhouse structures and terraces destroyed a building with mosaics and an area of pottery kilns. At Kireç Yıkığı Mevkiisi SU_10 a building and associated features have been cut through. HLC has the potential to provide information on the historic character of areas being considered for development, indicate the value and quality of the HLC type and highlight areas of potential threat. This would allow action to be taken to prevent or record exemplary landscapes before destruction. In the Troodos case study the extensive nature of the prior survey carried out by the SCSP mean that the HLC results have more value as a management tool and as an example of future practice.

This thesis has demonstrated that as a research tool HLC can provide new and informative insights into the development of the landscape. This thesis has also shown the potential of HLC to stimulate further study of the historic landscape. The theoretical exploration of the perception and experience of the inhabitants of each region conducted by this thesis is an example of how HLC could be used to stimulate further research. The incorporated HLC and survey results allow the landscape to be looked at in a different framework allowing patterns to be identified that may not be visible in the real world. This allows ideas to be stimulated about the meaning of these patterns and as a result HLC is a valid tool for exploring questions of the lived experience of landscape.

There is further potential for HLC to explore theoretical ideas by incorporating different users' viewpoints into the HLC types. Experimenting with the classifications given by people of very different backgrounds promotes community involvement. HLC has great potential for use by local communities as a tool to provide an awareness of the historic environment. For example the HLC method has potential to be used to incorporate a vast amount of intangible resources things such as oral history could be formed to inform a characterisation of the oral history interpretation of the landscape. Incorporation of people's feelings into a HLC, categorising the landscape by thought and perception directly, rather than by look and physical and historical characteristics, is an interesting and potential wide future study.

Outside Cyprus and Turkey this thesis has highlighted the potential of HLC as a tool for desk-based investigation. As discussed above, the Troodos case study ground truthing investigation confirmed the potential of desk-based HLC for the investigation of areas that are difficult to access due to political, economic or geographical issues that are prohibitive to ground survey and investigation. An example of an area where HLC could be effectively employed is in the currently inaccessible Homs region of Syria where a significant amount of research has been carried out (Philip *et al.* 2002; 2005) which could be used to aid a desk-based HLC. However, the best potential for HLC and landscape survey would be an integrated project designed from the start to incorporate HLC, retrogressive landscape analysis and ceramic survey. The development of landscape survey techniques to include compatibility for HLC analysis would greatly benefit the study of landscape. The results of this thesis show that ceramic inclusion in a HLC analysis can be extremely informative, but the limits of the field work that was able to be conducted by this thesis show that limits in ceramic survey collection areas greatly affect the value of the results. In the Troodos case-study area where the survey was not conducted with HLC in mind, the ceramic survey techniques were not as compatible with HLC as first thought. The Pisidia case-study area, where HLC was considered before the ceramic survey was carried out, shows how useful ceramics can be to HLC interpretation, but in the case of Pisidia this was limited by the small scale of the survey.

An ideal future integrated project without budgetary constraints would embrace a strategy that incorporated well organised systematic transect survey across all of a selected area, alongside retrogressive landscape analysis using satellite imagery and other landscape archaeological techniques discussed in Chapter 2. The results of these studies will then be incorporated in to the HLC so that all areas categorised would have information from both retrogressive landscape analysis and ceramic survey to be taken into consideration before classifying the land into HLC types, rather than relying on the accuracy of focus areas like in this thesis. However, entire landscape surveys like this cannot always be carried out due to funding restrictions. In that case a preliminary HLC should be carried out to identify target survey areas for each HLC type and each HLC type should be investigated more than once. Four or five samples of each HLC type would be preferable to see if ceramic content is related to HLC type. In this thesis the importance of the method and the fact that it can add new dimensions to consider all side of the resources was recognised but future studies could take this much further. An ideal project would then take the HLC methodology further by experimenting to see if more can be added to the analysis. One experiment could be to carry out an investigation into the current landscape occupants perceptions of the landscape as discussed above. Interviewing the inhabitants and asking them the feelings that they associate with certain areas. From this a HLC of perceptions could be built. This could also be extended to oral history. With oral history investigations into what the inhabitants associated with different areas to see if particular types of landscape have similar histories or stories types associated with them. These are just two ways in which the HLC methodology can be used to explore the landscape in new and interesting ways. This thesis focused on the Byzantine period but an ideal project would look in detail at all periods of the landscape and considered the changing HLC types in more details to see the similarities and differences through the ages.

8.5 Concluding Remarks

This research has demonstrated that through a combination of HLC, retrogressive landscape analysis and ceramic survey it has been possible to reveal the greater diversity and time-depth apparent across the complex landscape of the case-study areas than any one methodology alone. By integrating a wide range of sources we can create well-contextualised interpretations of past societies and places (Turner 2006). When considering the results of the ceramic survey a different story is told to the HLC and when compared to the landscape analysis results, there is a much longer and more complicated history depicted. This highlights an extremely significant point, which is that ceramic surveys should not be carried out without some form of landscape analysis to contextualise the results. Other methodologies can be enhanced by incorporating ceramic survey results, adding extra depth to HLC and the understanding of landscape development. Future methodologies should take note of this study to develop incorporative strategies to study landscape using ceramics, survey and HLC. The future potential of HLC is extremely great. These techniques which provide a framework for understanding how the landscape was structured and organised in the past can then be used to help decipher the experience and perceptions of past peoples. This form of exploration is essential to improving the future understanding of Byzantine rural society.

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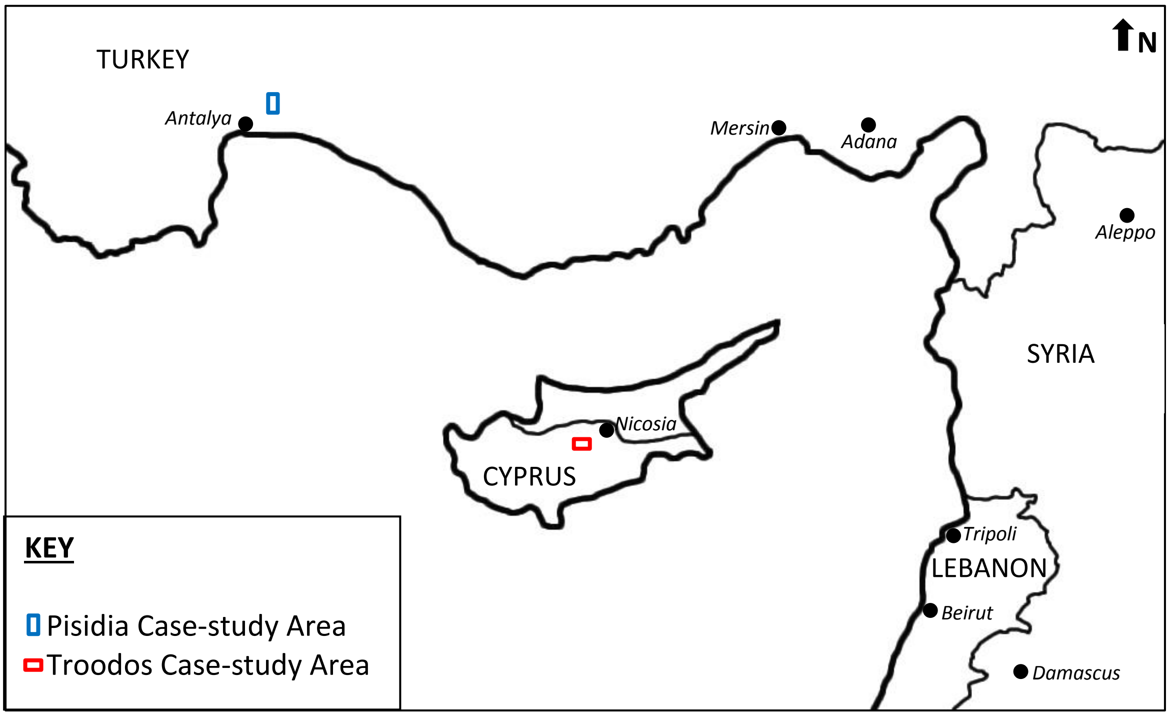


Figure 1.1: Location of HLC case-study areas in eastern Mediterranean.

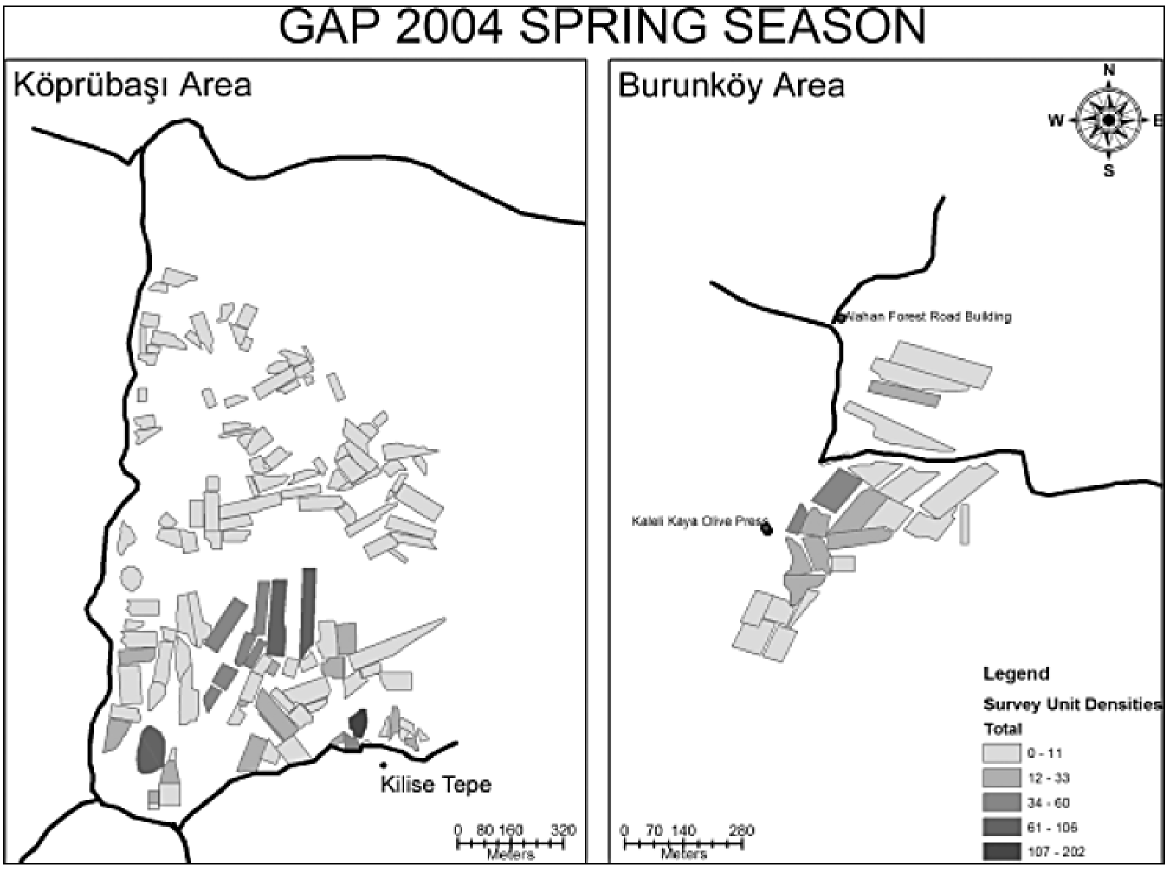


Figure 3.1: Göksu Archaeological Project 2004 survey results (Elton 2005: 338, fig. 3).

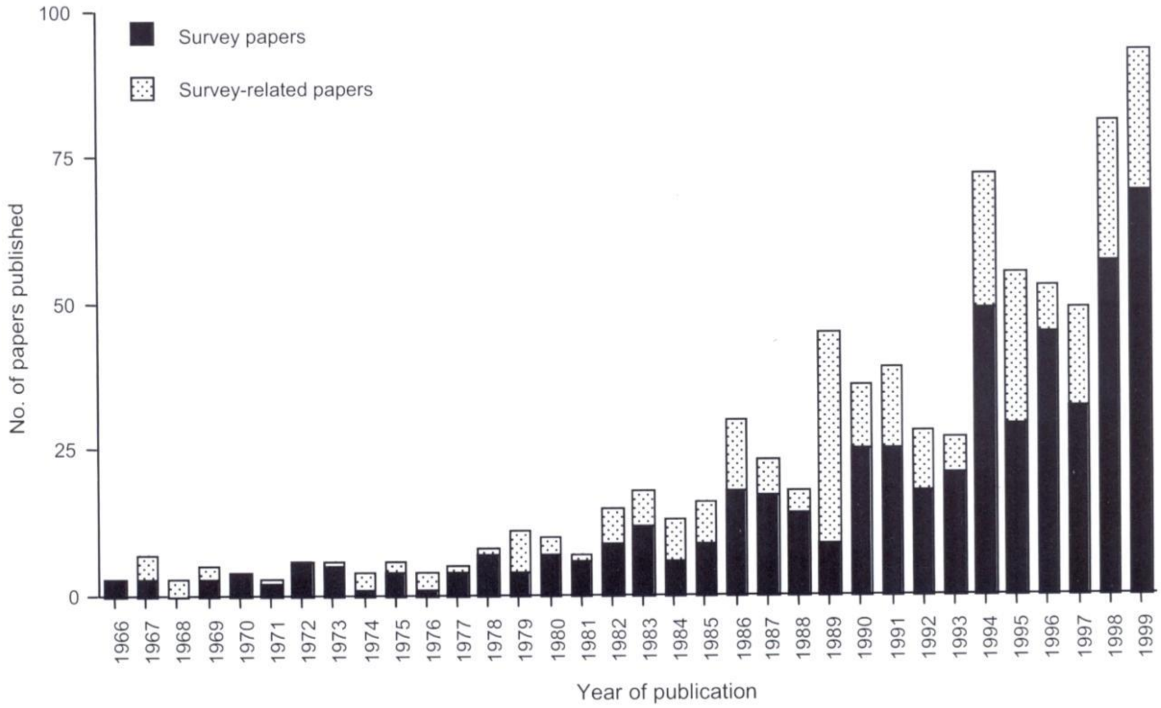


Figure 3.2: Number of journal papers devoted to survey data between 1967 and 1999, in 15 journals selected by Cherry (Cherry 2004: 1, fig. 1.1).

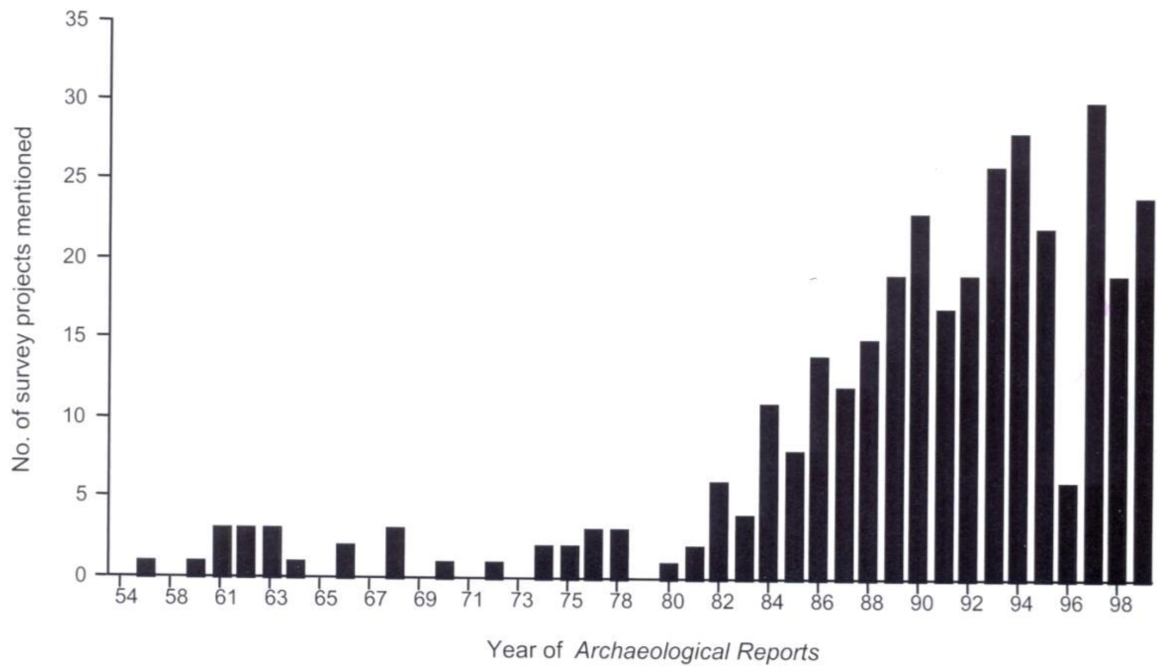


Figure 3.3: Number of survey projects in Greece between 1954 and 1999, reported in *Archaeological Reports* (Cherry 2004: 2, fig. 1.2).

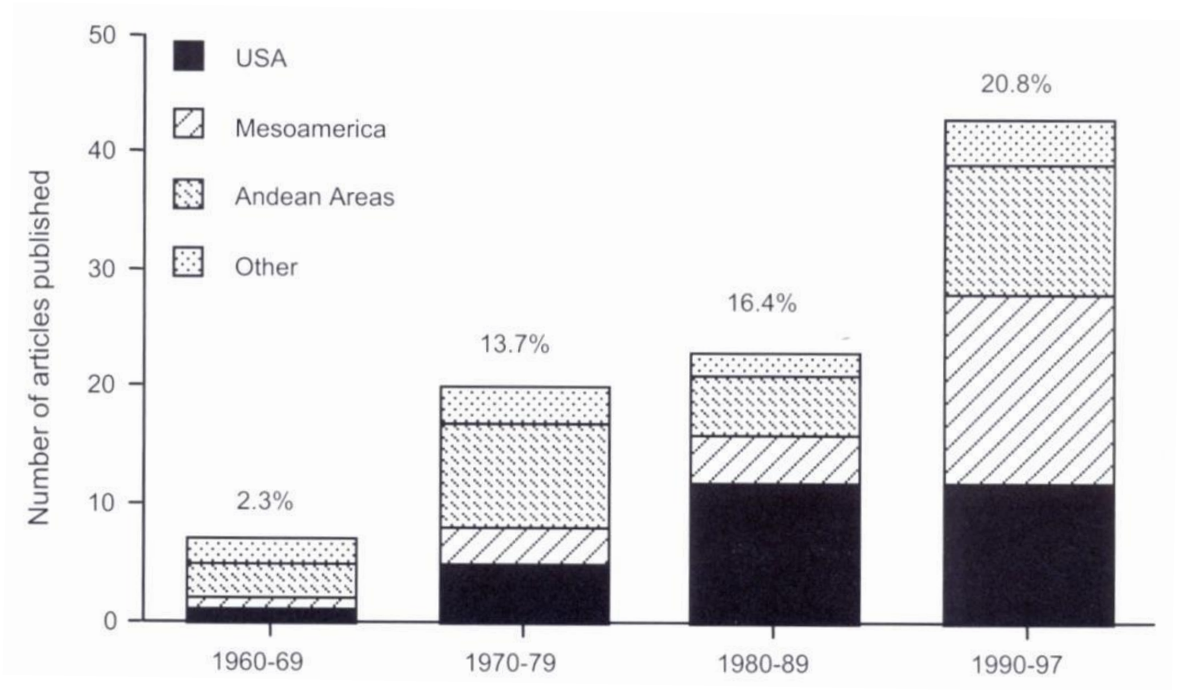


Figure 3.4: Number of settlement themed articles in *American Antiquity* between 1960 and 1997 (Cherry, 2004: 3, fig. 1.4).

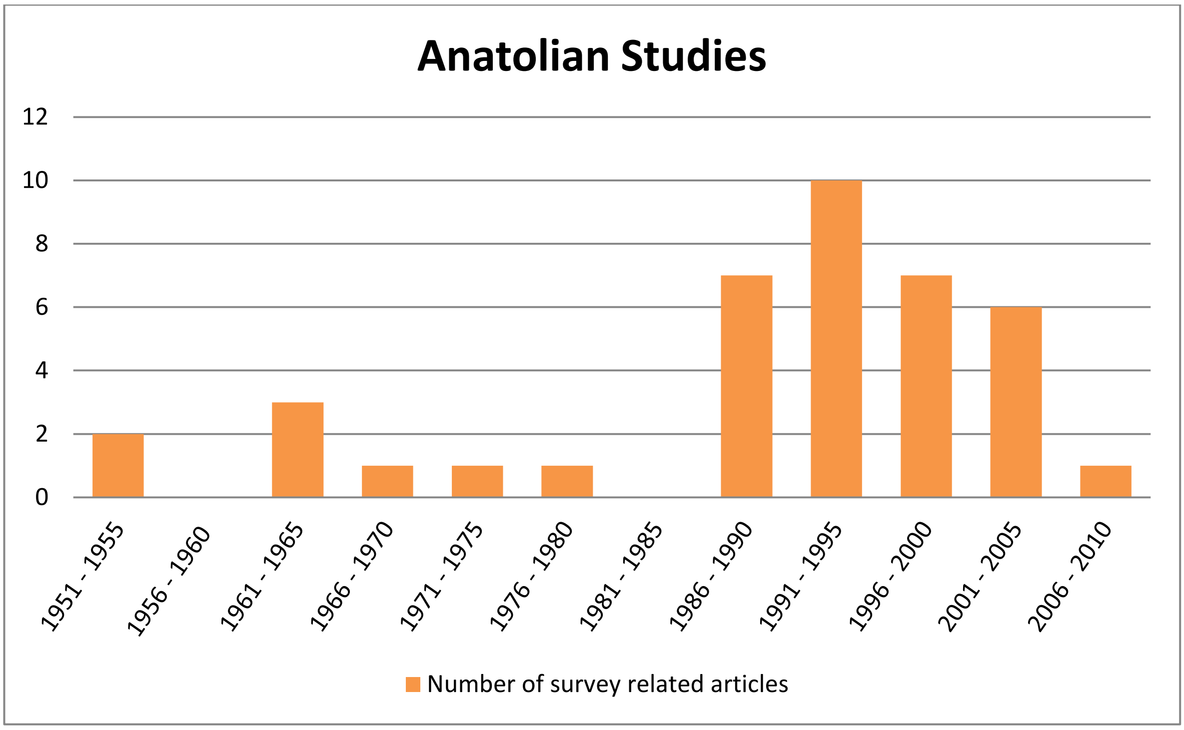


Figure 3.5: Graph presenting the number of survey related *Anatolian Studies* articles between 1951 and 2010.

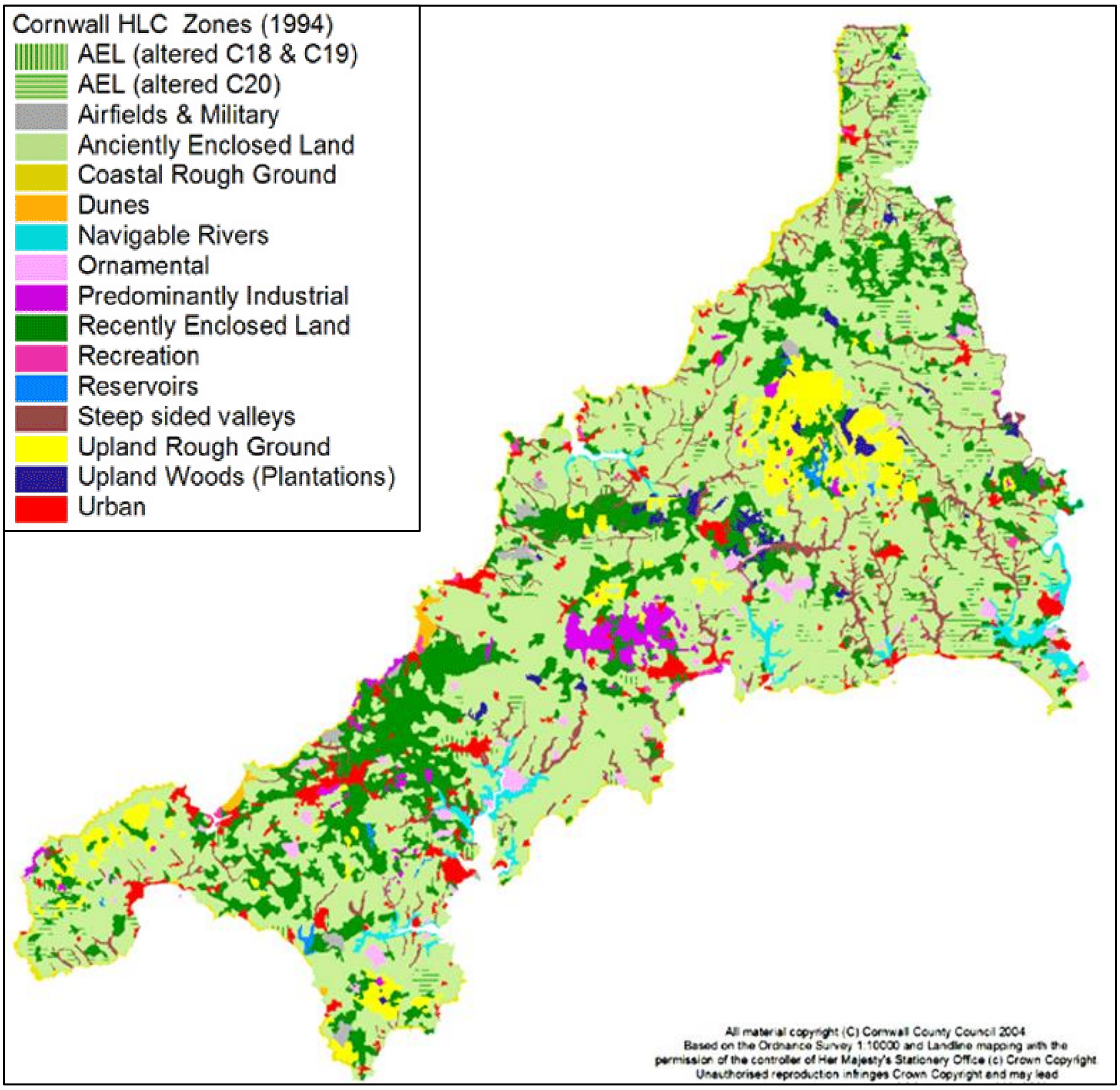


Figure 4.1: Cornwall Historic Landscape Characterisation (CCC 2004).

Figure 4.2: Historic Ordinance Survey map (left) with resultant HLC map (right) (Winterburn 2008: fig. 2).

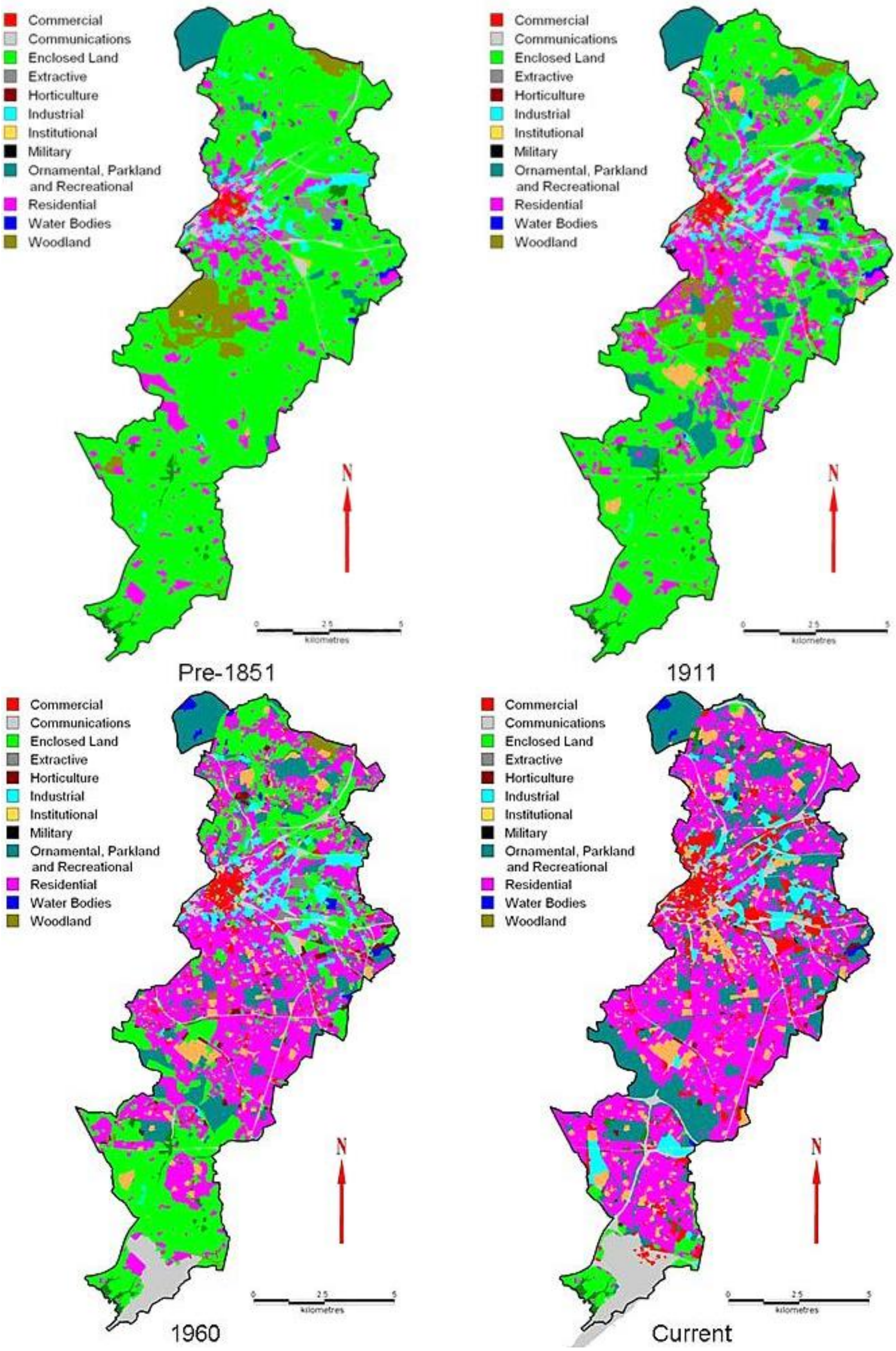


Figure 4.3: HLC time slices of the Greater Manchester Urban Historic Landscape Characterisation (GMAU n.d.).

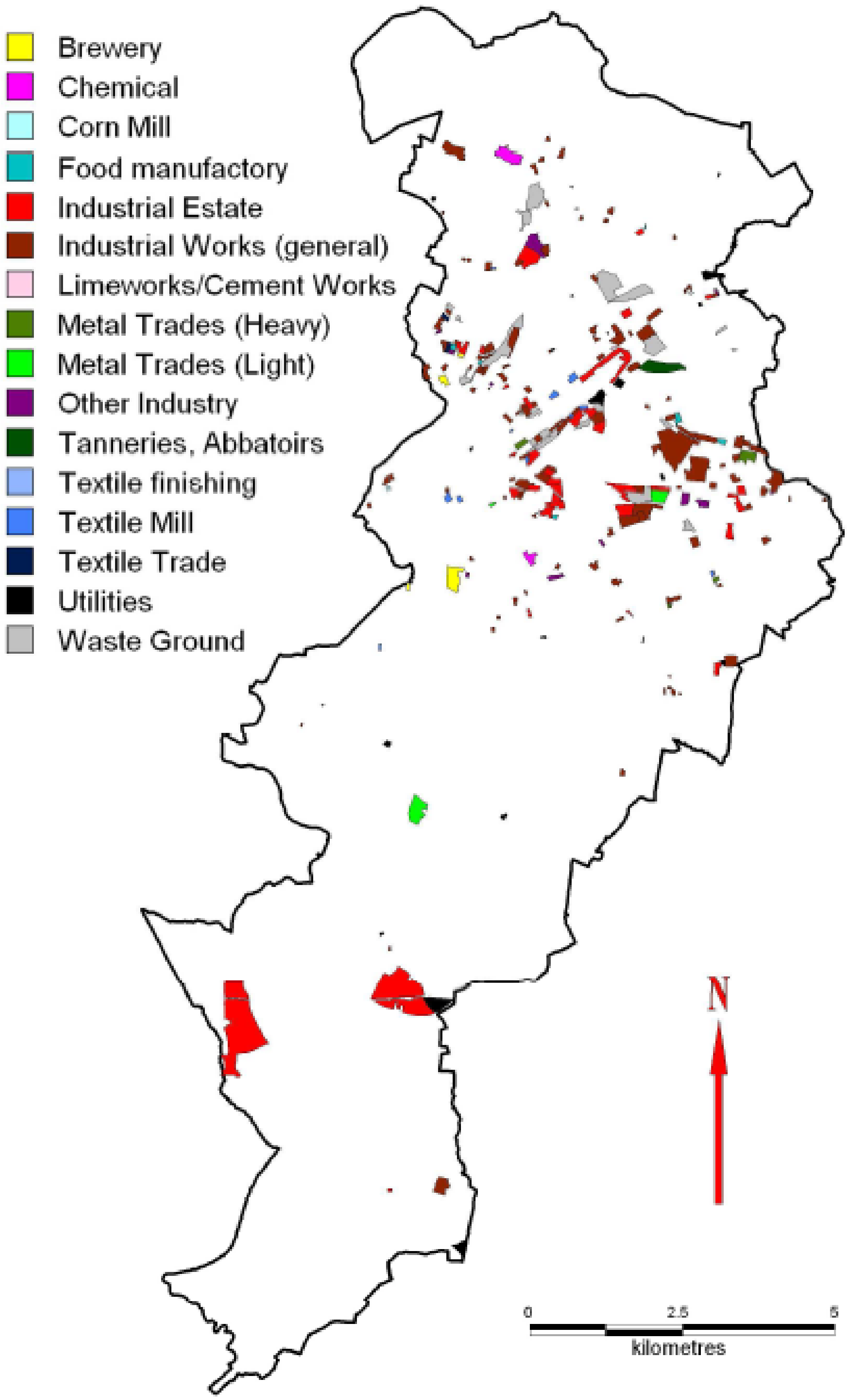


Figure 4.4: Industrial HLC types in Manchester (GMAU 2009: 87, Fig. 17.)

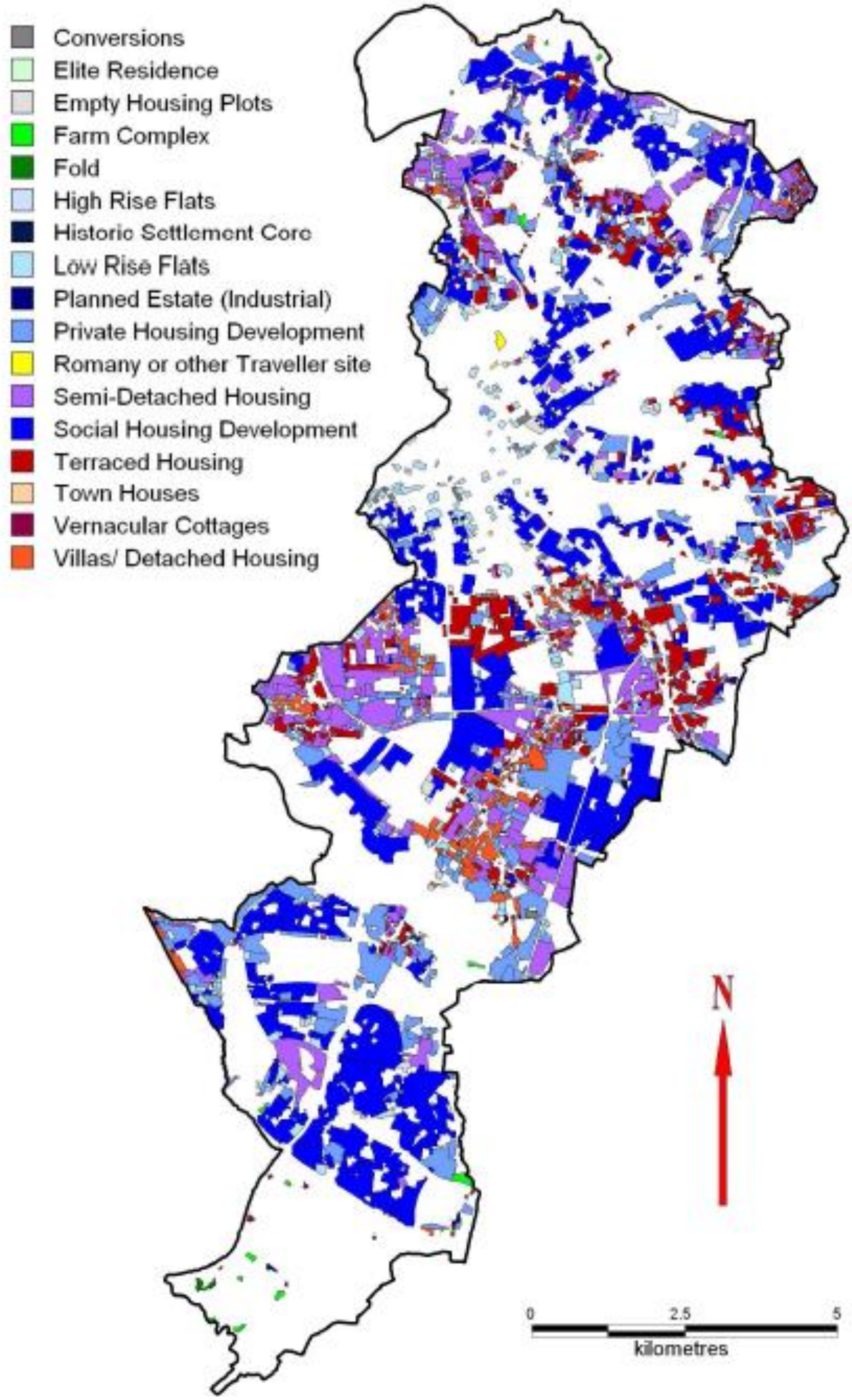


Figure 4.5: Residential HLC types in Manchester (GMAU 2009: 48 Fig. 9).

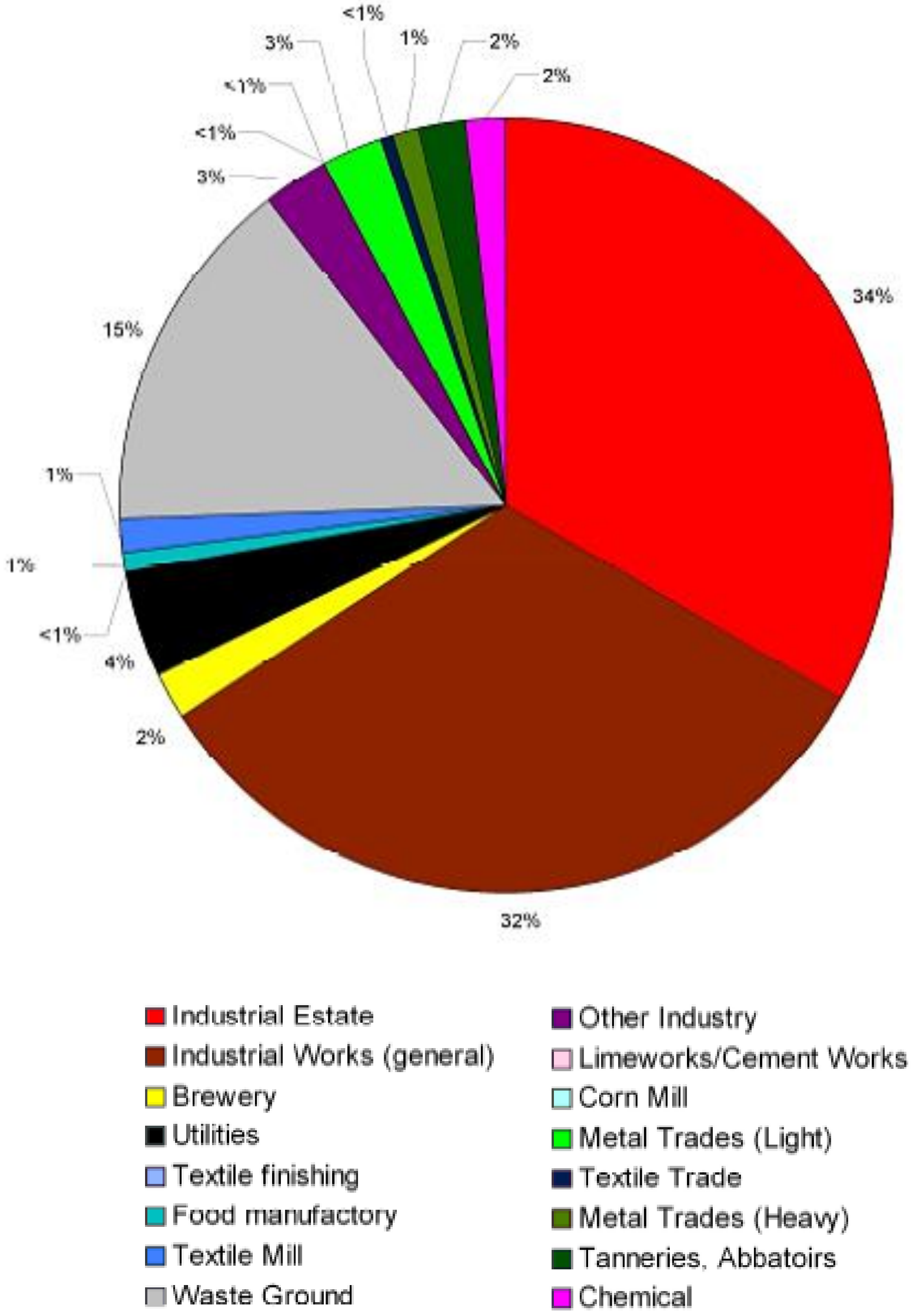


Figure 4.6: Pie chart of Industrial HLC types in Manchester (GMAU 2009: 89, Fig. 18.).

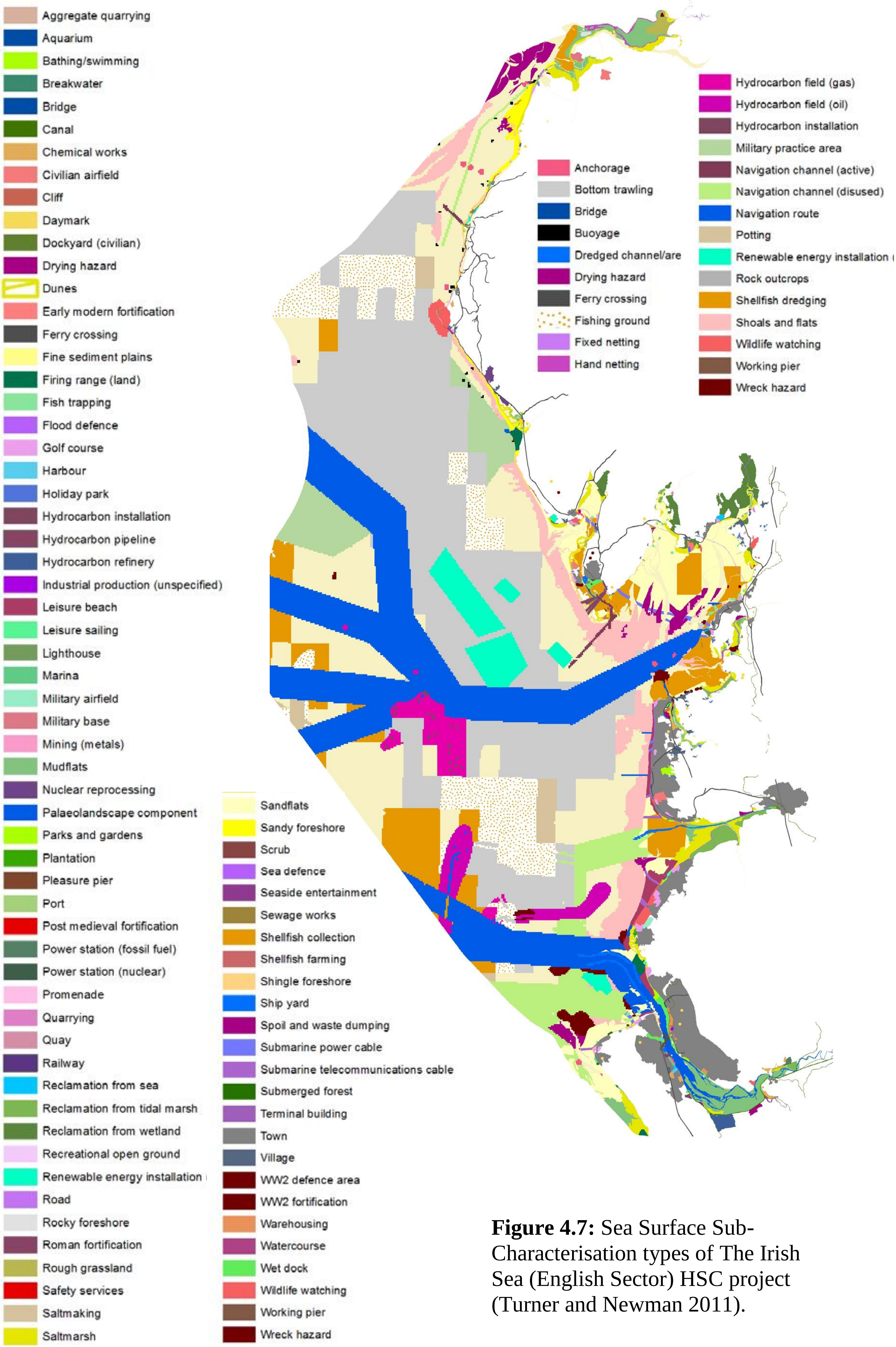


Figure 4.7: Sea Surface Sub-Characterisation types of The Irish Sea (English Sector) HSC project (Turner and Newman 2011).

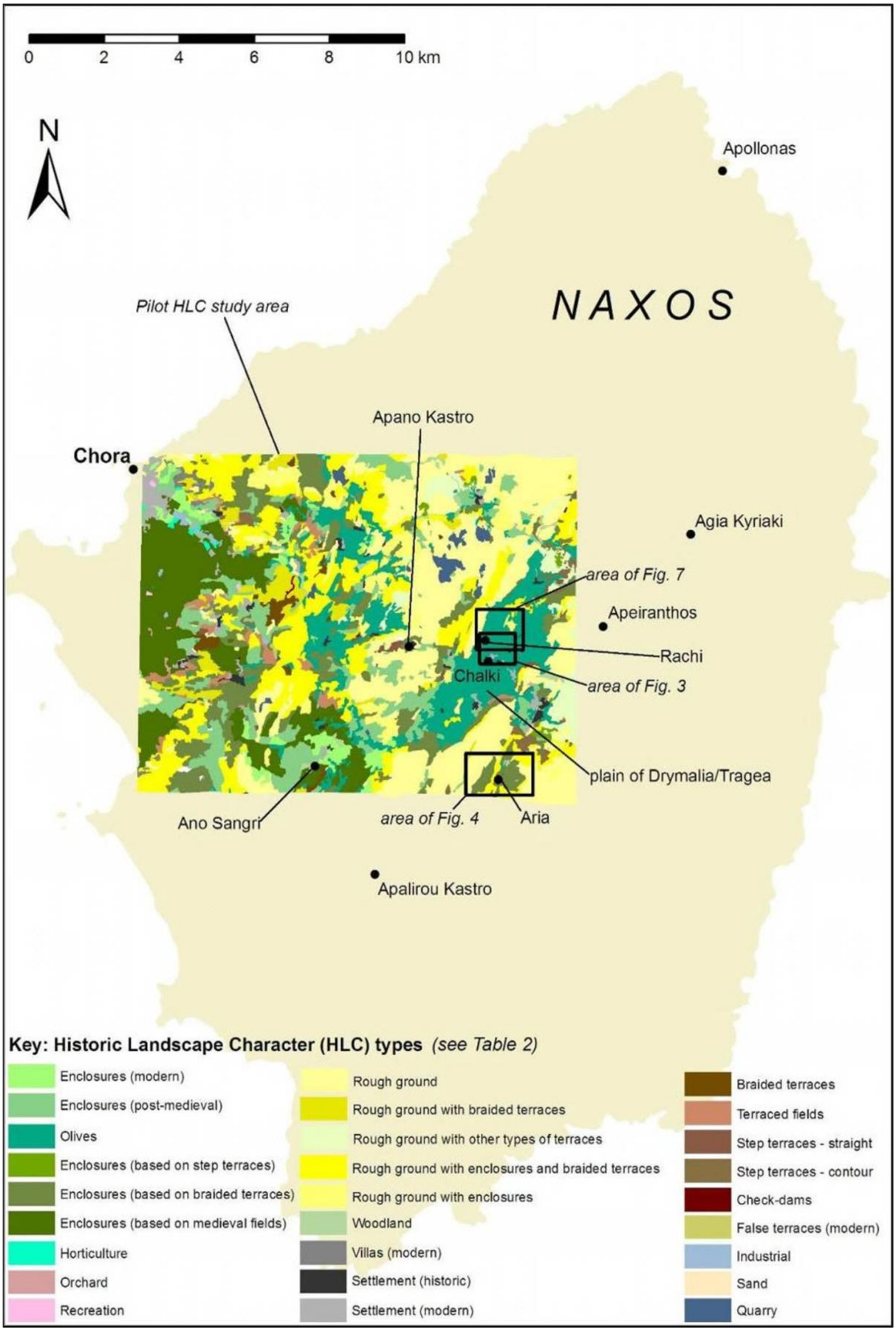


Figure 4.8: HLC of Naxos, Greece (Crow *et al.* 2011: 121).

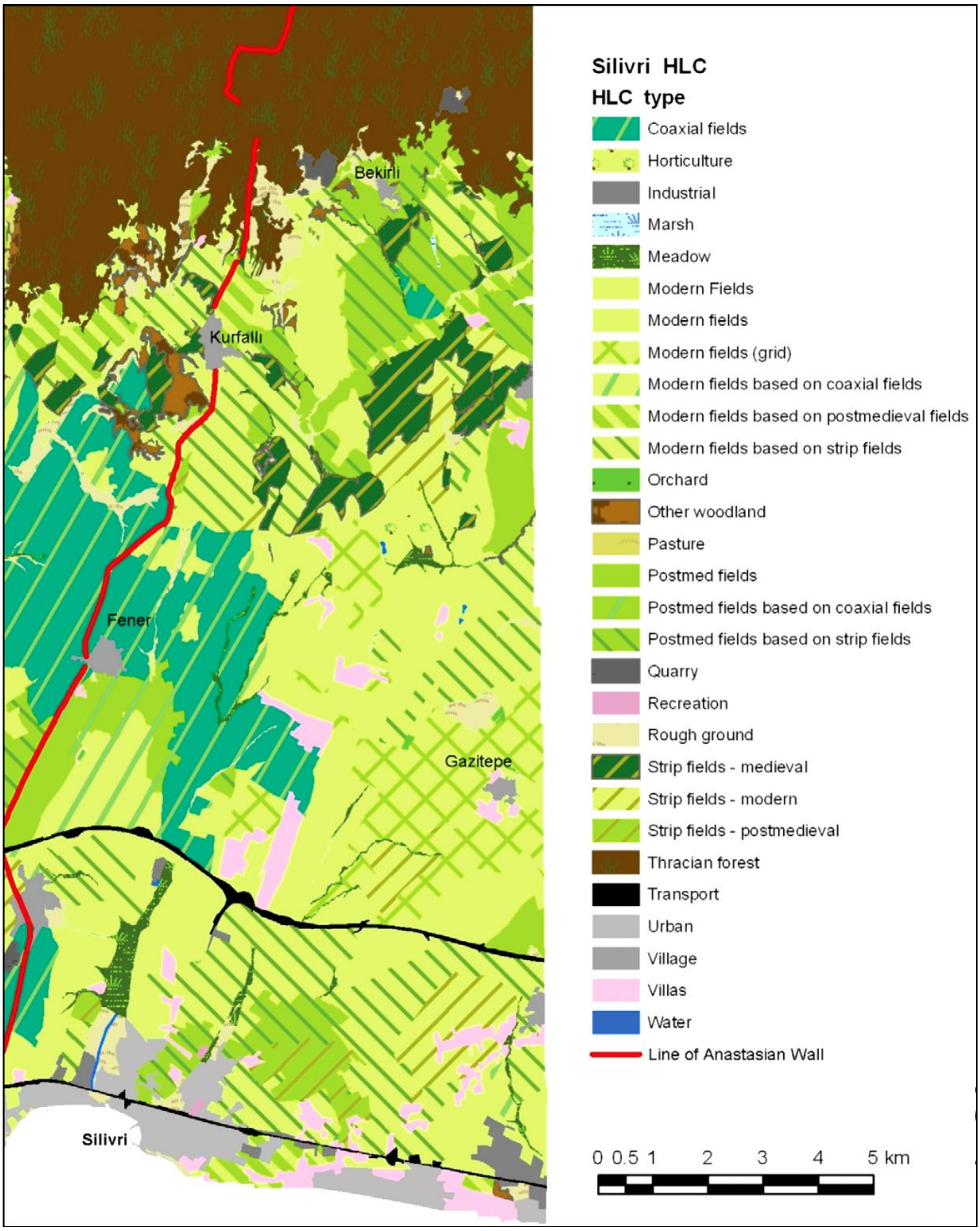


Figure 4.9: HLC of Silivri, Thrace (Turner and Crow 2010: 227, Fig. 6.).

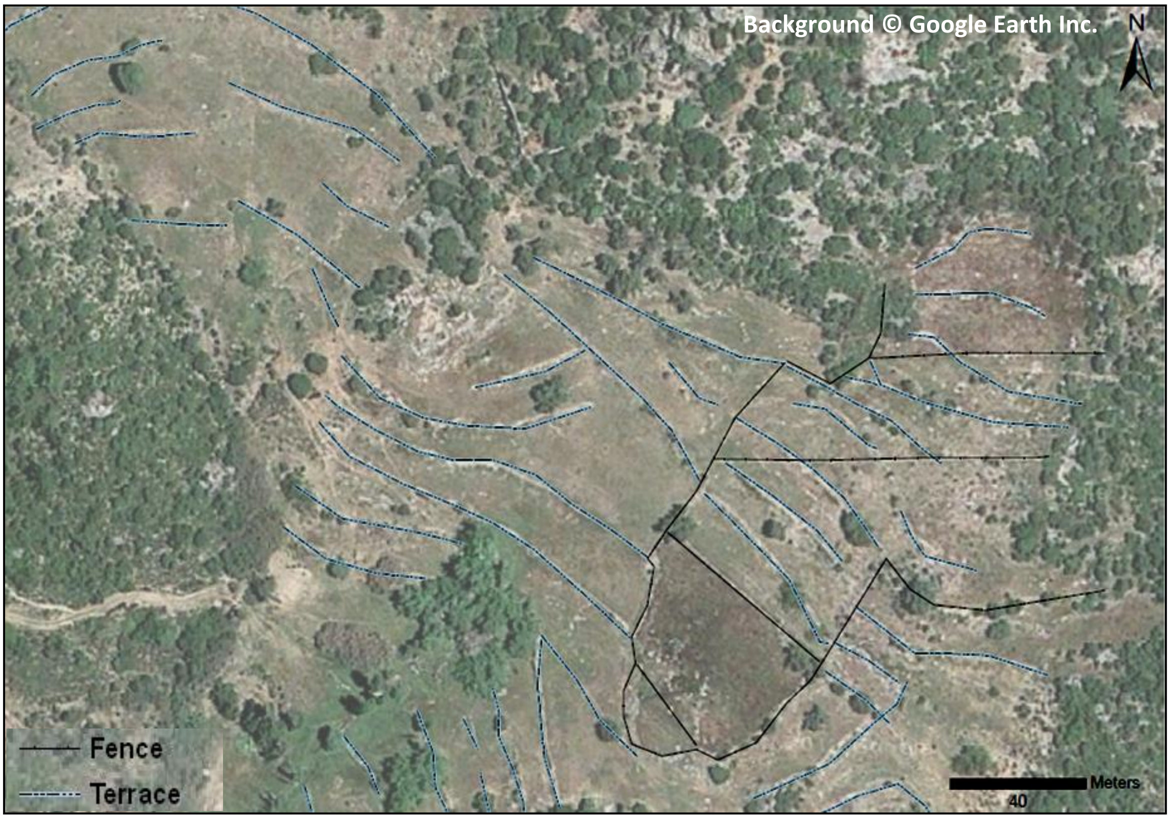


Figure 5.1: GPS survey of boundaries at Pednelissos, Pisidia (SU_05) overlaid on Google Earth imagery.

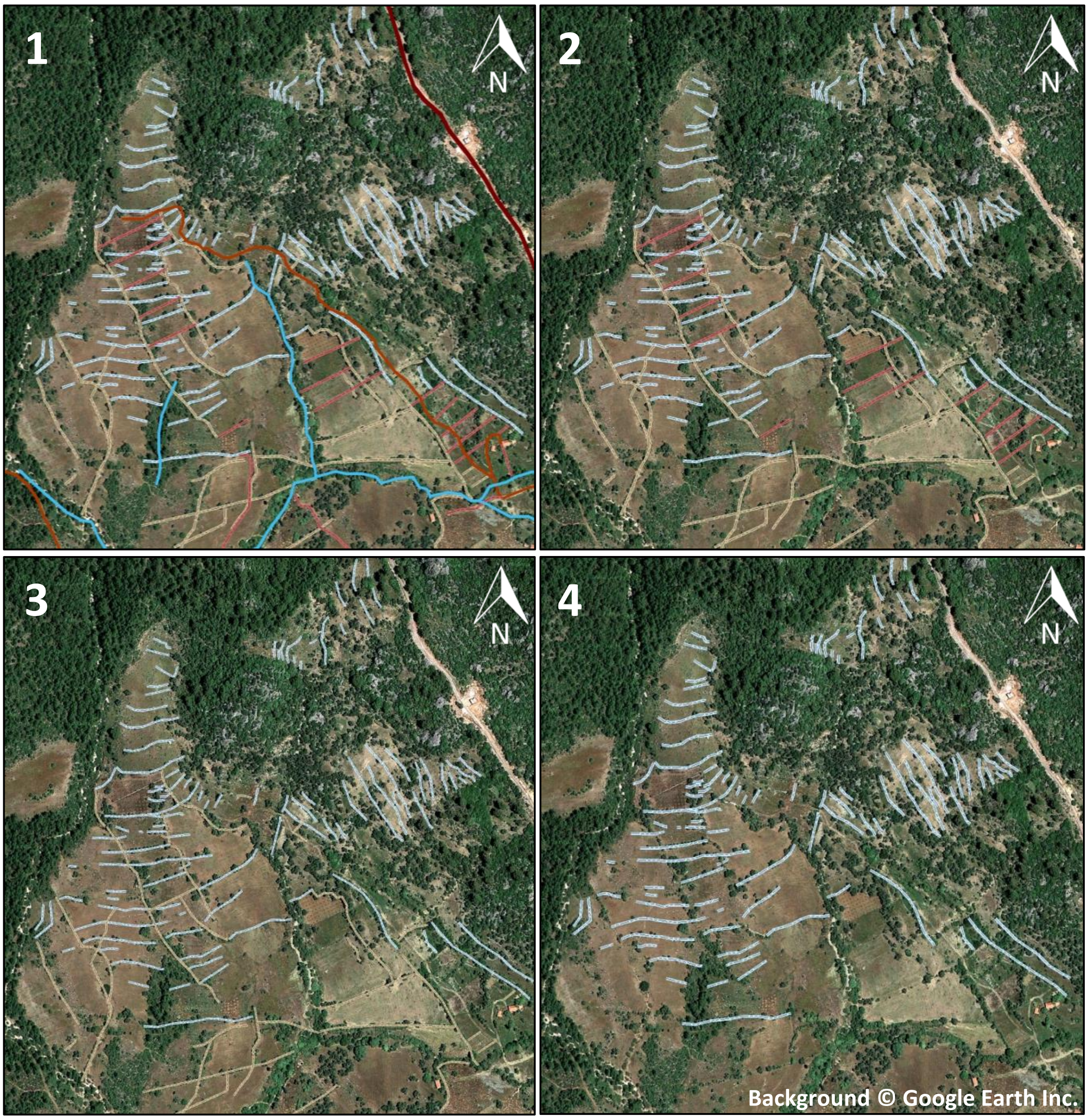


Figure 5.2: Retrogressive landscape analysis image sequence of Kozan Köyü, Pisidia (SU_04).

Figure 5.3: Wall of a water mill in Pisidia. Diagnostic ceramic sherds can be clearly seen within the mortar of building.

Figure 5.4: Terrace with tree growing from it in Pisidia. This suggests that the terrace is older than the tree.

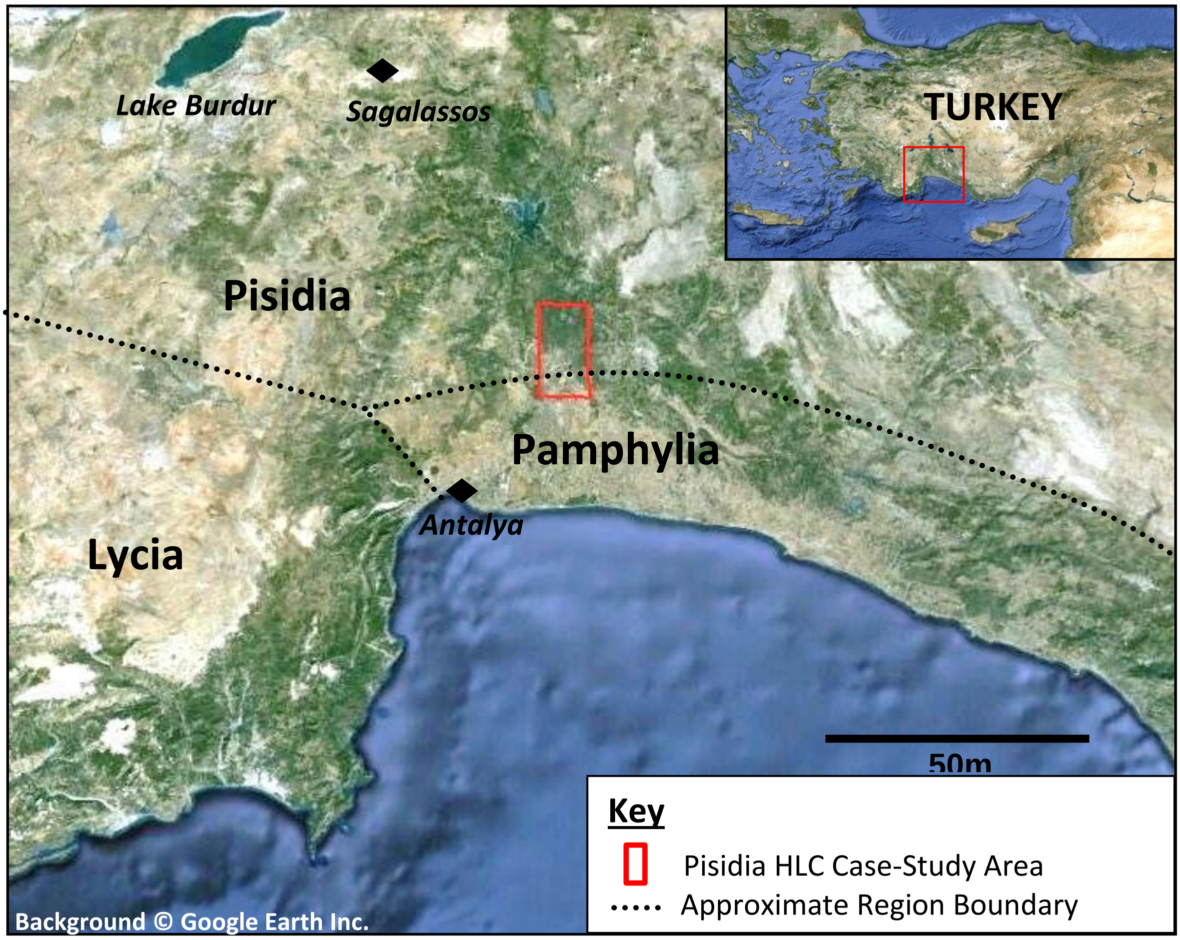


Figure 6.1: Location of the Pisidia HLC case-study area.

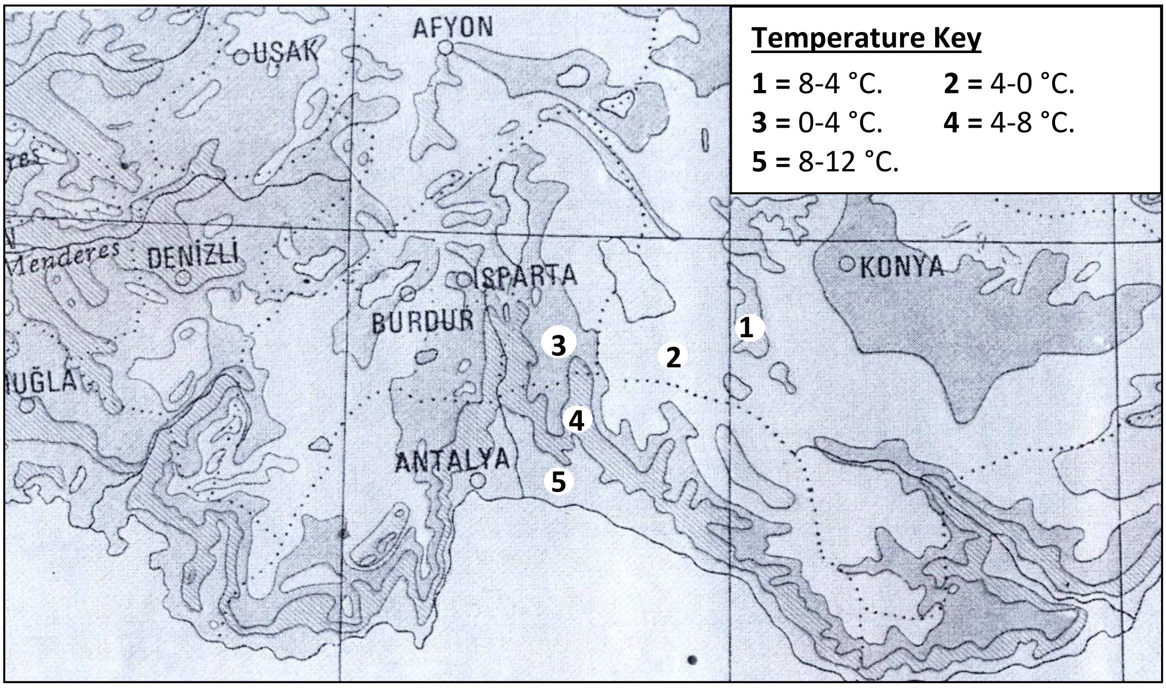


Figure 6.2: Map of average temperature levels in January (Bottema and Woldering 1984: 127).

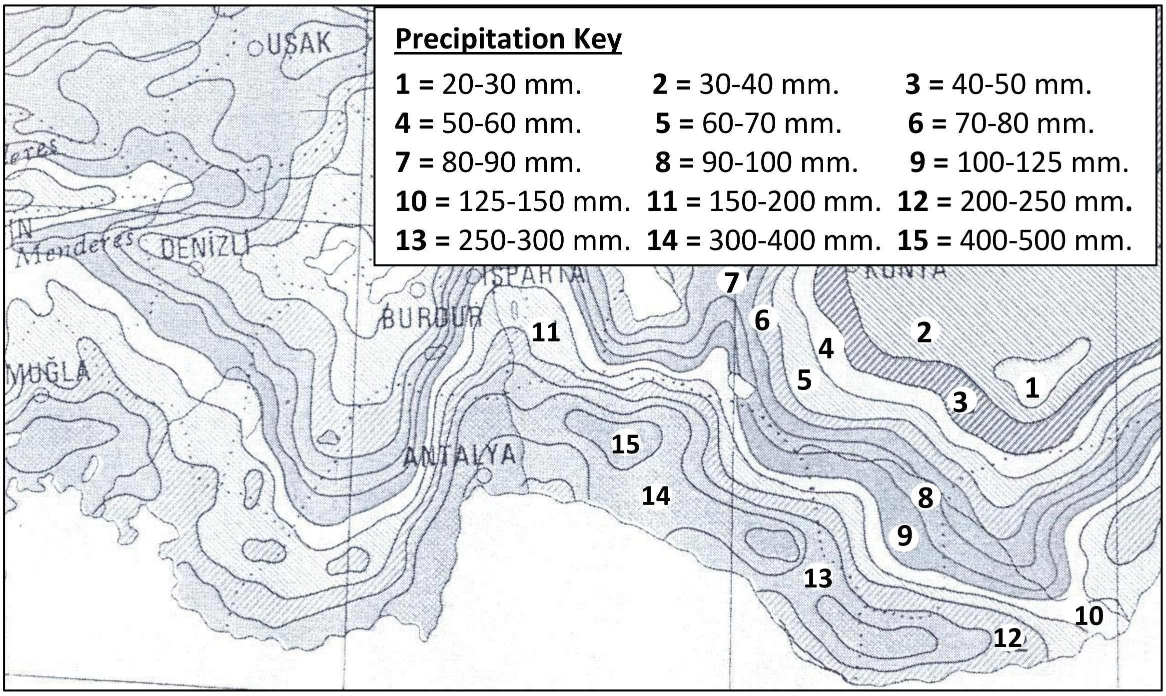


Figure 6.3: Map of average precipitation levels in January (Bottema and Woldering 1984: 126).

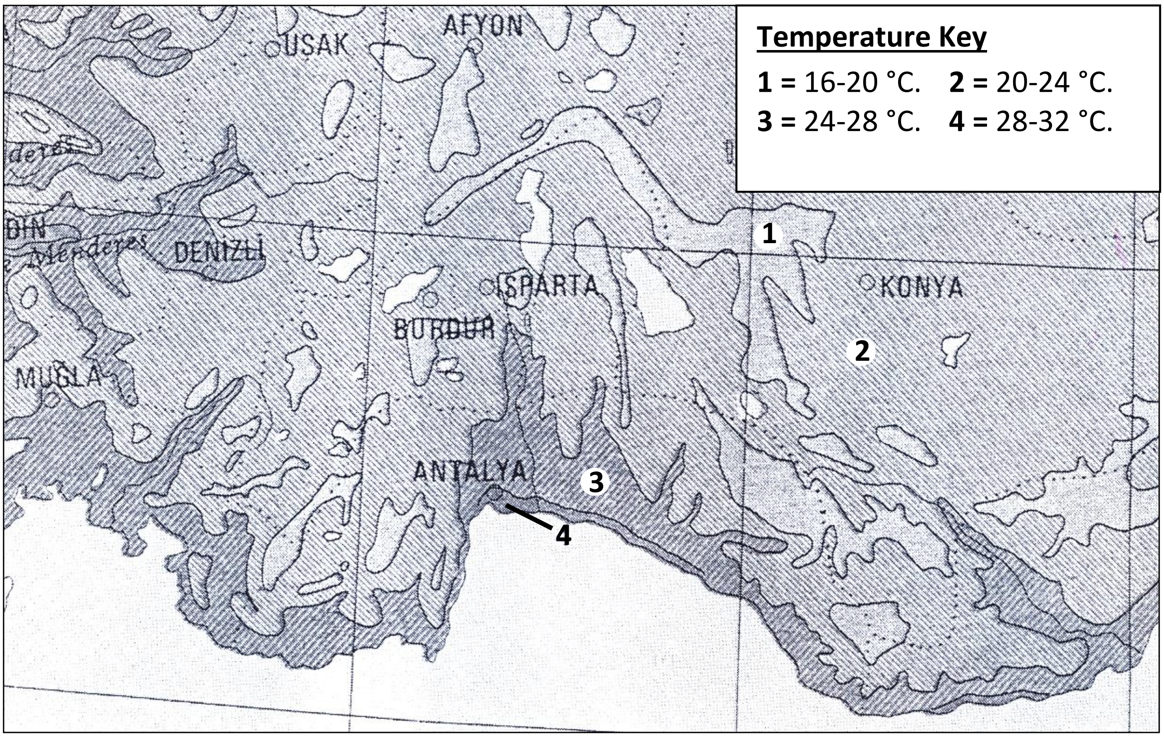


Figure 6.4: Map of average temperature levels in July (Bottema and Woldering 1984: 128).

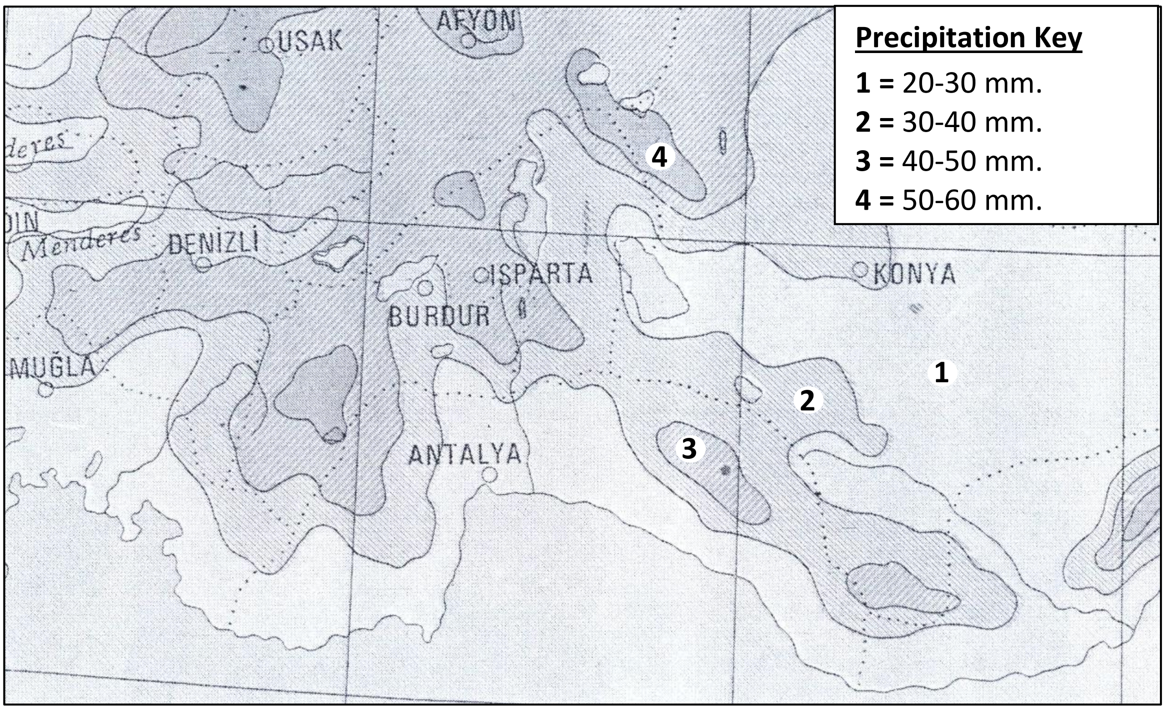


Figure 6.5: Map of average precipitation levels in July (Bottema and Woldering 1984: 127).

Figure 6.6: Possible grape press construction. 1. Beam slot for press. 2. Press bed. 3. Drainage hole. 4. Collection container.

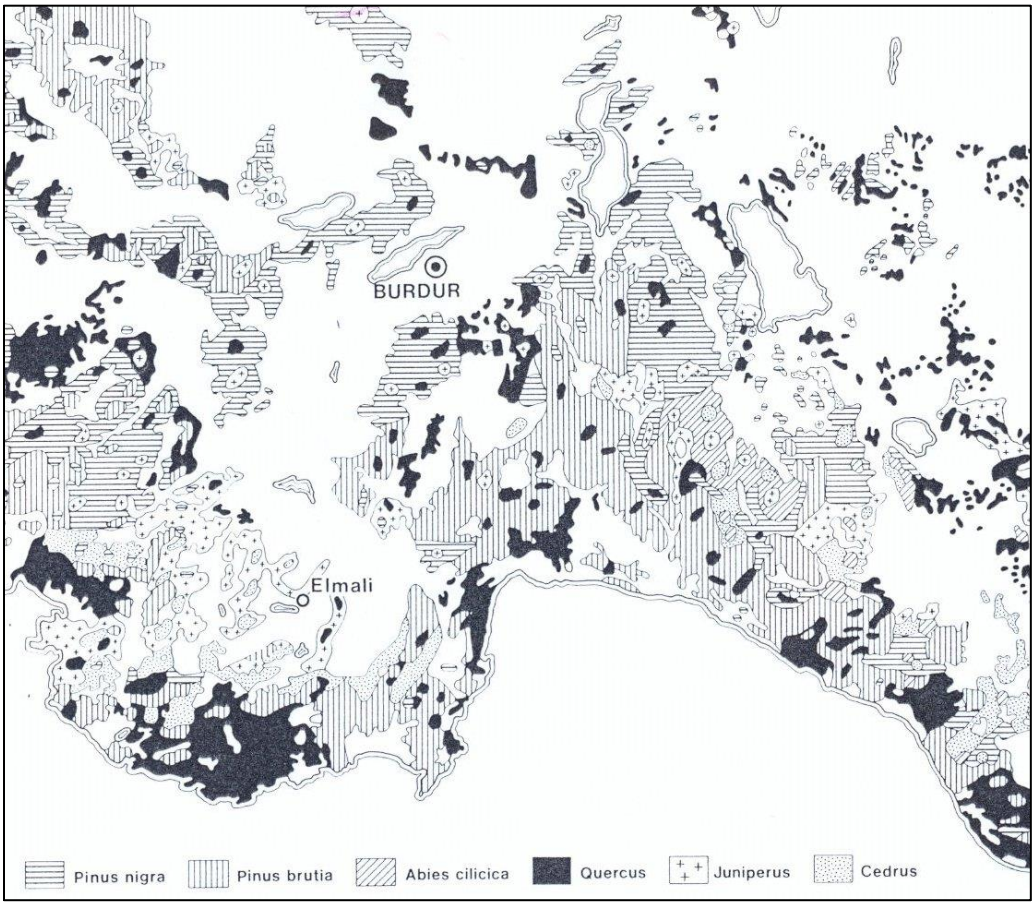


Figure 6.7: Map of tree species locales (Bottema and Woldering 1984: 125).

Figure 6.8: Possible olive press beds found in Pisidia.

Figure 6.9: Hittite Anatolia c. 1300 B.C. depicting the region of Lukkā (Mladjov n.d.).

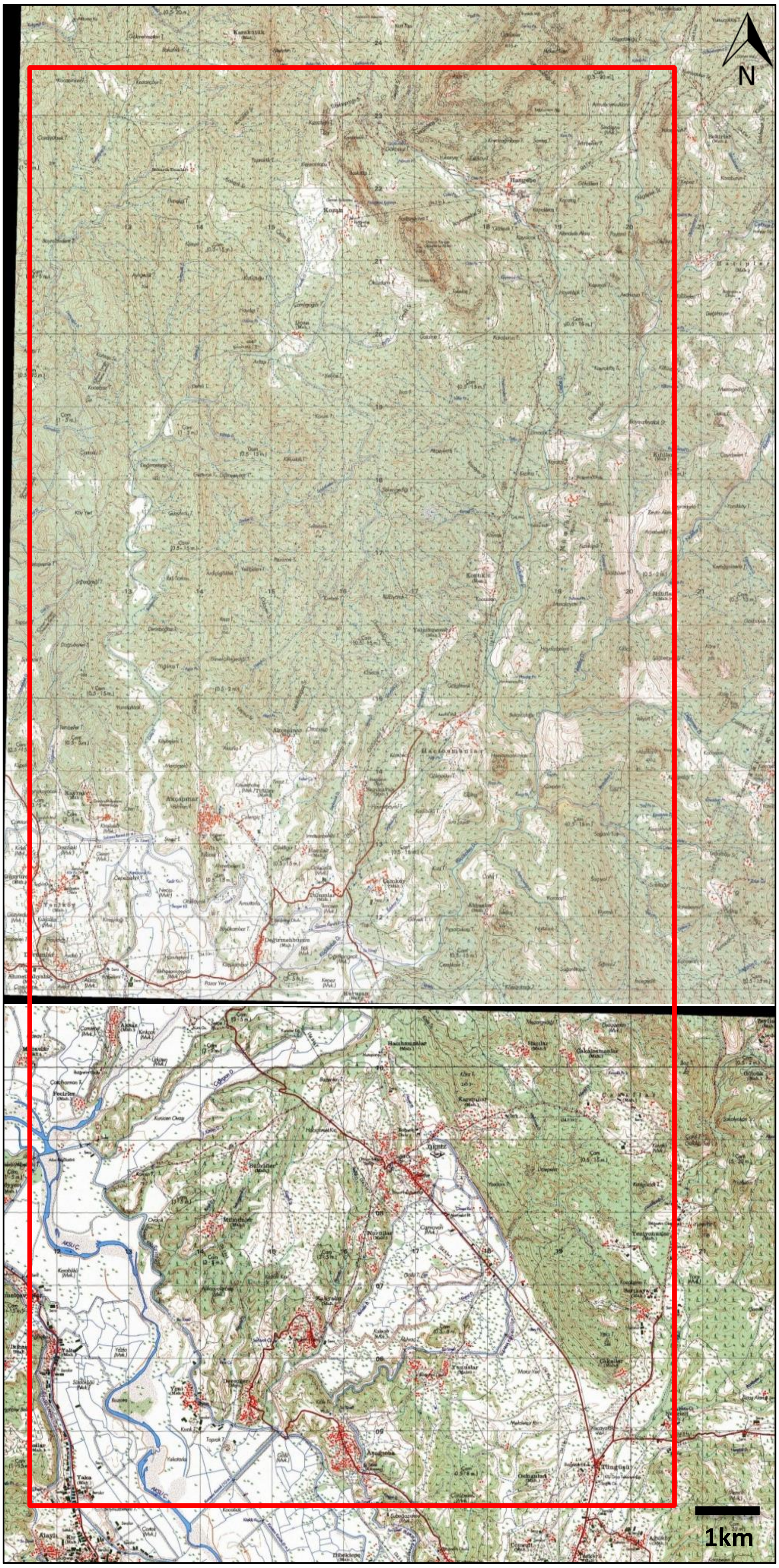
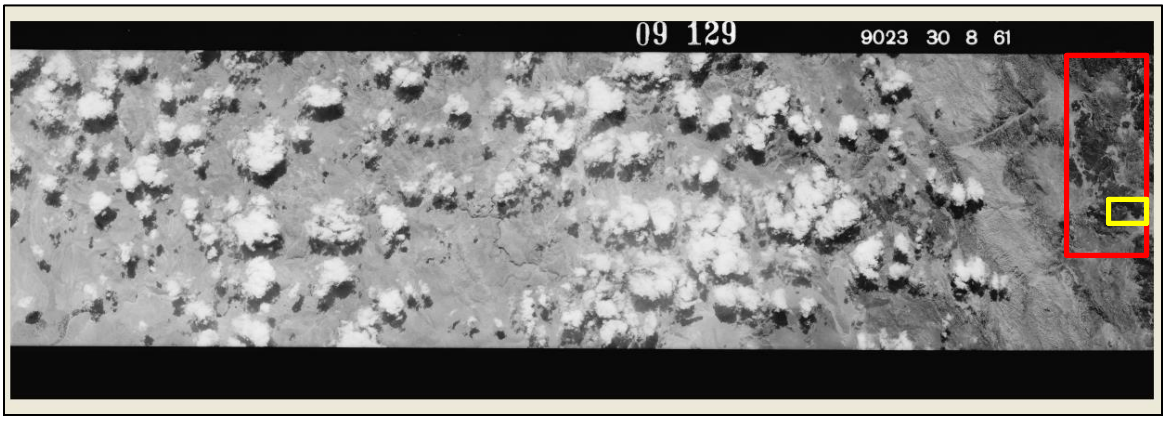


Figure 6.10: 1:25,000 Turkish National Maps with Pisidia HLC case-study area highlighted.

Figure 6.11: Google Earth imagery of the Pisidia HLC case-study area.



Entity ID	DS009023009DV129	**Data Source**	Contractor
Date	1961/08/30	**Camera Resolution**	Vertical Medium
Mission	9023	**Camera Type**	Vertical
Revolution	009D	**Image Type**	Black and White
Frame	129	**Film Type**	70mm Panoramic
Polarity	Negative	**Generation**	2
NW Corner	37°01'58.80"N, 29°49'58.80"E	**SW Corner**	36°46'58.80"N, 29°52'58.80"E
NE Corner	37°30'00.00"N, 33°46'58.80"E	**SE Corner**	37°15'00.00"N, 33°48'57.60"E

Figure 6.12: CORONA imagery with attached data, highlighting the Pisidia HLC case-study area in red and the close up area (**Figure 6.14)** in yellow.

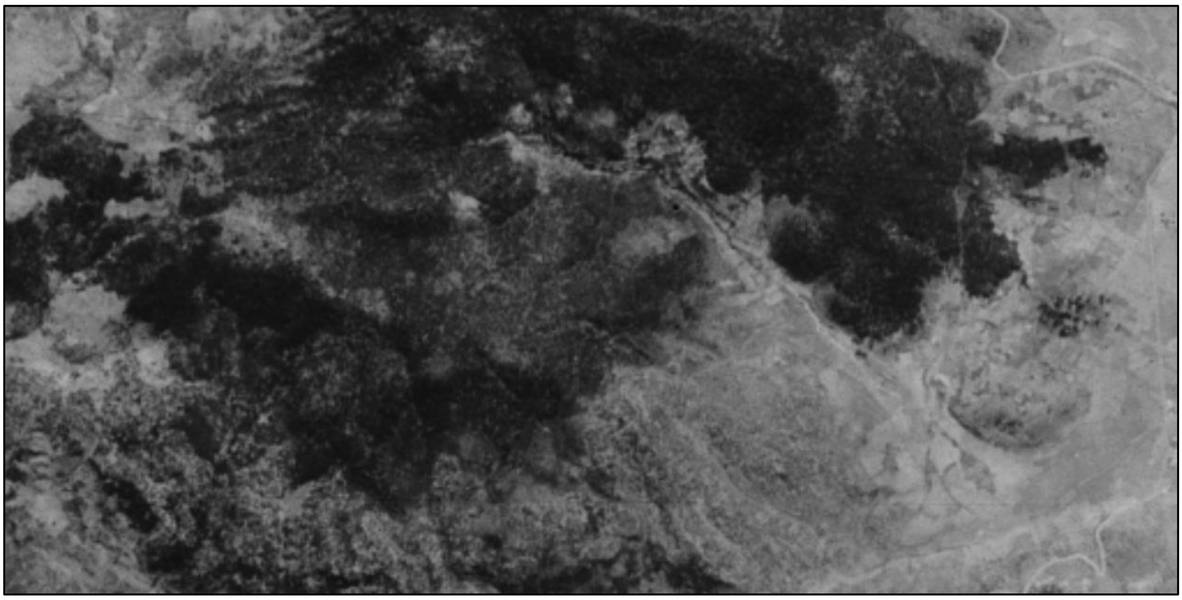


Figure 6.13: Close up of CORONA imagery showing low quality of image indicated by yellow rectangle in **figure 6.12**.

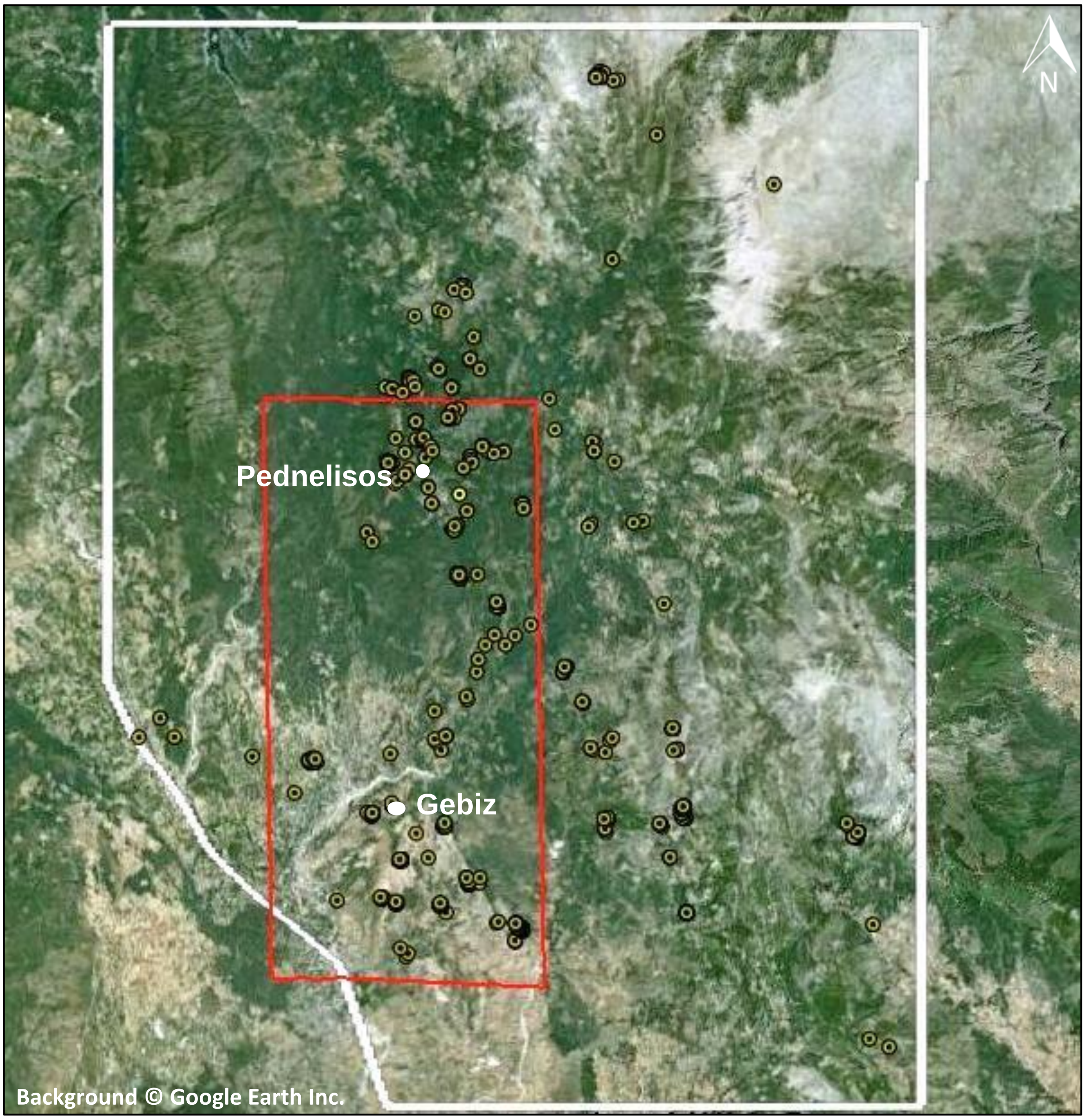


Figure 6.14: The PSP archaeological survey permit area outlined in white, with Pisidia HLC case-study area highlighted in red and the Pisidia Survey Project POI find spots indicated in yellow. Many of the find spots are located in currently uninhabited forested areas highlighting the higher level of activity in the past.

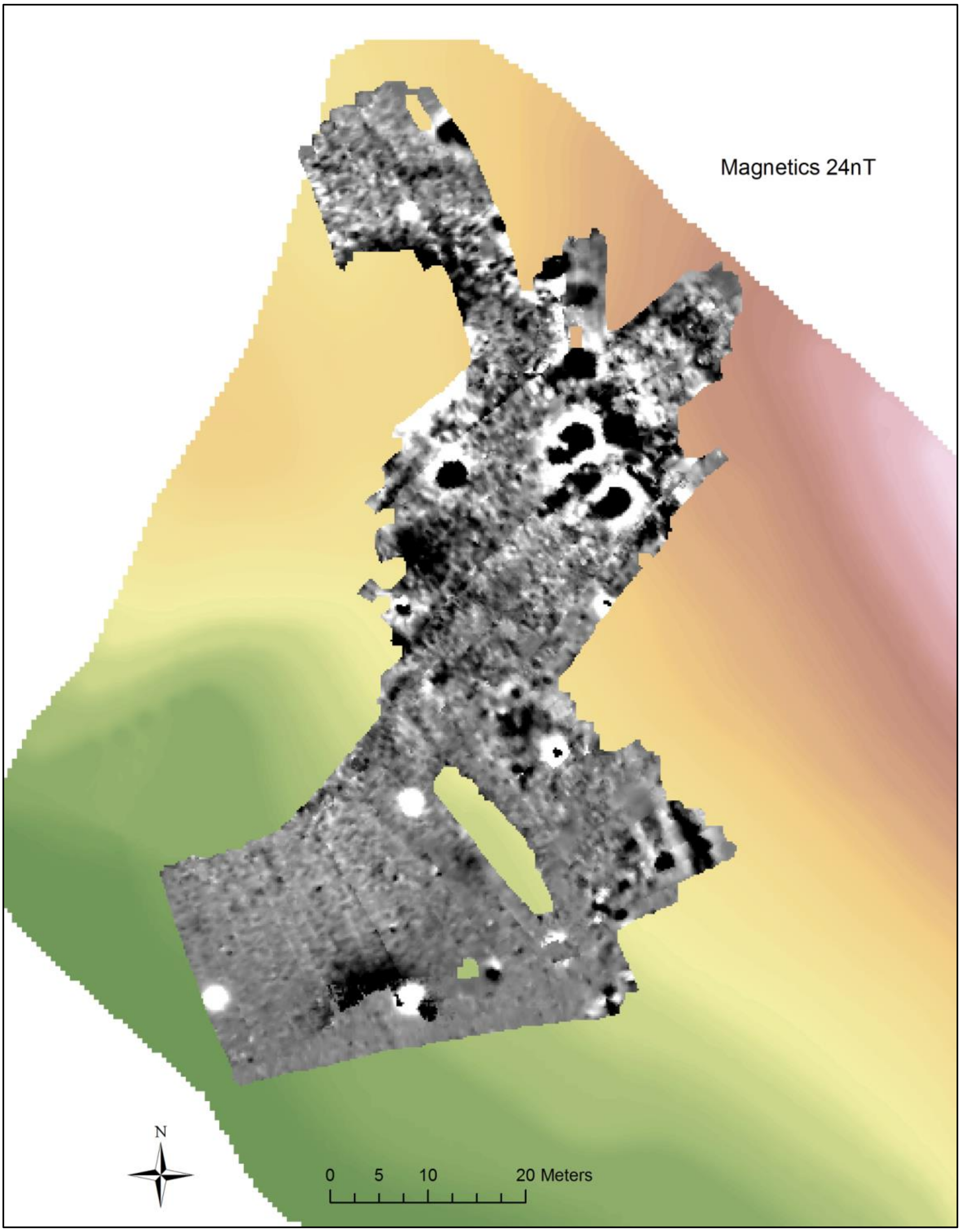


Figure 6.15: Geophysical Survey of Kadirgürü Mevkiisi, clearly showing key hole shaped kiln features (Courtesy of Pisidia Survey Project).

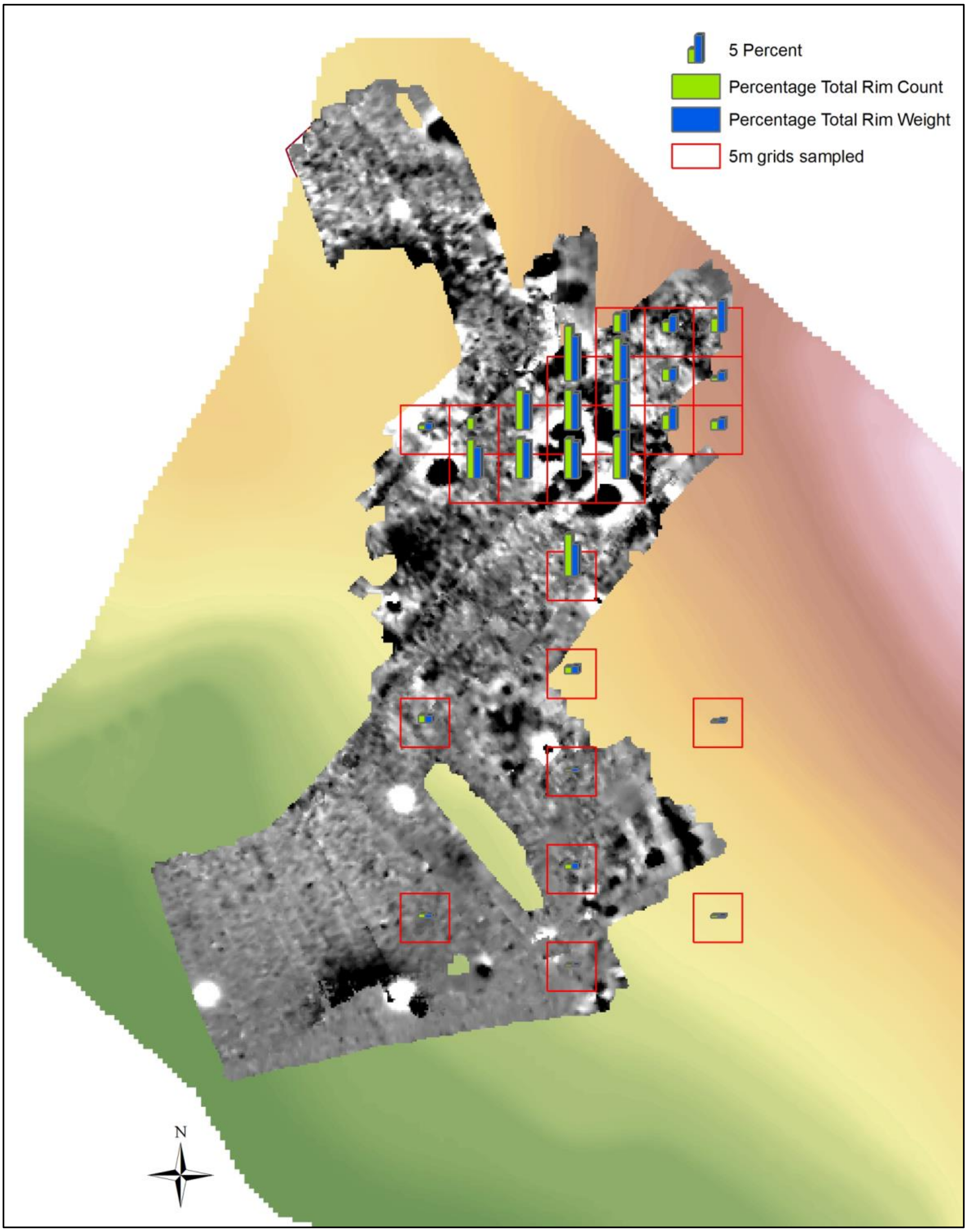


Figure 6.16: Ceramic grid survey of Kadirgürü Mevkiisi, overlaid upon resistivity survey. Bar charts represent percentage of each ceramic type per grid. (Courtesy of Mark Jackson).

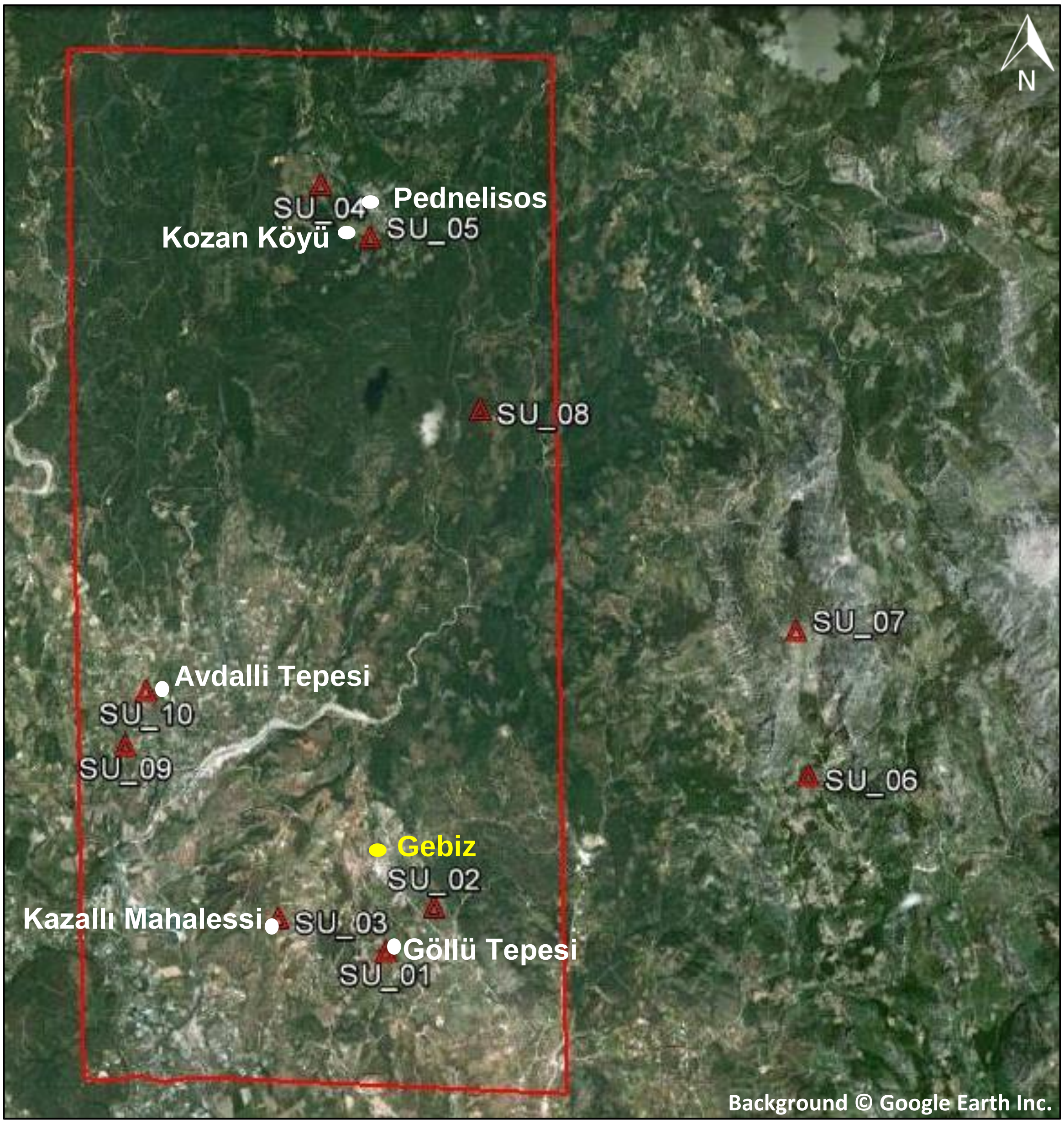


Figure 6.17: Survey Unit and Focus Study locations.

Figure 6.18: Transect lines at SU_02.

Figure 6.19: Students field walking along survey transect lines SU_10.

Figure 6.20: Identification and classification of diagnostic sherds.

Figure 6.21: Inputting ceramic data into Access database.

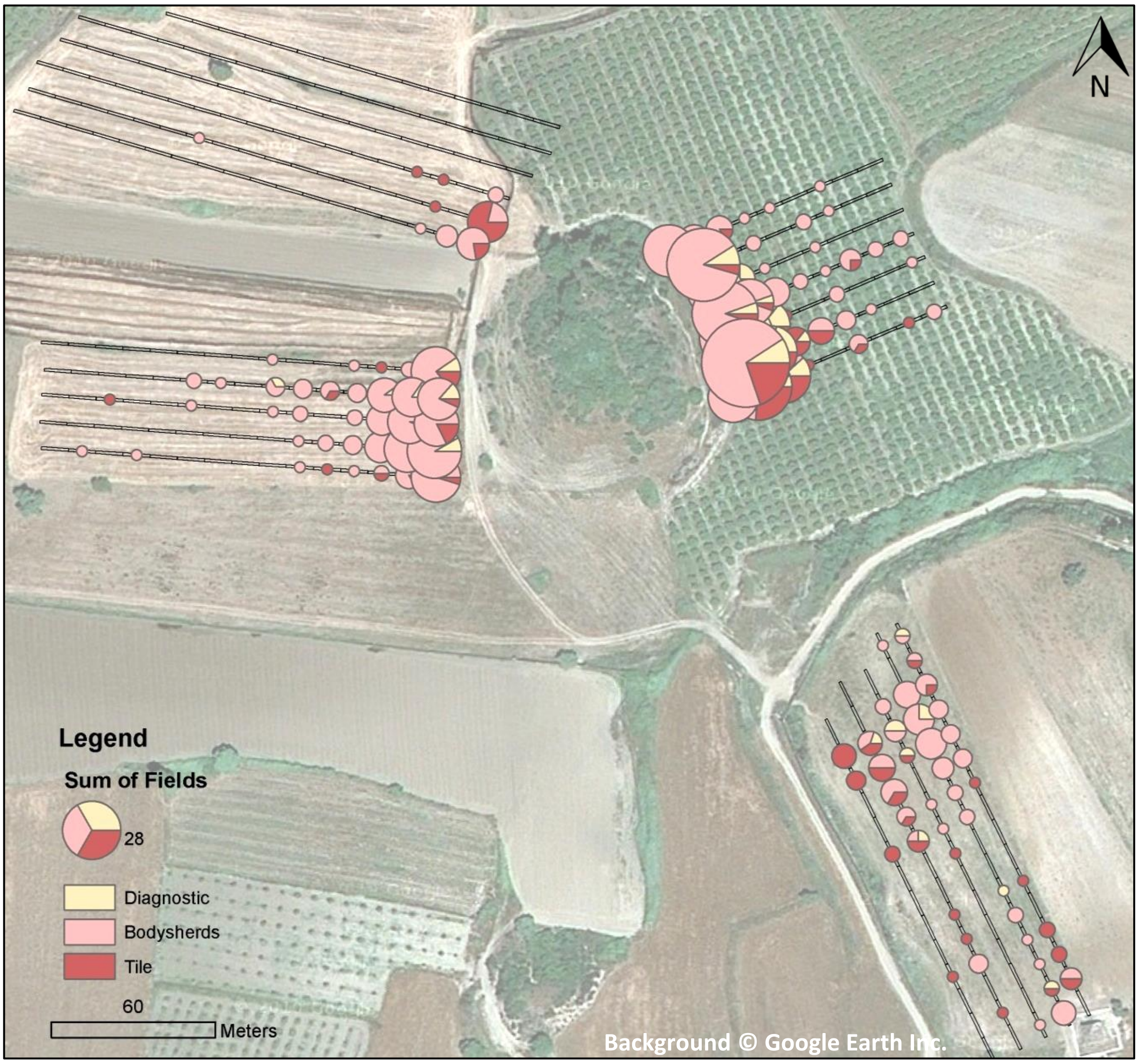


Figure 6.22: Quantity of body, diagnostic and tile sherds recorded in SU_01.

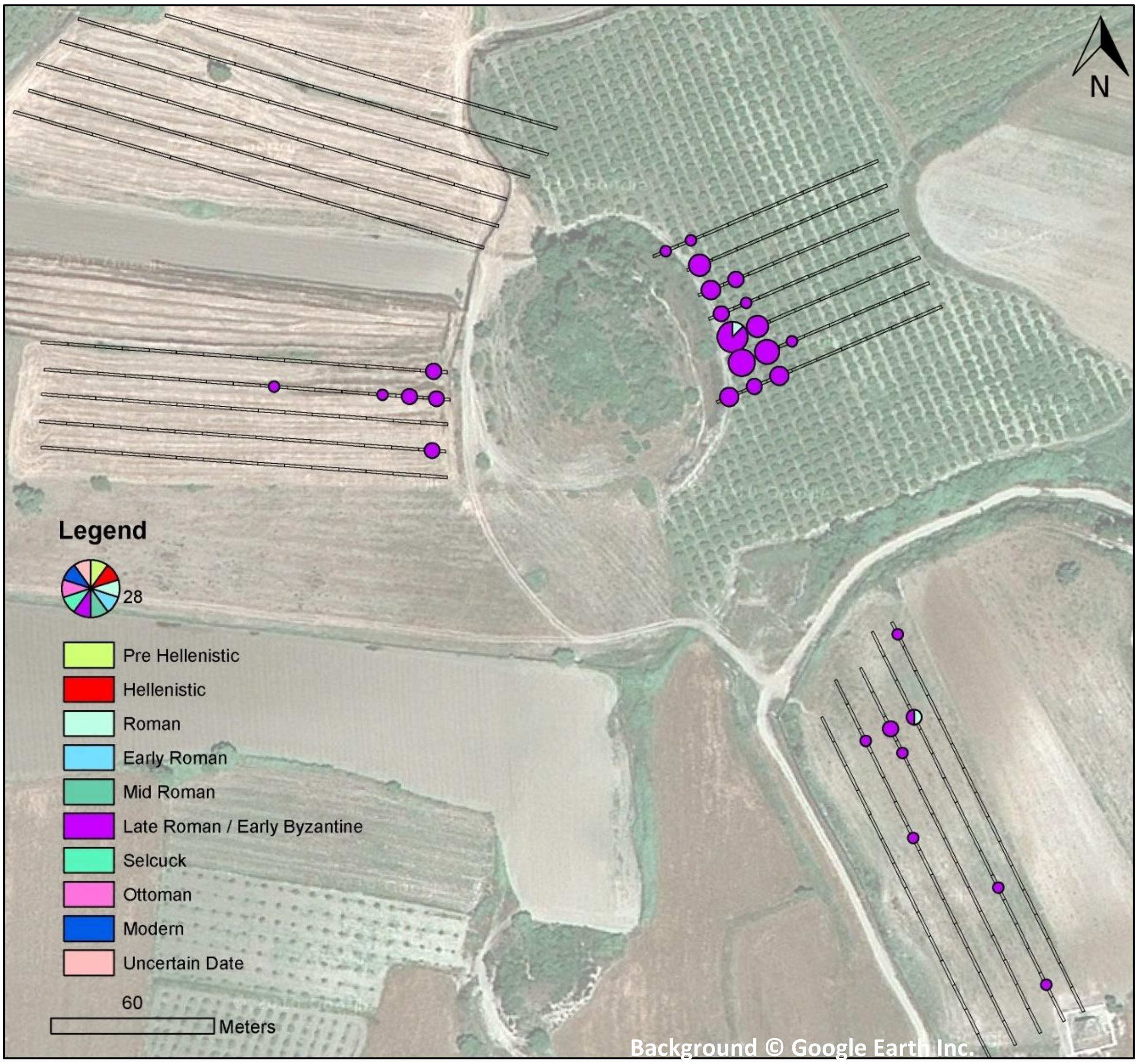


Figure 6.23: Dates for the diagnostic sherds recorded in SU_01.

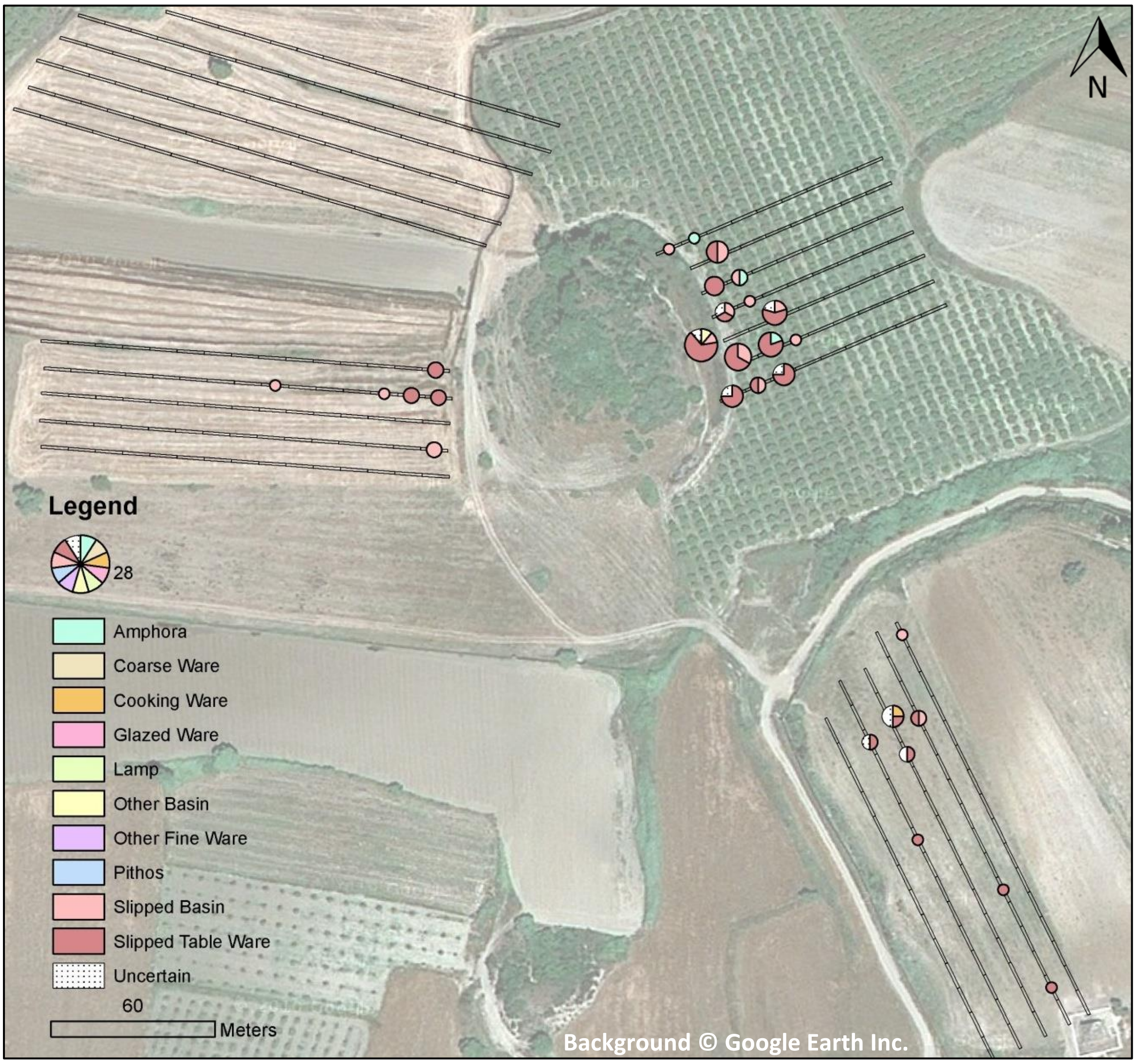


Figure 6.24: Class type for the diagnostic sherds recorded in SU_01.

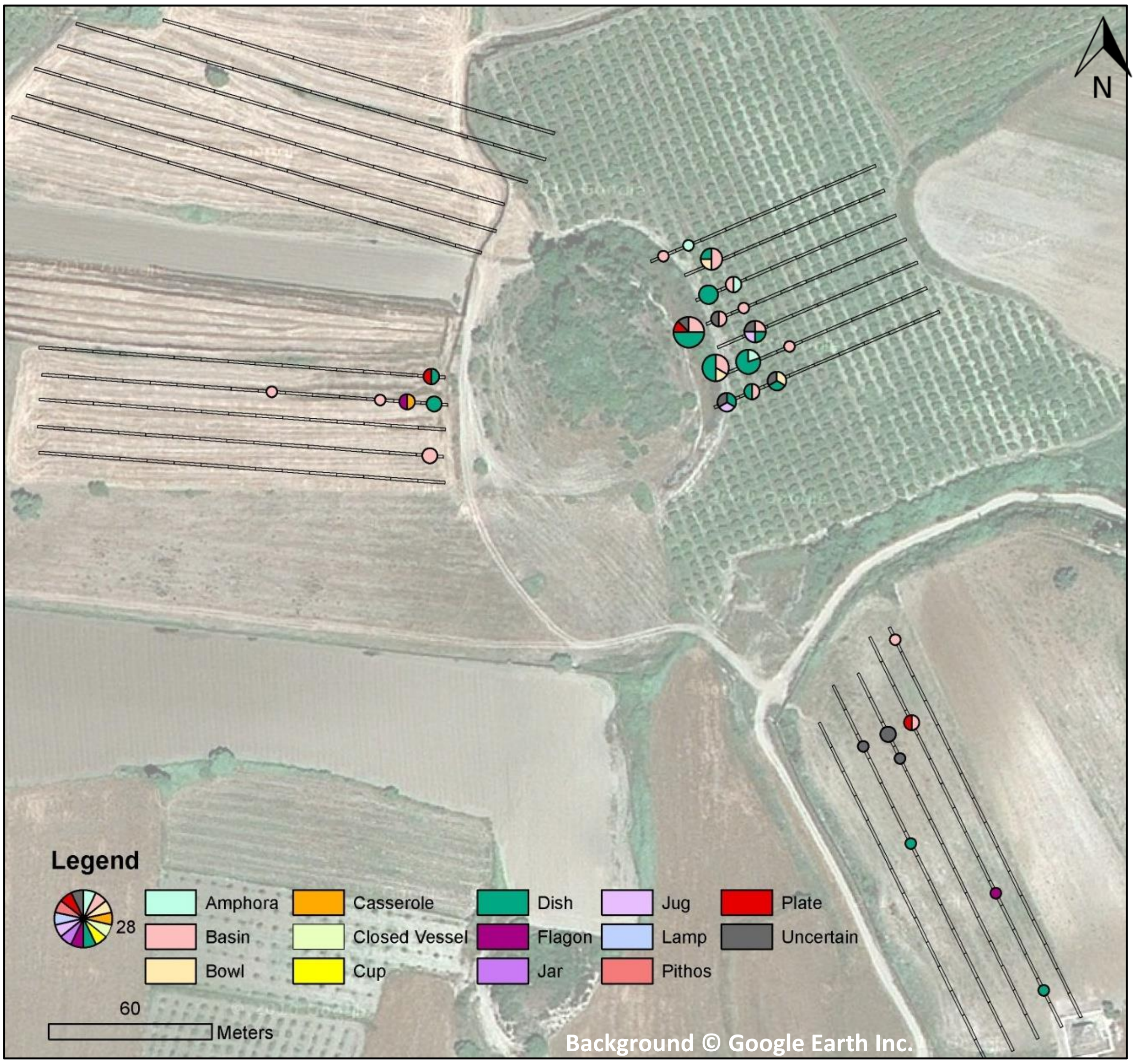


Figure 6.25: Vessel types for the diagnostic sherds recorded in SU_01.

Figure 6.26: Marshy reed bed north of SU_02.

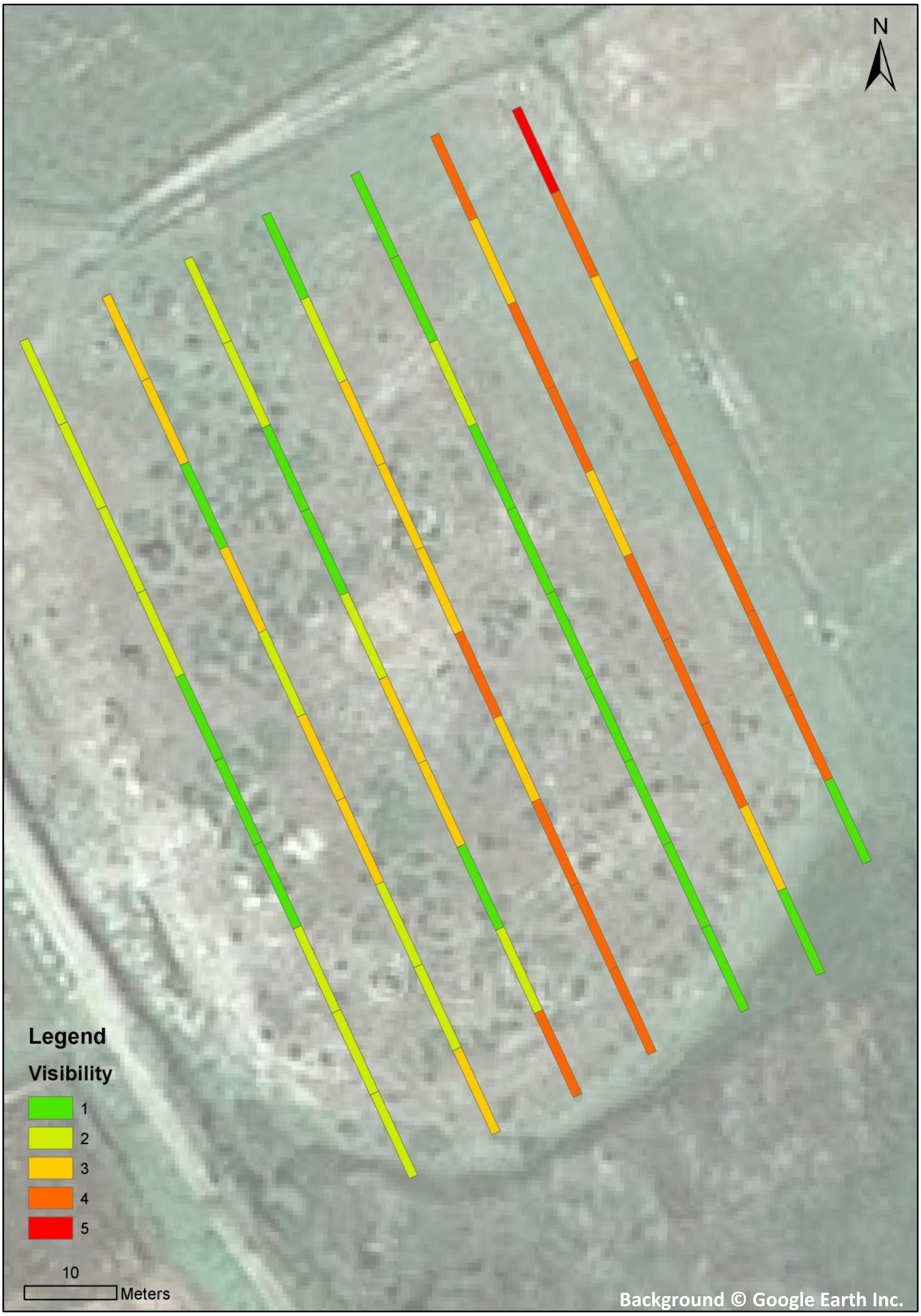


Figure 6.27: Visibility grading for the transect divisions in SU_02. 1 is poor, 5 is excellent.

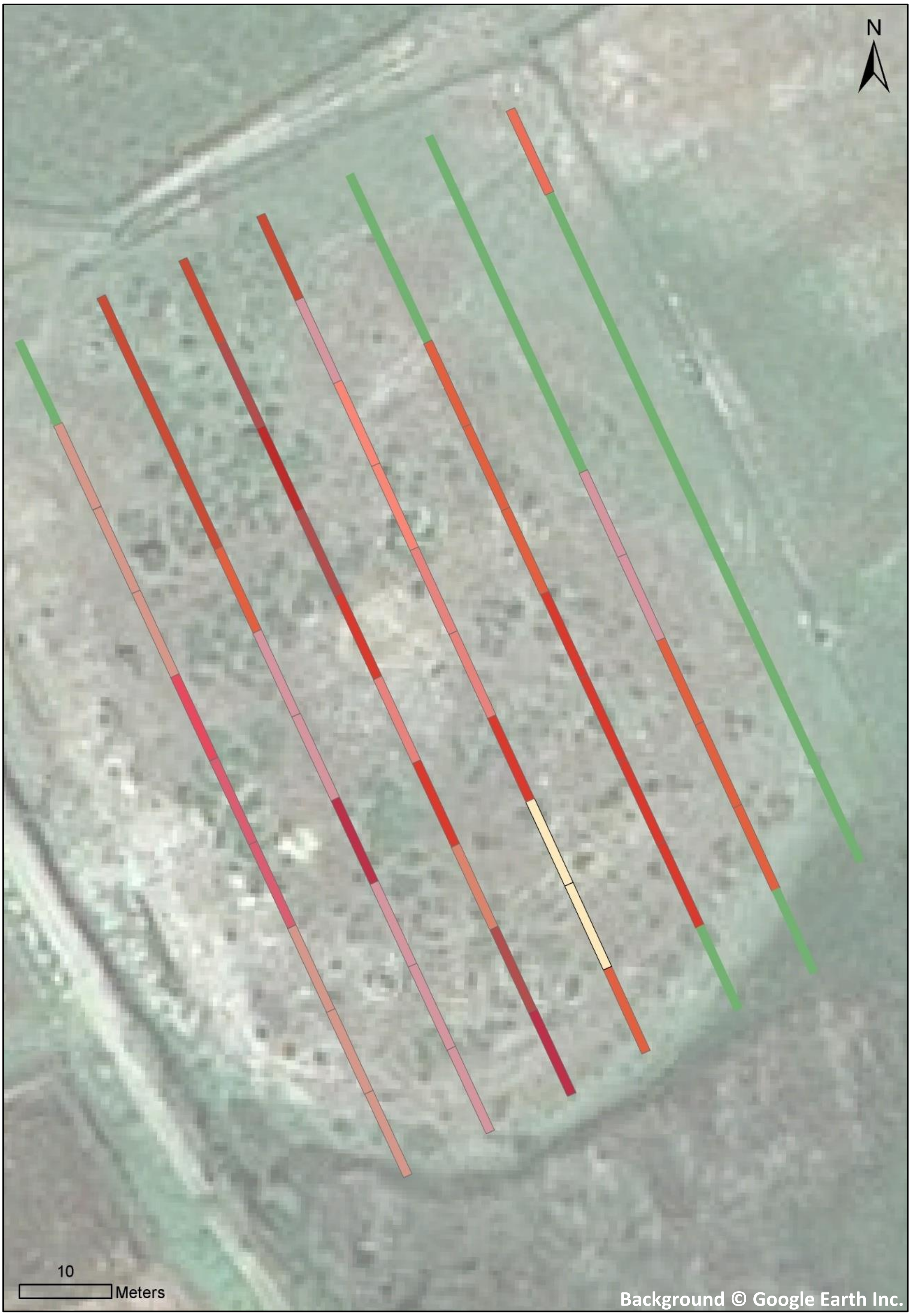


Figure 6.28: Surface coverage classifications for the transect divisions in SU_02. Green represents grasses, the darker orange red classifications represent variety of scrub levels and the pinker shades represent gravels and rocky areas.

Figure 6.29: Bodysherd density results in SU_02.

Figure 6.30: Tile fragment density results in SU_02.

Figure 6.31: Dates for the diagnostic sherds recorded in SU_02.

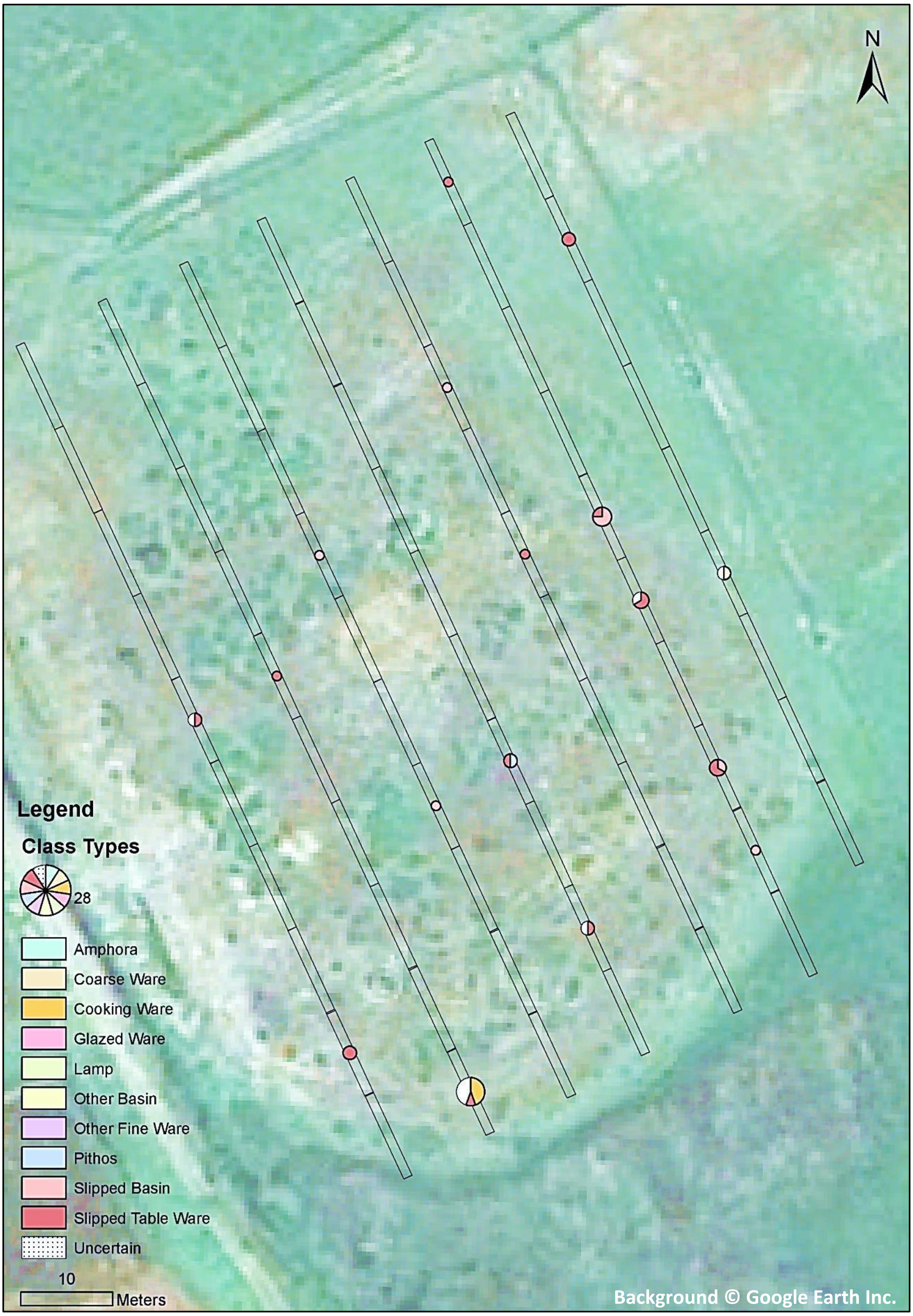


Figure 6.32: Class type results for diagnostic sherds recorded in SU_02.

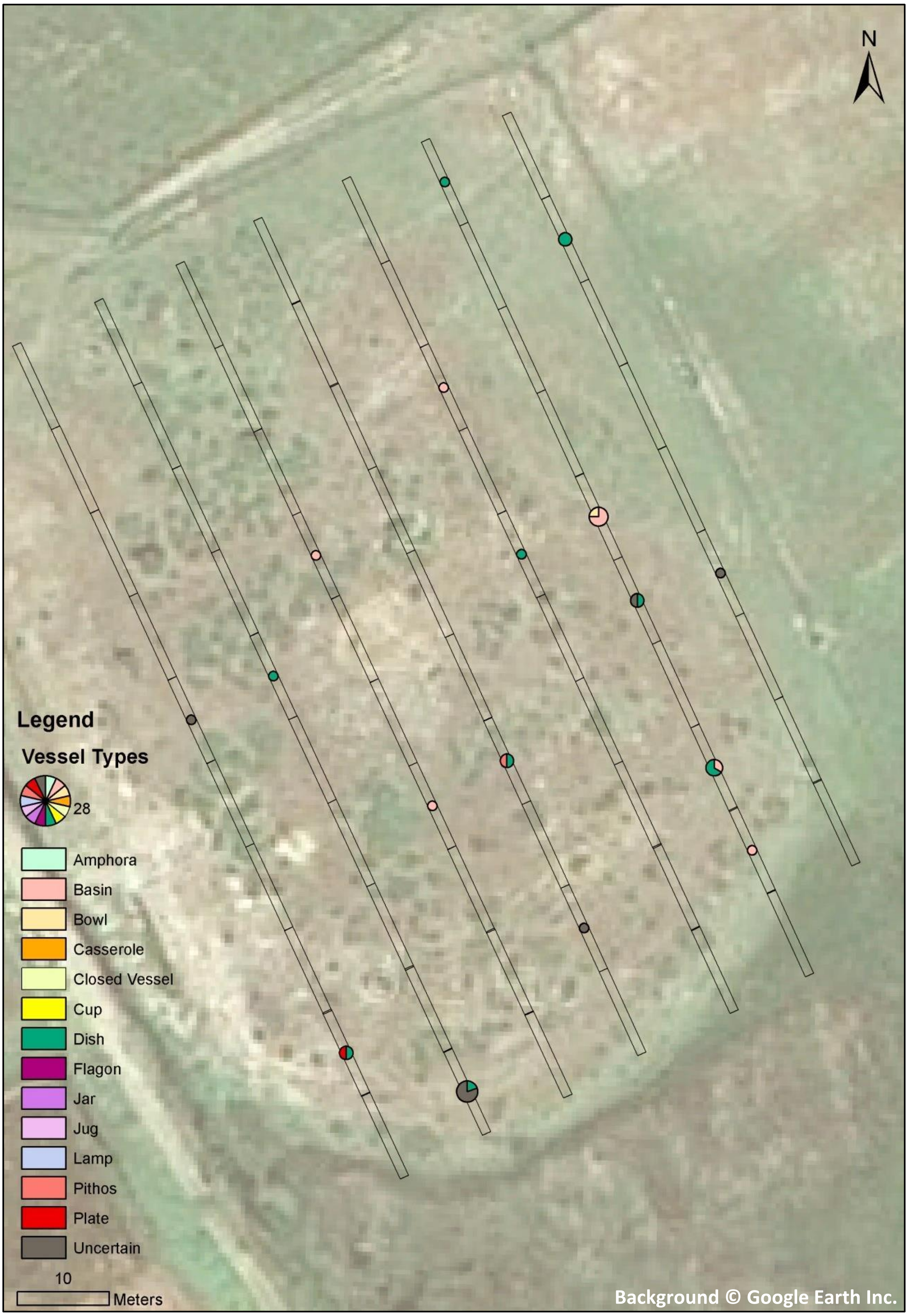


Figure 6.33: Vessel type results for diagnostic sherds recorded in SU_02.

Figure 6.34: Visibility grading for the transect divisions in SU_03. 1 is poor, 5 is excellent.

Figure 6.35: Student surveys at top of raised knoll in SU_03. Revealing the dry rock ground in this area.

Figure 6.36: Quantity of body, diagnostic and tile sherds recorded in SU_03.

Figure 6.37: Lithics recorded in SU_03.

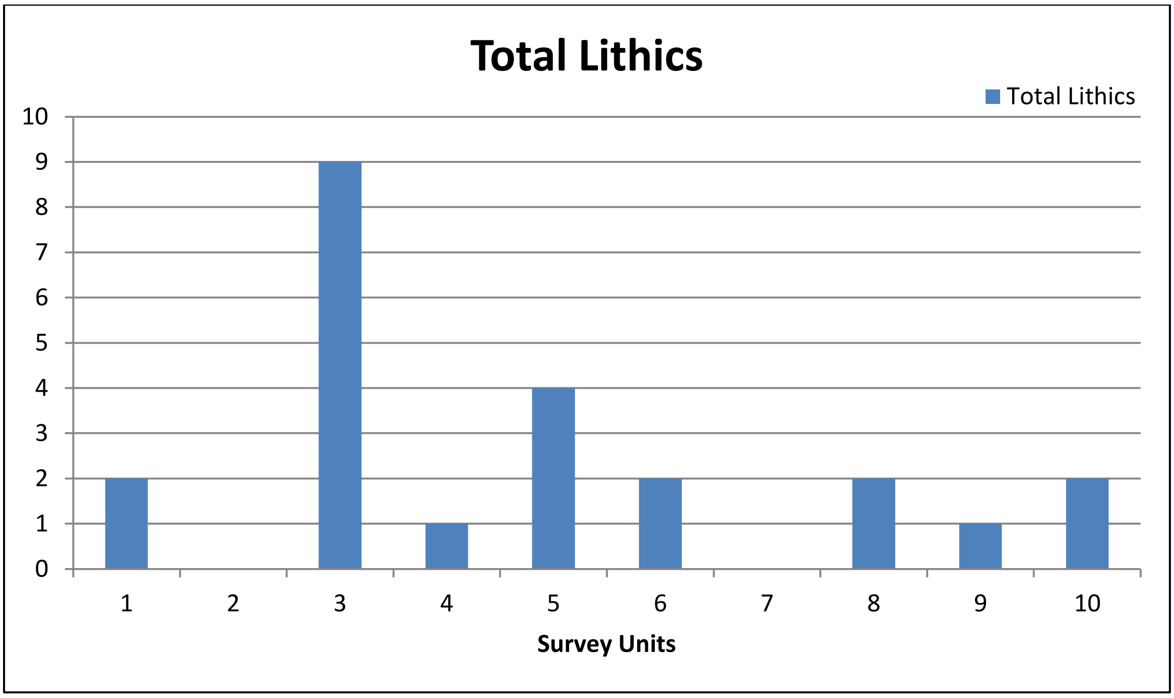


Figure 6.38: Total lithic numbers found across the Survey Units.

Figure 6.39: Threshing board.

Figure 6.40: Dates for the diagnostic sherds recorded in SU_03.

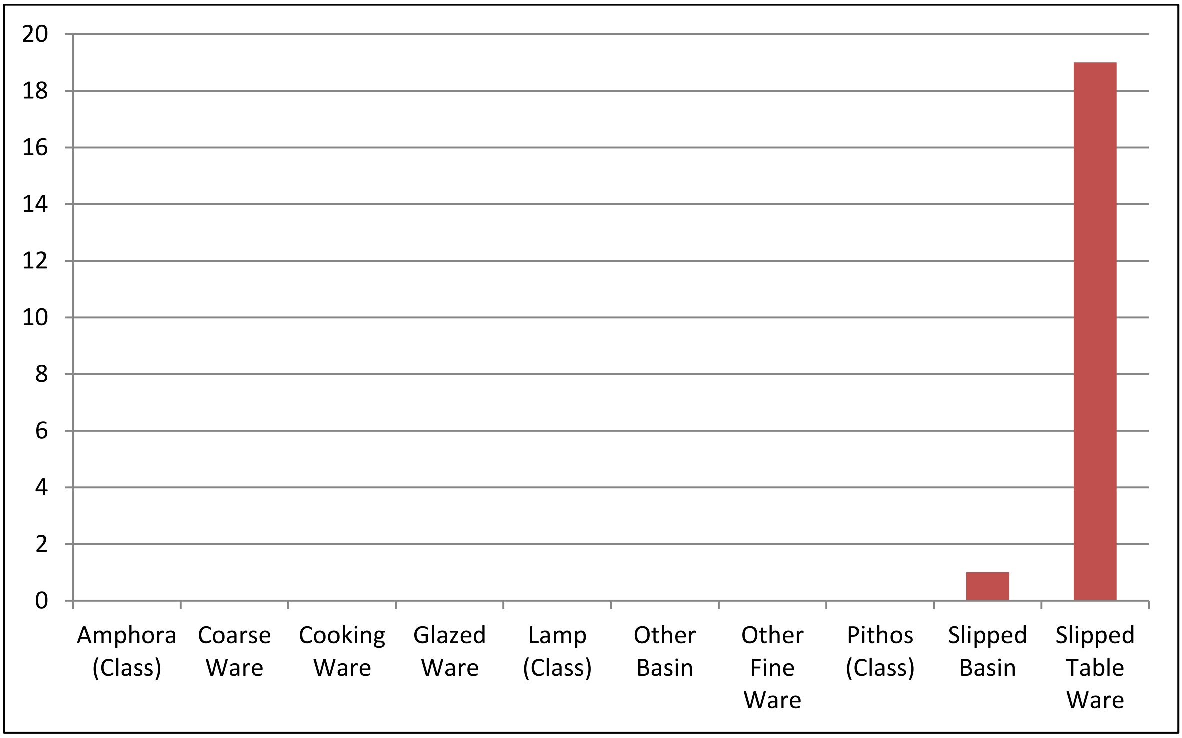


Figure 6.41: Class types found in SU_03.

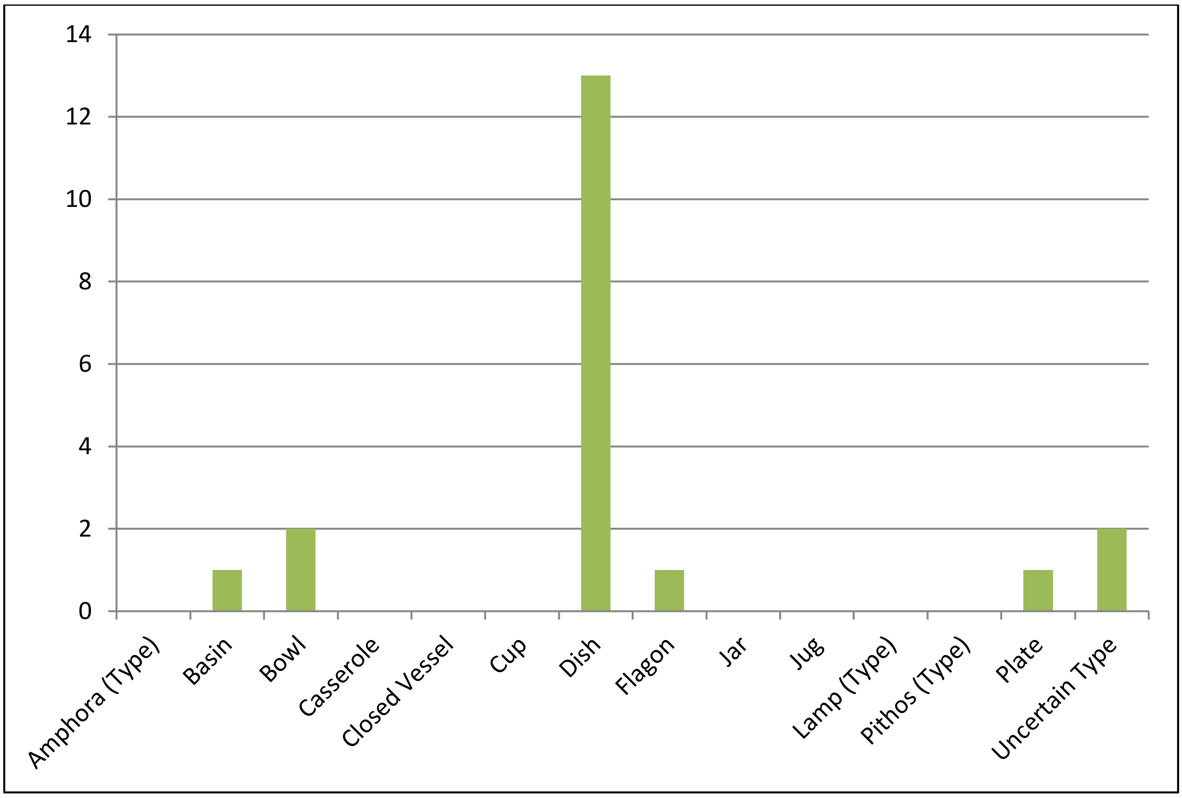


Figure 6.42: Vessel types found in SU_03.

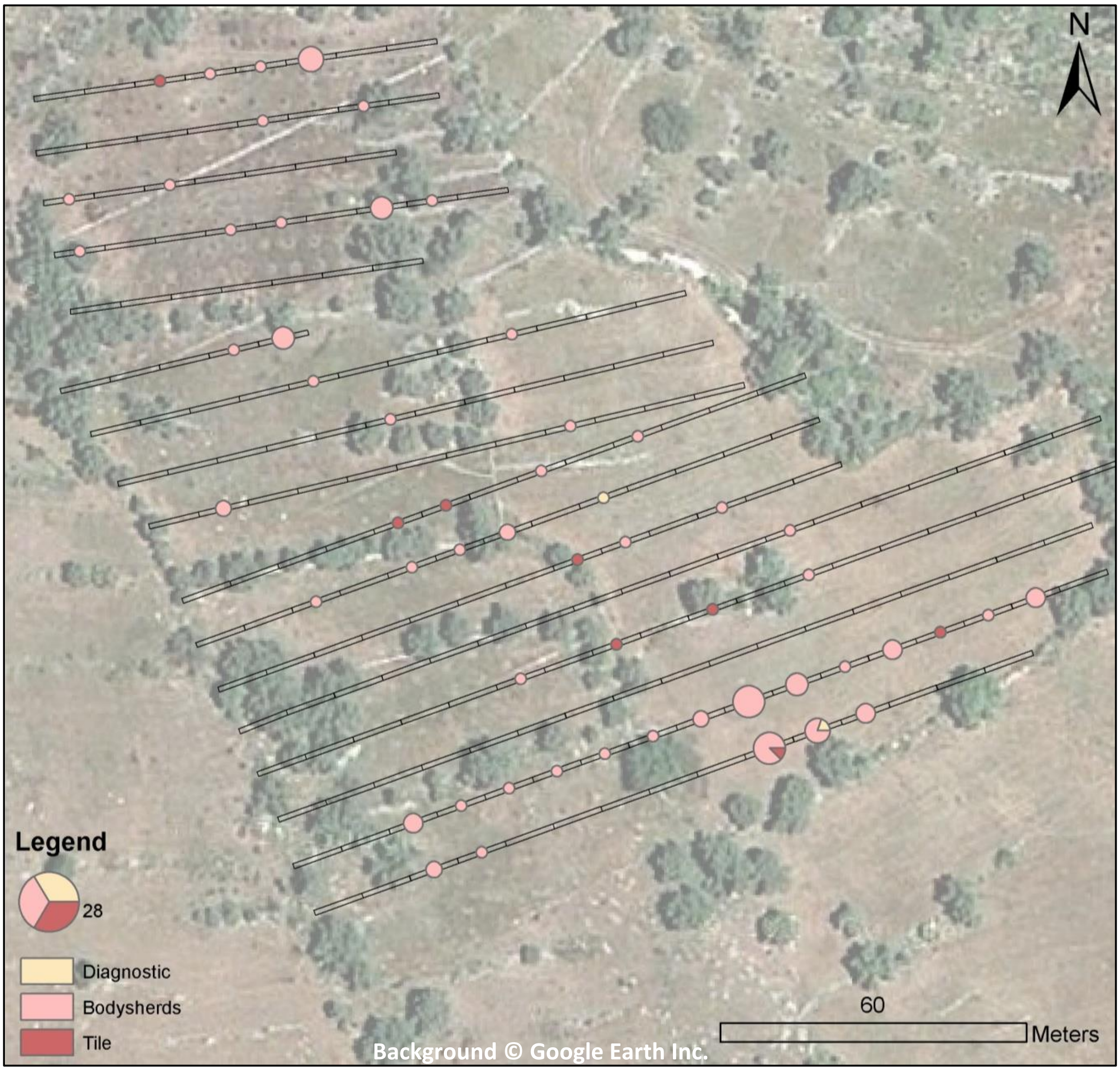


Figure 6.43: Quantity of body, diagnostic and tile sherds recorded in SU_04a.

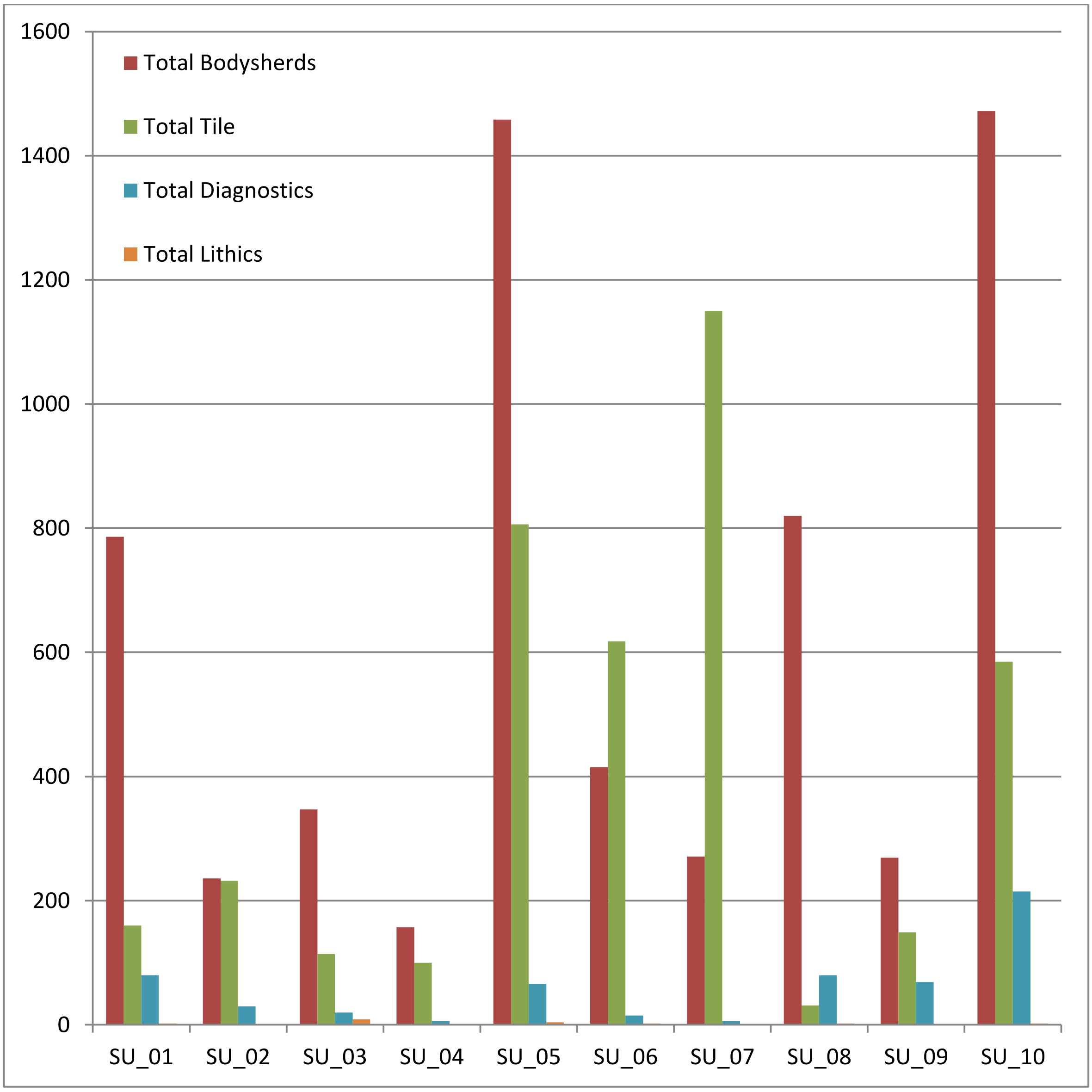


Figure 6.44: Comparative values of lithic, bodysherds, tile fragments and diagnostic sherds from all ten Survey Units.

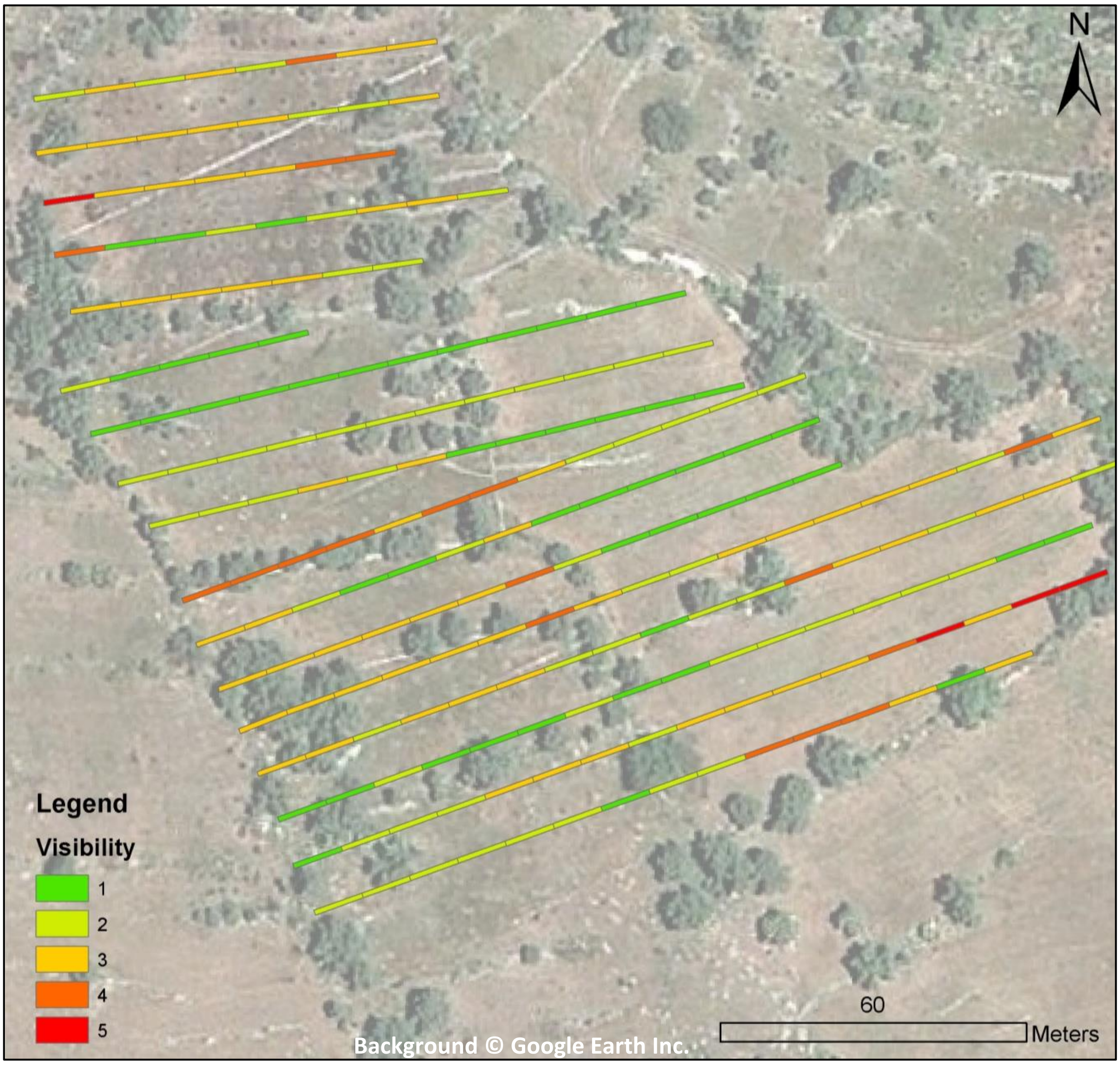


Figure 6.45: Visibility grading for the transect divisions in SU_04a. 1 is poor, 5 is excellent.

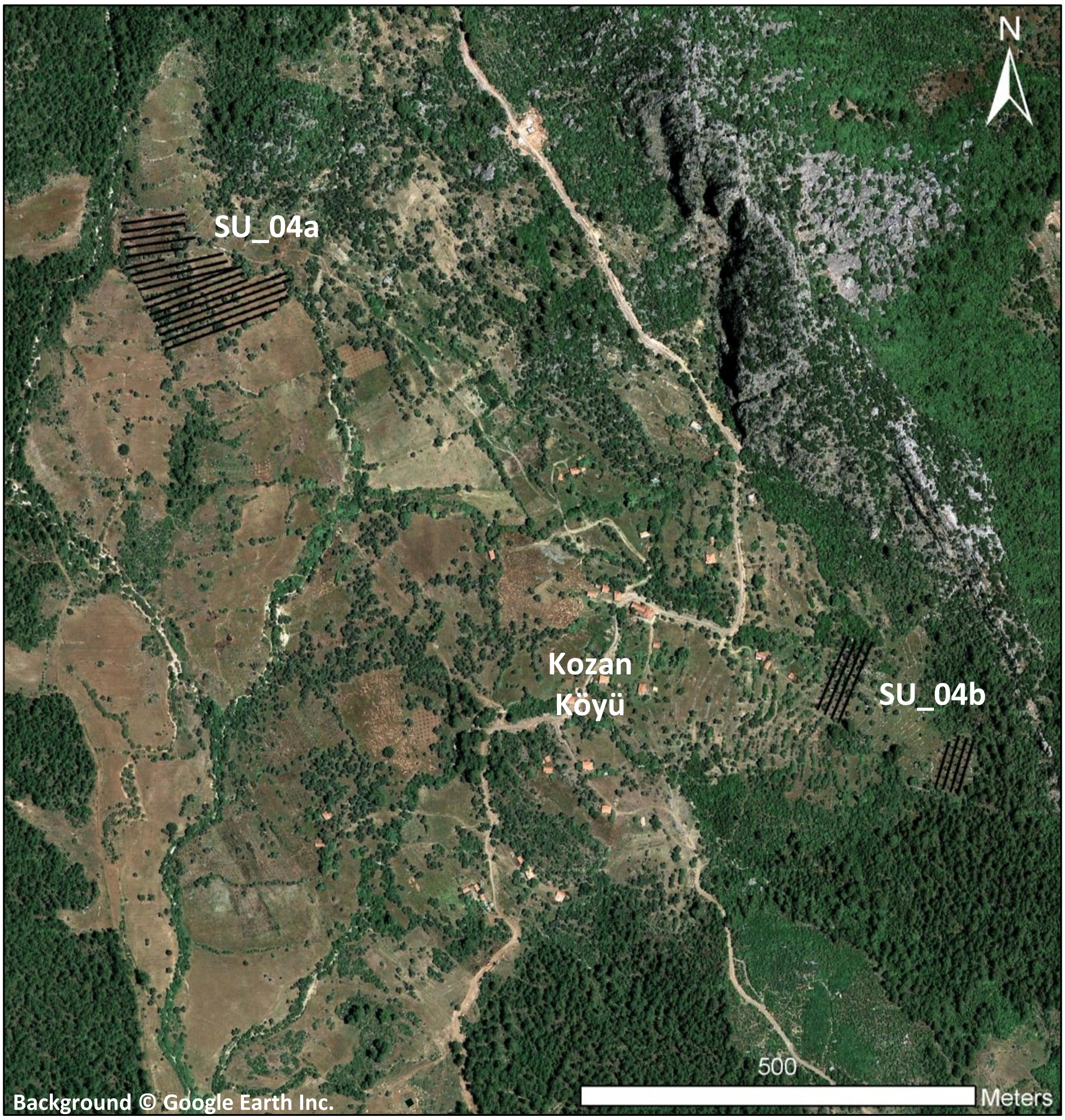


Figure 6.46: Map of Kozan Köyü, SU_04a and SU_04b.

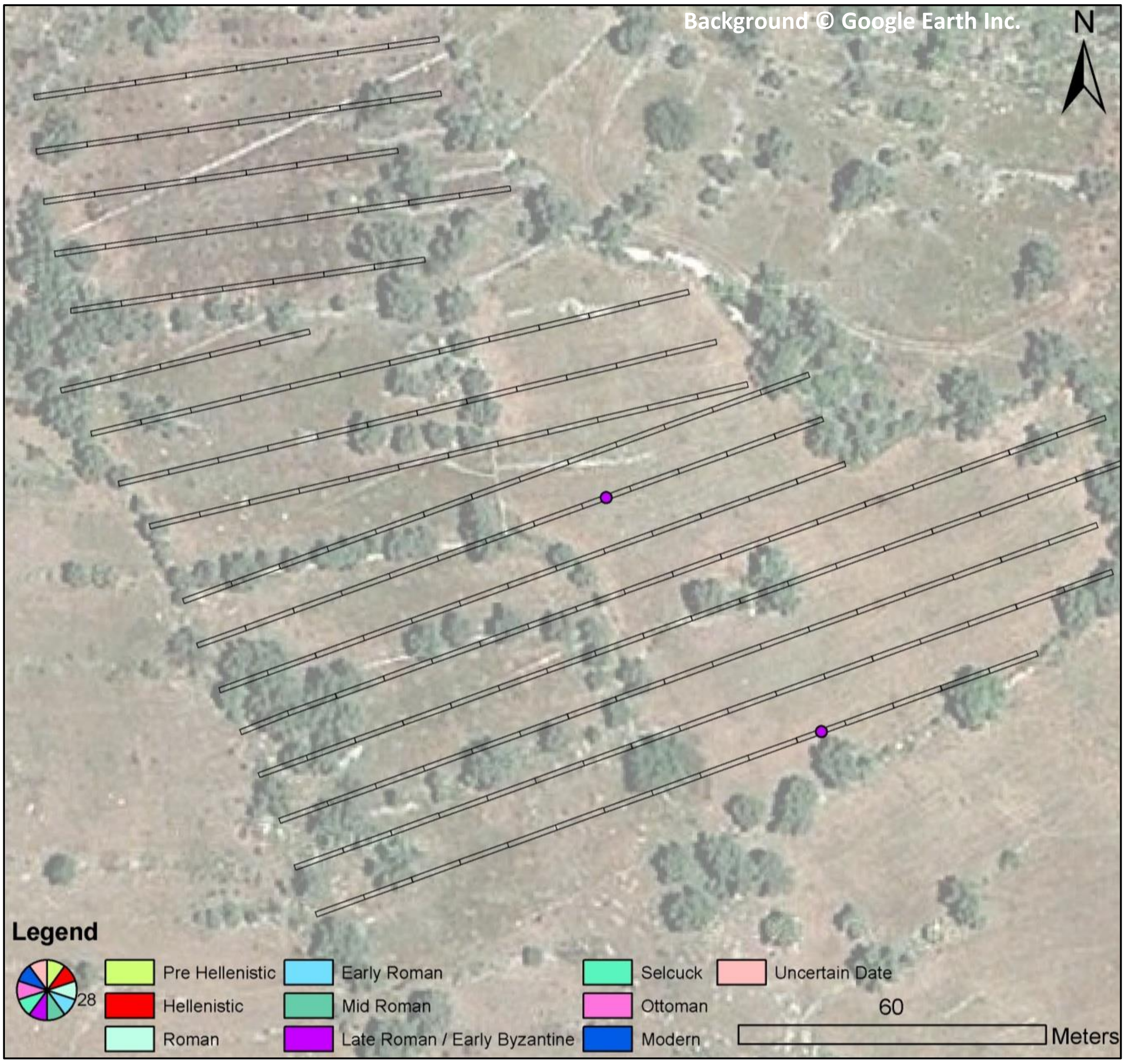


Figure 6.47: Dates for the diagnostic sherds recorded in SU_04a.

Figure 6.48: Abandoned badly degraded terraces with new olive tree plantation in SU_04b. Red circles highlight the very young olive trees.

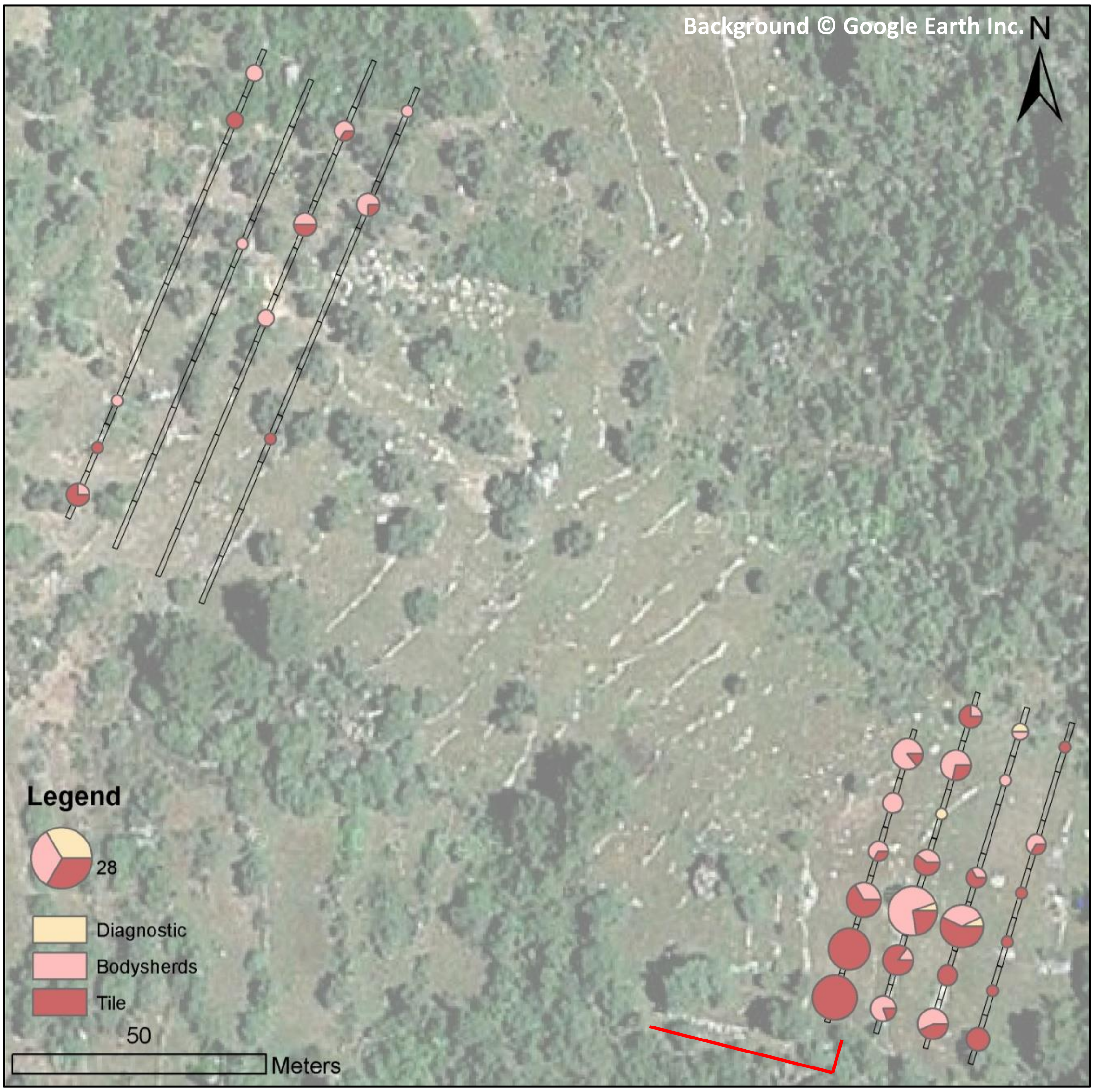


Figure 6.49: Quantity of body, diagnostic and tile sherds recorded in SU_04b.

Figure 6.50: Possible Hellenistic building adjacent to SU_04b.

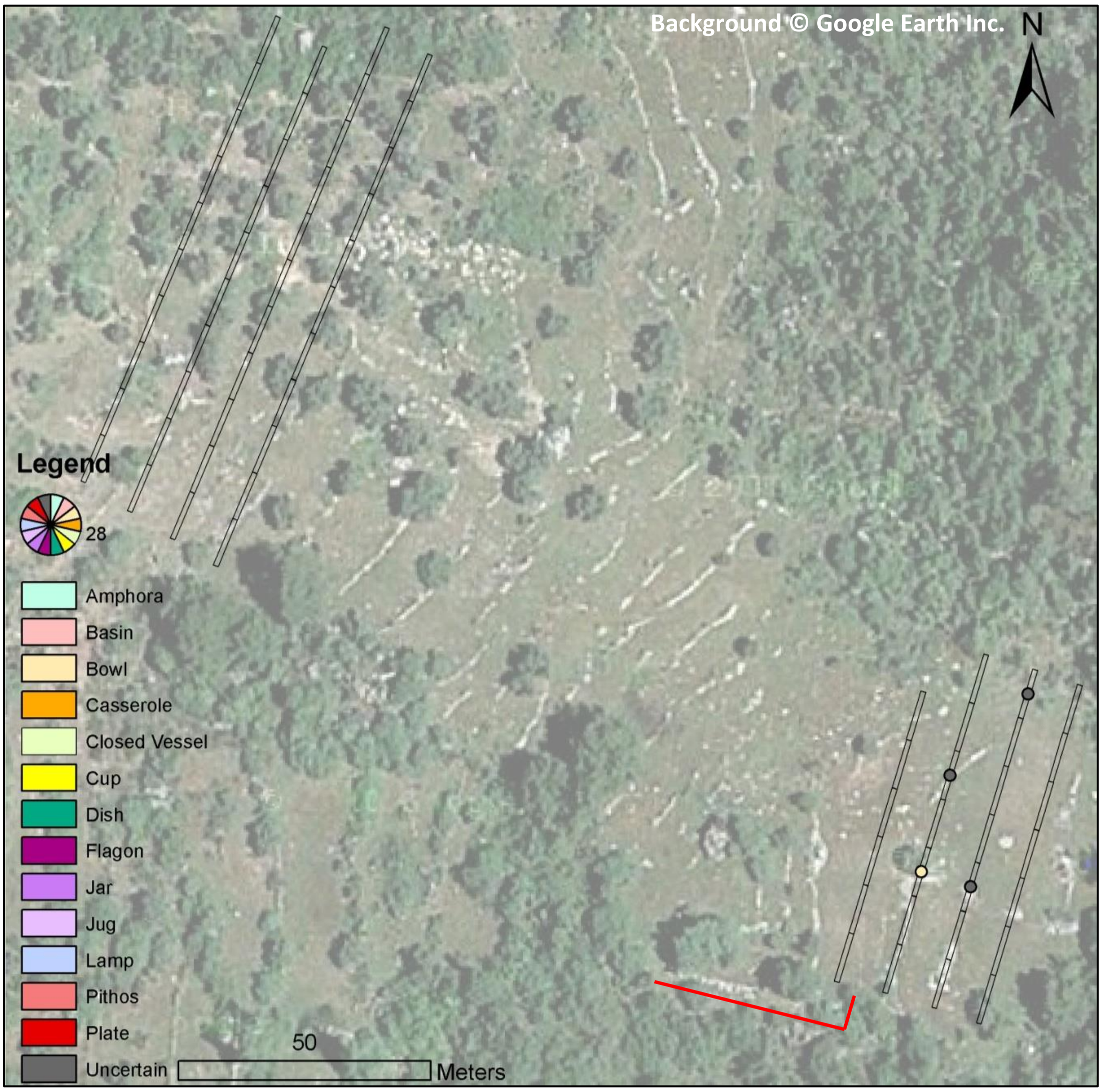


Figure 6.51: Dates for the diagnostic sherds recorded in SU_04b.

Figure 6.52: Paved roadway in SU_04b. Flag stones of the road are very overgrown but can be seen running from the bottom right of the image to the top left.

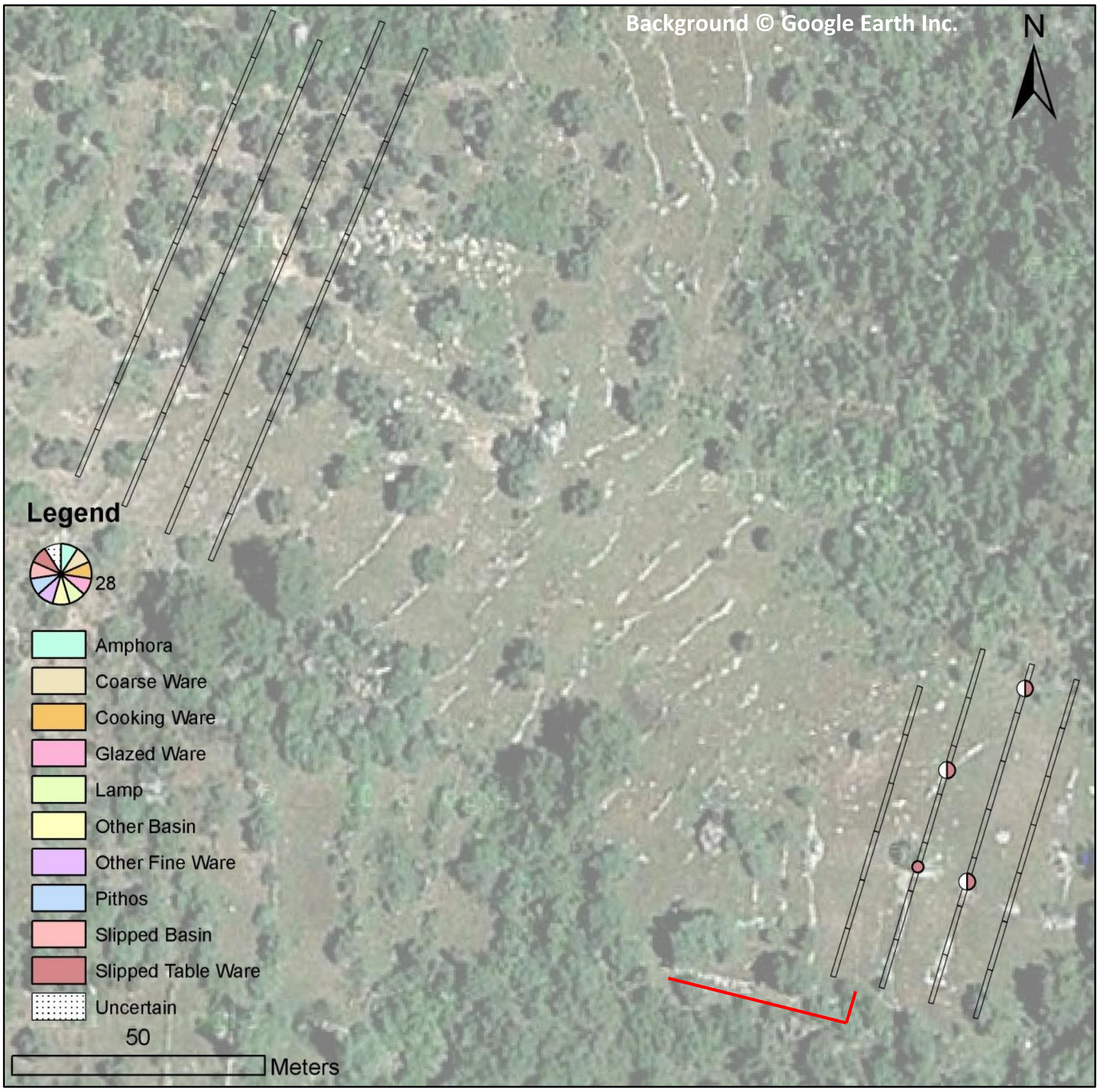


Figure 6.53: Class type for the diagnostic sherds recorded in SU_04b.

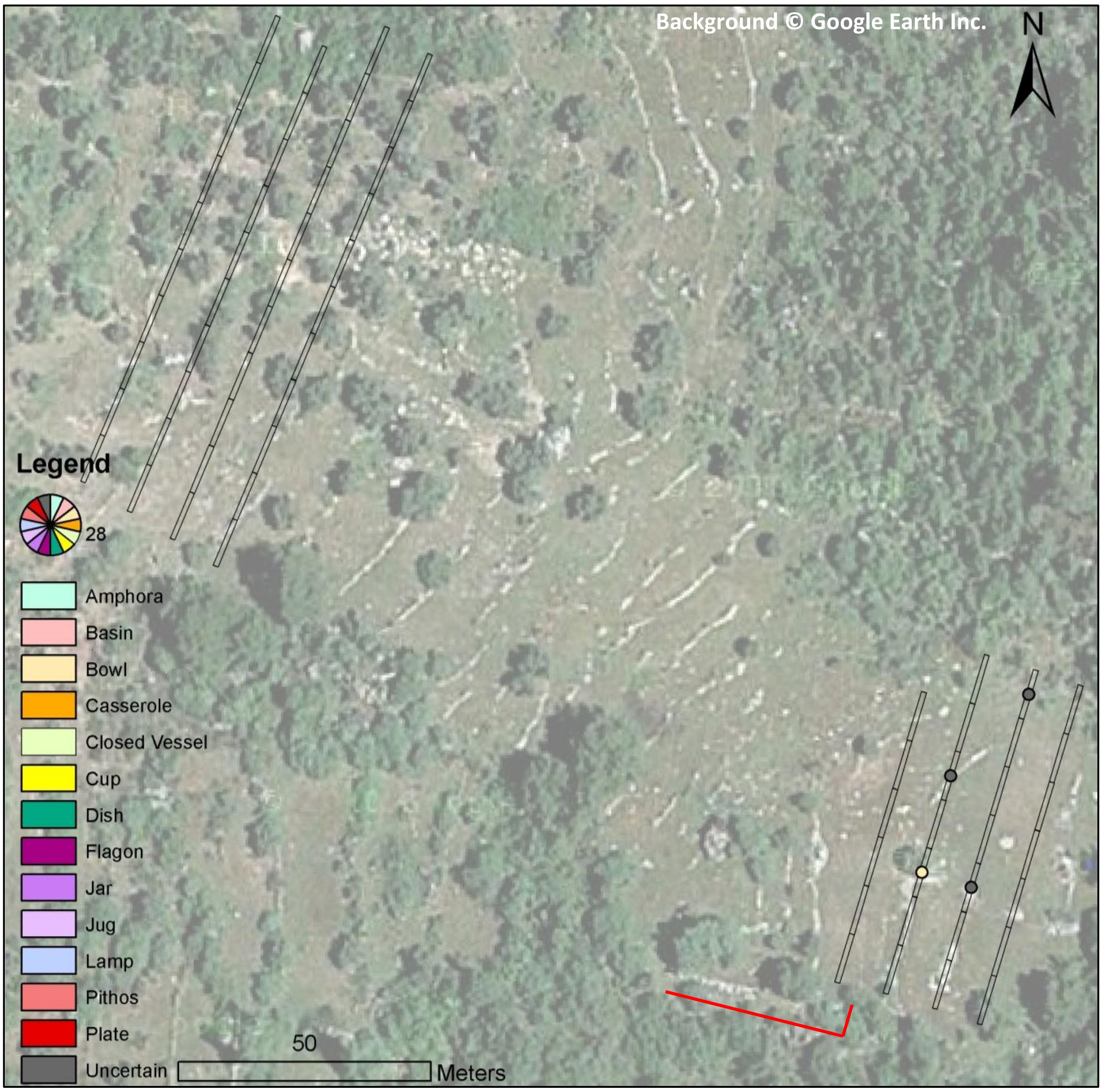


Figure 6.54: Vessel types for the diagnostic sherds recorded in SU_04b.

Figure 6.55: Student surveyors surveying SU_05.

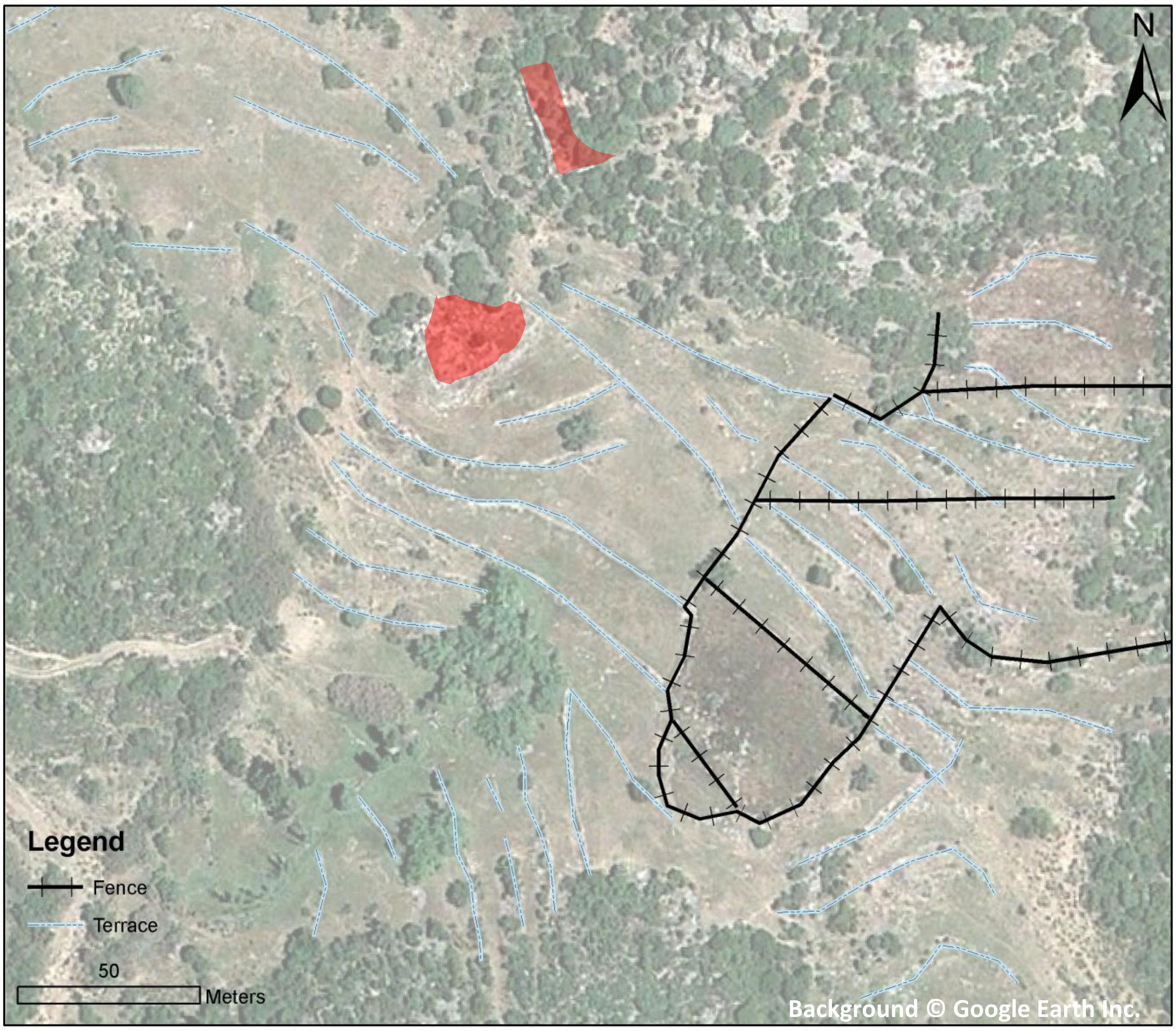


Figure 6.56: GPS survey of SU_05. Red areas indicate buildings.

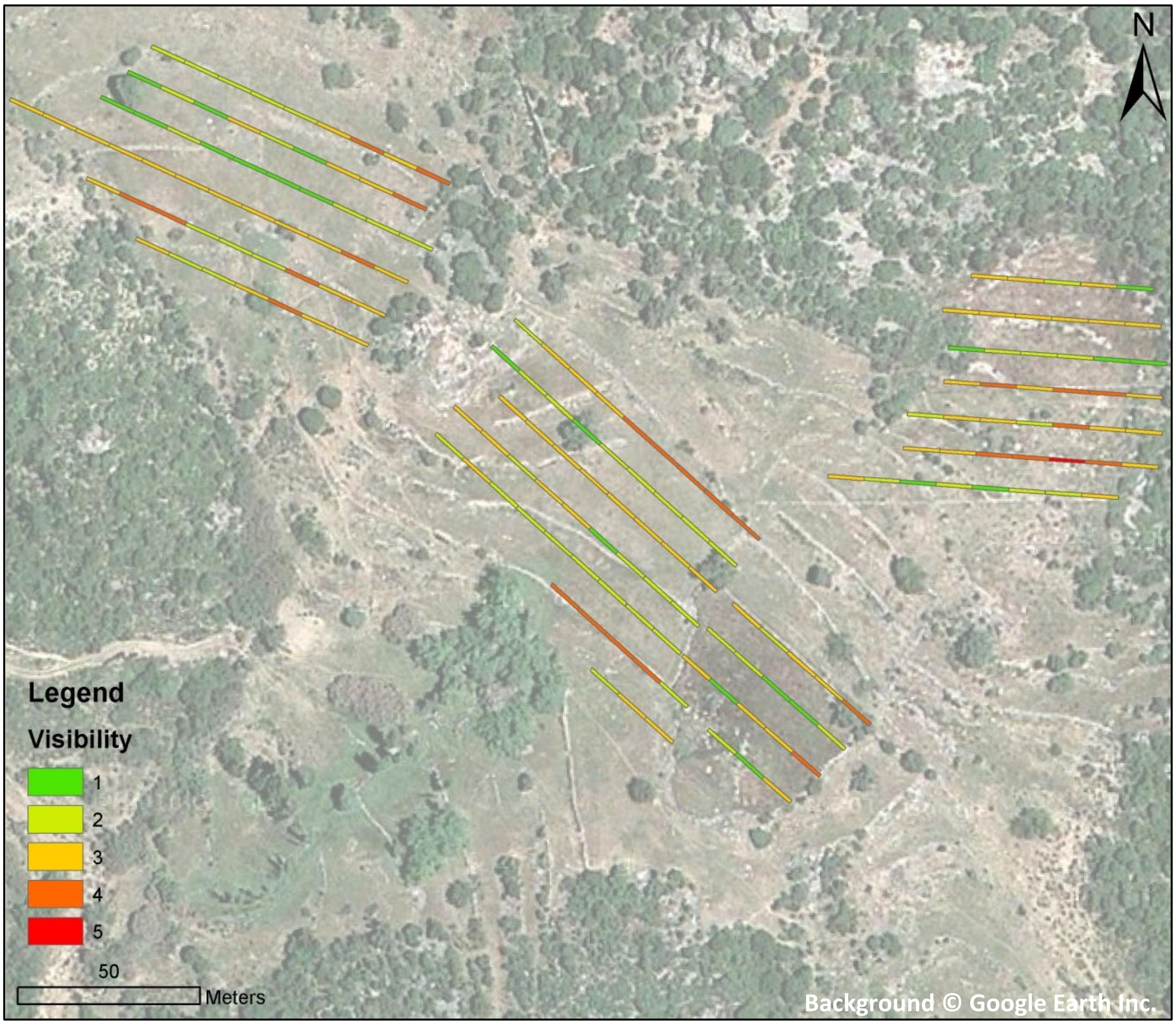


Figure 6.57: Visibility grading for the transect divisions in SU_05. 1 is poor, 5 is excellent.

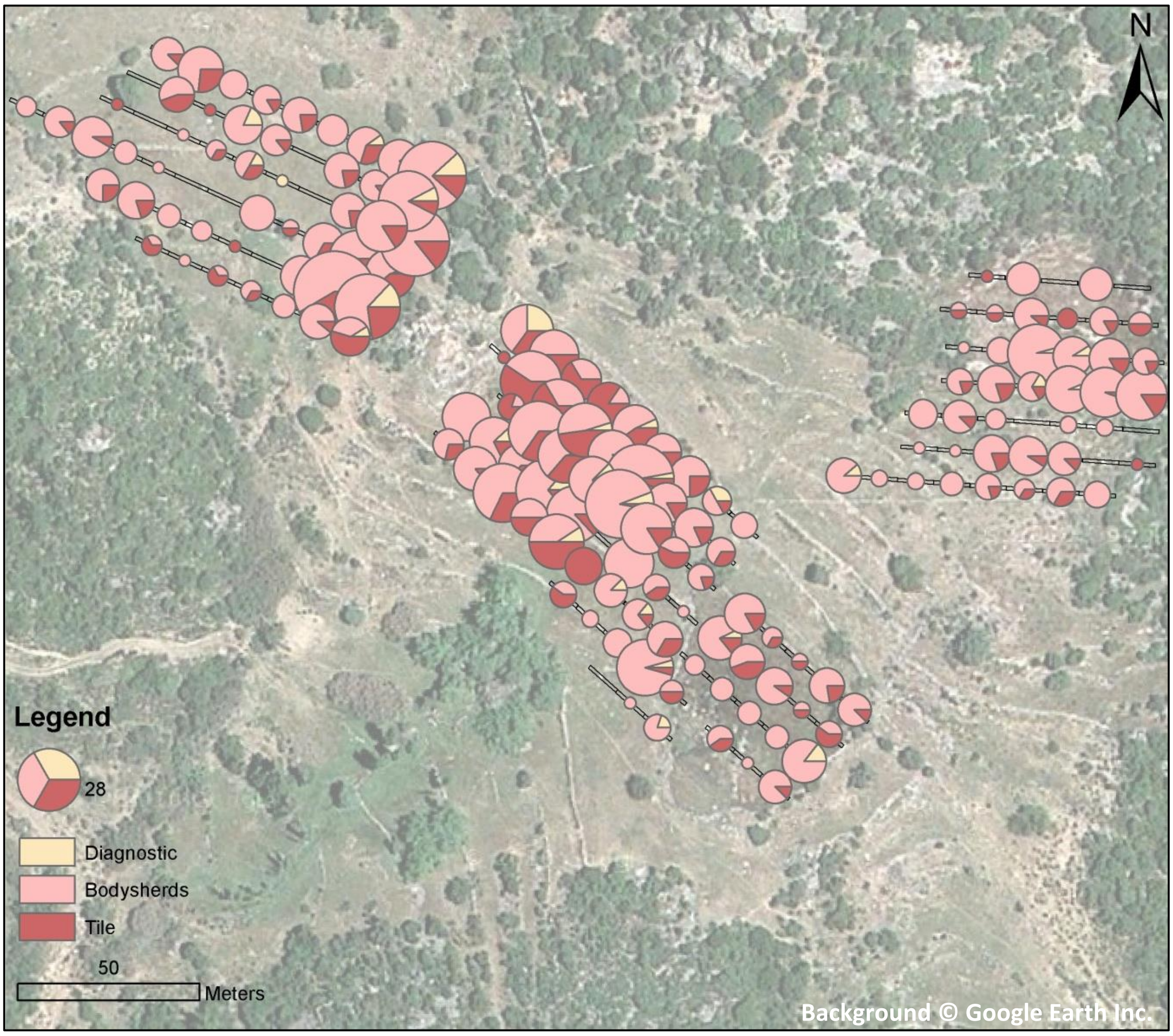


Figure 6.58: Quantity of body, diagnostic and tile sherds recorded in SU_05.

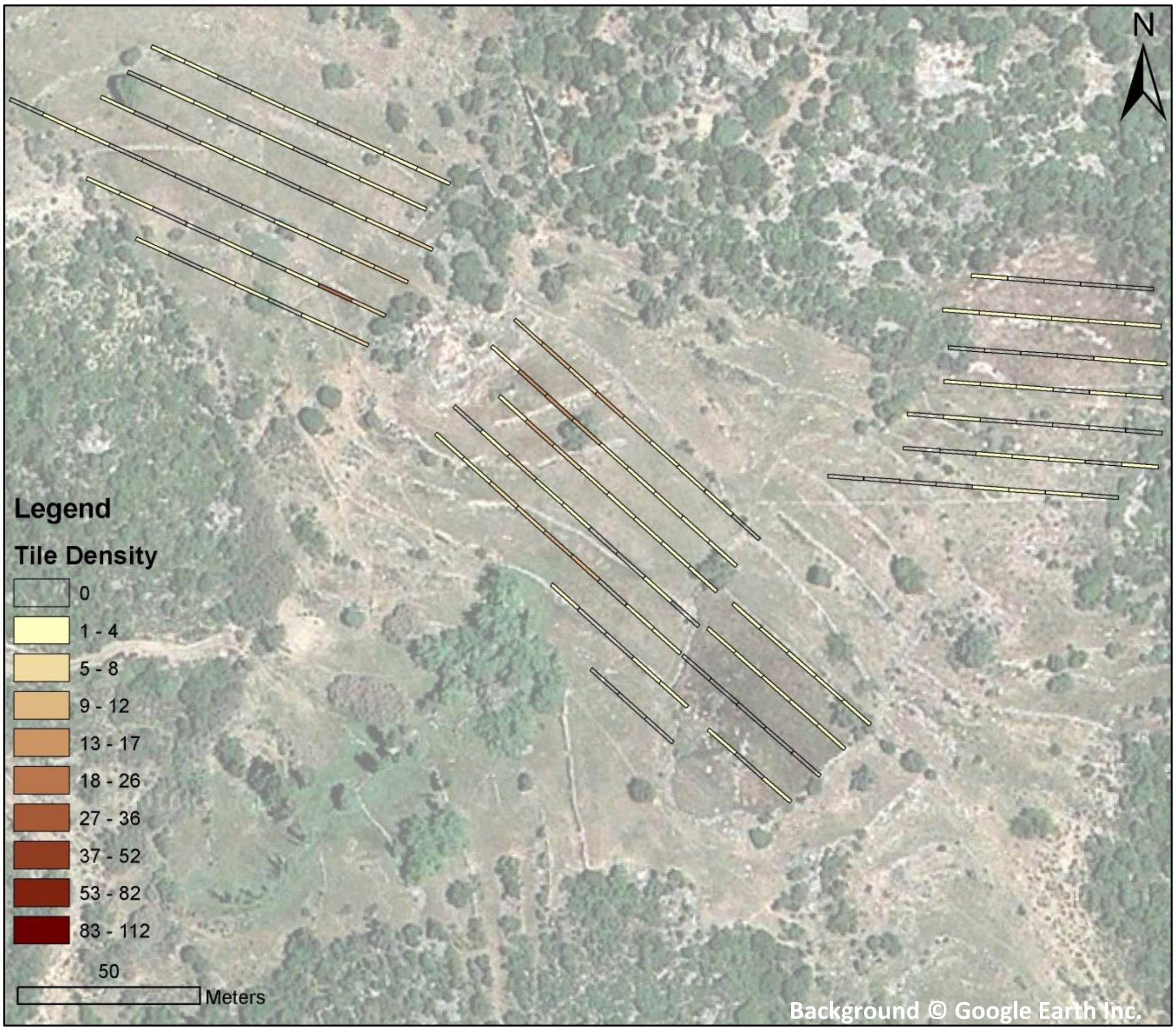


Figure 6.59: Density of tile fragments recorded in SU_05.

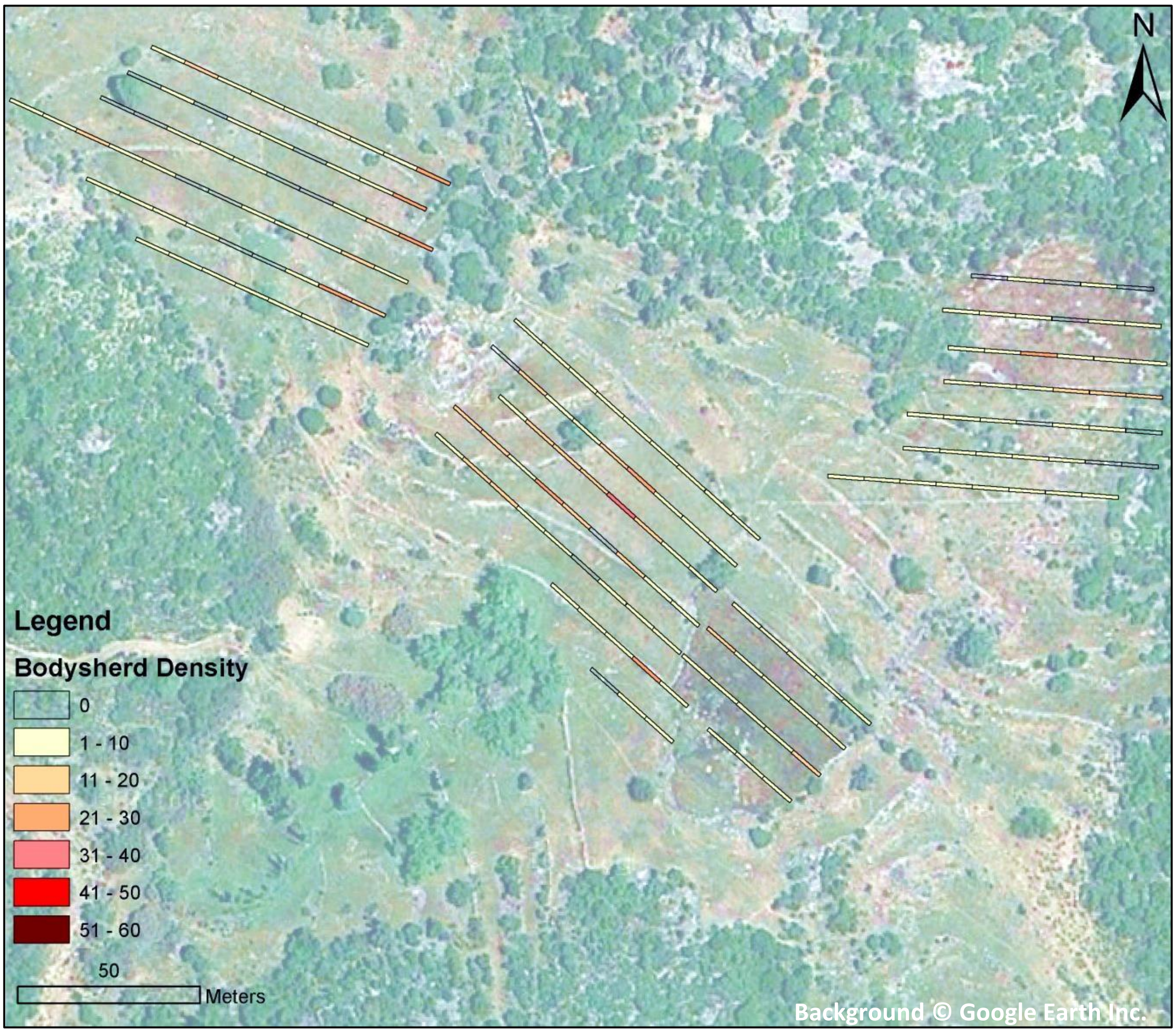


Figure 6.60: Density of bodysherds recorded in SU_05.

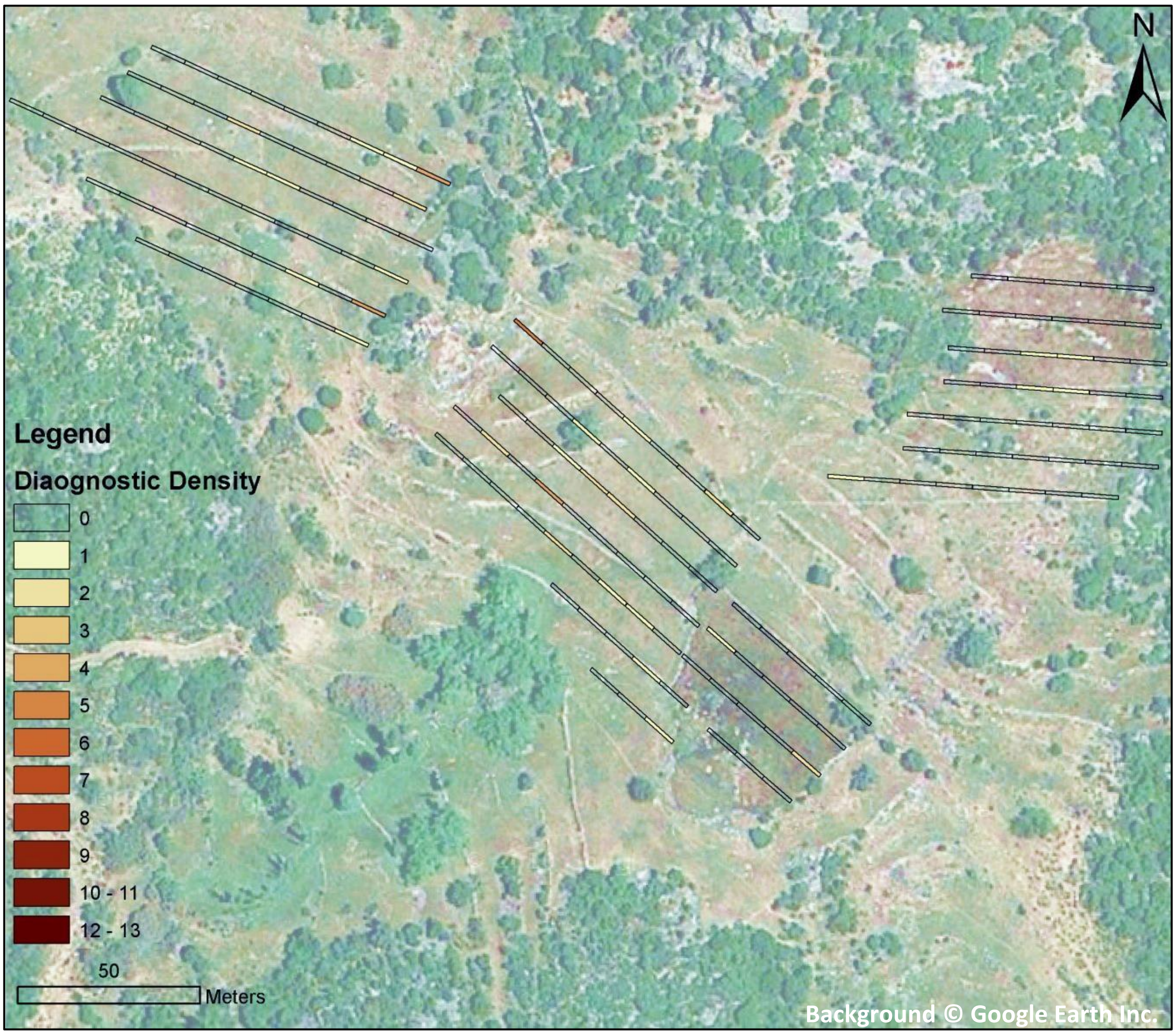


Figure 6.61: Density of diagnostic sherds recorded in SU_05.

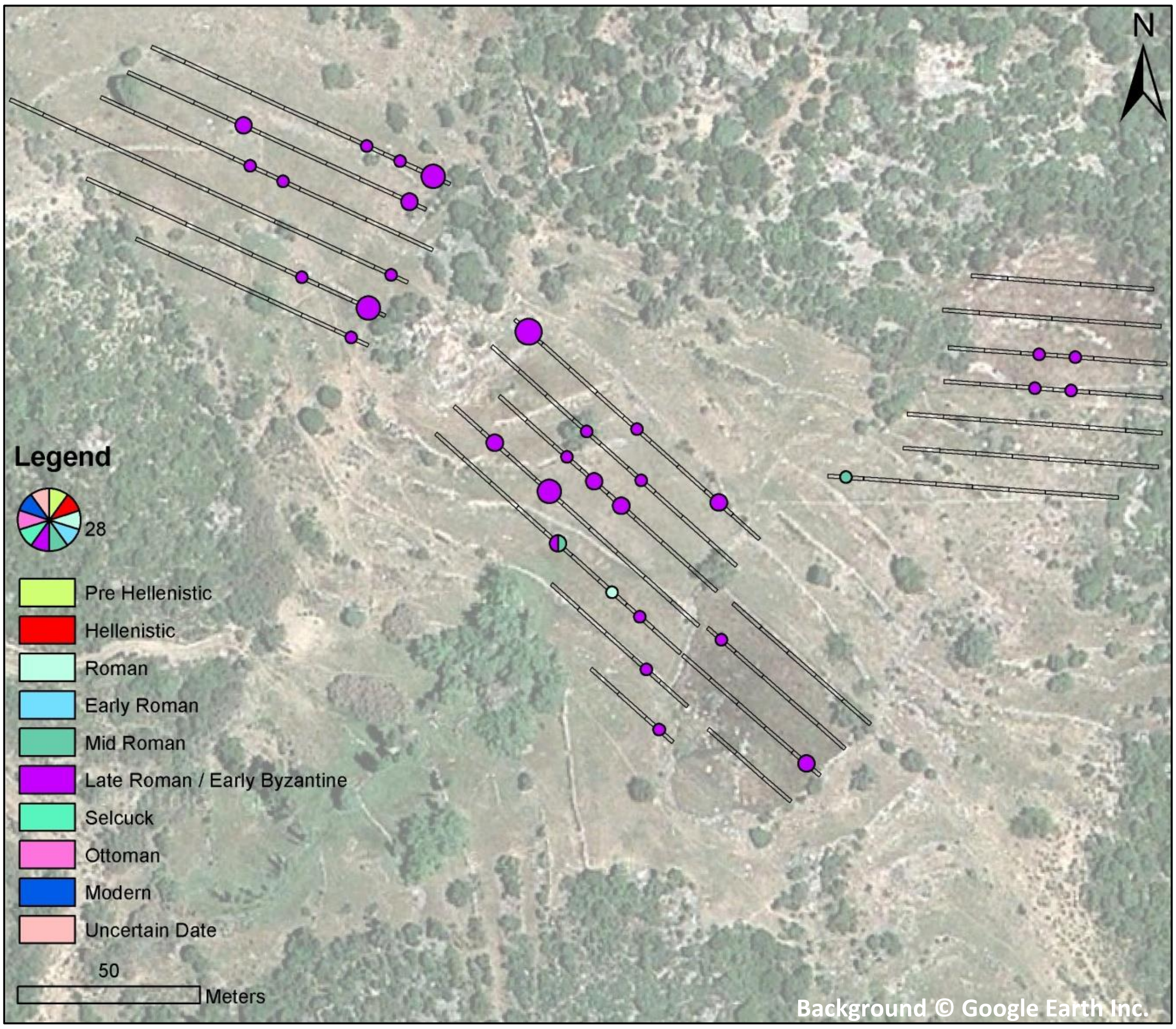


Figure 6.62: Dates for the diagnostic sherds recorded in SU_05.

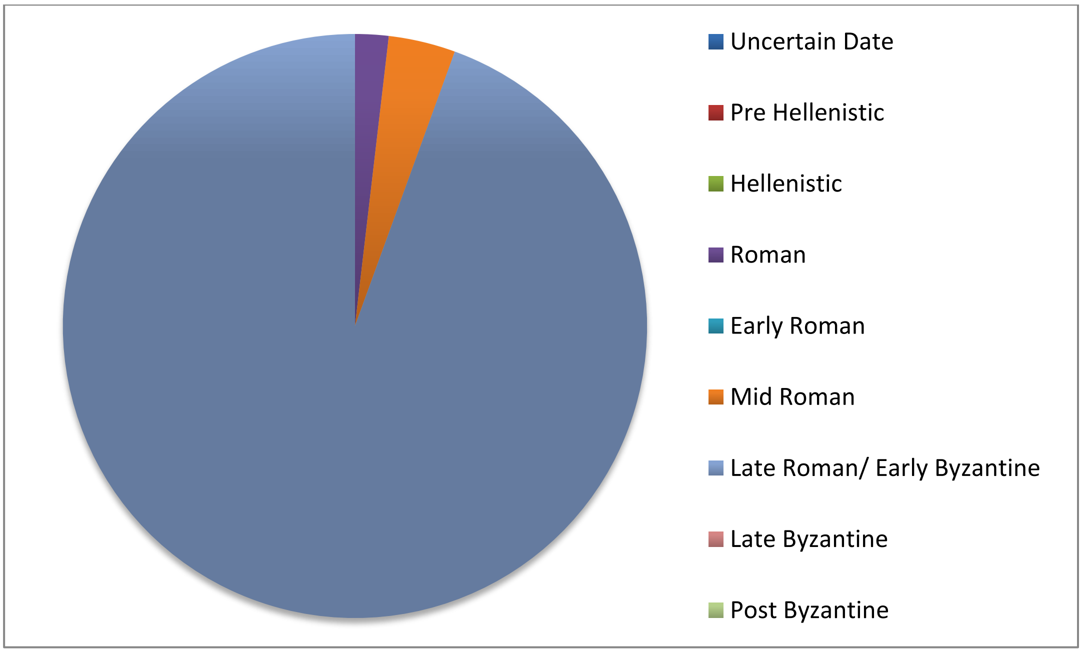


Figure 6.63: Pie chart presenting the dates for the diagnostic sherds recorded in SU_05, emphasizing the dominance of early Byzantine sherds.

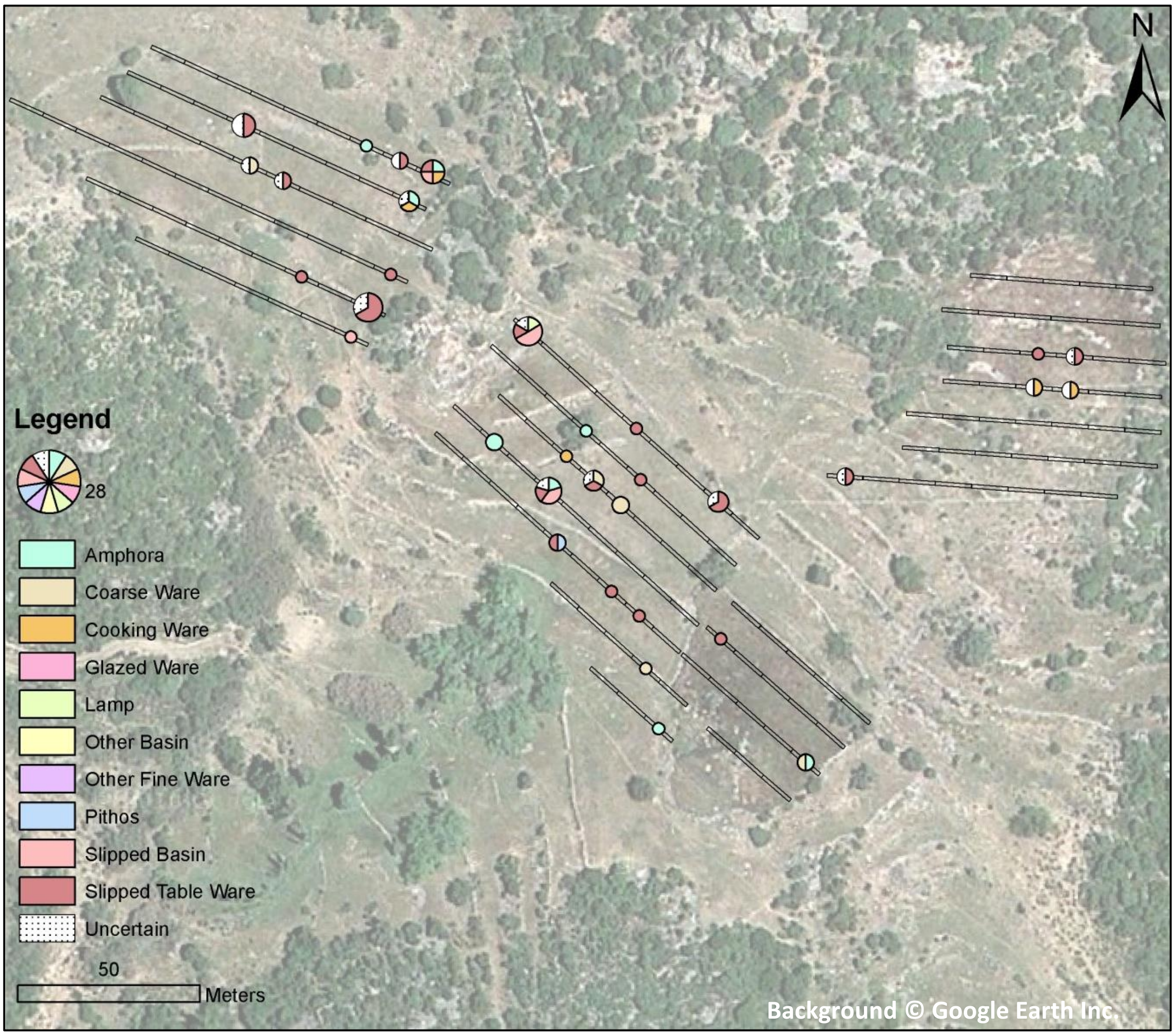


Figure 6.64: Class type for the diagnostic sherds recorded in SU_05.

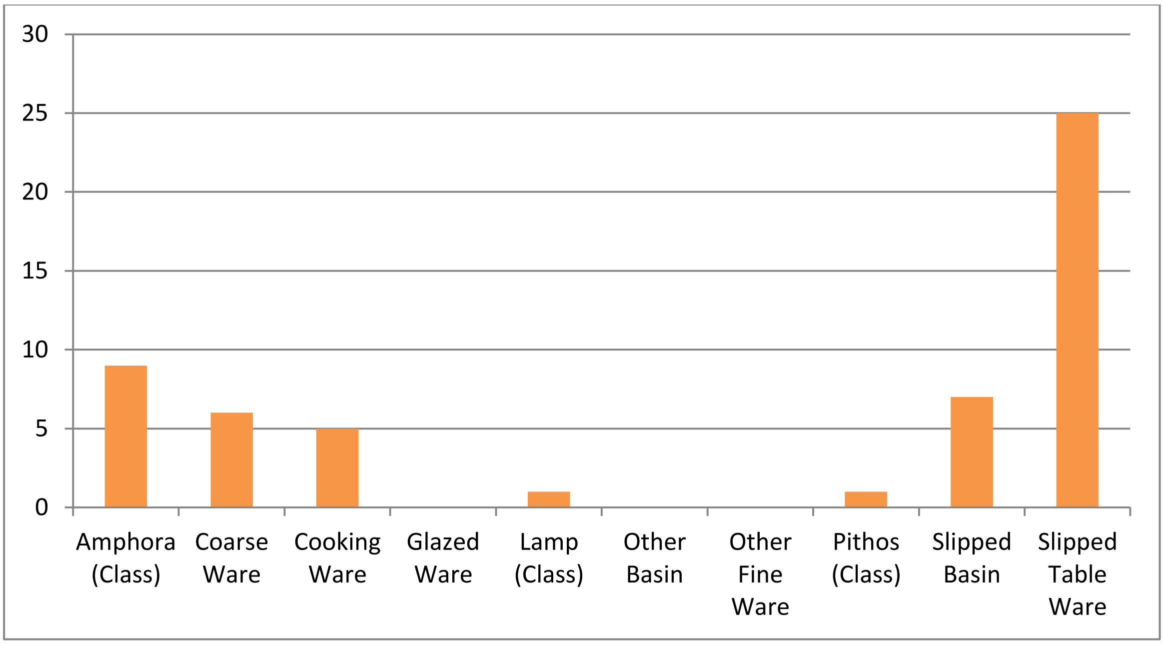


Figure 6.65: Bar graph showing the class types recorded in SU_05.

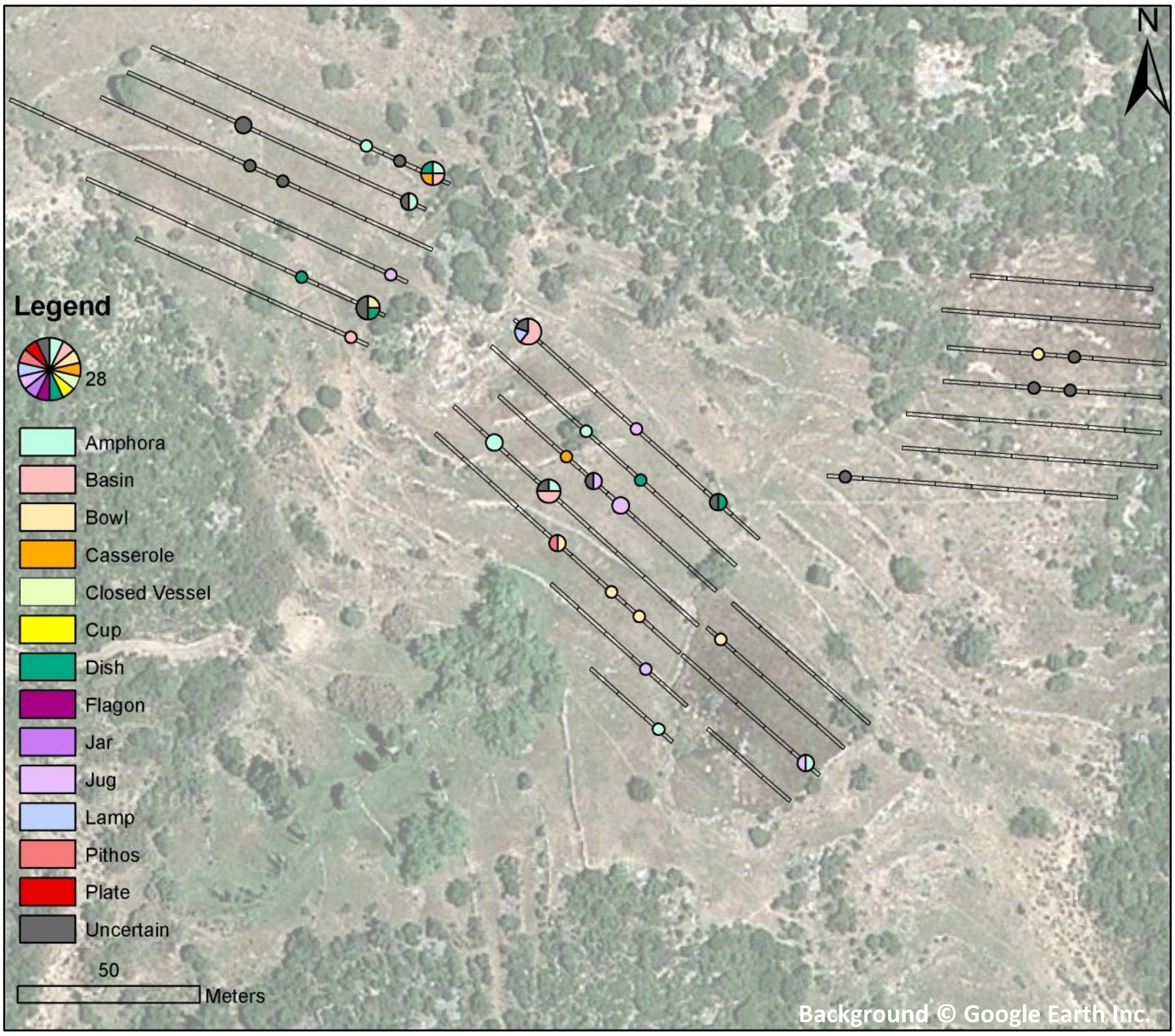


Figure 6.66: Vessel types for the diagnostic sherds recorded in SU_05.

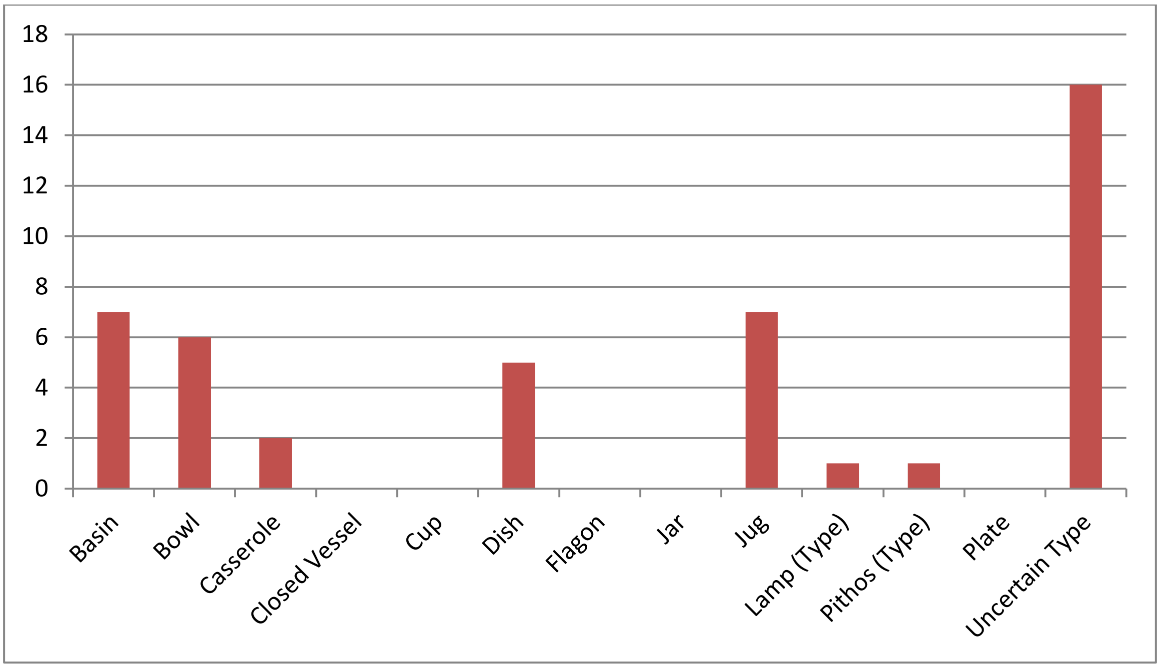


Figure 6.67: Bar graph showing the vessel types recorded in SU_05.

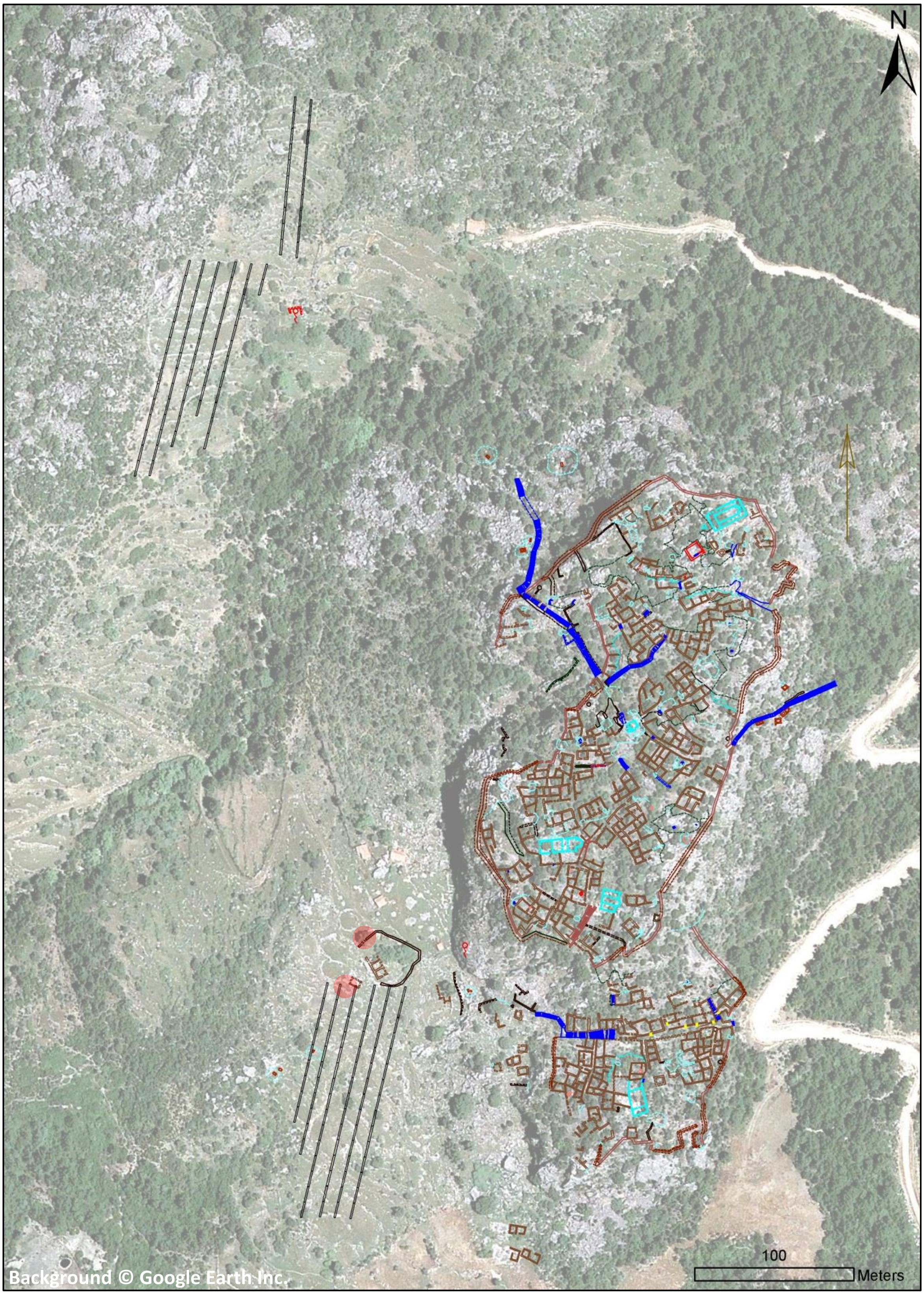


Figure 6.68: SU_06 transects and plan of Koca Mehmetler Asari. Red circles highlight threshing floors.

Figure 6.69: Quantity of body, diagnostic and tile sherds recorded in the northern area of SU_06.

Figure 6.70: Quantity of body, diagnostic and tile sherds recorded in the southern area of SU_06.

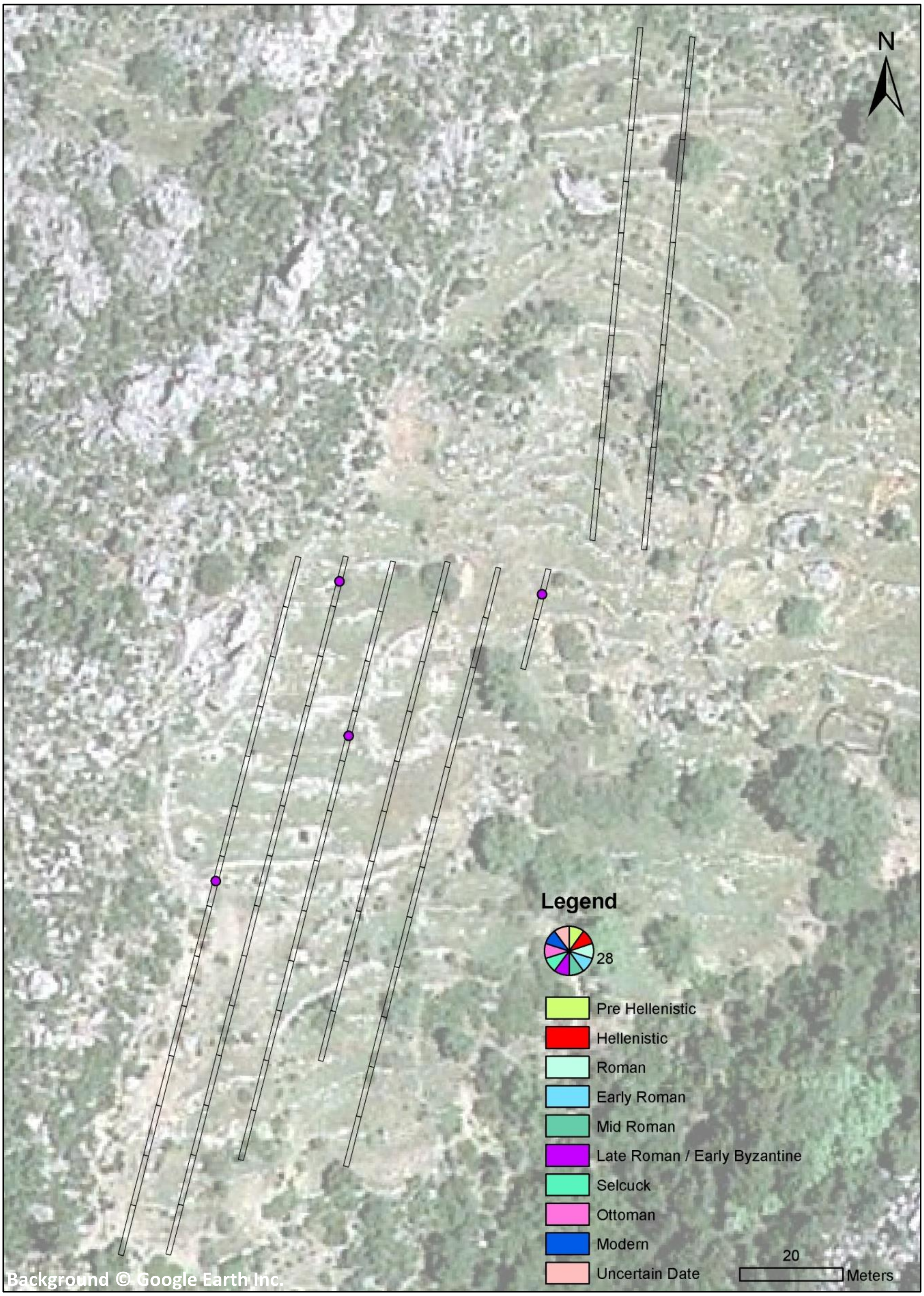


Figure 6.71: Dates for the diagnostic sherds recorded in the northern area of SU_06.

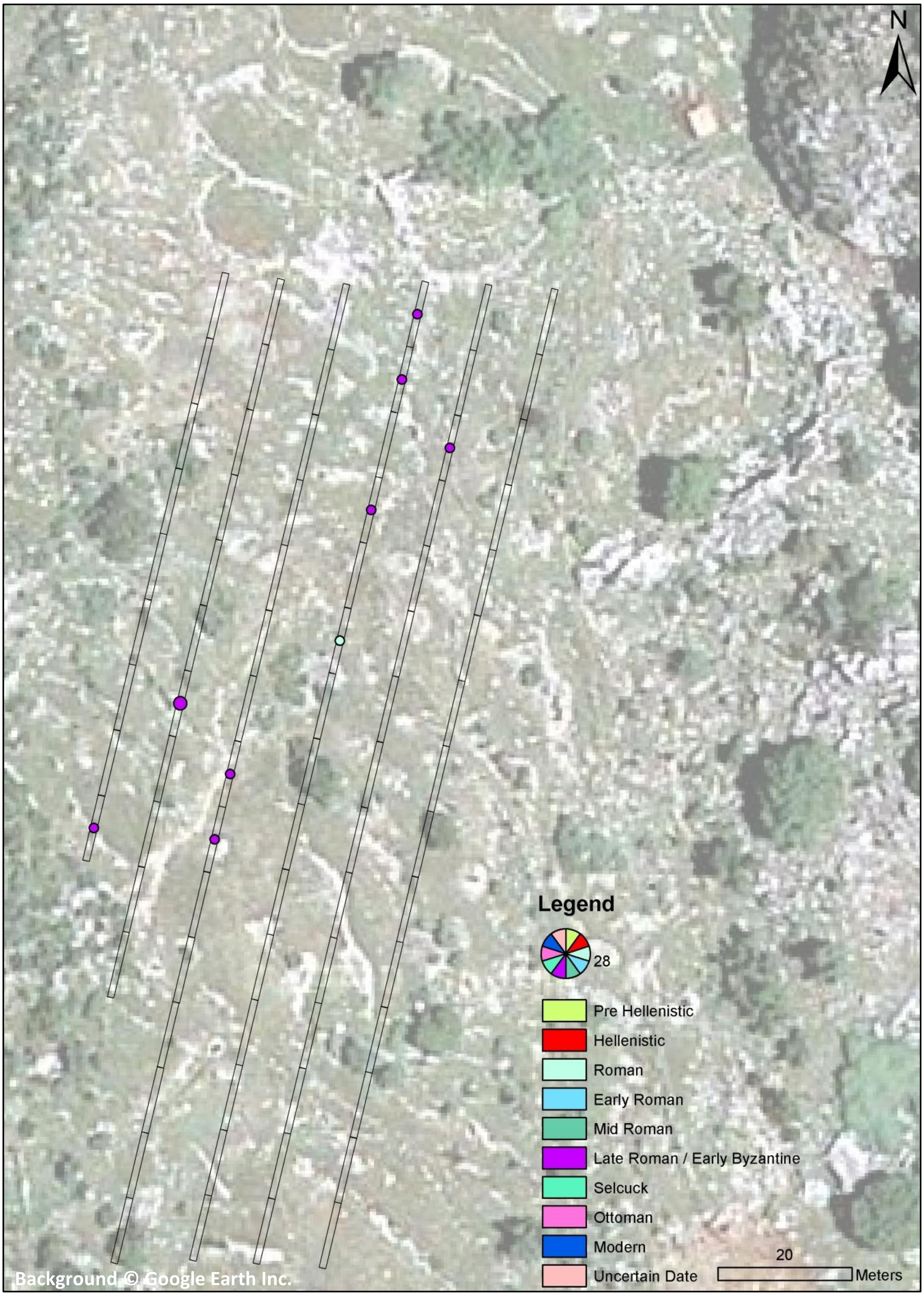


Figure 6.72: Dates for the diagnostic sherds recorded in the southern area of SU_06.

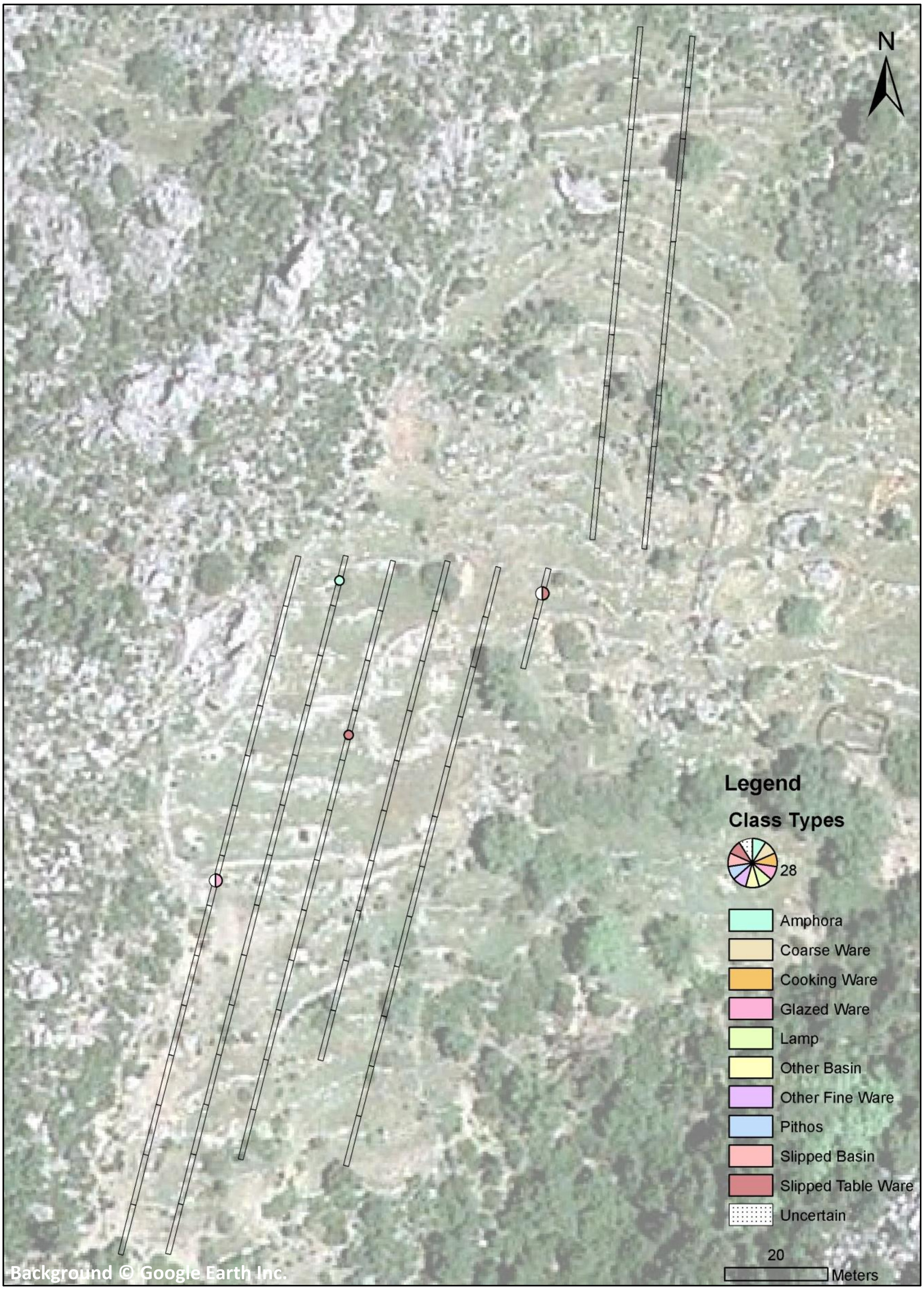


Figure 6.73: Class type recorded in the northern area of SU_06.

Figure 6.74: Class type recorded in the southern area of SU_06.

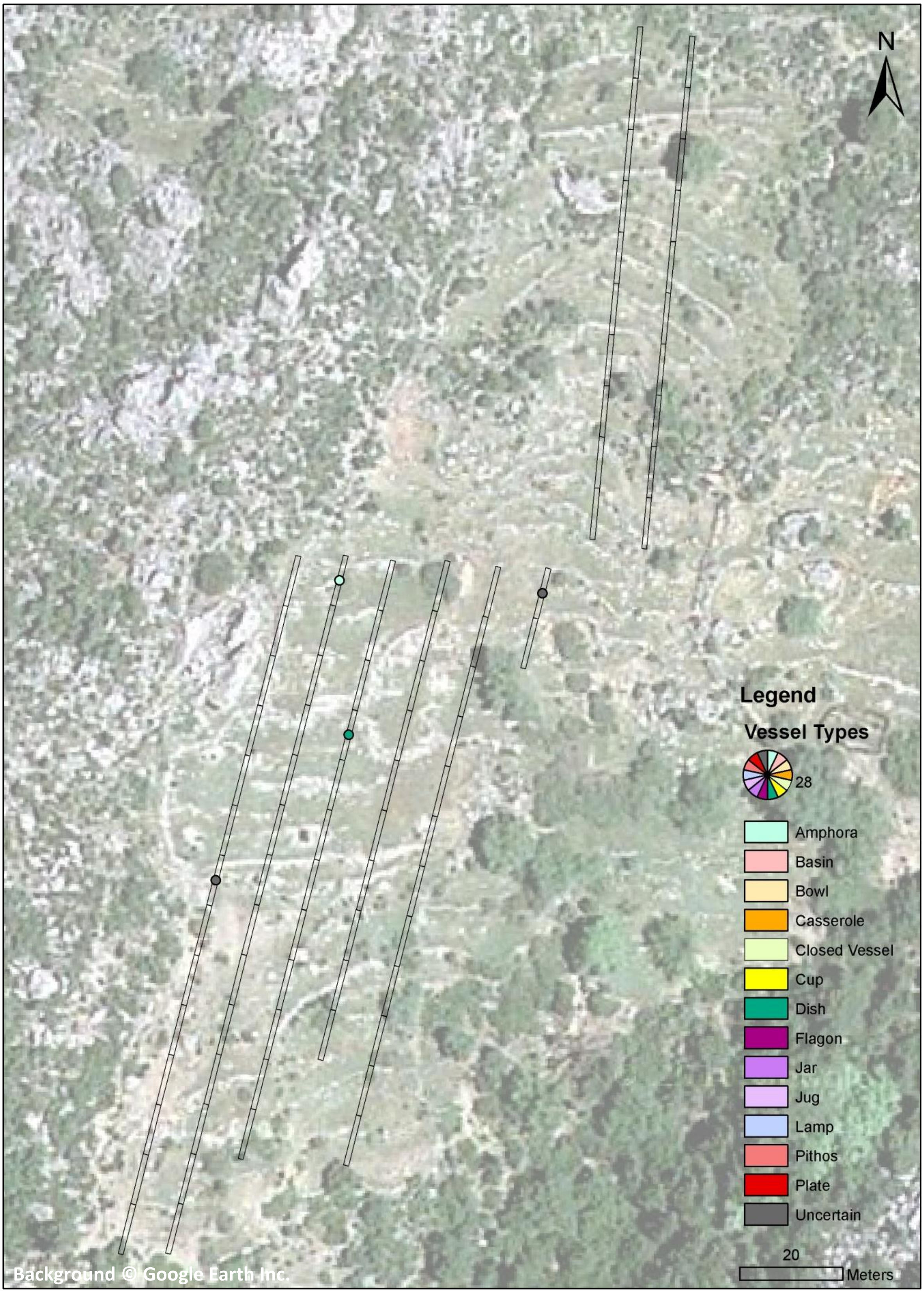


Figure 6.75: Vessel types recorded in the northern area of SU_06.

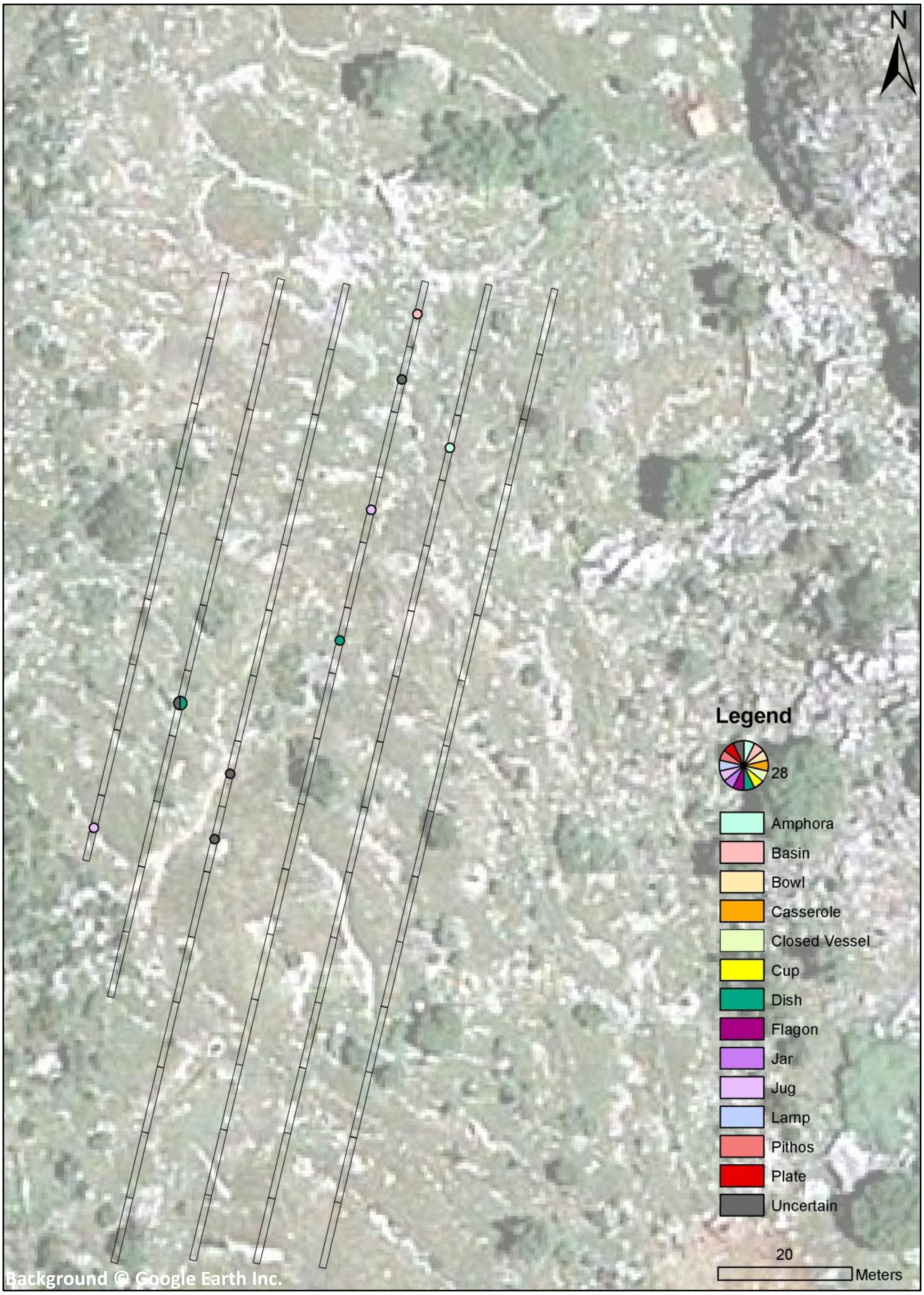


Figure 6.76: Vessel types recorded in the southern area of SU_06.

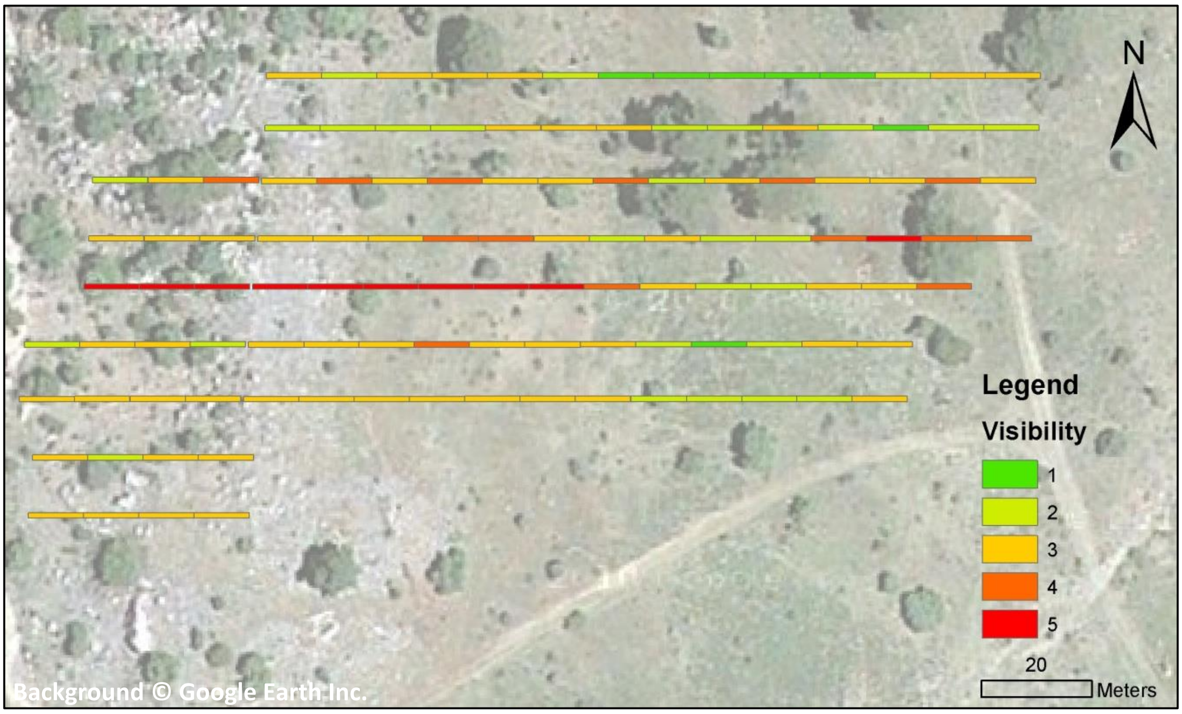


Figure 6.77: Visibility grading for the transect divisions in SU_07. 1 is poor, 5 is excellent.

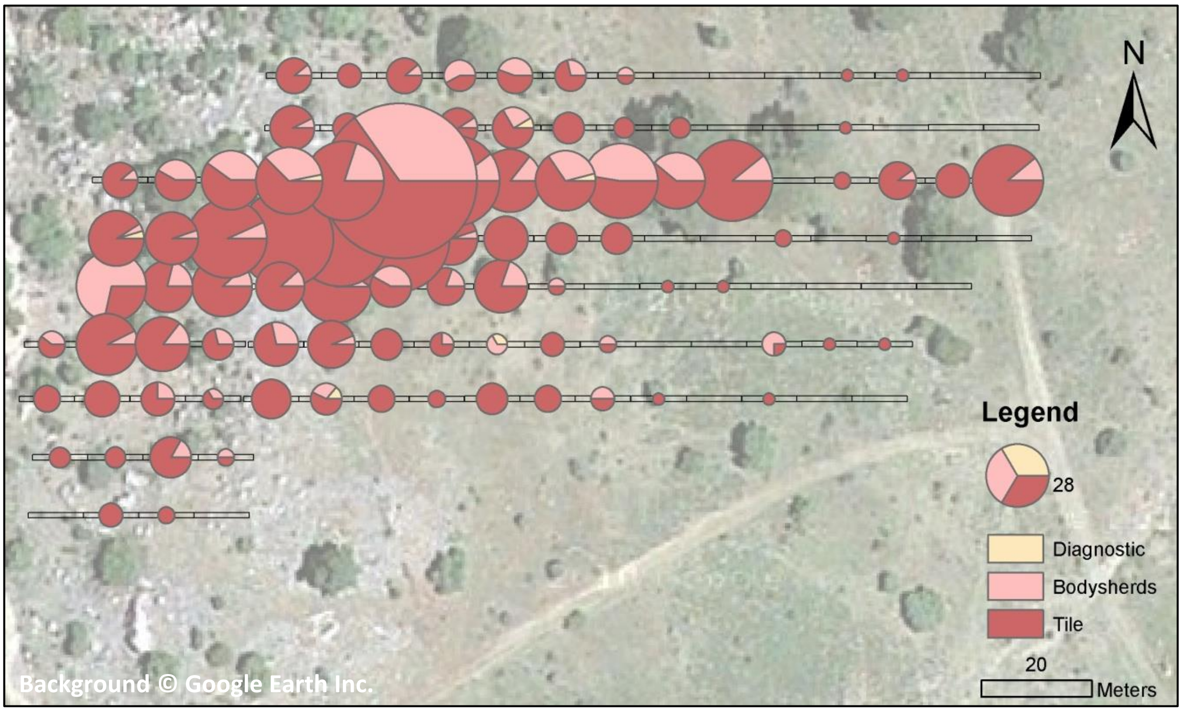


Figure 6.78: Quantity of body, diagnostic and tile sherds recorded in SU_07.

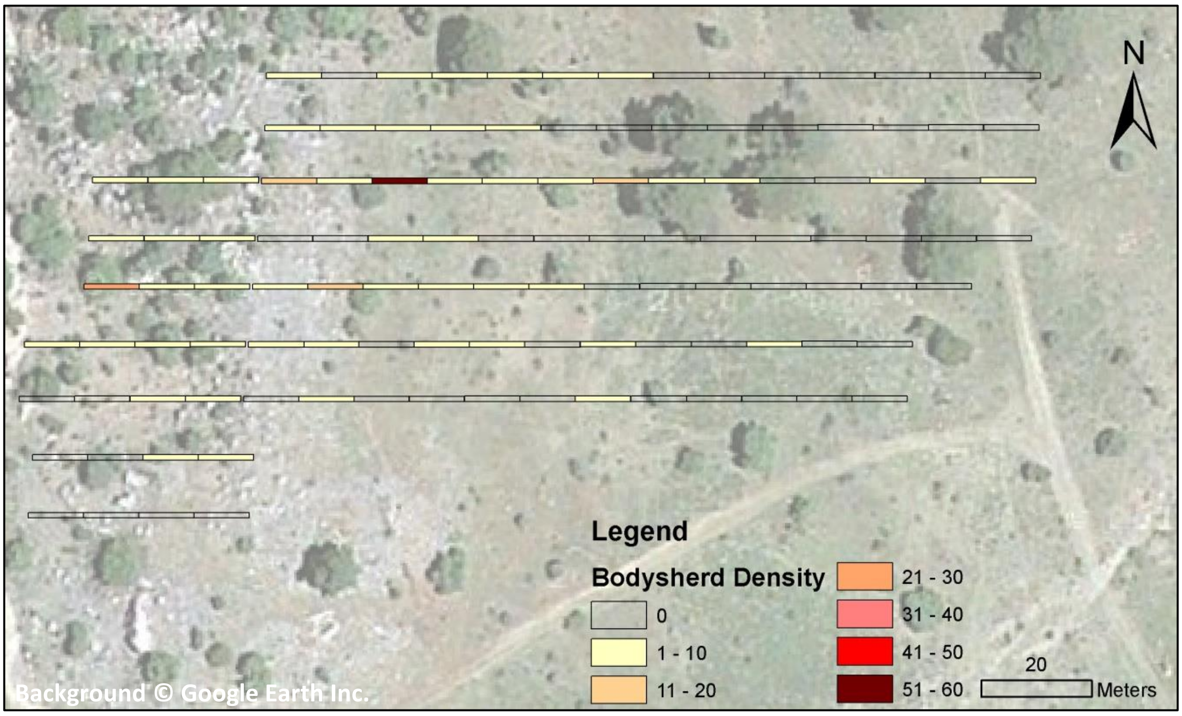


Figure 6.79: Density of diagnostic sherds recorded in SU_07.

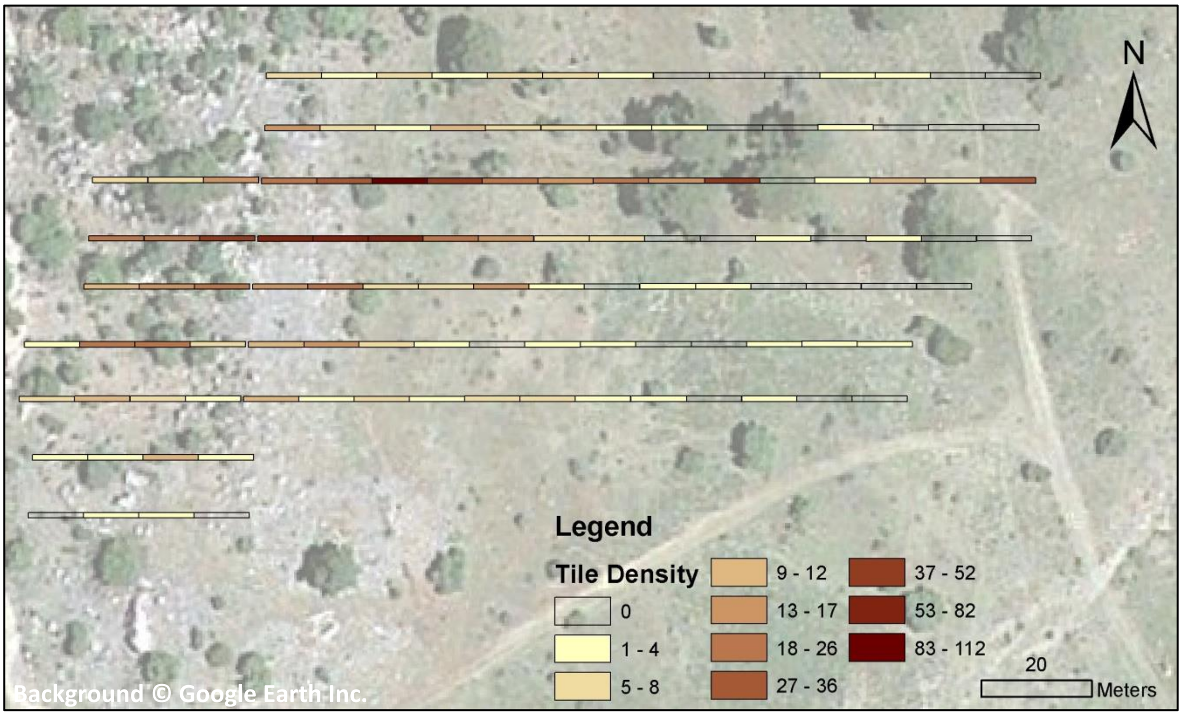


Figure 6.80: Density of tile fragments recorded in SU_07.

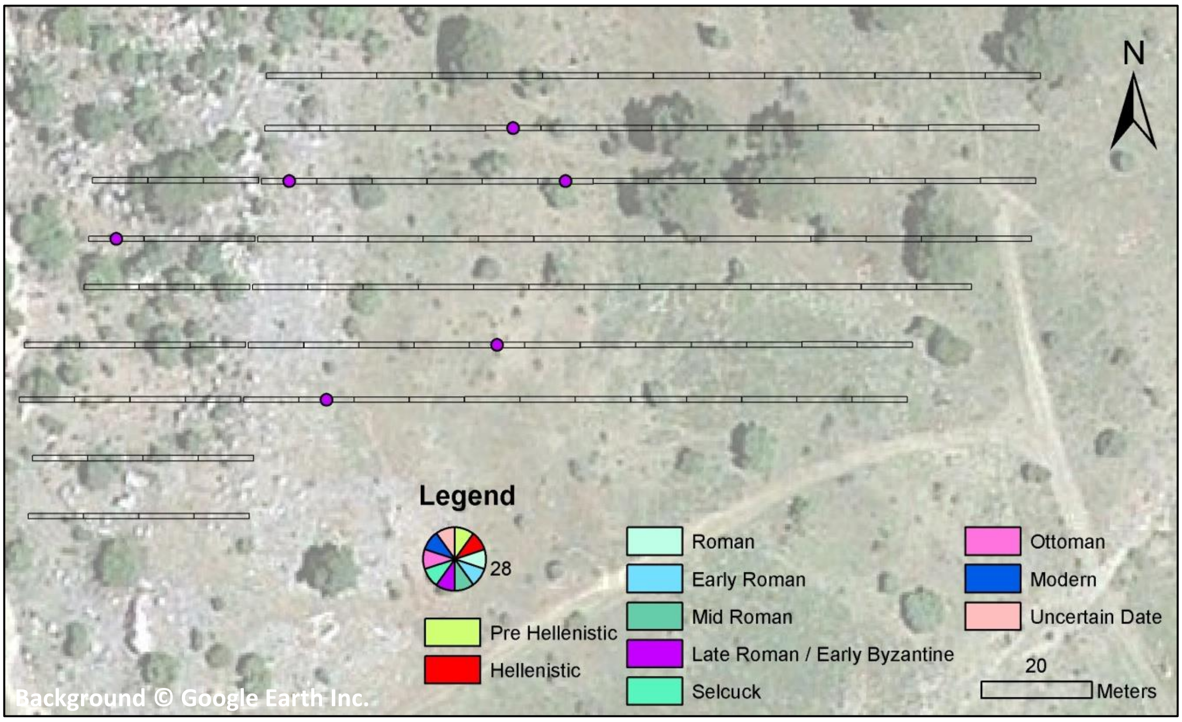


Figure 6.81: Dates for the diagnostic sherds recorded in SU_07.

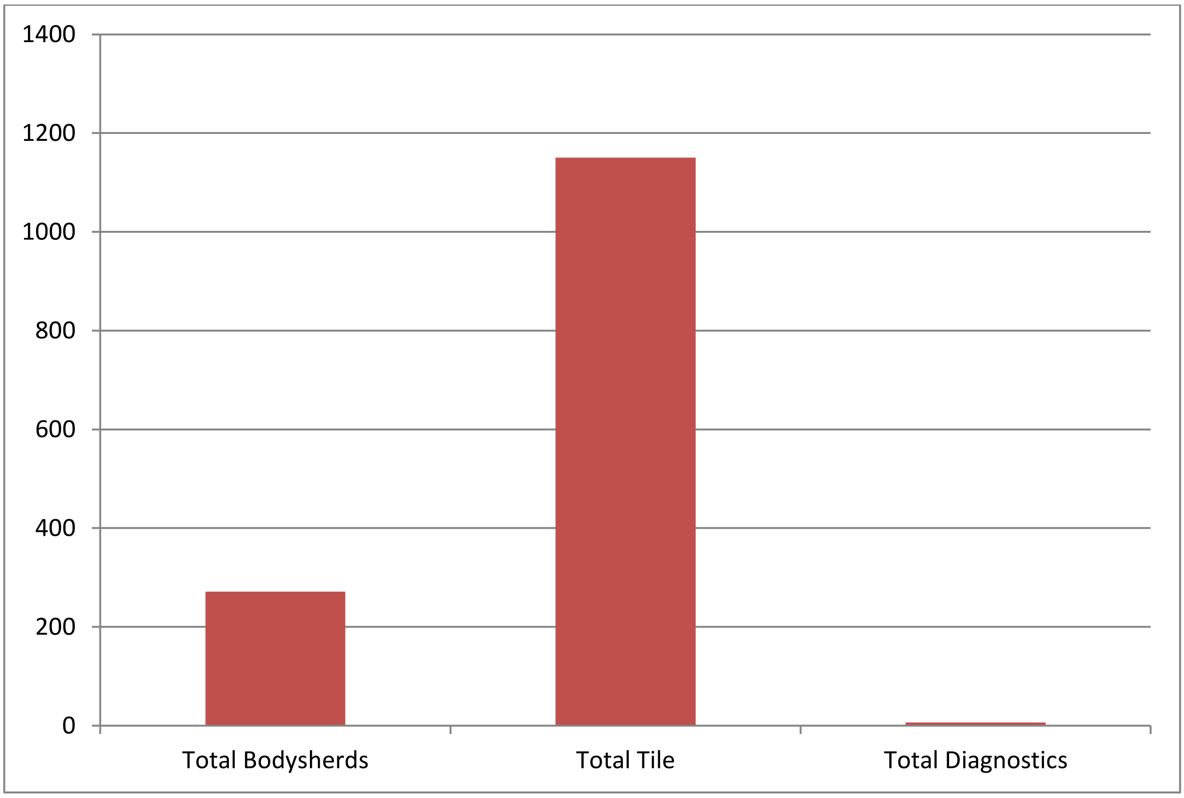


Figure 6.82: Comparative amounts of body, diagnostic and tile sherds found in SU_07.

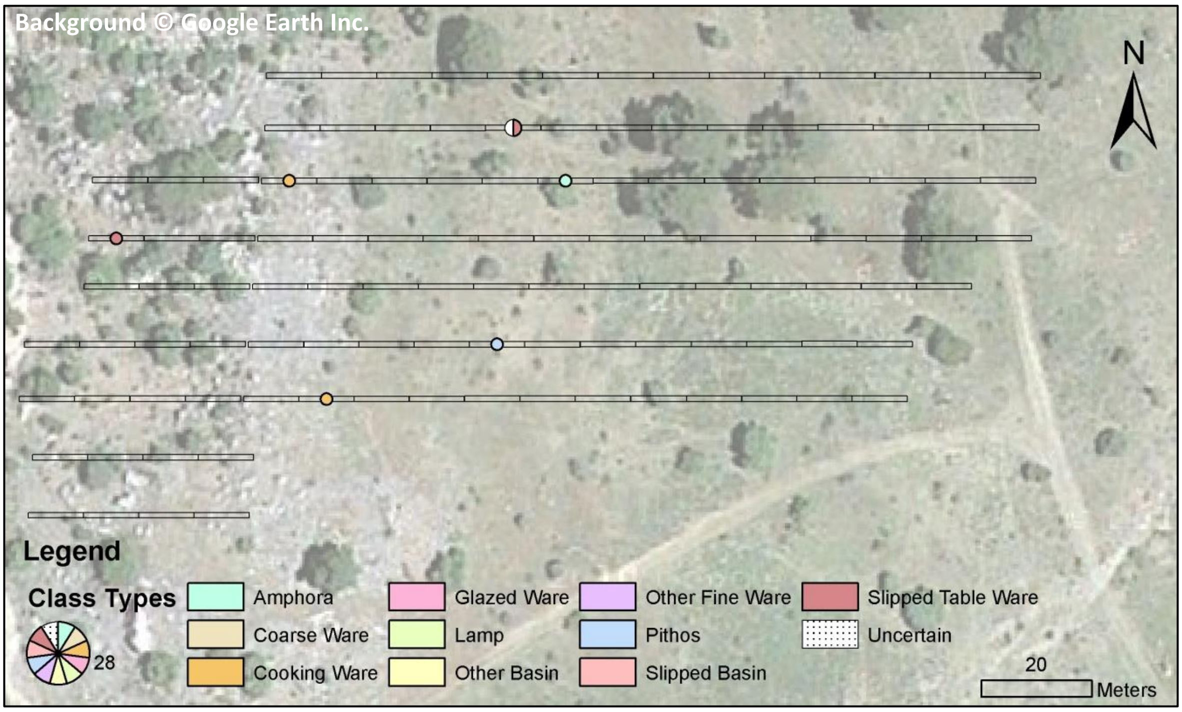


Figure 6.83: Class type for the diagnostic sherds recorded in SU_07.

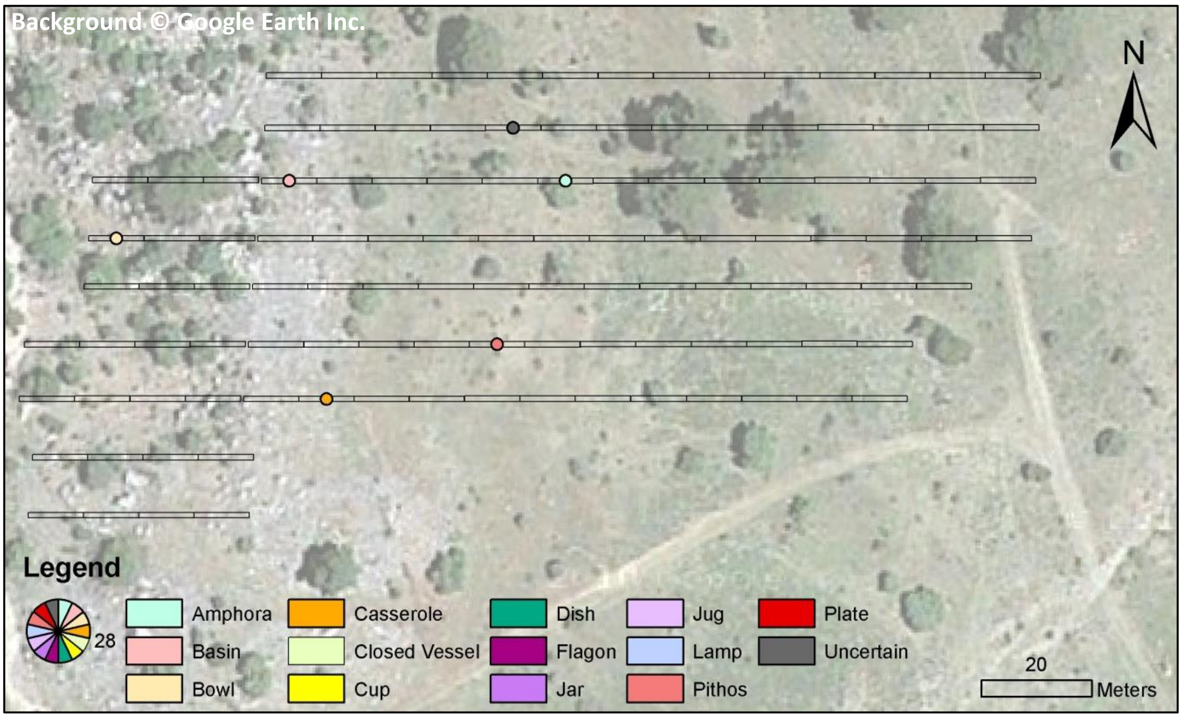


Figure 6.84: Vessel types for the diagnostic sherds recorded in SU_07.

Figure 6.85: Possible amphora stopper made from a pithos sherd found in SU_07.

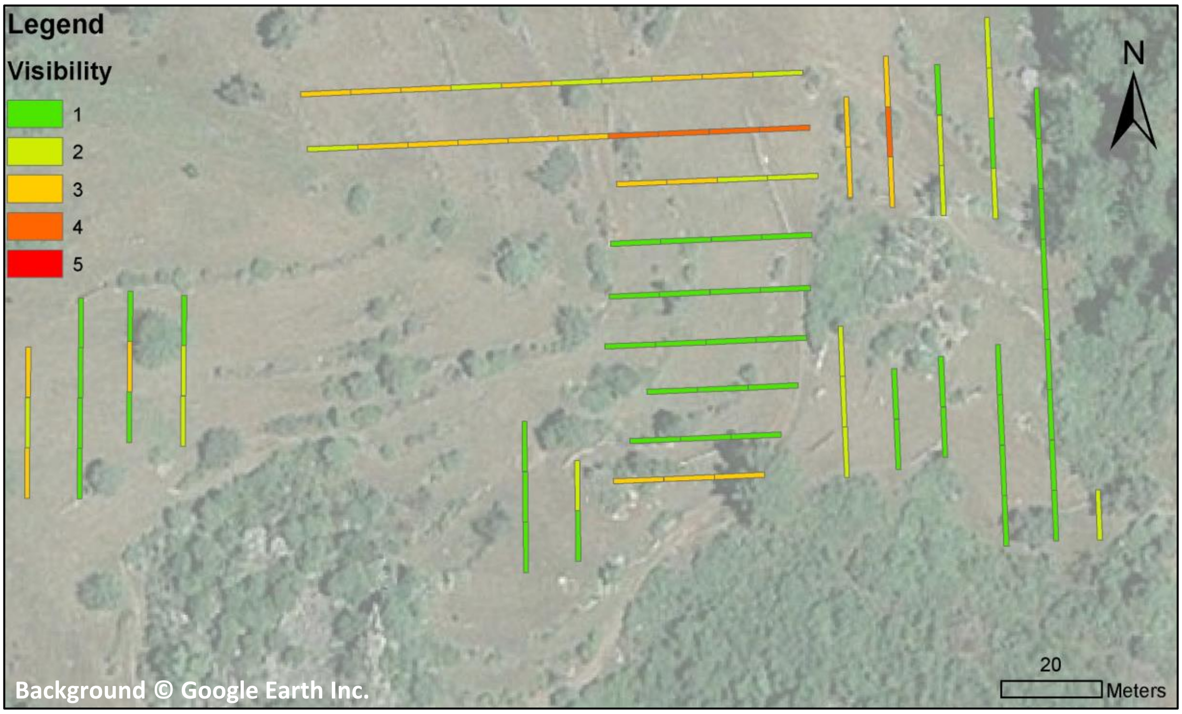


Figure 6.86: Visibility grading for the transect divisions in SU_08. 1 is poor, 5 is excellent.

Figure 6.87: Quantity of body, diagnostic and tile sherds recorded in SU_08.

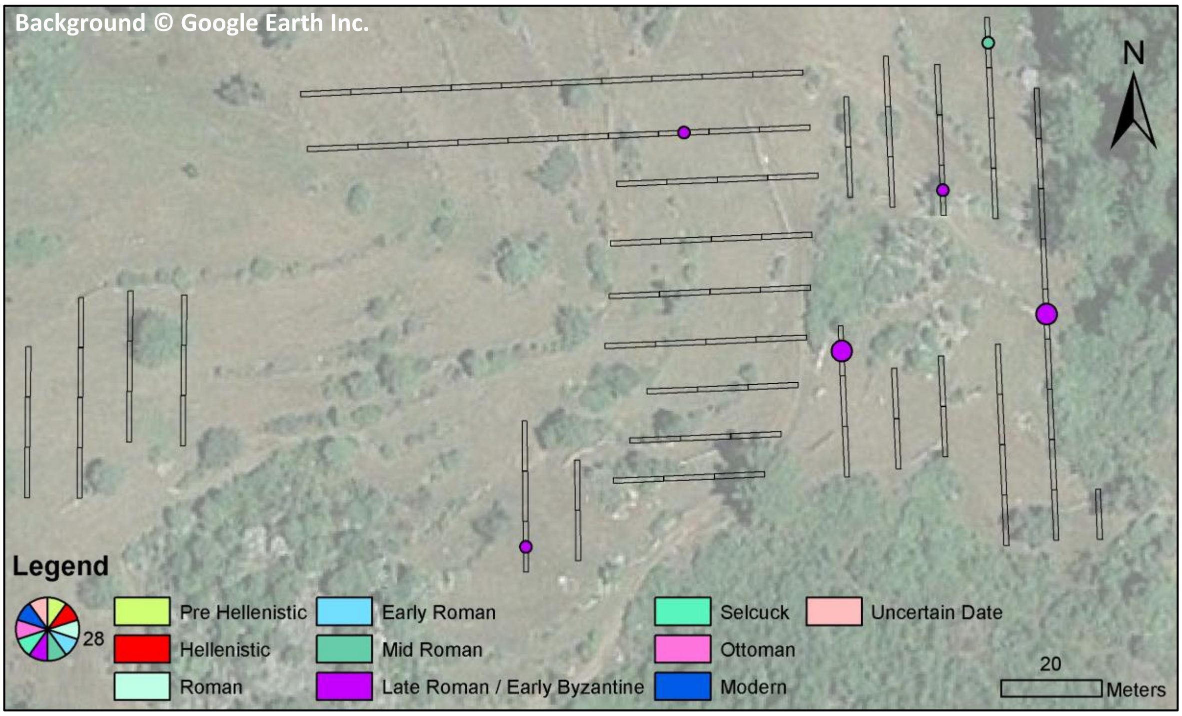


Figure 6.88: Dates for the diagnostic sherds recorded in SU_08.

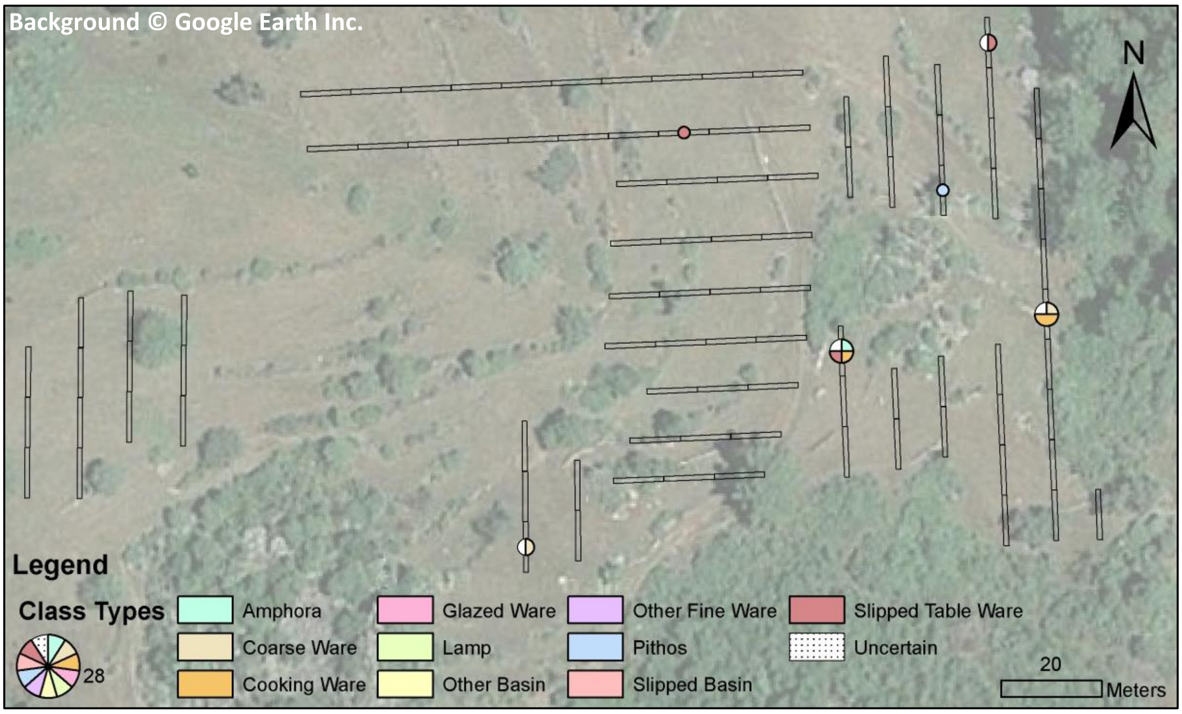


Figure 6.89: Class type for the diagnostic sherds recorded in SU_08.

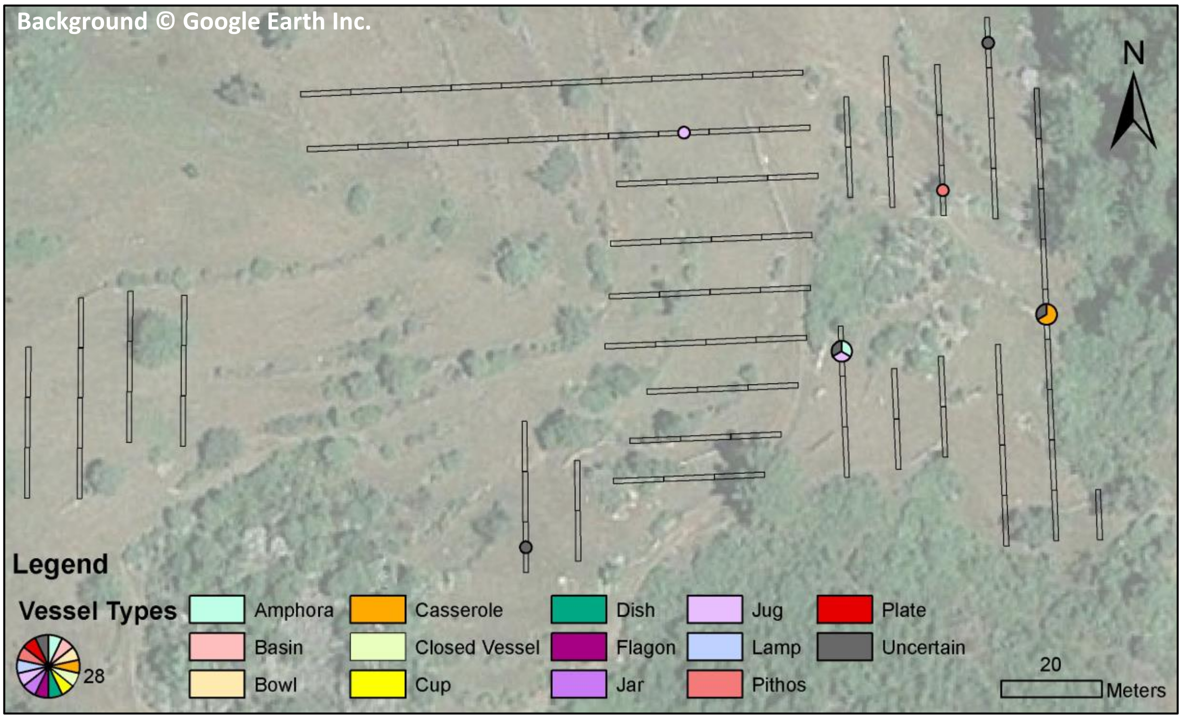


Figure 6.90: Vessel types for the diagnostic sherds recorded in SU_08.

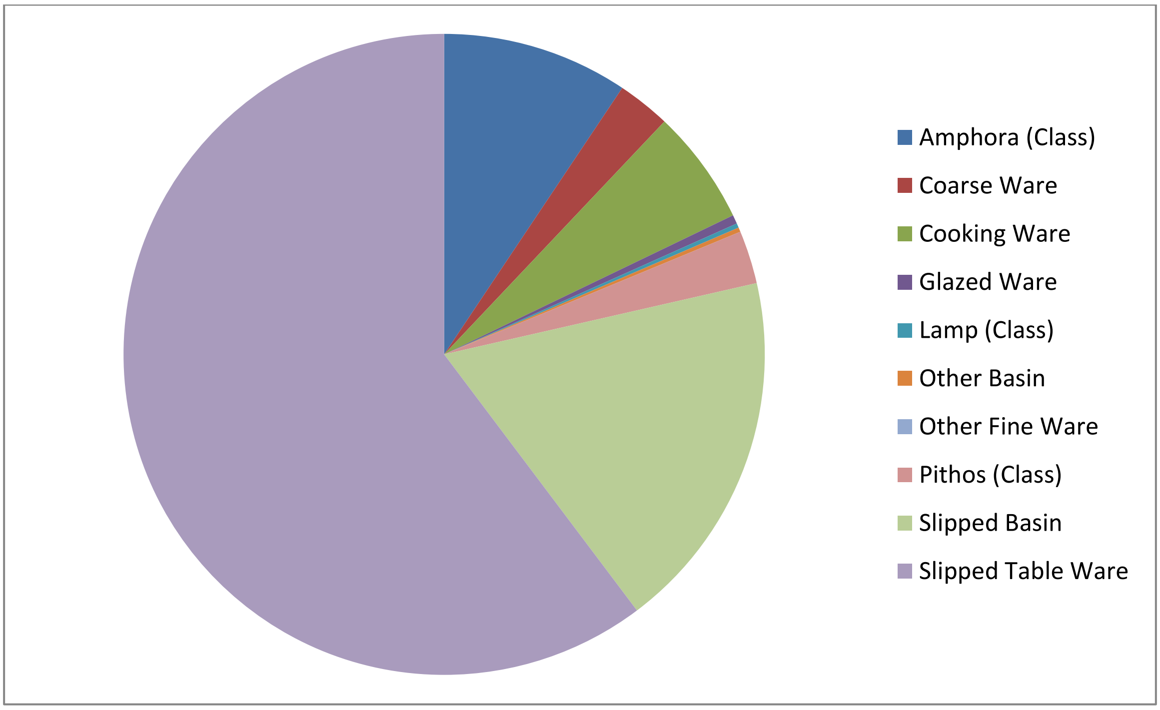


Figure 6.91: Comparison of ceramic class quantities across all Survey Units. Slipped table ware is the clear majority.

Figure 6.92: Extremely tall grass in SU_09.

Figure 6.93: Quantity of body, diagnostic and tile sherds recorded in SU_09.

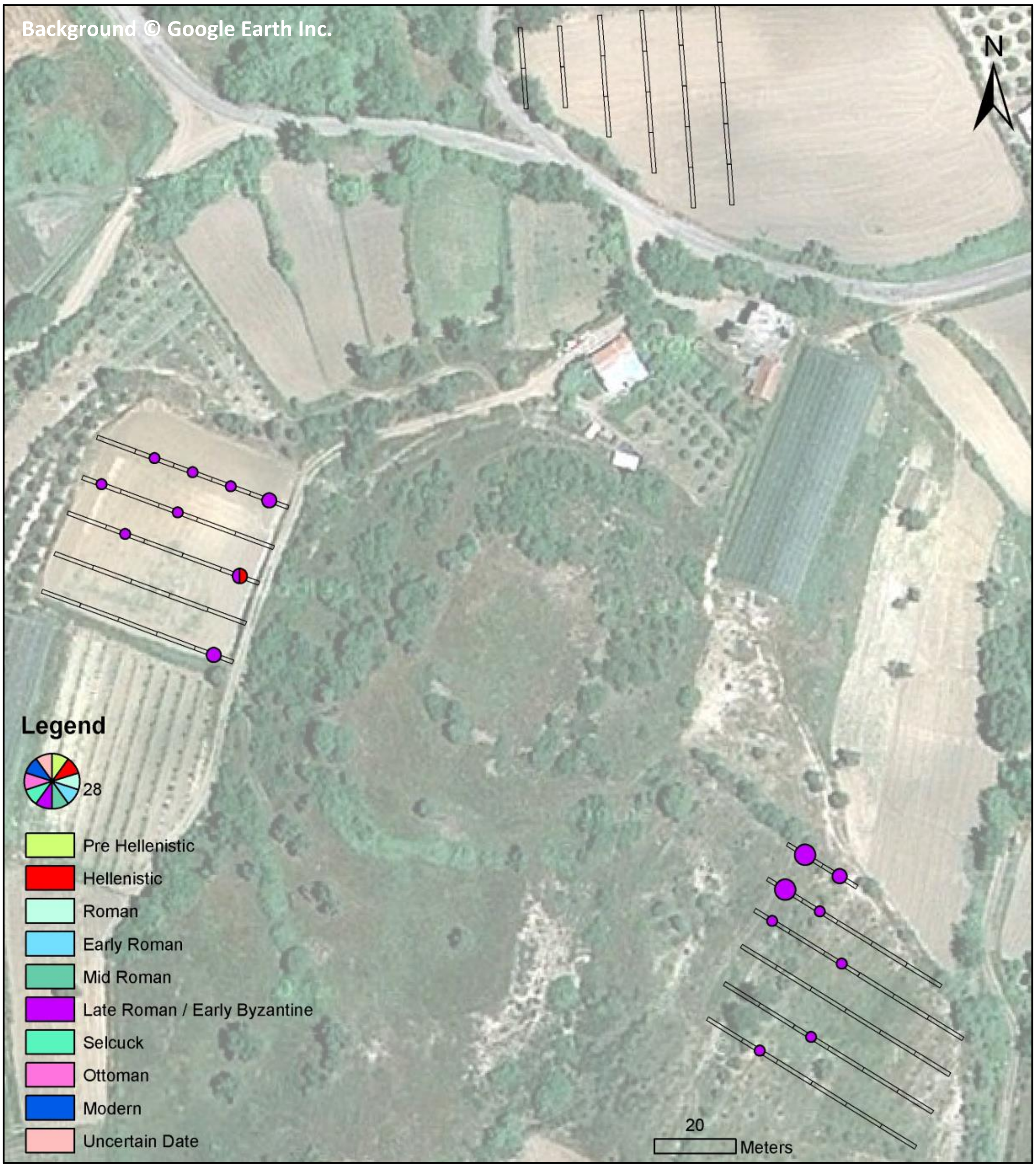


Figure 6.94: Dates for the diagnostic sherds recorded in SU_09.

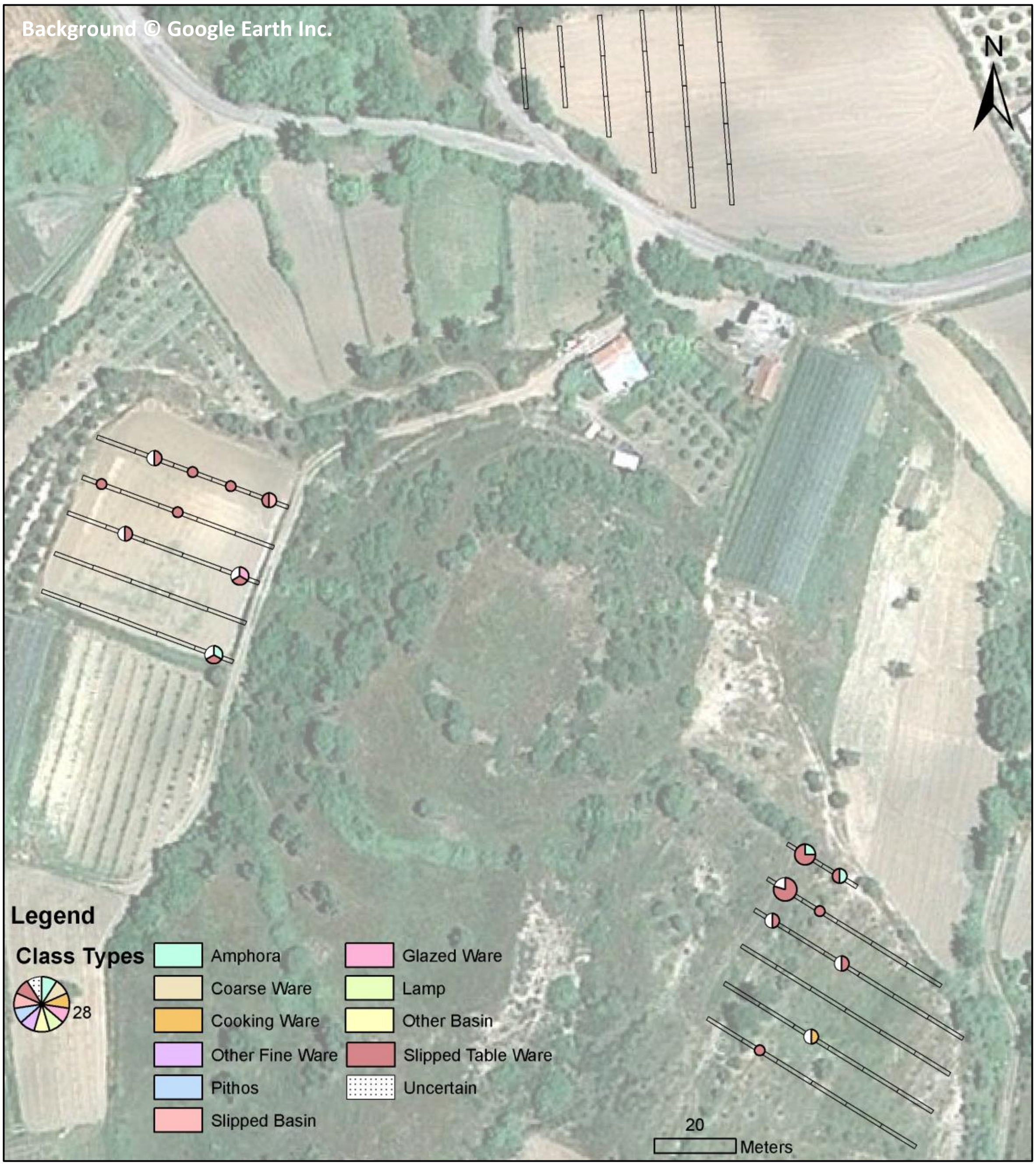


Figure 6.95: Class type for the diagnostic sherds recorded in SU_09.

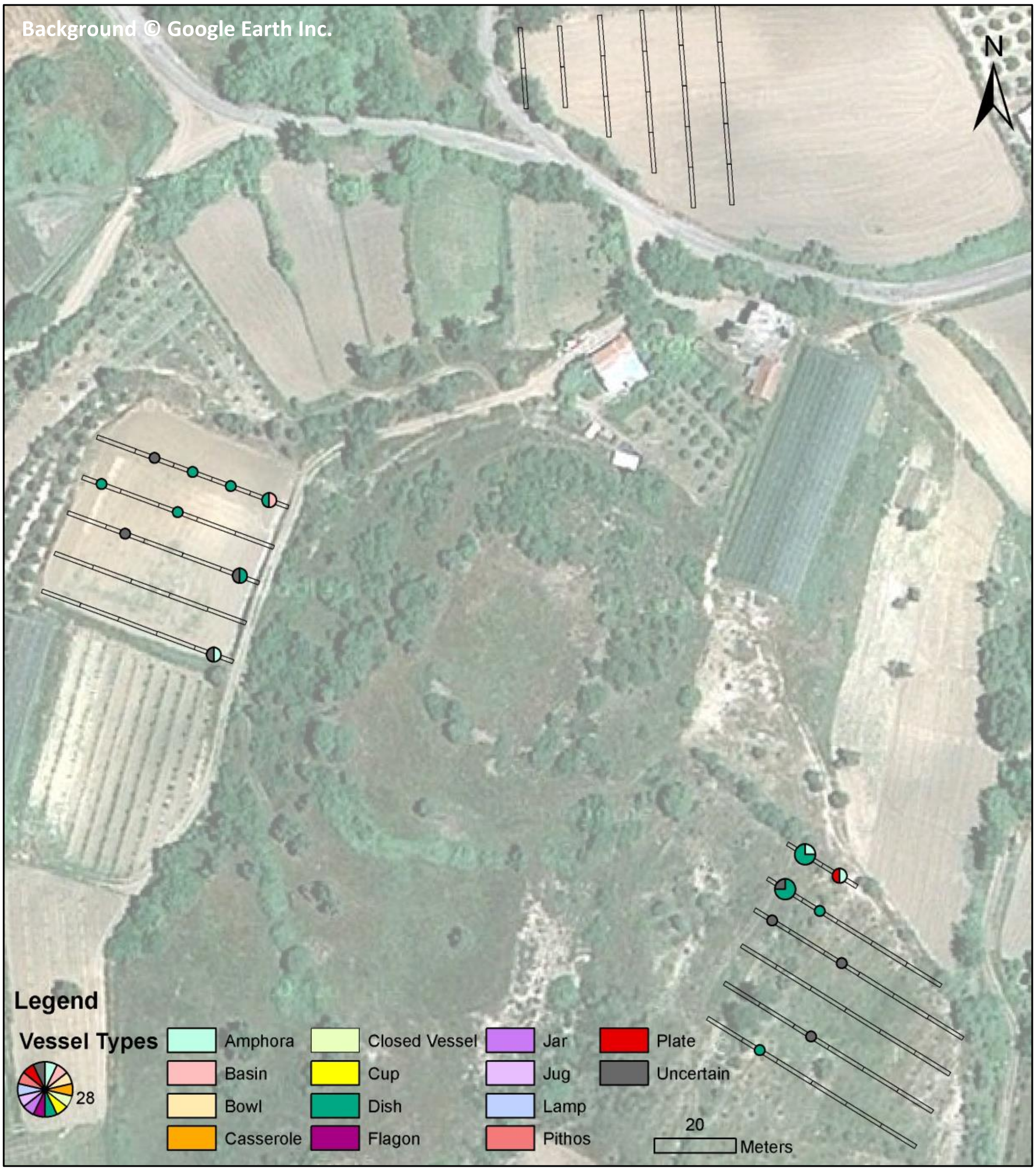


Figure 6.96: Vessel types for the diagnostic sherds recorded in SU_09.

Figure 6.97: Visibility grading for the transect divisions in SU_10. 1 is poor, 5 is excellent.

Figure 6.98: Environment classifications for SU_10. CG (blue) = Cultivated ground, FG (pink) = Fruit grove, OGO (green) = Old olive trees, OGY (lilac) = Young olive grove.

Figure 6.99: New bulldozed terraces in SU_10.

Figure 6.100: Remains of buildings seen in the bulldozed terrace cuts in SU_10. Red underlines a floor line and blue indicates a wall face.

Figure 6.101: Quantity of body, diagnostic and tile sherds recorded in SU_10.

Figure 6.102: Dates for the diagnostic sherds recorded in SU_10.

Figure 6.103: Class type for the diagnostic sherds recorded in SU_10.

Figure 6.104: Vessel types for the diagnostic sherds recorded in SU_10.

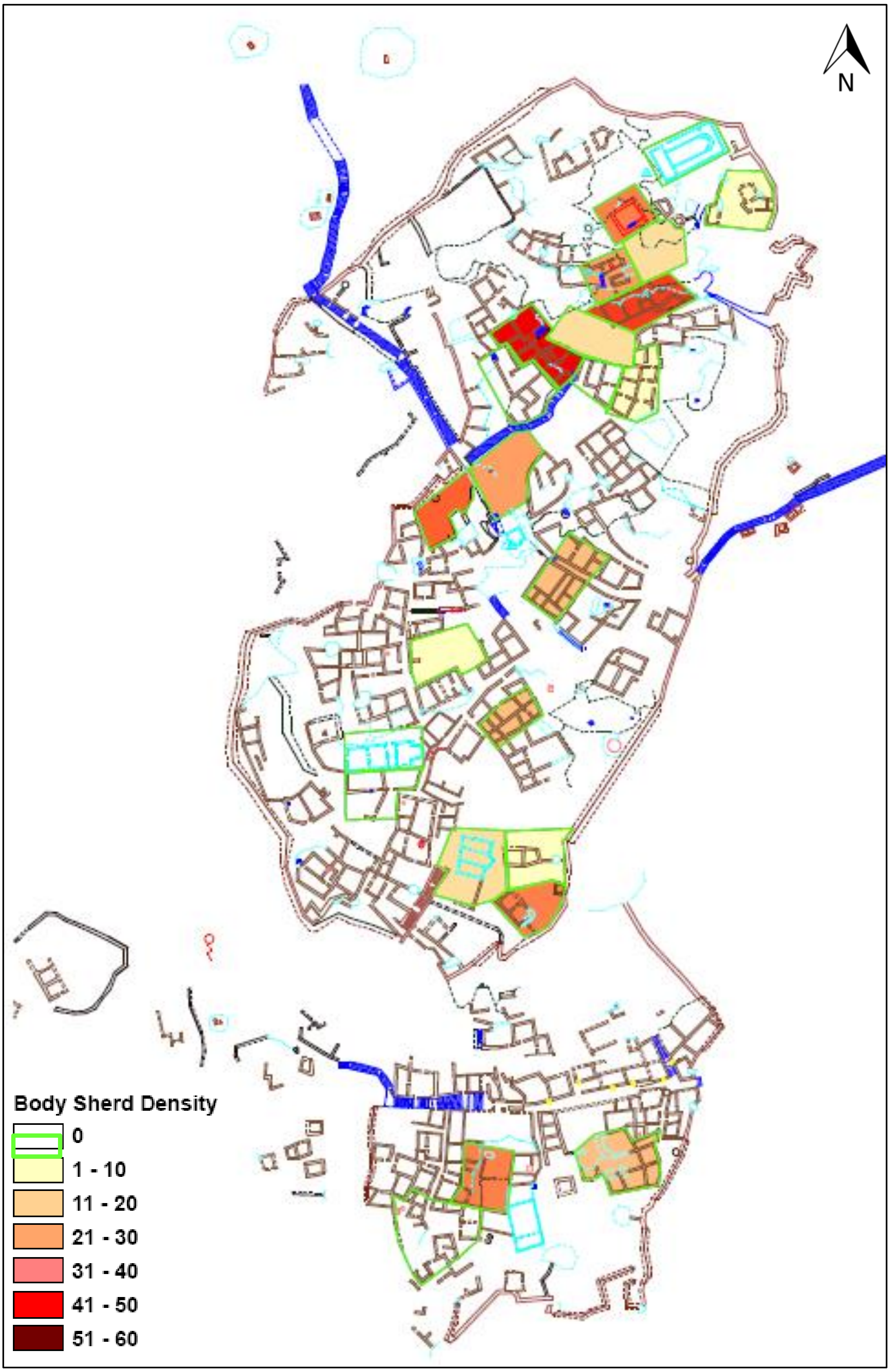


Figure 6.105: Bodysherd density results from the Koca Mehmetler Asari Survey.

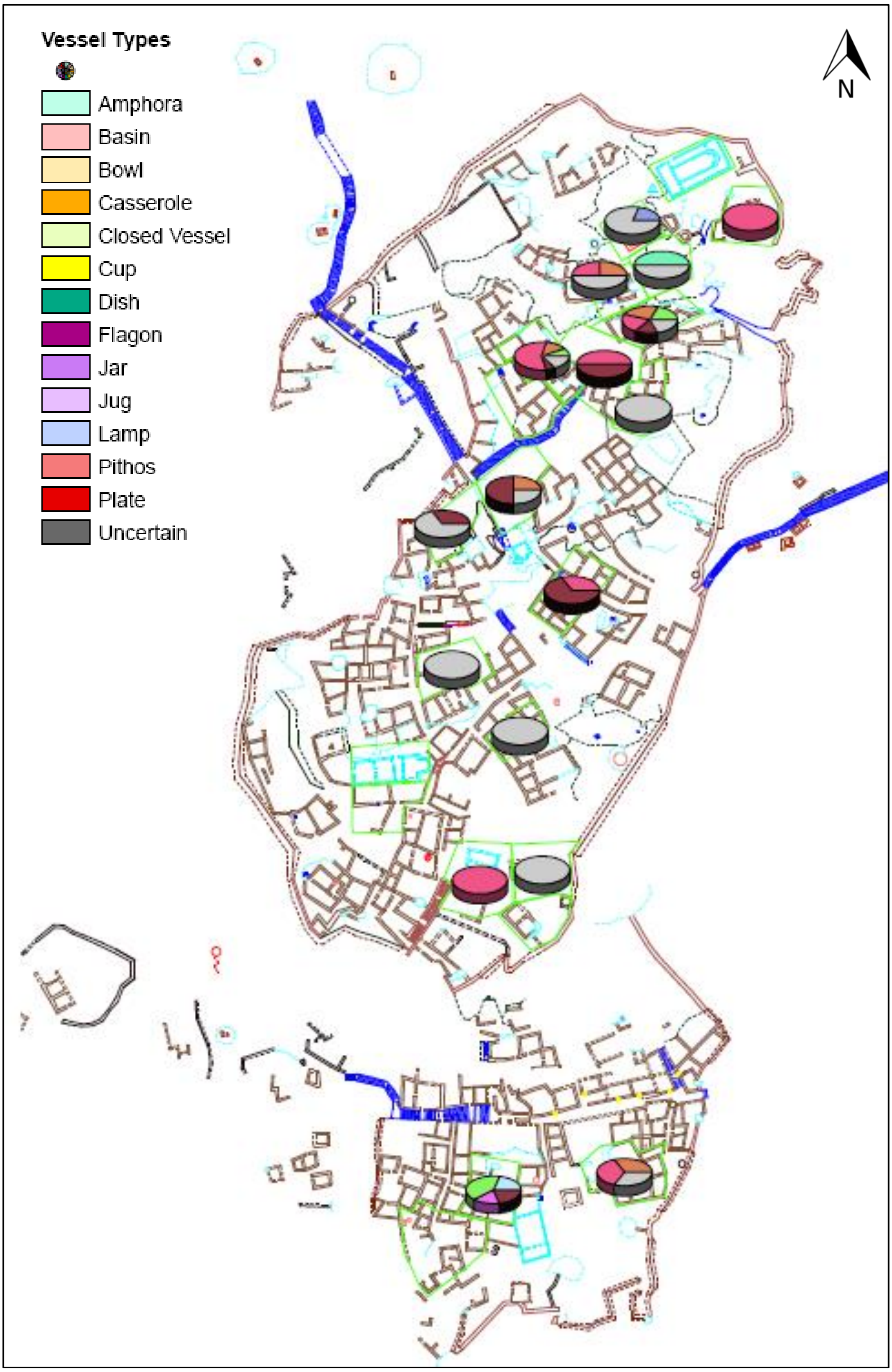


Figure 6.106: Vessel types recorded at Koca Mehmetler Asari.

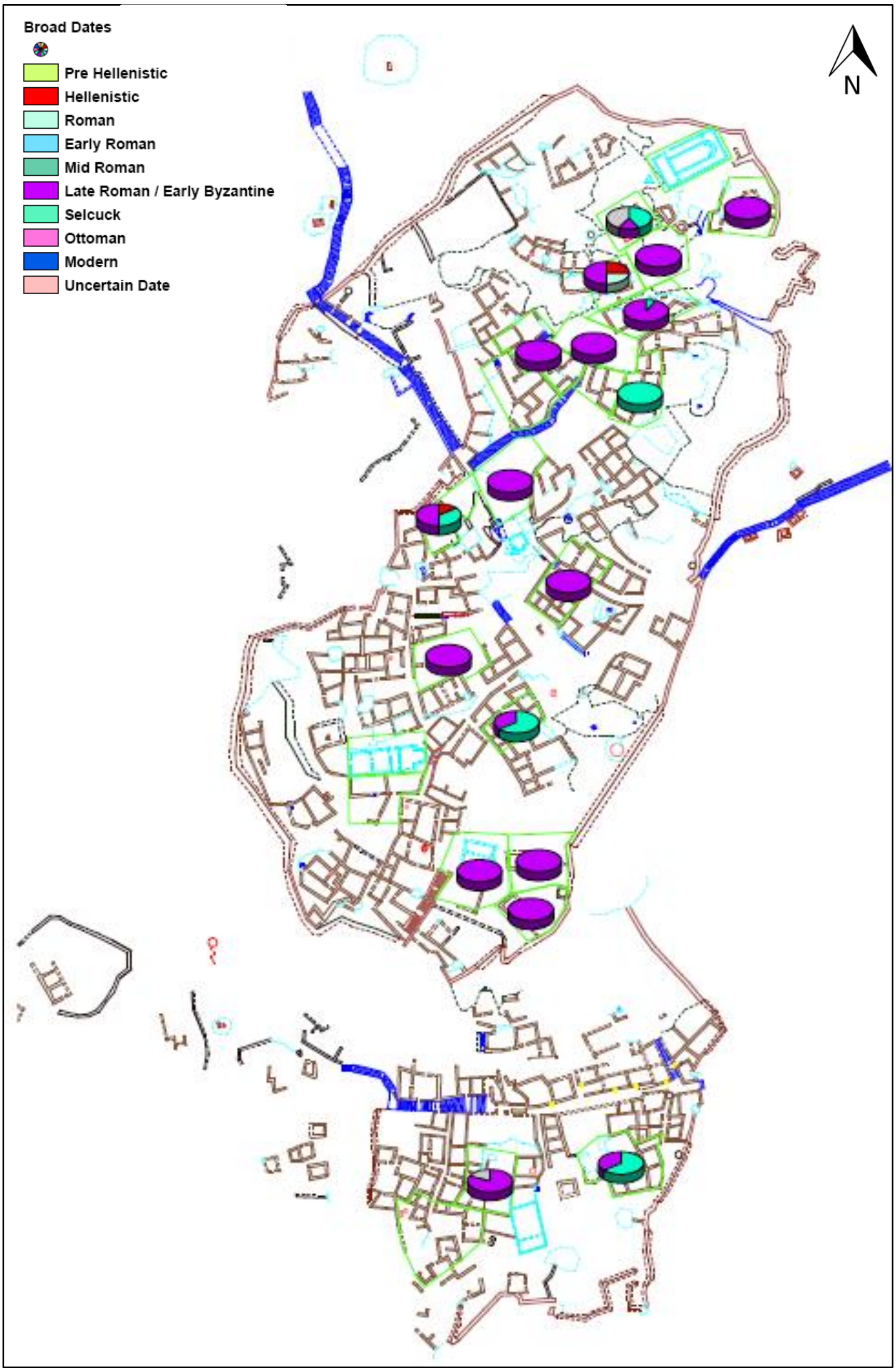


Figure 6.107: Dates for diagnostic sherds recorded at Koca Mehmetler Asari.

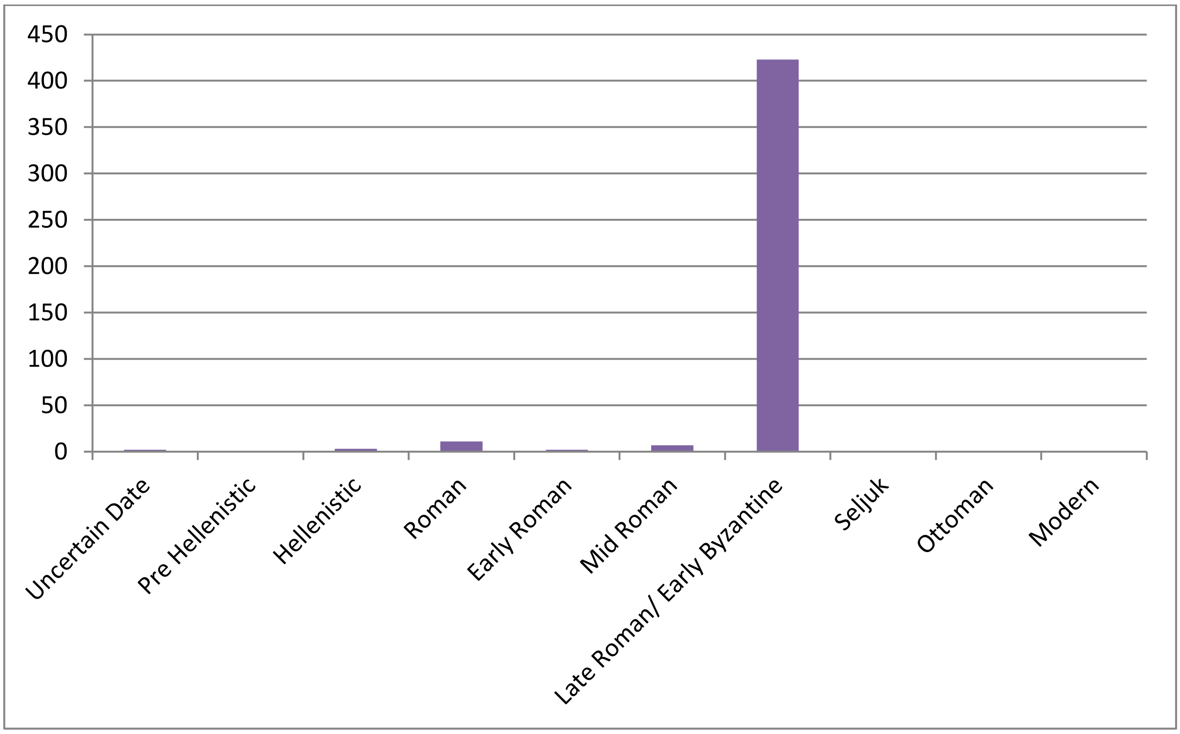


Figure 6.108: Comparison of diagnostic sherds by date classification across all ten Survey Units.

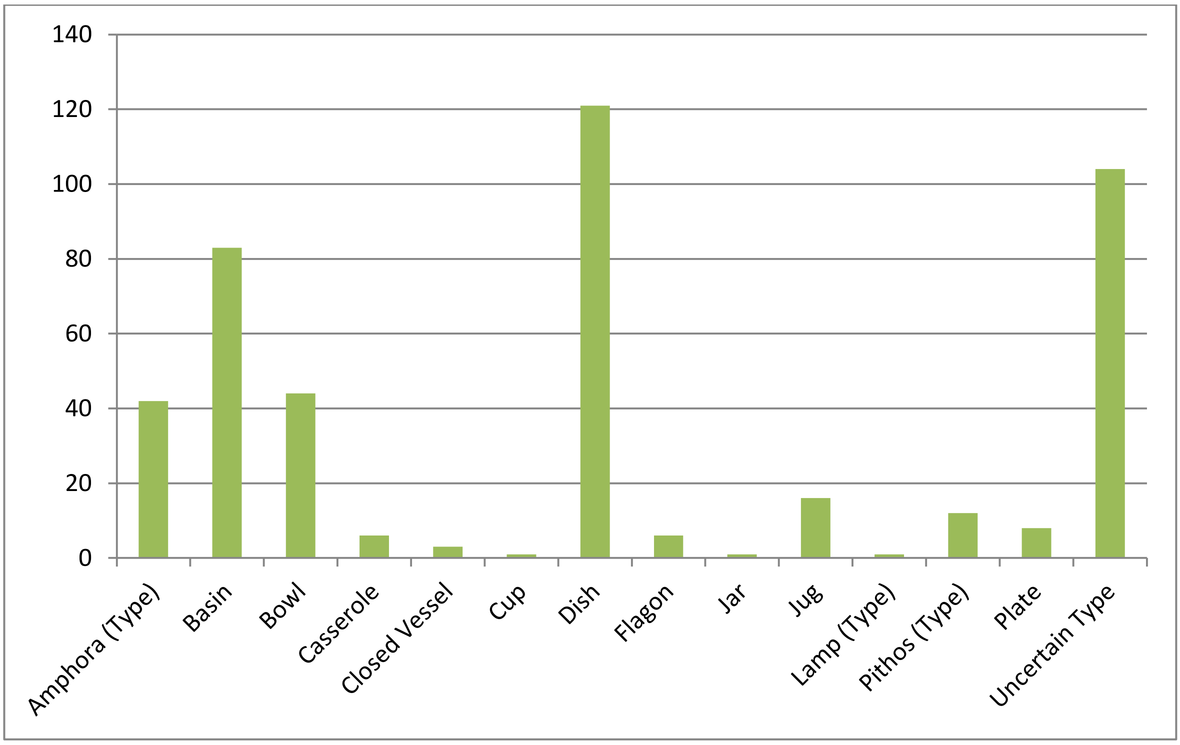


Figure 6.109: Comparison of diagnostic sherds by vessel type across all ten Survey Units.

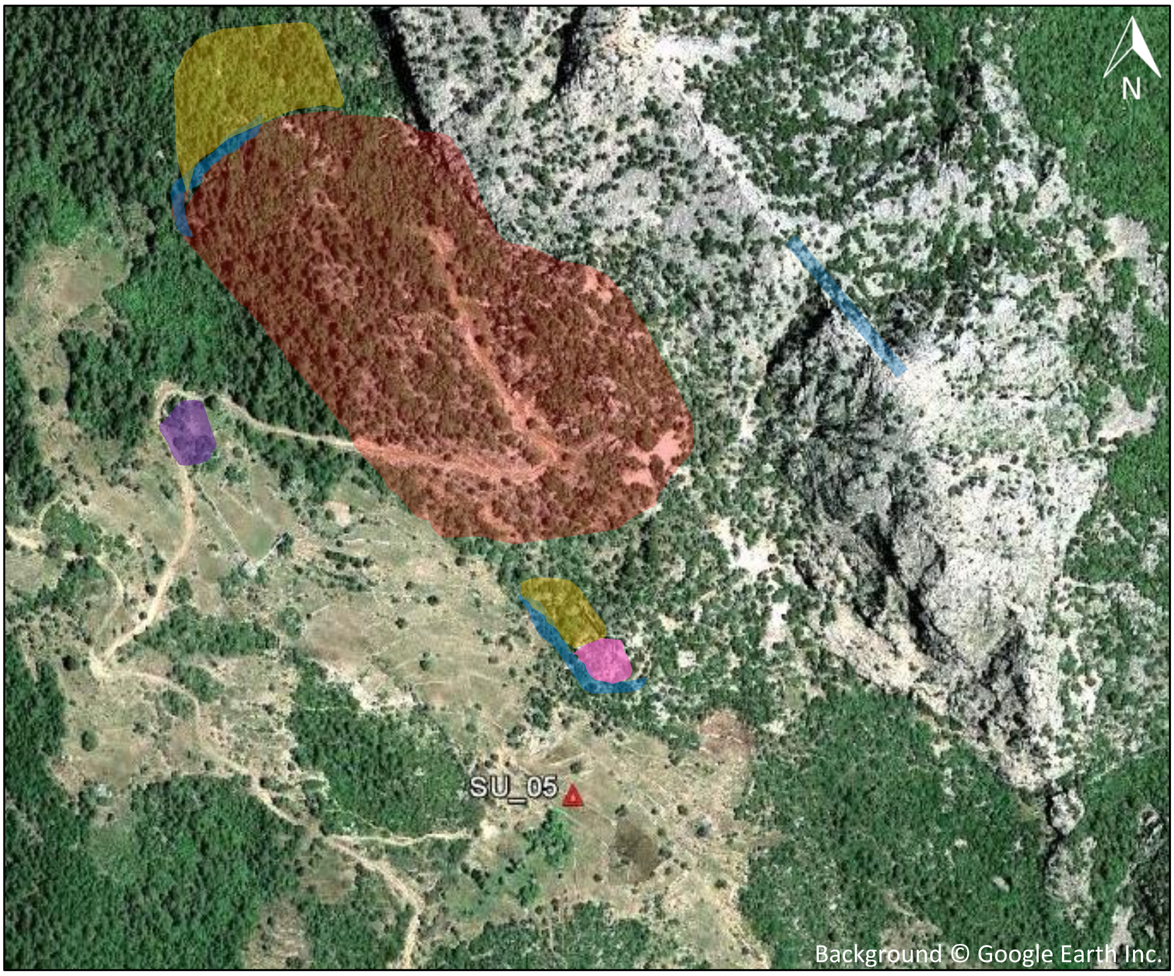


Figure 6.110: Pednelissos focus study.

Figure 6.111: Retrogressive landscape analysis of Pednelissos.

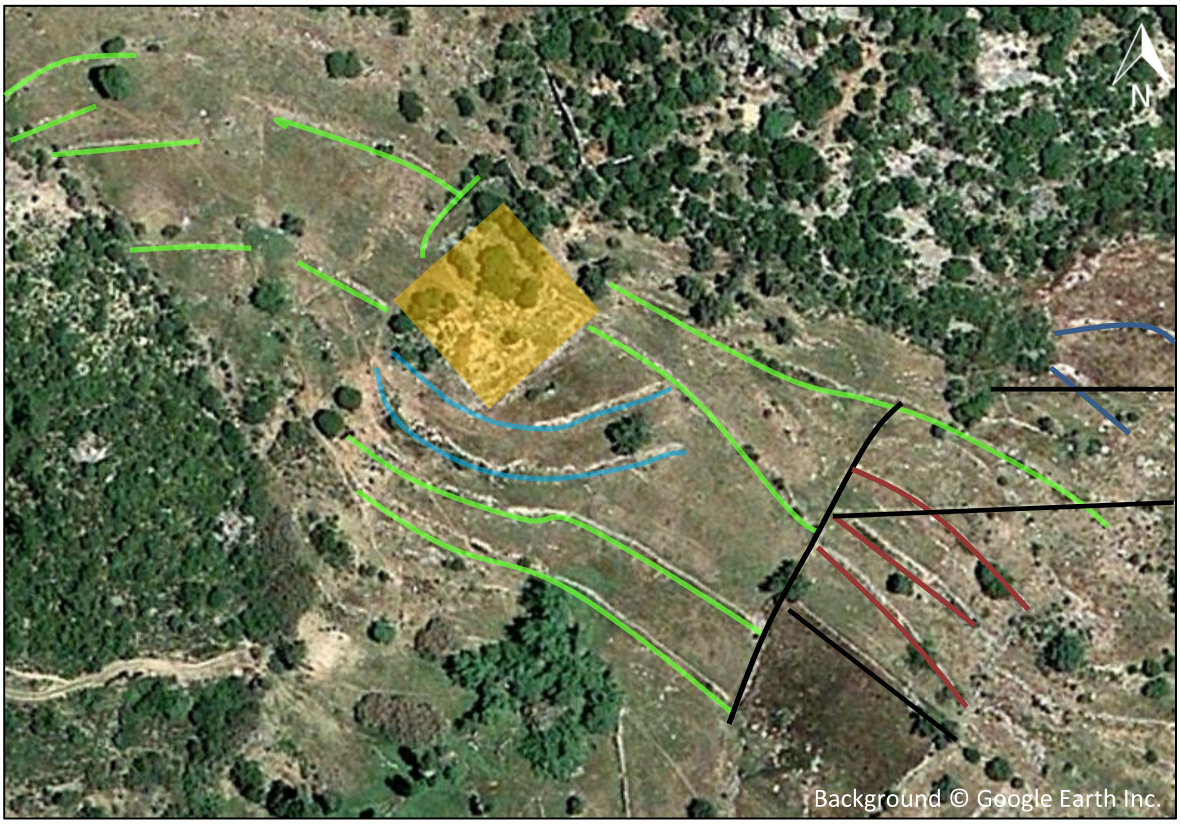


Figure 6.112: Retrogressive landscape analysis of Pednelissos.

Figure 6.113: Kozan Köyü.

Figure 6.114: Ottoman timber and stone house in Kozan Köyü.

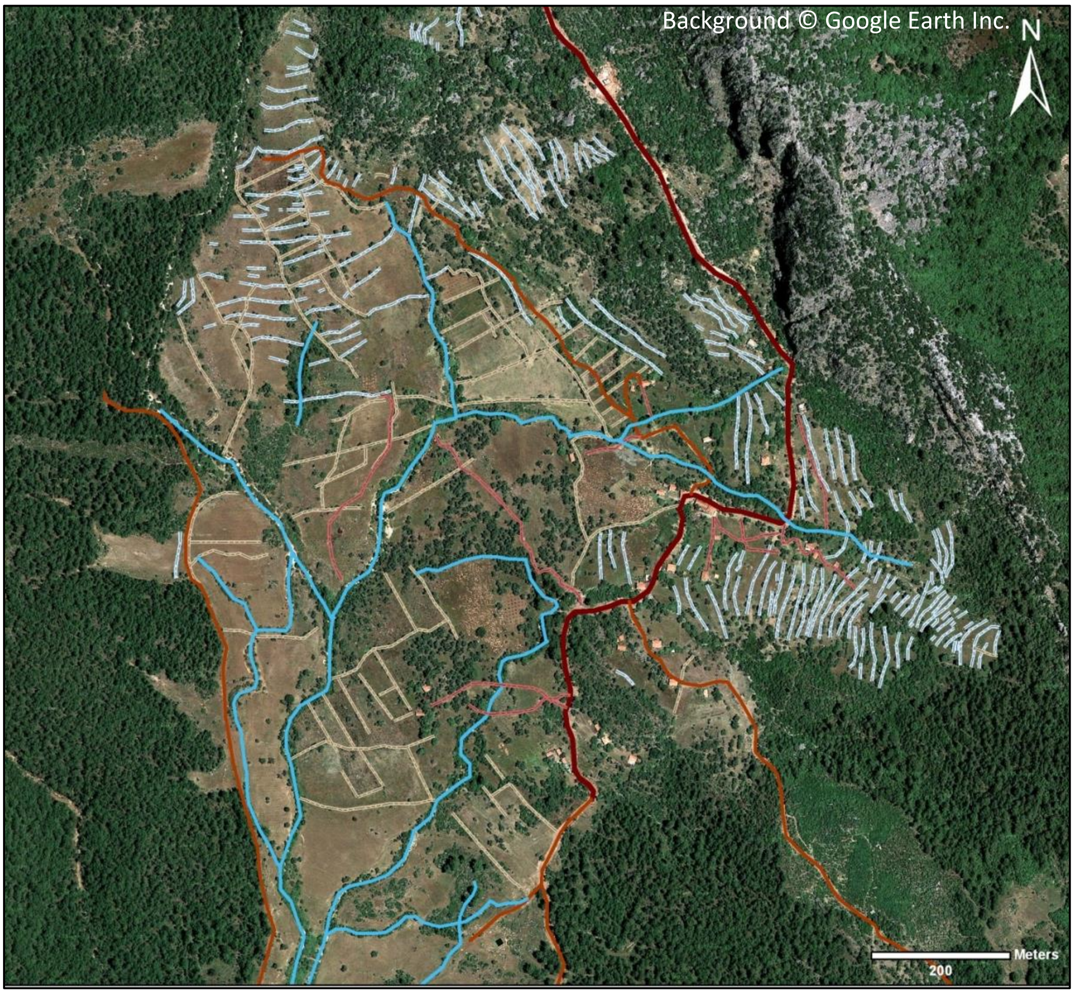


Figure 6.115: Retrogressive landscape analysis of Kozan Köyü.

Figure 6.116: Modern boundary, Kozan Köyü upper fields.

Figure 6.117: Kozan Köyü lower fields, field boundaries highlighted in red.

Figure 6.118: Earliest level of retrogressive landscape analysis.

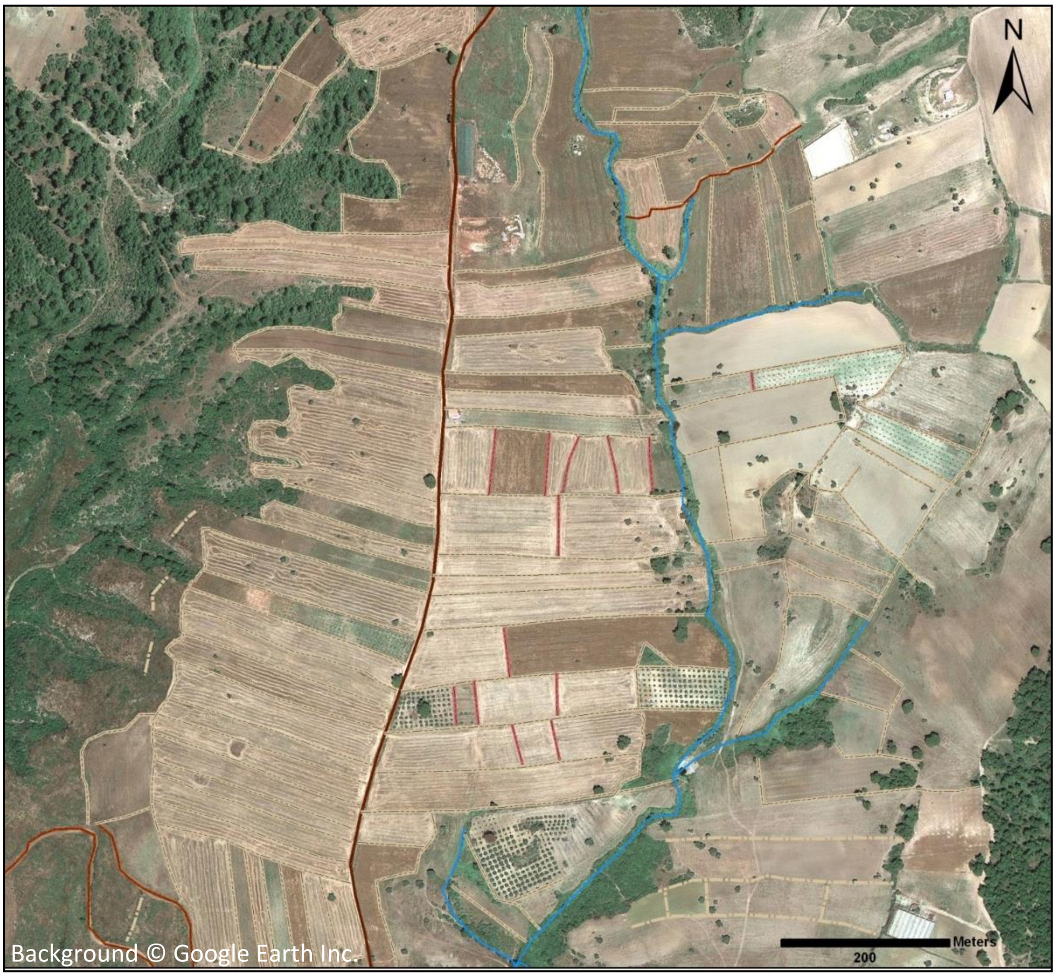


Figure 6.119: Retrogressive landscape anaysis of Kazallı Mahalessi.

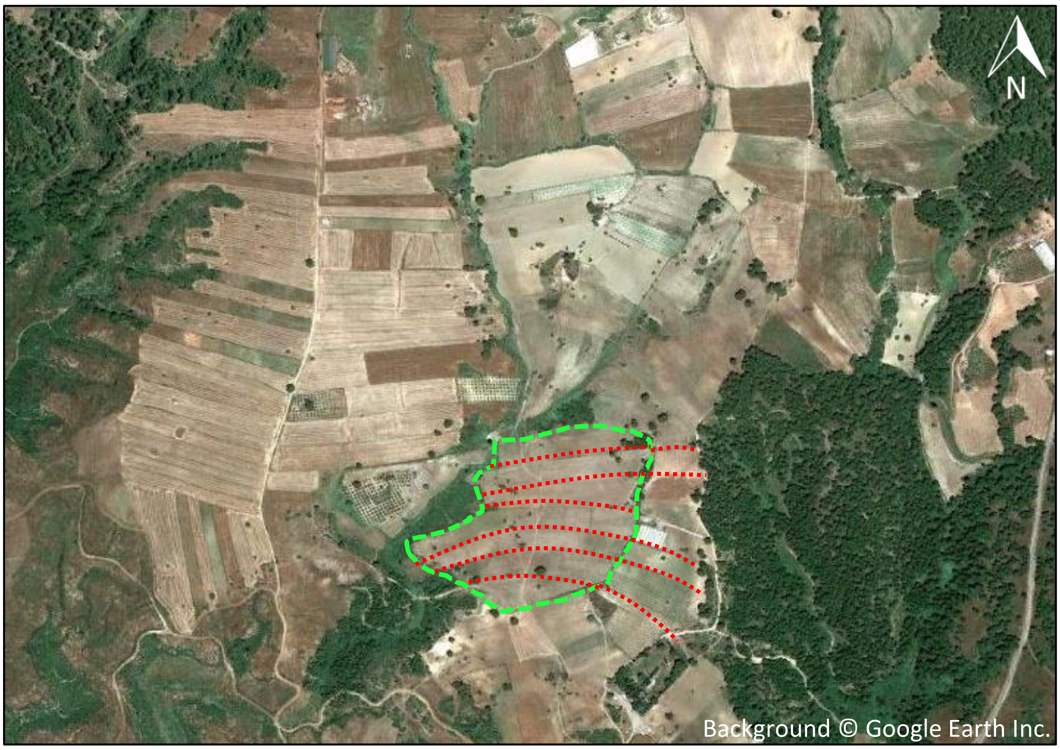


Figure 6.120: Crop markings revealing earlier strip fields at Kazallı Mahalessi.

Figure 6.121: Retrogressive landscape anaysis of Göllü Tepesi.

Figure 6.122: Retrogressive landscape analysis of Avdalli Tepesi.

Figure 6.123: Example of Modern 'Strip Field' HLC type.

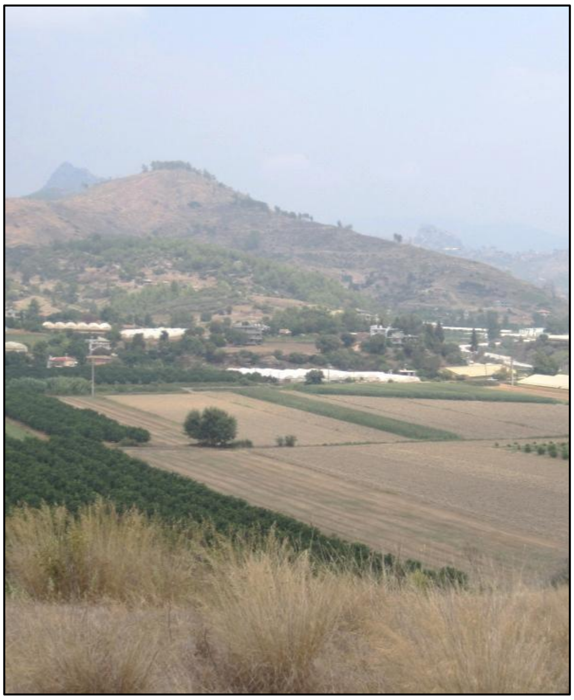


Figure 6.124: Landscape photograph of Modern 'Strip Field' HLC type.

Figure 6.125: Modern 'Strip Field' HLC type with irrigation channels highlighted in red.

Figure 6.126: Crop marks (highlighted in red) indicating field systems prior to Modern strip fields.

Figure 6.127: Modern strip fields, for the cultivation of fruit trees.

Figure 6.128: Example of Modern 'Irregular Angular Field' HLC type. Modern irrigation channels highlighted in red.

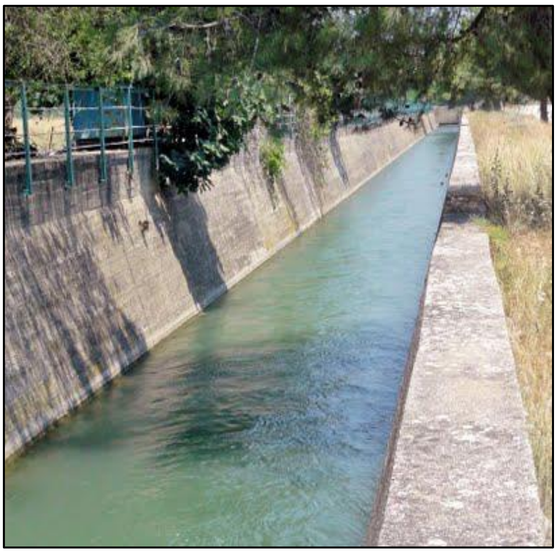


Figure 6.129: Modern concrete irrigation channel.

Figure 6.130: Modern concrete aqueduct.

Figure 6.131: Example of Modern 'Open Field' HLC type.

Figure 6.132: Landscape photograph of open fields. Raised scrub boundaries highlighted in red.

Figure 6.133: Example of Modern 'Regular Clearance Field' HLC type.

Figure 6.134: Example of Modern 'Sinuous Clearance Field' HLC type.

Figure 6.135: Landscape photograph of sinuous clearance fields.
Photograph taken after the grain harvest.

Figure 6.136: Example of Modern 'Riverside Irregular Field' HLC type.

Figure 6.137: Example of Ottoman 'Abandoned Field' HLC type.

Figure 6.138: Landscape Photograph of Ottoman 'Abandoned Field' HLC type. Olive trees mark the lines of abandoned stone boundaries.

Figure 6.139: Example of Ottoman - Irregular Broken Strip HLC type.

Figure 6.140: Landscape photograph of Ottoman 'Irregular Broken Strip Field' HLC type. Irregular Broken Strip field boundaries are highlighted in red, stream in blue.

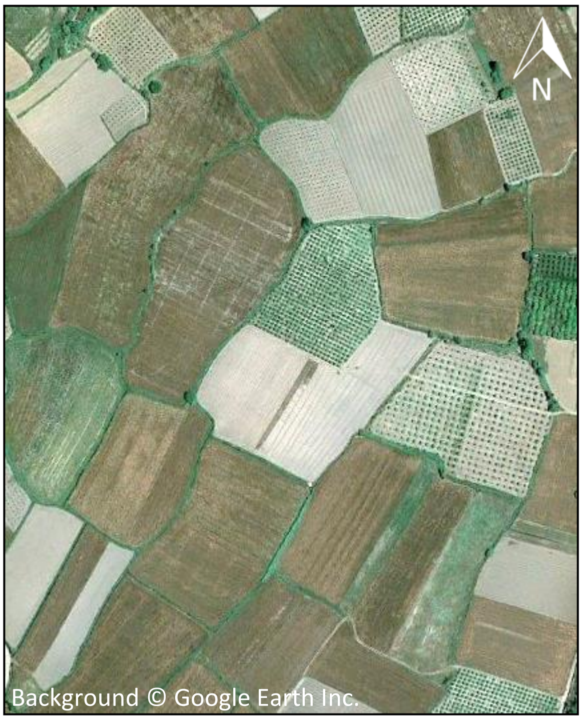


Figure 6.141: Example of Ottoman 'Irregular Rectilinear Field' HLC type.

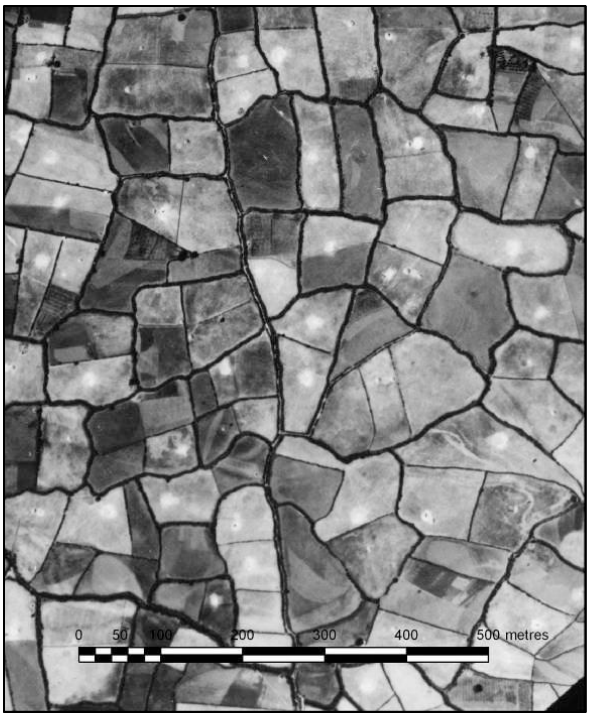


Figure 6.142: 1940s RAF air photographs of post-medieval fields based on medieval fields seen in Naxos (Crow and Turner n.d.).

Figure 6.143: Example of Ottoman 'Irregular Field' HLC type.

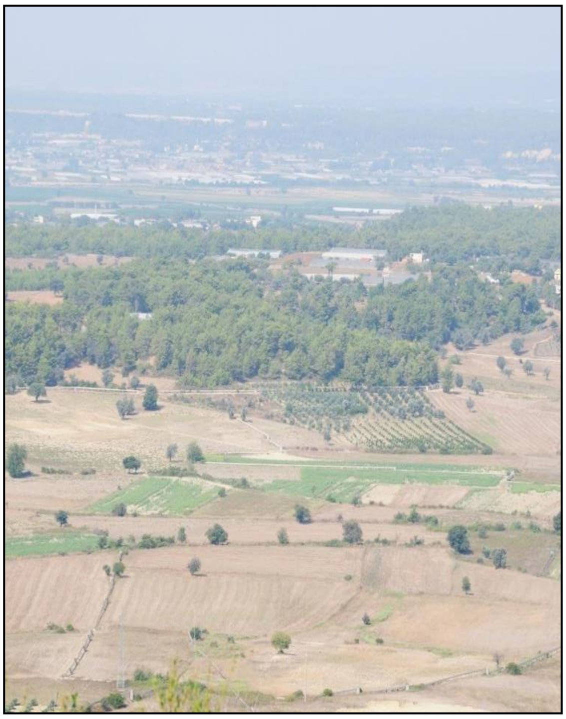


Figure 6.144: Landscape photograph portraying Ottoman 'Irregular Field' HLC type.

Figure 6.145: Example of Byzantine 'Strip Field' HLC type.

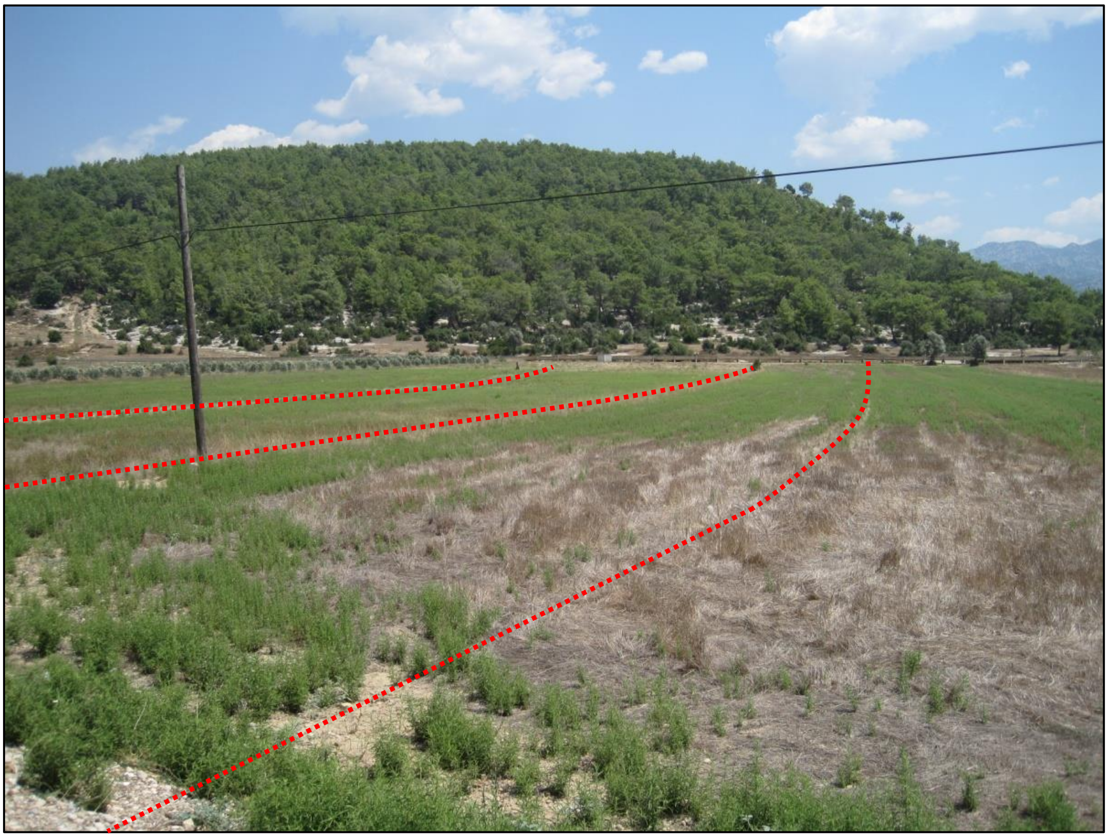


Figure 6.146: Landscape photograph of Byzantine strip fields.
Curved boundaries highlighted in red.

Figure 6.147: Landscape photograph of Kozan Köyü with area of prior Byzantine 'Rectilinear Fields' highlighted.

Figure 6.148: Example of Modern 'Contour Terrace' HLC type.

Figure 6.149: Example of Modern 'Step Terrace' HLC type.

Figure 6.150: Landscape photograph of Ottoman 'Abandoned Contour Terrace' HLC type.

Figure 6.151: Landscape photograph of very degraded Ottoman abandoned contour terraces.

Figure 6.152: Example of Byzantine – Ottoman ‘Contour Terrace’ HLC type.

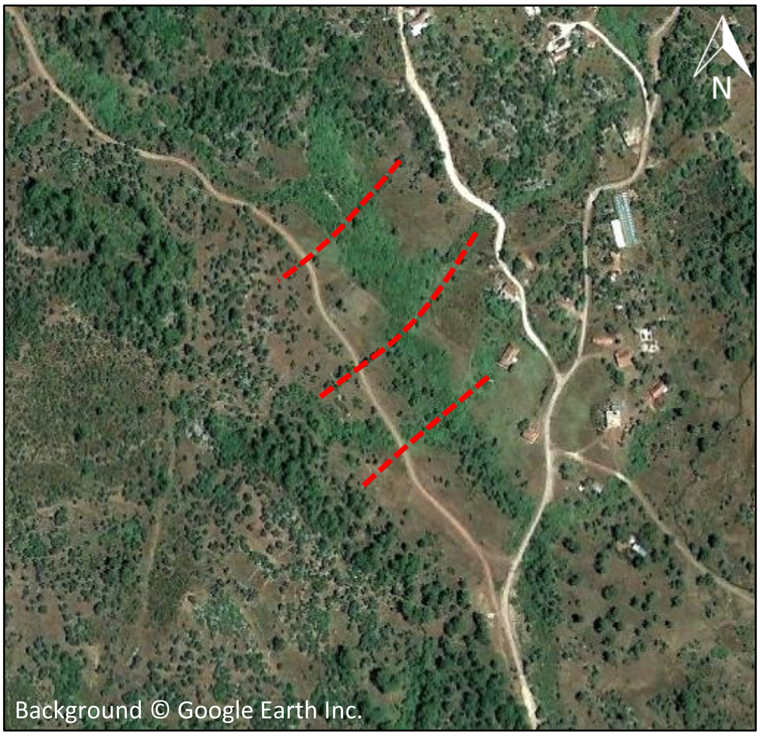


Figure 6.153: Example of Byzantine 'Lynchet' HLC type. Lynchets highlighted in red.

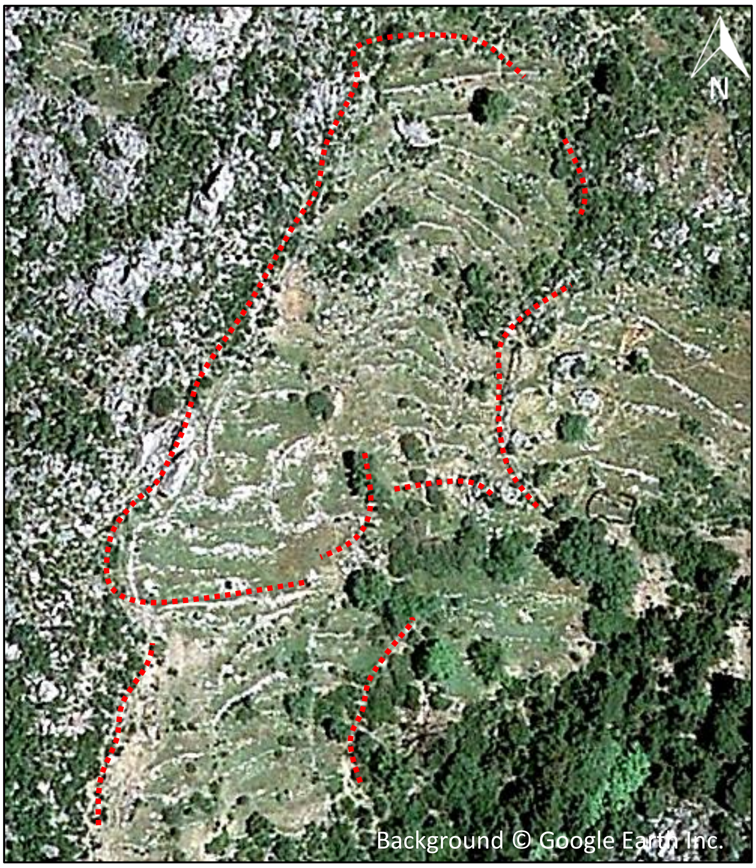


Figure 6.154: Example of Byzantine 'Contour Terrace' HLC type. Red lines highlight outer boundaries.

Figure 6.155: Example of Modern 'Fire Recovery Scrubland' HLC type.

Figure 6.156: Example of Modern 'High Scrubland' HLC type.

Figure 6.157: Landscape photograph of 'High Scrubland' HLC type.

Figure 6.158: Example of Modern 'Low Scrubland' HLC type.

Figure 6.159: Landscape photograph of 'Low Scrubland' HLC type.

Figure 6.160: Example of Modern 'Mountain Scrubland' HLC type.

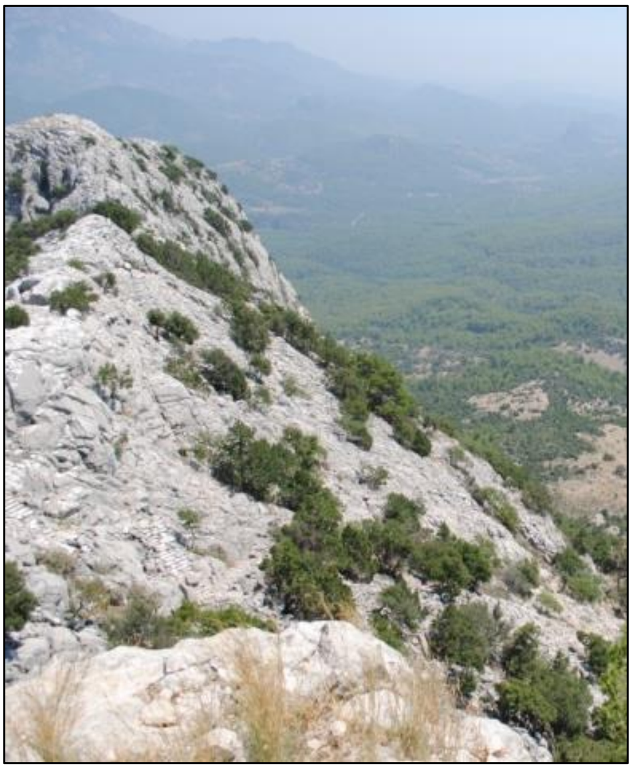


Figure 6.161: Landscape photograph of Modern 'Mountain Scrubland' HLC type.

Figure 6.162: Example of Modern 'Riverside Rough Ground' HLC type.

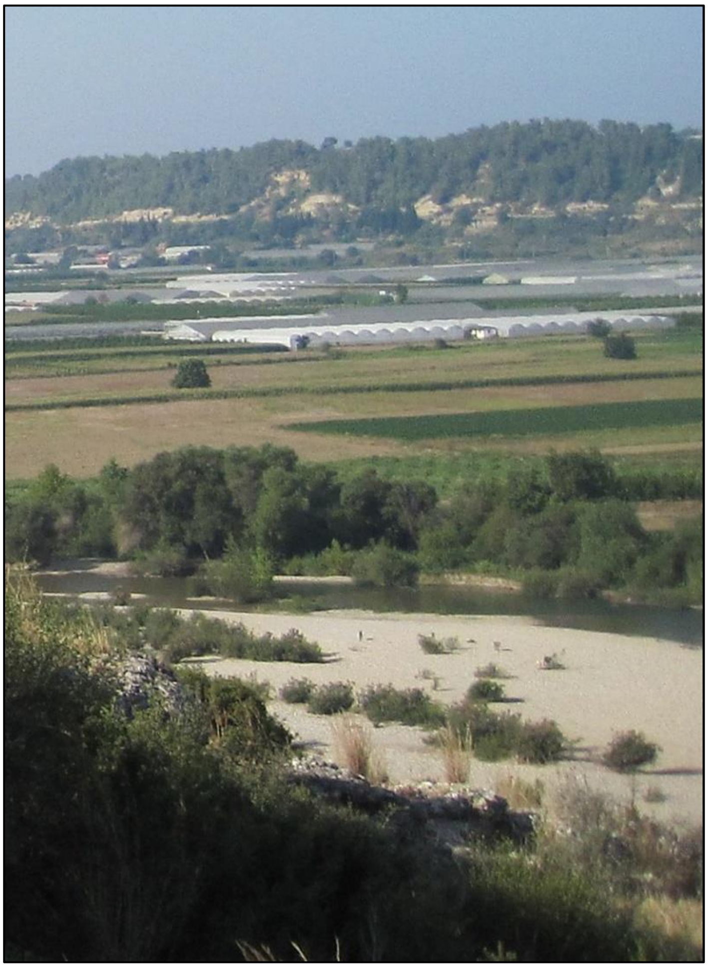


Figure 6.163: Landscape photograph of Modern 'Riverside Rough Ground' HLC type.

Figure 6.164: Example of Modern 'Woodland Clearance' HLC type.

Figure 6.165: Woodland in 2005 prior to clearance.

Figure 6.166: Example of Modern 'Natural Woodland' HLC type.

Figure 6.167: Example of Modern 'Sparse Natural Woodland' HLC type.

Figure 6.168: Example of Ottoman 'Natural Forest' HLC type.

Figure 6.169: Example of Ottoman 'Forested Abandoned Terrace' HLC type.

Figure 6.170: Example of a cluster settlement.

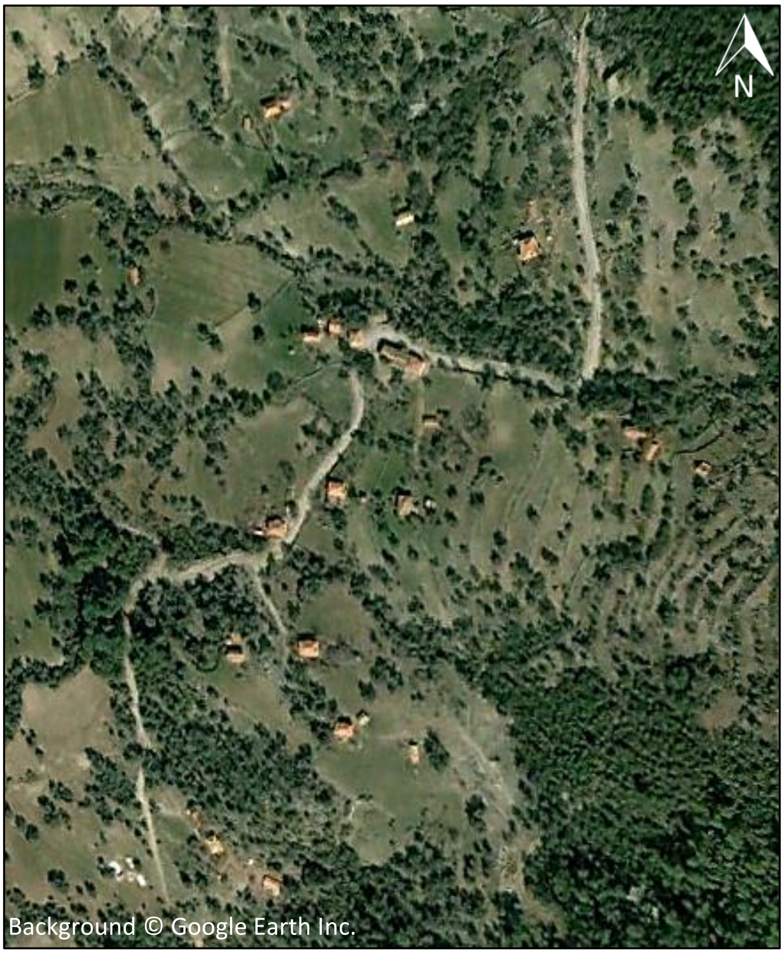


Figure 6.171: Example of a dispersed settlement.

Figure 6.172: Example of a linear settlement.

Figure 6.173: Example of a nucleated settlement.
The area of the settlement to the left of the main road has been modernised, whereas the remains of the settlement to the right has not and can be dated to the Ottoman period.

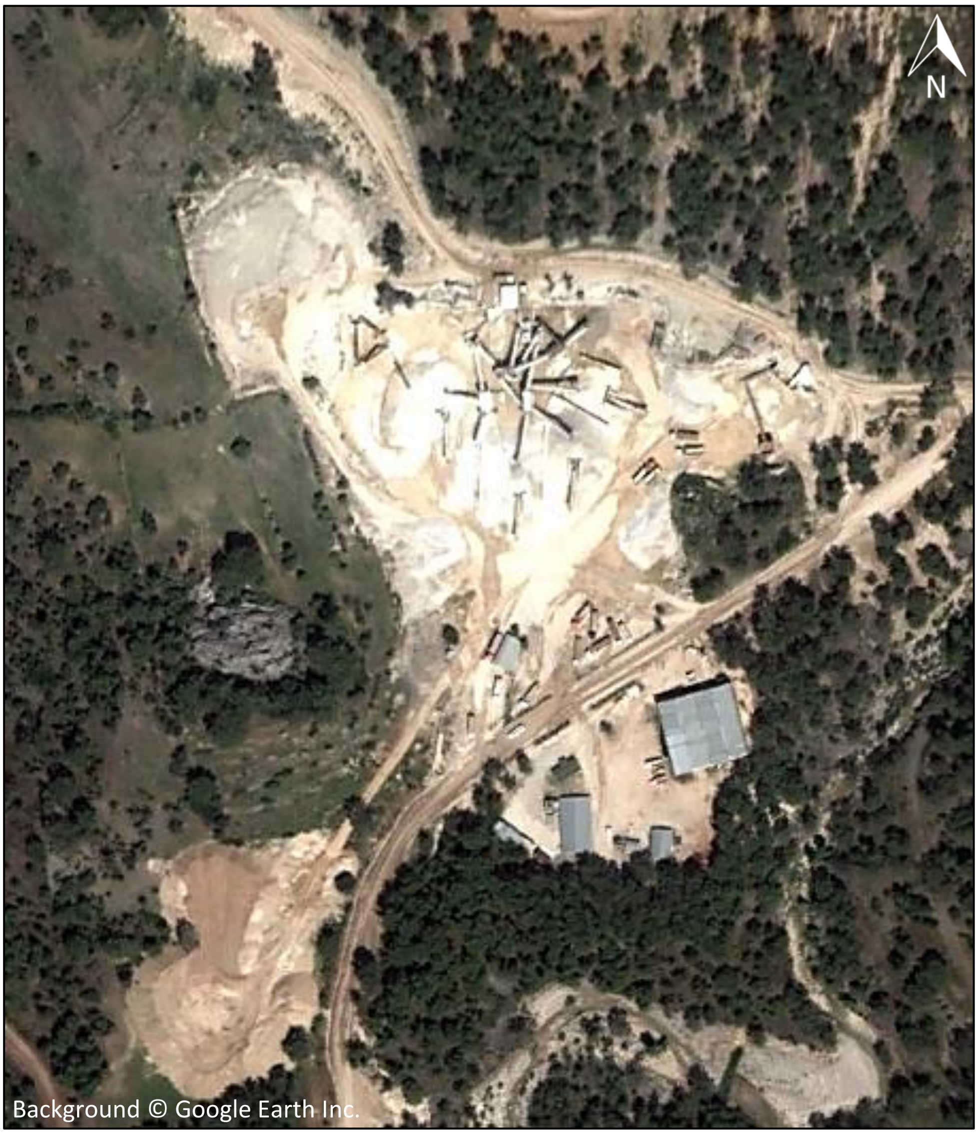


Figure 6.174: Example of Modern 'Quarry' HLC type.

Figure 6.175: A quarry in 2005 prior to abandonment.

Figure 6.176: A quarry in 2011 after abandonment.

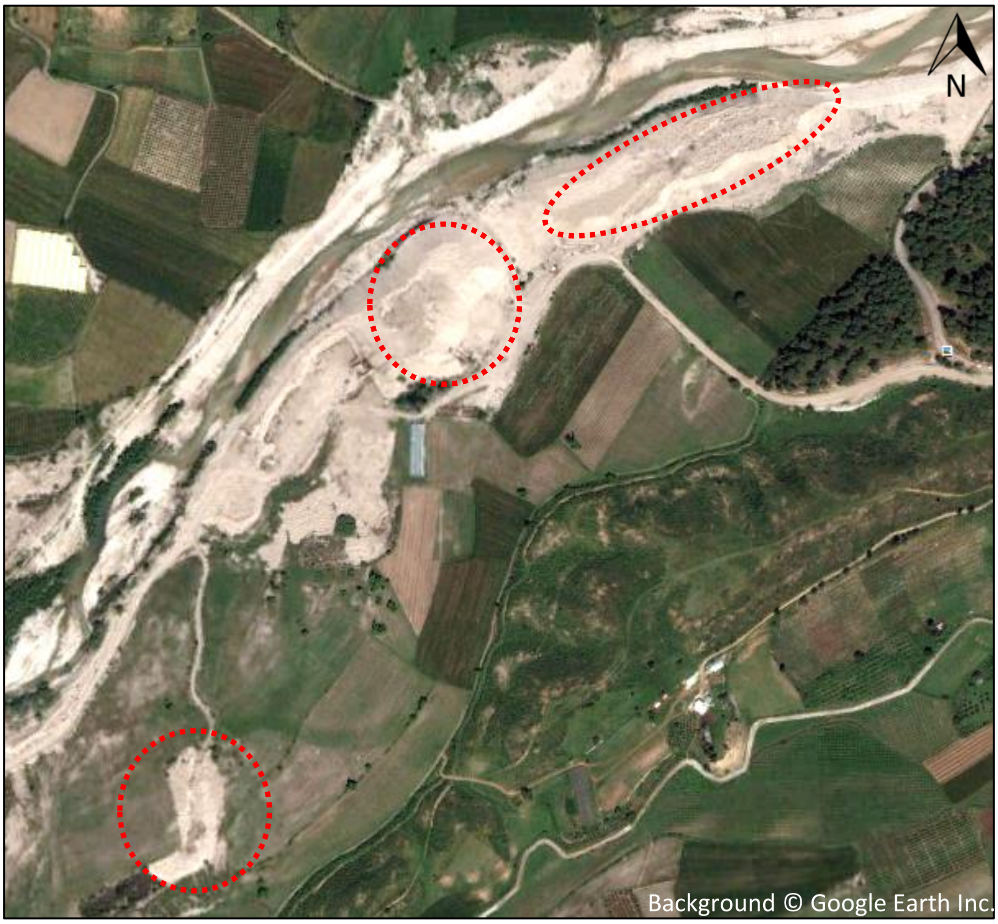


Figure 6.177: Example of Modern ‘Gravel Quarry’ HLC type, with gravel piles circled in red.

Figure 6.178: Gravel piles at Gravel quarry.

Figure 6.179: Example of Modern 'Woodworks' HLC type.

Figure 6.180: Landscape photograph of Modern 'River' HLC type.

Figure 6.181: Modern 'River' HLC type with pools and riverside gravel.

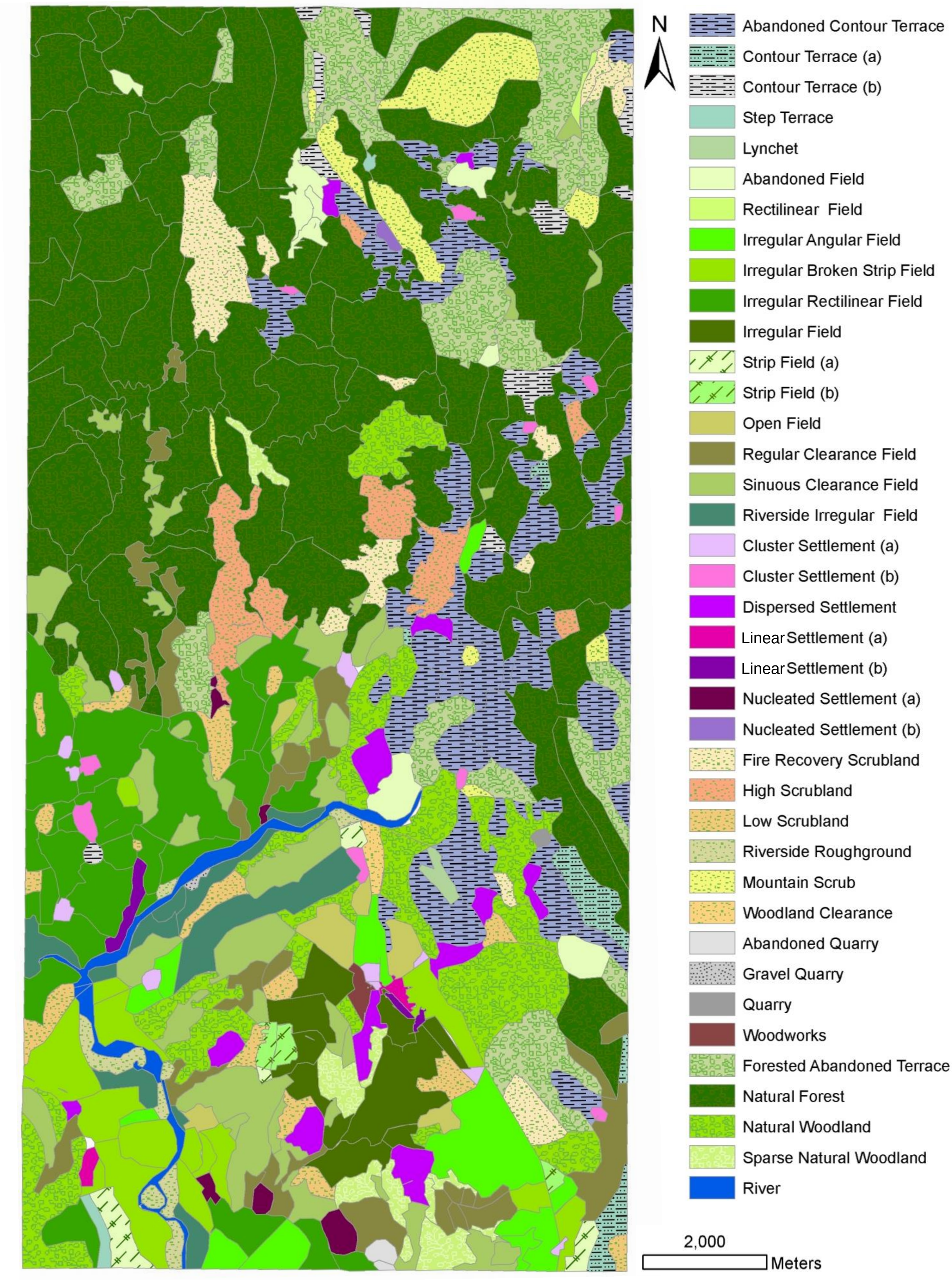


Figure 6.182: Current HLC of the Pisidia case-study area.

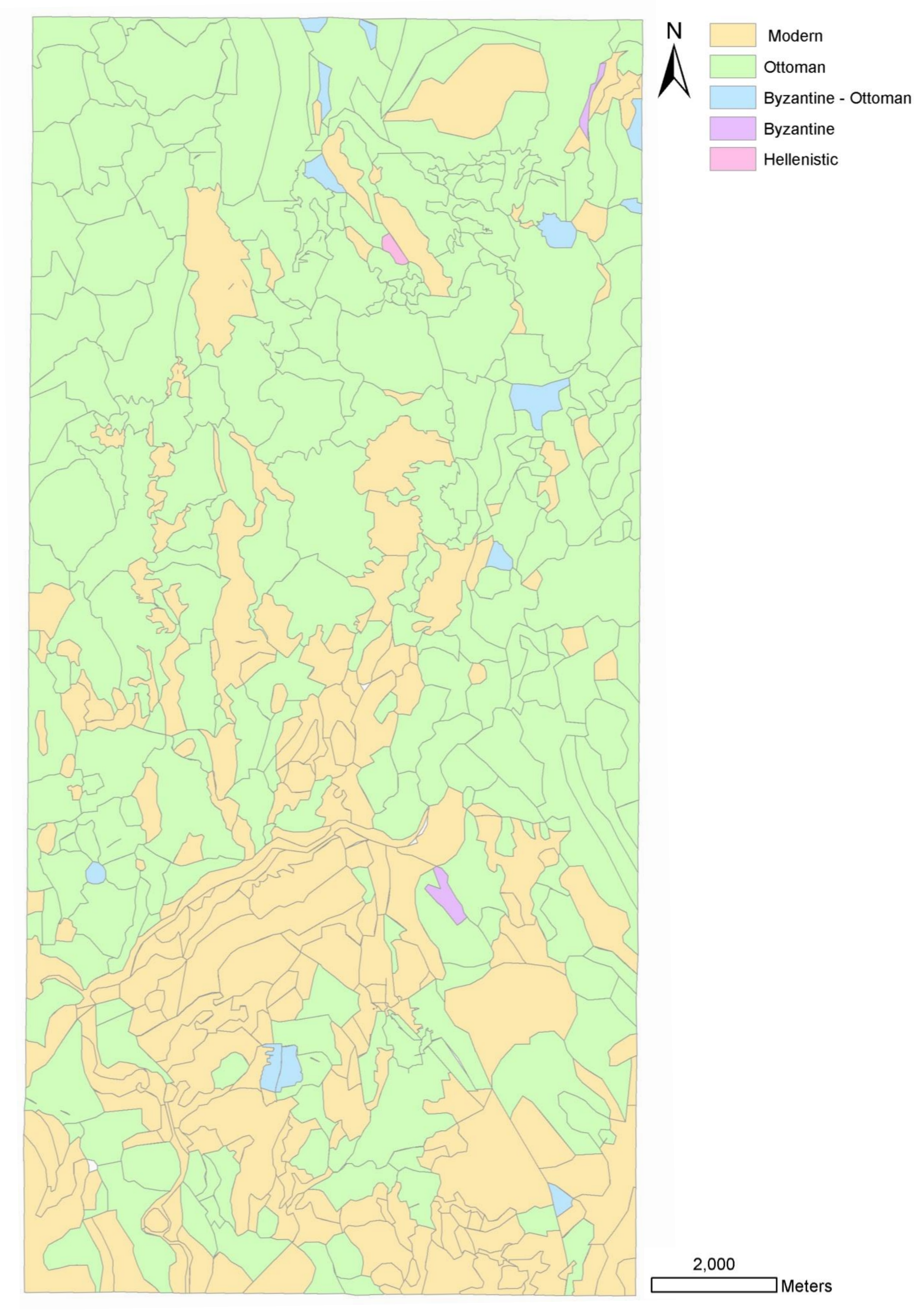


Figure 6.183: Current HLC dates for the Pisidia case-study area.

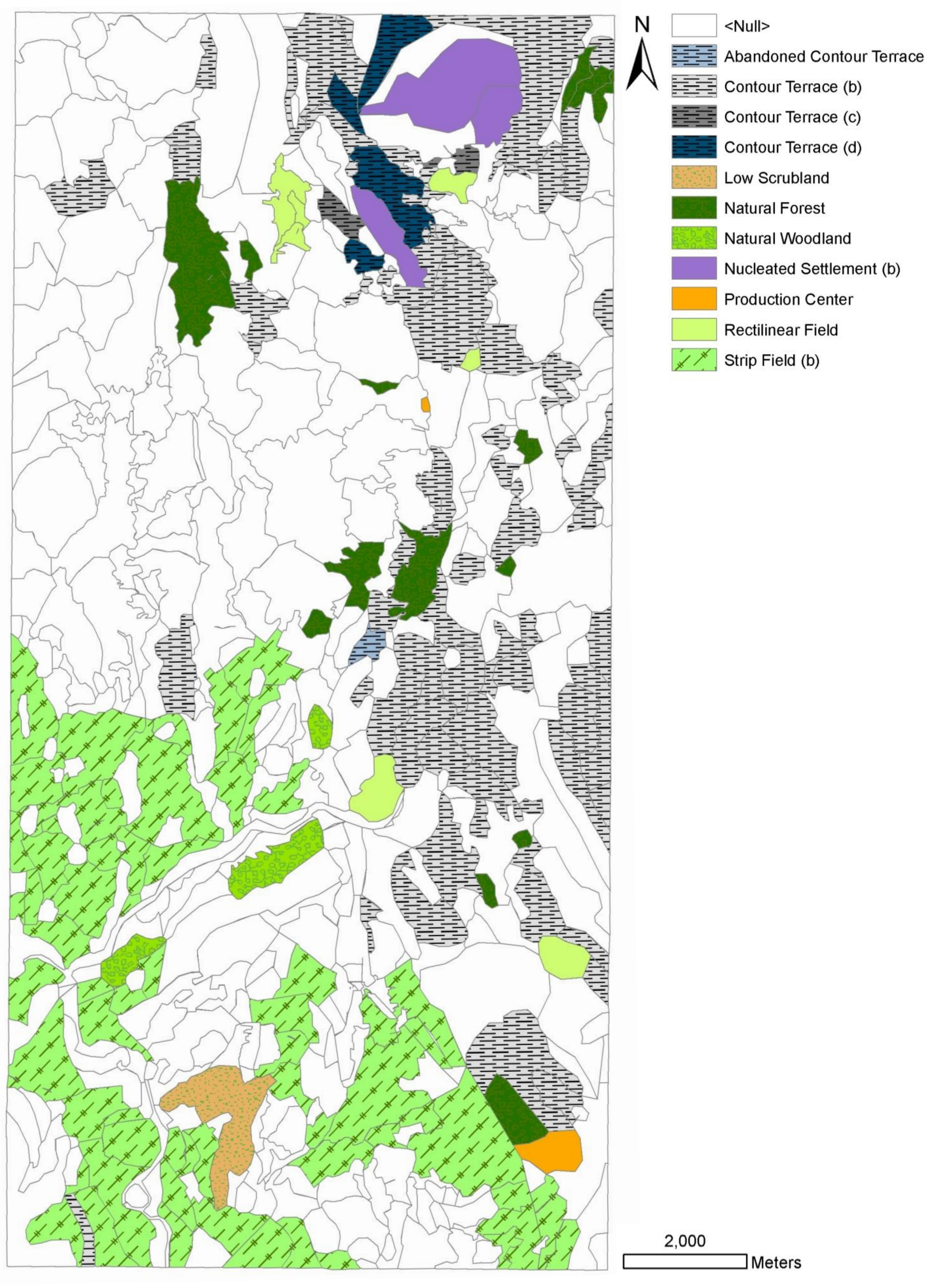


Figure 6.184: Level two HLC of the Pisidia case-study area. These are the HLC types prior to the current HLC types.

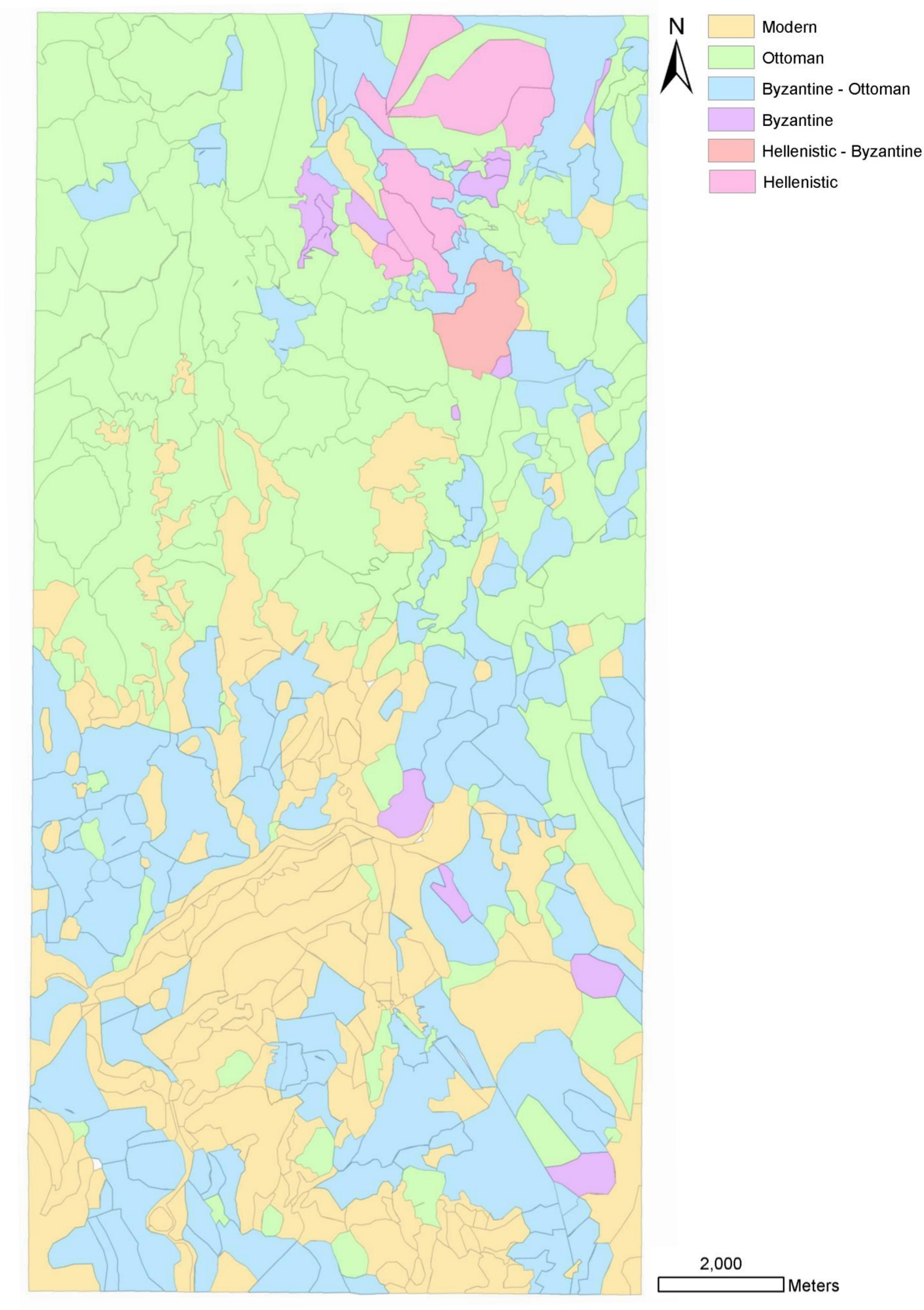


Figure 6.185: Level two HLC dates for the Pisidia case-study area.

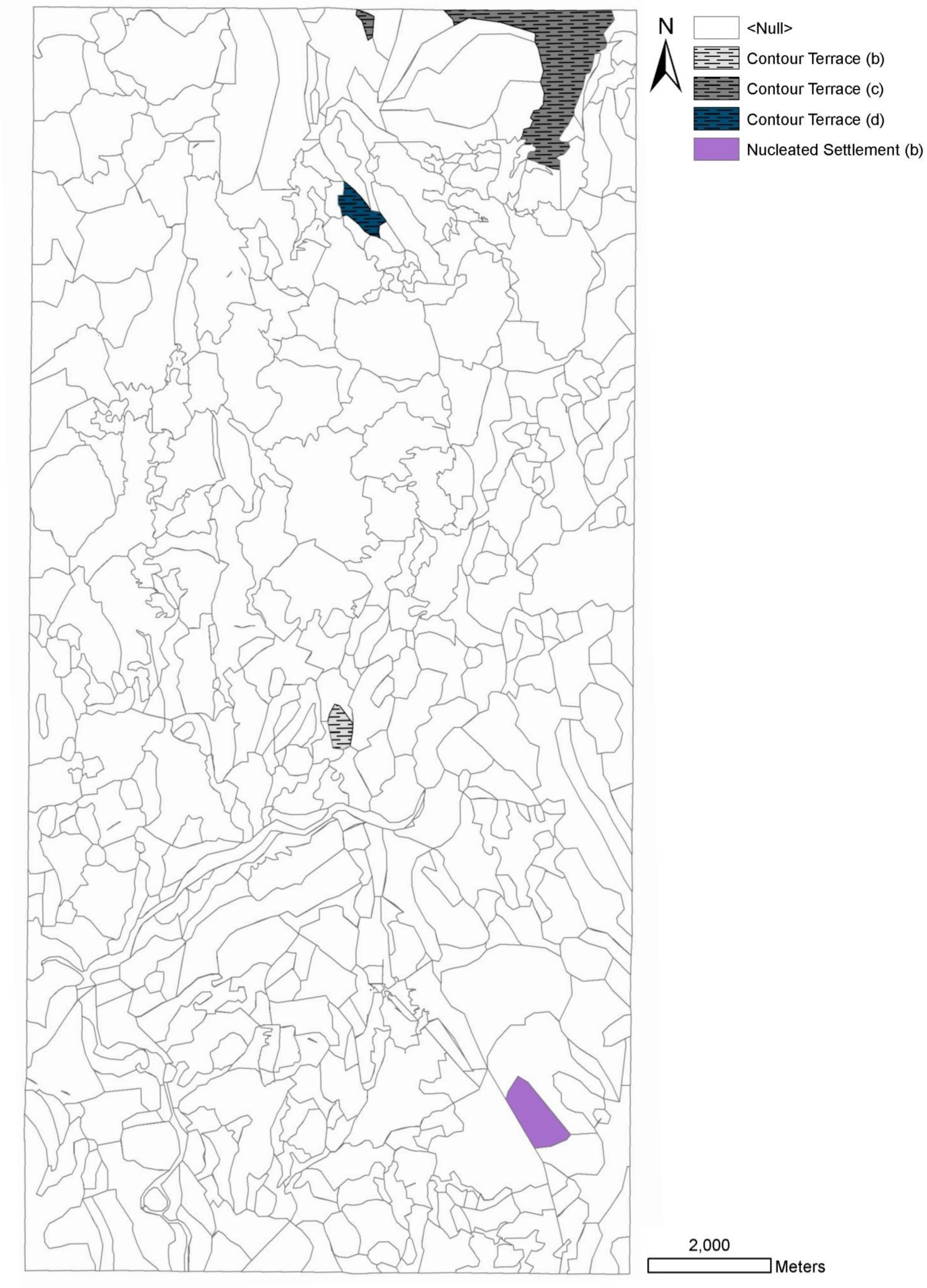


Figure 6.186: Level three HLC of the Pisidia case-study area.

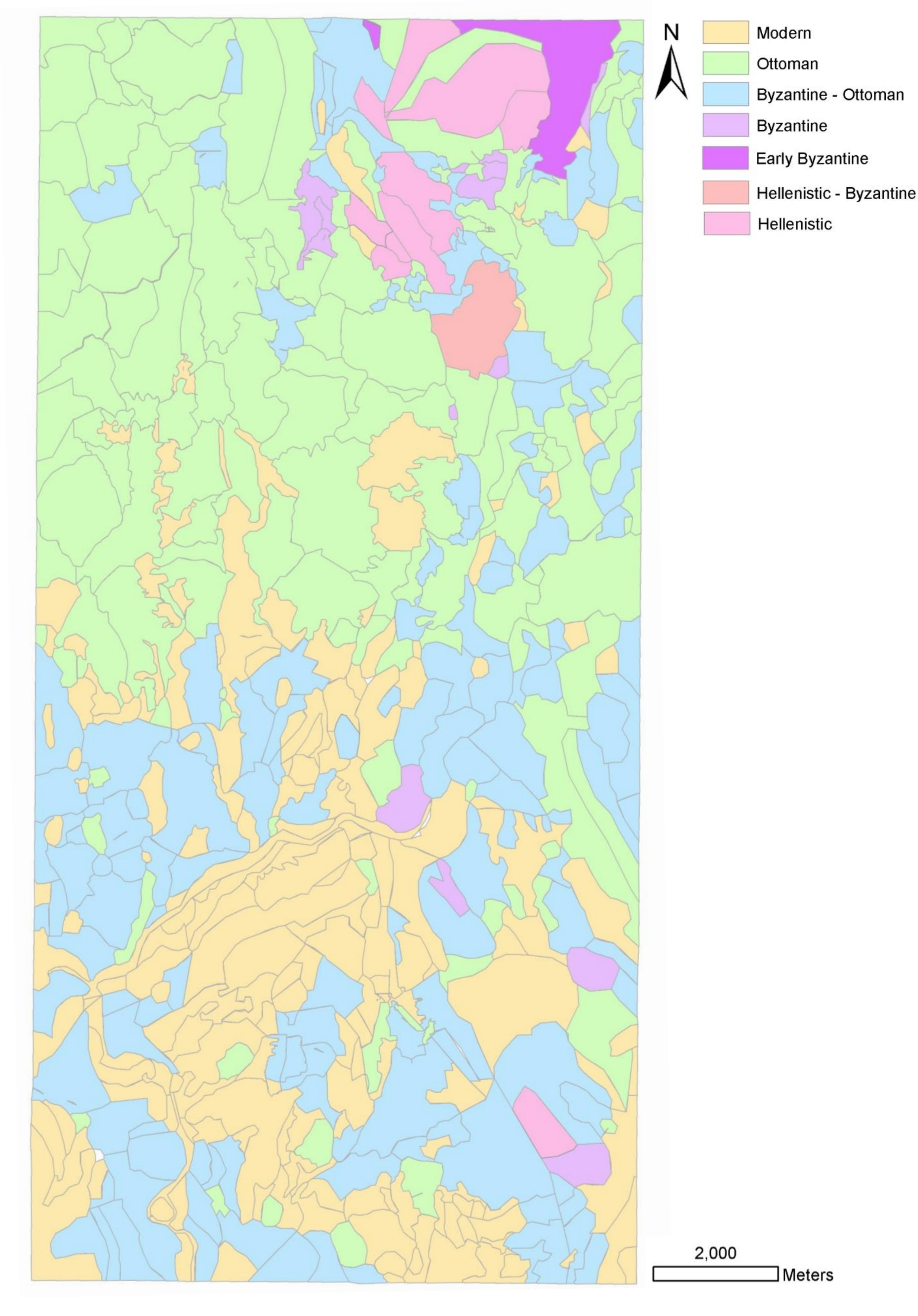


Figure 6.187: Level three HLC dates for the Pisidia case-study area.

Figure 6.188: Level four HLC of the Pisidia case-study area.

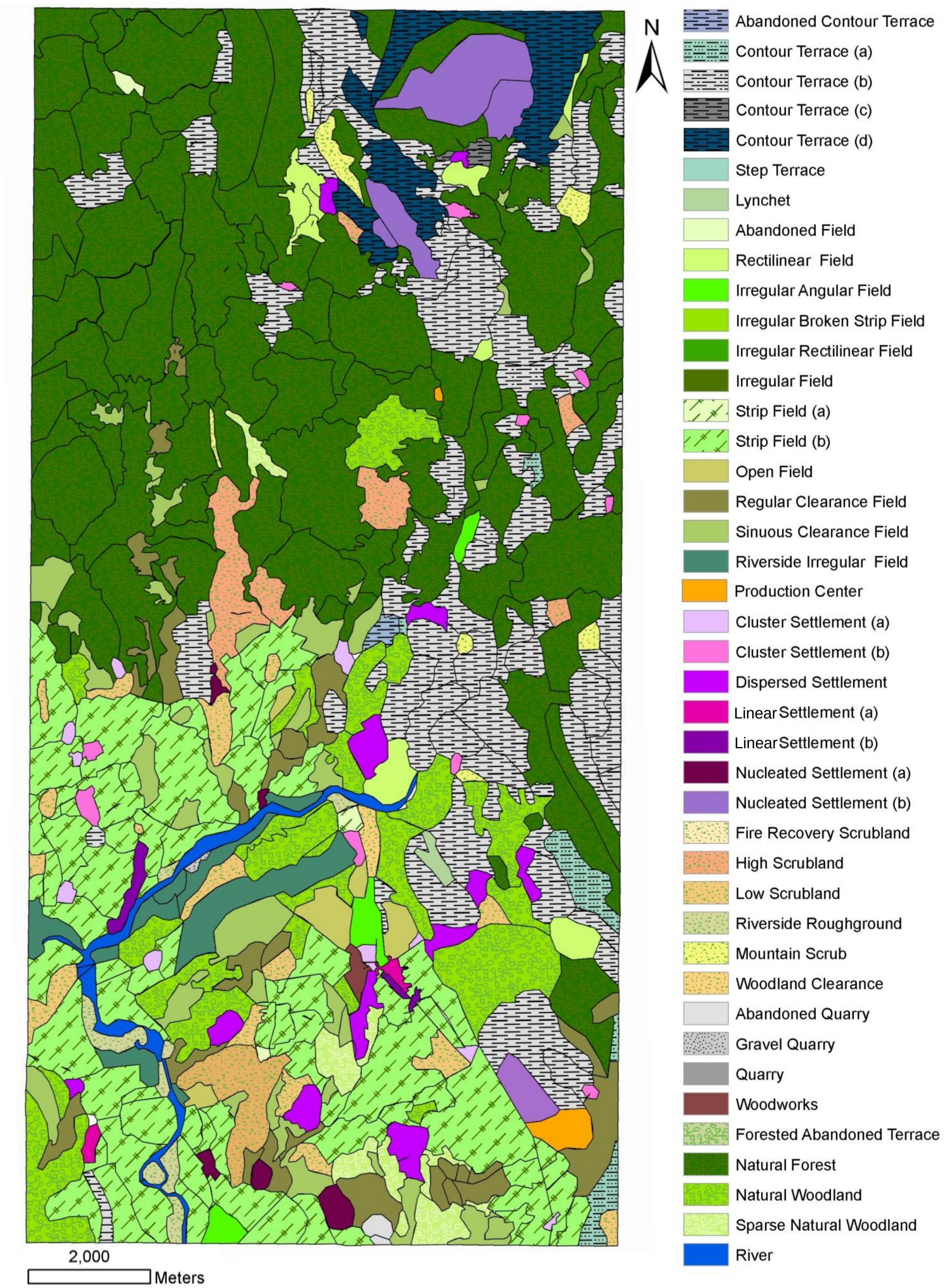


Figure 6.189: Multi-level HLC of the Pisidia study area with the current HLC as the base and the following levels above.

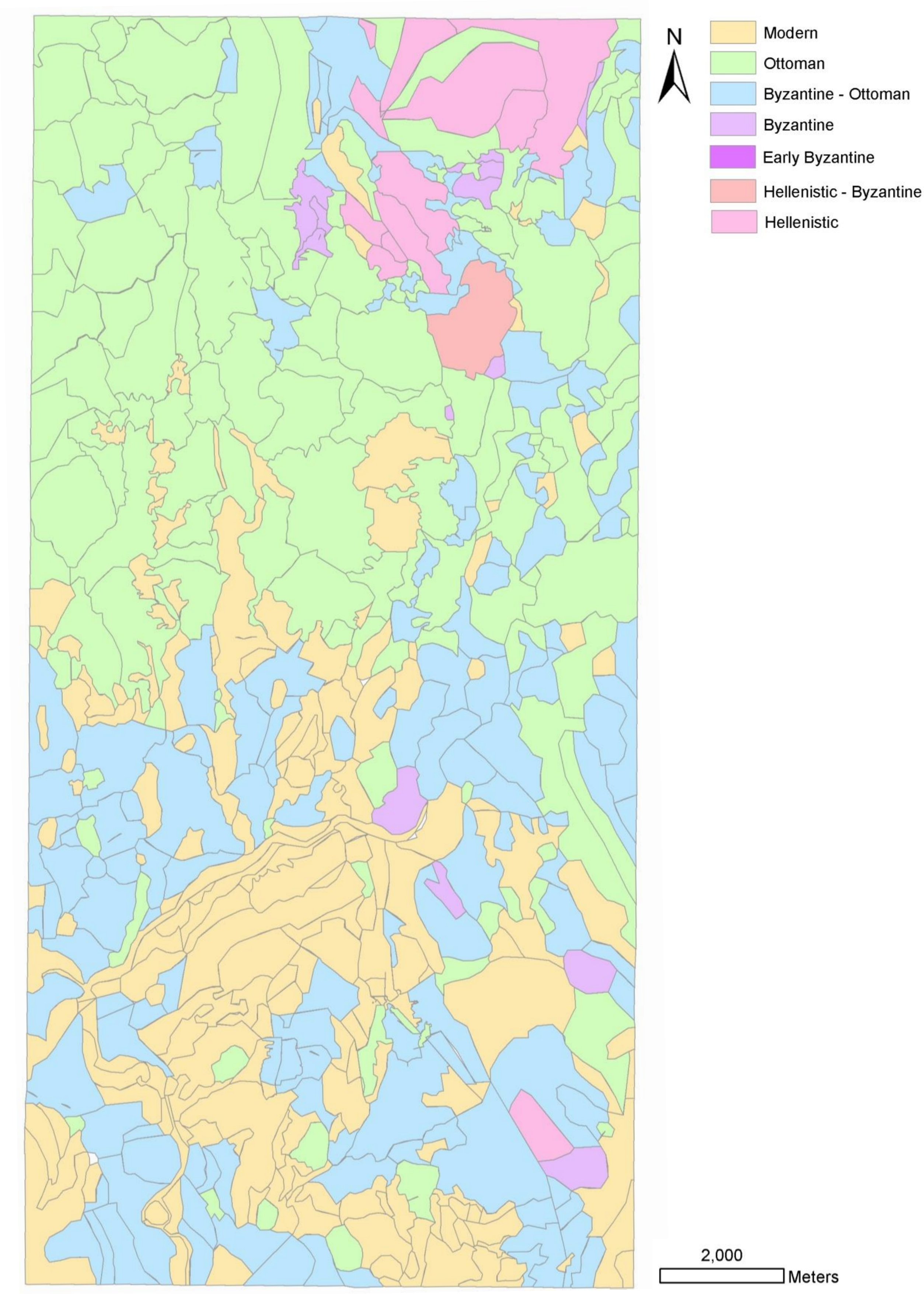


Figure 6.190: Level four HLC dates for the Pisidia case-study area.

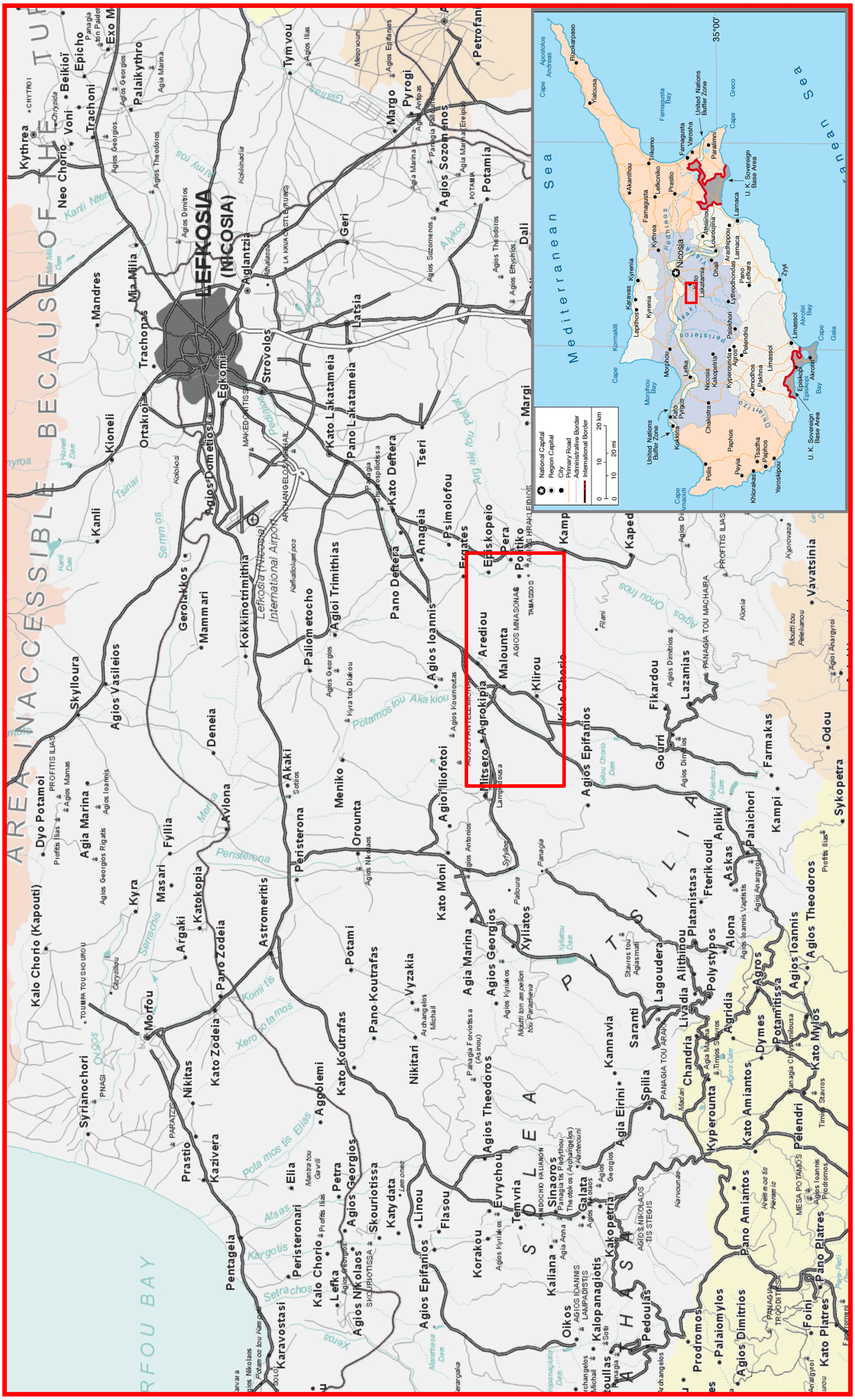


Figure 7.1: Map of the Troodos case-study area in Cyprus.

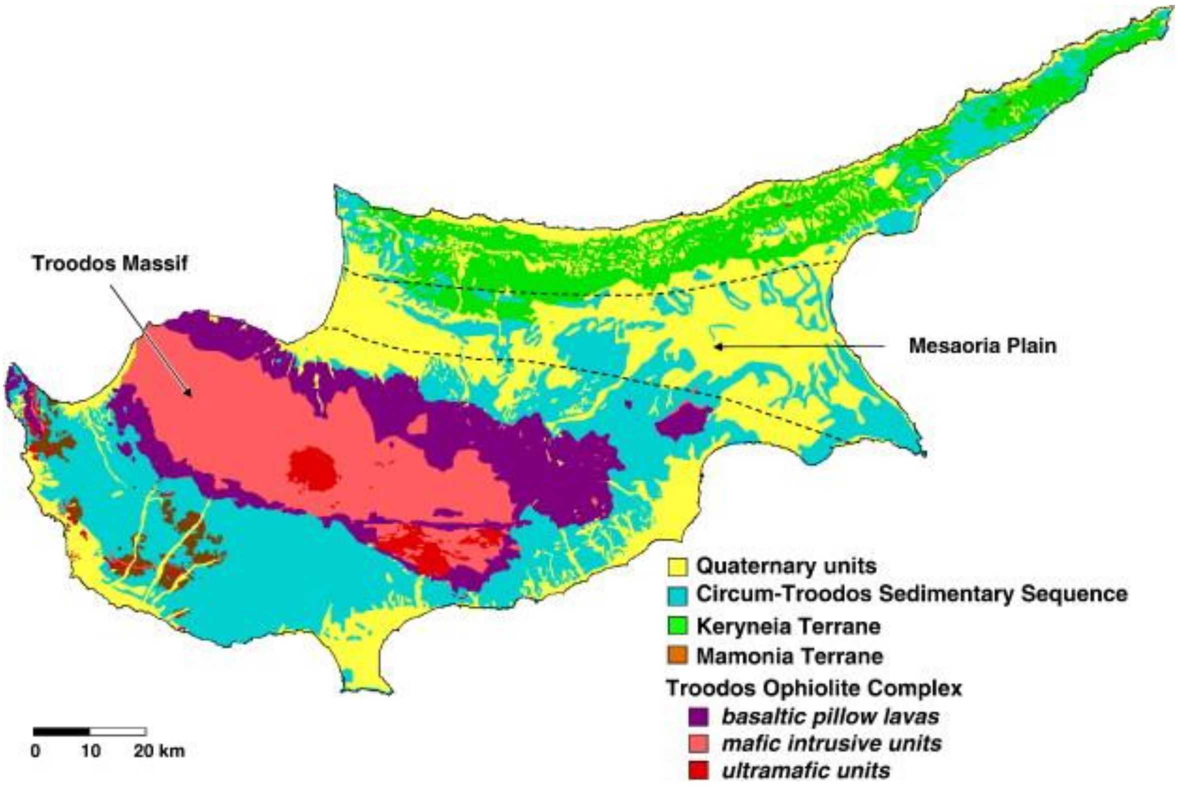


Figure 7.2: The Geology of Cyprus, highlighting the Toodos Mountain Range Ophiolite complex (Cohena *et al*. 2012).

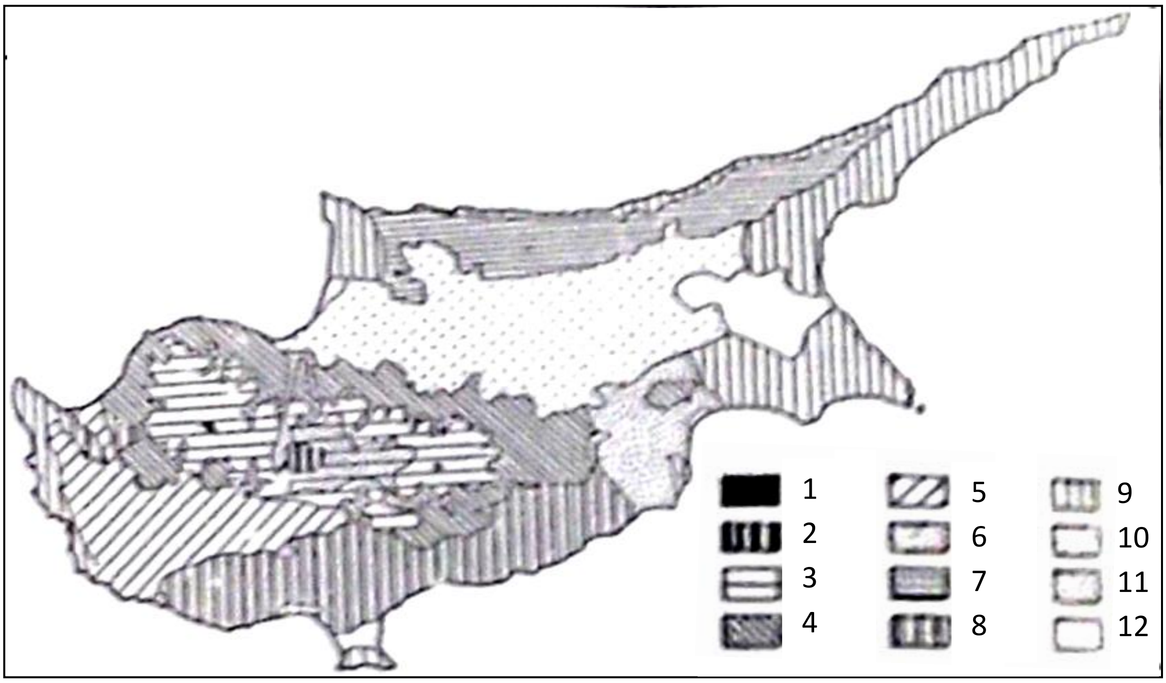


Figure 7.3: Vegetation zones in Cyprus (Holmboe 1914: Fig 2.)

Figure 7.4: Average minimum and maximum temperatures in Nicosia, Cyprus (WC 2009).

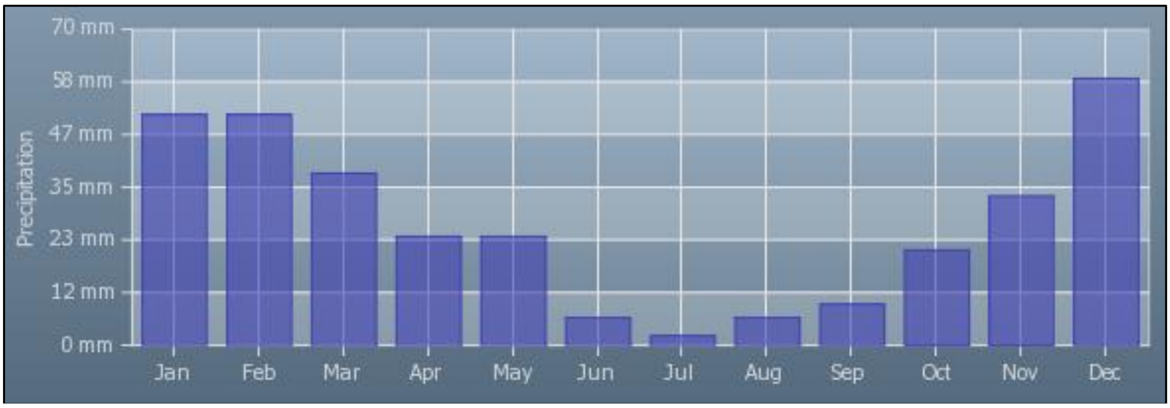


Figure 7.5: Average rainfall in Nicosia, Cyprus (WC 2009).

Figure 7.6: Bronze Age clay model representing agricultural work from Vounous, Cyprus (Cyprus Museum).

Figure 7.7: Bronze Age clay model of open air sanctuary from Vounous, Cyprus (Getty Images).

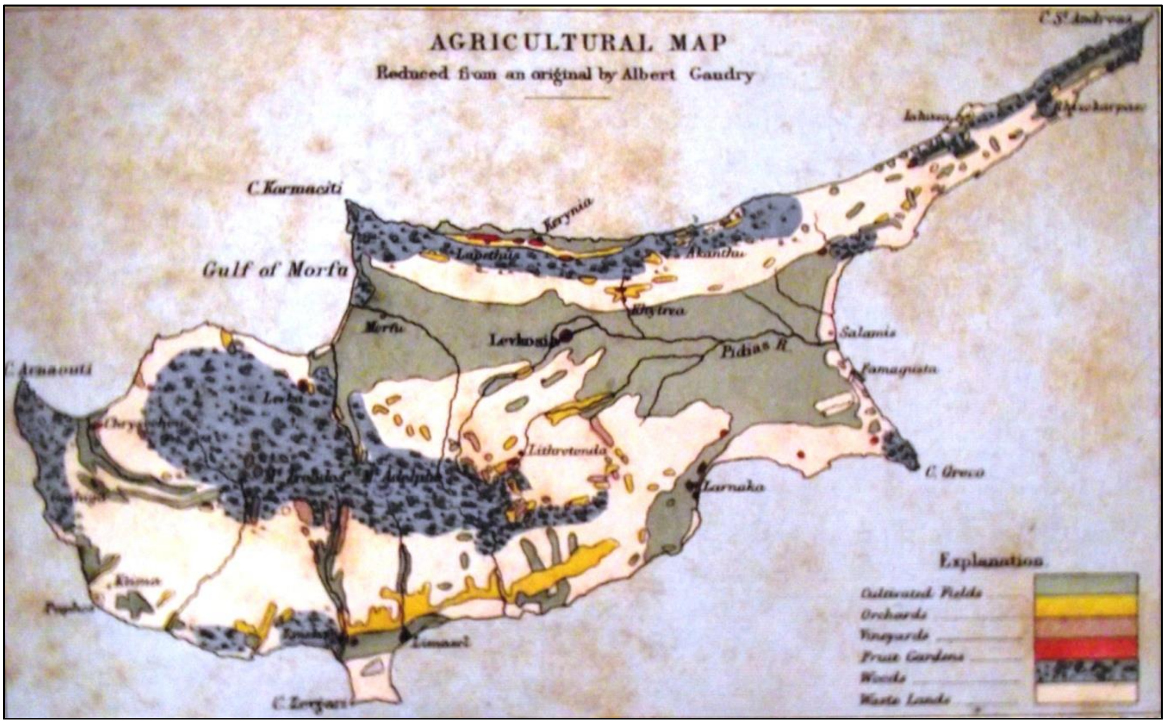


Figure 7.8: 1878 Agricultural map of Cyprus showing the Troodos case-study area to be in an area of waste land (indicated by the white areas) (Papavassilis 2007: 135).

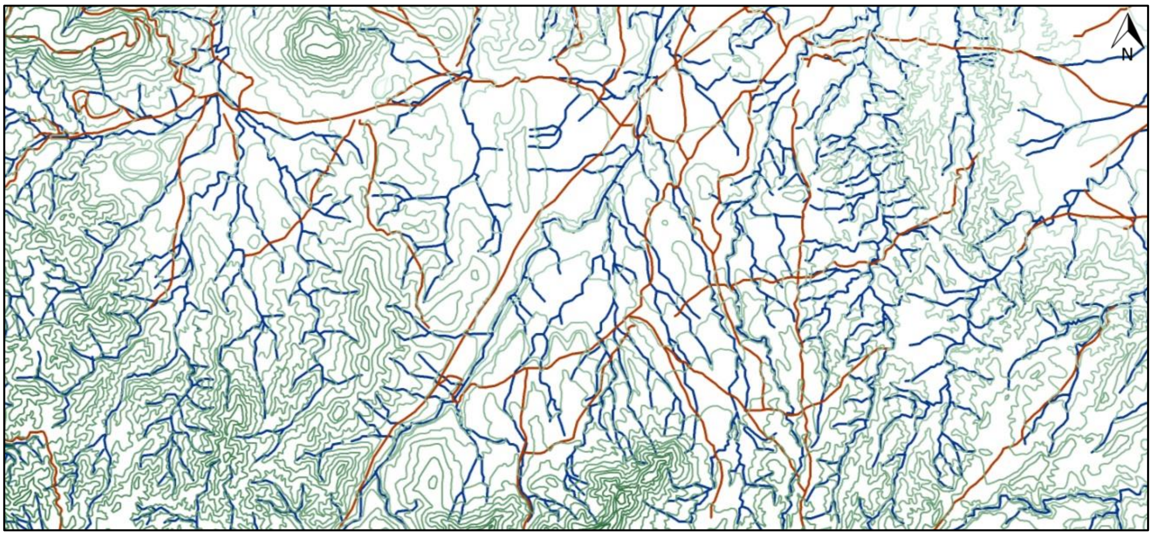


Figure 7.9: SCSP base map of digitised shapefiles, of the roads (brown), rivers (blue) and contours (green).

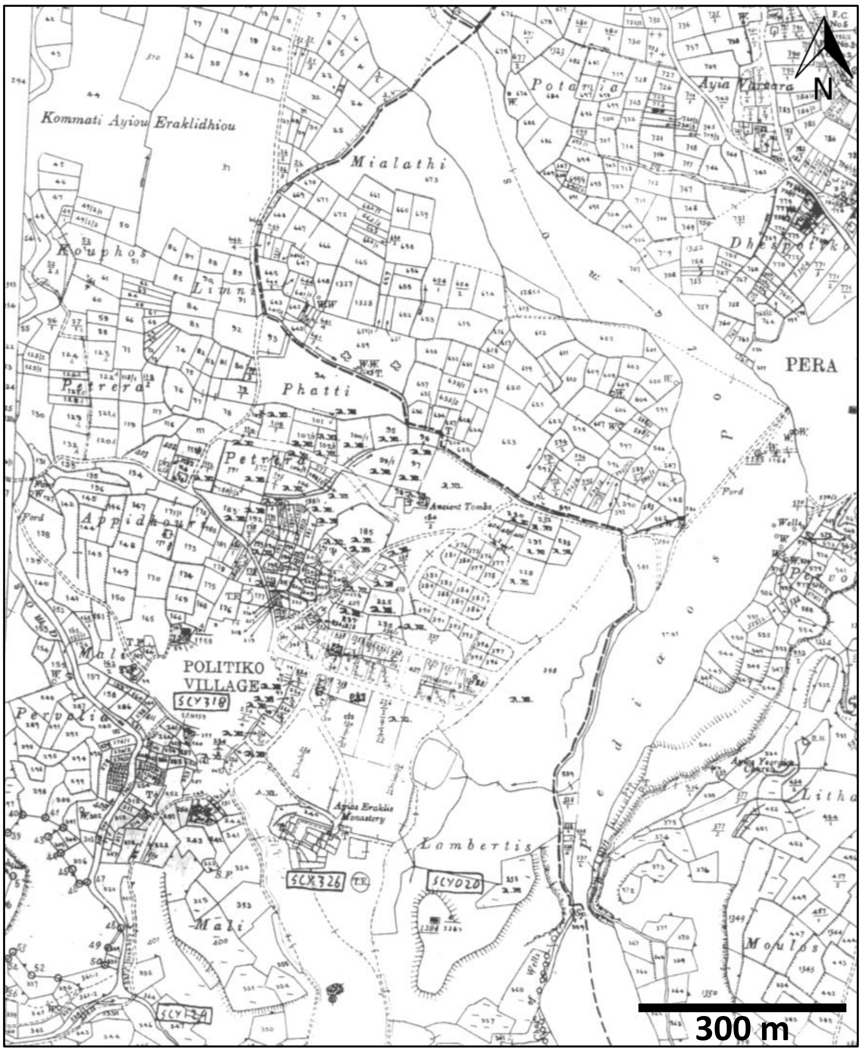
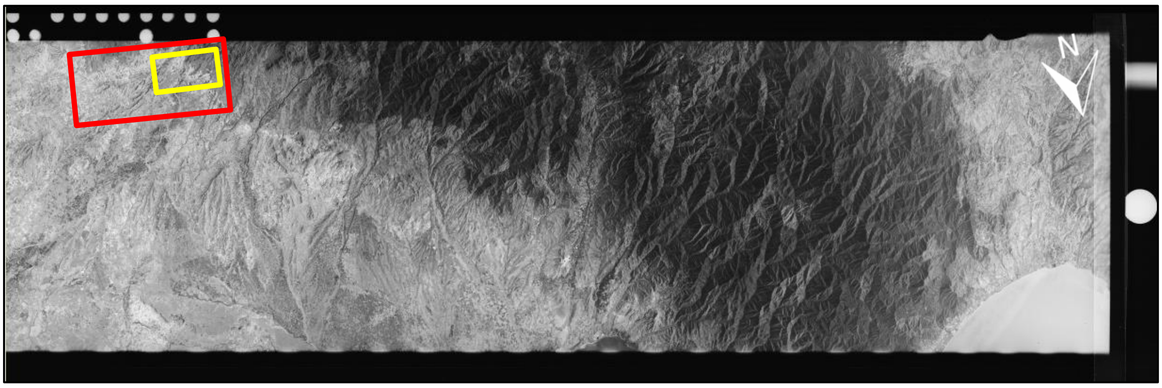


Figure 7.10: Cadastral map of Politiko, Cyprus (DoLS 1990a: XXX, plan 58).

Figure 7.11: Google Earth imagery of the Troodos case-study area with Focus Studies.



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Revolution	009D	Image Type	Black and White
Frame	76	Film Type	70mm Panoramic
Polarity	Negative	Generation	2
NW Corner	35°09'28.80"N, 32°17'38.40"E	SW Corner	34°56'06.00"N, 32°23'02.40"E
NE Corner	35°31'37.20"N, 35°46'01.20"E	SE Corner	35°17'31.20"N, 35°44'42.00"E

Figure 7.12: CORONA imagery with attached data, highlighting the Troodos HLC case-study area in red and the close up area (**Figure 7.13**) in yellow.

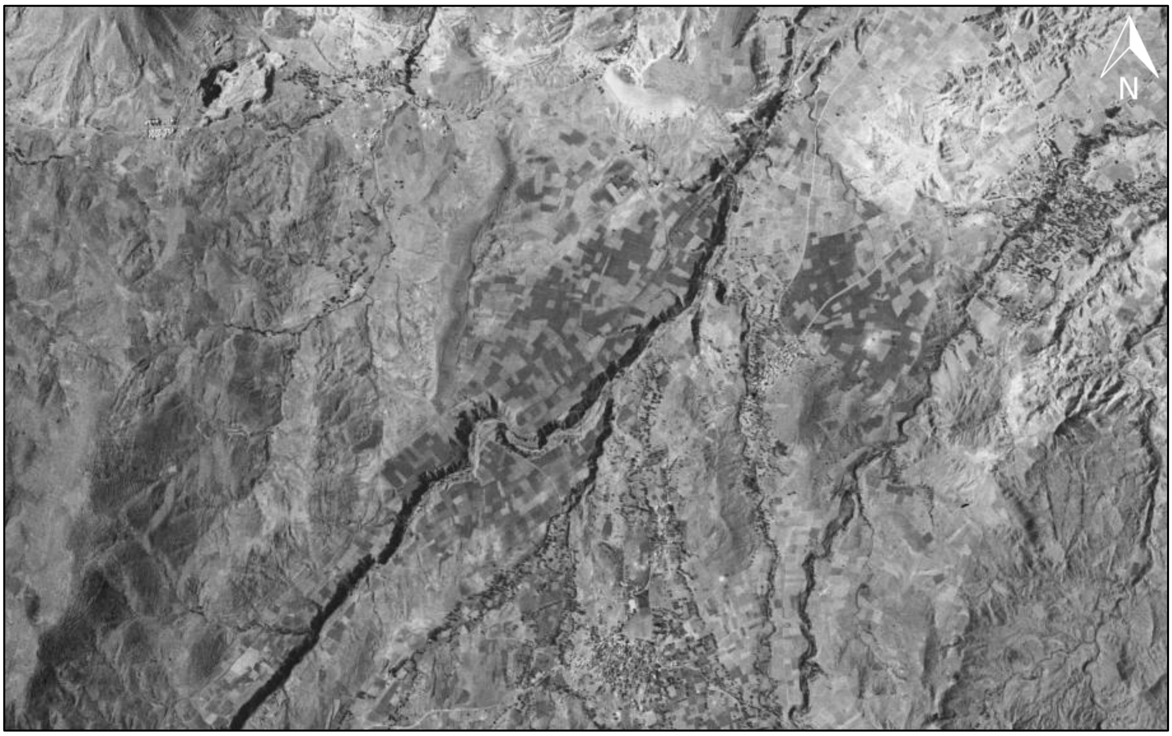


Figure 7.13: Close up of the CORONA imagery of the Troodos HLC case-study area.

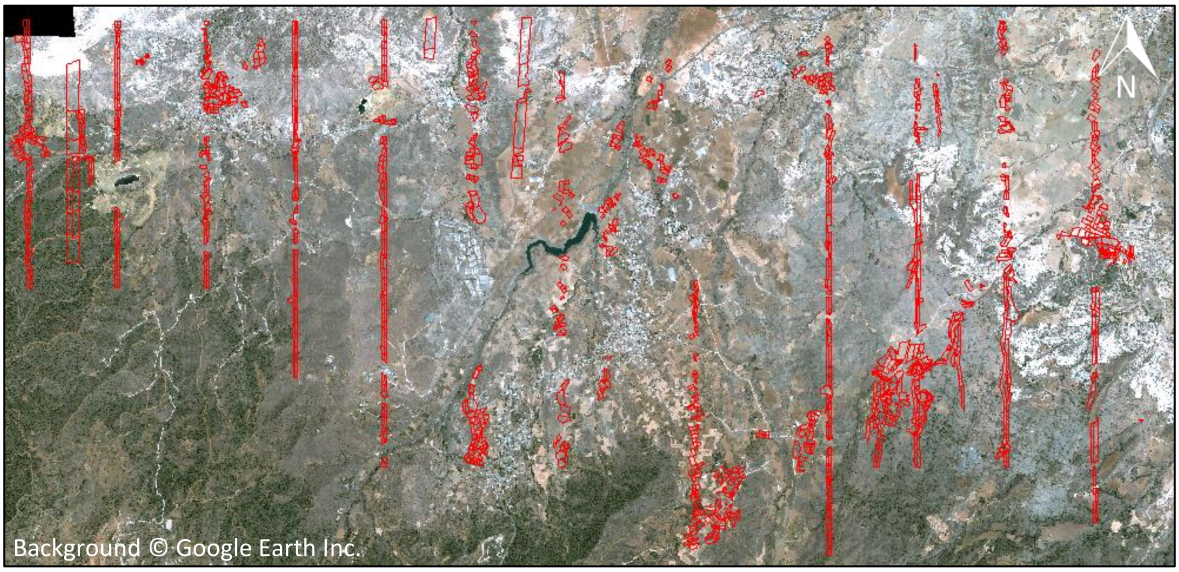
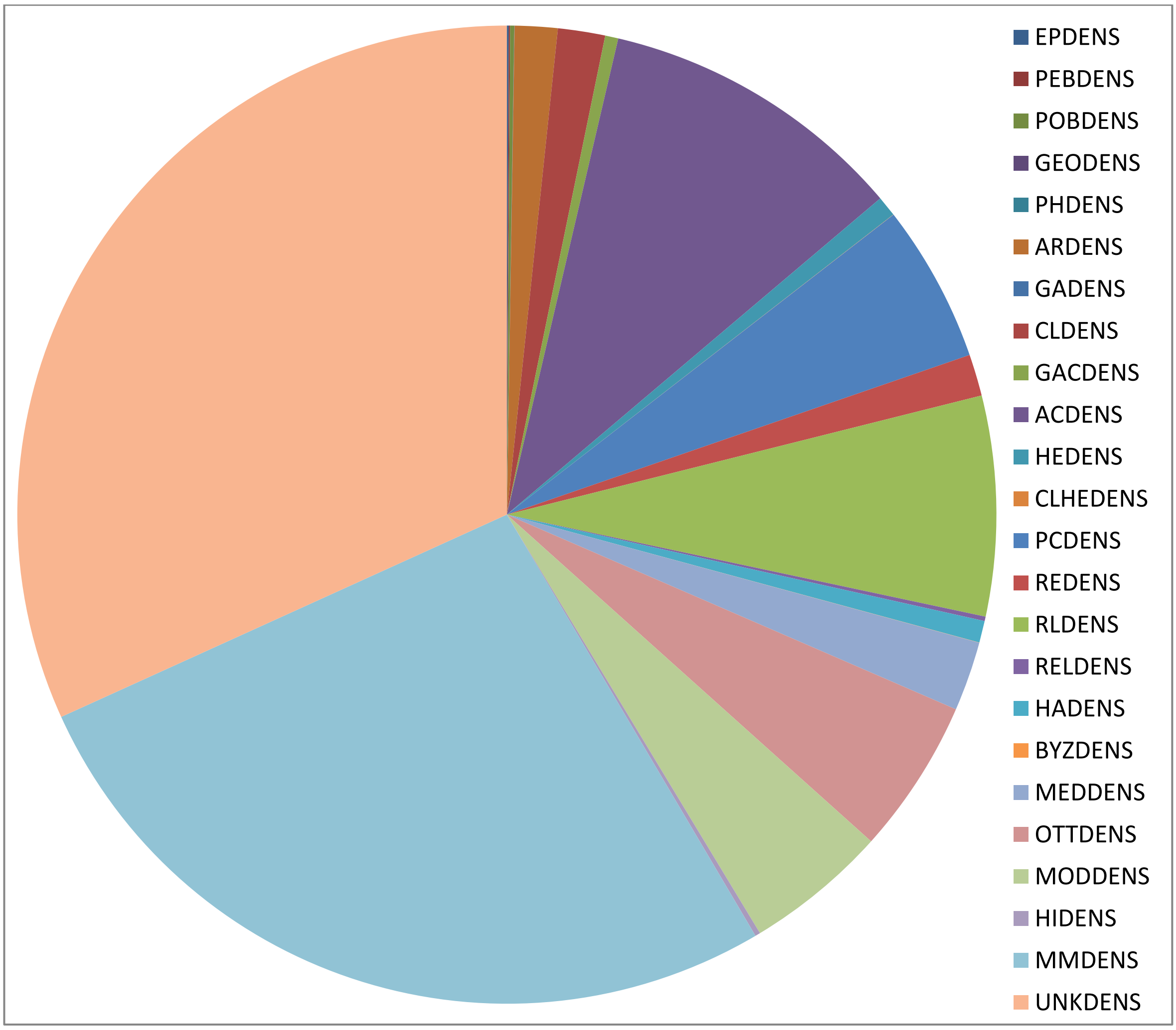


Figure 7.14: SCSP survey units (highlighted in red) (Data from: Knapp and Given 2003).



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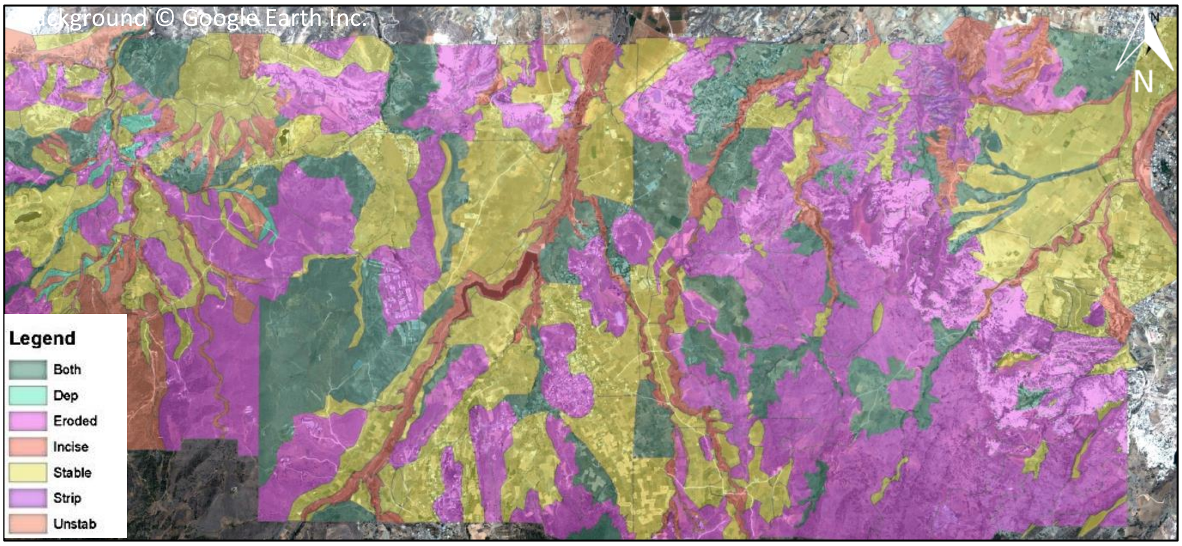

Figure 7.17: SCSP landscape stability classifications (Data from: Knapp and Given 2003).

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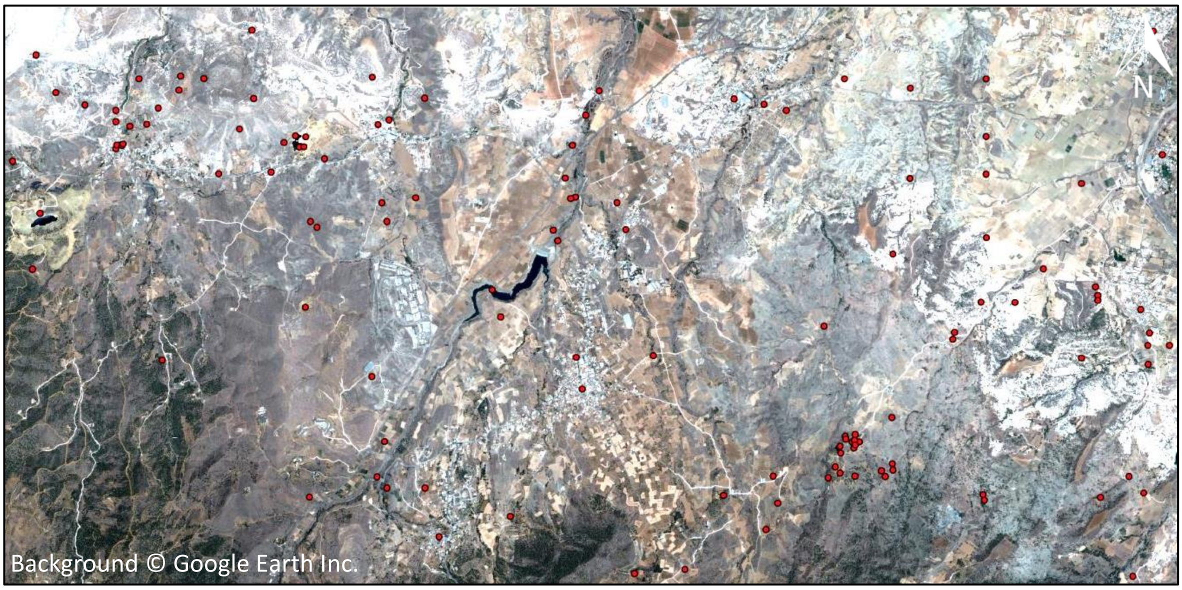

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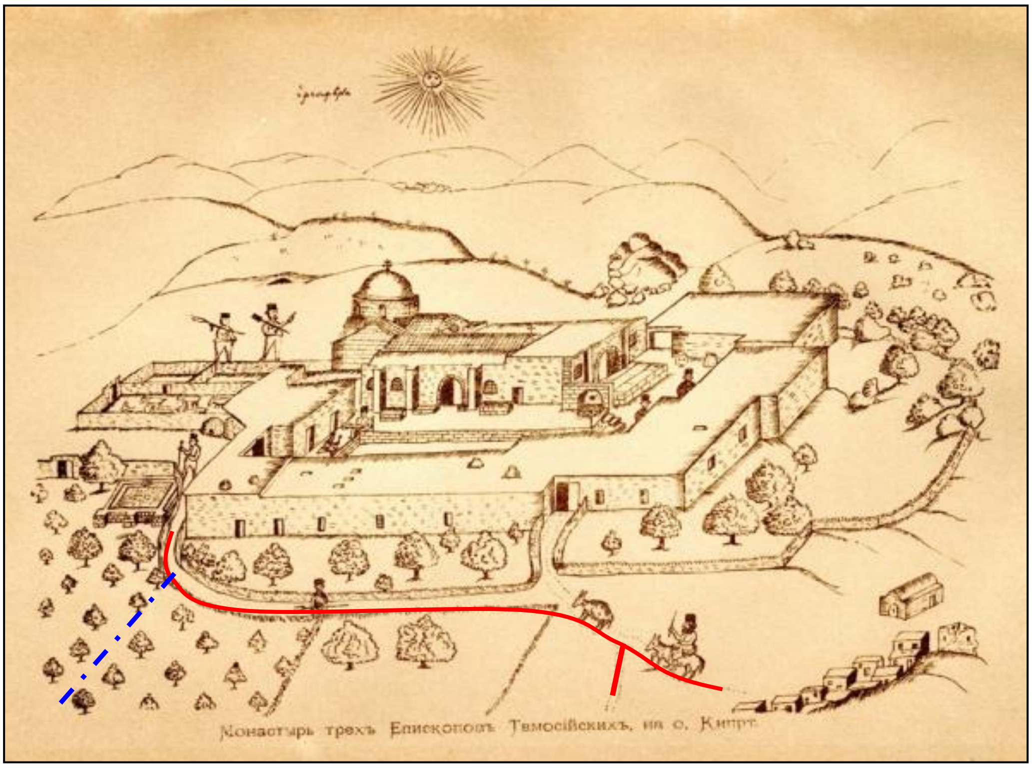


Figure 7.23: 1753 Drawing of the St Iraklidhios monastery by Bars'kyj (Meadows and Voulau 1989: 36). The red lines highlight the approach road from 1753, the blue line highlights where the modern road approaches.

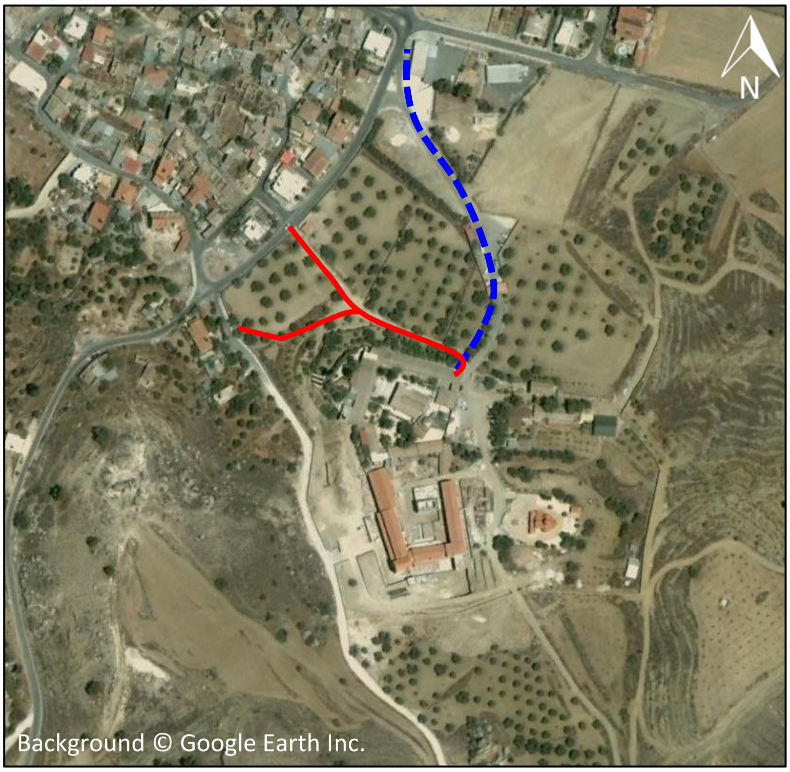


Figure 7.24: 2010 Google Earth imagery of the St Iraklidhios monastery. The red lines highlight the approach road from 1753, the blue line highlights where the modern road approaches.

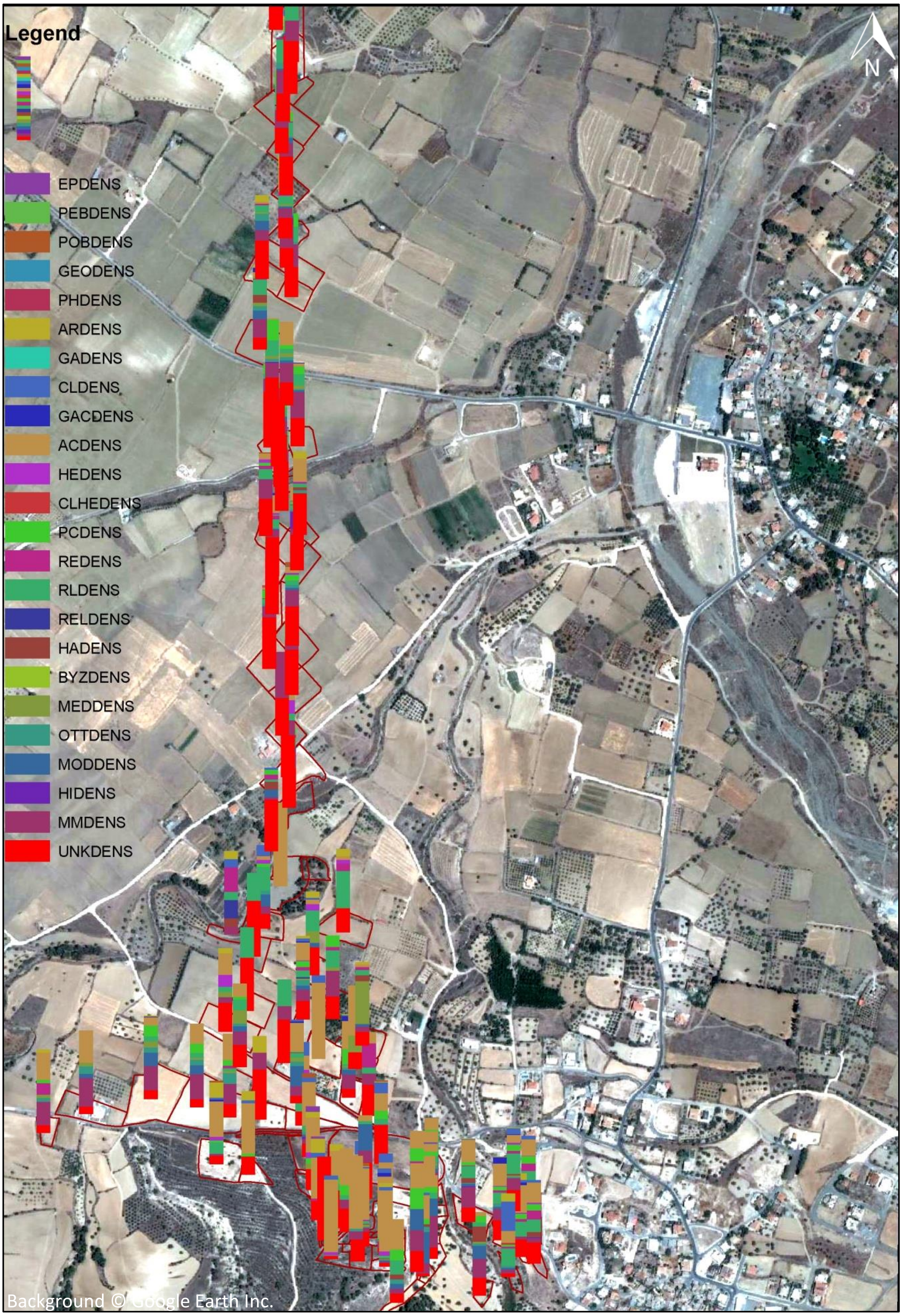
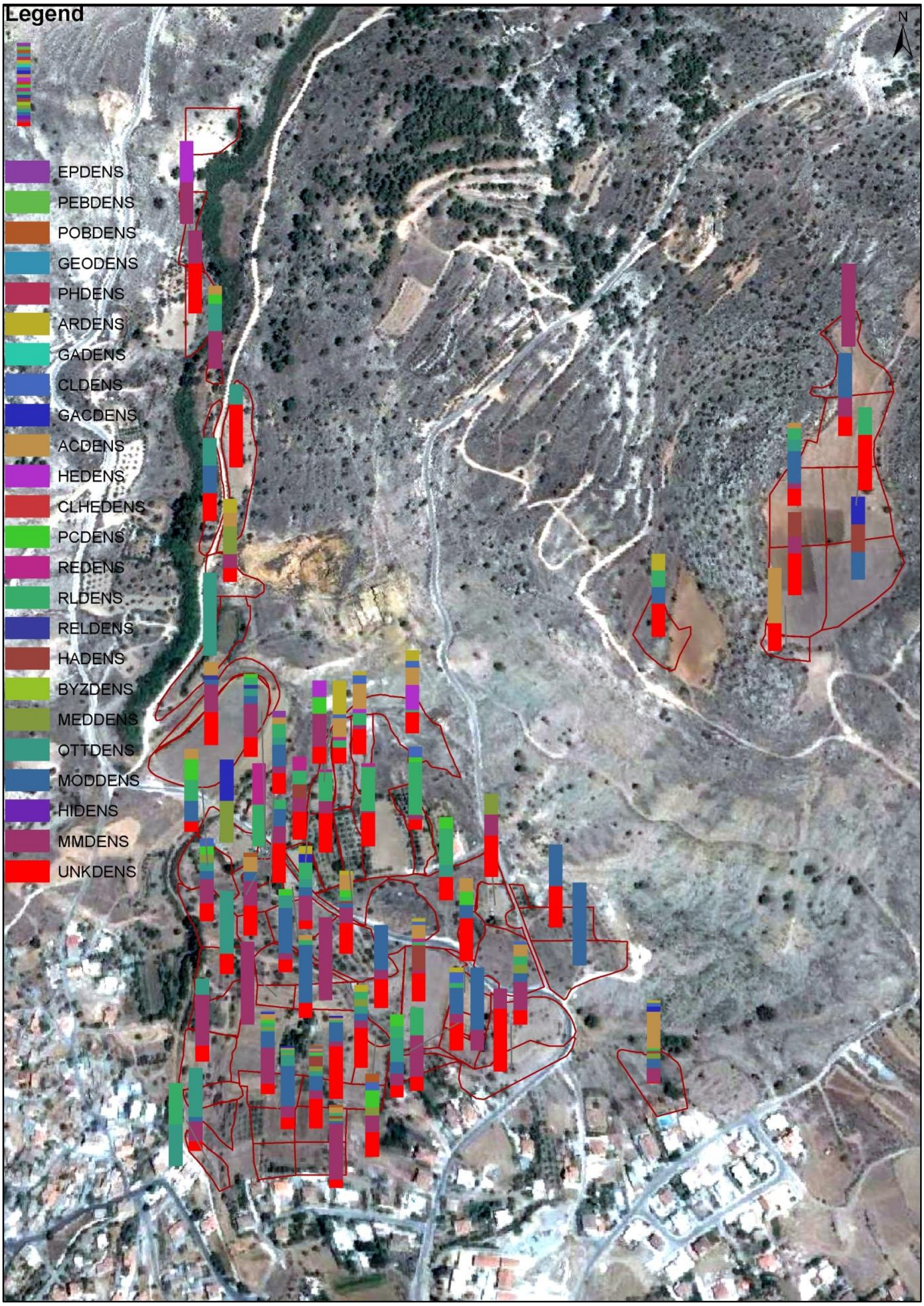


Figure 7.25: Dates for the ceramic recovered from Politiko by the SCSP **(**Data from: Knapp and Given 2003).



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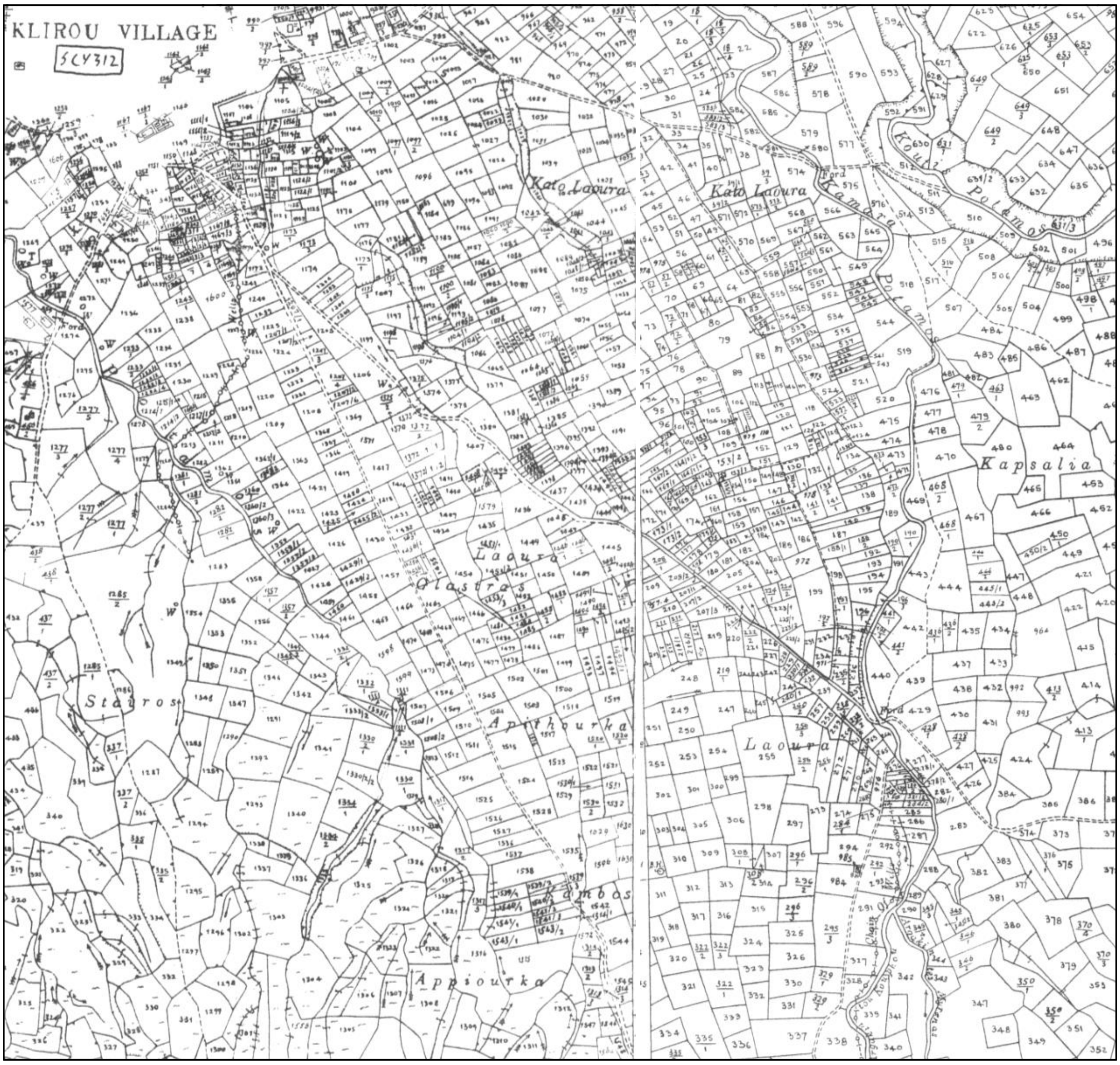

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Figure 7.30: Retrogressive landscape analysis of Loura Olastras.

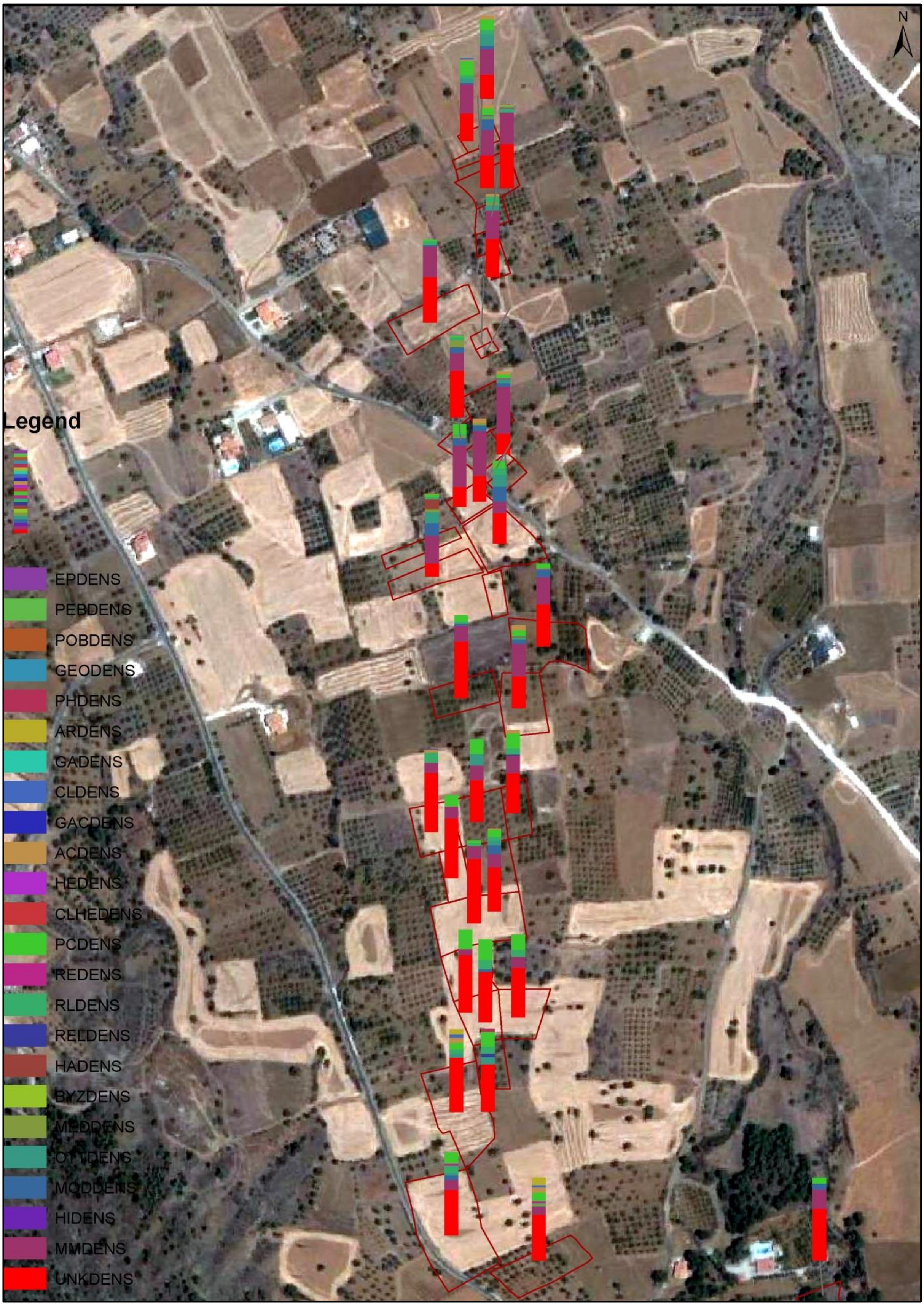
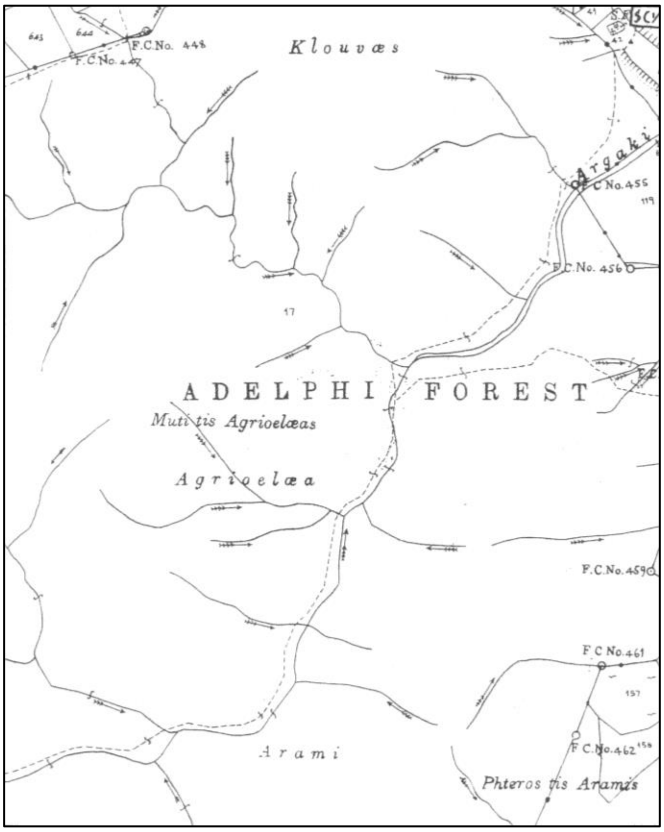


Figure 7.31: The SCSP ceramic results for Loura Olastras area by date (Data from: Knapp and Given 2003).



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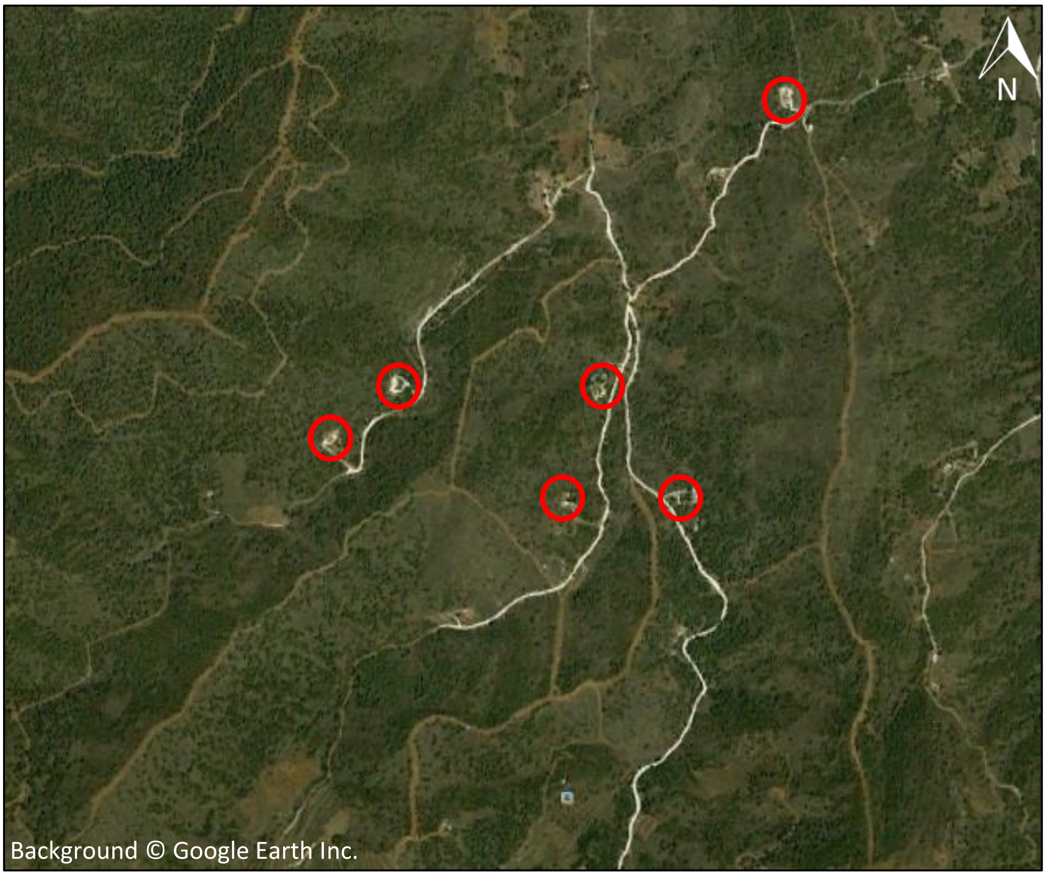

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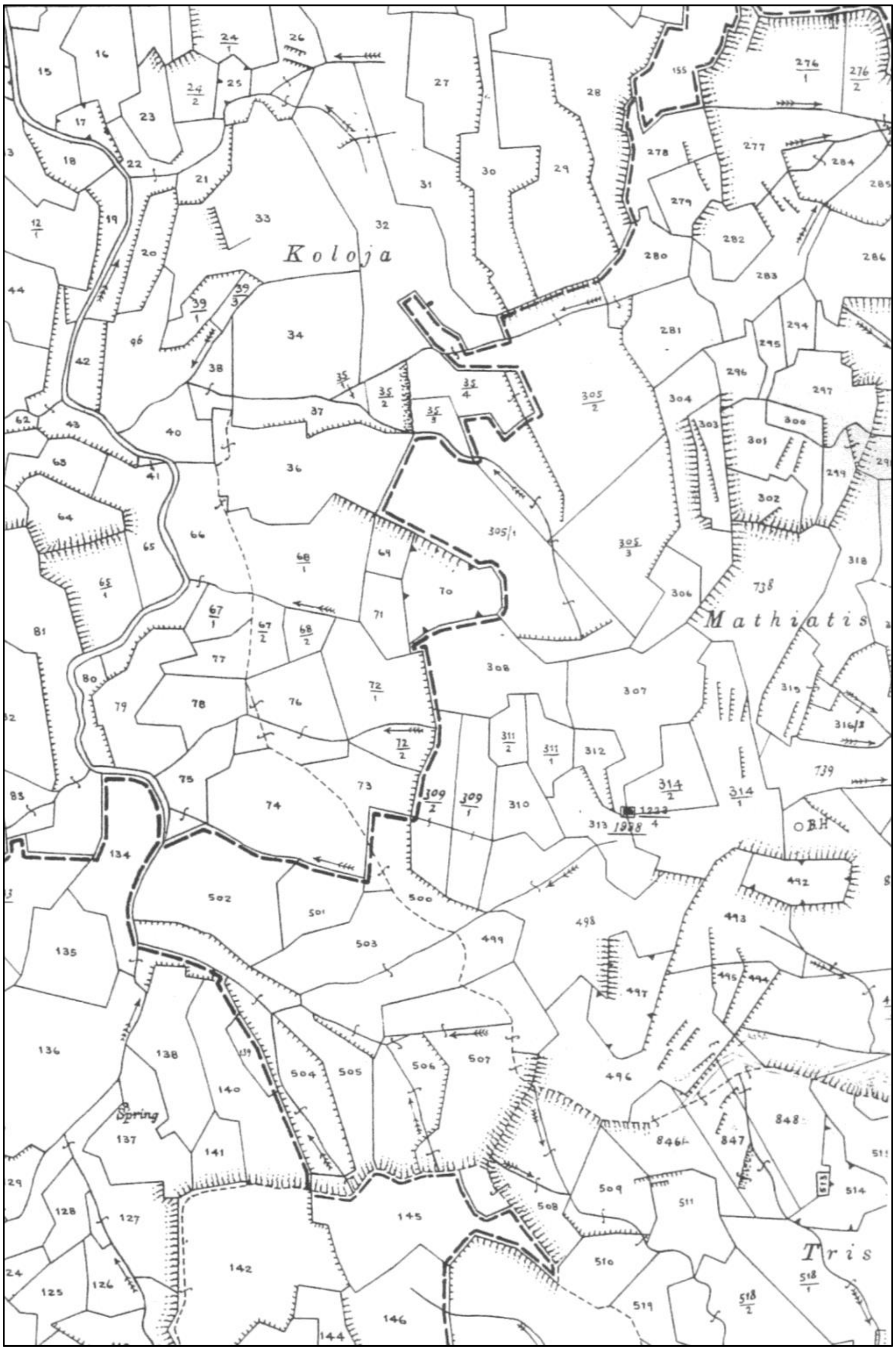


Figure 7.35: The cadastral map of Mathiatis focus study (DoLS 1990b, plan 6).

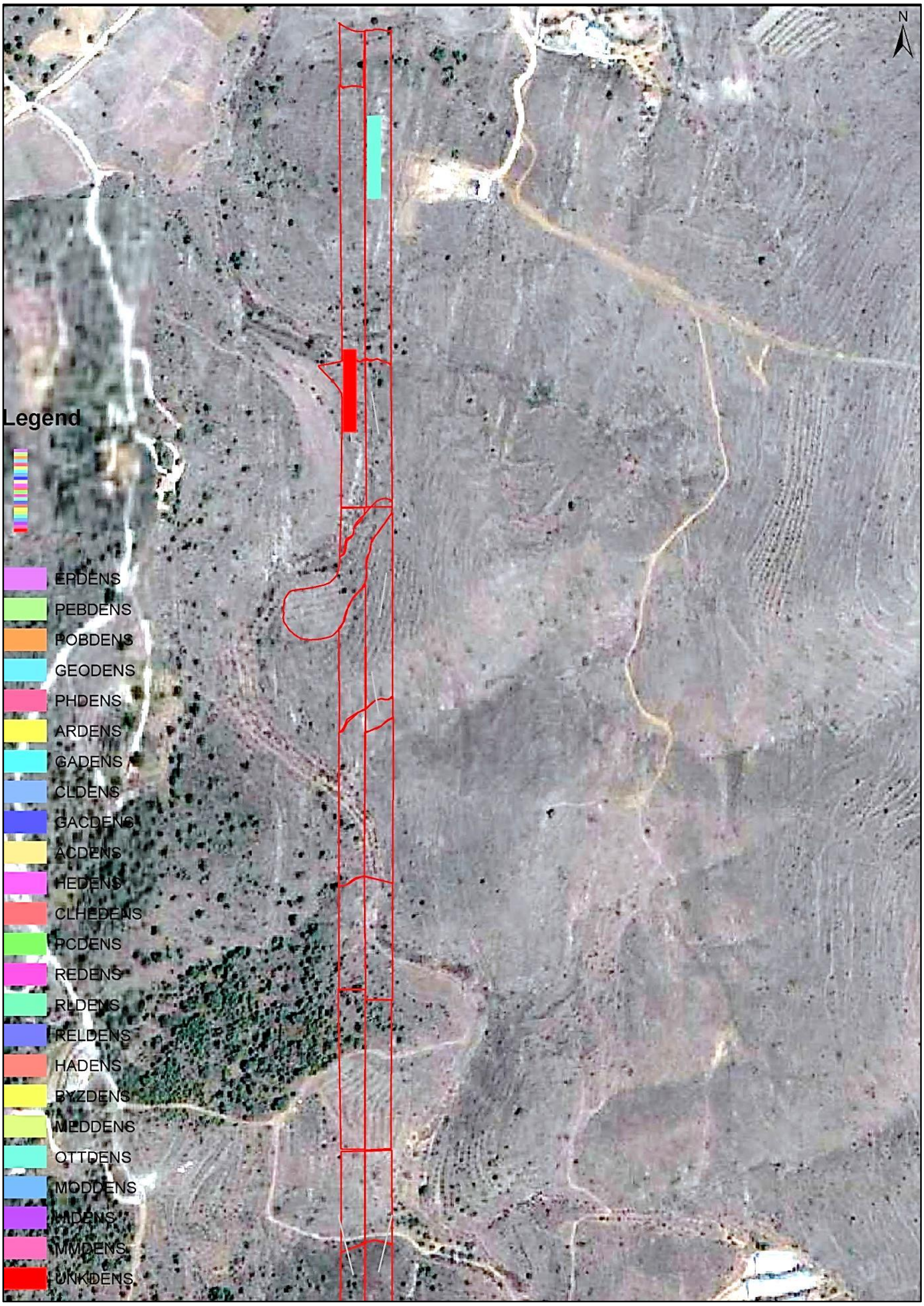


Figure 7.36: The SCSP ceramic results for the Mathiatis focus study **(**Data from: Knapp and Given 2003).

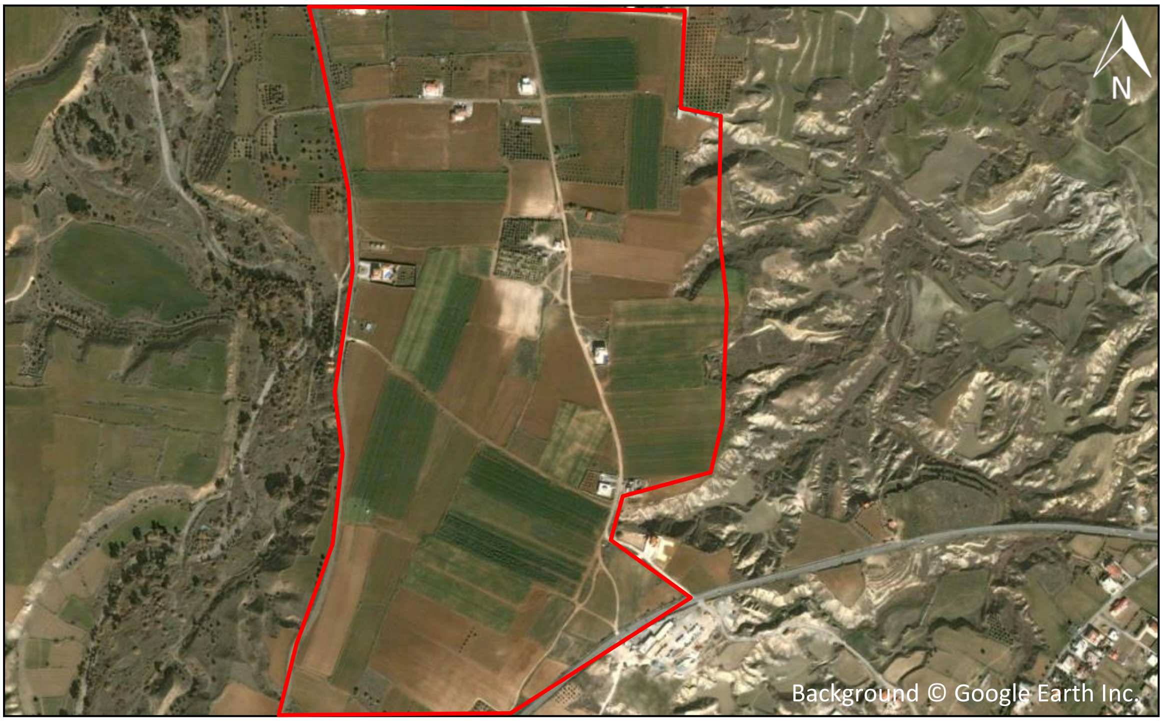
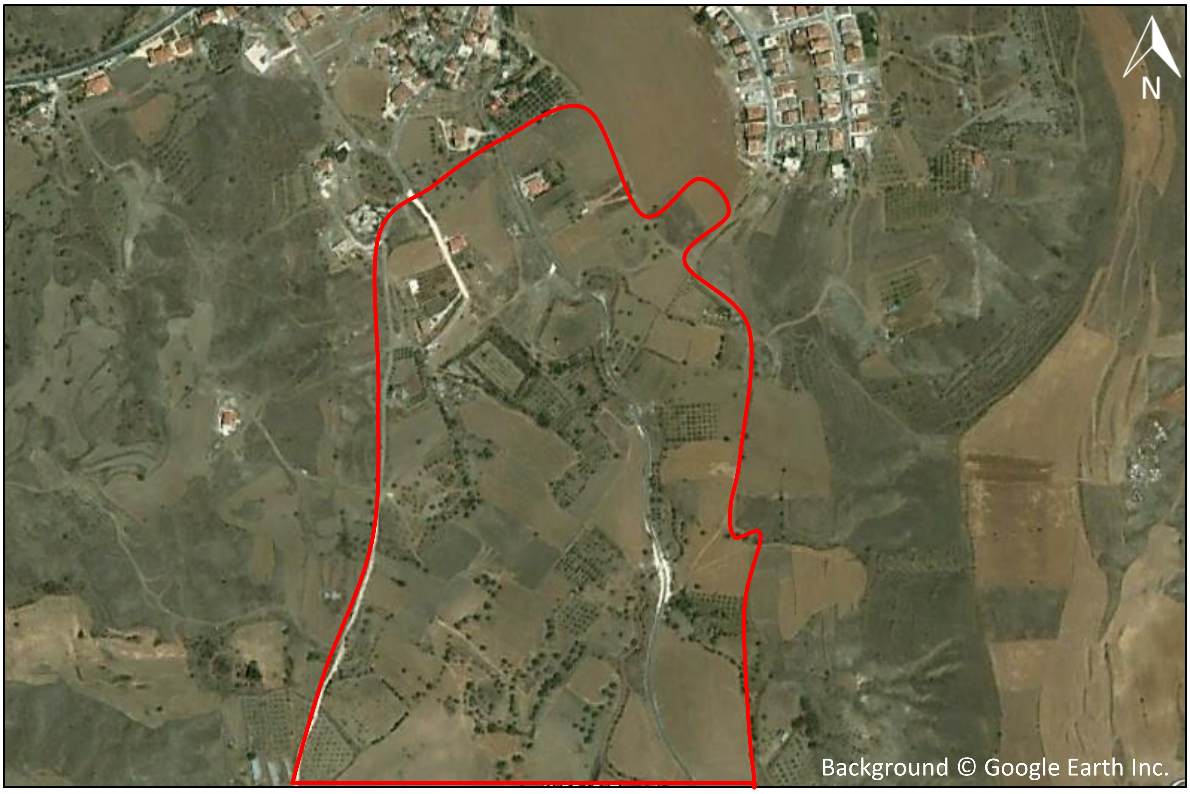


Figure 7.37: Example of Modern ‘Strip Field’ HLC type.



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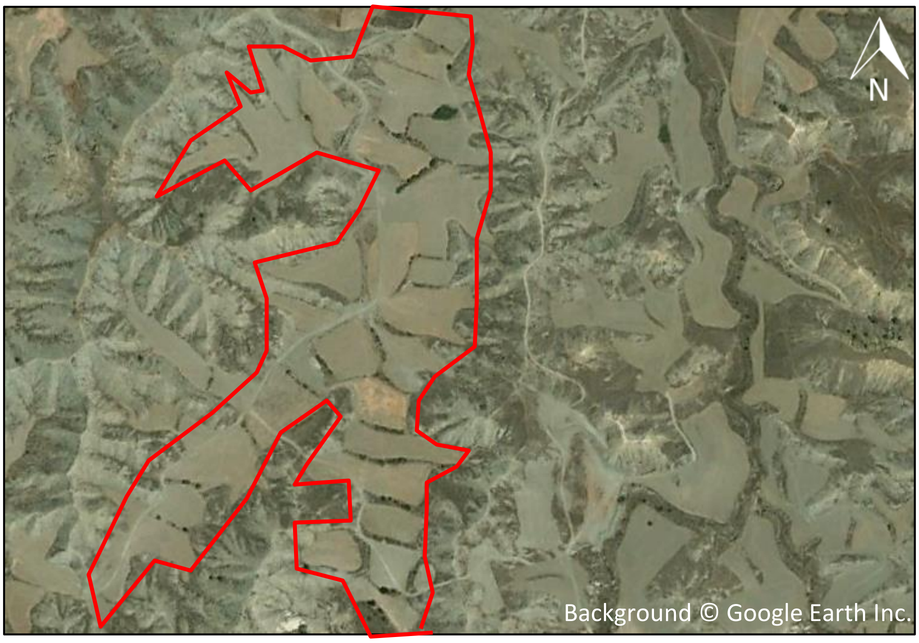

Figure 7.42: Example of Modern 'Irregular Valley Field' HLC type.

Figure 7.43: Example of Ottoman 'Box Field' HLC type.

Figure 7.44: Landscape photograph of the Ottoman 'Box Field' HLC type, with olive tress and associalted with indevidual homes.

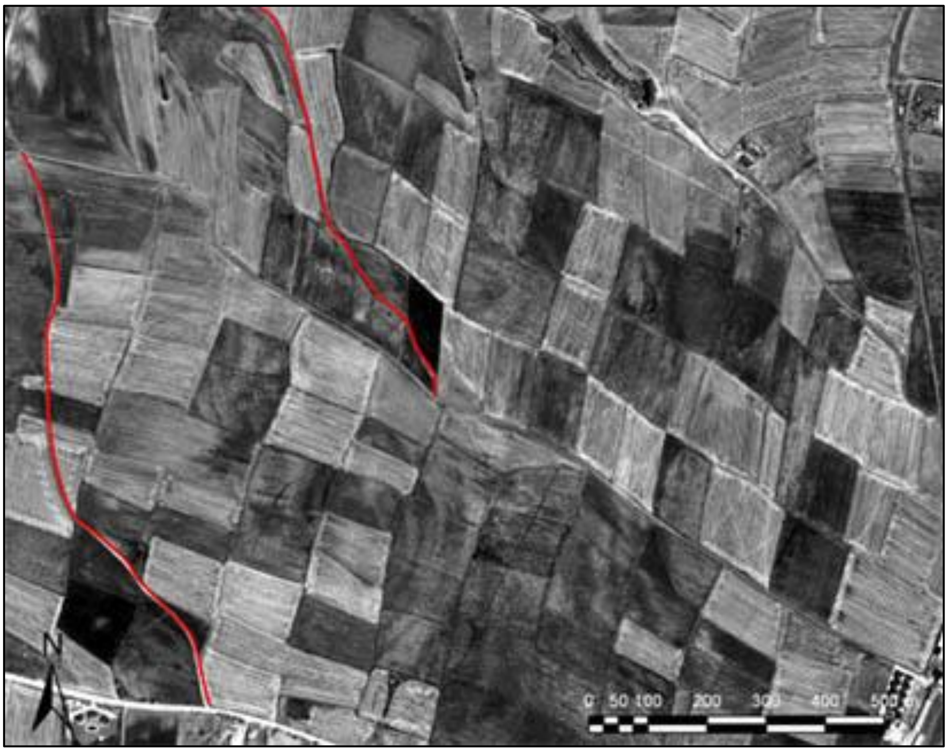

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Figure 7.46: Example of Modern ‘Step Terrace HLC type.

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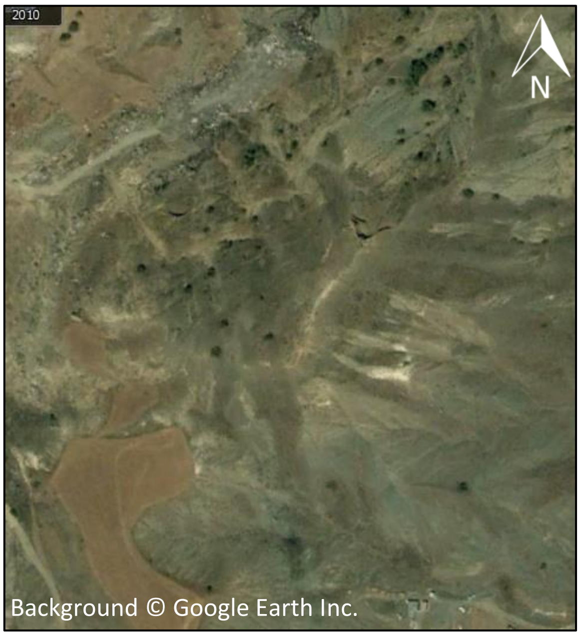

Figure 7.48: Landscape prior to contour terrace creation.

Figure 7.49: Example of Ottoman 'Abandoned Contour Terrace' HLC type.

Figure 7.50: Example of Modern ‘Riverside Scrub’ HLC type.

Figure 7.51: Example of Modern ‘Scrubland Terrace’ HLC type.

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Figure 7.54: Terraces for tree plantation (MA. 1984).

Figure 7.55: Example of Modern 'Sparse Woodland' HLC type.

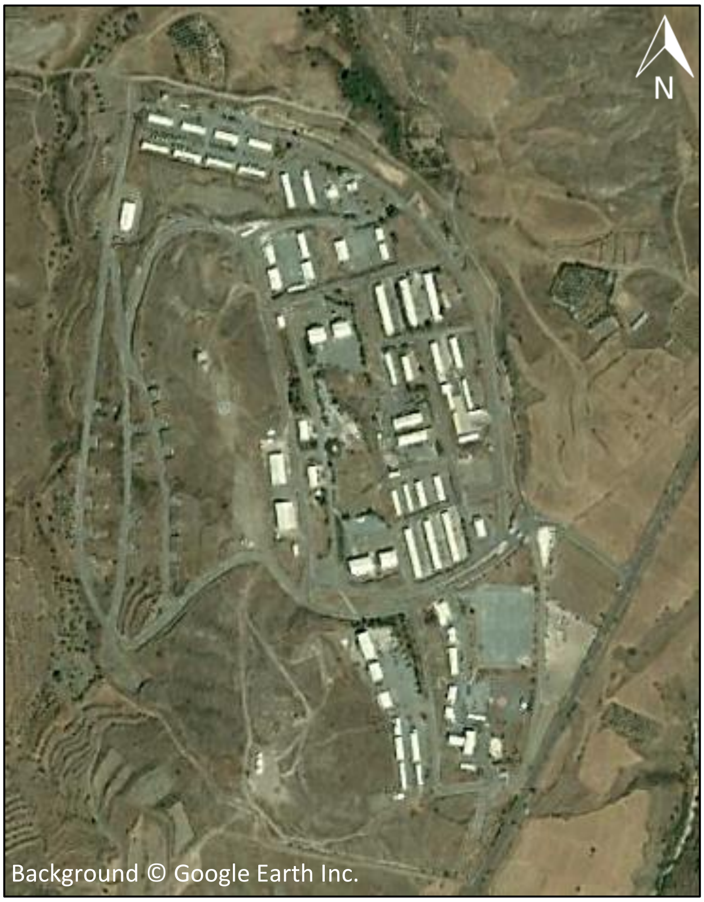

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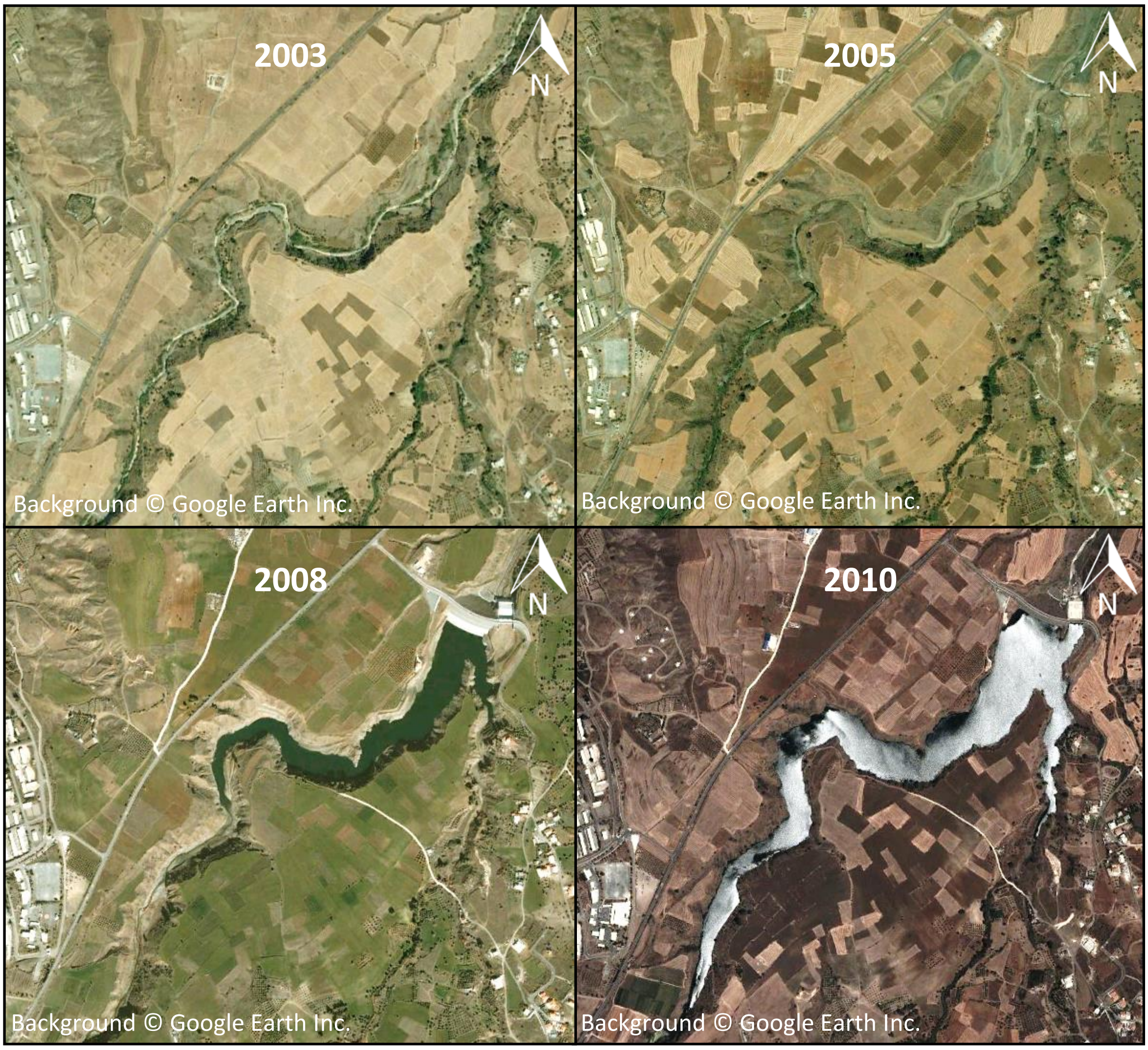
Figure 7.59: Klirou dam.



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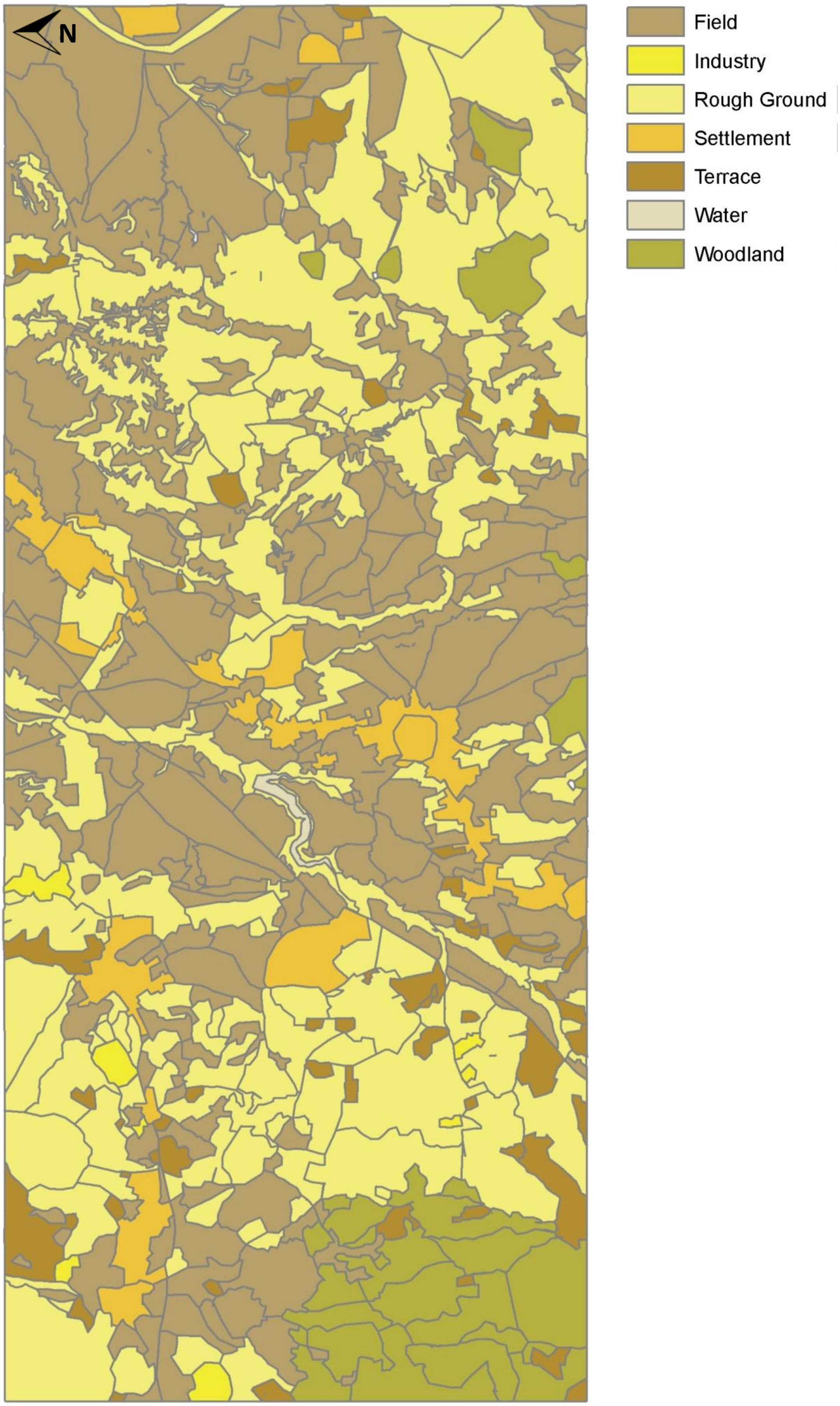

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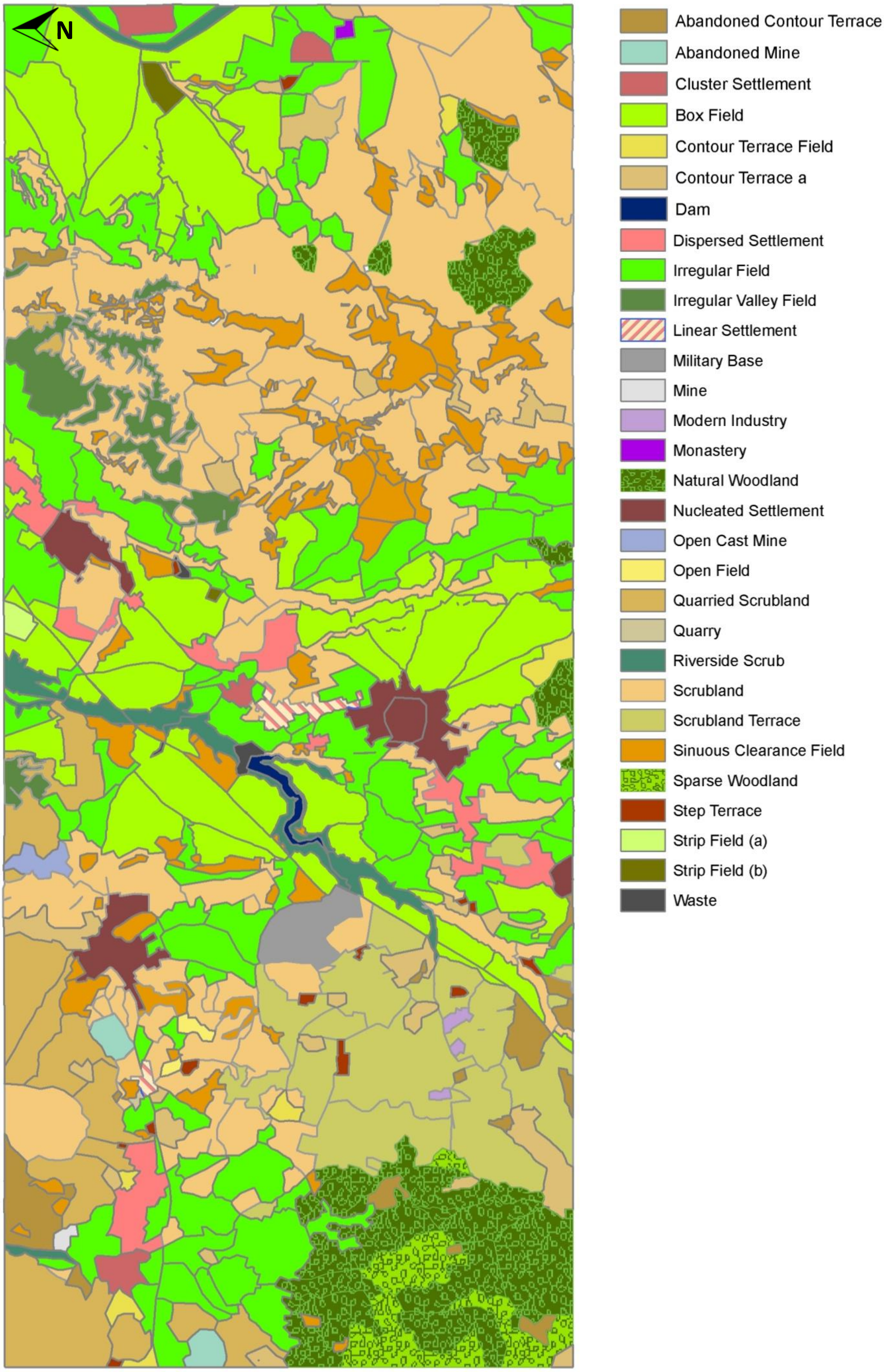

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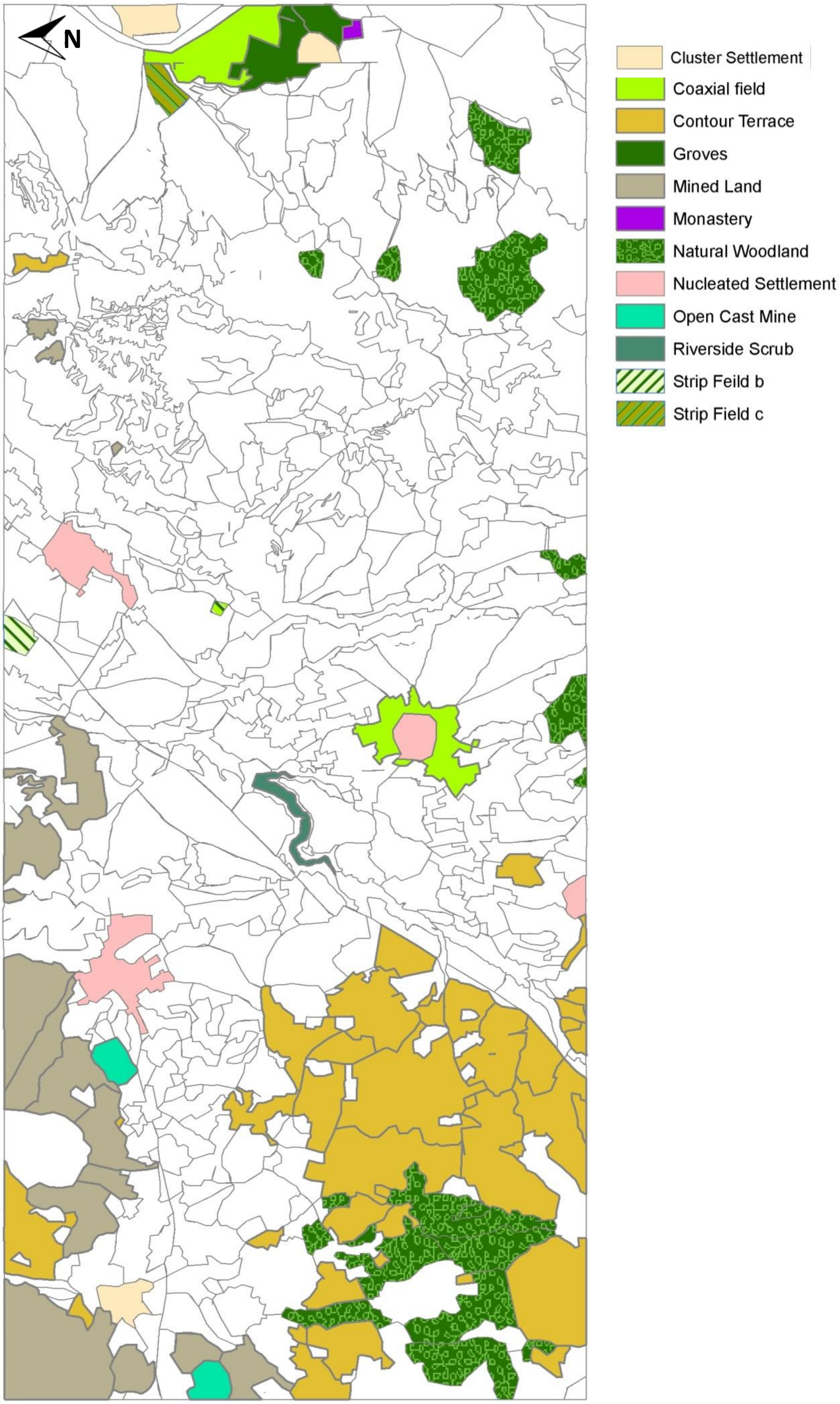

Figure 7.64: Level two HLC types of the Troodos case-study area.

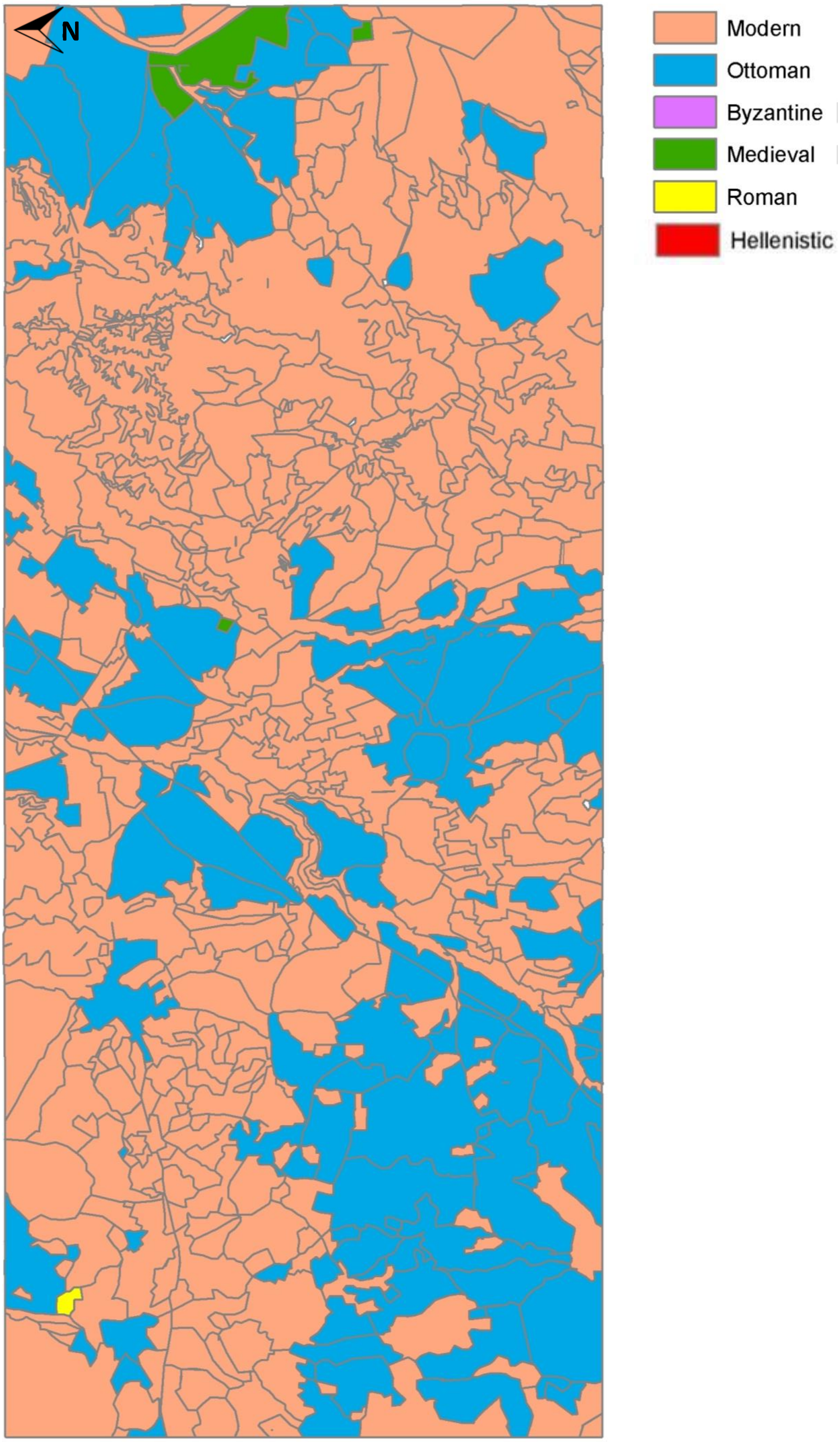

Figure 7.65: Level two HLC type dates for the Troodos case-study area. Areas without a level two HLC type present the dates for the current HLC type.

Figure 7.66: Level three HLC types of the Troodos case-study area.

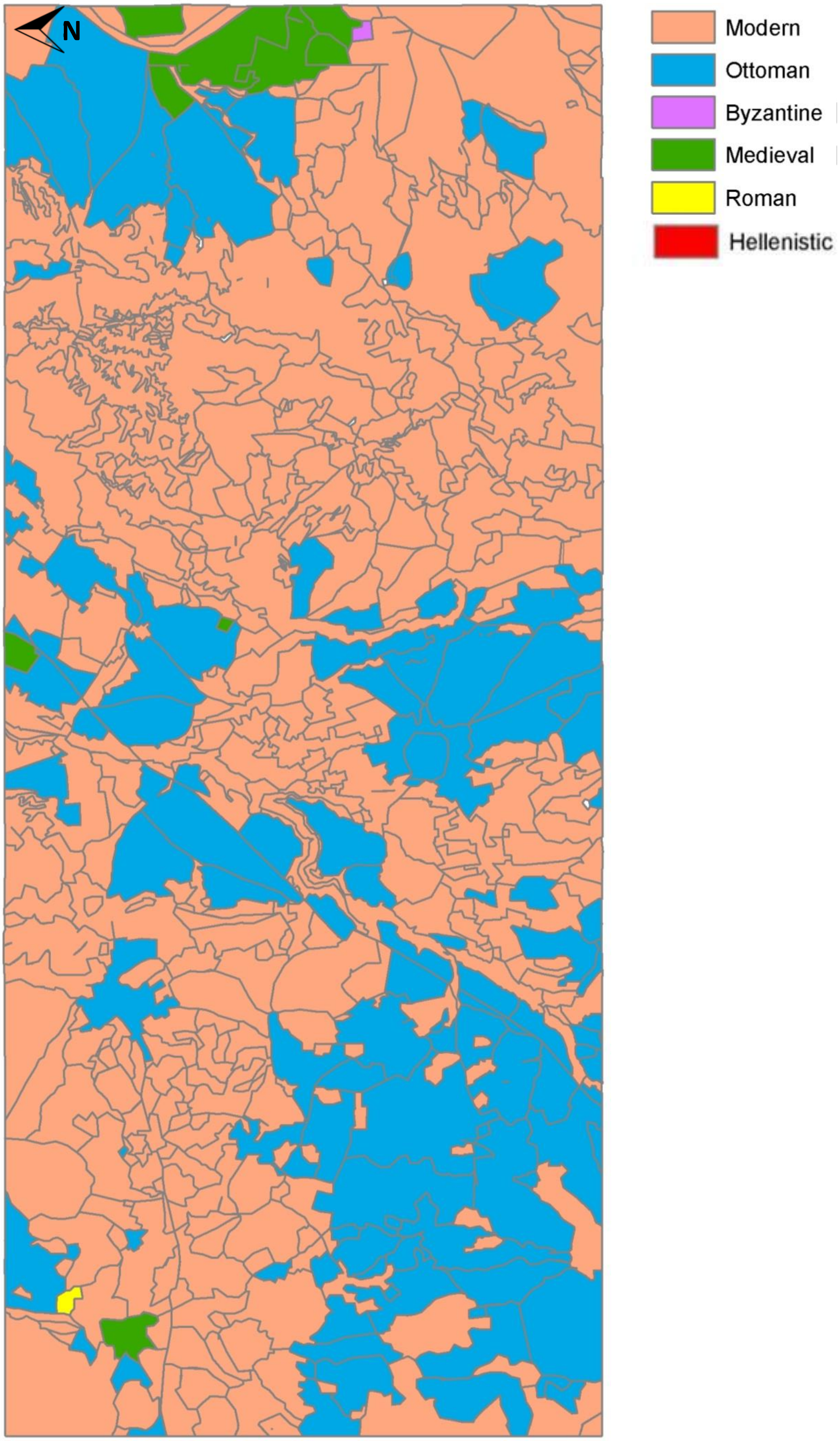

Figure 7.67: Level three HLC type dates for the Troodos case-study area. Areas without a level three HLC type present the dates for the next possible HLC type.

Figure 7.68: Level four HLC types of the Troodos case-study area.

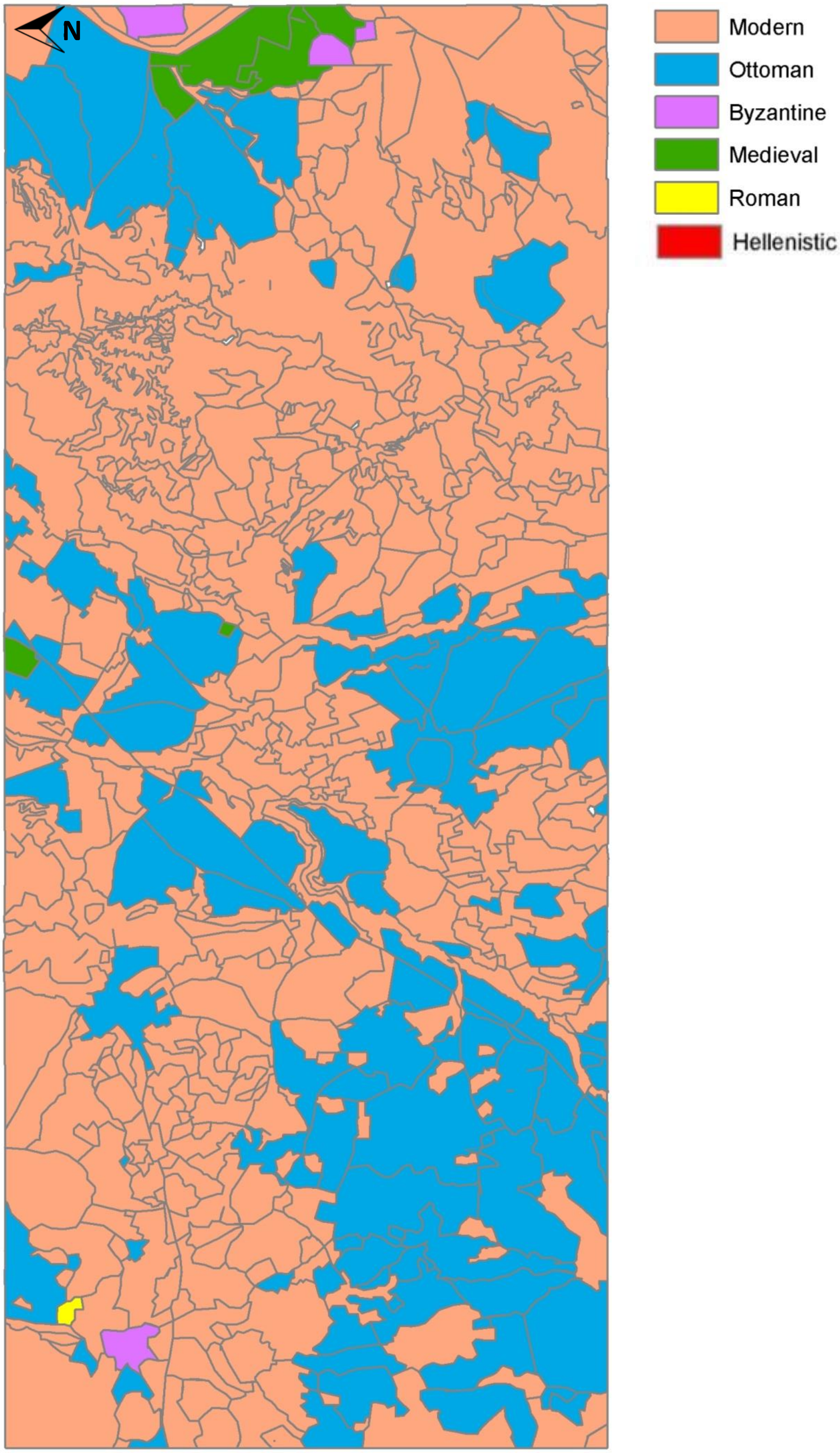

Figure 7.69: Level four HLC type dates for the Troodos case-study area. Areas without a level four HLC type present the dates for the next possible HLC type.

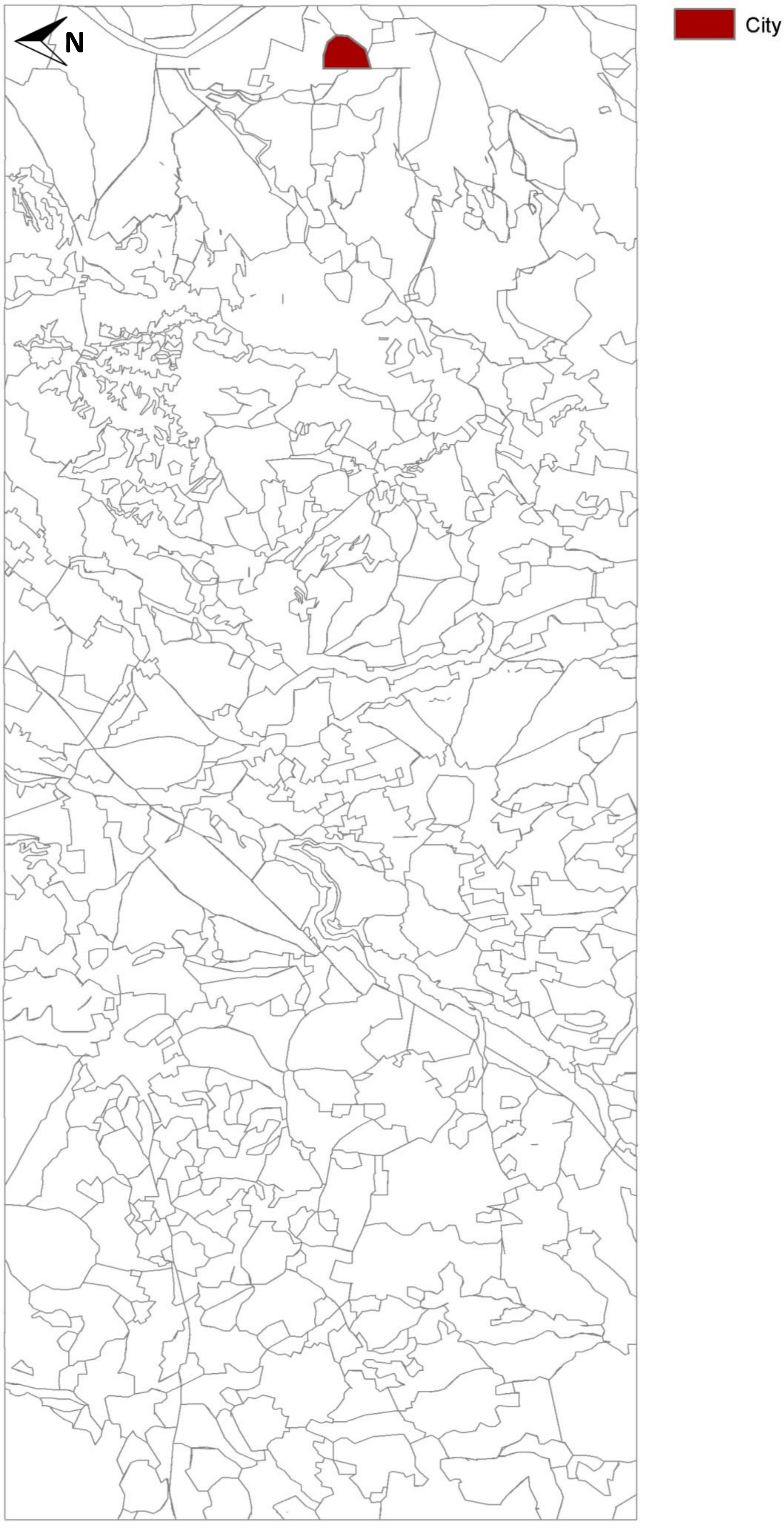

Figure 7.70: Level five HLC types of the Troodos case-study area.

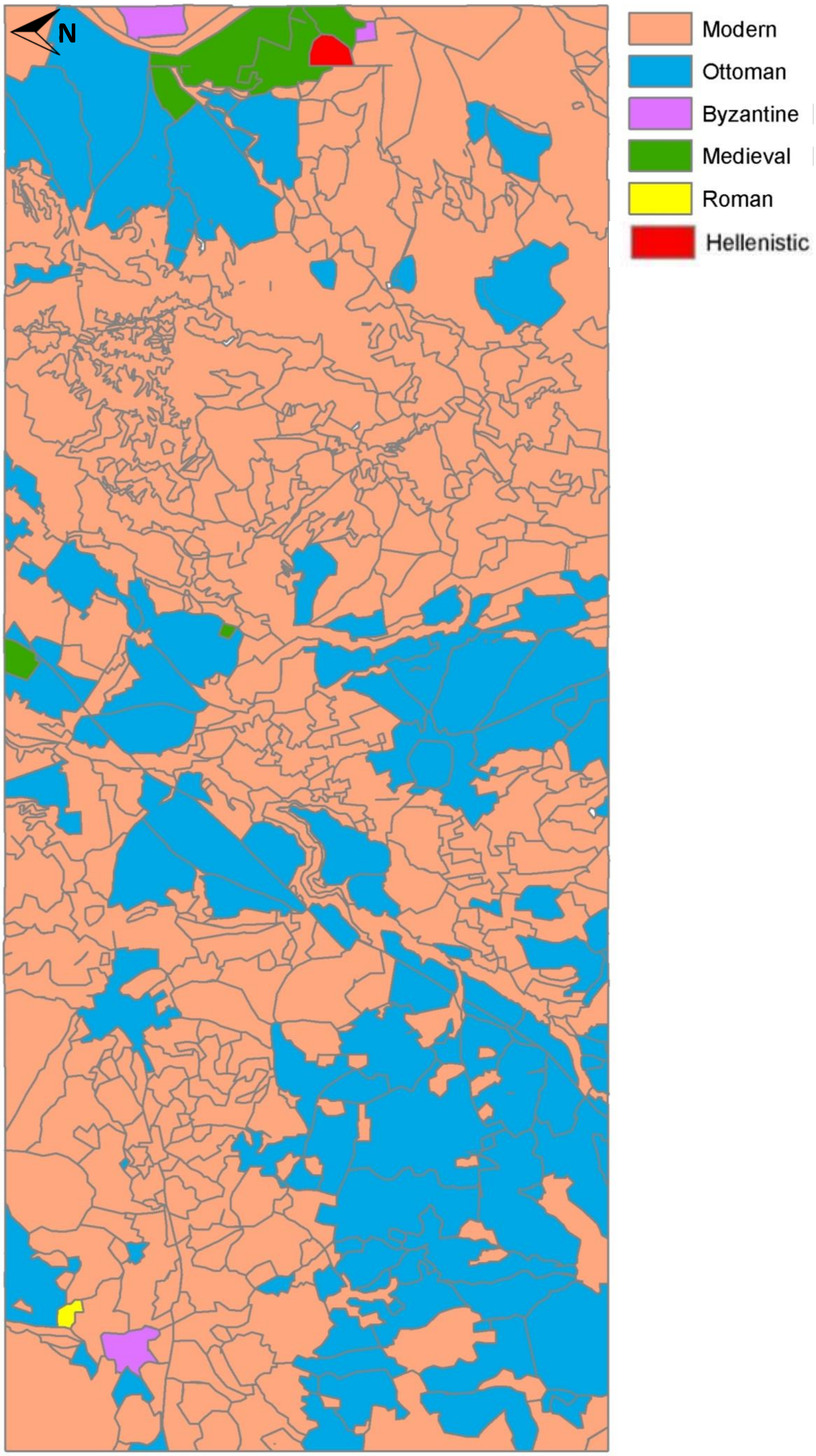

Figure 7.71: Level five HLC type dates for the Troodos case-study area. Areas without a level five HLC type present the dates for the next possible HLC type.

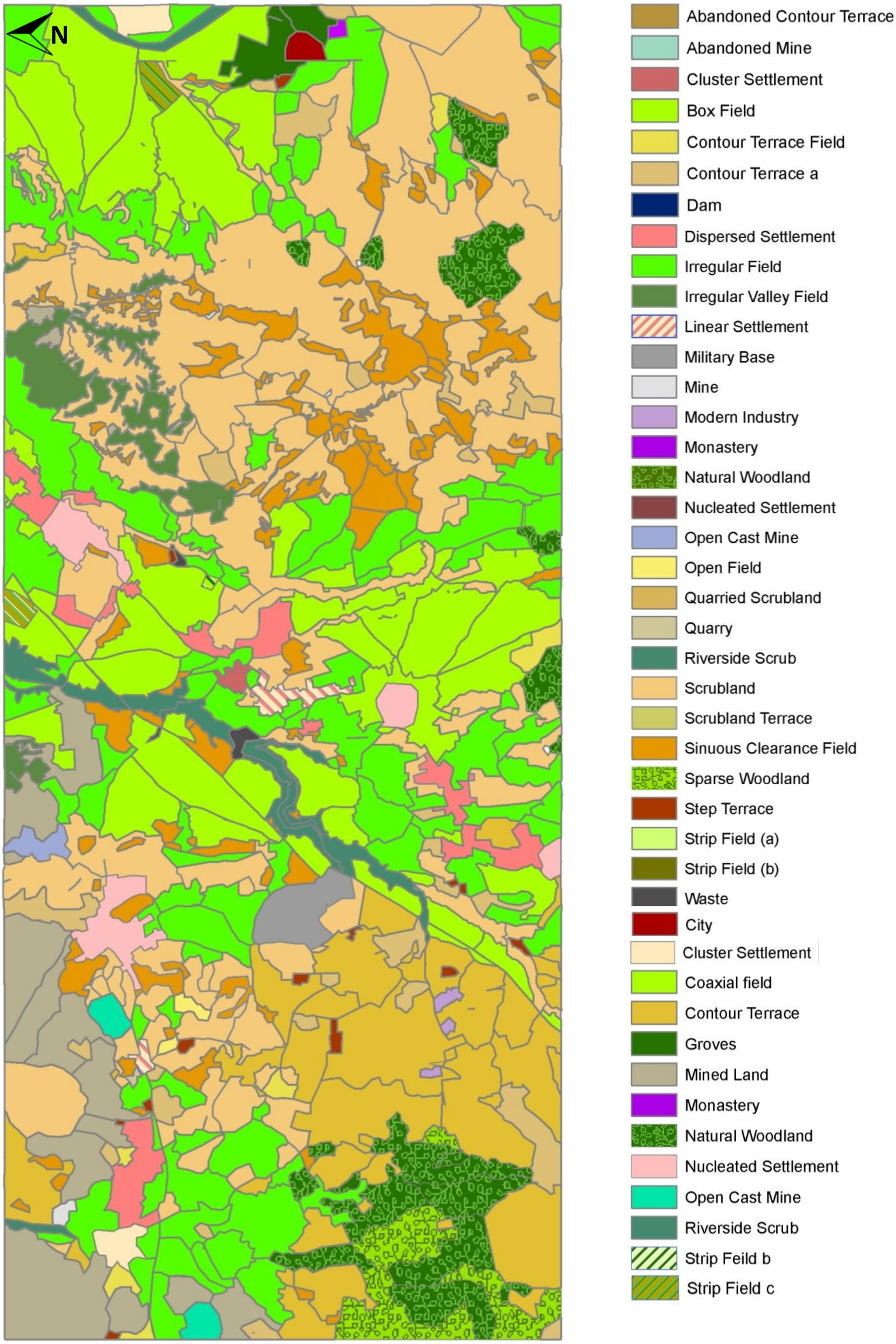

Figure 7.72: Multi-level HLC types for the Troodos case-study area. All HLC levels presented from current HLC to HLC level five on top.

Appendix 1

A1.1 Pisidia Intensive Surface Survey Student Handbook

The following text is a complete copy of the 2011 Pisidia Survey Project Student Handbook compiled by this author for the guidance of the student surveyors. The survey guide section is the most important to this thesis. The contents page numbers have been changed to reflect this thesis' page numbers for ease of reference. All personal information has been removed.

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1. The Pisidia Survey Project

1.1 Project Summary

Since the 1980s, the Pisidia Survey Project has conducted survey in the region of Pisidia, the mountainous area north of the coastal plain of Pamphylia. Work has concentrated on the remains of urban settlements in the area and has resulted in a good understanding of the development of the ancient *poleis* in western (Mitchell 1998). Most recently multidisciplinary survey in the ancient *polis* of Pednelissos dating from the mid-Hellenistic to early-Byzantine period and located 75 kilometres north-east of Antalya, has made it possible to distinguish the diversity in the development of the city centres in Pisidia (Vandeput 2007). In 2007 investigation into the territory of the city began in an attempt to answer hitherto unsolved questions. One of the main reasons for surveying the territory of Pednelissos is to address the lack of knowledge of the economic basis on which the *poleis* in the region were based upon.

The city's territory consists of a series of mountain ridges divided by small fertile valleys. The preliminary results of this survey reveal that the area looked and was used very differently in Antiquity than it is today. At present, only the bottoms of the valleys are inhabited and cultivated while slopes and summits are planted with pine forests, but in Antiquity the upland areas were much more intensively exploited. Numerous evidence for agricultural terraces and press installations show that the areas was cultivated extensively and olive oil was likely a major product. Remains of buildings have also been found in areas that are uninhabited now. South of the *poleis* of Pednelissos, in an area where the steep mountains level out into gently sloping hills and flat plains, seven ceramic production sites have been discovered. The ceramic forms being produced at these sites demonstrate close links with Cyprus. These sites provide new insight into the ancient economy of the region and highlight the importance of the region as an agricultural production centre since pottery of this kind normally travels with other agricultural goods (Greene 2005). In 2009 and 2010 several of these production sites were surveyed by a team of Newcastle University students. The aim of the 2011 season is to carry out an intensive field survey of ten key areas within the Pisidian landscape.

1.2 Surface Survey Objectives

- To record and process a representative sample of ceramic and other artefacts present on the surface in each Survey Unit.
- To confirm the landscape character type and record the current surface cover and landscape typography of each Survey Unit.
- To record the extent and the relationships of terraces and field boundaries within each Survey Unit.
- To collate a digital dataset that will provide a platform for spatial analysis and allow the archaeological material recorded to be investigated at a variety of different levels

1.3 The Team

The Pisidia Survey Project is a multidisciplinary regional survey project directed by Dr L. Vandeput (director of the British Institute at Ankara) and Dr V. Köse (Hacettepe University, Ankara). The Pisidia Survey Project team is an international and multi-disciplinary group of professional archaeologists, surveyors and other specialists from a variety of universities and institutions. This year the project will have team members from Newcastle University, Edinburgh University, Reading University, the University of Wales, the BIAA and Antalya Museum, other academics and specialists may also visit the project at various times during the season. The intensive ceramic survey that will be undertaken this year is directed by Dr Mark Jackson and project managed by Katie Green, 10 Newcastle University students will conduct the survey. Personal details for the Newcastle team including contact details can be found in the following section.

2. Newcastle Team Members

Dr Mark Jackson: Co-director of Pisidia Survey

English mobile number: ###########. To call from Turkey 0044 ############.
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Katie Green: Project Manager

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Harry Heiskanen: Team Leader

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Amara Litten

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Andrew Wardlaw

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Stephanie Elizabeth Spence

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Next of Kin Mobile: ############. To call from Turkey 0044 ############.
Allergic to #############

3. Pre Departure Information

3.1 Deadlines

10th May - Flights booked.

31st May - Personal detail forms to completed and returned.

12th June - Visa form, 1 photo and passport to handed in.

12th of June - Money to be handed in.

20th June - Pre departure meeting.

3.2 Health

Before leaving you should have up-to-date inoculation for **polio, typhoid A** and **B, tetanus, cholera** and **hepatitis B**. Please consult your doctor about this and take their advice.

Bring with you: - Any personal medication you take.
- A remedy for sunburn, dried skin and sore lips.
- something for stomach upsets.
- high protection sun-tan lotion.

The biggest health risk comes from the heat and from dehydration, so **long-sleeved shirts**, a **good hat** and a **water bottle** are musts.

3.3 Packing Essentials

Do not over pack. Remember that you will have to take some fieldwork equipment in your luggage and you will be able to wash clothing. We recommend a couple of outfits for survey, a couple for pottery processing and couple for when relaxing.

Fieldwork equipment check list	
Backpack for surveying	
Water container	
Mobile Phone*	
Basic first aid kit	
Retractable pencil (preferably 2H or 4H)	
Rubber	
Sharpie (black permanent marker)	
Pen	
Ruler	
Set Square (preferably one that starts at 0 in the right angle corner)	
Hand tape	
Compass	
Suntan lotion	
Bug deterrent	

Fieldwork clothing check list (this should be light but robust)	
Tough shoes or boots (trainers will disintegrate quickly)	
Long cotton trousers (jeans and shorts are not suitable)	
Long sleeved cotton shirts and T-shirts	
Light weight wind and waterproof anorak	
Sun hat	
We also recommend a torch, a penknife and a camera for personal use.	

Other essentials	
Any Personal Medication (including a remedy for sunburn or dried skin and sore lips and something to deal with stomach upsets).	
General toiletries	
Light shoes and/or Flip-flops	
Shorts, jeans or skirts for when not work in the field (nothing above the knee for girls)	
T-shirts or tops for when not working in the field (covered shoulders and nothing low cut for the girls)	
Warm jumper for the evenings (just in case)	
Underwear and socks (of course!)	
Swimming clothing, (including for the girls, something to put over your swimming costume when swimming in more reserved areas, such as a dress or long shorts and a t-shirt).	
Towel	

Washing clothes

We maybe able to have our clothes washed by someone in the village with a washing machine, but you will have to hand wash your underwear and socks and be prepared for the possibility that we may have to hand wash all our clothing if a washing machine is not available. Anyone with sensitive skin is advised to bring there own washing powder.

* ***Mobile Phones***

We would like all students to take a mobile phone with them, keep it charged up and always on their person while we are in Turkey. This is for emergency purposes only. We do not advise students to use the phone for anything else as this will result in an extremely large phone bill. There are phones in the village which can be used to call home.

3.4 Money and Foreign Currency

You will need little money on a day-to-day basis during the survey, but you may have expenses on weekend outings. We will have one and a half day off each week (which days are still to be determined). For those who feel like it, it will be possible to do some small-scale excursions to the sites close to Pednelissos.

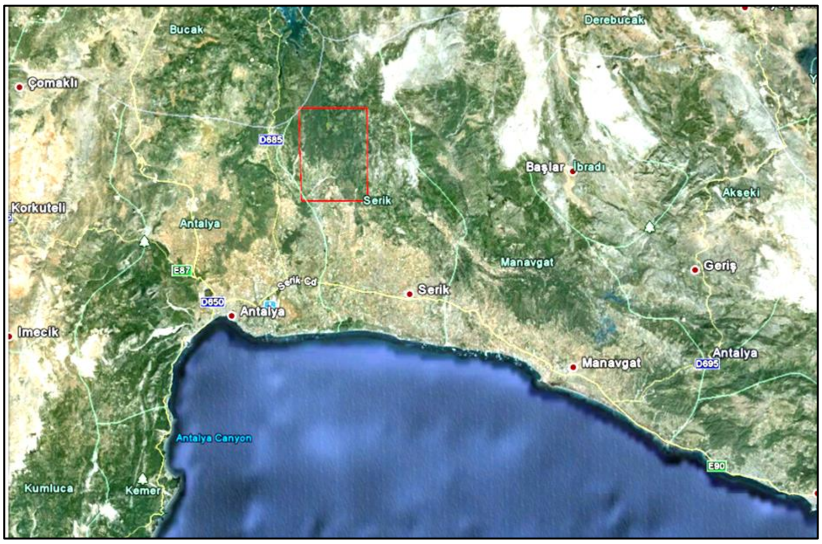
The currency in Turkey is the Turkish Lira. The Turkish Lira is divided into 100 *kuruş* (kurush). The average exchange rate is between 2.30 and 2.60 TRY to 1 GBP. The easiest way to get cash is to use your home bank card in a Turkish ATM (but check this with your bank first and be aware of any charges that might apply). You can also exchange foreign currency at a Currency Exchange Office, which give good rates for Euros or Pounds. Travellers' checks are almost impossible to get cashed in the area and it is not recommended that you use these.

There is no Currency Exchange Office or ATM in the village of Gebiz where we are staying, so it is recommended that you take enough Turkish currency with you for a couple of weeks at least, as you will not often get the opportunity to visit a cash machine.

3.5 Location and Accommodation

The team will live in Gebiz, a market town at the foot of the Taurus Mountains. The advantages of Gebiz are the existence of shops and easy access to public telephones. A big disadvantage is that it is a busy and very warm town! The closest city to the area where we shall be working is Antalya, regional and major tourist centre with an important museum. All official business will be carried out in Antalya, and we anticipate using Gebiz and Antalya for most shopping and other local needs. If you have any Turkish language skills there will be plenty of opportunity to use it. Few people outside Antalya will speak any English or more than rudimentary German. The team will be living in several traditional Turkish apartments. These apartments are currently not occupied and therefore very basic with little furniture and concrete floors. Each apartment usually has three to four bedrooms and one bathroom. The bedrooms will be shared with team members of the same sex. This is usually about three or four people to a room but it can vary. We will be sleeping in, camping style metal frame beds, with foam mattresses. Bedding will be provided. The apartments generally have Turkish style bathrooms as opposed to European style and water may only be hot at certain times of the day. Toilet paper must not be put down the toilet.

Meals will be eaten at a central apartment usually outside on a veranda and someone in the village will be hired to cook for us. Food will be local Turkish in style



Map of region with survey area highlighted in red.

3.6 Team Work

The ability to work as part of a team is an essential skill for an archaeologist and it is essential that everyone on the survey works together as a team, both during the survey itself and during day to day activities. Working and living in difficult and unfamiliar conditions can be stressful. To help keep stress levels low and help keep the project running smoothly individuals must respect all team members and must be considerate of others. For example you must carry out the jobs you are given, as it can adversely affect the whole team's work. If you have any problems you must inform the relevant team leader immediately. If it is your turn to prepare lunch or clean the toilets you must do so, as it not only affects you but it affects others. You must also be considerate of the people you are sharing a room with, try not to wake people up when you go to bed or get up, and keep your own belonging together and tidy.

3.7 Local Laws and Customs

The team will be living and working in Turkey in a traditional rural area, it is therefore essential that members of the project respect the Turkish culture and responsibly represent Newcastle University and the British Institute at Ankara's survey project. Any wrong doing on an individual's part could result in the survey project being cancelled and the team members not being allowed to work in Turkey again. We will send team members home if you are not behaving responsibly.

ID

- It is illegal not to carry some form of photographic ID in Turkey. It is therefore advisable to carry your passport and work permit with you at all times.

Antiquities

- The export of antiquities is prohibited and carries a prison sentence from five to ten years. This can refer to a single pottery sherd!
- Do not take any 'souvenirs' of a dubious origin home.
- Do not pick up pottery or artefacts when not carrying out the official survey.

Dress

- Women should dress modestly, covering their shoulders and knees and not wearing low cut tops. This does not apply to the beaches around Antalya where bikinis are suitable, but in certain more traditional areas swimming clothes should also be modest.
- Men should not be topless unless on a beach.
- When visiting a mosque or a religious shrine everyone should remove their shoes, woman should cover their hair, and men should not wear shorts.

Alcohol

- Alcohol is available in Gebiz and you are allowed to drink when not working, but do so discreetly and responsibly.
- Do not get drunk! You will not be able to work in the heat the following day and this will let your team members and the project down.
- The project management reserves the right ban from the survey any persons who are suspected of being under the influence of alcohol.

Drugs

- The Project Management reserves the right ban from the survey any persons who are suspected of being under the influence of drugs. Anyone using non medication drugs will be sent home.
- Turkey has strict laws against the use, possession or trafficking of illegal drugs. If you are convicted of any of these offences, you can expect to receive a heavy fine or a prison sentence of four to 24 years.

Smoking

- Smoking is not allowed while pottery recording or field-walking.
- Do not smoke inside the apartments and be considerate of the other team members.
- Smokers must also be particularly careful as the countryside is very dry during the summer months and fires can be easily started.
- There is a smoking ban on all forms of public transport (trains, ferries and taxis) and in outdoor venues (including stadiums, playgrounds, cafes, bars, and restaurants). You risk being fined 62 YTL if you are caught smoking in a designated smoke-free area.

3.8 Travel Insurance

All Newcastle University staff and students are covered by **ACE EUROPE insurance.** Each member of the team should **print** out and **carry** the relevant insurance document with them when travelling. The policy documents and a brief summary of the cover provided can be found at the end of this document. Further details on the policy can be found at http://www.ncl.ac.uk/students/wellbeing/finance/information/insurance/

In an **emergency** you can obtain immediate assistance by contacting ACE EUROPE using the current international dialling for the UK in the country from which you are calling.

Tel No. +44 (0) 20 7173 7797.
Quote your name, the name of Newcastle University and the policy number.
The 09-PAT-0000000467 policy is for **staff** and **post graduate** students
The 09-PAT-0000000466 policy certificate is for **undergraduate** students

Summary of Insurance Cover

Medical and Emergency Travel Expenses

Payment of medical, emergency dental, optical and emergency travel expenses which are necessarily incurred as a direct result of your falling ill, or sustaining accidental Bodily Injury or dying. Liability is limited to £2,500,000 on the amount claimed but payment will only be made for a maximum period of two years from the date of the accident or medical emergency.

The policy does not cover medical expenses incurred:

- in excess of £10,000 in the United Kingdom
- as a result of pregnancy (or child birth within one month of the expected date of delivery)
- if travelling against medical advice.

£50 excess applies to all claims
In the event of a claim you will be required to produce:

- all receipts/invoices in respect of treatment received
- details of any other cover under which you are permitted to claim
- confirmation that the Medical Expenses are necessarily incurred if treatment is taken in the United Kingdom.

Personal Accident

Payment of a lump sum, for accidental bodily injury which within two years is the sole cause of Death or Disablement.

Additional Benefits:

- Reasonable funeral expenses up to a maximum of £1,500
- Hospitalisation for more than 48 hours, £15 per day for 52 weeks
- Loss or damage to clothing/personal effects as a result of assault.

In the event of a claim being made the following must be provided:

- evidence of the cause of the accident
- medical certificates/reports (provided at your expense)
- name and address of the doctor attending.

Cancellation, Curtailment and Change of Itinerary

Payment of all deposits, advance payments and other charges for transport and accommodation for which you have paid, or will be liable to pay and cannot be recovered elsewhere:

- If you are forced to cancel the journey as a direct and necessary result of any cause outside your control.
- If you are forced to cut short your journey as a direct and necessary result of any cause outside your control and the additional cost of travel to return to the United Kingdom
- Payment of additional costs of travel necessarily incurred to enable you to continue your journey if you are forced to alter pre-booked arrangements as a direct and necessary result of any cause outside your control.

Sum Insured: up to £10,000. £50 excess applies to all claims.

Cover does not include:

- disinclination to travel
- childbirth
- your financial circumstances
- your failure to check in according to the itinerary
- travelling against medical advice

In the event of a claim you will be required to produce:

- evidence of the reason for claiming
- full breakdown of the amount claimed (with supporting documentation)
- name and address of your travel agent medical certificates if injury/illness is the reason for Cancellation/Curtailment/Change

Personal Baggage

Payment for the cost of repair or replacement of lost, damaged, stolen or destroyed baggage.

Sum insured: up to £3,000 (limit any one item £1,000). £50 excess applies to all claims.

In the event of a claim you will be required to produce:

- detail of the full circumstances leading to the loss/damage
- original receipts for items over £75 or receipts for replacement items
- a copy of any police report
- confirmation that losses have been reported to carriers, handlers or police as appropriate.

NB. Losses as a result of theft must be reported to the local police.

Money and Credit Cards

Reimbursement of Personal Money lost either on the journey or within 120 hours before departure or after return. Reimbursement of financial losses suffered by you solely as a result of a credit card being stolen or lost. Personal Money is: coins, bank and currency notes, cheques, postal and money orders, eurocheques, travellers cheques, travel tickets, passports, green cards and petrol and other cards or coupons which have monetary value. Credit Cards are: any credit, charge, cheque, bankers or cash card issued in the British Isles.

Sum Insured: up to £1,500. Cash (Coins and/or Bank Notes and Currency) limited to £1,000. **£50 excess** applies to all claims.

Insurers will not be liable for losses not reported to the police and/or appropriate authorities within 48 hours of discovery. In the event of a claim you will be required to produce:

- a copy of the police report
- details of the full circumstances leading to the loss.

Supplementary Cover

Travel Delay: Minimum 12 hours £80 (subject to conditions). Each further full 12 hour period £40 maximum per claim £240.

Passport Indemnity: Reimbursement of costs maximum £500.

Personal Liability: Limit of £2,000,000.

Hijack: £500 per day detained Maximum £25,000.

Legal Expenses: Up to a sum of £50,000 any one claim.

4. Travel Itineraries and Flight Details

GROUP 1

Katie Green, Harry Heiskanen

Outward

Depart: Manchester Airport (Fight TK1996) 15:55 24 Jun 2011

Arrive: Istanbul Ataturk Airport (Fight TK1996) 22:05 24 Jun 2011

- Travel by bus to Ankara to meet with Dr Lutgard Vanderput and travel with her by car to Gebiz.
- Arrive at Gebiz Sunday 26th June 2011.

Return

Depart: Istanbul Ataturk Airport (Fight TK1995) 12:50 02 Aug 2011

Arrive: Manchester Airport (Fight TK1995) 15:05 02 Aug 2011

GROUP 2

Mark Jackson, Maiju Pohjola, Kristjan Väljataga, Erin Slack, Andrew Wardlaw, Stephanie Elizabeth Spence, Amara Litten

- Meet at Newcastle Airport at 5.20am 27th June 2011.

Outward

Depart: Newcastle Airport (TCX6544) 07:15 27 June 2011

Arrive**:** Antalya Airport (TCX6544) 13.35 27 June 2011

- Team will be picked up by Dr Lutgard Vanderput and taken to the local police station to begin work permit registration.
- Arrive at Gebiz late afternoon on the 27th June 2011

Return

For all of Group 2 except Mark Jackson who will travel to Kilise Tepe on the 4th June

Depart: Antalya Airport (TCX6545) 03:50 26 July 2011

Arrive: Newcastle Airport (TCX6545) 06:30 26 July 2011

GROUP 3

Maria Duggan

Outward

Depart: Newcastle Airport (TCX6544) 07:15 4th July 2011

Arrive: Antalya Airport (TCX6544) 13:35 4th July 2011

- Maria will be picked up by Dr Lutgard Vanderput and taken to the local police station to begin work permit registration.
- Arrive at Gebiz late afternoon on the 4th June 2011.

Return

Depart: Antalya Airport (TCX6545) 02:10 19th July 2011

Arrive: Newcastle Airport (TCX6545) 04:50 19th July 2011

5. Health and Safety

A health and safety briefing will be given to all team members on arrival in Turkey, but team members must read the Risk Assessment below, pay particular attention to the potential hazards and precautions that should be taken to avoid these hazards, the accident and emergency procedures and the disaster plan.

5.1 Risk Assessment

Note: This form is for field procedures only.

People doing field activity: Mark Jackson (Director)
Katie Green (Manager)
Maria Duggan
Maiju Pohjola
Harry Heiskanen
Erin Slack
Stephanie Spence
Andrew Wardlow
Kristjan Valjataga
Amara Litten

Note: Katie Green will supervise the Newcastle team under the direction of Dr Vandeput.

Communication: On site

How? In person and by mobile phone

When? Every day

Note: Mark Jackson will travel from the Pednelissos Project to Kilise Tepe during July. Katie Green will keep in contact with him at Kilise Tepe via mobile phone.

Field activity outline: Students will carry out field survey: primarily they will engage in field-walking and artefact collection. They will record ceramics and artefacts.

Hazards and Precautions

Where: Pednelissos city site and hinterland

Hazards	**Precautions**
Heat and sun exposure	Wear hat, sunscreen, protective clothing. Rehydration salts will be available in the first aid kits. The working day will be organised to avoid exposure to the strongest heat of the day.
Dehydration	Consume plenty of water, with appropriate salt and

	sugar
Danger associated with work equipment	Wear appropriate foot wear
Danger from falling rocks	Ensure sections are inspected, and fenced off from above when working lower than surrounding land or people wear hard hat near standing walls
Danger from snakes and scorpions	Avoid shady places below which snakes and scorpions lurk. NEVER put your hands under anything you have not already inspected carefully. Similar caution is required if moving vegetation.
All team members who receive minor injuries will need first aid	First aid kit on site, in school and in vehicles
Inability to communicate well with people who speak other languages	Certain members of the team are able to act as translators if communication problems occur
British team members may be exposed to pathogens in Turkey; good health is a requisite for this field season	Team members have been advised of the vaccinations they require.
Minor cuts and major injuries	First Aid kits will be accessible to all on each vehicle or at each site where teams are working. An Accident Log Book will be kept at central base
Other incidents/accidents	An Accident Log Book will be kept at central base
Rabid animals	There is the possibility of an encounter with a rabid animal. Precautions should be taken not to touch dogs, cats and other animals. In case of an animal bite team-members should be taken asap to hospital.
Ticks	There is the possibility that team members could get a tick. Team members should avoid walking in long grass with short trousers and check their body for ticks regularly. If a tick is found on their person the team

	member should inform the project management so that they can be taken to the appropriate medical facility to have it removed and tested. Team members should not remove the ticks themselves.
Personal illness	The project management undertake to make a list of telephone numbers and make prior acquaintance of the hospital in Antalya in case of emergency. Site vehicles will be used where possible to take patient to Antalya hospital. Otherwise local transport will be used. Unwell team members will be accompanied by at least one other team member at all times. Any institutional insurances effected shall cover the costs of any necessary medical expenses and/or repatriation.
Risk of poor food hygiene	Team members will be required to help in the preparation of food for lunch on site. Hygiene must be taken seriously and hands washed thoroughly before handling food.
Risk of equipment failure	Very basic equipment will be used (30m tape measures, line-levels, hand tapes, paper and pencils) as well as sensitive equipment (Total Stations, cameras, GPS). Most team members have previous fieldwork experience. All have been given introductory skills training. Advice on safe load-bearing (bent knees, straight back) will be given verbally during heavy moving tasks.
Emergency incident management	Assuming first aider is unaffected, first aid to be administered including assessment of risks, primary health survey of casualties, first aid treatment, communication of medical requirements (via mobile telephone) and recovery of casualties. Chain of command: Dr Vandeput, Dr Jackson, Katie Green Car will be with surveyors at all times
Risk of injury for lone	There will be no lone-working. The team will be small

workers; insufficient no. of workers in proportion to size of site	and members will work closely together (within view and/or ear shot of one another).
Where: In Turkey generally	
Attack on persons or property	Crime figures are generally low in Turkey. Team members have been warned of the relative poverty and traditional values of people in parts of Turkey and the need to be circumspect and discreet regarding clothing (should be modest - especially for women), money and property. Photocopies of important documentation (passports and permits) will be stored separately from documents as a precautionary measure.
Where: On excursions	
Transport - Fuel supply; Mechanical failure of vehicles; risk of crashes	Vehicles with named drivers working on the project. The Project Managers undertake to check for general road worthiness (as far as can be ascertained by non-mechanics) in vehicles. The upkeep, including fuel consumption, of vehicles will be assured by the drivers whose livelihoods depend upon their vehicles. Drivers will be briefed upon emergency procedures and contacts in the event of serious accident. Night travel will be avoided. Whilst on excursions the vehicle will have at least one mobile phone and designated leader who will maintain contact with the director of the team in case of emergency

Potential hazards:

E = Extreme	needs immediate action
H = High	needs management attention
M = Moderate	specify management responsibility
L = Low	manage by routine procedures
N = N/A	Not Applicable

L	Unstable slopes	**M**	Dehydration	**N**	Contaminated waters
L	Falls from height	**N**	Rainfall	**L**	Aggressive animals
L	Cliffs/crevices	**N**	Severe storms	**L**	Bites (ticks, insects etc.)

L	Concealed holes	**L**	Lightning	**L**	Allergies to plants
L	Slippery surfaces	**L**	River or stream crossing	**L**	Allergies to insects
N	Soft sediments	**N**	In stream sampling	**L**	Hazardous equipment
L	Moving/falling objects	**N**	Caves/potholes		Other (specify)
N	Cold environment	**N**	Strong currents / tidal surges		

Training:

Advice on field-working will be given at the location prior to the initiation of group work

Controlling the risk:

- ✓Mobile phone
- ✓Navigation device (e.g. GPS)
- ✓Work in pairs/groups
- ✓Appropriate clothing
- ✓Protective footwear
- ✓Protective footwear
- ✓Protective footwear
- ✓Emergency details/medical form
- ✓Notify authorities
- ✓Notify land owners
- ✓Obtain local weather information
- ✓Obtain relevant contact numbers
- ✓Obtain permissions
- ✓Inoculation(s)

Accident and Emergency procedures:

In the case of an accident the first aid officers are Katie Green and Mark Jackson.
A First Aid Kit shall be provided in each vehicle, at the field site and the Accommodation base. The Project Management shall ensure that all team members are made aware of the location and contents of the First Aid Kit at each work-site. The Project shall maintain an Accident Book. All accidents shall be reported to the Project Manager and shall be recorded in the Accident Book. The Project Manager shall summarise in writing all accidents and the results of any accident investigation including the findings and proposed remedial measures. The Project Manager shall report any non-trivial accident to Prof Tim Kirk the Head of School at School of Historical Studies, Newcastle University at the earliest opportunity.

The nearest hospitals are:

A very small 'health care centre' with a doctor in Gebiz for minor health problems. This may be half an hour or longer from some of the sites in the survey area.
A large city hospital with a renowned medical faculty in Antalya. This is between 75 and 90 minutes to get to from our survey area.

An emergency is understood as an incident that injures of imperils one or more team members, with a high probability of becoming more serious if appropriate action is not taken immediately and clear-sightedly. As under the Disaster Plan (below), in the event of an emergency the most senior person present will take responsibility for managing the emergency as it develops. He/she will be responsible for communicating with the rest of the team and with the appropriate authorities.

Any person working on the project who at any time reasonably considers that they are exposed to serious, imminent and unavoidable danger shall, in the absence of any further guidance and instruction, stop work and immediately proceed to a place of safety. Such a situation shall be reported immediately to the Project Manager. In the event of the Project Manager identifying an emergency on site (examples could include a medical emergency, or a hazard being identified such as imminent collapse of a trench edge), the first priority is to remove all personnel from further danger. In a medical emergency, the person affected should be transported as swiftly as possible to an appropriate medical facility.

5.2 Emergency Contact Information

The Pisidia Survey Project in Turkey (for next of kin)

Contact the project only in cases of emergency!

Dr Lutgarde Vandeput (Director),	Mobile: ############.	Email: ##########
Dr Mark Jackson (Co-Director),	Mobile: ############.	Email: ##########
Katie Green (Survey Manager),	Mobile: ############.	Email: ##########

Newcastle University: School of Historical Studies

School administrator: Barbara Cochrane,

Telephone: ###########. To call from Turkey 0044 #########. Email: #######

Head of School: Prof Tim Kirk

Telephone: ###########. To call from Turkey 0044 ##########. Email: #######

British Institute at Ankara (in Ankara, Turkey)

Director in Turkey: Dr Lutgarde Vandeput,

Address: BIAA Office in Turkey: Tahran Caddesi 24, Kavaklidere, Ankara TR-06700

Telephone: ###########. To call from Turkey ##########.

Fax: ##########. Email: ##########.

Administrator: Gülgün Girdivan: ggirdivan@biaatr.org

Tahran Caddesi 24, Kavaklidere, Ankara TR-06700

Telephone: ##########. To call from Turkey ##########.

Fax: ##########. Email: ##########.

British Institute at Ankara (in London)

BIAA Administrator in UK: Claire McCafferty

Telephone: ##########. To call from Turkey ##########..

Fax: ##########. Email: ##########.

British Embassy, Ankara

Şehit Ersan Caddesi 46/A, Cankaya 06680, Ankara

Phone: 0090 312 455 3344. Fax: 0090 312 455 3334

Out of hours Duty Officer: 0090 532 262 7654. To call from Turkey 0532 262 7654.

British Vice-Consulate Antalya

Address: Fevzi Çakmak Caddesi, 1314 Sokak 6/8 Elif Apt., Antalya

Tel: 0090 242 244 5313. To call from Turkey 0242 244 5313. E-mail: britconant@turk.net

Summer working hours: 08:45 – 13:00, 14:00 – 17:00 Monday to Friday.

Open to public only: 09:00 – 12:00, 14:15 – 16:15 Monday to Friday.

6. Survey Guide

6.1 Fieldwork Equipment

Everyone should take into the field the following equipment:

- Passport and work permit preferably in waterproof bag.
- Backpack
- Drinking container for water
- Retractable pencil (preferably a H/2-4)
- Rubber
- Sharpie
- Pen
- Ruler
- Hand tape
- Compass
- Finds bags of various sizes
- Transect sheets
- Finds labels
- Finds bags
- Clip board
- Suntan lotion

We also recommend a **penknife** and a **camera** for general personal use.

Remember fieldwork clothing should be **light** but **robust:**

- Tough shoes or boots (trainers will disintegrate quickly);
- Long cotton trousers (jeans can be a bit tight and shorts are not suitable on site)
- Cotton shirts and T-shirts,
- Hat

6.2 Important Recording Rules

- Do not mix up pottery from different transect divisions
- Label everything correctly
- Always use the correct data codes (each person will get a laminated copy of the data code list)
- Tell team leader about any mistakes
- All date formats follow the UK system, DD/MM/YY
- All measurements use the metric system
- Team members should be referred to by their initials i.e. Katie Green = KG
- If you make a mistake do not use tippex, draw a line through the error and carry on
- All forms and records must be completed in ink pen, only use pencil for drawings
- For all bag labels use indelible ink (Sharpie)
- Place labels in bags facing outwards so they can be read

6.3 Survey Procedure

The survey procedure that will be used in Pisidia Survey Project 2011 is a well-established intensive survey technique known as transect walking. This involves dividing the landscape into survey units (roughly 300m by 100m) that will be walked across in straight transect lines by surveyors spaced 15m apart. Each transect line will be divided into 10m divisions and the pottery, finds and landscape characteristics within each transect division will be recorded on specifically designed transect sheets (see the next page).

Guidelines

1. Team arrives at survey unit
2. Team leader sets out the transect lines using GPS, takes record photographs and records any landscape features
3. Team leader provides each surveyor with a transect sheet
4. Team spreads out at 15m intervals
5. Surveyors walk in straight lines referring to compass
   - recording the number of bodysherds, tile and kiln fragments every 10m
   - recording the surface and visibility of each 10m transect division using correct terminology from list
   - collecting diagnostic sherds* from each 10m transect division, bagging and labelling them appropriately (see below)
   - reporting any small finds** found to team leader
6. At end of transect surveyors then place bags of collected pottery and finds into larger bags or crates labelled*** with the transect number
7. Team regroups and transect sheets are checked by the team leader in case of problems
8. Team returns home and finds and pottery is placed in the 'to be processed' area

*****Diagnostic pottery sherds are all rims, bases, handles and painted, decorated or otherwise unusual sherds.

******Small finds refer to all non-modern metal, glass, stone, ceramic or worked bone objects (we do not collect bone unless it is worked).

*******Labels for collection bags:

Pisidia Survey Project 2011	
Intensive Survey Collection Labels	
Survey Unit: SU_01	Date: 7/07/2011
Transect:TRANS_001 Surveyor: KG	
Transect Division:001_004	
	Bag 1 of 1

Transects

BIAA | BRITISH INSTITUTE AT ANKARA
Understanding Turkey and the Black Sea

Newcastle University

Transect:	TRANS_001			**Survey Unit:**	SU_03	**Surveyor:**	KG
Date:	__27__/_06__/2011			**Time:**	midday	**Weather:**	Dry, sunny
Transect length:	100 m	**Direction:**	N	**Start Point:**	n/a	**End Point:**	n/a

Transect Sketch: *Include landscape and architectural features, small finds and POIs*

Draw a sketch of any relevant landscape features

Transect Description: *Include landscape and architectural features, small finds, POIs and any additional comments*

Transect runs parallel to the wall of a contour terrace, the ground is even and un ploughed. Due to a cover of grass find as are hard to see along the entire length of the transect. Except for the terrace wall the transect has no architectural features within it transect but one POI 340 is located within the transect.

Photograph Numbers: Photo _0004 to 0007

Transect division	Land	Surface cover	Visibility	Small Finds	Body	Tile	Kiln	Bags
_01	T	G	1	0	1	0	0	0
_02	T	G	1	0	4	0	0	1
_03	T	G	1	0	0	0	0	0
_04	T	G	1	0	0	0	0	0
_05	T	G	1	0	0	0	0	1
_06	T	G	1	0	0	0	0	0
_07	T	G	1	0	3	0	0	0
_08	T	G	1	0	1	0	0	0
_09	T	G	1	0	0	0	0	0
_10	T	G	1	0	2	0	0	1
_11								
_12								
_13								
_14								
_15								
_16								
_17								
_18								
_19								
_20								
_21								
_22								
_23								
_24								
_25								
_26								
_27								
Totals:				*Number of Small finds* **0**	*Body* **11**	*Tile* **0**	*Kiln* **0**	*Bags* **3**

Surveyor Signature:	Harry Heiskanen	**Checked by:**	**Transect Data Inputted:**	____/___ __/2011
Team Leader Signature:	Katie Green		**TSD Data Inputted:**	____/___ __/2011

6.4 Data Codes

Each surveyor will be provided with a small laminated reference sheet with these codes.

General	
Pisidia Survey Project 2011:	PSP2011
Survey Unit:	SU_0?
Transect:	TRANS_00?
Transect Division:	000_00?
Point of Interest:	POI_00?
Photograph:	Photo_000?
Drawing:	DR_00?
Small Find:	SF_00?
Fabric:	FB_0?
Stamp code:	S_00?
Form Code:	FC_00?

Visibility	
Poor	1
Little	2
Average	3
Good	4
Excellent	5

Surface	
Grass	GR
Light Scrub	LS
Thick Scrub	TS
Cereal	CR
Low Crop	LC
Mid Crop	MP
Vine	V
Ploughed soil	PS
Turned soil	TS
Natural soil	NS
Mulch	M
Light Rocky	LR
Heavy Rocky	HR
Bare Rock	BR
Clay	C
Sand	S
Gravel	G
Other	O

Landscape Character Types	
Abandoned Contour Terraces	ACT
Abandoned Rectangular Fields	ARF
Abandoned Strip Fields	ASF
Bulldozed Land	BL
Bulldozed Terraces	BT
Cultivated Contour Terraces	CCT
Cultivated Rectangular Fields	CRF
Cultivated Strip Fields	CSF
Fruit Grove	FG
Grassland	G
Irregular Clearance Fields	ICF
Olive Grove Modern	OGM
Olives Old	OO
Plantation	P
Scrubland	S
Wasteland	W
Woodland	WD

Land			
Typography		**Environment**	
Contour Terraced	CT	Fruit Grove	FG
Bulldoze Terraced	BT	Olive Grove Young	OGY
Slope	SLP	Olive Grove Old	OGO
Steep slope	SSLP	Wooded	W
Flat	F	Forestry Plantation	FP
Uneven	U	Open ground	O
		Cultivated ground	CG

6.5 Processing Procedures

1 - Washing the Pottery

The first stage of processing is to clean the pottery and finds. In most cases this involves washing them in water. Care should be taken that they are allowed to dry properly before they are re-bagged (in the case of large fragments, the time taken can be considerable). Be very careful to avoid contamination of finds from different transect divisions. If this happens inform a team leader immediately. Any stones, rocks or non-diagnostic sherds should be put in a marked rubbish container.

2 - Sorting the Pottery

The next stage of the processing procedure is to sort the pottery from each transect division into classification types (such as cooking ware or fine ware), making sure not to mix up sherds from different transect divisions. The pottery is then sorted into form types (the specific form of vessel the sherd belongs to). We will be referring to previously published material and the forms found in past years of the Pisidia Survey Project to identify the form types. As the amount of pottery from each transact division may be quite small it is possible that the identification of the form type will be carried out along side the data input stage. Occasionally new forms and new fabric types will be found and these will be given a number from the relevant register and recorded on form and fabric record sheets.

3 - Data Input

This stage is where the details of each sherd is inputted into the Access 2007 database. This requires that the diameter and EVE of each sherd is measured using a rim chart and inputted into the database alongside the information on where the sherd was found and the sherds form and fabric. This stage is very important and it is essential that the correct information is inputted into the database.

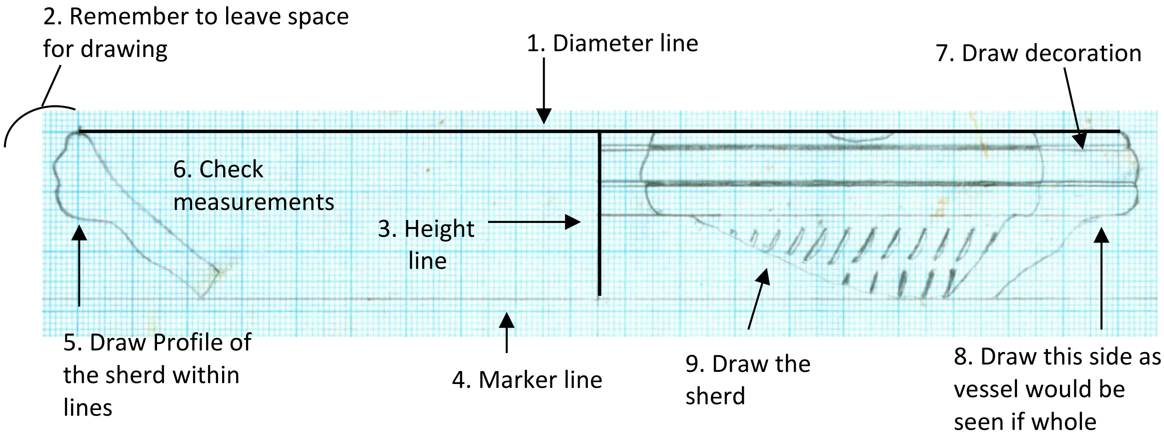
4 - Photography

All the small finds, new pottery forms and the survey transect lines will have a record photograph taken of them. Each photograph taken should be recorded in the photography register and given a number. Be generous with your photographs – even for the most insignificant feature, there should be several photos from different directions. Avoid contrasts between bright lighting and shadow as this always looks much worse in photographs than in real. If the light is not good for photography, try schedule a better time for more photographs. For small finds and pottery all pictures should betaken using a tripod and have a scale within them. Make sure that there are no people, shadows, boots, etc. in your landscape photographs.

5 - Drawing

The drawing process can be quite complicated and you will need to practice it to become efficient pottery drawers. The before beginning your drawing you must get a drawing number from the drawing register. The drawing is then labelled with the correct codes and relevant information. You can then begin drawing.

1. Measure the rim diameter of the sherd when correctly stanced (feel for the gripping point) and draw line on graph paper equating to the diameter.
2. Remember to leave enough space for your drawing.
3. Measure the height of your sherd remembering again to correctly stance it first. Then draw a line in the centre of your diameter line, to represent the height of the sherd.
4. Sketch a marker line to indicate the extent of the area your drawing will need to fit within.
5. Stand directly above the sherd and draw its profile, again making sure it is correctly stanced. Draw on whatever side is most comfortable for you and trace sherd to other side. Use stancing blocks if this helps.
6. Use callipers to check all measurements. Use profile gage to check shape but do not rely on this.
7. Draw decoration on the right-hand side of the image that can be seen on the outside of the vessel and draw on the left side any inside decoration.
8. The right side image will not show any over hangs as these would not be seen if the vessel was whole.
9. Draw the sherd shape with its decoration.



Samples

There may possibly be the need for us to export some materials to England to add to our reference collection or for scientific analysis. This requires that each sample, whether it is a pottery sherd or a clay sample, to be individually recorded in the sample register, photographed and logged into a database so that the information can be given to the Turkish authorities to arrange export. Any samples taken must be recorded in the register and labelled accordingly.

Recording Small Finds

Each small find found in during the survey will immediately be given a small find number by the team leader from the small find register, then a record photograph will be taken of it in situ. It will then be bagged with the correct labels and taken back to base to be processed. The process for recording small finds is very similar to the diagnostic pottery sherds. The finds are washed with the exception of metal objects, then each find is recorded using the special small find record sheet and this data is then inputted into a database. The small find is then drawn, photographed and added to the material that will eventually get sent to Antalya museum for storage.

Stamps

Stamps refer to the stamped images that are used to decorate pottery. When a new type of stamp decoration is found it will need to be given a new stamp code and recorded in the stamp register. This involves describing it, drawing it, photographing it and also taking a rubbing of it.

Record Registers

There will be registers for the following items;

- Survey Units
- Transects
- Photographs
- Drawings
- Small Finds
- Stamps
- Samples
- Form Codes
- Fabric Codes

For all codes or numbers, please consult the relevant register and take the next consecutive number. Do not use numbers without recording them in a register first. For example when starting a drawing you will need to take a drawing number from the register. If in doubt about whether you should be using a number, check! If you think you need more numbers for a task, then you can ask for more than one at a time.

7. Reading List

This lists the bibliography of the Pisidian survey to date, if you want to pursue in detail what has been done in previous years, but **newcomers** might want to orient themselves by reading some of the following:

- Bean, G.E. (1979) *Turkey's Southern Shore,* London: Benn.
- McDonagh, B. (1995) *Blue Guide to Turkey,* London: A & C Black.
- Akurgal, E. (1978) *Ancient Civilizations and Ruins of Turkey : From Prehistoric Times Until the End of the Roman Empire,* Istanbul: Haşet Kitabevi. A classic guide book, which is unfortunately a bit thin on our area.

There are several well illustrated books and pamphlets about Pamphylia and Pisidian sites available in the book shop of Antalya museum (including some by our surveyor Sabri Aydal).

The only substantial **classical excavation** in the region is at Sagalassos, directed by Prof. Dr. M. Waelkens since 1990. Five volumes of detailed research and excavation reports exist: *Sagalassos I to V*.

A classic **geographical study** of the region, focussing on questions of geology, settlement and transhumance is:

- de Planhol, X. (1958) *De la plaine pamphylienne aux lacs pisidiens. Nomadisme et vie pastorale,* Paris : Dépositaire Librairie Adrien-Maisonneuve.

Useful discussions of aspects of the **region's history** in various large-scale studies of Asia Minor in antiquity:

- Magie, D. (1950) *Roman Rule in Asia Minor,* Princeton: Princeton University Press.
- Jones, A.H.M. (1998) Cities of the Eastern Roman Provinces, Oxford: Clarendon.
- Mitchell, S. (1993) *Land Men and Gods, Volume. I,* Oxford: Clarendon.

Earlier work of the Pisidia Survey Project:

Annual reports can be found in *Araştırma Sonuçları Toplantısı*.

- Mitchell, S. (1991) 'The Hellenization of Pisidia', *Mediterranean Archaeology* 4: 119-145.
- Mitchell, S. (1994) 'Three Cities in Pisidia', *Anatolian Studies* 44: 129-148.
- Behrwald, R. (2003) 'Inscriptions from Pednelissos', *Anatolian Studies* 53: 117-130.
- Mitchell, S. (1998) 'The Pisidia Survey', in Matthews, R. (ed.) *Ancient Anatolia,* London: British Institute of Archaeology at Ankara: 237-253.
- Vandeput, L., Köse, V. and Aydal, S. (1999) 'The 1998 Pisidia Survey Project', *Babesch* 74: 133-145.

- Vandeput, L. and Köse, V. (2001) 'The 1999 Pisidia Survey at Melli', *Anatolian Studies* 51: 133-145.
- Vandeput, L. and Köse, V. (2002) 'Pisidia Survey Project: Melli 2000', Anatolian Studies 52: 145-152.
- Vandeput, L. (2007) 'Pisidia Survey Project 2007: a survey in the territory of Pednelissos', *Anatolian Archaeology* 13: 33-35.

Recent monographs on major **neighbouring sites**:

- Mitchell, S. (1995) *Cremna in Pisidia: an ancient city in peace and in war,* London: Duckworth, in association with The Classical Press of Wales.
- Mitchell, S. and Waelkens, M. (1998) *Pisidian Antioch: the site and its monuments,* London: Duckworth with The Classical Press of Wales.
- Vanhaverbeke, H. and Waelkens, M. (2003) *The Chora of Sagalassos: The evolution of the settlement pattern from prehistoric until recent times,* Washington: Brepols Publishers.

Pottery

- Armstrong, P. 2009 'Trade in the East Mediterranean in the Eighth Century', in M. M. Mango (ed.) *Byzantine Trade, 4th–12th centuries. The archaeology of local, regional and international exchange.* Oxford: Ashgate Publishers, 157-178.
- Fırat, N. (2000) 'So-called "Cypriot Red Slip Ware" from the habitation area of Perge (Pamphylia)', *Rei Cretariae Romanae Fautorum Acta* 36, 35-38.
- Hayes, J. W. (1972) *Late Roman Pottery*. London: British School at Rome.
- Jackson, M. and Greene, K. (2008) 'Ceramic Production' in J.P. Oleson (ed.) *The Oxford Handbook of Engineering and Technology in the Classical World*. Oxford: Oxford, 496-519.
- Poblome, J. 1999. *Sagalassos Red Slip Ware. Typology and Chronology, Studies in Eastern Mediterranean Archaeology 2*. Leuven: Brepols Publishers.
- Poblome, J., P. Degryse, D. Cottica and Fırat, N. 2001 'A new early Byzantine production centre in western Asia Minor. A petrographical and geochemical study of red slip ware from Hierapolis, Perge and Sagalassos', *Rei Cretariae Romanae Fautorum Acta* 37, 119-126.

8. Insurance Documents

Certificate of Insurance

Insured: Newcastle University (Staff and Postgraduate)

Personal Accident/ Travel Insurance Policy Number:

10-PAT-0000000467

This certificate certifies that the under mentioned Insured Person is insured subject to the terms and conditions of the above policy in respect of Medical, Surgical and other remedial attention or treatment, Hospital, Nursing Home and Ambulance charges and other emergency transport and accommodation expenses necessarily incurred within two years of and as a direct result of the Insured Person falling ill or sustaining accidental bodily injury during the journey

*In the case of emergency in the event of serious illness or injury abroad assistance **MUST** be obtained by contacting Aon Protect Assistance at any time, day or night.*
Aon Protect Assistance will decide the most appropriate course of action to help you through the emergency.
TELEPHONE: +44(0)2071737797

To ensure that these services operate smoothly when you need them most…
Telephone Aon Protect Assistance using the correct international dialling tone for the UK in the country from which you are calling.

Quote your name, the name of Newcastle University and the policy number
10-PAT-0000000467

Give details of any appropriate contacts in the UK- relative, friend etc.
Give a telephone number where you can be contacted

Insured Person(s): Any employee or post-graduate of the University
Insured Journey: Any authorised journey undertaken in connection with University business outside England, Scotland and Wales
Effective Time: From time of departure from normal place of residence or the University, whichever is last until return.

Certificate of Insurance

Insured: Newcastle University (Undergraduate)

Personal Accident/ Travel Insurance Policy Number:

10-PAT-0000000466

This certificate certifies that the under mentioned Insured Person is insured subject to the terms and conditions of the above policy in respect of Medical, Surgical and other remedial attention or treatment, Hospital, Nursing Home and Ambulance charges and other emergency transport and accommodation expenses necessarily incurred within two years of and as a direct result of the Insured Person falling ill or sustaining accidental bodily injury during the journey

*In the case of emergency in the event of serious illness or injury abroad assistance **MUST** be obtained by contacting ACE Rescue at any time, day or night.*
ACE Rescue will decide the most appropriate course of action to help you through the emergency.
TELEPHONE: +44(0)2071737797

To ensure that these services operate smoothly when you need them most…
Telephone Ace Rescue using the correct international dialling tone for the UK in the country from which you are calling.

Quote your name, the name of Newcastle University and the policy number
10-PAT-0000000466

Give details of any appropriate contacts in the UK- relative, friend etc.
Give a telephone number where you can be contacted

Insured Person(s): Any undergraduate student of the University
Insured Journey: Any authorised journey undertaken in connection with a University course outside England, Scotland and Wales
Effective Time: From time of departure from normal place of residence or the University, whichever is left last, until return.

A1.2 Completed Survey Unit Sheet Example

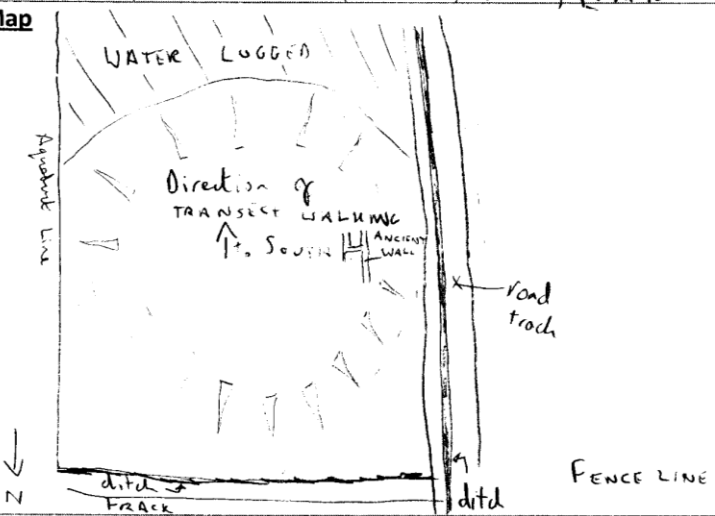
Survey Unit

BIAA | BRITISH INSTITUTE AT ANKARA
Understanding Turkey and the Black Sea

Newcastle University

Survey Unit:	02	**Survey Area Name:**	TESPILI TEPE		
Date:	30/06/2011	**Time:**	Pm	**Weather:**	Sunny
Team Leader:	MPCJ MARK + HARRY	**Team:**	MP MAIJN, SS STEPHANIE, AL AMARA, ES ERIN, AW ANDREW, KJ KRISTJAN, MPCJ MARK, HH (HARRY WITH GPS)		

Map



Map Code:	

Number of Transects:	7	**Direction:**	SSE
Small Find Numbers:		**POI Numbers:**	
Landscape Character:	U, O, LS, IR | S	**Visibility:**	2

Description:

The focus of the site is on elevated area featuring a high concentration of small rocks (up to 20cm limestone). These rocks protrude through the soil which is mostly covered in short grass and low bushes with small trees. The surrounding low-lying land is heavily irrigated today, but very wet, the water lies in pools and has marsh reeds growing in it to the south of the site. The soil appears quite clay-like. The field stones appear to represent collapsed buildings with large numbers of clay tiles visible on surface.
The site is about 80m ~~[illegible]~~ E-W and 100m N-S (oval)

Continue on back if needed

Photograph Numbers:		**Total Bags:**	23.
		Total Crates:	—
Data Inputted:	____/____/2011	**Signature:**	

A1.3 Completed Transect Sheet Example

FRONT

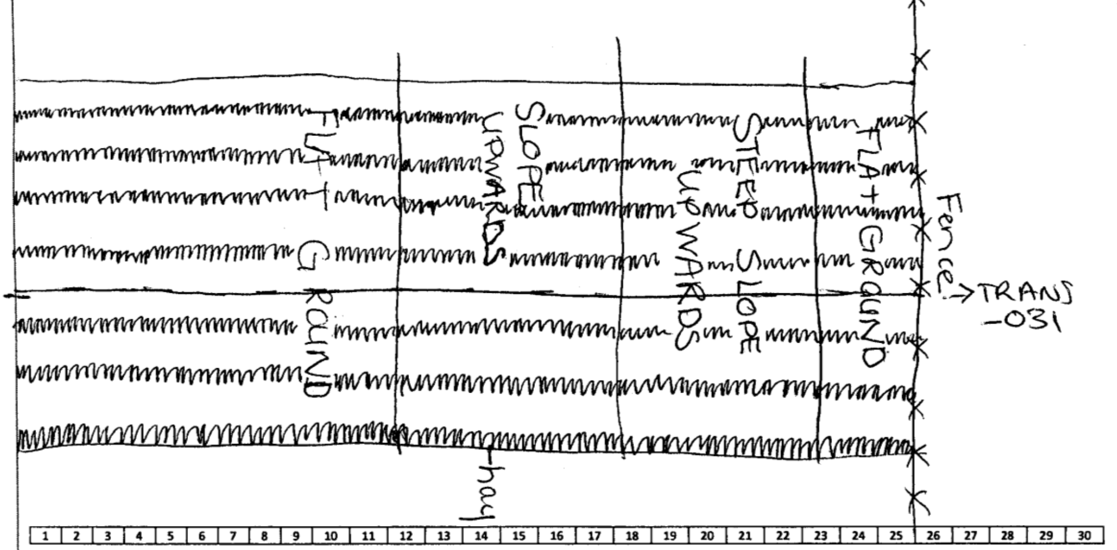
Transects

BIAA | BRITISH INSTITUTE AT ANKARA
Understanding Turkey and the Black Sea

Newcastle University

Transect:	TRANS_031	**Survey Unit:**	SU_03	**Surveyor:**	AL
Date:	01 /07/2011	**Time:**	morning	**Weather:**	dry, sunny
Transect length: 250m	**Direction:** W ~~NW~~	**Start Point:** 30.916729 37.094247		**End Point:**	30.913971 37.094938

Transect Sketch: *Include landscape and architectural features, small finds and POIs*



Transect Description: *Include landscape and architectural features, small finds, POIs and any additional comments*

Transect begins on flat cultivated ground with ploughed soil. There is hay and rocks. A slope upwards begins at TRANS_012 and becomes a steep slope upwards at TRANS-018 which continues until TRANS_023, then finishes until TRANS_025 with flat cultivated ground. The soil changes color from a dark brown to a red when the steep slope starts. The finds included body sherds, rim sherds, tile, possible stone tools. Most of these were found before the start of the slope, before TRANS-012. The transect ends at a fence which runs perpendicular to transect.

Photograph Numbers: photo_0022

BACK

Transect division	Land	Surface cover	Visibility	Small Finds	Body	Tile	Kiln	Bags
_01	FCG	PS	2	-	2	0	0	0
_02	FCG	PS	2	-	4	0	0	0
_03	FCG	PS	2	-	2	0	0	0
_04	FCG	PS	2	-	4	I	0	0
_05	FCG	PS	2	-	2	I	0	0
_06	FCG	PS	2	-	2	III	0	0
_07	FCG	PS	2	-	2	0	0	1
_08	FCG	PS	2	-	1	III	0	1
_09	FCG	PS	2	1 30.915835 / 37.094557	2	0	0	~~1~~ 2
_10	FCG	PS	2	1 - 30,915694 / 37.094551	3	I	0	1
_11	FCG	PS	2	1 - 30.915559 / 37.094587	3	II	0	1
_12	SLPCG	PS	2	-	1	II	0	0
_13	SLPCG	PS	2	-	0	0	0	0
_14	SLPCG	PS	2	-	0	0	0	0
_15	SLPCG	PS	2	-	0	III	0	0
_16	SLPCG	PS	2	-	0	0	0	0
_17	SLPCG	PS	2	-	0	0	0	1
_18	SSLPCG	PS	2	-	1	0	0	0
_19	SSLPCG	PS	2	-	0	0	0	0
_20	SSLPCG	PS	2	-	0	0	0	0
_21	SSLPCG	PS	2	-	0	0	0	0
_22	SLPCG	PS	2	-	0	0	0	0
_23	FCG	PS	2	-	0	0	0	0
_24	FCG	PS	2	-	0	0	0	0
_25	FCG	PS	2	-	0	0	0	0
_26			↑					
_27			would not ploughed soil have good visibility?					
_28								
_29								
_30								
			Totals:	*Number of Small finds* 3 dont input numbers into data base	*Body* 29	*Tile* 16	*Kiln* 0	*Bags* 7

Surveyor Signature:	[signature]	**Checked by:** KG	for small finds	**Transect Data Inputted:**	13/7/2011
Team Leader Signature:	KL Green			**TSD Data Inputted:**	13/7/2011

Appendix 2

A2.1: CD Data Guide

The accompanying CD contains the following files.

<table>
<tr><td rowspan="2">HLCs</td><td>HLC Pisidia.shp</td></tr>
<tr><td>HLC Troodos.shp</td></tr>
<tr><td rowspan="5">PISIDIA SURFACE SURVEY 2011</td><td rowspan="2">Raw</td><td>Pisidia Surface Survey 2011.shp</td></tr>
<tr><td>Pisidia Surface Survey 2011.txt</td></tr>
<tr><td rowspan="3">Access</td><td>Pisidia Surface Survey 2011.accdb</td></tr>
<tr><td>Transect Descriptions</td><td>TRANS_000.txt (file for each transect)</td></tr>
<tr><td>Transect Sketches</td><td>TRANS_000.jpg (file for each transect)</td></tr>
</table>

Table A2.1: File structure for accompanying CD.

HLC Pisidia.shp

This is a shapefile containing the data for the Pisidia HLC. This can be viewed in ArcGIS or ArcReader*.

HLC Troodos.shp

This is a shapefile containing the data for the Troodos HLC. This can be viewed in ArcGIS or ArcReader*.

Pisidia Surface Survey 2011.shp

This is a shapefile containing the data for the transect divisions of the 2011 Pisidia surface survey. This can be viewed in ArcGIS or ArcReader*.

Pisidia Surface Survey 2011.accdb

Access 2007 database file that contains the relational database for the 2011 Pisidia surface survey. This file can be viewed in Microsoft Access 2007. The following tables are included within this database.

- Diagnostic Sherds
- Survey Unit
- Transect
- Transect Division
- Teams
- Team Members
- Small Finds
- Lithics
- Sample List

The relational structure of this database can be seen in **table A2.2.** This is a reduced form of the original database for ease of reference for this thesis. The original database also included tables that linked, the form codes used by this survey to their published form names and the data codes used to their full names and descriptions. The original database also held record tables for all the survey registries, including links to photographs and diagrams, and forms designed for the input of the data by the student surveyors.

TRANS_000.txt

Each of these files contains a description of the associated transect line. Each file is linked to the Pisidia Surface Survey 2011. accdb file.

TRANS_000.jpg

Each of these files contains a sketch of the associated transect line. Each file is linked to the Pisidia Surface Survey 2011.accdb file.

*ArcReader is a free mapping application that allows users to view, explore, and print ArcGIS shapefiles. ArcReader can be downloaded from

http://www.esri.com/software/arcgis/arcreader/download

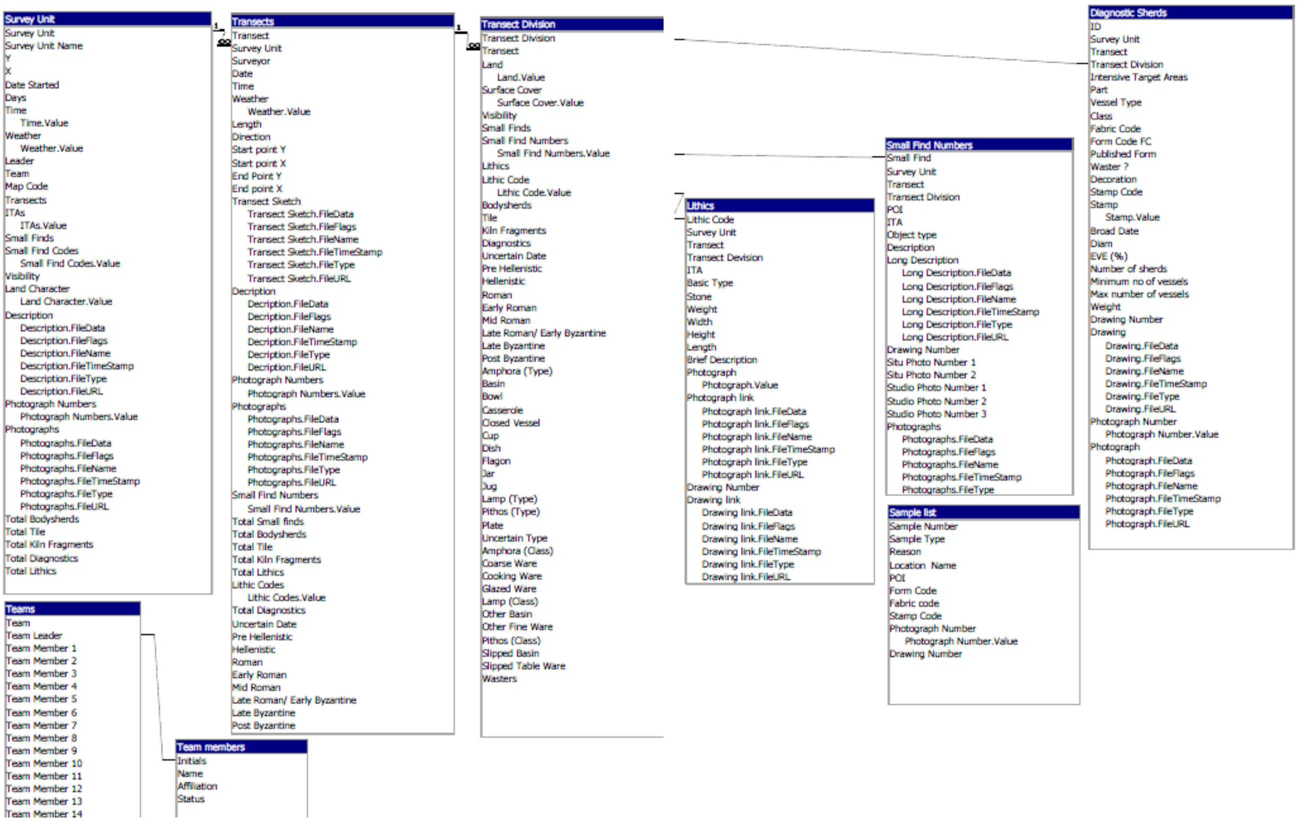


Table A2.2: Relational structure for the Pisidia surface survey database.

A2.2 Data CD

The CD below contains the data for the HLCs of the two case study areas and the data for the surface survey carried out in Pisidia.