SANCTUARY AND COMMUNITY IN THE CHORA OF METAPONTO

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Lay Abstract

This thesis investigates the nature of rural habitation and use of sacred spaces in the countryside of the Greek settlement of Metaponto. Using digital methodologies within the field of landscape archaeology and a robust database of archaeological material, routes of access are reconstructed between these rural settlements and their nearest sanctuary beyond the walls of the city proper. When visualizing these routes which have been digitally reconstructed, it becomes clear that they meaningfully interact with linear topographical anomalies identifiable in the landscape of the countryside. This provides confirmation of the use of these routes in antiquity, as well as of regular frequentation at these sacred sites. These data are then used to explore autonomy outside the city of Metaponto and to suggest that regions formed in which sacred spaces were used as points of contact among residents of the countryside, creating communities which self-managed and evolved semi-independently from the asty.

Abstract

The following thesis investigates routes of communication and connectivity within the *chora* of Metaponto. Using digital methodologies within a project Geographic Information System, Least Cost Path (LCP) is used to reconstruct ancient routes between rural farmsteads and sanctuaries. LCPs are a means of presenting lines drawn over digitized terrain in order to reconstruct the easiest route of travel between two points with respect to cost factors such as slope and distance. The results of Least Cost Path are then compared against topographical anomalies identified within the landscape of the chora, many of which confirm the likelihood that these linear anomalies were used as ancient routes of travel. A survey of ancient scholarship regarding the parceling of land in both colonial and rural contexts suggests that the lines identified in the chora and supported by this LCP analysis are evidence of rural land division, urban planning, and of ancient roads from as early as the 6th century BCE.

This evidence is used to suggest that independent communities formed within the Metapontine chora, using rural sanctuaries as locations for agglomeration in both cultic and secular contexts. The founding of these sanctuaries created spheres of influence within which a nucleated collection of inhabitants of the countryside formed. The boundaries of these rural communities are identifiable using a combination of Cost-Distance Allocation and a system of land division first proposed by Giovanni Uggeri in 1969.

This thesis concludes that communities formed within the chora of Metaponto, exercising self-governance in local affairs related to life in the countryside. Identities within

these communities were of a composite nature, at once both members of a polis and of a unique regional community centered upon their nearest extra-urban sanctuary. Residents of the chora used these sacred spaces as the symbolic capitol of their neighbourhood and the sanctuaries themselves communicated the limits of Metapontine influence and protection.

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ANSMN	American Numismatic Society Museum Notes
DEM	Digital Elevation Model
EAW	Equivalent Artifact Weight
GCP	Ground Control Point
GIS	Geographic Information System
FGrHist	Fragmente der griechischen Historiker
FMCE	Final Multiple Criteria Evaluation
ICA	Institute of Classical Archaeology (University of Texas, Austin)
LCP	Least Cost Path
LGPN	Lexicon of Greek Personal Names
LiDAR	Light Detection and Ranging
NASA	National Aeronautics and Space Administration
NDVI	Normalized Difference Vegetation Index
SIG	Sylloge Inscriptionum Graecarum
SILC	Sensor Information Laboratory Corporation
SRTM	Shuttle Radar Topography Mission

Declaration of Academic Achievement

The author declares that this thesis and its associated research has been completed by Christine Davidson and recognizes the contributions of supervisory committee members Dr. Spencer Pope, Dr. Martin Beckmann, and Dr. Sean Corner throughout the process of researching and writing this work.

Introduction

The following dissertation investigates the Greek settlement of Metaponto as evidence towards understanding archaic state formation and localism in the Greek countryside. Following an exploration of scholarship which addresses state formation more generally, an investigation of Metaponto will be conducted in 3 key areas: firstly, a brief chronological review of ancient scholarship is conducted in which evidence of Greek settlement along the Ionian coast as well as colonial urban planning are investigated. Secondly, this work catalogues extra-urban farmsteads and sanctuaries discovered through excavation and survey located within the ancient Metapontine countryside and maps these in relation to linear topographical anomalies discovered using aerial photography in the 1950s. Combining the locations of these sites with those of the linear anomalies, digital tools are used within a Geographic Information System (primarily a tool called Least Cost Path) to trace ancient movement in the countryside. Thirdly and finally, the results of this analysis are used to suggest the existence of and tentative locations/bounds for rural communities in the countryside of Metaponto.

Ultimately, I prove that rural communities formed outside of the asty of Metaponto and that these communities functioned semi-autonomously from the city proper. These communities used sanctuaries within the landscape of the countryside as points of contact and agglomeration, granting sacred spaces a civic function in the development of these areas. Using evidence gathered via aerial photography and through physical exploration of

these landscapes, we can loosely trace the most likely areas of influence for extra-urban sanctuaries and thereby locate the geographical extent of these rural communities.

Chapter 1 focuses on the scholarship of the Greek polis (beginning primarily with Max Weber and Moses Finley, among others). It becomes evident that dating the advent of the concept of *'polis'* is difficult, if not impossible. Instead, a number of qualities are investigated with respect to state 'membership' as a flexible concept. These include military service, land ownership, and participation in cult. Ancient attitudes towards community and citizenship are explored, particularly in rural contexts. From this survey I conclude that village clusters may have formed and functioned semi-autonomously in Greek countrysides both in mainland Greece and in the West, and that their residents shared complex identities related to polis and rural community.

In Chapter 2, I begin with a survey of settlement along the Ionian coast. A dearth of literary references to these events leaves us with scant evidence for the foundation of these city-states and for interaction with each other and indigenous Italians. Understanding the political and geographical environment in which these states developed, however, is crucial to our understanding of ancient urbanism at Metaponto. Included here are all references to the city's foundation in ancient sources as well as contemporary reference to land division. In addition to providing context for the discussion of the development of the asty and chora, this will also prove to be a useful catalogue for others wishing to consult ancient sources which interact with settlement foundation and early urban policy.

The chapter continues with a discussion of ancient urbanism in the context of Magna Graecia. Close attention is paid to the process of land division in areas within and surrounding western city-states. This will inform a later analysis of land division within the chora of Metaponto. Also provided here is a brief summary of archaeological activity in the region of Basilicata (the modern Italian region in which Metaponto resides), and of the Metaponto Archaeological Project. This includes a description of the project Geographic Information System, a database that is used extensively in Chapter 3. Topographical anomalies (referred to as "division lines") are also introduced here, which were identified by the Institute for Classical Archaeology (University of Texas at Austin) from aerial images taken in the 1950s. These represent crucial pieces of evidence for conclusions regarding land division in the chora and the development of nucleated communities outside the city.

Chapter 3 begins with a review of recent applications of GIS in the analysis of ancient networks. Several aspects of these methodologies are adopted in this study, especially with regards to hydrography and paleogeomorphology. The parameters for this study are then explained, including the sites selected for analysis, and current data regarding survey and excavation at these sites. The advantages of the elevation data used in this study are briefly discussed (an important aspect when conducting an analysis of travel – it requires more energy to walk up or down a hill than across a flat surface) and the Cost Distance Analysis tool which utilizes these elevation data is introduced.

The largest portion of this chapter is dedicated to an explanation of Least Cost Path; a tool which digitally reconstructs the path of least resistance across dynamic terrain. This

tool is used to propose ancient routes of travel between rural farmsteads and sanctuaries in the chora of Metaponto. These paths frequently align with the 'division lines' proposed by both the Institute of Classical Archaeology (University of Texas, Austin) and Giovanni Uggeri in 1969. Each segment of a Least Cost Path which interacts with these divisions in the chora is assessed in detail, then summarized. A statistical analysis of the results is performed using a Monte Carlo simulation, resulting in confirmation that there is <1% chance that the LCP interaction with the division lines is a result of chance.

In Chapter 4, rural community formation in the Greek world is surveyed in order to best interpret the results of the previous chapter, particularly in the areas of southern Italy. This includes an investigation into the function of a rural sanctuary, its potential secular and socio-political use, and the likelihood that a rural sanctuary could serve as a site of agglomeration in a nucleated extra-mural community. Comparanda from studies conducted within the same region (Basilicata/Apulia) are considered and it is concluded that there is a wealth of evidence for rural community development centered upon sacred space.

Finally, this analysis of rural community formation is combined with the data from Chapter 3, and sub-regions of the Metapontine chora are suggested, based on an influencing sanctuary. This project then concludes with a summary of results and proposes that Metaponto did indeed have a thriving extra-urban landscape full of socially nucleated and semi-autonomous communities – communities which can be located on a map.

Chapter 1: State Formation

In the following chapter, I will examine the state of scholarship with respect to Greek state formation, paying particular attention to attempts to codify state development in both colonial and mainland contexts. Through this review of recent literature, it will become clear that, paradoxically, the countryside (chora) represents a core component of urban development. A reliance on the hinterland results in a polity that extends beyond the center of urban activity (the asty) and permanent residents of this space exhibit characteristics of a polity, despite their relative distance from a nucleated asty. The nature of these polities, as I shall argue is the case for Metaponto in later chapters, amounts to semi-autonomous village clusters which share identities founded in the polis and in their localized community.

1.1 Evolution of Scholarship, Defining and Dating the *Polis*

The topic of the *polis* enters scholarly discourse in approximately 1845 when, echoing the concerns of K. F. Hermann and B. J. Niebuhr, E. Kühn finds the German *Stadtstaat* an unsatisfactory term for ancient Greek polities.[1] Subsequently J. Burckhardt publishes *Griechische Kulturgeschichte* in 1898, marking the beginning of the use of polis as the preferred nomenclature for Greek city-states among German scholars.[2] Current

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[1] Sakellariou 1989, 20.
[2] Sakellariou 1989, 20; Davies 1997, 13.

discussions involving the formation of Greek city-states are therefore founded upon publications from the late 19th century and upon the substantial contributions of later scholars such as Max Weber, Victor Ehrenberg, Karl Polyani, Moses Finley, Ian Morris and Mogens Hansen, as well as the multiple serial publications produced by the Copenhagen Polis Center.[3] Among these discourses are attempts to classify and define accurately the use of terminology from both modern and antique sources. The terms polis, city, city-state, micro-state, tribe, *genos, phratry*, *koine, ethne,* and *demos/damos* each communicate a nuanced facet of socio-political community, yet with considerable and consistent overlap among sources.[4] Davies, for example, finds the term 'micro-state' to be the most all-encompassing and preferable when generalizing the development of these institutions.[5] Foxhall, on the other hand, chooses to remove herself from the typologizing of these early settlements, citing such discussion as, "unhelpful for understanding early Greece."[6] Should we take a 'Webarian' approach to defining the Greek polis as a 'city' or even 'city-state', we would describe it as an institution which includes self-containedness, a significant population (of several thousand), differentiation in society and workforce, an 'urban life-style,' and nucleation within an expansive hinterland, to paraphrase both Davies (1991) and Kolb (1984).[7] This is a restrictive list of qualifications, however, and removes the nuance necessary to identify these ancient polities in context. These assumed

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[3] Weber 1909; Ehrenberg 1937; Polanyi 1944; Finley 1983; 1999; Morris 2000; Hansen and Nielson 2004. Copenhagen Polis Center, *Inventory of Archaic and Classical Poleis*.
[4] Davies 1997; Hansen and Nielsen 2004. Herodotus, for example, refers to Anthela as both a 'polis' (7.176.2) and a *kome* (7.200.2). For the problematic use of 'tribe' and *genos* see Bourriot Félix 1976; Roussel 1976; Davies 1997, 13.
[5] Davies 1997, 14.
[6] Foxhall 1997, 61.
[7] Kolb 1984, 20; Davies 1997, 15.

characteristics are also regularly consolidated among qualities such as clear systems of hierarchy, government, legislative processes, and urban planning, to list but a few. While Robin Osborne turns focus towards the countryside of the state, Hans Beck prefers a person-focused translation of 'citizen-state', marginalizing the physical requisites of a polis.[8] Perhaps it is better to take a more ambiguous approach to the definition of an ancient 'city,' reminiscent of anthropologists George Cowgill and Arjan Zuiderhoek, who identify it as the kind of phenomenon that one knows when one sees it.[9] The best method of classification in my view lies between these two extremes. On the topic of Metaponto, for example, few would argue that it does not fulfil many of the requirements of a Greek polis, yet the settlement, like many *apoikiai*, experiences a thoroughly different evolution than the pattern experienced by cities of the Greek mainland. This dissertation will thus use the following qualities in its definition of a 'polis': an autonomous community established with a nucleated center of urban activity, and which is set within a contiguous landscape. Members of this polis demonstrate numerous qualities of unified ethnic expression, both archaeologically and in the literary tradition of the city. In the following pages, the development of Metaponto will be compared against patterns witnessed elsewhere in the Mediterranean (primary in areas of Southern Italy, Athens, and the northern Peloponnese) in an effort to demonstrate best the selection of these criteria, understanding that these are wholly dependent on the unique context of one site in particular.

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[8] Osborne 1987; Beck 2013, 4; 2020, 71. c.f. Hansen 1998, Hanson 1995, 3: "…the proper framework of the entire historical discussion of both the genesis and the decline of the Greek *polis* must lie in the realm of agriculture."
[9] Cowgill 2003, 1; Zuiderhoek 2016, 4.

A universal date for the development of the Greek polis is not possible. In fact, de Polignac suggests a shift from discussions of the 'birth of a city' and instead would prefer scholarship which tracks stages of 'transition,' wherein a city becomes more defined and 'adult' in its institutions.[10] While Ehrenberg initially argues for the first instances of a Greek polis in the 7th and 6th centuries BCE, this chronology is shifted further into the Iron Age in subsequent scholarship, and again as far as the Bronze Age in the last decade.[11] Beginning in the 1990's, advisories against the dating of the polis entirely have since been adopted by most discussants. Parker rather aptly warns, "…any attempt to treat the 'birth of the polis' as a dateable occurrence is in danger of compacting a long history into too short a space."[12] Thus, it does not seem productive to argue for a particular period in which the Greek polis emerged. Instead, through the careful examination of a community in context, in this case that of Metaponto, we can endeavor to trace its development through direct connection to ancestral tradition including that of its 'homeland' in the northern Peloponnese. It will become clear that Metaponto likely met many of these qualifications for polis at its outset, in a unique position to establish an expansive and intentional cityscape when its colonists first established roots in the 8th century BCE.

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[10] de Polignac 1994, 18.
[11] Ehrenberg 1937; Scully 1994; Seaford 1994, 1–10; Davis 2021.
[12] Parker 1996, 21.

1.2 Class, Status, Order

Class, status, and order are frequently identified as features of any complex society, each to varying degrees yet with relative salience throughout. While class represents a socio-economic position with respect to production, status is represented in the social esteem one garners from their kinsmen. Order is the most rigid of these concepts, often defined by rights and privileges afforded to an individual though an established legal system. Since the political landscape of the Metapontine chora will be considered in some depth here and in future chapters, understanding the parameters of these features is beneficial. Moses Finley offers a survey of these three characteristics and in *The Ancient Economy*, initially published in 1973, Finley defines 'order' as, "…a juridically defined group within a population, possessing formalized privileges and disabilities in one or more fields of activity, governmental, military, legal, economic, religious, marital, and standing in a hierarchical relation to other orders."[13] Navigating the political landscape of pre-classical periods is challenging, even more so prior to the Archaic Period. Nevertheless, Manville finds limited evidence of village-level order and early dynastic hierarchies in the works of Thucydides.[14] Here, independent villages of Attika seem accountable to a local monarch, perhaps implying that a council of local chiefs was once present among these rural, disparate villages.[15] If so, this is one of very few examples of identifiable hierarchy (order) in the Iron Age. Application of this limited evidence to the landscape of Metaponto

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[13] Finley 1999, 45; Zurbach 2013, 620.
[14] 2.15.1.
[15] Manville 1990, 71.

is problematic, however, since we lack any literary reference to the political framework of the polis, Iron-Age or otherwise. Discussion, however, of class and status may yet be possible.

"The largest class of men live from the land and the fruits of its cultivation," Aristotle writes in the 4th century BCE.[16] Aristotle's use of *genos* here gives some indication of a group defined both by their labour (in this case agricultural) and geographic location (*apo tēs gēs*). While Aristotle writes significantly later than our period of interest, Victor Davis Hanson applies a similar interpretation of this class in the 8th century, characterizing them neither as subsistence peasants nor as privileged aristocrats: "…the new polis agriculture created a new 'class,' a middling breed rare in agricultural history."[17] A clearer understanding of this middling class at Metaponto is challenging, since this identification is far from standardized, and significant variation in forms of agrarianism in the Archaic Period is expected.[18] One cannot rely on the more plentiful characterizations of the Athenian model alone.[19] Based on Aristotle's description, however, it may be inferred that classical attitudes held the farmer class as the most valuable to polis function, and that these same attitudes may have been prevalent in earlier periods.[20] He writes,

> In all city-states, then, there are three divisions of the polis: the very rich, the very poor, and those who are in the middle (*hoi mesoi*) of the two. Because it is agreed that the moderate way (*to metrion*) or middle (*to*

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[16] *τὸ δὲ πλεῖστον γένος τῶν ἀνθρώπων ἀπὸ τῆς γῆς ζῇ καὶ τῶν ἡμέρων καρπῶν*: Aristot. *Pol.* 1.1256a39-41.
[17] Hanson 1995, 104.
[18] Hanson 1995, 105, 111.
[19] Our work is cut out for us, since the creation of a paradigm for farming life in antiquity relies heavily on the Athenian literary tradition. Hanson notes, "…nearly all Greek tragedy and comedy, as well as oratory, were produced at Athens," (1995, 128); Nevertheless, Bresson warns, "…we must not reduce the form of rural occupation to a single type," (2016, 156).
[20] Hanson 1995, 108.

meson) is best, it is clear then that it is most preferable to have the middle amount (*he mese*) of all fortunate things.

Aristot. *Pol.* 4.1295b2-6[21]

Thus, a seemingly positive status is conferred onto an agrarian class.[22] Hanson resolutely objects to a label of "peasant" for these farming classes, finding little evidence to suggest they possessed the qualities requisite for such a designation (debts, rents, lack of involvement in the markets, etc.).[23] Hanson also associates such descriptions of 'middling' members of society with a growing class of yeoman farmers in the Archaic Period and understands Solon's recognition of 4 census 'classes' in the 6th century as a response to yeoman lobbying for political incorporation.[24] For archaic Athenian society, the image emerges of a "…defined exclusivity according to agricultural production, not birth, and farming success was apparently the key to all political and military privilege."[25] Carter agrees with this interpretation and imagines a similar rural society at Metaponto that is not one of landed aristocracy, but rather an egalitarian society composed of farmsteads, not estates.[26] We may speculate, therefore, that a largely well-to-do middling class arose in the countryside at Metaponto, later seeing incorporation into the civic life of the asty and benefiting from participation in assembly and public office. As expressed here, this characterization aligns with trends contemporary elsewhere in the Greek world.

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[21] Translation provided by Hanson 1995.
[22] Aristotle later mitigates this idolization of the agrarian class, however, by criticizing their inability to engage in philosophical and political pursuits, too busy with the tasks necessary to managing their farmsteads (*Pol.* 7.1329a2).
[23] Hanson 1995, 107.
[24] Hanson 1995, 111, 125; the lowest of these classes, the *thetes*, were not afforded political office (Aristot. *Pol.* 2.1274a22)
[25] Hanson 1995, 112.
[26] Carter 1990, 430.

1.3 The Land: Ownership and Growth

It is suggested that the population of the Athenian chora was as high as 80% of the total population.[27] An understanding of perceived ownership over these landscapes promises insight with respect to political institutions during these periods. Scholars have generally settled upon an 8th-century dating for the rise of property ownership and occasionally cite Homeric attitudes towards land ownership as evidence for an even earlier date.[28] In his *Works and Days,* Hesiod certainly protests against his own perceived injustices based on disputed land-ownership. Despite Hesiod's irritation, Manville recognizes the likelihood that early property delineations were vague and somewhat changeable, dependent upon changing environmental factors within the landscape.[29] Here I propose that Metaponto (as well as several other Greek colonies) deviates from this Attik standard. As I will suggest in Chapter 3, it is likely that farming plots were clearly defined as early as the 6th century and their borders longer lasting due to the initial land division in the chora. Community formation alongside these property delineations is likely, and it is to this we turn next.

The 'Fission-Fusion Model' presented by Bintliff offers a potential explanation for the development of independent communities in the Iron Age. This model serves to describe the creation of sub-communities under semi-independent leadership, such as leading families or clans (fission) and the subsequent combining of such communities into

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[27] Gehrke 1986, 18; Beck 2020, 32.
[28] Bintliff 2014, 204.
[29] Manville 1990, 112.

larger, more vertically structured systems of power as witnessed in a town or city (fusion).[30]

Bintliff suggests that villages are predisposed to reach a peak population of approximately 150, which is reflective of the limit of face-to-face social relationships human beings are able to comfortably manage.[31] However, the number necessary for a healthy pool of marriage candidates, genetically speaking, is 500-600, necessitating marital relationships between a minimum of four settlement clusters.[32] If, as we have established, property ownership was a characteristic of these Iron-Age settlements, systems of inheritance become complex. If, however, these villages form a cluster based on shared kinship and ownership of property, perhaps this represents a small proto-polis of sorts; a community network reaches a scale at which endogamy is safely practiced, resulting in an internalized conception of socio-cultural unity, instigated by marriage and proximity.[33]

Some have also taken a 'pedestrian' approach to understanding the development of early Greek states. Approximately 15 km (or a 2-3-hour walk) is presented as the limit to a pedestrian commute.[34] Therefore it follows that any sense of nucleation has an upward radial limit of 15 km for its full territorial extent (supposing a core/periphery model). This is not to suggest that one might sketch a circle around ancient urban centers and suppose a definite halo of influence 15 km from its core. In fact, this would fail to account for

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[30] Bintliff 2014, 204; c.f. early village sites identified within Athenian demes: "Halai Aixonidai (on the coast south of Phaleron), Anagyrous (Vari, slightly east of the preceding deme), and Thorikos," Bresson 2016, 155; Andreou 1994; Nevett 2005.

[31] Bintliff 2014, 204. Here Bintliff references 150 as coinciding with the average number of Facebook 'friends' each user is likely to have. This number has since increased to nearly 400, although this friend-pool may no longer qualify under Bintliff's definition of a 'face-to-face' relationship: Brown et al. 2021.

[32] Bintliff 2014, 204.

[33] Bintliff 2014, 205. Henri Van Effenterre and Françoise Ruzé have coined the term 'pre-*politeia,*' perhaps something which deserves application here, too: Van Effenterre and Ruzé 1994, 25–8.

[34] Wilkinson 1994; Bintliff 2014, 206.

networks of 'unofficial' agglomerations which, while not declared as politically independent, would have served similar mercantile and community functions as an urban center (more on this to follow).[35] This 'Bintliff model' results in a chora of about 80-110 km^2, in addition to the size of the asty.[36] Reports from the Copenhagen Polis Center, however, suggest significant variability in size with respect to the asty and chora. A minimum of about 50 km^2 is suggested, and maximums (identified as likely statistical outliers) of 1000 km^2 or more.[37] The majority of poleis, however, (60%) fall within the range of 50-100 km^2, and another 20% between 100 and 200 km^2.[38] In addition, Hans Beck directs us towards studies using Least Cost Path (a digital reconstruction of human pathfinding; to be discussed in greater depth in Chapter 3) which suggest that, while these longer 15-km commutes were certainly possible, the highest density of farmsteads can typically be found within a 1.5-hour commute, amounting to approximately 5 km.[39] Thus densities of population in the chora should be considered when exploring territorial organization.

While these approaches may be applicable within mainland contexts which often conformed to a familiar 'hub-and-spoke' model, much of this requires further consideration in colonial contexts. The models above presume a gradual development of settlement characteristics, while most Greek colonies in the western Mediterranean can pinpoint a precise beginning to their community founding; its *ktisis*. Concerns related to property

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[35] Bintliff 2014, 206.
[36] Beck 2020, 32.
[37] Beck 2020, 32.
[38] Beck 2020, 32.
[39] Bintliff 2006; McHugh 2017, 99–131; Beck 2020.

ownership could be anticipated and dynastic inheritance of land established from the outset, leading to an initial process of land distribution. An interpretive framework borrowed from Plato's *Laws* may even provide a theoretical treatise on the foundation of city-states, including the distribution of property.[40] Here Plato proposes an egalitarian division of the land, presumably into a gridded system of plots. This idealistic representation of an initial distribution of land does not conform, however, to the evidence. Metaponto, along with Chersonesos, appear as outliers in the establishment of division. As will be examined in more depth in the following chapter, the Korkyra Melaina is likewise of note in providing epigraphic evidence for land distribution related to foundation.[41] Keeping within the context of apoikiai, the *Gamoroi* of Syracuse were those who 'own a share of land,' which is understood to mean that these individuals represent the descendants of those initially granted property at the foundation of the colony.[42] A bronze plaque recovered in the area of Naupaktos may also allude to land distribution in the area of Ozolian Locris, set aside for colonists.[43] This type of distribution also finds precedent in earlier periods, including that of the Mycenaeans in the 13-12th centuries BCE.[44]

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[40] c.f. Asheri 1966; *τίς οὖν δὴ τρόπος ἂν εἴη τῆς ὀρθῆς διανομῆς; πρῶτον μὲν τὸν αὐτῶν ὄγκον τοῦ ἀριθμοῦ δεῖ τάξασθαι, πόσον εἶναι χρεών: μετὰ δὲ τοῦτο τὴν διανομὴν τῶν πολιτῶν, καθ' ὁπόσα μέρη πλήθει καὶ ὁπηλίκα διαιρετέον αὐτούς, ἀνομολογητέον: ἐπὶ δὲ ταῦτα τήν τε γῆν καὶ τὰς οἰκήσεις ὅτι μάλιστα ἴσας ἐπινεμητέον. / What, then, would be a plan for a proper distribution? First it is necessary to determine what their number should be: after this, the distribution of citizens, and how many and how large the portions ought to be divided. The land and houses should then be distributed as equally as possible to these subdivisions* (Plato *Laws* 737c; translations are by author unless stated otherwise).
[41] Lombardo 1993. SIG³ 141.
[42] Zurbach 2013, 650.
[43] *Nomima* I, no. 44; Duplouy 2018, 19.
[44] Zurbach 2008.

1.4 Citizenship

The admission of foreigner specialists (e.g. doctors, scribes) among the citizenry of several city-states at the end of the Archaic Period included a clear entitlement to land within state territory, suggesting that land may well have been a requirement for citizenship as early as the Archaic Period.[45] In instances of exile, as is the case Phocaeans reported by Herodotus and the Athenians by Thucydides, the loss of land was mourned in tandem with the loss of citizenship.[46] In the 5th century BCE, Dionysius is reported to have been granted a number of citizen privileges by the city of Gortyn, which included a house and a plot of land.[47] Likewise, Deucalion was granted land in Pisa by the city of Elis and thus made a citizen.[48] Thus is it suggested that belonging to the state was a product of land ownership, or vice-versa.

This concept of community membership was felt as early as the Bronze Age, and while Aristotle offers us the most 'neat' definition of a 'citizen' in the classical period, belonging and accountability to the state is found long before this.[49] There do not exist contemporary accounts from the 'Age of Lawgivers,' during which time Lycurgus, Solon, Zaleucus and many others established constitutional procedures. Materially speaking, even

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[45] Pečírka 1966, 148–9; van Effenterre 1979; Duplouy 2018, 18. A doctor made citizen: IG^2 373.
[46] Herod. 1.165.3; Thuc. 2.16.2.
[47] *Nomima* I, no.8.
[48] *Nomima* I. no. 21.
[49] Arist. *Pol.* 3.1274b; Manville 1990, 8, 94; Herodotus is our earliest source for the use of the word *politeia*, although he does not offer a definition of the term: Herod. 9.34.1; Duplouy 2018, 1. Van Effenterre equates the Linear B *ereutero* with the Athenian use of the word *eleutheros*, or 'free man,' arguing for a translation of "'he who owes nothing to anyone'…Freedom remained the primary quality of a citizen," Effenterre 1985, 155.; Morris warns against the supposed longevity of such an interpretation, since the understanding of vocabulary can and certainly did change over the course of as many as 8 centuries: Morris 2000, 101.

our earliest epigraphic evidence for citizenship (which itself is non-direct, requiring interpretation from privileges denied to non-members of the state) dates to the early 5th century BCE.[50] In reviewing references to potential 'citizenship' in the literature of the Greeks, it becomes difficult to identify a single word which represents the 'truest' or most ubiquitous understanding of community membership (examples include *koinonia, politeia,* and *metechein tes politeias*).[51] Aristotle's use of *metechein* and *politeia*, Alain Duplouy suggests, is rooted in the distinctly Classical conceptions of philosophy and political thought.[52] Aristotle takes great care in identifying the methods by which a state is governed, describing how these systems can change the very meaning of a 'citizen.'[53] For the most part, concepts of citizenship are expressed through opposition, usually towards foreigners (*xenoi*), and through descriptions of rights and privileges *not* afforded to these individuals. Ian Morris simplifies this dichotomy by highlighting opposition between the *agathoi* and the *kakoi* in burial customs of the mid-8th century BCE. Morris concludes that citizenship is evident in the practice of formal burials, a rite non-citizens would not have enjoyed: "…formal burial within spatially defined cemeteries was considered a primary symbol of the social group monopolising full membership of the community, through lineal descent from the dead."[54]

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[50] Effenterre 1985.
[51] Ehrenberg 1937. Josine Blok would also have us add *astoi* and *ethnika* to this list: Blok and Krul 2017, 146–86.
[52] Duplouy 2018, 1,3.
[53] Arist. *Pol.* 1274b-1275a.
[54] Morris 1989, 9.

Among the residents of the Mediterranean landscape, the Greeks approached concepts of citizenship quite differently than their Latin-speaking neighbours, evidenced in the traditions associated with foundation and founders which finds far less focus in the development of Roman cities. Greek cities trace foundation to heroic founders (e.g. Theseus at Athens or Lamis at Megara Hyblaia) who embody the beginning to the city itself and create the structural framing for all aspects of the city's political, religious, and judicial institutions.[55] The city is established, and those who belong to this new community are considered members politically. Thus, ancestry plays a significant role, indicating descent from the first settlers of the city.[56] This is evident linguistically as well, in the evolution of *polites* from the word *polis*; the former is derivative of the latter. In comparison, the Latin *civitas* is derivative of *civis*, suggesting that a citizen creates a city, contrary to the Greek tradition of a city creating its citizens.[57] Muddying the waters, however, are contradictory statements from authors like Thucydides, who suggests ἄνδρες γὰρ πόλις, καὶ οὐ τείχη οὐδὲ νῆες ἀνδρῶν κεναί / 'men make the city, not their walls and ships,' (7.77.7). Thus, scholars like Duplouy have settled upon an understanding of archaic citizenship not as a membership but rather as participation, or something which exists only when members are involving themselves in all facets of life in the state, be it political,

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[55] Duplouy 2018, 2.

[56] Transmission of citizenship was *ius sanguinis*: Duplouy 2018, 8.

[57] Benveniste 1969; Duplouy 2018, 2. Van Effenterre and Ruzé applies their term 'pre-*politeia*' to these cities without citizens: "Ce que nous appelons pré-*politeia* n'est aucunement un statut précis qui aurait précédé la citoyenneté classique. C'est, sur un siècle et demi, du VIIᵉ au Vᵉ siècle, la confluence d'efforts dispersés qui permettent de dégager peu à peu le rapport fondamental entre l'homme et la cité." / "What we call a pre-*politeia* is in no way a precise status which would have preceded Classical citizenship. It is, over a century and a half, from the 7ᵗʰ to the 5ᵗʰ century, the confluence of dispersed efforts which make it possible to gradually identify the fundamental relationship between man and the city," Van Effenterre and Ruzé 1994, 28.

religious, economic, or otherwise.[58] As he succinctly concludes, "…there was no classical citizenship before the classical period!"[59]

Both Aristotle and Xenophon refer to the *hoi mesoi*, self-sufficient farmers who may or may not possess membership of the state.[60] Their participation in a political system is not clearly defined, yet it is this class who may best represent the archaic Greek inhabitants of the Metapontine countryside. A pattern has emerged in the characterization of this particular class in which these self-sufficient farmers, having proven their worth militarily, are granted rights of the state by existing aristocratic members.[61] Aristotle, in his reconstruction of citizen histories, claims that it was first a class of soldiers who formed a post-monarchic constitution among the Greeks and the *Athenian Constitution* confirms that, at the time of Drako, citizenship was bestowed upon those bearing arms.[62] These soldier-farmers may represent a 'middling class,' a topic to which poets of the 6th and later centuries are drawn.[63] It may even be possible that there existed a system of economy-based citizenship, in which a middling farming class was admitted as member of the state only once they have proven possession of adequate funds, evidenced through the purchasing of

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[58] Duplouy 2018, 3.
[59] Duplouy 2018, 13.
[60] Morris 2000, 161.
[61] Morris cites, for example, the rights afforded to Athenian rowers following the battle of Salamis, who gained access to offices of the demos officially under the reforms of Ephialtes in 461 BCE: Morris 2000, 161–2.
[62] Arist. *Pol*. 4.1297b; *Ath. Pol.* 4.2.
[63] Pindar, *Nemean* 11.47-8; *Isthmian* 6.66-72; 1.49; *Paean* 1.2-5; 4.32-53; Baccylides, Ode 1.168-171; Morris 2000, 187.

hoplite panoply.[64] In such a system, defense of the state, therefore, would have been a central concern for the polity at large, enough so to render it a prerequisite to membership.

Communities defined by physical proximity are evident in the emergence of *phylai* (groups of *oikoi*) as early as the 11th century BCE.[65] 4 Attik phylai are known: Geleontes, Hopletes, Argadeis, and Aigikoreis, each of which likely was ruled by a *phylobasileus*.[66] Similarly, Athenian citizenship appears to have had an intimate relationship with the composition of *phratriai*, which Manville defines as "…associations of oikoi that shared common cults…and publicly recognized births, marriages, and adoptions of their members."[67] Evidence from Drakonic law suggest that every Athenian citizen of the 7th century belonged to a phratry.[68] Additionally, the phratry of Dekeleia recorded localized worship at shrines of Zeus Phratrios and Athena Phratria, highlighting the relationship between community and cult.[69] Phratries therefore are a likely development of the Iron Age, beginning as small neighbourhood communities sharing in cult, proximity, and marital bonds.[70] Other identifications of early communities include *syssitoi* (members of which ate together), *homotaphoi* (groups who buried their dead together), *orgeones* (hereditary organizations united in hero worship), *thiasoi* (cult organizations with overlap among phratries and *gene*), and *trittys* (religious units which occasionally joined *phyle* in

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[64] Bravo 1996, 537; Duplouy 2018, 31.
[65] Manville 1990, 60.
[66] Manville 1990, 59.
[67] Manville 1990, 60.
[68] *IG* i² 11-2 ; Manville 1990, 62.
[69] *IG* ii² 1237.
[70] Manville 1990, 63-64.

sacrifice).[71] It is the role of cult in community formation and citizenship, however, that is of particular interest in this study.

François de Polignac, cited frequently throughout the following chapters, produced his seminal work, *La Naissance de la Citè Grecque: Cultes, espace et société, VIIIe-VIIe siècles avant J.-C,* in 1984. It has become foundational in studies which explore settlement patterns of archaic Greece, especially with respect to the role of sanctuaries in the development of the ancient Greek state and to defining what constitutes a polis. De Polignac paints an image of extra-urban sanctuaries (a term he uses interchangeably with 'rural' sanctuaries: more on these distinctions in Chapter 4) as visual definitions of the territorial extent of the polis. He also concludes that these places likely represented spaces for the significant political, commercial, and familial exchange, including between Greeks and non-Greeks.[72] Ultimately de Polignac suggests the establishment of a 'bi-polar' model among Greek states, in which the urban and extra-urban sanctuaries function in tandem and with equivalent significance to the polity and its people. De Polignac concedes, however, that Athens and Sparta prove exceptions to this rule, having developed slowly over time through *synoikismos*, and that this model is best observed among the comparatively quickly developed settlements of the Greek West in the 8th and 7th centuries BCE.[73] These conclusions have hugely influenced scholarship of state development and cultic space over

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[71] Manville 1990, 63-64.
[72] de Polignac 1984; Pedley 2005, 53.
[73] de Polignac 1984; Pedley 2005, 54–5.

the last 40 years, and indicate the importance of sanctuaries in the formation of communities, large and small.

Hero cults, procession, and border sanctuaries each represent a facet of state religion which unifies the urban and rural territories. De Polignac proposes a direct link between religion and early citizenship, writing, "Participation in religious rituals guaranteed a mutual recognition of statuses and set the seal upon membership of the society, thereby defining an early form of citizenship."[74] Common sanctuaries shared by both urban and rural residents of the polis served as an equalizer in the two very different lifestyles of the state. At the same time, sanctuaries outside of the city center, often amounting to little more than non-monumentalized shrines and springs, offered a similar sense of belonging on a smaller scale, serving more localized communities in the chora. It is towards these small communities that we now turn.

1.5 Characterizing Life in the Archaic Countryside

The poet Hesiod represents our only first-hand account from a self-proclaimed farmer of the Archaic Period. His farm (and the ancient site of Ascra) has been located on the slopes of Mount Helikon.[75] In his treatise, framed as a guide to farming and critique of

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[74] de Polignac 1995, 153.
[75] Snodgrass 1985, 88-95; Hanson 1995, 90; While it is not confirmed that Hesiod actually lived on his farm, Hanson holds the belief that an isolated residence can be inferred from the *Works and Days*. Archaeological evidence in the area identified as Ascra also suggests permanent farmsteads (Handon 1995, 97-98).; We may also infer from Thucydides' passing comment regarding the difficulties Athenian farmers

various civic institutions (mainly the courts), Hesiod refers to his fellow agriculturalists and neighbours as *geitones*. The use of this word has a longstanding history in poetry, which may explain his usage here, although its repeated use suggests it is of some moral value to Hesiod.[76] The word may even be rooted in the land itself, having *ge* as its root.[77] This would suggest an inherent connection between the oikos and the land which it inhabits, and Victor Davis Hanson suggests that this connection between oikos and *kleros* ('plot') is an evolutionary characteristic of the polis-period.[78] The desire to characterize the archaic farmer's relationship with his neighbours has drawn many scholars to the *Works and Days,* a text in which Hesiod portrays relationships resulting from proximity in the chora as, at once, tenuous, significant, and reciprocal in nature. While Hesiod suggests that one must, "play fair with your neighbour and pay him back with fairness – or better if you are able, and if you ever have need again, you will find him always there," (*WD* 350-351) he also illustrates an air of competition: "…the potter is at odds with the potter, and the craftsman with the craftsman, and the beggar is jealous of the beggar, and the singer of the singer," (*WD* 25-26). Hesiod suggests that a farmer ought to marry a woman of the countryside, "…who lives nearby," (*WD* 700) and avoid socializing in the city (one should, "pass by the blacksmith's shop and its crowded lounge" [*WD* 493]). One should invite neighbours over for dinner (*WD* 342) but be wary of the competition they pose with respect to wealth and

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faced during the Peloponnesian War , having been made to leave the farms on which they'd "always lived," that permanent residency in the Athenian chora was common. (2.24).

[76] Semonides 7.110; Alcaeus 123; Anacreon 354; Pindar, *Nemean* 67.87-9. Regarding the repeated use of *geitones* in both Hesiod and Pindar's works: Uhlig 2021.

[77] Beck 2020, 24.

[78] Hanson 1995, 40.

property maintenance (*WD* 20-24).[79] Suffice it to say, Hesiod's opinions of his agrarian neighbours are mixed, and one wonders if this is reflective of a generalized model of rural communities or of Hesiod's unique dissatisfaction with the status quo.

Anthony Edwards interprets Hesiod's relationship with his neighbours as one of polite distance, in which one might request favours in extenuating circumstances but, for the most part, one in which oikoi remained self-sufficient and *philoi* were held in esteem over *geitones*.[80] While communal feasting in the chora is attested by both Hesiod and within the 4th-century works of Theophrastus, Edwards proposes that such gatherings would have been founded upon a clear expectation of repayment for the hosting of such events.[81] Edwards suggests, "In Hesiod's village one cannot expect help from neighbors outside of preexisting, voluntarily established relationships of balanced reciprocity," (Edwards 2004, 97). Even if these rigid expectations are well-attested (and Edwards would surely argue they are), expectation of repayment, in my view, does not impede community involvement. That one would host dinner for their neighbours and expect that each attendee offer the same in future seems quite a collaborative, unifying expectation. Edwards also highlights a self-sufficiency in the chorai of the Greeks, in which each oikos takes responsibility for its own survival.[82] I would qualify this further, since again this does not necessarily preclude community collaboration altogether (nor do I believe Edwards is suggesting such

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[79] For similar sentiments see Dem. 53.4-5; Ar. *Plut.* 223-225; Plut. *Mor*. Fr. 50.
[80] Edwards 2004, 94-99.
[81] Hes. *WD* 342; Theoph. *Char.* 10.11; Edwards 2004, 94.
[82] Edwards 2004, 88-89.

a binary concept).[83] Instead, this may mimic many modern tendencies to separate subsistence from community involvement - the middle class rarely relies on the generosity of neighbours to feed their families, but for issues of a more communal nature, the situation is quite different.

Concerns that are regional in nature were almost certainly managed at a localized level, without necessitating oversight by a distant institution (e.g. *ekklesia*) of the asty. Rural subsistence and basic specialization (including the crafts of wood, ceramic, and metal-working) fell under the purview of rural communities among whom the needs of the countryside-dwellers were most familiar.[84] Prosopographical analysis of the Athenian chora for the 4th century BCE suggests decreasing involvement in urban ekklesia as distance from the city increased.[85] From this we can infer two things: 1) a level of voluntary involvement in urban assembly, and 2) an increased need for localized decision-making as distance from the asty increased. In fact, Plato provides a concise and useful list of disputes which appear perfectly suited to being handled at a local level, including: boundaries, carelessness in fire-starting, planting too close to property lines, matters of irrigation and water supply, flood control, theft of fruit, trespassing, and injury of property.[86] This is not to suggest that Greek farmers were completely withdrawn from civic institutions in the city, as Mogens Herman Hansen has proven was almost certainly untrue (travelling several

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[83] "While the relationship between neighbors is, as I will continue to argue, limited, it remains the main form of association outside of household and familial connection," (Edwards 2004, 90).
[84] Bintliff 2014, 205.
[85] Manville 1990, 17-18.
[86] Plat. *Laws* 8.842E-846D; For example, "*μὴ κινείτω γῆς ὅρια μηδεὶς μήτε οἰκείου πολίτου γείτονος, μήτε ὁμοτέρμονος ἐπ' ἐσχατιᾶς κεκτημένος ἄλλῳ ξένῳ γειτονῶν, νομίσας τὸ…*"/"No man shall move boundary-marks of land, whether they be those of a neighbor who is a native citizen or those of a foreigner…" (Plat. *Laws* 8.842E).

hours a day to reach the city was not an imposition to rural labourers, and Hansen suggests that financial compensation may have enticed distant farmers to attend much meetings).[87] Nevertheless, and as Victor Magagna has proposed, there may have existed a level of mutual responsibility among members of rural communities.[88] While perhaps a stretch (and one which Edwards finds too reaching), Magagna imagines participation in communal labour during periods of increased need in agricultural cycles.[89] Without speculating beyond reason, I suggest that localized assembly was present and that the nature of such meetings resulted in various degrees of regional collaboration, if not sentimental then at least utilitarian.

Spaces for such localized decision-making may have replicated aspects of urban assembly (e.g. the *agora*) while serving multiple functions. Chapter 4 (Section 4.2), for example, explores the civic uses of cultic space in the chora. Stephen Miller has no qualms identifying such spaces as agorai despite their non-urban contexts: "I suggest, then, that even in antiquity assemblies took place- and I do not mean legislative bodies but informal gatherings at the end of the day - or during the day for the lazy ne'er-do-wells - in small communities which lacked an agora, and which were never considered to be a *polis*."[90] While this topic will be explored in more depth later, especially in the context of the Metapontine sanctuaries of the chora, Philip Manville provides a useful summary of this concept, present even as early as the 9th century BCE:

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[87] Hansen 1983; Hansen 1987.
[88] Magagna 1991.
[89] Magagna 1991; Edwards 2005, 81, 124.
[90] Miller 1995, 222.

> In an age of limited mobility and agricultural livelihood, family and land were closely connected. The names and the territories associated with the various nuclei suggest that they were rooted in a specific area, often around a local cult, and doubtless within reach of family fields.
>
> (Manville 1990, 66).

The independent nature of such communities is supported by studies conducted upon archaic topographies in the rural districts of Locri and Rhegion (specifically that of the Umbro House) where there is little evidence that these rural settlements of southern Italy would require supply from a nearby city center (i.e. even materials that could feasibly be 'mass produced,' such as tile and amphorae, were produced locally).[91] There is a distinct lack of evidence indicative of specialization beyond what is witnessed locally: no furniture fittings, decorative ceramics, or biological remains suggestive of non-local foodstuffs were located in the area of the Umbro House.[92] It is likely that, rather than relying on supply from a comparatively distant asty, inhabitants of the chora instead proved self-sufficient, even producing surplus which might be sold at the city agora when desired.

Nucleated settlement has been suggested in the Metapontine chora (while not abundantly visible in the archaeological record, since we are only rarely able to identify domestic structures themselves in the absence of stone foundations) by Joseph Carter and Alberto Prieto.[93] These 'established clusters' fall in the areas of Giardetto, Avinella, Venella, and Lago del Lupo.[94] Comparanda may be found in the area of Bova Marina in southern Calabria, in which, on a plateau overlooking the modern village of Mazza, the

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[91] Foxhall and Yoon 2016, 437.
[92] Foxhall and Yoon 2016, 437.
[93] Carter 2011a, 700.
[94] Carter 2011a, 700.

presence of Rhegian coins (ca. 5th c. BCE) indicate participation in a communal village economy in the countryside of ancient Locri.[95] While, for the most part, the degree to which these villages engaged with nearby poleis is unclear, the presence of coinage suggests some level of interaction with these urban markets, and may indicate more localized trade as well.[96] Nevertheless, assemblages such as that of the Umbro House, likewise situated in the Greek landscape of southern Italy, indicate a focus on village relationships more so than those with the distant city-center.[97] Lin Foxhall recognizes remarkable similarity between the assemblages in rural Calabria and those of the Metapontine chora, strengthening any comparisons to be made here.[98]

It is important to note, diachronically speaking, the variable nature of these rural sites. Over the course of even a single generation, areas could change in their primary land use.[99] Foxhall comments on this unique variability as evidence for the prioritization of rural community relationships:

> These volatile, fragmented, comparatively small-scale patterns and configurations of activity support the view that the rural territories of many, possibly most, ancient Greek communities were exploited in small spatial units which could quite rapidly change in function, change hands, or go in and out of use. This further supports the argument that household and community relationships were performed across rural landscapes as much as in a village center.
>
> (Foxhall 2020, 18)

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[95] Foxhall and Yoon 2016, 435; Foxhall 2020, 14–5. The Locrians did not develop their own coinage until much later, therefore the presence of Rhegian coinage in its place is not suprising.
[96] Foxhall 2020, 19.
[97] Foxhall 2020, 19.
[98] Foxhall and Yoon 2016, 438.
[99] Foxhall 2020, 18.

Metaponto therefore, with many clusters of habitation in its chora, may have hosted a number of rural communities which functioned as villages. It stands to reason that the focal point for these loosely aligned settlements, and therefore a likely candidate for local agglomeration, would be any nearby space which was shared, similar to an urban agora. In the absence of such a space, those which were shared through cultic practice become a natural substitute.

1.6 Conclusions

From the survey conducted here it is clear that it is impossible to assign a precise date to the origin of the polis, and to state formation more broadly. The criteria for membership in poleis was irregular and may have included, in varying doses, participation in political office, military service, ownership of land, displays of wealth, and participation in cult activities. The prioritization of relationships within a localized community did not preclude membership in a larger polis structure. We can infer that, regardless of distance, so long as one's property fell within the bounds of the polis, the farmer and his oikos maintained some level of political attachment to the city-center, to varying degrees. It was possible for one to belong to a village community cluster exhibiting signs of localized governance and still be considered a member of the polis at large.[100] The control of these

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[100] "Presumably [the Attic individual] developed a sense of belonging on many levels: broadly to a *phylē,* locally to a *phratriai,* perhaps to a *genos,* perhaps also to the *orgeōnes* of his valley or other cult group located a few miles from his village or farm. Worship of common gods, friendship, and kinship would help solidify his sense of place, but regional custom would also affect and shape the meaning of his various memberships," (Manville 1990, 66).

rural settlements on behalf of an urbanized center, and their sovereignty in general, appears to have been undefined and variable. Thus, we might characterize the many village clusters witnessed in the chorai of Greek city-states on the mainland and in the West as being semi-autonomous, yet retaining the identity shared between urban and rural residents. Hanson summarizes these concepts as follows:

> For the next four centuries (700-300 B.C.) these farmers, or *geôrgoi*, revolutionized the economic and cultural life of their fellow Greeks, and left as their legacy the ideas that small, family-centered production on family property was the most efficient and desirable economic system; that the farmers' creed of equality could be successfully superimposed on the entire community, urban and rural; that groups of like-minded people could band together in novel, self-sufficient communities to ensure their personal liberty and equality; and that the civilian could dictate every aspect of defense preparedness, collectively deciding when and when not to make war.
>
> <div align="right">(Hanson 1995, 4)</div>

The following chapters will investigate the chora of Metaponto and reveal that anomalies within the topography of the countryside provide further clarity towards the nature of rural settlements. By treating rural and extra-urban sanctuaries as foci of interaction between members of communities outside the asty, it is possible to trace to locations and extent of a number of sub-communities. This, provided in addition to insight regarding shared and unique identities between the asty and the chora, suggests a complimentary model to that of the city-state, one which features further subdivision than previous studies have suggested.

Chapter 2: The Chora of Metaponto

2.1 Colonial Settlement

Figure 1: Ancient Greek colonies and their dialect groupings in southern Italy (Woodard 2008, 51).

The advent of Greeks in Italy began with the first permanent settlement of Chalkidians and Eretrians on Ischia, with the founding of Pithekoussai.[101] A boom in the settlement of the southern coast of Italy is evident in the late 8th century, beginning with the foundations of Rhegion and Crotone (Figure 1). Table 7 (Appendix C: Western Greek Settlement Data) lists principle colonial foundations in the West, including approximate foundation dates, ethnic origins, proposed oikists ('founders'), and sources relating to their foundation. Most relevant to this study are the foundations of Sybaris (late 8th century BCE), Taranto (Taras, 706 BCE), and Siris (690-60 BCE). It is estimated that 8% of all Greek poleis acted as metropolis to a colonial foundation in antiquity, both a product and catalyst of increased connectedness in the 8th-century Greek Mediterranean.[102]

While the archaeological evidence suggests a clear Greek foundation of the 7th century BCE, literary traditions complicate our understanding of the city's founding. In terms of human activity prior to Greek arrival, evidence in the area of Metaponto is present as early as the Neolithic period. Mycenaean pottery recovered in the area of Scanzano Jonico suggests an early Bronze-Age (13-12th c. BCE) relationship between Italiot inhabitants and the Greek East.[103] On a hill-top plateau south of the Basento river, a village formed at the site of Incoronata, ethnically Oenotrian (a name assigned to the Italiots of the southern coast by the Greeks). The 'mass migration' of Greeks towards southern Italy presented the Oenotrians with groups of 'numerically inconsistent' colonists who were

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[101] Mertens 2006, 36. Osborne disagrees and suggests that Pithekoussai cannot be afforded "full colonial honours" due to the disparate provenance of its ceramic material (Osborne 1998, 258).
[102] Malkin 2011; Ober et al. 2014; Ober 2015, 21–44; Beck 2020, 4, 6.
[103] Adamesteanu and Vatin 1976, 113; De Siena 1996; Mertens 2006, 46.

unfamiliar with both the territory and the means by which to found a city.[104] Current excavation at Incoronata greca invites the possibility of early and symbiotic Greek-Oenotrian interactions at this site prior to the official founding the Greek settlement, perhaps as a means of alleviating Greek lack of familiarity with the region.[105] Sometime after 650 BCE, Achaians settled the new city of Metaponto, 8 km east of Incoronata. This is the dating for colonial foundation accepted by the majority of discussants. The Achaians likely responded to a request from Sybaris, whose people recognized the growing power of Laconian Taranto and sought to buffer its influence.[106] Despite the narrative suggested by excavated materials, literary evidence indicates an unlikely date of foundation far earlier in 773.[107] Although there are a number of contradictory myths regarding its foundation, Metaponto was an Achaian settlement, evidenced by inscriptions including those on its 7th-century walls which use the Achaian alphabet.[108] The city quickly developed a distinct layout – a network of orthogonal streets (for which evidence can be found dating to 550 BCE in the form of the orientation of the temples in the urban sanctuary) which divided the asty into sacred, public, and private spaces. Around the same time (6th c. BCE), the Metapontines erected a temple to Hera (the 'Tavole Palatine') along the Bradano river.

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[104] Altomare 2022, 235.
[105] See the Metaponto Archaeological Project, McMaster University and St. Mary's University: https://www.metaponto.center/ . Discussed further in 4.3 Indigeneity in the Metapontino.
[106] Antiochus, FGrHist 555 F12; Adamesteanu and Vatin 1976, 113.
[107] de Polignac 1995; Mertens 2006, 46; on unlikely dating from Strabo: Shipley 2005, 343; on a dating of ca. 690-80 as a sub-colony of Sybaris: Petropoulos 2015, 116–7; the definition of the term ἀποικία remains the topic of contestation including the appropriate English translation and the use of ἄποικοι vs. ἔποικοι to distinguish between generations of settlers (Greco 2006, 169; Wilson 2006, 29).
[108] Dubois 2002, 81–133.

The city flourished in subsequent centuries, in large part due to its swathes of fertile land extending several kilometers from the coast. The coinage of Metaponto emphasizes its most profitable industry; barley featured on the reverse of the vast majority of coinage produced by the Metapontines. The city became a natural port-of-call for ships passing from the Greek East towards Sicily, as evidenced in the account of Timoleon's voyage in 344 BCE.[109] The Corinthian, selected as commander in Syracuse, makes his way to Sicily as an auspicious comet flies over his ships:[110]

> διόπερ ὁ Τιμολέων καὶ οἱ συμπλέοντες περιχαρεῖς ἦσαν, ὡς τῶν θεῶν συνεργουσῶν αὐτοῖς. τὴν δ' ἀρίστην τῶν νεῶν καθιερώσας ταῖς θεαῖς ὁ Τιμολέων ὠνόμασεν αὐτὴν Δήμητρος καὶ Κόρης ἱεράν.
> καταπλεύσαντος δὲ τοῦ στόλου χωρὶς κινδύνων εἰς Μεταπόντιον τῆς Ἰταλίας ἐπικατέπλευσε Καρχηδονία τριήρης ἔχουσα πρεσβευτὰς Καρχηδονίους. οὗτοι δ' ἐντυχόντες τῷ Τιμολέοντι διεμαρτύραντο μὴ κατάρχειν πολέμου μηδ' ἐπιβαίνειν τῇ Σικελίᾳ. ὁ δὲ Τιμολέων, ἐπικαλουμένων αὐτὸν τῶν Ῥηγίνων καὶ συμμαχήσειν ἐπαγγελλομένων, ἐξέπλευσεν εὐθέως ἐκ τοῦ Μεταποντίου σπεύδων φθάσαι τὴν περὶ αὐτὸν φήμην· σφόδρα γὰρ εὐλαβεῖτο μήποτε Καρχηδόνιοι θαλασσοκρατοῦντες κωλύσωσιν αὐτὸν εἰς Σικελίαν διαπλεῦσαι. οὗτος μὲν οὖν κατὰ σπουδὴν ἐτέλει τὸν εἰς Ῥήγιον πλοῦν.
>
> Wherefore Timoleon and his companions were delighted, since the goddesses [Demeter and Persephone] were giving them support. Timoleon dedicated the best of his ships to the goddesses, calling it "The Sacred Ship of Demeter and Persephone."
> And they put in at Metapontum in Italy, apart from any dangers, as did a Carthaginian trireme bearing Carthaginian ambassadors. Meeting with Timoleon, they earnestly begged him not to start a war or even to set foot in Sicily. But Timoleon, with the people of Rhegion summoning him and promising alliance, quickly put out from Metapontum hoping to outstrip the report of his coming. Since the Carthaginians controlled the seas, he was wary that they would prevent his sailing across to Sicily. Thus he was quickly completing his passage to Rhegion.
>   (Diod. 16.66.5-7)[111]

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[109] Dating based on the archonship of Eubulus, Diod.16.66.1.
[110] It had been prophesized by the priestesses of Corinth that Demeter and Persephone would accompany Timoleon on this journey.
[111] Unless otherwise indicated, translations are by author.

It is apparent that Metaponto functioned as an integral part of Mediterranean transport along this thoroughfare of the Ionian Sea.

The name 'Metaponto' has been a continuing topic of discussion, with evidence suggesting the etymology does not refer to the two rivers (Basento and Bradano) between which the Greeks settled, but rather *Metabos*, the indigenous name for the area existing prior to colonization.[112] Alternatively, this may instead be the name of a local hero, appropriated by the Greeks for the purposes of naming the settlement.[113] Our clearest literary source concerning Metaponto's early foundation is provided by Strabo (6.1.15) who records a number of details including the city's distance from Herakleia (140 stadia), its fortune gained through rich agricultural industry (*γεωργία*), and a dubious oikist in the form of Nestor and his Pylians returning from Troy:

> Πυλίων δὲ λέγεται κτίσμα τῶν ἐξ Ἰλίου πλευσάντων μετὰ Νέστορος, οὓς οὕτως ἀπὸ γεωργίας εὐτυχῆσαί φασιν ὥστε θέρος χρυσοῦν ἐν Δελφοῖς ἀναθεῖναι.

> And [Metapontum] is said to have been founded by the Pylians sailing from Troy with Nestor, who they say were so prosperous with respect to farming that they dedicated a golden crop at Delphi.

Strabo also indicates that Metaponto represented a frontier between Italiots and Iapygians, something which is confirmed by the evidence of Iapygians in the 8th century at Incoronata and San Teodoro.[114] He reinforces this heroic foundation myth of the Pylians in 5.2.5:

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[112] De Juliis 2001, 13.
[113] De Siena 2007, 14.
[114] Adamesteanu and Vatin 1976, 113.

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ἡ δὲ Πῖσα κτίσμα μέν ἐστι τῶν ἐν Πελοποννήσῳ Πισατῶν, οἳ μετὰ Νέστορος ἐπὶ Ἴλιον στρατεύσαντες κατὰ τὸν ἀνάπλουν ἐπλανήθησαν, οἱ μὲν εἰς τὸ Μεταπόντιον οἱ δ᾽ εἰς τὴν Πισᾶτιν, ἅπαντες Πύλιοι καλούμενοι.

Pisa was founded by the Pisatai of the Peloponnese, who journeyed with Nestor to the expedition against Troy, but upon their return strayed from their course, some to Metaponto, others to the Pisatis, all were called called Pylians.

Alternatively, Dionysius of Halicarnassus, writing in the 1st c. BCE, suggests that the area was first settled by the Spartan Leucippus, who acquired the land via clever wordplay:

Λευκίππῳ τῷ Λακεδαιμονίῳ πυνθανομένῳ, ὅπου πεπρωμένον αὐτῷ εἴη κατοικεῖν καὶ τοῖς περὶ αὐτόν, ἔχρησεν ὁ θεὸς πλεῖν μὲν εἰς Ἰταλίαν, γῆν δὲ οἰκίζειν, εἰς ἣν ἂν καταχθέντες ἡμέραν καὶ νύκτα μείνωσι: καταχθέντος δὲ τοῦ στόλου περὶ Καλλίπολιν ἐπίνειόν τι τῶν Ταραντίνων ἀγασθεὶς τοῦ χωρίου τὴν φύσιν ὁ Λεύκιππος πείθει Ταραντίνους συγχωρῆσαί σφισιν ἡμέραν αὐτόθι καὶ νύκτα ἐναυλίσασθαι. ὡς δὲ πλείους ἡμέραι διῆλθον, ἀξιούντων αὐτοὺς ἀπιέναι τῶν Ταραντίνων οὐ προσεῖχεν αὐτοῖς τὸν νοῦν ὁ Λεύκιππος, παρ᾽ ἐκείνων εἰληφέναι λέγων τὴν γῆν καθ᾽ ὁμολογίας εἰς ἡμέραν καὶ νύκτα: ἕως δ᾽ ἂν ᾖ τούτων θάτερον, οὐ μεθήσεσθαι τῆς γῆς. μαθόντες δὴ παρακεκρουσμένους ἑαυτοὺς οἱ Ταραντῖνοι συγχωροῦσιν αὐτοῖς μένειν.

When Leucippus the Lacedaemonian inquired where it was commanded that he and his comrades settle, the god commanded them to sail to Italy and settle in that land where, after landing, they should stay a day and a night. The expedition landed near Kallipolis, a seaport of the Tarentines; and Leucippus, adoring the nature of the land, persuaded the Tarentines to grant them permission to take up quarters there for a day and a night. When several days had passed and the Tarentines expected them to depart, Leucippus paid no heed to them, claiming that he had taken possession of the land under an agreement for day and night; and so long as there should be either of these he would not give up the land. So the Tarentines, understanding that they had been tricked, granted them permission to remain.

(Dionys. Hal. 19.3.1-2)

This account appears in the context of Dionysius' narrative of the Roman wars against Pyrrhus, during a period in which the Tarantines stood in opposition to Rome, which had been advancing its territory southward into the Greek colonies of the coast. Taranto invited Pyhrrus to its city, so that he might aid Taras and '*τοῖς ἄλλοις Ἰταλιώταις*'- 'other Italiots' (19.9.1; presumably this included Metaponto). The settlement founded (or perhaps more accurately re-founded) by Leucippus, while not mentioned by name, can be none other than Metaponto since the foundation of Taranto itself immediately precedes this passage, wherein Dionysius claims that Spartans (specifically the Partheniae, men born during the Messenian wars) received an oracle from Delphi instructing them to settle along the river Taras (19.1.2-4).[115]

A third founder is proposed by Aristotle, who instead suggests that the famous manufacturer of the wooden horse (Epeius) that breached the walls of Troy dedicated his tools to Athena at or near Metaponto:

> Περὶ δὲ τὴν Ἰταλίαν τὴν καλουμένην Γαργαρίαν, ἐγγὺς Μεταποντίου, Ἀθηνᾶς ἱερὸν εἶναί φασιν Ἑλληνίας, ἔνθα τὰ τοῦ Ἐπειοῦ λέγουσιν ἀνακεῖσθαι ὄργανα, ἃ εἰς τὸν δούρειον ἵππον ἐποίησεν, ἐκείνου τὴν ἐπωνυμίαν ἐπιθέντος. φανταζομένην γὰρ αὐτῷ τὴν Ἀθηνᾶν κατὰ τὸν ὕπνον ἀξιοῦν ἀναθεῖναι τὰ ὄργανα, καὶ διὰ τοῦτο βραδυτέρας τυγχάνοντα τῆς ἀναγωγῆς εἰλεῖσθαι ἐν τῷ τόπῳ, μὴ δυνάμενον ἐκπλεῦσαι· ὅθεν Ἑλληνίας Ἀθηνᾶς τὸ ἱερὸν προσαγορεύεσθαι.

> In Italy in the place called Gargaria, near Metapontum, they say that there is a temple of the Hellene Athena, where they say the tools of Epeius are dedicated, which he made for the purposes of the wooden horse, giving her this name. For they say that Athena appeared to him in a dream and demanded that he dedicate the tools to her, and that, having delayed his setting out on this account, he was cooped up in the

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[115] These accounts of foundation and re-foundation are dubious in nature. No evidence, literary or otherwise, compliments the idea of a 're-founding' of Metaponto. Nevertheless, multiple contradictory accounts claim a unique origin for the establishment of the city.

place and not able to set out; whence the temple was named for Hellene Athena.

<div align="right">(Arist. Mir. 108)</div>

Thucydides provides useful information regarding Metaponto's involvement in wider policy and trade in the Mediterranean. During the Sicilian expedition of Athens, Nicias sends for reinforcements, faced with formidable forces at Syracuse. The *strategoi* Demosthenes and Eurymedon are dispatched and make landfall at various ports of the Ionian coast on their way to Sicily. This includes Metaponto, where they bolster their forces with allies:

> καὶ ὁρμηθέντες αὐτόθεν κατίσχουσιν ἐς τὰς Χοιράδας νήσους Ἰαπυγίας, καὶ ἀκοντιστάς τέ τινας τῶν Ἰαπύγων πεντήκοντα καὶ ἑκατὸν τοῦ Μεσσαπίου ἔθνους ἀναβιβάζονται ἐπὶ τὰς ναῦς, καὶ τῷ Ἄρτᾳ, ὅσπερ καὶ τοὺς ἀκοντιστὰς δυνάστης ὢν παρέσχετο αὐτοῖς, ἀνανεωσάμενοί τινα παλαιὰν φιλίαν ἀφικνοῦνται ἐς Μεταπόντιον τῆς Ἰταλίας. καὶ τοὺς Μεταποντίους πείσαντες κατὰ τὸ ξυμμαχικὸν ἀκοντιστάς τε ξυμπέμπειν τριακοσίους καὶ τριήρεις δύο καὶ ἀναλαβόντες ταῦτα παρέπλευσαν ἐς Θουρίαν. καὶ καταλαμβάνουσι νεωστὶ στάσει τοὺς τῶν Ἀθηναίων ἐναντίους ἐκπεπτωκότας…

> And starting from there they steered to the Choirades islands of Iapygia, and they took on board the ship a hundred and fifty Iapygian javelin-throwers of the Messapian tribe, and after renewing an old friendship with Artas the leader, who had provided them with the javelin-throwers, arrived at Metaponto in Italy. Here they persuaded their allies the Metapontines, to provide and send with them three hundred javelin-throwers and two galleys, and having taken these up they sailed through to Thurii. And they found them recently having become hostile towards Athens, expelled by sedition…

<div align="right">(Thuc. 7.33.4-5)[116]</div>

Thucydides indicates that this Thuriian revolution had been a key factor in this alliance. What follows are heavy losses for the Athenian forces in Sicily and Sparta's attack on

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[116] Translation of *ἐκπεπτωκότας* ('expelled') provided by Dent 1910.

Athens directly. The Athenians, now battling on two fronts, are hugely weakened. The Metapontines are mentioned again shortly after, in a list of reinforcements gathered along the Ionian coast.[117]

This amicable relationship between Metaponto and its old neighbours of mainland Greece is evident in later sources as well. Pausanias describes a dedication made at Olympia by the people of Metaponto:

> προελθόντι δὲ ὀλίγον Ζεύς ἐστι πρὸς ἀνίσχοντα τετραμμένος τὸν ἥλιον, ἀετὸν ἔχων τὸν ὄρνιθα καὶ τῇ ἑτέρᾳ τῶν χειρῶν κεραυνόν· ἐπίκειται δὲ αὐτῷ καὶ ἐπὶ τῇ κεφαλῇ στέφανος, ἄνθη τὰ ἠρινά. Μεταποντίνων δέ ἐστιν ἀνάθημα, Αἰγινήτου δὲ ἔργον Ἀριστόνου· τοῦ δὲ Ἀριστόνου τούτου διδάσκαλον, ἢ καθ᾽ ὅντινα χρόνον ἐγένετο, οὐκ ἴσμεν.

> Continuing along a little there is a Zeus turned towards the sun, holding an eagle in one hand and in the other a thunderbolt. On him spring blooms are set and crowned on his head. It is an offering of the people of Metaponto and the artist was Aristonos of Aegina, but we do not know Aristonos' teacher or in which age he lived.
> (Paus. 5.22.5)

The Metapontines evidently felt particularly tied to the cultic practices of Zeus, having dedicated a space to Zeus Agoraios/Aglaios in their own agora.[118]

The Greek poet Bacchylides (fl. 518-451 BCE) provides one of the most important pieces of literary evidence for the cultic practices of rural Metaponto. The lyric poet composed an ode to the Metapontine athlete Alexidamus after his victory in the Pylian games (dating uncertain). Alexidamus had emerged the victor in the wrestling contests and Baccylides presents his achievement alongside a re-telling of the foundation myth of

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[117] Thuc. 7.57.11.
[118] Mertens 1985, 648.

Tiryns. He describes the journey of Proetus' daughters abroad and the establishment of a cult of Artemis in Achaia which Achaian settlers would later bring to Metaponto. The ode is provided in full in Appendix D: Bacchylides' Ode 11, and the most relevant passages are as follows:

> ἔλλαθι, [βαθυ]πλοκάμου
> κούρα [Στυγὸς ὀρ]θοδίκου: σέθεν δ᾽ ἔκατι
> καὶ νῦν Μεταπόντιον εὐ-
> γυίων [κατέχ]ουσι νέων
> κῶμοί τε καὶ εὐφροσύναι θεότιμον ἄστυ:
> ὑμνεῦσι δὲ Πυθιόνικον
> παῖδα θαητὸν Φαΐσκου.
>
> Be gracious, daughter of Styx with her long hair, the upright judge. For your sake even now Metapontion, the city honored by the gods, is filled with delight and with victory processions of young men with fine limbs. They sing the praises of the Pythian victor, the marvellous son of Phaiscus.
>
> (Bacchyl. 11.113.8-14)[119]

Of greatest interest here is the mention of victory processions. In the analysis to follow, routes to sacred spaces are reconstructed using digital methodologies. While Bacchylides does not explicitly state whether these processions are inter or extra-mural, we can imagine that these or similar processions either athletic or sacred in nature could feasibly take place among the many extra-urban sanctuaries of the Metapontine chora.

Bacchylides continues,

> ἀλλ᾽ ὅτε δὴ   χραῖνόν τέ μιν αἵματι μήλων
> Λοῦσον ποτὶ καλλιρόαν πατὴρ   καὶ χοροὺς ἵσταν γυναικῶν.
> ἴκανεν,   ἔνθεν καὶ ἀρηϊφίλοις
> ἔνθεν χρόα νιψάμενος φοι-   ἄνδρεσσιν ἐς ἱπποτρόφον πόλιν
> νικο[κραδέμνοι]ο Λατοῦς   τ᾽ Ἀχαιοῖς
> κίκλ[ησκε θύγατρα] βοῶπιν,   ἔσπεο, σὺν δὲ τύχα
> χεῖρας ἀντείνων πρὸς αὐγὰς   ναίεις Μεταπόντιον, ὦ

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[119] Passages of Baccylides translated by Diana Svarlien, 1991.

ἱππώκεος ἀελίου,
τέκνα δυστάνοιο λύσσας
πάρφρονος ἐξαγαγεῖν:
θύσω δέ τοι εἴκοσι βοῦς
ἄζυγας φοινικότριχας.
τοῦ δ᾽ ἔκλυ᾽ ἀριστοπάτρα
θηροσκόπος εὐχομένου: πιθοῦσα
δ᾽ Ἥραν
παῦσεν καλυκοστεφάνους
κούρας μανιᾶν ἀθέων:
ταὶ δ᾽ αὐτίκα ϝοι τέμενος βωμόν τε
τεῦχον,

χρυσέα δέσποινα λαῶν:
ἄλσος τέ τοι ἱμερόεν
Κάσαν παρ᾽ εὔυδρον πρὸ <u>να-</u>
οῖ᾽ ἐσσαμένων, Πριάμοι᾽ ἐπεὶ
χρόνῳ
βουλαῖσι θεῶν μακάρων
πέρσαν πόλιν εὐκτιμέναν
χαλκοθωράκων μετ᾽ Ἀτρειδᾶν.
δικαίας
ὅστις ἔχει φρένας, εὑ-
ρήσει σὺν ἅπαντι χρόνῳ
μυρίας ἀλκὰς Ἀχαιῶν.

But when their father came to the beautiful stream of Lusus, he washed his skin with its water and called on Leto's daughter with her crimson headdress, the ox-eyed goddess, stretching his hands to the rays of the steed-swift sun, and asked her to deliver his children from their deranged miserable madness. "I will sacrifice to you twenty unyoked red oxen." And the huntress, whose father is the highest god, heard him praying. She persuaded Hera, and stopped the godless mania of the bud-garlanded girls. They built her a sanctuary and an altar right away, and stained it with the blood of sheep, and set up choruses of women. From there you accompanied battle-loving Achaean men to their horse-nurturing city; and with good fortune you dwell in Metapontion, golden mistress of the people. And a lovely precinct beside the fine waters of the Casas ~ their ancestors established? ~ when at last, by the counsels of the blessed gods, they sacked the well-built city of Priam together with the Atreidae with their bronze breastplates. Whoever has a just mind will find, throughout all time, countless deeds of valor done by the Achaeans.

(Bacchyl. 11.113.95-126)

Bacchylides describes the foundation of a sanctuary along the *Κάσαν παρ᾽ εὔυδρον,* "fine

waters of Casas," (119). This is generally identified as the sanctuary at San Biagio, where

a number of female votives suggest, at the very least, worship of a goddess or by women.[120]

While we are missing the completion of line 119 (bolded and underlined above), one interpretation is to read this as a form of νάσσω, 'found/settle.' This provides a useful juxtaposition with the earlier use of κατένασσε in line 41 of the ode, during a description of the establishment of an altar.[121] There is therefore a shared quality between κατένασσειν βωμὸν, 'to found an altar' (41), νάσσειν ἄλση 'to found a sanctuary' (119), and κατένασσειν in its more general usage as 'to settle.'[122] It is an etymological connection that suggests that the foundation of sacred spaces was an integral step in the process of 'settling.' It is indicative of an intimate relationship between establishing a cultic presence in the vicinity of a new living space. Bacchylides makes a connection here between the Metapontine sanctuary of San Biagio and the 'founding' of a community.

Also of note is the use of θεοδμάτους ἀγυιάς, 'god-built' streets in line 58, highlighting the importance of prioritizing streets in the foundation of Tiryns. Cairns (2005) argues that Bacchylides is here attempting to use the foundation myth of Tiryns as a means of praising the victor Alexidamus' home city as "…a divinely favoured colonial foundation" (39). The streets of a colonial settlement, then, are a divinely sanctioned component of its founding. Bacchylides does not mention the streets of Metaponto (which would have been well-established in the asty by his time), but the implication is clear:

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[120] Olbrich 1976, 398; Carter 1994, 168–9; De Siena 2001, 25–6; Carter also suggests that this may equally be identified as the sanctuary at Pantanello, perhaps with the two sanctuaries acting as compliments to one another (Carter 2018).

[121] Cairns 2005, 38.

[122] c.f. Strabo 9.2.33; c.f. Hes. *WD* 167-8: τοῖς δὲ δίχ᾽ ἀνθρώπων βίοτον καὶ ἤθε᾽ ὀπάσσας Ζεὺς Κρονίδης **κατένασσε** πατὴρ ἐς πείρατα γαίης. 'But to the others father Zeus the son of Cronos gave a living and an abode apart from men, and made them **settle** at the ends of earth.'

Tiryns was beautifully founded, with an altar and streets. Alexidamus' city of Metaponto, equally beautiful and granted divine approval through his victory in the Pythian games, likely shared the same fundamental physical qualities.

This description of a sanctuary's founding and dedication to Artemis evokes interesting connections between the goddess and the process of city foundation. Artemis is a goddess of transition, one who leads young women from the wildness of their youth into a tame stage of maturity. It is the same process for settling a colony: a taming of the wilds followed by a process of establishing a basis of order upon which the people can prosper. It is unlikely to be coincidence that Bacchylides has paired this story of Tiryn's foundation with that of a new sanctuary of Artemis in the early Metapontine chora.

The final sources in this survey of Metaponto's representation in the literature of antiquity, like Pausanias' description of dedication at Olympia, come from a later perspective following Roman conquest. Excluding the sources explored above, Metaponto's history from the 7th century to the Pyrrhic War is communicated almost exclusively through material remains. The colony is mentioned very little in literature addressing this period, and it isn't until 303 BCE, when Kleonymos (a general and member of the Spartan royalty with formidable military experience) is invited to Taranto to provide aid against enemy Lucanians, that we see Metaponto interfacing with the complex politics of southern Italy.[123] In this episode against the Lucanians, Kleonymos provokes a double attack against Metaponto of both Lucanian and Laconian forces (at least 5,000 strong, according to Diodorus Siculus), forcing the Metapontines into surrender. The Metapontines

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[123] Diod. 20.104.1-4.

are then forced to pay a tribute of 600 silver talents and 200 young women to the Spartan forces. Given the large number of troops landing on the Ionian Coast, it is somewhat surprising that Metaponto did not follow suit with the majority of Greek colonies and declare an alliance with the Laconians. Instead they remain undeclared, eventually paying a hefty penalty for this independence. This suggests that the Metapontines felt prosperous and secure enough (having established an alliance[s] with other military powers – perhaps even the Romans) to refuse Kleonymos.[124] The price paid of 600 talents suggests that Metaponto was a very prosperous city. Its function as a well-frequented port along the Ionian coast in addition to its rich agriculture evidently afforded the state with a great deal of wealth. It was also populous enough to support the export of 200 marriable women. This refusal is also indicative of a long-standing aversion to cooperation with Taras. Established as a city to stand in direct opposition to Taras and the Iapygians, it would appear that the Metapontines maintained this border (physically and politically) well into the 4th century.

At this stage of Metaponto's history, we reach the account provided by Dionysius of Halicarnassus and the report of the Pyrrhic War (280-275 BCE), addressed above.[125] The result of the Pyrrhic War was the same for all Greek colonies along the Ionian coast: Roman control of their territories. This did not, however, quell the desire the resist the Romans indefinitely. The Punic Wars and the arrival of Hannibal offered the Greeks of southern Italy an opportunity to reclaim their independence. Along with Taranto and many others,

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[124] Mitchell 1969, 66.
[125] Dionys. Hal. 19.3.1-2; c.f. Plut., *Pyrrh.* 16.3; for emphasis on significance of Tarantine alliance in the march to the Roman capitol: Plut., *Pyrrh* 17.5.

Metaponto was quick to seize the opportunity to oppose their oppressors and joined

Hannibal's campaign against the Romans:

> itaque Metapontini extemplo metu quo tenebantur liberati ad
> Hannibalem defecere. hoc idem eadem ora maris et Thurini fecerunt.
> movit eos non Tarentinorum magis defectio Metapontinorumque,
> quibus indidem ex Achaia oriundi etiam cognatione iuncti erant, quam
> ira in Romanos propter obsides nuper interfectos.

> And thus the Metapontines, relieved from fear by the departure of the
> Romans, promptly defected to Hannibal. The people of Thurii, on the
> same part of the coast, did this too. Not only in part did the defection
> move them, of the Tarantines and Metapontines, to whom they were
> even joined in blood, sprung from the same place of Achaia, but it was
> due as much to their anger towards the Romans on account of the
> recent slaughter of their hostages.
>
> (Liv. 25.15.6-7)

Unsuccessful in their bid for independence, Metaponto declined rapidly following

the Punic Wars. This is evidenced in the archaeological record, in which Greek material

native to southern Italy and materials of non-Roman influence gradually vanish throughout

the 3rd and 2nd centuries. Survey data (as discussed below) also confirms this decline, with

very few new farmsteads, sanctuaries, or necropoleis developing during this period. By the

1st c. BCE, much like all other non-Roman ethnic groups, the Metapontine identity is no

longer identifiable in the archaeological or literary record. Only the Latinized name of the

city of Metapontum remained.

2.2 Land Division

One of the traditional aspects of a Greek colonial foundation (*ktisis*) was the

dasmos, the 'dividing' or 'parceling' of territory for the purposes of land distribution to

heads of households among the first generation of an apoikia.[126] Urban planning was familiar enough to composers of the Archaic period to feature explicitly in the *Odyssey* no less than three times. In a passage familiar to those exploring the origins of Greek urbanism, Nausithous settles Scheria, taking great care to ensure the city first has, in order, a wall, houses, temples, and divided ploughlands:

> ἔνθεν ἀναστήσας ἄγε Ναυσίθοος θεοειδής,
> εἷσεν δὲ Σχερίῃ, ἑκὰς ἀνδρῶν ἀλφηστάων,
> ἀμφὶ δὲ τεῖχος ἔλασσε πόλει, καὶ ἐδείματο οἴκους,
> καὶ νηοὺς ποίησε θεῶν, καὶ ἐδάσσατ᾽ ἀρούρας.

> From thence Nausithous, the godlike, had removed them, and led and
> settled them in Scheria far from men that live by toil. About the city
> he had drawn a wall, he had built houses and made temples for the
> gods, and divided the ploughlands.
> (Od. 6.8-11)

Later Nausicaä describes the approach to her father's city of the Phaeacians – tilled fields between which they must walk to reach the city wall, and symmetrical harbours on either side of the great gate.[127] After this, through contrast, the land of the lawless and uncivilized Cyclopes is characterized by what it lacks: ploughed fields, places of assembly, houses, and a developed harbour.[128] What is emphasized in these passages are the key ingredients in the development of a city: a city wall, extramural ploughlands, houses, and sanctuaries.

Likewise, the portioning of land features in Aristophanes' *Clouds*, suggested as the purpose of geometry (as even its etymology suggests), and *Birds*, where Meton (the

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[126] Carter 2011b, 616.
[127] Od. 6.255-69.
[128] Od. 9.105-40.

astronomer) describes the creation of his 'star-city', parcelling the land into lots

differentiated by use.[129] Here Meton presents Pisthetairos with this plan for the division of

a new asty:

> Μέτων:
> ὀρθῷ μετρήσω κανόνι προστιθείς, ἵνα
> ὁ κύκλος γένηται σοι τετράγωνος κἂν μέσῳ
> ἀγορά, φέρουσαι δ᾽ ὦσιν εἰς αὐτὴν ὁδοὶ
> ὀρθαὶ πρὸς αὐτὸ τὸ μέσον ὥσπερ δ᾽ ἀστέρος……
>
> Meton:
> With a straight ruler I worked to measure out so that
> a square be in this circle and in the center
> the marketplace, into which the straight streets lead
> towards its center, just as a star…
>
> <div align="right">(Aristoph. Birds 1004-7)</div>

In this utopic division of land, straight streets meet at the city's center, the location of the

marketplace.

Aristotle tells us that Hippodamos, the famous 'father' of urban planning and

implementor of some of the earliest urban grids, suggested another type of utopic city:

> …[Ἱππόδαμος] πρῶτος τῶν μὴ πολιτευομένων ἐνεχείρησέ τι περὶ
> πολιτείας εἰπεῖν τῆς ἀρίστης. κατεσκεύαζε δὲ τὴν πόλιν τῷ πλήθει μὲν
> μυρίανδρον, εἰς τρία δὲ μέρη διῃρημένην· ἐποίει γὰρ ἓν μὲν μέρος
> τεχνίτας, ἓν δὲ γεωργούς, τρίτον δὲ τὸ προπολεμοῦν καὶ τὰ ὅπλα ἔχον.
> διῄρει δ᾽ εἰς τρία μέρη τὴν χώραν, τὴν μὲν ἱερὰν τὴν δὲ δημοσίαν τὴν δ᾽
> ἰδίαν· ὅθεν μὲν τὰ νομιζόμενα ποιήσουσι πρὸς τοὺς θεούς, ἱεράν, ἀφ᾽ ὧν
> δ᾽ οἱ προπολεμοῦντες βιώσονται, κοινήν, τὴν δὲ τῶν γεωργῶν ἰδίαν.
>
> …[Hippodamos] was the first man not engaged in politics who attempted
> to speak on the subject of the best form of constitution. His system was
> for a city with a population of ten thousand, divided into three classes;
> for he made one class of artisans, one of farmers, and the third the class
> that fought for the state in war and was the armed class. He divided the
> land into three parts, one sacred, one public and one private: sacred land

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[129] Aristoph. *Cl.* 180-220; Aristoph. *Birds* 990-1120.

to supply the customary offerings to the gods, common land to provide
the warrior class with food, and private land to be owned by the farmers.

(Aristot. Pol. 1267b)[130]

Plato discusses the distribution of "first allotments" in colonial foundation in his

Laws, warning colonists against the later division of these land parcels:

…καὶδὴ καὶ νῦν τὸν ἀριθμὸν μὲν πρῶτον διὰ βίου παντὸς φυλάξετε τὸν
εἰρημένον, εἶτα τὸ τῆς οὐσίας ὕψος τε καὶ μέγεθος, ὃ τὸ πρῶτον
ἐνείμασθε μέτριον ὄν, μὴ ἀτιμάσητε τῷ τε ὠνεῖσθαι καὶ τῷ πωλεῖν πρὸς
ἀλλήλους· οὔτε γὰρ ὁ νείμας κλῆρος ὢν θεὸς ὑμῖν ξύμμαχος, οὔτε ὁ
νομοθέτης.

…guard throughout your lives the number just mentioned [the 5,040
original plots], and in the next place, do not dishonor the upper limit and
size of your property, which you were originally apportioned as a
reasonable amount, by buying and selling to one another; for neither will
the lot which distributed, being divine, be your ally, nor will the lawgiver.

(Plat. *Laws* 741b)[131]

Alluding to the methods used within the Kleisthenian reforms of 510 BCE in Athens, Plato

also suggests that lands are allotted to individuals based on land value and distance, each

given both a "near" piece and a "distant" piece of land, all within a city which has been

divided into twelve distinct districts.[132]

Physical evidence for the division of land in a colonial context is additionally

present at a number of sites throughout the Mediterranean. The orthogonal grid appears so

frequently in an urban framework throughout 7th-5th century settlements of southern Italy

and Sicily as to seem a Zeitgeist of the Greek colonial age, and Carter even suggests that

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[130] Translation adapted from N. Cahill 2002.
[131] Ibid.
[132] Plat. *Laws* 745a-e

this may reflect an emerging pattern specific to settlers from the Peloponnese.[133] This system then also appears later to extend to the chorai of Greek apoikiai. Ancient Pharos, for example, features a clear orthogonal grid for the purposes of rural property delineation.[134] The Heraclean settlements of Kallatis in modern Romania and Kalos Limen, a sub-colony of Chersonesos, serve as additional examples of systems of property delineation applied within the chora.[135]

Epigraphical evidence of land division in a colonial context is offered by the inscription of Black Corcyra dated to approximately 385 BCE.[136] The inscription, unearthed in a cistern at the site of Lumbarda, describes the first policies enacted following the foundation of a colony on Korkyra Melaina, as dictated by the colony's oikists. In 2018, a new fragment of the inscription (the upper right-hand corner) was recovered by Hrvoje Potrebica (University of Zagreb) and his team. The first 17 lines, as reconstructed by Jelena Marohnić, Hrvoje Potrebica, and Miroslav Vuković, are as follows:[137]

ἀγαθᾶι τύχαι· ἐφ᾽ ἱερομνάμονος Πραξιδάμου, Μα[χανέος, τῶν ἀ]ρχαγε-
τᾶν Ἰσσαίων καὶ Πύλλου καὶ τοῦ υοῦ Δάζου· τάδε συν [έγραψαν οἱ αἱρεθέ]ντες ᾗ
καὶ ἔδοξε τῶι δάμωι· λαβεῖν ἐξαίρετον τοὺς πρώτους [καταλα]βόντ[ας τὰ]ν χώ-
ραν καὶ τειχίξαντας τὰν πόλιν τᾶς πόλιος οἰκόπ[εδον ὅ]λον κα [ὶ] ἥμισυ τᾶς
τετειχισμένας ἐξαίρετον σὺν τῶι μέρει, τᾶς δὲ Ε[. . . . .]ΙΕΡΗ. λ **[αβ]εῖν δὲ αὐ-**
τοὺς καὶ τᾶς χώρας ἐξαίρετον τὸν πρῶτον κλᾶρον [πέλεθρ]ον κα[ὶ τὰ] ἐχόμενα
πέλεθρα τρία, τᾶς δὲ ἄλλας τὰ μέρη· ἀναγραφῆμεν δὲ [τὸν πρῶ]τ [ο]ν [κ]λᾶρον ἐς πίνα-
[κα] εἶ ἕκαστος ἔλαχε· κατάμονον δὲ εἶμεν αὐτοῖς καὶ τ [οῖς ἐγγόνοις κ]λᾶρον πέλε-
[θρο]ν καὶ ἥμισυ ἑκάστωι· **λαβεῖν δὲ τοὺς ἐφέρποντας τᾶ[ς χώρας κλᾶρ]ον ἴσον ᾗ**
[τ]ᾶ -

5

10

[133] Examples of colonial urban grids include Megara Hyblaea (8th c. grid), Selinus (7th c. grid), and Syracuse (8th c. grid): Carter 2006a, 94, 128.
[134] Gaffney 2000, 30–6.
[135] Avram 1991, 123–37; Carter 2006a, 128.
[136] SIG³ 141; Rendić-Miočević 1965; LGPN III.A 1997, 374: on later dating to a century later, giving a rough estimate of 4th-3rd c. BCE.
[137] Marohnić et al. 2021, 139.

[ς χώρα]ς ἀδιαιρέτου πέλεθρα τέσαρα καὶ ἥμισυ· ΤΑ[... ca 11 ...]Η[.] μη [δέ-]
[ποτ]ε τὰν πόλιν μηδὲ τὰν χώραν ἄνδαιτον ποή[σεσθαι μηδαμῶς. εἰ δέ τί]
[κα ἄρχω]ν προθῆι ἢ ἔτας συναγορήσηι πὰρ τ[ὰ ἐψαφισμένα, αὐτὸς ἄτιμος καὶ]
[τὰ ὑπάρχ]οντα δαμόσι[α ἔστ]ω, ἀθῶιος [δὲ ὁ ἀποκτείνας αὐτὸν — — —]
15   [— — — — —]ΤΟΥ[— — — — — — — — — — — — — — — — — —]
[— — — —]ΠΑΤΙ[— — — — — — — — — — — — — — — — — —]
[εἴ κα τῶι δ]άμωι δό[ξηι — — — — — — — — — — — — — — — —]
[Οἴδε] κατέλαβον τὰν χώρ[αν καὶ ἐτείχιξ]αν τὰν πόλιν·

The following translation is adapted from Cahill 2001 (220-1) and incorporates new interpretations proposed by Marohnić et al. (2021):

> With good fortune. When Praxidamos was recorder in the month of Ma[chaneus, an agreement] of the [oikists] of Issa and of Pyllos and his son Dazos. [The oikists wrote] this up and the people decreed it.
> The first colonists [who took possession of the] land and who fortified the city will take by choice:
> of the fortified city, a choice house [plot, one each,] together with his portion.
> 5   **of the land [outside the walled city, the same colonists will take] a choice "first allotment" of the territory, consisting of:**
> **[of the best land], three plots.**
> of the other types of land, the portions.
> The magistrates shall write up [(?) their names as] each colonist was allotted. One and a half plot of land shall be inalienable, for them and [for their offspring].
> **Those who come later shall receive:**
> 10   **of the city, the same one house plot, and**
> **of the undivided land, four and one-half plot.**
> The [magistrates shall swear never] to make a redistribution of the city or of the territory [in any way. If a magistrate] proposes or a private citizen advocates anything contrary to what [has been decreed, let him be deprived of civic rights, and his property] confiscated, and [whoever kills him will go] unpunished . . .
> 15
> . . . [if] it is resolved by [the] people.
>
> These people took possession of the country [and fortified] the city:
>   (SIG³ 141)

Lines 5-7 demonstrate a clear allotment of parceled land in the chora: 3 portions to each colonist. Interestingly, it appears that 1/3 of the plots allocated at the colony's foundation were left empty in order to allow for the allocation of plots to newcomers in

future (*'λαβεῖν δὲ τοὺς ἐφέρποντας τᾶ[ς χώρας κλᾶρ]ον ἴσον ἢ [τ]ᾶ/[ς χώρα]ς ἀδιαιρέτου πέλεθρα τέσαρα καὶ ἥμισυ'* in lines 9-10).[138] The importance of the inscription from Korkyra Melaina cannot be overstated. It is unique in that it offers evidence of property delineation at the ktisis of a new colony, of rural land division beyond the asty, and of the foresight to utilize urban planning to benefit a growing population.

Despite regular allusion to Hippodamos as a founder of city-division, there is plenty of evidence to suggest this practice precedes him by several centuries. Megara Hyblaia represents a clear antecedent to Hippodamian practices, with evidence of division dated to the 8th century BCE.[139] Such division, according to Michel Gras, may not have been precisely calculated but nevertheless conformed to a visually-based egalitarian system of land distribution (*isomoria*).[140] Further colonial context is also provided at Thurii. Thurii, an Achaian colony comparable to Metaponto in a number of respects (see Table 7), was evidently divided by arterial streets in the city center at the time of its foundation, according to Diodorus Siculus:

> τὴν δὲ πόλιν διελόμενοι κατὰ μὲν μῆκος εἰς τέτταρας πλατείας, ὧν καλοῦσι τὴν μὲν μίαν Ἡράκλειαν, τὴν δὲ Ἀφροδισίαν, τὴν δὲ Ὀλυμπιάδα, τὴν δὲ Διονυσιάδα, κατὰ δὲ τὸ πλάτος διεῖλον εἰς τρεῖς πλατείας, ὧν ἡ μὲν ὠνομάσθη Ἡρῴα, ἡ δὲ Θουρία, ἡ δὲ Θουρῖνα.

> They divided the city in length by four streets, the first of which they named Heracleia, the second Aphrodisia, the third Olympias, and the fourth Dionysias, and they divided it in width by three streets, of which the first was named Heroa, the second Thuria, and the third Thurina.

> (Diod. 12.10.7)

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[138] Marohnić et al. 2021, 141.
[139] Gras 2022, 573–4.
[140] Asheri 1966; Gras 2022, 576.

Most analogous for this study of Metaponto is the colonial foundation of Chersonesos. Despite geographical distance (Chersonesos lies on the Crimean Peninsula), the settlements of Chersonesos and Metaponto share a number of characteristics - the first and most obvious of these is the evidence of property division in their chorai. Tauric (or Crimean) Chersonesos, while typically given a foundation date of 422/1, provides material evidence suggesting a foundation of up to 100 years earlier, aligning closely with the proposed foundation of Metaponto.[141] Members of the Institute for Classical Archaeology at the University of Texas at Austin (who managed the survey of the Metapontine chora for a number of decades, detailed below) maintained annual involvement with excavations and survey in the chora of Chersonesos until 2007, allowing for the simultaneous study of and comparison between these two Greek settlements.[142] It was thus discovered that the two colonies seemingly share a unit of measure. Despite discussion suggesting an Egyptian standard at Chersonesos, the distance between longitudinal lines (identified as topographical anomalies and discussed in section 2.5 The Division Lines) in the Metapontine chora (ca. 210 meters) mirrors the sides of plots measuring 50 Greek plethora (sub-plots) at Chersonesos.[143] Despite the difference in shape (the square plots of Chersonesos vs. the oblong plots of Metaponto), the difference in the measurement of the *kleroi* ('plots') between the two cities is only 1%.[144] A long history of excavation prior to ICA involvement at Chersonesos not only supports the identification of these

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[141] Carter et al. 2000, 711.
[142] Carter 2011c, xii.
[143] Nikolaenko 1985; the plots of Chersonesos could also amount to 36 Egyptian plethra; Carter 2006b, 94, 128.
[144] Adamesteanu and Vatin 1976, 120.

topographical anomalies as clearly-defined property delineation, but also the practice of enclosing and connecting the kleroi using a gridded road system.[145] Here the evidence for using roads for the dual purposes of both land parceling and an extra-urban road network is unmistakeable, and its study may yield clues as to Metaponto's process of rural land division. Unlike Metaponto, however, Chersonesos also delineated properties using permanent walls along the edges of these roads.[146] A similar system was implemented at
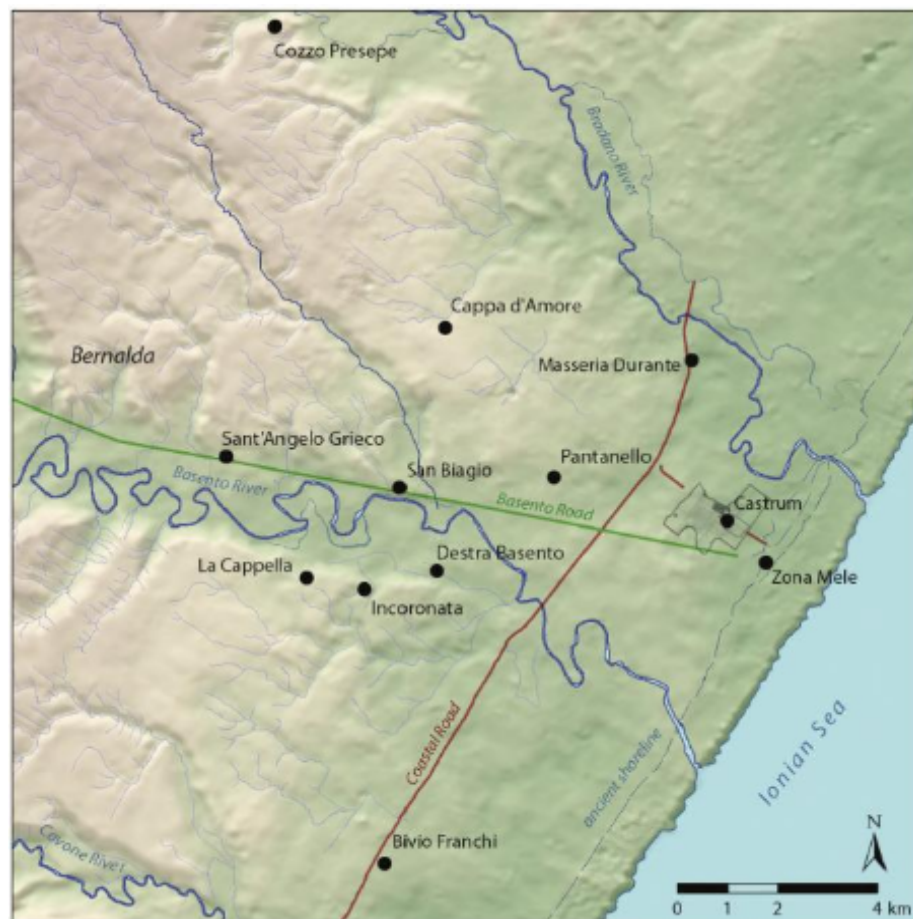
Figure 2: Map of the territory of Metaponto with sites occupied
in the Roman periods (J. Trelogan, Lapadula 2012, 1).

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[145] Pečírka 1970, 131.
[146] Adamesteanu and Vatin 1976, 120.

a number of Chersonesos' sub-colonies: Kalos Limen (as mentioned above), Belyaus, and Bolshov Kastel.[147]

2.3 Defining the Chora

Outside of a city-center which was located approximately 2 km north-west of the modern shoreline of Metaponto lay the chora.[148] The chora is here defined as the rural component of the polis, comprising of an area immediately outside the urban center and including the space reserved for agricultural purposes as well as a land lesser defined - the *eschatia* ('hinterlands'). This 'no man's land' is characterized as the extent of the chora in which Greek/indigenous use of territory is often unclear. It marks the shift from the lands influenced by the polis to the wilder, less-developed geography of the interior. The universal definition and characterisation of a 'chora' has presented several challenges, primarily in the areas of etymology and ancient interpretation. Ptolemy of Alexandria (2nd century CE), for example, defines 'chorography' as something which, "sets out the individual localities, each one independently and by itself, registering everything practically to the least thing therein, for example harbours, towns, districts, branches of principal rivers, and so on," (*Geog.* 1.1). Thus the chora embodies, for Ptolemy, the culmination of all physical aspects of the polity, including features which are not

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[147] Carter et al. 2000, 714.
[148] Boardman 1973, 176–7: figurines in the *asty* at the temple of Apollo Lykeios have been dated to ca. 700, perhaps giving us material evidence for a foundation date as early as the end of the 8th century (this is unlikely).

anthropogenic yet still contribute to state topography (e.g. 'rivers').[149] Ptolemy's inclusion

of rivers in the definition of 'chora' is unsurprising; rivers seemed to provide an important

boundary between territories. An excellent example of this is provided by the Boiotian

cities of Koroneia and Lebadeia, for which an inscription upon limestone declares the

border between the two polities as, "along from the source where the water flowed from

the ridge to the Altar of Zeus."[150] De Polignac instead favours a person-focused

Figure 3: Survey areas of the 'nearer' and 'farther' chora (J.
Trelogan, Carter 2011, 619).

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[149] Beck contributes to a definition of the 'chora,' suggesting it is "…the outlines of a particular entity, one where the quantification of scalar geography were outweighed by the embodied experience," Beck 2020, 10.
[150] SEG 23.297. Roesch 1965, 61–3; Beck 2020, 61.

understanding of the term, defining the territory of a city as "…the 'space of the citizens', a closed space under the control of a single sovereign body."[151]

Members of the ICA mapped this area within the territory of Metaponto, suggesting that a nearer portion of developed countryside extended 12 km inland, bounded to the north by Cozzo Presepe, the west by Pomarico Vecchio (18 km from the asty, slightly out of frame to north-west in *Figure 2*), and by the sanctuary at San Biagio marking the official Metapontine frontier in the west (*Figure 2*).[152] This area was then subdivided into a 'nearer' (zones I and III in Figure 3, ~240km^2) and 'farther' countryside (zones II and IV, ~175 km^2), with the latter reaching inland an additional 15 km.[153] As Carter admits, this distinction is somewhat arbitrary and does not represent a true definition of space since these boundaries shifted over time.[154] Even so, the 'nearer' chora alone provided such a large capacity for a rural population that it is likely the rural sanctuaries were frequented far more regularly than those we see elsewhere.[155] The countryside can otherwise be classified into two major geographical areas by their distinct physical characteristics: an alluvial plain near the sea which features rivers running N-S, and a terrace featuring rivers running E-W.[156]

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[151] de Polignac 1994, 3.
[152] Giannotta 1980, 47; de Polignac 1995, 110; Carter 2011b, 619; Robinson 2016, 244: expansion to the north was limited by Tarantine territory, and Taras pre-dated Metaponto by approximately a century.
[153] Carter 2011b, 621: this extension does not suggest that all of this land was equally worked, and in fact appears to trace activity inland until there is almost no colonial material evident.
[154] Carter 2011b, 621.
[155] Greco and Mertens 1996, 245–6: this high level of frequentation is a significant factor contributing to the overall opportunity for connectivity analysis which the chora of Metaponto offers.
[156] Adamesteanu and Vatin 1976, 111.

With regard to anthropic topographical features, the proposal of a road network in the chora relies heavily on the discovery of topographical 'division lines' through aerial photography (discussed below), yet the urban street system is much clearer. An arterial road network is evident as of the 5th/4th century, and while evidence is absent of any prior iteration of these pathways on or near the existing remains, the monumental structures of the asty constructed in the 6th century conform to their orientation.[157] This is taken by scholars as evidence for a pre-existing orthogonal street network which also appears to have provided delineation between religious, public, and private sectors within the city.[158] The urban space was the subject of impressive foresight, with walls defining the 156 ha. of the asty, and the space within them delineated in this way from the origin of the polis.[159]

In addition to the urban sanctuary at the heart of Metaponto, three sanctuaries have been extensively excavated in the chora: the Tavole Palatine, San Biagio, and Pantanello. Excavations in each of these areas have revealed the archaic construction of monumental structures evidenced by a monumental frieze (San Biagio) and painted sima in the traditionally Metapontine style (Tavole Palatine, Pantanello).[160] The earliest of these, San Biagio, shows evidence of Greek frequentation in the last quarter of the 7th century, while the Doric temples at both the Tavole Palatine and Pantanello are dated later in the 6th century.[161]

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[157] Greco and Mertens 1996, 252: later temples in the asty do not prescribe to this same alignment, which Greco and Mertens suggest was likely a deliberate decision to shift instead to the more traditional religious orientation.
[158] Owens 1992, 42; Greco and Mertens 1996, 252.
[159] Mertens 2006, 49.
[160] Carter and Swift 2018, 2–3, 955–1020, 1517.
[161] Carter and Swift 2018, 3.

2.4 Survey of the Chora

The work of the ICA at Metaponto and its surrounding territory began in 1974.[162] Excavation began at the Greek sanctuary at Pantanello (1974-1982) but the project quickly expanded to include a number of farmsteads (1983) and necropoleis (1982-1986) in this area.[163] In 1981 an area of ambitious size was selected for survey, led by Cesare D'Annibale, which resulted in the discovery of over 100 sites in the project's first season.[164] The definition of a 'site' is difficult to provide. In his description of field methods, Alberto Prieto has written, "Definitions of 'site' in archaeological survey are notoriously problematic and contentious, but almost all agree on a basic requirement that a site be a locus of human activity."[165] Nevertheless Prieto provides a working definition which presumably was used during the collection of survey material: "…a *site* is defined as a locus of *deliberate* human activity that may or may not be characterized by the presence of durable remains (artifacts and ecofacts)."[166] The area of the survey was selected in order to ensure that it was large enough to provide an accurate sample of life in the chora, including its varied natural topographical features. 1984 saw the excavation of one of the 'division lines' identified from earlier aerial photography, which dated the feature to no later than 480 BCE based on the nearby Pantanello necropolis. In 1990 the survey was expanded to include the Basento-Cavone watershed, guided largely by these

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[162] Carter 2011c, xi.
[163] Carter 2011b, 627.
[164] Carter 2011c, xi; 2011b, 621.
[165] Prieto 2011a, 74.
[166] Prieto 2011a, 75.

topographical division lines leading further inland.[167] A pipeline project crossing between the Bradano and Basento rivers prompted survey of a strip of land 17.3 km long in 1999, although material was reportedly too deep to leave evidence on the surface.[168] The ICA was also heavily involved in projects at Crimean Chersonesos until 2007, a settlement which shares many characteristics with Metaponto with regard to its chora.[169] By 2007 the survey area for Metaponto covered an area extending 27 km inland and a total surface area of 412.7 km^2. In 2016, legacy data, access to survey finds and tools, and a laboratory was granted to the leaders of the McMaster Metaponto Archaeological Project by the ICA and the Soprintendenza Archeologica of Basilicata.

During the period of survey, the ICA developed a system which allows sites to be dated with statistical precision. The Equivalent Artifact Weight (EAW) values for a site represent the average number of black gloss fragments at a site dateable within a period of 50 years. These 50-year periods were expressed as date 'bins', with a single number representing each of these date ranges (i.e. 525-474= 500). EAW values are seldom expressed as whole numbers because dating rarely falls within a single 50-year period. Therefore, a fragment which can be dated within the range of 450-350, would offer a value of .25 to 450, .5 to 400, and .25 to 350. Additionally, once all dateable fragments have been evaluated, they can be compiled within a table and the most likely date determined by multiplying the averaged EAW (the EAW values divided by the total number of black gloss fragments) by the value of the 50-year period. For example, a site with an average

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[167] Carter 2011b, 621.
[168] Carter 2011b, 627.
[169] Carter 2011c, xii.

EAW value of .25 for 500, .25 for 450, and .5 for 400 would receive an estimated peak

activity date of 438. When EAW values for multiple sites are represented in a table, Carter

and his team have decided to express these values not by their averages, but simply the

sum of artifact weights in each date bin, ranging from 0-20. This allows for a visualization

of site significance in addition to dating, a higher EAW value equating to a site with more

material overall. For example, an EAW value of 2.3 within the 400 period would indicate

that there was the equivalent of 2 fragments dateable to the period of 426-375 BCE. While

no single mathematical formula is offered in Carter and Prieto's publication (2011) which

describes this process, I found it useful to create the following in order to fully understand

this method:

Using Equivalent Artifact Weights to Calculate Estimated Date of Peak Activity

For each period of fifty years,

$$\frac{x}{t} = e$$

where x= the number of years within 50-year date 'bin', t=total years within estimated date range, and e= fraction of artifact value within a date period represented as a decimal. Next calculate the average artifact value for a date bin by dividing the sum of the artifact values within each date bin by the total number of artifacts (see example below). Finally, to determine the estimated date of peak activity, sum the averaged artifact values multiplied by the value of each date bin:

$$\Sigma ed = p$$

where e=the average artifact value within each date bin, d=value of each date bin, and p= estimated date of peak activity. Combining these two processes we get a single formula for determining peak site activity:

$$\Sigma \frac{x}{t}d = p$$

E.g. **Site 1**					
Artifact Number	**Estimated Date Range**	**500**	**450**	**400**	**350**
1	500-425	0.33	0.66	0	0
2	475-450	0.66	0.33	0	0
3	525-325	0.25	0.25	0.25	0.25
Averaged Artifact Values		0.42	.42	0.08	0.08
Estimated Peak Activity (p)		**459**			

For Artifact 1, given a range of 500-425, EAW values are calculated as follows:

$$\frac{25}{75} = 0.33 \ (for\ 500), and\ \frac{50}{75} = 0.66\ (for\ 450).$$

For estimated peak activity of Site 1:

$$(0.42 \times 500) + (0.42 \times 450) + (0.08 \times 400) + (0.08 \times 350) = \mathbf{459}$$

While the above describes a simplified process for calculating peak activity, Peter Dana explains how a number of other important factors, including the allocation of a heavier weight to the central third of an artifact's date range (using standard normal distribution) were accounted for in order to more accurately reflect the probability that more materials survive from the period of a site's peak activity. Dana accomplished this using a Visual Basic for Applications script (VBA) he called "ProcessDates".[170] A number of other scripts were written in order to typify land use for each site as well.[171] Using this method, the ICA has developed the means with which to date survey sites with a high degree of accuracy and identify the most likely use of the land. The survey data for zone 1 of the Metapontine chora was published in 2011.[172] Survey data for zone 3 is yet

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[170] Dana 2011, 104.
[171] Dana 2011, 109.
[172] Carter and Prieto 2011a.

unpublished but has been offered to the team of the McMaster Metaponto Archaeological Project, which I have been granted permission to use for the purposes of my dissertation.

Beginning in 2001, leadership of the survey team was entrusted to Alberto Prieto, who managed field survey until 2007.[173] Prieto's greatest contribution to the project was his experience with Geographic Information Systems (GIS), and in addition to the conversion of non-computerized data (including coordinate projections in order to accurately represent locations of sites using the Universal Transverse Mercator system originally expressed in longitude and latitude), he developed many of the maps and the Metaponto GIS database currently used by members of the project. Prieto was able to incorporate data offered by project members in the fields of geomorphology, pedology, and geology into a singular system, allowing us to visualize data as 'layers' draped over a curvature-corrected topographical map of southern Basilicata. The visualizations include both raster ('pixel' data able to show gradients, ex. soil pH) and vector (lines and shapes, ex. survey areas) datasets.

In October 2018, archaeogeophysical analysis was conducted at the site of Incoronata greca as part of the Metaponto Archaeological Project (McMaster University). This area, hypothesized to be a site both of religious significance and of cross-cultural interaction between Greeks and Oenotrians in the 7th century is located 8 km from the Ionian coast and features compelling material evidence for Greco-indigenous interaction in the chora of Metaponto. The results of the survey of this plateau included an

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[173] Carter 2011c, xii.

orthomosaic (high-resolution image of surface, geo-tagged for spatial accuracy), a Digital Surface Model (DSM- a 3D digital 'object' representing the terrain which can manipulated for viewing at all angles) as well as a Normalized Difference Vegetation Index (NDVI- a process which uses infrared light to identify vegetative features in a landscape). The increasing accessibility of these types of tools have led to a corresponding increase in their popularity in archaeological contexts, with tools such as Ground Penetrating Radar (GPR) and magnetometry steadily becoming a staple analytical tool for non-invasive predictive archaeology. Even elsewhere in comparable colonial contexts similar methods are used for the study of subterranean material. Di Stefano outlines his team's use of GPR, DSMs, and magnetometry in 2017 to identify areas for future excavation at Kamarina, a Greek colony in south-central Sicily.[174]

Published survey data of the Bradano-Basento watershed indicates the following spatial resolutions: site positions 10 m, site elevations 2.5 m, streams 20 m, division lines 20 m.[175] Location data was created using a combination of GPS (Site Position), 1:10,000 maps (Site Position, Streams), 5 m Elevation Contours (Site Elevation), and Georegistered Aerial Photographs (Division Lines).[176] Survey performed using the SXBule II device beginning in 2018 allowed for a special resolution of 2 m or less for site position and elevation.

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[174] Di Stefano et al. 2018.
[175] Prieto 2011b.
[176] Dana 2011, 113.

2.5 The Division Lines

Low-altitude aerial photographs made shortly after World War II reveal clear and regular 'lines' in the Metapontine chora.[177] These first appeared as canals 1-10 m deep and only 1-3 m wide, "…intagliati nella terra e nella roccia."[178] Uggeri first discounted the possibility that these marked roads due to their 'V-like' shape, and while preliminary hypotheses posited that these were evidence of the initial dasmos of the chora, subsequent study revealed a number of characteristics suggesting otherwise.[179] There are clearly at least two distinct systems of different alignments (generally differentiated as those of the Bradano-Basento and Basento-Cavone), and the plots themselves are not orthogonal, but rather parallelogrammatic, each consisting of six units measuring approximately 210 meters on each side.[180] While some argue that the majority of the division lines in the chora of Metaponto cannot be dated to earlier than the first half of the 5th century, the question remains whether these lines, much like the units arranged *per strigas* in the asty, are indicative of an earlier iteration of land division for which physical evidence has all but disappeared.[181] Corinthian ceramics dating to the 6th century have been identified surrounding a division line at Santa Fara, offering an earlier date for these features of approximately 550 and archaic material (primary a black-figure krater dated 530-510)

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[177] Schmiedt and Chevallier 1959, 27–36.

[178] "…carved into the earth and rock." Uggeri 1969, 52.

[179] Nevertheless, Uggeri did concede, "Ma pur non trattandosi di manufatti intenzionali , dovevano assolvere alla funzione di vie di accesso ai campi e di trasporto dei prodotti agricoli,"/ "But even though these were not intentional products, they had to fulfill the function of access routes to the fields and transport of agricultural goods," (1969, 53); Carter 2006b, 95.

[180] Carter 2006b, 95.

[181] Greco and Mertens 1996, 252; Carter 2006b, 94: evidence of early urban roads from temple alignments.

supports this chronology.[182] For this study, a general date of the late 6th century is proposed for the division lines in the chora.

Robert Folk has offered four possible interpretations of the division lines in the Metapontine countryside: 1) that these are naturally-occurring fractures which provided drainage to the south-east, 2) that they represent an anthropogenic drainage/irrigation system for the countryside, 3) that they are evidence of topography created by the Achaeans for the purposes of property delineation, and 4) that these 'division lines' are evidence of an extra-urban road network.

The first of these hypotheses is supported largely by the geology of Basilicata. Folk explains that the division lines running north-south often align themselves quite precisely with natural fractures in a Pleistocene layer, although this does not account for the transverse lines also visible in surface survey.[183] The second interpretation of these divisions, that they are evidence of the implementation of widespread irrigation and drainage for agricultural purposes, is less likely. There does not appear to be significant evidence (if any) of earth deposits adjacent to these lines which we might expect from the construction of such large-scale infrastructure.[184] This process would also necessitate raising the water level of either the Bradano or Basento river 10-30 meters in order to facilitate the angle required for water to flow through these fissures, for which we also have little evidence.[185]

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[182] Carter 2006b, 97, 113.
[183] Folk 2011, 12–3.
[184] Folk 2011, 20.
[185] Folk 2011, 21.

The suggestion that these lines represent deliberate property delineation executed by settling Greeks is one which is difficult to prove, yet not without evidence. The first problem lies in the project's scope; with an area of approximately 240 km^2, the creation of ditches to mark rural kleroi within the 'nearer chora' would have required an enormous amount of labour, with comparably little payoff. However, the far clearer system of walls, roads, and fissures in the chora of Chersonesos extends over an area exceeding 100 km^2, suggesting that a project of this scale is at least possible.[186] If we accept that the Metapontine chora developed gradually (i.e. 'planned' but undeveloped), beginning just beyond the city's walls and extending northward over the course of a century or more, the implementation of clear physical property delineation perhaps becomes more feasible.[187] At the very least there exists proof of a standard metrology, with rural plots measuring
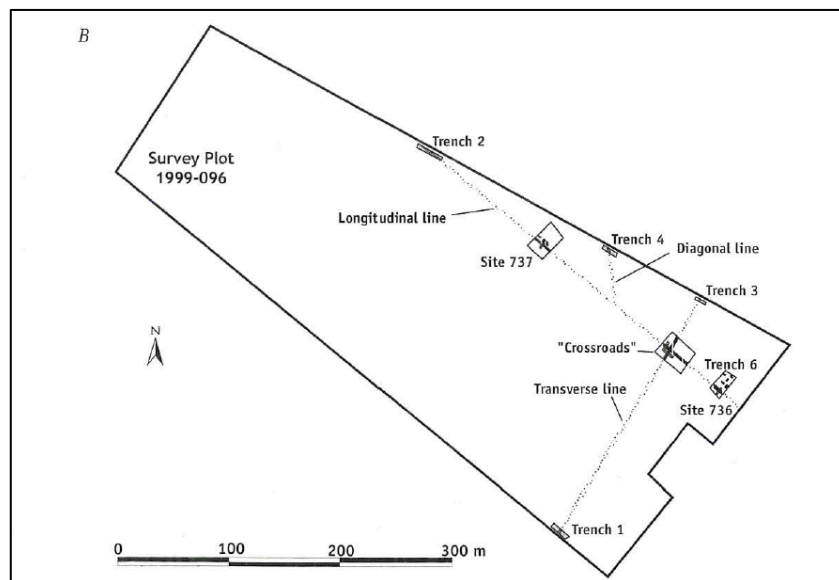
Figure 4: Division lines in the area of Pizzica and their excavation (including sites 736 and 737). (J. Trelogan and S.M. Thompson, Carter 2006, 110)

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[186] Carter et al. 2000, 713.
[187] c.f. SIG^3 414, in which planning for future development of parceled land is clearly indicated and contemporary with Metaponto.

approximately 625 x 415 meters in almost all cases, a measure which is divisible by the standard Doric foot.[188]

The final hypothesis, of an extra-urban road network, is equally problematic. Typically a street system will feature a joining of roads approaching an area of high frequentation, something which is noticeably absent on approach to the asty.[189] The division lines also appear to ignore incline to a large degree and maintain a consistent trajectory in favour of pathways which deviate in order to provide a level pass.[190] Despite these complications, convincing evidence for an extant road network can be found at Pizzica, where roads (including wheel-ruts) have been clearly identified and which are also flanked by a number of nearby tombs, a characteristic of rural streets with well-documented frequency.[191] One such feature at Pizzica was excavated within a division line (L09b), revealing a level surface approximately 3.5 meters wide, suggestive of a road.[192] Here a transverse line (T01) was later clearly identified on the ground to correspond directly with the anomaly visible in the aerial photomosaic, reinforcing that this area was indeed a cross-roads (Figure 4).[193] Division line L15 appears to have served as a central axis throughout the chora, flanked by concentrations of burials from Mutinati to Pantanello and Morlino.[194] Thus, despite occasional irregularities, there is evidence that, at the very least, some of the division lines represent a road network within the chora.

[188] Giannotta 1980, 47.
[189] Folk 2011, 22.
[190] Folk 2011, 22.
[191] Lohmann 2002, 78–9.
[192] Carter 2006b, 108.
[193] Carter 2006b, 109.
[194] Carter 2011b, 622.

2.6 The Metaponto GIS

Beginning in 2001, Alberto Prieto developed the Metaponto Geographic Information System (GIS), and, in addition to the conversion of non-computerized data (including coordinate projections in order to accurately represent locations of sites using the Universal Transverse Mercator system originally expressed in longitude and latitude), he and Jessica Trelogan developed many of the maps and the Metaponto GIS database currently used by members of the project.

The data which have been incorporated into the existing GIS are many and diverse. Regarding site locations in the chora, a "known sites" layer (those which have been investigated beyond surface survey) incorporates land-use identification, bibliographic references to materials, chronological activity, and dating both of the site and of excavation. A 'division lines' layer was added, georeferenced using the aerial photography taken in the 1950s by superimposing them over digitized topography (in addition to on-site ground-truthing). Modern anthropic elements in the landscape have also been geolocated within the project GIS, including modern canals, pipelines, and roads. In the asty, principal structures have been outlined for easier identification and the extent of the ancient city indicated using polygons.

In terms of non-anthropic features, both the modern and ancient coastlines have been mapped and added to the GIS. Hydrography of the Basento-Bradano and Basento-Cavone watersheds was added by James T. Abbott from digitized maps provided by the Istituto Geografico Militare (a highly useful addition for the analysis explored in the next

chapter).[195] Abbott's geomorphological layers are incorporated as well (compiled following years of survey and sampling), identifying areas of alluvial and coastal deposits as well as terrace levels throughout the chora.[196]

Finally, the entirety of the data gathered during surface survey (quantities of recovered materials, chronological activity, site visibility etc.) for the past three decades has been digitized here as well. 'Sites' are identified as an area of dense surface material and within a larger survey area (typically delineated according to modern plowlands). In some instances, survey members have placed a centralized point within a larger area of artifact scatter. These are differentiated using the terms 'sites' and 'plots' respectively.[197]

My own contributions to this GIS (in addition to the products outlined in the following chapters) consist of additional survey data from 2018-2023, georeferenced legacy data of prior excavation (Incoronata greca) and division systems (Uggeri 1969), isolated layers for farmstead/settlement and sanctuary locations, and the incorporation of DEMs (Digital Elevation Models) from survey of Incoronata in 2018.[198]

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[195] Dana 2011, 94.
[196] Abbott 1998; 2011.
[197] Alberto Prieto defines a 'plot' as follows: "A plot was defined as a territorial unit characterized by a single type of land use/cover, whether anthropic (agricultural) or natural (e.g. thicket or woods)." Prieto 2011a, 83.
[198] Survey of the Incoronata plateau was conducted using a drone, Pix4D Capture, and ArcGIS Pro. Patrick DeLuca (McMaster University) provided much appreciated on-site assistance and post processing of captured photogrammetric data. Products of this survey include an orthomosaic, DEM, and NDVI of the plateau at a resolution of <2cm. This has been used to identify a potential route of access to the east as well as anomalies since explored or otherwise slated for excavation in future seasons.

Chapter 3: Topographical Analysis of Sanctuaries and Local Settlement

3.1 Methodologies in Ancient Network Analysis using GIS

Survey in the *chora* of Metaponto is uniquely advantaged and suited to digital methodologies, and the project's continuous activity of over 40 years has shaped practices regarding survey of the colonies of southern Italy.[199] Rarely has surface survey elsewhere resulted in such a high density of sites (an average of 15/km^2), and this data surplus is reflected in the number of computational processes which can then be applied to the project GIS.[200]

The use of GIS in the following chapters can be categorized by two geospatial tools used: Least Cost Path and network analysis. While both are tools for analysis of raster data (cell or grid-based data, akin to pixels in a digital image), least-cost path (LCP) generates a least accumulated cost path within a raster, whereas network analysis relies on the existence and known attributes (location, shape etc.) of roads on which to generate a network. The former in this case can conceivably lead to the latter, provided that the LCPs are generated using accurate and reliable datasets. Thus, the following pages will lay a sturdy foundation upon which theories concerning settlement in the chora of Metaponto will be built, beginning with a description of precedent (applications of GIS tools in similar

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[199] Significant portions of this chapter have been published with the *Journal of Archaeological Science: Reports* (Davidson 2024).
[200] Carter 2006a, 20.

contexts), then by exploring the reliability of the data used in this project, before finally describing the methodologies used in analysis.

Survey conducted in the late 1980s to mid-2000's under the Forma Italiae-Ager Venusia project, headed by Maria Luisa Marchi and Giulio Sabbatini, surveyed an ambitious landscape of approximately 700 km^2 in areas west of Metaponto.[201] Many comparisons can be made between these two projects; their scale, the use of black gloss for dating of sites, and survey methodologies in the field.[202] Anita Casarotto, Jeremia Pelgrom, and Tesse Stek have recently undertaken the enormous task of investigating legacy data from this field survey in order to compare the nature of Roman settlement in the Hellenistic period against hypothesized settlement patterns, including even distribution and polynuclear settlement strategies.[203] The latter term, polynuclear settlement, describes the process by which colonists settle in village clusters, separated by areas of comparatively low population density.[204] Despite the similarities between the two projects (which also includes the disturbance of surveyed material by modern agricultural exploitation), categorization of sites (e.g. function and size), were deliberately discounted from investigation, with project members instead opting to represent each survey site as an 'unclassified dot.'[205] This renders comparison between the projects difficult, since land use is a primary focus of the study conducted here (i.e. distinction between settlement, farmstead, sanctuary, etc.). Nevertheless, the project represents an application of many of

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[201] Marchi and Sabbatini 1996; Casarotto et al. 2016, 569.
[202] Casarotto et al. 2016, 569–70.
[203] Casarotto et al. 2016.
[204] Stek 2014; Casarotto et al. 2016, 568.
[205] Casarotto et al. 2016, 570–1.

the preliminary methodologies used, both in the survey itself and in the treatment of legacy data, and one which is geographically relevant in its proximity. The result of this Venusia project, however, will become relevant once more in Chapter 4 (incidentally it was the polynuclear settlement model which was ultimately concluded based on point-pattern analysis).[206]

Another source of inspiration for the following analysis stems from the efforts of Maeve McHugh, who has recently published their results of mapping rural settlement of the Akte and Methana peninsulas using cost analysis and least-cost path.[207] The methodology used by McHugh represents survey data (i.e. site location and elevation) as nodal points in an interconnected agricultural network. There are a number of similarities between McHugh's project and that of Metaponto: both of these represent self-contained geographic areas; the peninsulas of McHugh's study are bounded by water, and the Metapontine chora by liminal extra-urban sanctuaries representing the extent of the chora.[208] Each also features at least one larger *asty* acting as a central nodal 'hub,' and the geographic areas of each project were all active throughout the Archaic and Classical periods. A highlight of this study was the comparison of Least Cost Path (LCP) models and the locations of theorized ancient roads.[209] The LCP data McHugh and their team yielded aligns with known ancient routes, including those leading to Sellasia north of their survey

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[206] Casarotto et al. 2016, 579, 583.
[207] McHugh 2017.
[208] On mapping the extent of the chora: Carter 2011b, 621; De Polignac suggests that sanctuaries of the *eschatiai* acted as a barrier to the 'wilds' beyond the *chora*, at the *methorios* (1995, 35–6, 56, 76); 'frontier' sanctuaries and symbolic claim of territory: Papantoniou and Kyriakou 2018, 544–5.
[209] McHugh 2017, 101–6.

area and with modern roads between Halieis, Hermione and Mases which McHugh suggests are built over ancient pathways.

Thiessen polygons have also been adopted for the study outlined below, which are rendered by use of a computational process which draws polygons over digitized terrain within which any point is closer to the polygon's 'source' than the source of any other polygon, creating zones. These are occasionally utilized in archaeological contexts and are included in Farnetti's publication of the results of a GIS-based analysis of survey performed in Boeotia which explored the use of Thiessen polygons to determine the extent of the chorai of Boeotian poleis.[210] In his analysis, he utilized both Euclidean-based ('as the crow flies') polygons and those generated from weighted cost-surface analysis (accounting for realistic travel over terrain). Predictably, the cost-surface generated polygons were significantly more detailed than the Euclidean. This project will use cost-surface analysis exclusively in the generation of Thiessen polygons.

The Unlocking Sacred Landscapes project (UnSaLa) on Cyprus likewise utilized Thiessen polygons in addition to several other processes including visibility, cost-surface and least-cost path analyses.[211] While the cost-surface analysis was performed using GRASS, the least-cost paths were generated within ArcGIS, the same software used by the Metaponto Archaeological Project.[212] Papantoniou reports the discovery of an archaic sanctuary at Vavla-Kapsales (Cyprus), and of the UnSaLa team's creation of "catchments"

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[210] Farinetti 2011.

[211] Papantoniou and Kyriakou 2018.

[212] ArcGIS and related ESRI software products make up 47% of software used for archaeological applications in published scholarship, nearly 8x more heavily than the next leading software (IDRISI – 6%) (Arias 2013, 117).

which defined the nearest Iron-Age/Archaic polity from any given point in an area west of Kition. This resulted in identifying the newly-discovered sanctuary at Vavla-Kapsales as an extra-urban sanctuary belonging to Amathous, a settlement along the coast.[213] The following analysis concerning sanctuaries in the chora of Metaponto accomplishes the inverse, instead assigning settlements to their nearest extra-urban sanctuary, although the methodology in this respect is otherwise nearly identical.

This process of identifying settlement regions based on extra-urban sanctuaries is then complemented by processes which reconstruct communication to and between sites in the chora. The Durham-Cambridge Boeotia Survey originated in 1978 and investigates the nature of rural land use in a Greek context contemporary with peak activity at Metaponto. Scholars of landscape archaeology conducted surface survey in the province of Boeotia in an effort to map sites around several cities north of Athens: Thespiae, Hyettos, and Haliartos. John Bintliff and Anthony Snodgrass have published regularly since the project's inception and have reported results which mimic settlement in the chora of Metaponto in several ways. The density of tile scatter and "halo" of discards within and surrounding sites identified outside Thespiae suggest permanent extra-mural settlement, and these qualities are reflected in the survey data at Metaponto.[214] While the excavation of farmsteads within the Metapontine chora are proof of permanent structures, key to the study conducted below is the confirmation that the sites chosen for analysis reflect use of the land year-round. Seasonal occupation of areas for agriculture has been hypothesized, however the qualities

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[213] Papantoniou and Kyriakou 2018, 564.
[214] Bintliff et al. 2007, 39.

identified within the body of ceramics at sites outside Thespiae (and Metaponto) – specifically that of tile density – reflect both a high level of continual activity and structures which were able to weather both wet and dry seasons.[215] It is therefore with a degree of certainty that we can conclude that the sites chosen for analysis below (see "3.2 Curating the Catalogue") represent the permanent settlement of households engaged in agricultural activities, presumably representative of the 20-30% population of the typical Greek polis which lived outside the asty.[216] Contributors to the survey project in Boeotia include Phil Howard, who used cost-surface analysis in addition to visualization of artifact densities to suggest a major thoroughfare running NW-SE below the city of Thespiae.[217] His methods used to identify ease of access within areas of the survey did not include least-cost path modelling, although the published survey data suggests this could be a fruitful process if performed.

Least Cost Path has seen limited application in sacred pilgrimage. Steven Soetens conducted topographical analysis in an area south of Knossos in an effort to plot the route between the Minoan palatial complex and the peak sanctuary at Ψηλή Κορφή του Γιούχτας.[218] While the route deviates from the path initially proposed by scholars invested in these two sites (which suggested a path through Vasilies), it passes through the bronze-age villages of Silamos, Alonaki, and Anemospelia, a relationship which Soetens suggests

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[215] Osborne 1985; Whitelaw 1998.
[216] Bintliff 2019, 354.
[217] Bintliff et al. 2007, 124.
[218] Soetens 2009, 266–7.

is far from coincidental. This analysis, if nothing else, sets a precedent for visualizing travel to extra-urban sanctuaries using LCPs.

Perhaps the most comprehensive and critical analysis of LCP use in archaeological contexts is offered by Irmela Herzog, who addresses several pitfalls to LCPs and cautions against using "push-button" software which does not disclose the full parameters of these and related digital processes.[219] To address these issues, processes in the following analysis have been coded in Python, which allows for complete customization within the ArcGIS environment. Specific modifications to these processes are elaborated below, and example code has been provided for the purposes of replicable results.

Andrew Bevan has tested the overall efficacy of computational modelling in archaeology, including the use of LCPs, and his performance estimates used to calculate ancient travel times are often cited within studies of ancient topography.[220] Chief among his concerns is the need to develop quantifiable and standardized methods for representing different modes of travel (pedestrian vs. burdened pedestrian, individual vs. group, etc.) and accounting for agency and variability between travellers. However, incorporation of cost factors including load and means of travel (horse-back, on foot etc.) was determined unnecessary in this case study, due to the comparative nature of the data; the focus is not on time travelled, but rather on comparative efficiency in overall pathfinding.

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[219] Herzog 2012.
[220] Bevan 2013.

3.2 Curating the Catalogue

Data were acquired from the GIS inherited from the ICA, including materials published in the comprehensive series edited by Joseph Carter and Alberto Prieto.[221] Geospatial, tabular, and graphical data are freely available within the project Archaeological Recording Kit (ARK, ICA, *Metaponto Field Survey ARK*).[222] The software used was ArcGIS Pro, version 3.2.1 Professional.

Within ArcGIS it is possible to perform a 'query'; a search which returns only those data which meet a user-defined set of criteria (e.g. all sites labelled as 'sanctuary'). Thus, a query performed within the "known sites" layer of the existing Metaponto Archaeological Project GIS yielded a curated list of only sites which have been designated as farmsteads, settlements, or sanctuaries. These results included all sites with these designations, regardless of size or significance. These designations are based upon studies of survey assemblages completed by members of the ICA team wherein an assemblage which yields artifacts of a votive nature (terracottas, decorative ceramics, etc.) was labelled as sacred land use ('sanctuary') and an assemblage of a domestic nature (loom weights, courseware, etc.) was labelled 'farmstead.'[223] In order to account for sites for which the evidence is somewhat unconvincing (featuring a limited number of diagnostic materials), only those which have an EAW exceeding 0.95 for any period from 600-350 BCE were permitted for

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[221] Carter and Prieto 2011b.
[222] https://ica.tacc.utexas.edu/metaponto/metsur_ark/user_home.php
[223] Keith Swift provides a collection of sample assemblages from survey in order to present a 'typical' assemblage for each land use ('site type') used in the labelling of survey sites: Swift 2011, 134–42. Land use was otherwise identified in the field

use in this study, which was accomplished with another query of the "known sites" layer. This weight represents the existence of at least 1 black-gloss fragment for that period, although this does not typically reflect the reality within the assemblage. Most often, this value represents several fragments distributing their weight across multiple periods, yet this threshold provides perhaps the least arbitrary of EAW thresholds which could be assigned for analysis. ≥0.95 is the same weight the ICA used in determining their Final Multiple Criteria Evaluation.[224] The total number of unique farmstead sites which met these criteria was 131, and there were 11 sanctuaries (excluding that of the asty). Additionally, data for prehistoric sites which also met this threshold yet were not included within the "known sites" layer were pulled from the Metaponto Atlas, offering another 3 sites to this study.[225] This resulted in the use of a total of 145 sites.

The sanctuaries of the Metapontine chora vary in scale and purpose.[226] The Temple of Hera (Tavole Palatine), for example, stood 8 km from the city and at a space of contact between Metaponto and the *eschatia* ('hinterlands'). It established an important boundary between the territory of the Metapontines and that of the Iapygians and Taratines to the east. Likewise, the sanctuary of San Biagio dominated the banks of the Basento. While sanctuaries at a great distance from the urban center might have once been considered isolated from the polis, they are now understood as extensions of the city's sphere of

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[224] Carter 2011b, 636; Carter's team tested this threshold by creating a secondary magnitude of farmhouse assemblage EAWs, resulting in an additional 56 farmhouses meeting the new threshold of ≥0.45 (the equivalent of 0.5 black-gloss fragments/period). While this resulted in significant percent change (127-293%), the patterns with regard to activity were largely reproduced among the sites which met the new threshold (Carter 2011b, 633–4).
[225] Carter and Prieto 2011a.
[226] Adamesteanu 1976; Carter 1994; Barberis 1995; Sassu 2018.

influence.[227] Sanctuaries such as these (other examples include the Heraion on the Sele at Poseidonia and the Heraion at Lacinia/Sanctuary of Apollo Alaios on Cape Ciro at Croton) acted as visible political boundaries and through contact with those at and beyond these boundaries, cult at Metaponto evolved.[228] The survey assemblages for these sites are convincing evidence of cultic activity in both monumental and non-monumental spaces, as the following will demonstrate.

Since this analysis will explore the degree to which sanctuaries acted as foci in rural communities (c.f. farmsteads), a brief review of excavated and/or identified sanctuaries included in this study is provided below (both in a summative table and with further elaboration following, divided into two parts; excavated and non-excavated). When sanctuaries have been identified as both domestic and sacred (e.g. Saldone, Sant'Angelo Vecchio), priority has been given to the 'farmstead' identifier. This avoids conflicts in which the nearest sanctuary location is identical to that of the farmstead. More information for all survey sites, including the farmsteads not listed here, can be located in the survey Gazetteer (Volume 4 of *The Chora of Metaponto 3*, compiled by Alberto Prieto, Cesare D'Annibale, Jon Morter, Steve Thompson, and Allison Devereux). All sanctuaries fall within 'Zone I' of Carter's proposed division of the chora (*Figure 3*). For a map of all sites used in this LCP analysis (both sanctuaries and farmsteads) see Appendix B: Map of Sites in LCP Analysis.

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[227] Vallet 1967.

[228] Discussed in further depth in section 4.2 The Extra-Urban Sanctuary and its Civic Uses; Pugliese Carratelli 1962; Lo Porto 1966, 322; Guzzo 1987; Asheri 1988; de Polignac 1995; Greco 1999; Osanna 1999, 283–91; Torelli 1999; Nafassi 2001; Sassu 2018; Williamson 2021.

Sanctuary Name	Distance from Ancient City	Earliest Greek Activity	Nature of Investigation	Site/Terrain Features	Features of Note
Pantanello	~3 km	7th c. BCE	excavated	natural spring	Nearby necropolis: '*agglomerato di Villaggio*' ['village agglomeration'] (Greco 2001, p. 185)
San Biagio	~8 km	7th c. BCE	excavated	natural spring, North bank of Basento River	Possible identification as Sanctuary of Artemis by Kasas River (Baccyl. 11.113)
Incoronata greca	~8 km	late 7th c. BCE	excavated	South bank of Basento River	8th-century Oenotrian settlement, 6th-century Greek sanctuary; nearby necropolis: Incoronata indigena (Carter 1994, 175-6; 2006 74-8; Savelli 2016)
Tavole Palatine	~3 km	7th c. BCE	excavated/standing temple	South bank of Bradano River	Sanctuary of Hera (SEG XXX.1176)
Favale	<1 km	7th c. BCE	excavated	Suburban Sanctuary	Weapon votives, Satyr/silenos/Pan votives (Carter and Prieto 2011, p. 499)

Pantano	~6 km	late 7th c. BCE	excavated	North bank of Bradano River	Possible structure (De Siena 2002, p. 36)
Site 266	~9.5 km	mid-6th c. BCE	surface survey	peak of small ridge	397 artifacts recovered over 80x50 m area (Carter and Prieto 2011, p. 56)
Site 270	~10 km	7th c. BCE	surface survey	low hill	Seated female votives, ~300 total artifacts over 40 x 30 m area (Carter and Prieto 2011, p. 99)
Site 334	~8.5 km	7th c. BCE	surface survey	valley	Miniature fragments, 220 total artifacts over 25 x 20 m area (Carter and Prieto 2011, p. 71, 102)
Site 397	~8.5 km	7th c. BCE	surface survey	sloping plateau	440 total artifacts over 20 x 10 m area (Carter and Prieto 2011, p. 74)
Site 477	~8.5 km	7th c. BCE	surface survey	valley	Seated female votives, 322 total artifacts over 30.25 m^2 area (Carter and Prieto 2011, p. 78, 112)

Table 1: Principal features of the 11 sanctuaries used in analysis.

Pantanello

Pantanello lies ~1.5-4 km east of the asty and 500 m from the ancient riverbed of the

Basento.[229] The area featured a natural spring and highly fertile soil. This region currently

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[229] Prieto 2011c, 50; summaries of localities referenced here can be found in Prieto 2011c, 48–53.

consists mostly of groves and areas of annual cultivation. Over the course of 8 seasons of excavation from 1974-2013, the sanctuary yielded nearly 30,000 artifacts and is recognized as "…one of the very few sanctuaries outside a Greek urban center in southern Italy or elsewhere to have been completely investigated in all of its diverse aspects."[230] Among the artifacts recovered were images of Pan, Herakles and female figures.[231] It consists of both a lower and upper sanctuary and appears to have been centered upon a natural spring (now obstructed and overgrown). In addition to ceramic and lithic artifacts, structures such a "collecting basin," hestiatorion, and structure for cultic use have been recovered.[232]

A nearby necropolis of 464 tombs served the immediate rural residents west of the asty, which suggests that the entire complex may have functioned as an epicenter and point of aggregation for the surrounding settlements.[233]

San Biagio

The literary evidence and identification of this site as a sanctuary of Artemis has been discussed above (2.1 Colonial Settlement). While only foundation courses suggest the location of a temple which once overlooked the Basento, 6 km from the asty, a spring appears to have been the focal point of this site whose activity began as early as the Bronze Age.[234] This spring, as we see regularly elsewhere in Metaponto and in other colonial

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[230] Carter 2018, 1.
[231] Osanna 1992, 78–9; Ammerman 2018; Carter 2018, 1.
[232] Carter and Swift 2018, 1.
[233] Greco 2001, 185; Sassu 2018, 149.
[234] Adamensteanu 1964; Bottini and Guzzo 1986, 103–7; Lo Porto 1988, 14–5; Carter 1994, 169; De Siena 2007; Carter 2011b, 613; De Stefano 2014, 158–61.

contexts, was likely what incentivized the construction of a sanctuary here.[235] Here (in addition to Favale, Tavole Palatine, Pantanello and Incoronata), excellent examples of archaic terracotta production in the Daedalic style, female figures (both seated and standing) wearing *peploi* and *apoptymai*, have been recovered from votive deposits.[236] These figures have been identified as Artemis and are dated as early as the 7th century, providing valuable context for the site (in addition to materials indicating the worship of Zeus Aglaos).[237] Scenes of procession are present on terracotta revetments from the site, including the highly recognizable 6th-century depiction of a hero aboard a chariot drawn by winged horses.[238]

Carter notes that this is one of several larger sanctuaries which appear at regular intervals along the Basento, at a spacing of approximately 3 km.[239] He suggests that this is nearly mirrored along the Bradano, although missing a sanctuary between those of Saldone and Cozzo Presepe and concludes that this is evidence for a clear division of the territory into "a dozen or so larger units."[240] The use of sanctuaries in establishing political boundaries is well documented in recent scholarship, and San Biagio may represent a political boundary established on the northern side of the Basento, perhaps along with its sister-sanctuary on the opposite bank to the south, at Incoronata greca.[241]

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[235] Olbrich 1979, 70–86; De Stefano 2014.
[236] Osanna 1992, 79–80; Carter 2011b, 613.
[237] Olbrich 1979, 70–86; Bacchyl. 11.113.
[238] Carter 1980, 27; De Siena 2007, 15–6; .Cyma frieze, held at the Museo Archeologico Nazionale di Metaponto; "departure of Amphiaraus."
[239] Carter 1994, 180.
[240] Carter 1994, 181.
[241] Lombardo 1983; Guzzo 1987; de Polignac 1995; Papantoniou and Kyriakou 2018, 544–5..

<u>Incoronata</u>

8 km from the coast, Incoronata is situated as if a twin to San Biagio, in an area overlooking the opposite bank of the Basento. There are many dozens of publications documenting the past 5 decades of excavation and survey at Incoronata, distinguished by their focus on the necropoleis (to the west) and Incoronata 'greca' (to the east) or 'indigena' (to the south).[242] The site famously produced the Incoronata *perirrhanterion* currently within the collection of the Museo Archeologico Nazionale di Metaponto, in addition to terracotta revetments similar to those discovered at San Biagio. The site has produced evidence of a long and varied history, including the floors of iron-age huts (both at indigena and greca), Greek ceramic presence beginning in the 7th century, and religious activity thereafter. [243] Possible identifications for the sanctuary include the worship of Persephone, although characterizing the site is an ongoing effort.[244]

Indigenous presence at the site prior to Achaian settlement in the 7th century BCE was likely an inciting factor for Greek interest in the area. While Incoronata greca is currently undergoing excavation and survey, preliminary results indicate the presence of both Greeks and Oenotrians simultaneously, perhaps in a peaceful relationship quite unlike the violent arrival of Greeks witnessed elsewhere in the West.[245]

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[242] Excavation of the area began in the 70s headed by Bruno Chiartano (necropoleis) and later Dinu Adamesteanu (sanctuaries) (Castoldi 1984); the results of the first test trenches of the plateau were published in 1971 by Dinu Adamesteanuwho continued to publish along with the later primary publications of Pietro Orlandini and Joseph Carter (Adamesteanu 1971).

[243] Iron Age huts (indigena): Siena and A. 1990, 72–5; De Siena 1996, 180–2; Iron Age huts (greca): De Siena 1996, 192–4; 7th-century ceramics: Carter 2011b, 585.

[244] Carter 1980, 27.

[245] Savelli 2016.

Tavole Palatine

The extra-urban Temple of Hera (Tavole Palatine) stands at a space of contact between Metaponto and the 'outside,' and established an important boundary between the territory of the Metapontines and that of both the Iapygians and the Tarantines to the east. This will be discussed in more depth in Chapter 3.

The sanctuary rests approximately 3 km from the walls of the ancient city, opposite the Bradano. 15 standing columns remain of the 6th-century hexstyle peripteral temple, investigated via survey sometime before 1830 by Honoré d'Albert, Duke of Luynes and the architect Joseph-Frédéric Debacq.[246] Still visible today is a monumental altar and pieces of the temenos, built following the temple of Apollo in the center of the Metapontine asty.[247] Dedicatory inscriptions to Hera have been excavated within the sanctuary, and the materials here have been the topic of publications for over a century.[248]

Favale

Ceramic materials indicate activity beginning in the 7th century and relief plaques depicting a satyr/silenos/Pan and a woman have been recovered here in greater quantity than elsewhere outside the asty.[249] A substantial votive deposit and reliefs of reclining banqueters suggest continual cultic land use into the late 4th century BCE.[250]

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[246] Luynes and Debacq 1833, 36; Osanna 1992, 78.
[247] Mertens 2005.
[248] SEG XXX.1176; Galli 1928.
[249] Adamesteanu 1980, 275–6; Ammerman 2011, 499.
[250] Ammerman 2011, 502.

<u>Pantano</u>

Located on the north bank of the Bradano and excavated between 2000 and 2001, Pantano lies buried in an alluvial plain.[251] Activity in this area is dated to the late 7th, early 6th century BCE and represents some of the earliest colonial activity documented within the chora.[252] The nature of the deposits found here are suggestive of a nearby structure for cultic use, although no such structure has yet been located.[253]

The sanctuary sites introduced above are those which have seen some level of exploration beyond surface survey, be it excavation or (as is the case with the Tavole Palatine) monumental remains. Below are sites which have not received the same level of attention, but which nevertheless meet the threshold outlined above in terms of EAW and FMCE. While a complete report of assemblages form survey can be found within the Gazetteer of Sites, each of the following presents a locality, year of survey, survey area size, and notable artifacts collected (and their count).[254] They represent sites with a significant scatter of materials and for which the land use can be identified with a high degree of certainty.

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[251] Carter 2011b, 614, 620.Carter 2011b, 614, 620.
[252] Andreassi 2002; Carter 2011b, 643.
[253] De Siena 2002, 36.
[254] Prieto et al. 2011.

Site 266

In the locality of Cogno del Prete, heavy ceramic and tile scatter has been identified in an area of 30x35 m, at the peak of a small ridge overlooking the plain. The site was identified in 1982 and 397 surface level artifacts were collected within an area of about 80x50m. A total of 110 black-gloss fragments were recovered, in addition to large amounts of banded ware (25), plainware (124), and transport amphorae (36). The identification of 2 miniature fragments, 48 terracotta fragments, and 1 decorated tile led to the identification of this site as a sanctuary.[255] Notable pieces from the assemblage include terracotta fragments of a banqueter(s) (No. 87-9), satyr and female figures (No. 90-7), an oinochoe (No. 76), and at least 9 skyphoi.[256]

Site 270

Light tile scatter and moderate ceramic presence was identified in the locality of Giampasquale over an area of 40x30m. The site was first surveyed in 1982 and revisited in 1990, with surveyors collecting nearly 300 total artifacts. 87 black gloss fragments were recovered over the two visits, along with 47 plainware, 24 banded ware and 79 impasto. 14 miniature fragments, 3 terracotta pieces, and 6 pieces of faunal remains collectively characterize the site as a sacred space.[257] Here, 1/3 terracotta pieces appears to depict a

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[255] Prieto 2011c, 56; site 266 may also represent a farmhouse, a production site, or any combination of the three yet in the absence of a more conclusive identification of the site, sanctuary seems to be the best site-type represented in the assemblage (Carter 2011b, 614–5).

[256] Swift and Devereux 2011, 98.

[257] Prieto 2011c, 68.

seated female figure and 18 pieces of archaic fine ware have been recorded, including an archaic line-decorated Panionian type cup (No. 43).[258]

Site 334

In the Venella valley, 220 total artifacts were recovered within a dense scatter covering 25x20m in 1982.[259] These included 83 black gloss, 18 banded ware, and 67 plainware. 4 terracotta pieces, and a significant 24 miniature fragments suggest the location of a rural sanctuary.[260] Among these miniature fragments are at least 4 pyxis sherds (No. 286), and 2 cups (No. 289).[261]

Site 397

This site in Avinella witnessed repeated survey in the years 1982, 1990, and 2001. Over the course of these visits, a total of 440 artifacts were recovered, including 174 black gloss, 27 banded ware, 115 plainware. 85 miniature fragments and 10 terracotta suggest religious activity. The total area surveyed at the site, located along a sloping plateau, ranged from 35x30 to 20x10 between visits.[262]

Site 477 (Figure 5)

Very heavy tile scatter was recorded again in the Venella valley in 1983. Here a total of 322 sherds were collected, of which 132 were black gloss, 40 were banded ware, and 79

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[258] Swift and Devereux 2011, 99.
[259] Artifact density was recorded with some infrequency throughout the many years of surface survey. Seasons for which this was recorded have the data included within the site Gazateer and project ARK: Prieto et al. 2011.
[260] Prieto 2011c, 71.
[261] Swift and Devereux 2011, 102.
[262] Prieto 2011c, 74.

plainware. The additional identification of 39 terracotta fragments and 10 miniature led to the classification of this site as a sanctuary. Site area was approximated at 30x25m.[263] Among the finds was a banded miniature and several terracotta figures of women both seated and standing (No. 229-44).[264]

A full table, listing each date bin with >0.95 EAW for each site used in this study can be found in "Appendix A : Site Catalogue". The processes outlined below have been performed for each of the 10 date bins used in the site dating process by members of the

Figure 5: Sanctuary Site 477, facing north. GCP placed at 16.74437525, 40.41070292. (Photo: Christine Davidson, May 2022)

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[263] Prieto 2011c, 78.
[264] Swift and Devereux 2011, 112.

ICA and Metaponto Archaeological Project. 9 of these bins span from 600 to 200 in 50-year increments, with one additional bin encompassing all material "pre-600."

3.3 Elevation Data

In the same way one might imagine an x and y axis in 2D space, a z axis is that third component in the creation of 3D space. When dealing with landscapes, the x and y axes can be equated to longitude and latitude, while this 'z value' is often referred to as 'elevation.' The most common means of acquiring elevation data for landscapes is through photogrammetric processes carried out via satellite imagery. Using images with significant overlap, parallax (the same method the human brain uses to judge depth and the reason all animals have a minimum of 2 eyes) is used to calculate depth between a satellite and the earth's surface. These measurements are recorded and, once compiled, can create a cell-based raster wherein each cell has an elevation value. When combined with geographical data (longitude and latitude), 3D data can be compiled, resulting is models of the earth which reflect location as well as surface topography.

While many topographical datasets (e.g. SRTM, TenDEM-X, ASTER) are provided as open-source (i.e. without the need to pay for the service of hosting/downloading etc.), the nature of global imaging via satellite results in a far lower resolution than desired. Instead, more localized imaging is preferred. This type of survey can be accomplished via LiDAR (Light Detection and Ranging) using planes or drones yet, as one might expect,

these types of survey are costly.[265] Digital Elevation Models (DEMs) made available by the Regione Basilicata - Centro cartografico dipartimentale della Direzione Generale del Dipartimento Ambiente e Territorio have thus been employed in this analysis. Unlike global DEMs (with resolutions of 24-30 m) these models boast a resolution of 5 m. In addition, survey towards the compilation of these data was conducted within the last decade (2016) and is freely accessible.[266] These are the results of a far more localized survey process, allowing for greater accuracy and higher spatial resolution.

3.4 On Cost Distance Analysis

The use of cost distance analysis in the visualization of network connectivity can be expressed as a series of sequential processes; 1) the definition of costs associated with a raster (pixel-based) layer representative of topography, 2) the application of these costs to create a cost-surface layer which utilizes a specified source from which travel originates, and 3) the digital tracing of a path representative of the least-cost route of travel between the source and a specified destination.[267]

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[265] The drone, a cheaper means of performing aerial survey and imaging when compared to the use of planes, is problematic as well. In the survey of Incoronata conducted in 2018, battery life presented substantial difficulty, with the necessity to 'hot-swap' batteries mid-survey posing a not insignificant obstacle to completion. These devices are therefore best suited for small scale survey of microtopography. For implementation of LiDaR in archaeological contexts of southern Italy (locating of Samnite hillforts), see Fontana 2022. Note that project members did not perform LiDaR survey themselves, but rather acquired access to data through a third party.

[266] While the DEMs are free to download, users may experience difficulty accessing the website outside of Italy: http://rsdi.regione.basilicata.it/dbgt-ctr/

[267] These processes are neatly summarized and contextualized within archaeology by Bevan (2013).

A fundamental component of this first process, and of cost distance analysis, is the use of multi-criteria evaluation.[268] This refers to the use of more than one criterion on which to base a computational decision. In much the same way that we might decide the route of our commute to the office based on traffic, toll roads, highways etc., multi-criteria evaluation in GIS allows us to assign weighted costs based on these criteria when evaluating topography. In a morning commute, a cost factor might include a numerical representation of traffic, or money needed to use toll roads. One of the systems in which multi-criteria evaluation is used is cost distance analysis, easily performed using software such as ArcGIS Pro which features a collection of tools designed for this purpose.

Cost distance tools use accumulated travel cost and weighted distance in order to determine the shortest possible distance between two points. Rather than calculating distance "as the crow flies" (Euclidean distance), these tools first create a surface raster layer which visualizes cost values of each cell. This means that the values represented in the surface raster layer are reflections of cost units, not geographic units. Using multi-criteria evaluation, these costs may include, for example, multiple factors such as slope or land use. Each of these costs can then be weighted differently, provided that the sum of the weights of each cost is equal to 1.[269] By combining these distinct cost-surface rasters into one, we create a total cost raster which visualizes the sum of all cost factors. Using this total cost raster as an input, we can then create a cost weighted distance raster in which a

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[268] c.f. Eastman 1999.

[269] This is otherwise referred to as weighted linear combination, used in multi-attribute decision-making (MADM) and multi-criteria evaluation.

source is specified, and cell values are determined by the least accumulative total cost in relation to the source. To return to the office commute, this source could be a residence, and each cell value could be determined by the accumulated costs such as traffic, money spent on tolls etc. in relation to the source cell.

This project utilizes only two cost factors (slope and hydrology) in the creation of a total cost distance raster layer, and the following represents a defense of this decision. While complex multi-criteria evaluation is preferred in projects which operate within an environment of existing connectivity, the purpose of the following digital analysis of the Metapontine chora is to strip all assumptions concerning connectivity away for the purposes of comparison with existing scholarship. Therefore, while it is possible to include draw factors (functioning as the opposite of cost factors) such as use of the Metapontine division lines as roads, this would rely on the assumption that these division lines represent routes of connectivity, rather than support or refute this hypothesis. This also ensures that the only data which is being processed is that of site location/type, terrain elevation, and water within the Basento-Bradano watershed. These data have physical, observable evidence and therefore the analysis avoids as much inferred information as possible (such as land use between sites, for example).

To simplify these two cost factors, slope has been reclassified by percentage, rather than degree. This ensures that all slope values fall between 0 and 100, and that water can be assigned a multiplier to represent the realistic method of pathfinding in which water-crossing is only attempted when land travel would require significant route deviation. For water within the Basento-Bradano watershed, all streams and rivers (classified as "Ancient

River" in the "hydrography" layer of the Metaponto GIS) have been assigned a multiplier of 5.[270] This reflects the same multiplier used for "wet soils" in Herzog's pathing of 9th-century trade routes the Bergisches Land, Germany.[271] The function RemapValue was used to reclassify all "no data" cells to a value of 1 in the "hydrography" layer, ensuring that all non-river/stream cells would offer no change to total cost.
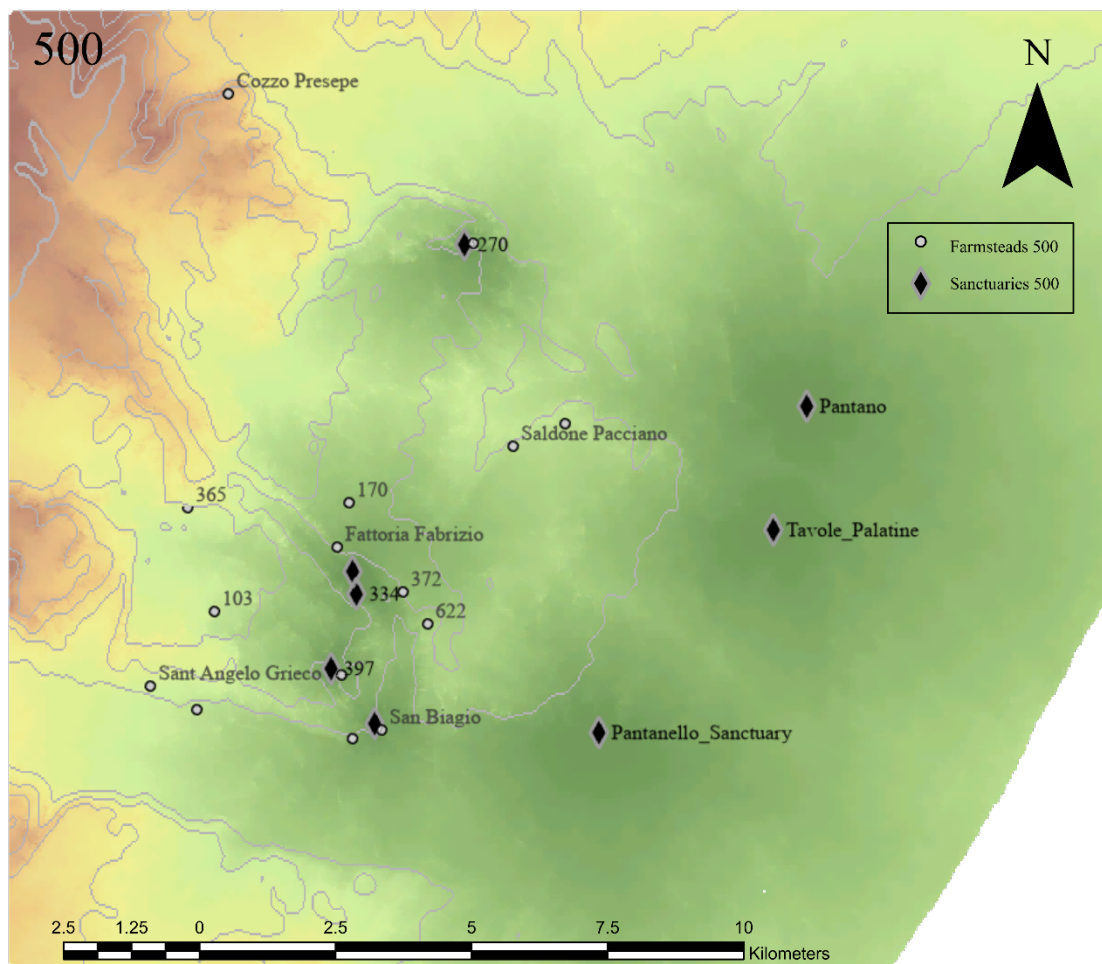
Figure 6: Cost distance raster for 500 date bin. (ArcGIS Pro 2.6.3)

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[270] Hydrography data has been collected from the Istituto Geografico Militare 1:50,000 topographic maps (sheets 491/Ferrandina, 492/Ginosa, and 508/Policoro) and the ICA 1:10,000 topographic maps, Dana 2011, 94.

[271] Herzog 2012, 238.

Mechanically, the cost distance is calculated using ArcPy (Python) within the ArcGIS Pro environment. The Cost Distance tool requires only the total cost and source variables and produces a total cost distance raster layer. A total cost distance raster has been produced for each date bin, an example of which can be seen in Figure 6. Note that the clipping of the raster in the bottom right corner indicates the modern waterline of the coast.

This slope cost is considered fully anisotropic, meaning it is directionally dependent; travelling against an upward slope should suggest a higher cost than travelling perpendicular to the incline. Before we are able to determine any paths which connect two points, it is also necessary to create a cost direction, or backlink raster. This utilizes the total cost distance raster to determine for each cell within the raster which cell among the 8 immediately adjacent cells represents the least-cost path back to the source. This 8-cell ("Queen's led") backlink process is used by ArcGIS Pro, although other GIS software, such as GRASS, can use a 16-cell ("Knight's led") backlink process. Bevan has compared these two methods, and the 16-cell backlink raster appears to mimic human pathfinding more closely.[272] It is this, in addition to the total cost raster, which is used in the creation of a series of least-cost paths.

3.5 On Geomorphology

There are within the chora areas which have undoubtedly been affected by the shifting landscape of the past two millennia. Sampling of soil in the cut faces of the Basento and

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[272] Bevan 2013.

Bradano rivers reveals an ancient landscape buried as deep as 10 meters.[273] Along with the majority of coastal settlements from antiquity, the coastline has receded significantly and at Metaponto this amounts to a change of one kilometer.[274] A geomorphological layer within the Metaponto GIS was added while the project was led by members of the ICA, and this has proved a valuable tool in identifying areas in which site density may be the result of shifting materials, and not therefore indicative of original settlement patterning.

This geomorphology would result in a meandering quality to any generated LCPs, a typical result of sediment shifting into drainage areas (a purpose roads also served). These straight lines would form truncated spurs over the course of several centuries of alluvial shift.[275] The division lines as they appear in the GIS are also highly simplified, and not reflective of their sinuous nature on the ground, again a likely result of shifting topography.[276]

Dario Gioia, Massimo Bavusi, Paola Di Leo, Tonia Giammatteo, and Marcello Schiattarella have composed a thorough geoarchaeological study using the Metaponto GIS.[277] Using an automatic classification of landscape called the Topographic Position Index, they have mapped the geomorphology of the Metapontine chora and identified important areas of alluvial deposits, floodplains, and terraces. Following the coastal plain (which has seen little activity in terms of surface survey or excavation), alluvial terrace is

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[273] Folk 2011, 26–7.
[274] Folk 2011, 26.
[275] cf. Folk 2011, 21, Figure 1.45: formation of truncated spurs over time.
[276] Folk 2011, 20.
[277] Gioia et al. 2020.

the most common landform suggested by this analysis.[278] The sites used here therefore avoid these alluvial areas so as to provide the most accurate georeferencing of site materials.[279]

The final process before LCPs are generated localizes farmsteads and settlements based on the nearest sanctuary within each date bin. This can be visualized through the use of Cost-Distance Allocation and Thiessen polygons.

3.6 Cost-Distance Allocation to Visualize Nearest Sanctuary in Date Bin
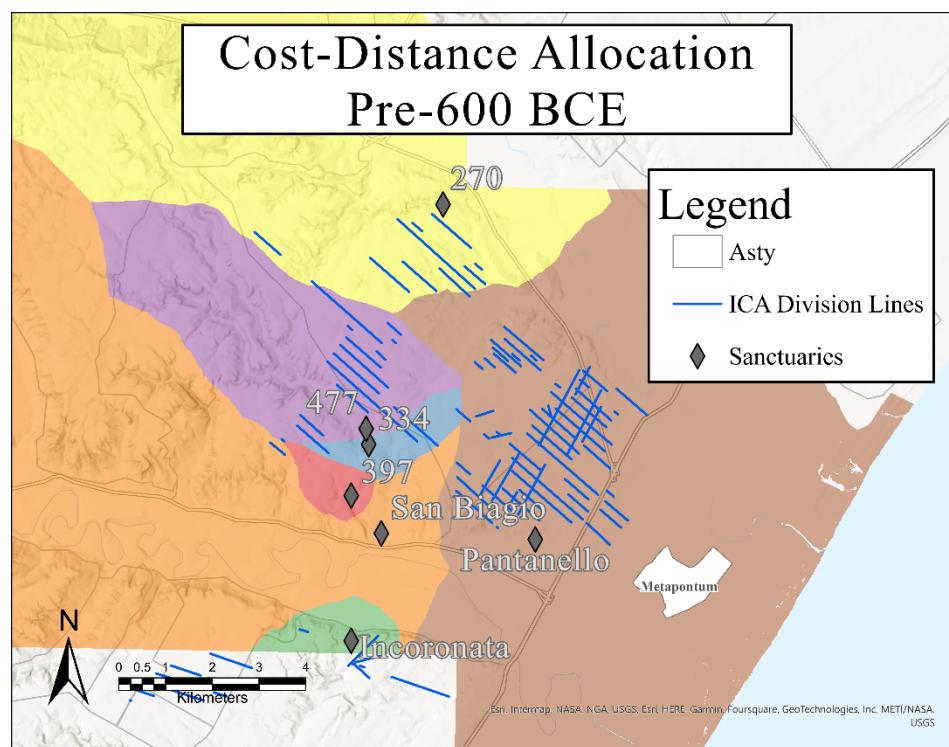
Figure 7: Cost-Distance Allocation raster of sanctuaries pre-600. (ArcGIS Pro 3.1.1)

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[278] Gioia et al. 2020, 123.

[279] Incidentally, the settlers of the Metapontine chora seemed to avoid these areas anyway – with only a handful of sites falling within this threshold. Perhaps the alluvial nature of the terrain today is suggestive of regular flooding in antiquity, not suitable for permanent settlement.

Referenced above, Thiessen polygons are created using a computational process which draws polygons over digitized terrain within which any point is closer to the polygon's 'source' than the source of any other polygon. This results in the creation of zones, and is a process which has been used in order to determine the nearest sanctuary to each settlement within the Metapontine *chora*. The polygons created for use in this study utilize cost factors such as slope and hydrography to determine which contemporary sanctuary was closest to each settlement by foot, rather than Euclidean distances which fail to account for costs of travel across a surface. These are referred to as Cost-Distance Allocations. An example set of Cost Distance Allocations and Thiessen polygons for the Pre-600 date bin can be found in Figure 7 and Figure 8. Cost-Distance Allocations for all 10 of the date bins can be found in Appendix E: Cost-Distance Allocations.
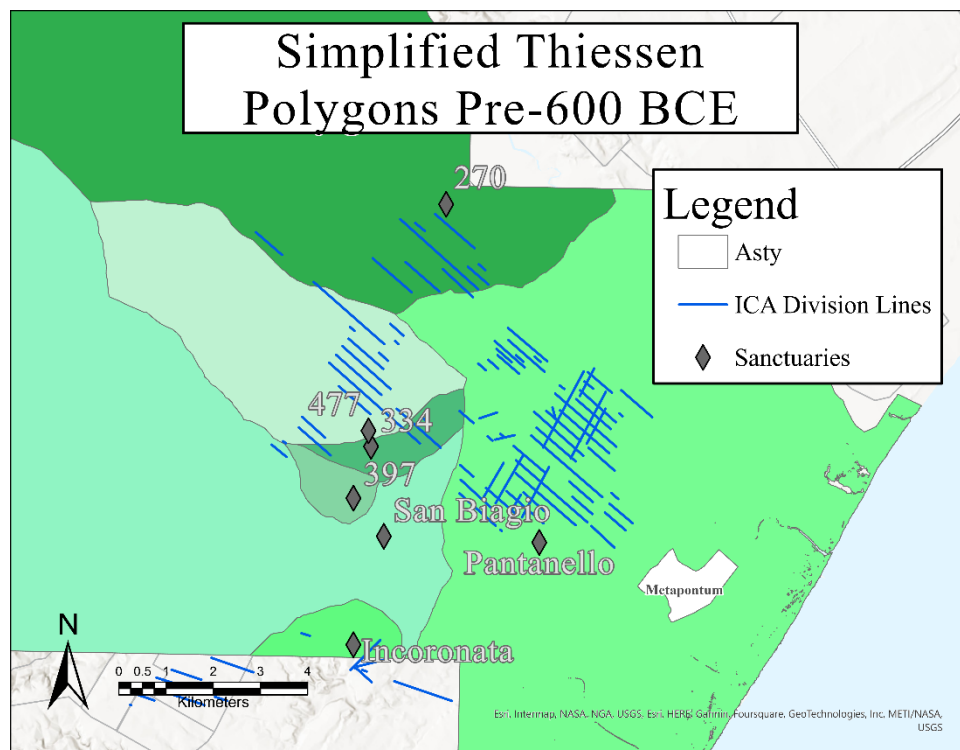
Figure 8: Simplified Thiessen Polygons of sanctuaries pre-600. (ArcGIS Pro 3.1.1)

3.7 Cost Path Analysis

The processes outlined above are each necessary for the creation of a Least Cost Path. This function requires a cost-surface (itself reliant on a DEM to create slope), a source, a backlink raster, and a destination. Both cost distance and backlink are calculated using the cost-surface and source variables, and finally a destination is added in order to calculate a cost path.

Limited testing has been performed concerning the efficacy of LCPs, the majority of which serves as cursory addenda to survey data rather than as explicit testing of its ability to accurately identify the locations of ancient thoroughfares.[280] This largely is the result of limited physical evidence of extra-urban roads prior to the Hellenistic period. The discovery of physical evidence which confirms the suggested location of a route from Mount Pentelikon to the Athenian Acropolis predicted by Korres (1995) presents a unique opportunity to retroactively test if an LCP may have provided more evidence for the placement of this route.

Korres utilized analysis of geomorphology and archaeological remains to attempt mapping the Pentelikon *lithagogia* to the Athenian Acropolis, established for the purposes of transporting quarried marble used in the construction of the Parthenon of the classical period.[281] In 2009, within the district of Chalandri, Ioanna Drakotou and their team from the 2nd Ephorate of Prehistoric and Classical Antiquities revealed physical evidence of this

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[280] Exceptions include Soetens 2009; Herzog 2012.
[281] Korres 1995.

route (Melpo Pologiorgi identified a stretch measuring 19.7x3.3 m, flanked by supporting walls), confirming a significant portion of Korres' proposed route.[282] This presents a set of conditions which are ideal for testing the accuracy of LCPs in predicting ancient road placement. Using the original maps published by Korres, we are able to generate and overlay an LCP and test if this model aligns with the lithagogia Korres suggests.

From Korres' publication, two maps have been georeferenced using spline transformation. A total of 44 ground control points were selected for Map 1 (the Acropolis), and 71 for Map 2 (Pentelikon). Hydrography was acquired from the American School of Classical Studies at Athens, from the Geofabrik/OSM (OpenStreetMap) Waterways shapefile.[283] An LCP was then created using Korres' placement of the marble quarry at Pentelikon as the source and the east face of the Parthenon as the destination. Initial LCP generation using the ASTER elevation dataset yielded a path which diverged considerably south from Korres' proposed route in the area of Koto Patima. It continued south until reuniting with Korres' route in western Chalandri. Alternatively, an LCP was also generated using an EU DEM, which itself combines both ASTER and SRTM data at a resolution of 25 m. Unfortunately this, too, deviated from Korres' proposed route by travelling north from Patima to Chalandri. This area of Athens is largely devoid of slope, making up a valley between Lykavittos and Kesariani. Paths in this area meandered based on least cost, misrepresentative of travel along thoroughfares, which favour straight lines

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[282] Rovva 2017.
[283] Geofabrik is an opensource geodata service, shared with the ASCSA in 2007. (https://www.ascsa.edu.gr/excavations/ancient-corinth/digital-corinth/maps-gis-data-and-archaeological-data-for-corinth-and-greece)

over circuitous pathfinding.[284] This prompted the addition of a new cost factor: preference for straight pathfinding (a draw factor). By adding a new percentile-based cost raster layer which assigned weight based on accumulative distance from a line drawn between the source and destination, a path was generated which traced Korres' route closely (Figure 9).
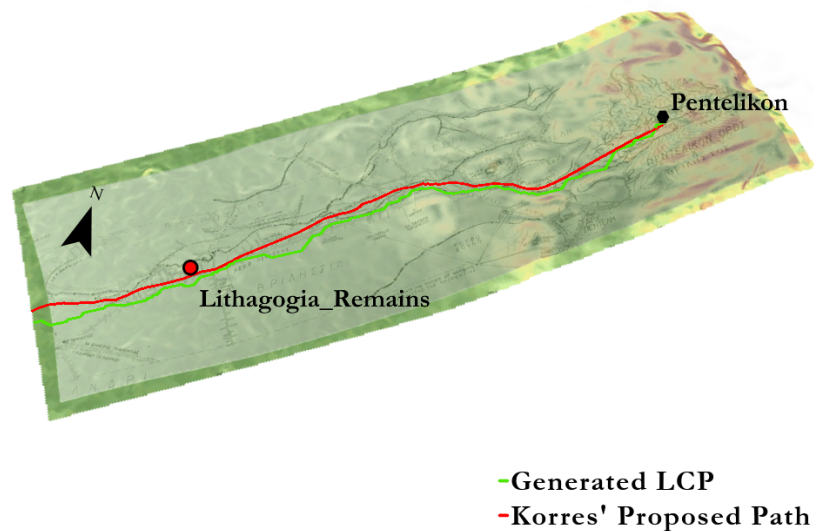
Figure 9: LCP following the path of the *lithagogia* (after Korres 1995).

While a promising start, a single path does not constitute a network. The default in LCP rendering within ArcGIS Pro is to construct networks which are "all pair shortest paths" in situations where there is more than a single source/destination. This results in a chaotic web of connecting paths wherein each node is connected to each of its neighbours, without a sense of path chronology. Instead, especially in the case where land use is largely

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[284] Flat terrain results in paths which are, "…ephemeral, redundant and without centrality…" (Herzog 2012, 328).

agricultural, a "least-cost network to the builder" is required.[285] This constructs a network which, in addition to minimizing costs based on weighted factors such as slope and distance, also favours the least number of roads needed to sufficiently connect nodes within the network. Complicating this process, however, is the necessity to include all site locations within the network. Typically, this would render this process incompatible in a context such as that of Metaponto in which all sites are not known. While survey in the Metapontine chora is extensive, it cannot accurately comprise of every antique site by the very nature of site degradation over time (nor could any project in surface survey).[286] The focus of this analysis is not to fully reconstruct communication throughout the chora, but to investigate areas of high traffic and communication in relation to the topographical "division lines" recorded throughout the landscape. We are therefore searching for any areas in which paths align with the division lines, and for this a least-cost to the builder network is ideal, even with a 'limited' catalogue of sites.

For each date bin, the following variables were used in the creation of a series of LCPs:

Elevation ('slope')	Regione Basilicata DSMs
cost	Slope, water (multiplier = 5); from "hydrography" layer in legacy data
source	Location of Sanctuaries
destination	Location of Settlements

Table 2: Variables used in ArcPython implementation of LCPs in the Metapontine chora.

[285] Herzog 2012, 239.
[286] Alberto Prieto discusses these concerns, and notes that the lengthy survey project (sometimes resulting in 20 years between site visits) enables investigation of modern-day site degradation: Prieto 2011a, 88.

The vocabulary used in these processes is somewhat counterintuitive, since the above variables produce paths which lead *from* a settlement *to* a sanctuary (a function referred to as "B to A"). Again, slope as a cost variable is anisotropic, and therefore the direction of travel will affect the LCP produced. Scholarship suggests that fresh water, arable land and several other agrarian-related factors were prioritized in settlement, and therefore it is unlikely that they were established in direct relation to the location of sanctuaries. Therefore, paths have been rendered which represent routes originating at a settlement and concluding at an extra-urban sanctuary, representing the more realistic direction of travel in terms of ancient pathfinding.

An example process within ArcPy (Python) for the Pre-600 date bin is as follows:

```
from arcpy.sa import *
from arcpy import env
slopeCost=Slope('RegioneDSMs.tif','PERCENT_RISE')
water=Raster('WaterRaster')
rcl=RemapValue([["NODATA",1],[0,1],[1,5],[2,5],[3,5]])
waterCost=Reclassify(water,'value',rcl)
hydroSlope=slopeCost*waterCost
source="Santuaries_Pre_600"
destination="Farmsteads_Pre_600"
costDistToSanctuaryPre600=CostDistance(source,hydroSlope)
backLinkToSanctuaryPre600=CostBackLink(source,hydroSlope)
CostPathAsPolyline(destination,costDistToSanctuaryPre600,backLinkToSanctuaryPre600,"pathfromFarms
teadToSanctuaryPre600",'EACH_CELL',"OBJECTID")
```

arcpy.CountOverlappingFeatures_analysis("pathfromFarmsteadToSanctuaryPre600","PathOverlapPre600")

The final line of this ArcPy process considers all generated LCPs within the date bin and identifies those which overlap. The number of LCP segments which overlap is tracked as a 'count,' and visualized within the generated "PathOverlap" polyline feature. A count of 1 represents a path for which there is no overlap, and the maximum overlap is 26. Only LCP segments with ≥4 overlap (the count mean) have been considered in this study (i.e. evidence of 'high traffic').
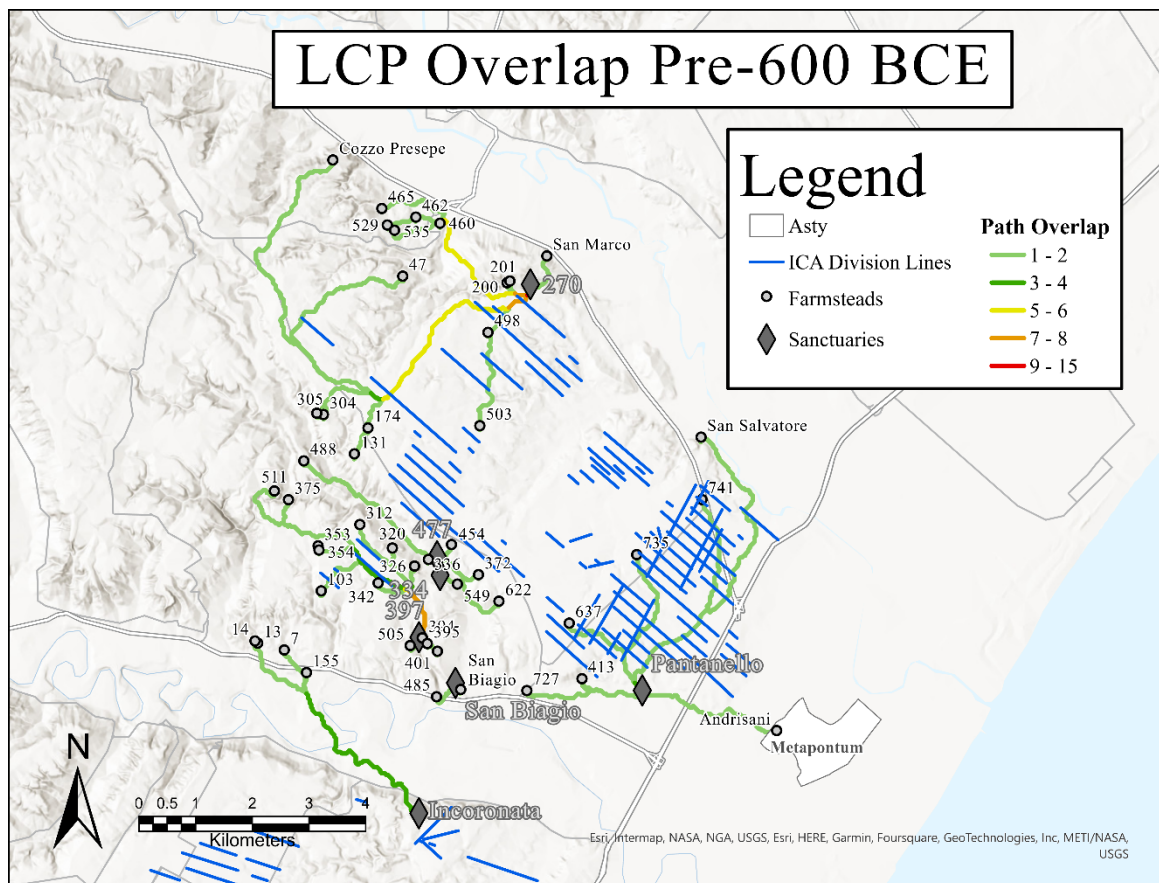
Figure 10: LCP overlap in 'pre-600 BCE' date bin.

The results of this example process can be seen in Figure 10. LCPs for each of the 10 date bins can be found in "Appendix F: LCPs by 50-Year Date Bin". Areas of particular interest, other than those with significantly high overlap, are those which appear as an extension of the division lines system and those which align with the division lines themselves. Both are explored in the following two sections.

3.8 Alignment with the ICA Division Lines

The following LCP segments included in are considered 'high-traffic' (i.e. ≥4 path overlap) and interact with the division line system, often across multiple date-bins. These relationships are summarized in the following table (Table 3) and explained further below. Segment lengths were determined using the measure tool (Geodesic) within ArcGIS Pro and represent Euclidean net distance. Segments were selected by identifying those which followed the mean azimuth of 131º for NW-SE division lines, and 225º for NE-SW represented by the ICA division lines at a threshold of ± 5 degrees. Due to the sinuous nature of some paths, where increasing the segment length would result in significant deviation from the division line mean azimuth, a shorter segment was selected. *Figure 11* incorporates all LCP segments outlined below (including those of the 'Uggeri transect system' discussed in section 3.9).

LCP	Date-Bins (≥4 Overlap)	Max. LCP Segment Length	Max. Overlap	Approximate Azimuth (and direction)
LCP 1	350, 300	1.6 km	10	132º NW-SE
LCP 2	Pre-600, 600, 550, 500, 450, 400, 250	1.6 km	8	128º NW-SE
LCP 3	550, 450, 400, 350, 300, 250	770 m	19	128-131 º NW-SE
LCP 4	Pre-600, 600, 550, 450, 400, 350, 300, 250, 200	2.69 km	14	206-212 º NE-SW
LCP 5	350, 300, 250	230 m	14	130º NW-SE
LCP 6	550, 500, 450, 400, 350, 300, 250	305 m	16	218º NE-SW
LCP 7	Pre-600, 600, 550, 450, 400, 250	730 m	12	132-136 º NW-SE

Table 3: LCPs which mimic the azimuth of ICA division lines by ± 5º.
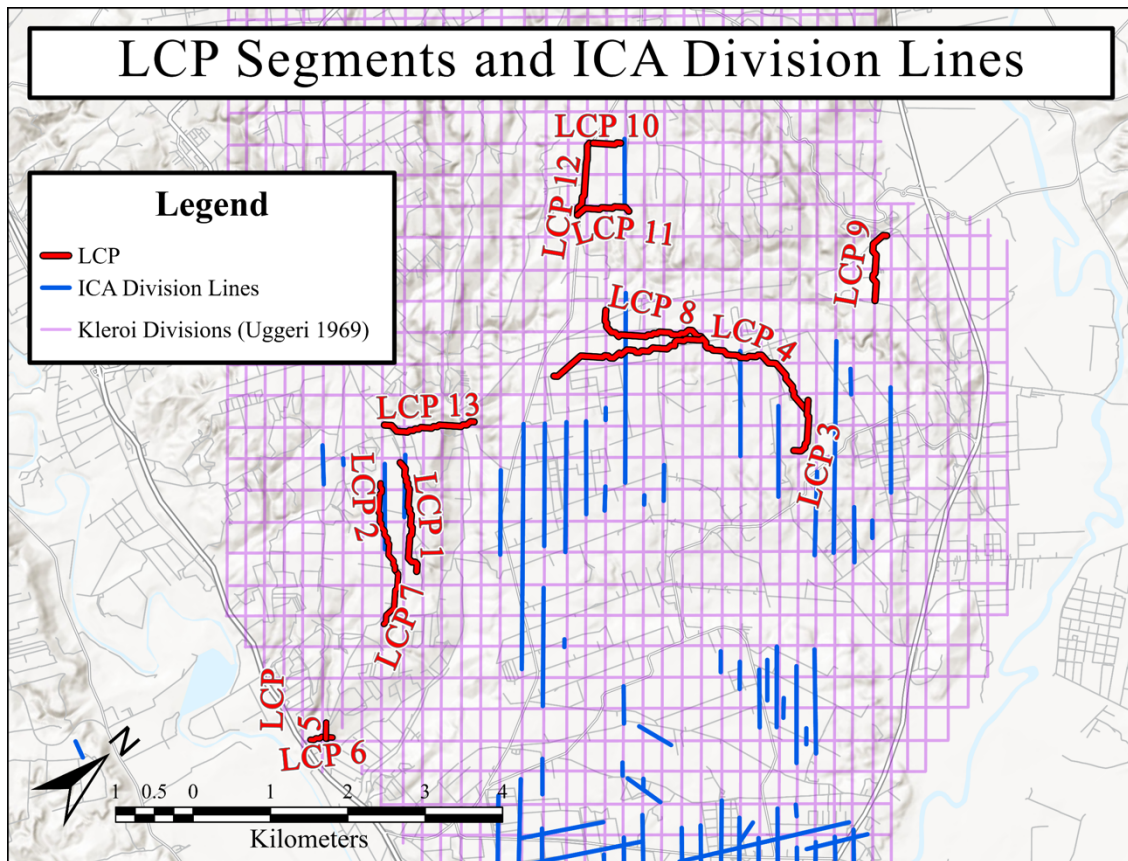
Figure 11: LCP segments and Division Lines across all date-bins, including Uggeri *kleroi* system (1969). (ArcGIS Pro 3.2.1)

LCP 1 (Figure 13)

LCP 1 follows L22 closely, and its approximate net bearing is remarkably close to that of the division line (132º NS). At 1.6 km in length, it is one of the longest LCP/Division Line interactions recorded. Most interesting is its interaction paired with that of LCP2, the pair of which confirm use of Lines 22 and 23 as routes of communication in the chora.

Photographs taken at the midpoint of this interaction (Figure 12) demonstrate that the vegetation blanketing the modern landscape renders a remarkably level topography. This highlights the efficacy of the LCP method – one which is able to digitally recognize patterns in pathfinding which are invisible to the naked eye.

Figure 12: Mid-point of LCP1 segment interacting with L22, facing NE (left) and SW (right). GCP placed at 16.73961292, 40.36809166. (Photos: Christine Davidson, May 2022)
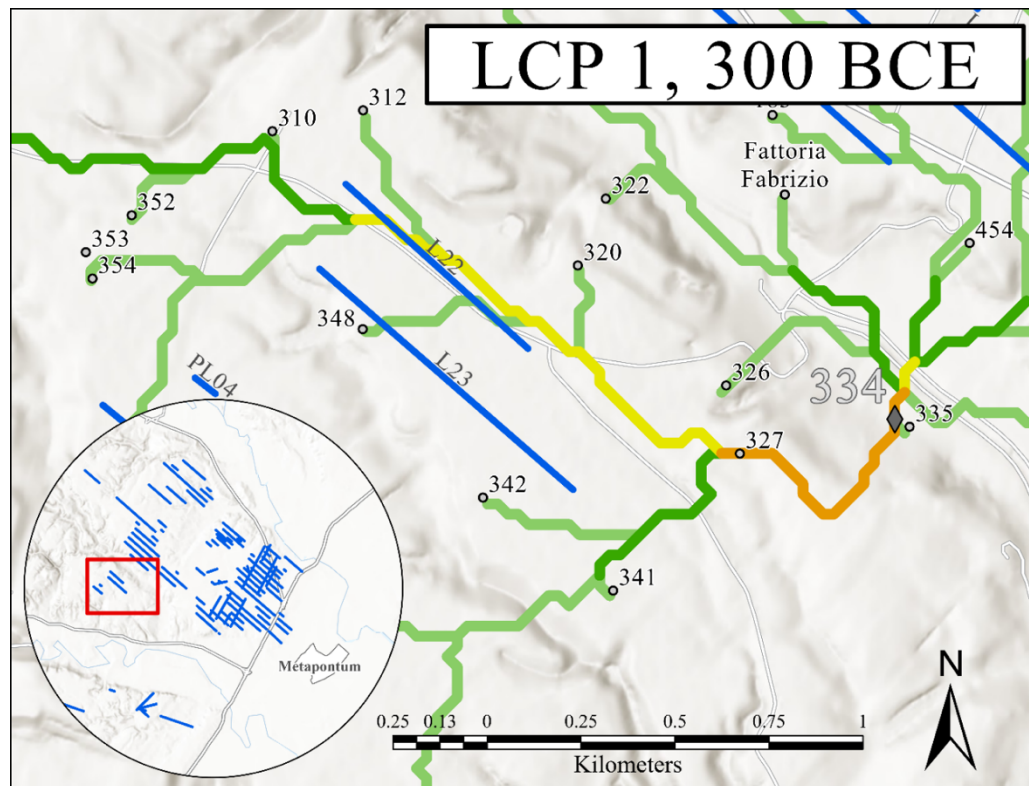
Figure 13: LCP1 from 300 date bin alignment with Division Line L22. (ArcGIS Pro 3.1.1)
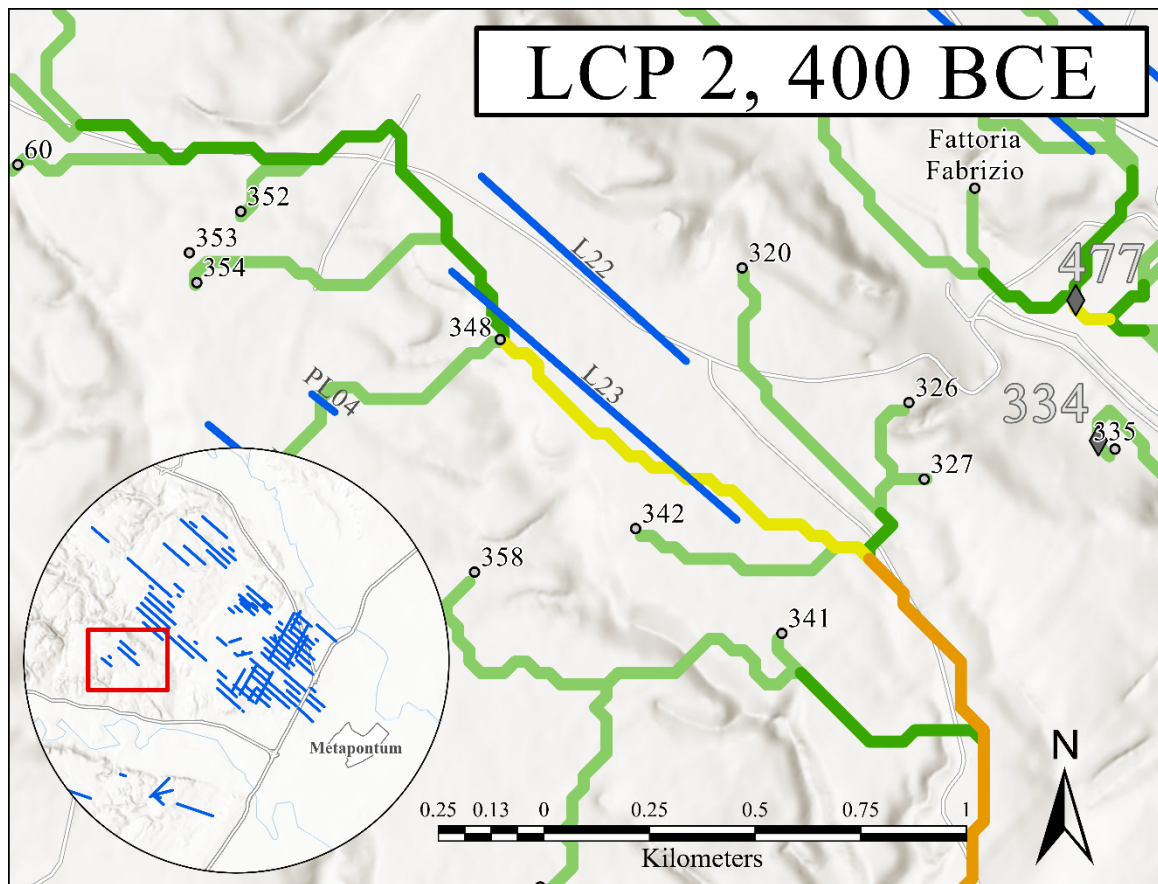
Figure 14: LCP2 from 400 date bin alignment with Division Line L23. (ArcGIS Pro 3.1.1)

LCP 2 (Figure 14)

The pair to LCP 1, LCP 2 follows Division Line L23 in much the same way. L23 follows a net bearing of 130º NW-SE, whereas LCP 2 averages 128º, again remarkably close. It also appears across 7 of 10 date-bins, suggesting continual usage of the route throughout the development of the chora.
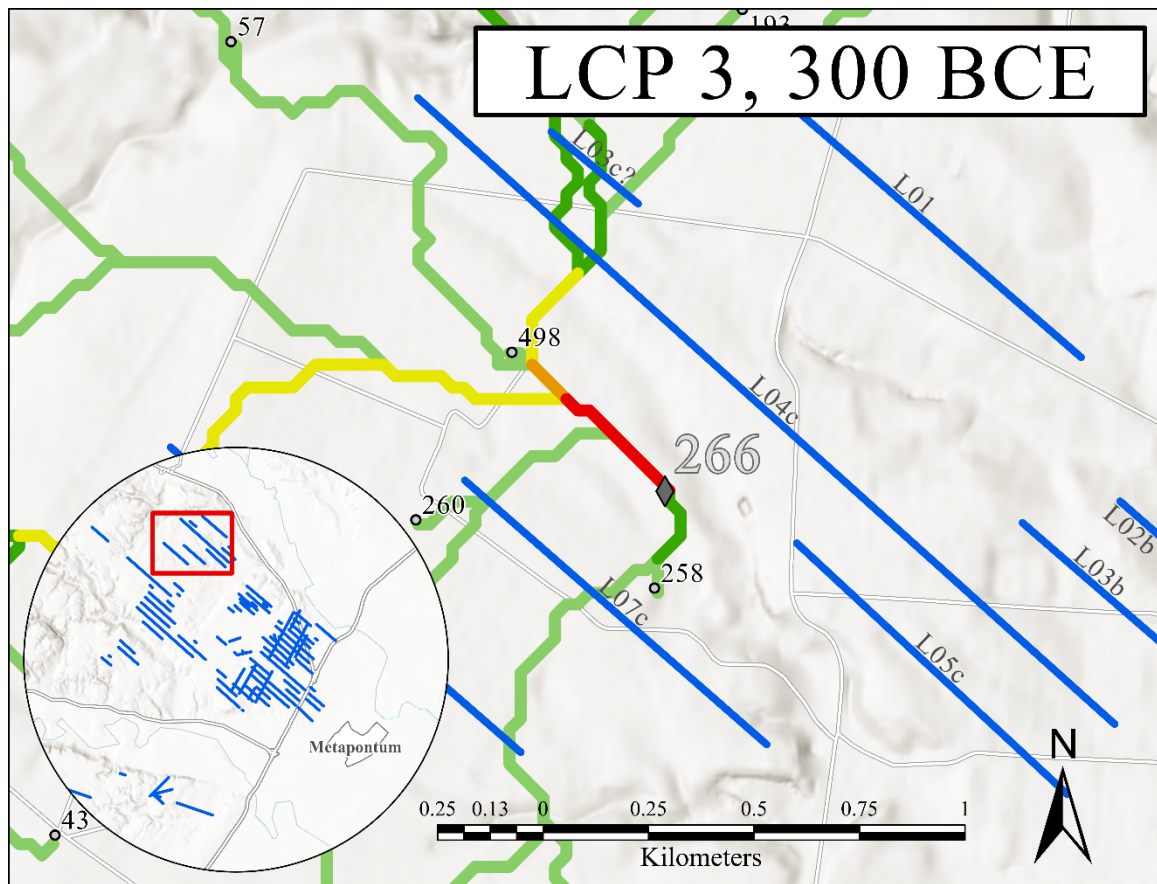
Figure 15: LCP3 from 300 date bin alignment with Division Line L05c. (ArcGIS Pro 3.1.1)

LCP3 (Figure 15)

This segment lies NW of division line L05c and parallel to L04c. With a net bearing of ~126-131º North-South, it is possible this segment indicates an extension of L05c which itself has a net bearing of 132º North-South. However, LCP3 is shifted ~100 m south of a true extension to L05c. This may be the result of division line projection error, of the varying schemes between Uggeri, Adamenstanu, and Vatin, or of conflicting resolution in the DEM data.[287]

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[287] Uggeri 1969; Adamesteanu and Vatin 1976.
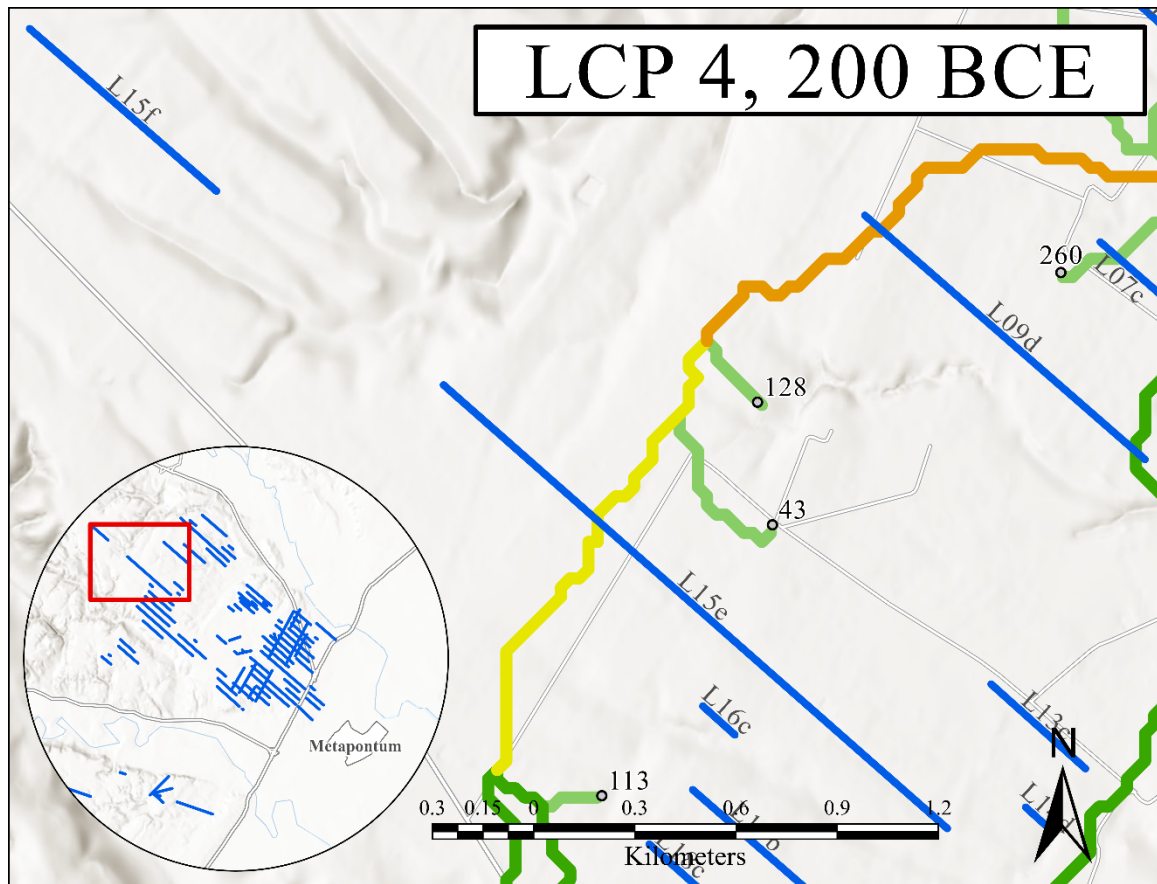
Figure 16: LCP 4 from 200 date bin creating transverse system intersecting with L15e and L09d. (ArcGIS Pro 3.1.1)

LCP 4 (Figure 16)

LCP 4 is the first of the segments which interacts with a potential transverse division line system. Transverse lines added to the division lines layer do not cross the NW-SE lines at a 90º angle, instead forming land parcels at an angle of 78º.[288] This transverse system proposed initially by Adamestanu and Vatin (1976) and supported by publications from the ICA, features a mean azimuth of 208º NE-SW. Not only does LCP 4 precisely align with

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[288] Adamesteanu and Vatin 1976.
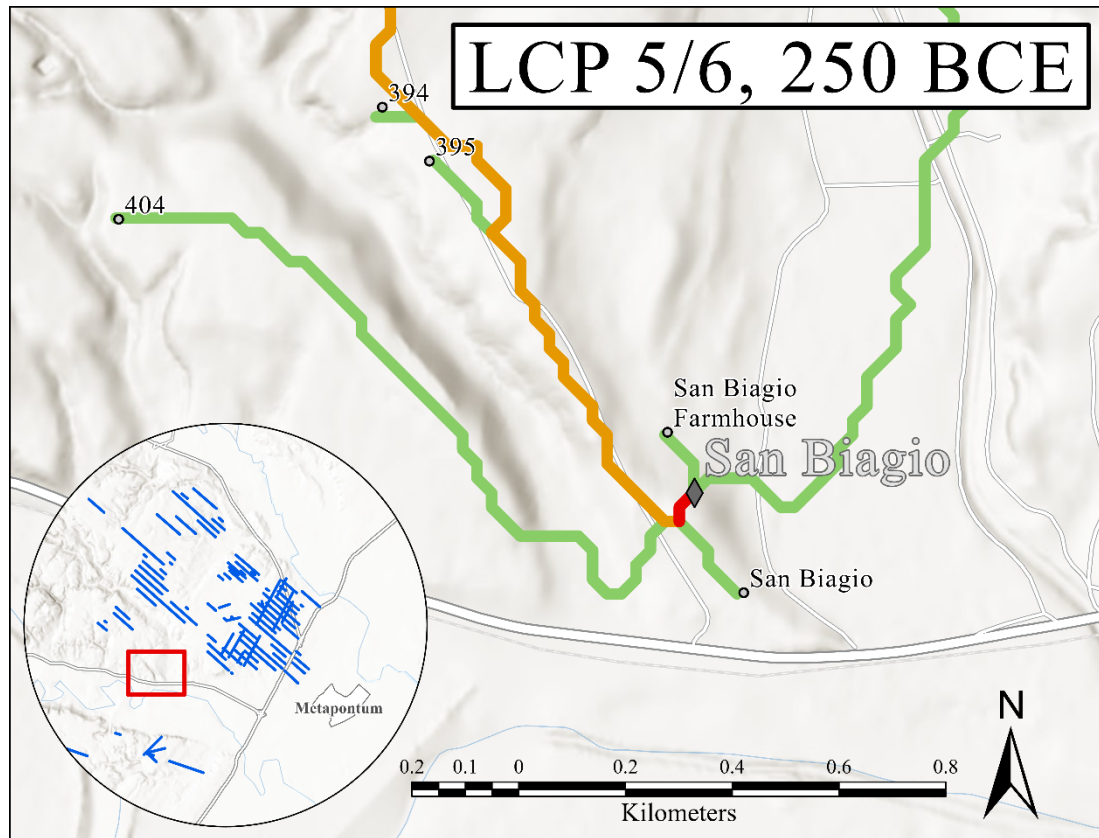
Figure 17: LCPs 5 and 6 from 250 date bin alignment interaction with San Biagio sanctuary (ArcGIS Pro 3.1.1).

this net bearing, but it is also present in nearly every date bin (9 of 10). This is likely the manifestation of a transverse thoroughfare. LCP 4 joins with LCP 3 and provides access to sanctuary site 266.

LCP 5 and 6 (Figure 17)

LCP 5 and 6 form a crossroads approximately 90 m south-west of the Sanctuary of San Biagio. The net bearings for each component of this intersection (NW-SE: 136 º, NE-SW: 218 º) align very closely with the division lines documented by the ICA. The segment running from NE-SW measures about 1 km and joins with an extension of LCP 2. While the net bearing of the NE-SW segment differs from the bearing of the ICA transverse

112
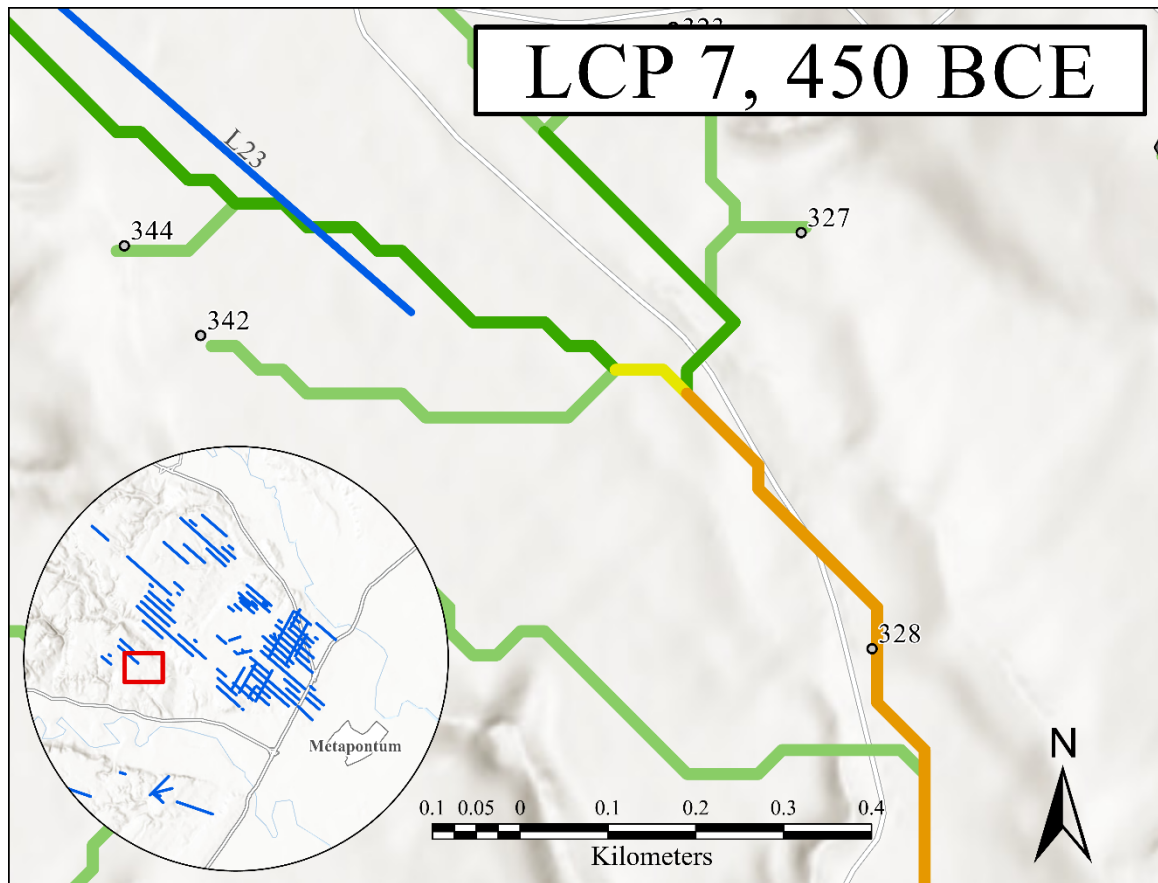
Figure 18: LCP 7 from 450 date bin indicating an extension of L23 (ArcGIS Pro 3.1.1).

system by approximately 10º, this may be explained using Uggeri's system (explored below).

LCP 7 (Figure 18)

This segment almost certainly represents an extension of L23. (in 7/10 date bins the segment is repeated at least in part at an overlap of 3 or less). Its net bearing is nearly identical to the division line mean and presents itself in a nearly perfect line along this bearing.

3.9 Alignment with Uggeri's Transverse Lines

LCP	Date-Bins (≥4 Overlap)	Max. LCP Segment Length	Max. Overlap	Approximate Azimuth (and direction)
LCP 8	Pre-600, 600, 550, 450, 400, 350, 300	1.1 km	10	221º NE-SW
LCP 9	Pre-600, 550, 450, 400, 350, 300, 250	800 m	7	130º NW-SE
LCP 10	[Present in: Pre-600, 450, 350, 300]	300 m	1	221º NE-SW
LCP 11	[Present in: 550, 450, 350, 300]	480 m	2	220 º NE-SW
LCP 12	[Present in: Pre-600, 600, 550, 500, 450, 400, 350, 300, 250]	804 m	3	136º NW-SE
LCP 13	200	910 m	5	222 º NE-SW

Table 4: LCPs which mimic Uggeri's kleroi system (1969) at ± 5º.

A number of LCP segments which have not been included above cross the division lines at or near a 90º angle. These support neither the transverse system proposed by Adamesteanu and Vatin, nor the 2011 survey publications. It is possible, however, that these represent similar topographical features, and perhaps more closely resemble the system first proposed by Giovanni Uggeri in 1969.[289] Uggeri's transverse system expanded from the anomalies Schmiedt and Chevallier identified from 1950s aerial imagery, with NE-SW lines crossing the modern state road 106 at equal distances approximately 210 m apart.[290] These divisions, which Uggeri suggests served the purposes of property

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[289] Uggeri 1969.
[290] Schmiedt and Chevallier 1959, 27–36; Uggeri 1969, 54.

delineation, drainage, and routes of access, initially were speculated as uniform *κληροῖ*

('plots') of about 328x205m, with each parcel encompassing an area of ~6.5 hectares

before being subdivided again into individual lots (*σχοῖνοι*, map included in Appendix 4).

While this transverse frame into which Uggeri fit his system of *κληροῖ* had not been

incorporated into the Metaponto GIS in full, this project has resulted in its addition. These

'new' divisions have an average net bearing of approximately 221º NE-SW. LCPs which

follow Uggeri's system are summarized in *Table 4*. Excluded from this analysis are those

LCPs which, while they align with Uggeri's system, are influenced by alluvial terrain (i.e.

so near a waterway that it follows Uggeri's system by coincidence).
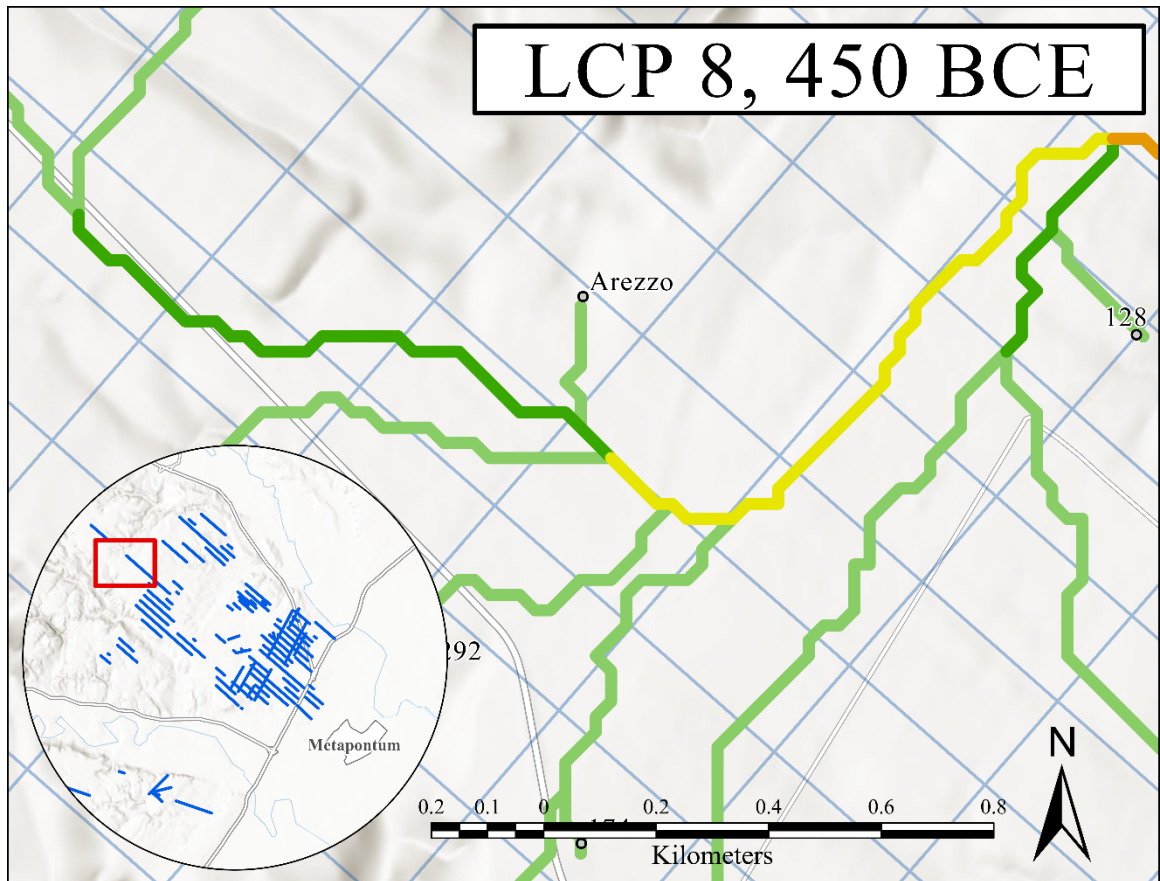
Figure 19: LCP 8 from 450 date bin alignment with Uggeri division system, indicated in blue
(ArcGIS Pro 3.1.1).

LCP 8 (Figure 19)

LCP 8 is located 600 m SE of the site of Arezzo and is present in 7 of 10 date bins.

The most interesting feature of this LCP is the 90-degree turn it makes at its southern extent.

This change in direction precisely follows the corner located at the intersection of the NE-

SW and NW-SE division systems. The closest modern road lies a minimum of 450 m away,

therefore it would not appear that this route is the result of influence from current

accessways. LCP 8 is therefore strong evidence in the confirmation of Uggeri's divisions.
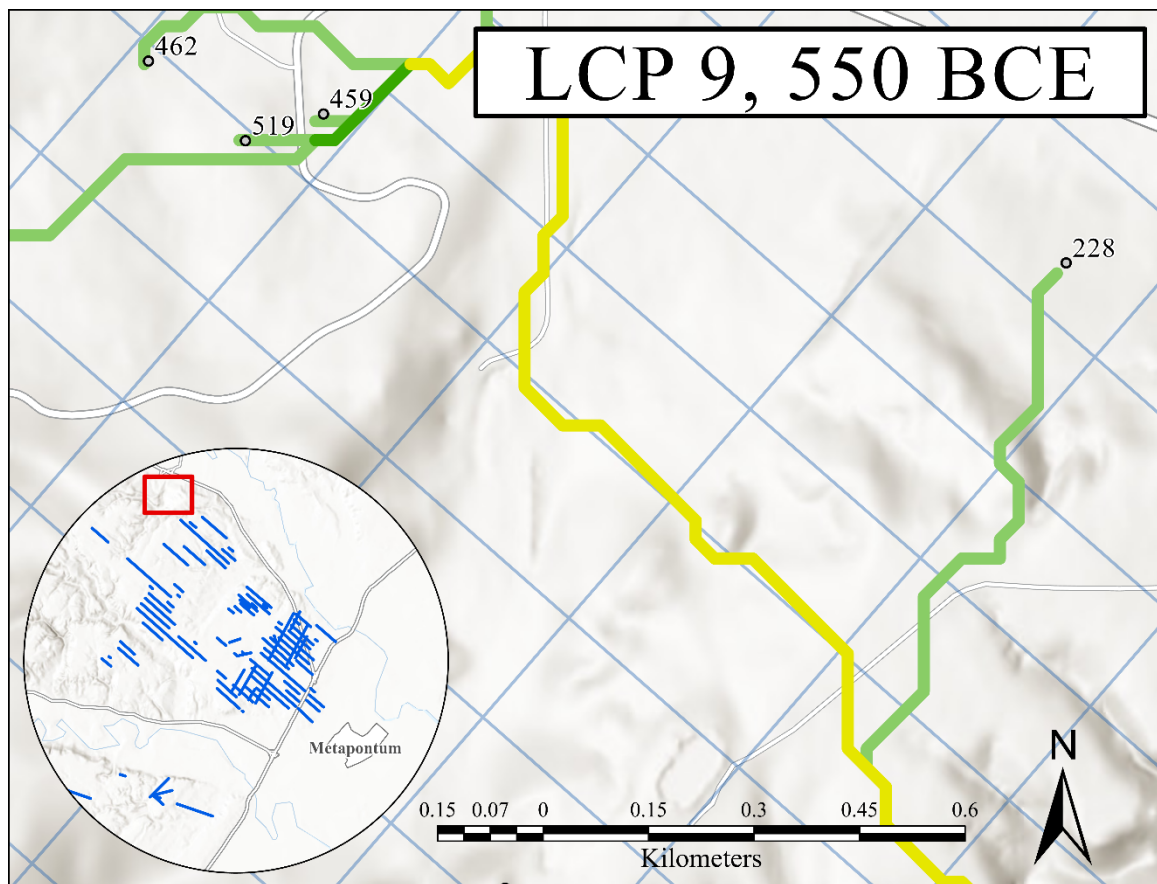
Figure 20: LCP 9 from 550 date bin alignment with Uggeri division system, indicated in blue (ArcGIS Pro 3.1.1).

LCP 9 (Figure 20)

Extending into the interior is this segment 800 m in length. In addition to this alignment with the NW-SE system, a secondary segment (falling just below the threshold for overlap, at 3 total paths) conforms to the opposite NE-SW system, servicing sites 519, 462, and 459. Its precise alignment with the 1960s *kleroi* prompted a site visit, revealing a hilly terrain and elevated plateau (Figure 21). The concentration of sites identified as farmstead to the NW may indicate that this route served as a means of connecting this community to the rural sanctuaries in the SE, namely site 270 and 266. The northern extent

of this segment also appears to make a directional shift to the NE, similar to the corner indicated by LCP 8. LCP 9 extends over a level plateau before descending into a valley of approximately 350 m. The terrain rises again where the LCP shifts towards the north. It is here, on the other side of this rise, that the segment connects with the farmsteads to the north-west.

Figure 21: LCP 9, facing NW. Just visible between the peach trees is an opposing plateau, between which lies a low valley. GCP placed at 16.75150055, 40.45594666. (Photo: Christine Davidson, May 2022)
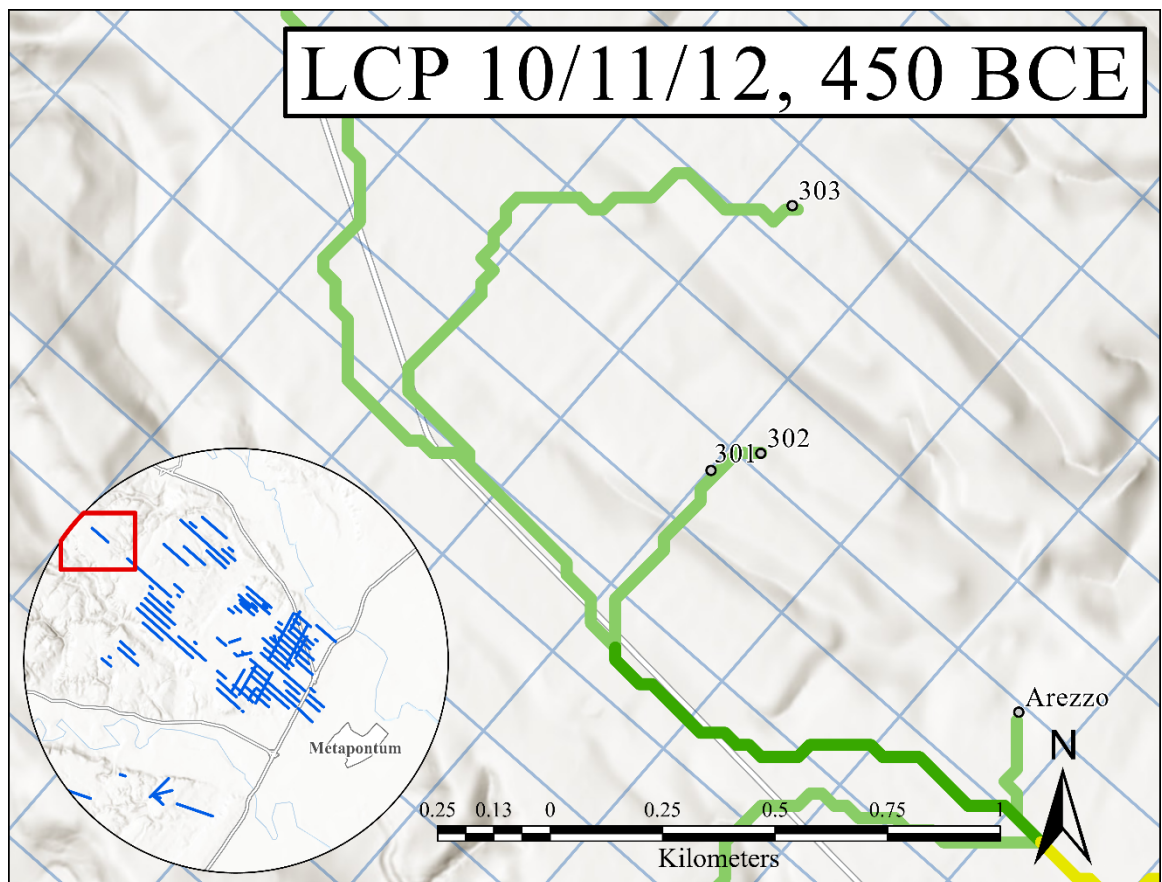
Figure 22: LCPs 10, 11, and 12 from 450 date bin alignment with Uggeri division system, indicated in blue (ArcGIS Pro 3.1.1).

<u>LCP 10, 11, and 12</u> (Figure 22)

These are the only LCPs for which the threshold of 4 path overlap has been discounted. Only one site identified as a farmstead (site 303) connects LCP 10 with a sanctuary (site 266), and two farmsteads (sites 301 and 302) for LCP 11. Nevertheless, they have been included here due to their interaction with the transverse lines indicated in Figure 22. LCPs 10 and 11 lie approximately 850 m from each other yet share net bearings which differ by only 3º (227º and 224º NE-SW respectively). In addition, LCPs 10 and 11 join LCP 12 at

119
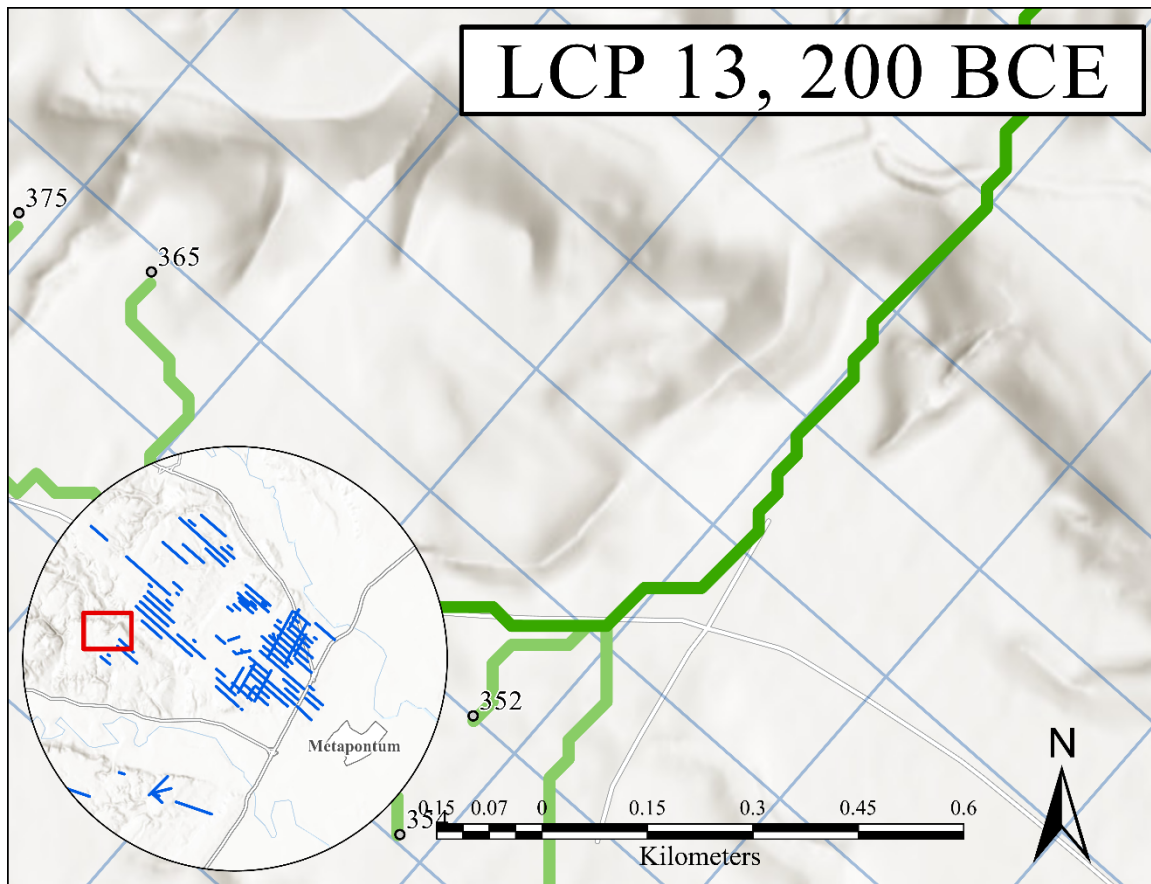
Figure 23: LCP 13 from 200 date bin alignment with Uggeri division system, indicated in blue (ArcGIS Pro 3.1.1).

intersections suggested by Uggeri's system. LCP 12 itself also conforms to this system and has a net bearing of 136º NW-SE.

LCP 13 (Figure 23)

This segment is present in only one of the ten date bins. While it aligns with Uggeri's transverse lines, its path overlap is almost certainly a result of limited survey data (there is only one sanctuary recorded for the 200 date bin, leading to what is likely artificially inflated path overlap. The length it follows the transverse line without deviation (910 m), however, is worthy of note.
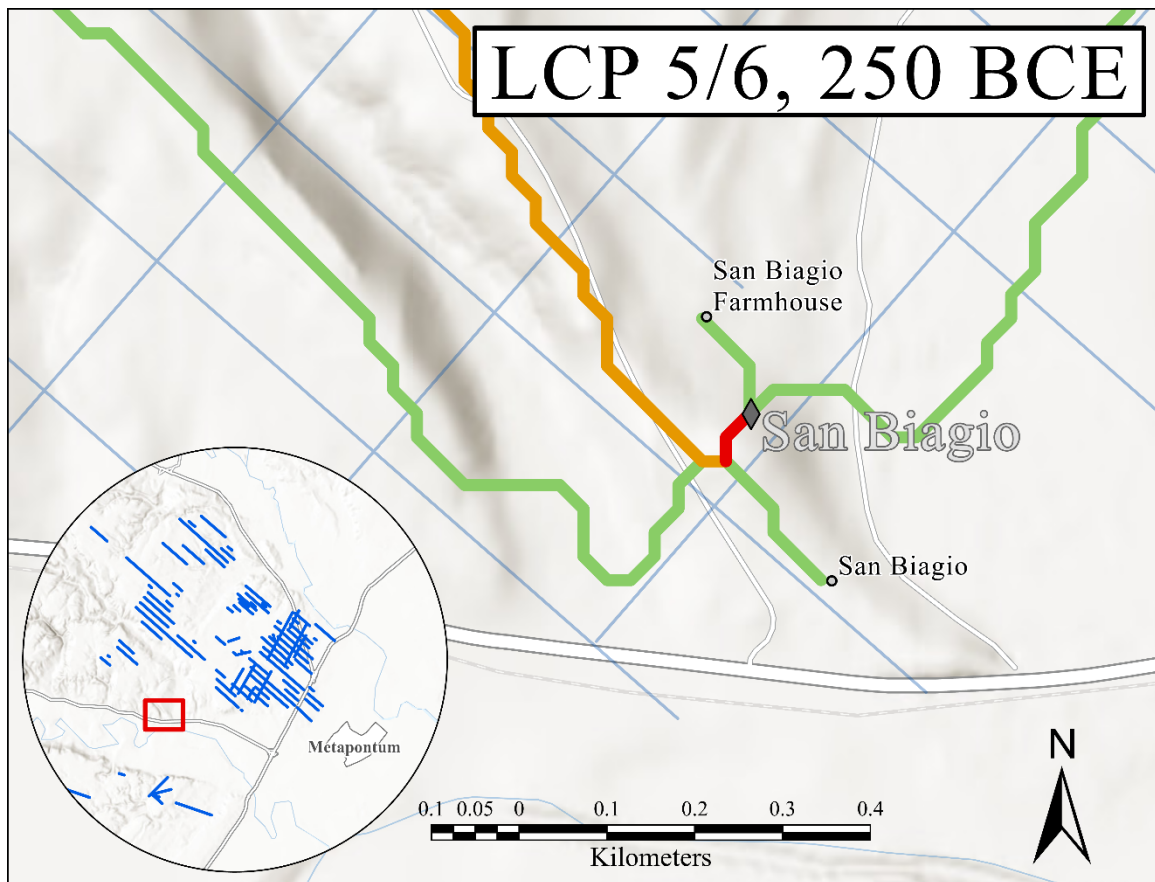
Figure 24: LCPs 5 and 6 from 250 date bin alignment interaction with San Biagio sanctuary (ArcGIS Pro 3.1.1).

On LCPs 5 and 6

Having introduced Uggeri's system of division, it becomes clear that the cross-roads identified at the intersection of LCP 5 and 6 not only conforms to the net bearing indicated by the ICA division lines, but that they also align themselves remarkably well with this earlier proposal. Not only this, but the precise point of intersection is less than 30 m from the corner proposed by the 1960s transverse lines, well within expected margins of error when georeferencing 'analog' maps like Uggeri's. This relationship has been visualized in Figure 24.

3.10 Statistical Significance of LCP-Division Line Interaction

An initial approach to addressing the statistical significance of the LCP alignments with the Uggeri transect system was to perform a chi-square test (χ^2; used by Peter Dana in determining the likelihood that farmsteads within the Metapontine *chora* appear adjacent to division lines by chance - incidentally, the results of this test were 12.9% probability of distribution by chance).[291] This proved unsuitable for the data under review since comparable real-world datasets do not exist. Instead, a Monte Carlo test was performed. A Monte Carlo test, a multiple probability simulation, aids in expressing the probability that observed results are due to chance. For each of the 13 LCPs analyzed above, 1000 random pathways between the same two points were generated using the R scripting language. The randomized paths were not generated using any spatial variables other than the extrapolated bounds of the LCP, as well as the start and end points themselves. Each randomly generated path is composed of the same number of segments as the LCP to which it is compared, amounting to the same number of directional shifts. An investigation of direct overlap (ie. intersection) with the ICA division lines was ruled out due to the inability to account for alignment means (as observed above, the generated LCPs 'meander' along these lines, skewing any total intersect values). Instead, the total LCPs (which extend beyond the areas of interest highlighted above; see *Figure 25*) were assessed by the total length of each line segment which adopts an azimuth of 131º and 221º (within ± 5º), in accordance with the alignments of both the ICA division lines in the Basento-Bradano watershed and the Uggeri

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[291] Dana 2011, 113.

kleroi system. The same analysis was then applied to the 1,000 randomized paths for each

LCP. This produced a total length of LCP-division line alignment for each of the 13 LCPs

as well as a mean length for the randomized pathways which likewise align with the

division line azimuths. The results of these simulations are presented in and the code in R

is below:

```r
#set working directory to filepath
setwd("DIRECTORY") # replace with directory filepath

install.packages("sf", "units", "geosphere", "ggplot")
library(sf)
library(units)
library(geosphere)
library(ggplot2)

#FOR LCPS
polyline <- st_read("SHAPEFILE.shp") # replace with shapefile name
count_line_segments <- function(polyline) {
  coords <- st_coordinates(polyline)
  num_segments <- nrow(coords) - 1
  return(num_segments)
}

# corrections for coordinate projections
polyline_wgs84 <- st_transform(polyline, crs = 4326)
polyline_meters <- st_transform(polyline, crs = 3857)

# loop through each line segment in the polyline
bearings <- numeric(0)
lengths <- numeric(0)
for (i in 1:nrow(polyline)) {
  coords_wgs84 <- st_coordinates(polyline_wgs84[i, ])
  coords_meters <- st_coordinates(polyline_meters[i, ])

  for (j in 1:(nrow(coords_wgs84) - 1)) {
    Point1_wgs84 <- coords_wgs84[j, 1:2]
    Point2_wgs84 <- coords_wgs84[j + 1, 1:2]

    Point1_meters <- coords_meters[j, ]
    Point2_meters <- coords_meters[j + 1, ]

    angle <- bearing(Point1_wgs84, Point2_wgs84)
    length <- st_distance(st_point(Point1_meters), st_point(Point2_meters))

    bearings <- c(bearings, angle)
    lengths <- c(lengths, length)
```

```
    }
  }

  # correct for units in meters
  lengths <- set_units(lengths, "m")
  lengths <- as.numeric(lengths)

  # determine segments lengths for bearings between 127 and 136 degrees and 217 and 226 degrees
(LCP)
  total_length <- sum(lengths)
  filtered_lengths_127_136 <- lengths[bearings >= 127 & bearings <= 136]
  filtered_lengths_216_226 <- lengths[bearings >= 217 & bearings <= 226]
  total_lengthLCP_127_136 <- sum(filtered_lengths_127_136)
  total_lengthLCP_216_226 <- sum(filtered_lengths_217_226)

  #FOR RENDOMLY GENERATED PATHS
  # creation of function to generate random paths
  generate_random_path <- function(start_point, end_point, num_points = num_segments) {
    lon_range <- range(start_point[1], end_point[1])
    lat_range <- range(start_point[2], end_point[2])
    intermediate_points <- cbind(runif(num_points - 2, lon_range[1], lon_range[2]), runif(num_points
- 2, lat_range[1], lat_range[2]))
    coords <- rbind(start_point, intermediate_points, end_point)
    linestring <- st_linestring(coords)
    lines <- st_sfc(linestring, crs = 4326)
    return(st_sf(geometry = lines))
  }


  # run simulated paths
  num_simulations <- 1000
  start_point <- c(COORDS)  # replace with start point coordinates
  end_point <- c(COORDS)    # replace with end point coordinates
  total_lengths_127_136 <- numeric(0)
  total_lengths_216_226 <- numeric(0)
  for (sim in 1:num_simulations) {
    path <- generate_random_path(start_point, end_point)
    path_wgs84 <- st_transform(path, crs = 4326)
    path_meters <- st_transform(path, crs = 3857)
    bearings <- numeric(0)
    lengths <- numeric(0)
    for (i in 1:nrow(path)) {
      coords_wgs84 <- st_coordinates(path_wgs84[i, ])
      coords_meters <- st_coordinates(path_meters[i, ])
      for (j in 1:(nrow(coords_wgs84) - 1)) {
        Point1_wgs84 <- coords_wgs84[j, 1:2]
        Point2_wgs84 <- coords_wgs84[j + 1, 1:2]
        Point1_meters <- coords_meters[j, ]
        Point2_meters <- coords_meters[j + 1, ]
        angle <- bearing(Point1_wgs84, Point2_wgs84)
        length <- st_distance(st_point(Point1_meters), st_point(Point2_meters))
        bearings <- c(bearings, angle)
        lengths <- c(lengths, length)
```

```
        }
      }
```

```
        # determine segments lengths for bearings between 127 and 136 degrees and 217 and 226 degrees
(simulated paths)
        lengths <- set_units(lengths, "m")
        lengths <- as.numeric(lengths)
        total_length <- sum(lengths)
        filtered_lengths_127_136 <- lengths[bearings >= 127 & bearings <= 136]
        filtered_lengths_217_226 <- lengths[bearings >= 217 & bearings <= 226]
        total_length_127_136 <- sum(filtered_lengths_127_136)
        total_length_217_226 <- sum(filtered_lengths_217_226)
        total_lengths_127_136 <- c(total_lengths_127_136, total_length_127_136)
        total_lengths_217_226 <- c(total_lengths_217_226, total_length_217_226)
      }
      sum_total_lengths_127_136 <- sum(total_lengths_127_136)
      sum_total_lengths_217_226 <- sum(total_lengths_217_226)

      #overall totals
      total_azimuth_overlapLCP <- sum(total_lengthLCP_127_136, total_lengthLCP_217_226)
      total_azimuth_overlapRandom <- sum(sum_total_lengths_127_136, sum_total_lengths_217_226)

      # plot LCP and the last generated random path
      ggplot() +
        geom_sf(data = path, color = "orange", size = 2) +
        geom_sf(data = polyline, color = "red", size = 2) +
        theme_minimal()

      #print relevant metrics
      cat("Metrics:", "\n", "Percentage of LCP in Alignment:", total_azimuth_overlapLCP /
st_length(polyline) *100, "%", "\n", "Total length of LCP Alignments:", total_azimuth_overlapLCP,
"\n","Total length of LCP:", st_length(polyline), "\n", "Random Alignment Length (Mean):",
total_azimuth_overlapRandom / 1000, "\n")
```

Among all simulations (13,000 in total), the average length of alignment within the

127º -136º and 217º -226º azimuth threshold was 416 m. Using the figures presented in ,

the mean length of alignment for the LCPs generated using the methods described above

was 1267 m, or an average of 33% of the total LCP length. The performance of a two-tail

T-test (a statistical comparison of means between two groups, in this case those of the LCPs

and the randomized paths) results in a T value of 4.39165, producing a P value of 0.000878.

This suggests that there is a 0.088% probability that these pathways are the result of chance.

This falls below the P value threshold of 0.05, suggesting that these LCPs are of statistical significance.

Observations here include the increased difference in alignment among LCPs 8 and 11. This particularly disproves the null hypothesis (that the LCPs generated are the result of chance) and is likely a result of the non-linear path to which these LCPs prescribe with respect to their start and end points, instead deviating around imposing terrain and appearing to align with the *kleroi* division system (see *Figure 25*).

LCP	Farmstead (coordinates)	Sanctuary (coordinates)	Percent of Path in Alignment (126-137/217-226°)	Random Path Alignment Mean
LCP1	312 (16.72784051, 40.41490922)	334 (16.74450638, 40.40763227)	69.93% (1498 of 2142 m)	309 m
LCP2	354 (16.71935844, 40.41089179)	397 (16.74011642, 40.39778909)	45.47% (1395 of 3068 m)	742 m
LCP3	57 (16.74659491, 40.45192235)	266 (16.75871836, 40.44245980)	59.63% (1088 of 1825 m)	517 m
LCP4	113 (16.73571624, 40.42785352)	266 (16.75871836, 40.44245980)	14.73% (596 of 4043 m)	227 m
LCP5	394 (16.74081379, 40.39695881)	San Biagio (16.74769999, 40.39055100)	56.33% (659 of 1170 m)	219 m
LCP6	404 (16.73499182, 40.39507348)	San Biagio (16.74769999, 40.39055100)	56.92% (905 of 1570 m)	188 m
LCP7	348 (16.72782469, 40.40968453)	397 (16.74011642, 40.39778909)	65.27% (1348 of 2065 m)	346 m
LCP8	Arezzo (16.729568, 40.438922)	266 (16.75871836, 40.44245980)	23.00% (806 of 3504 m)	26 m
LCP9	459 (16.7423971, 40.46288591)	270 (16.76326733, 40.45365101)	47.80% (1465 of 3066 m)	448 m
LCP10	47 (16.73674882, 40.45423276)	266 (16.75871836, 40.44245980)	25.44% (1994 of 7837 m)	612 m
LCP11	301 (16.72150417, 40.44374081)	266 (16.75871836, 40.44245980)	21.66% (1045 of 4828 m)	8 m
LCP12	Cozzo Presepe (16.7222215, 40.4725943)	266 (16.75871836, 40.44245980)	33.50% (3171 of 9465 m)	1378 m
LCP13	352 (16.72058729, 40.41240495)	266 (16.75871836, 40.44245980)	10% (598 of 6072 m)	386 m

Table 5: Figures used in the evaluation of statistical significance for LCPs and their results.
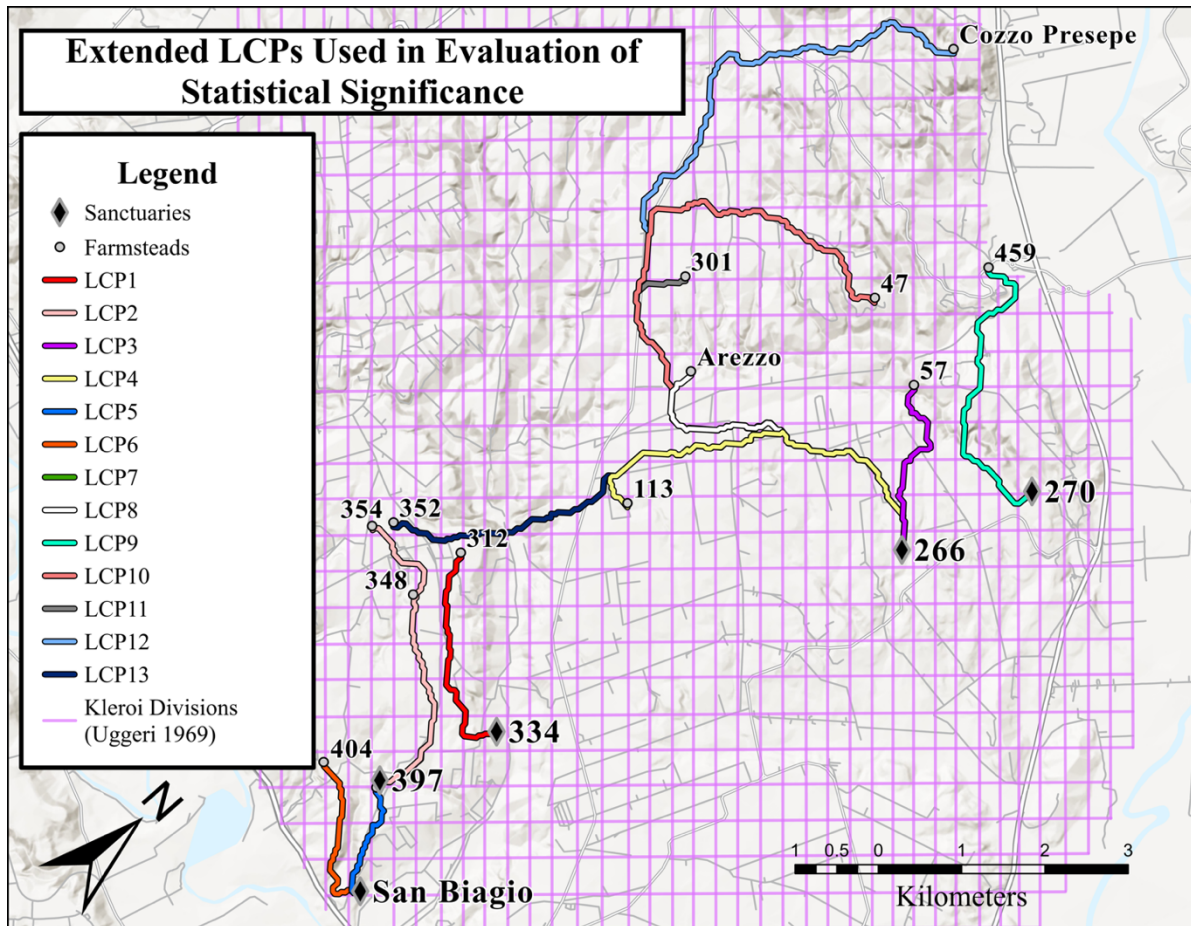
Figure 25: Full LCPs (extended beyond segments of interest) and the Uggeri *kleroi* system (1969). Start and end points (farmsteads and sanctuaries, respectively) have also been provided. Note that, due to the overlapping nature of several LCPs, some segments lie beneath others: provides details and coordinates for clarification. (ArcGIS Pro 3.2.1)

3.11 Conclusions

The proposal that the division lines represent a street network *per strigas* in the *chora* is one with many weaknesses. If all division lines are taken as a complete, immutable system of access it makes little sense. As Carter has identified, roads should naturally converge as they near points of interest (cities, river crossings etc.), which is not a feature

of these division lines.[292] The scale of this system would have been immense (if not without

precedent, cf. Chersonesos), and recordings of many of these anomalies on the ground do

not support their identification as roads. However, excavation has confirmed the presence

of roads along division lines at both Pizzica and in the area of PT02 without doubt.[293] The

placements of these farmsteads and sanctuaries is far from random, and Peter Dana has

used a combination of spatial join and chi-square tests to conclude that there is a 12.9%

chance that farmsteads appeared in their existing distribution relative to the division lines

by chance.[294]

The analysis conducted above using Least Cost Path can provide a digital source for

the identification of some of these lines as roads. Given the labour associated with the

construction of such large-scale infrastructure in the chora, it is difficult to imagine that all

identified division lines served as roads (see section 5.1 for more discussion regarding the

feasibility of such a system).[295] The LCP overlap present at division lines L22 and L23,

however, presents convincing evidence of travel between farmsteads and sanctuaries in this

area. LCP placement also supports a number of aspects of the Uggeri transect system,

particularly along UTL12. *Figure 11* summarizes these interactions, isolating only those

LCPs which align with the ICA and Uggeri division systems. One might imagine that these

LCPs constitute arterial routes among the communities of the chora. While other division

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[292] Folk 2011, 22.

[293] Folk 2011, 22.

[294] Dana 2011, 113: A chi-square (χ^2) test is a means of determining if an existing distribution is statistically significant – in this case it is likely that Dana compared existing farmstead distribution to a sample variance representative of random distribution.

[295] Carter 2020.

lines represent a system of drainage (necessitating less effort in their construction by virtue of their smaller width), the LCPs above represent roads maintained by residents of the chora.[296] A total of 72 LCP segments and over 12 km of paths have been reconstructed here, providing insight into the methods of travel within the Metapontine chora. Using this evidence, we may be able to reconstruct the nature of frequentation to extra-urban sanctuaries, the subject of the following chapter.

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[296] See 4.4 Journey to the Sanctuary.

Chapter 4: Agglomeration at Rural Sanctuaries

While excavation represents the most absolute means of confirming the placement of these pathways, the utility of performing this is questionable. These areas are unlikely to yield more than the expected ceramic scatter and a level plane indicative of a road. These routes provide us with far more value when we consider their contribution to theory concerning the characterization of extra-urban sanctuaries. While this forthcoming conclusion is neither concrete nor binary, this chapter will explore what we understand regarding frequentation to extra-urban sanctuaries and attempt to reconcile the routes identified in the preceding chapter with both a system of land division and rural community formation. The significance of rural sacred spaces will be discussed here, with particular attention paid to their relationship to and involvement in nucleation beyond the asty and in the definition of territorial borders. An examination of modern scholarship, literary sources from antiquity, and a survey of landscape archaeology surrounding Metaponto provide convincing evidence for the presence of communities outside the urban center, visible in the archaeological record.

4.1 Precedent and Meaning of Extra-Mural Community

When considering the relationship between city and land, we are reminded of Hesiod's view (among others) presented in Chapter 1; of a strong bond with one's neighbours and of a romantic presentation of the country landscape. We find further evidence of this among the people of Troizen, who had visual access to their chora (proven via a viewshed analysis similar to that conducted in section 4.2 below) and, evident in the work of Pausanias, a

sense of patriotism which tied them to the land.[297] In Theokritis' *Idyll 7*, Simichidas wishes, "May I plant my great winnowing shovel in [Demeter's] heap of grain once more…" (155-156), a sentiment which Hans Beck equates to a reimagining of the Homeric *nostos* ('return'), and a true sense of belonging to the land.[298] Beck articulates this belonging as a hallmark of Hellenic identity.[299] This concept of identity is further explored in the works of Josiah Ober, who finds that poleis situated themselves in a 'Greek' landscape, contributing to a sense of shared identity yet still maintaining a sense of distinctness and separation from nearby polities (a concept often referred to as 'panhellenism').[300] These identities are nuanced, incorporating facets of ubiquitous 'Hellenism,' territorial belonging, and small-scale localism. As early as the Mycenaean period, we witness representations the latter, of rural community, in small clusters of settlement in the countryside which were served by a centralized citadel.[301] Titles presented in Linear B indicate hierarchies incorporative of these localized roles: *ti-mi-to-a-ke-e* appears to reference an administrative control center, *ga-si-re-u* a head official of some description, and *ta-re-ta* may refer to local landholders.[302] The presence of such hierarchies demonstrates an early precedent for smaller 'spheres within spheres' in Bronze-Age city structures. Later authors such as Aristotle would define these smaller spheres as *koinonia tou topou*; a local community in which laws are shared, an economy is evident, and family groups are formed through

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[297] McHugh 2017, 129; Beck 2020, 163. *τῆς δὲ Ἐπιδαυρίας ἔχονται Τροιζήνιοι, σεμνύνοντες εἴπερ καὶ ἄλλοι τινὲς τὰ ἐγχώρια… / And next to Epidauria are the Troizens, great glorifiers of their own **countryside**…* (Paus. 2.30.5).
[298] Beck 2020, 207–8.
[299] Beck 2020, 208.
[300] Ober 2015, 21.
[301] Beck 2020, 44–5.
[302] Beck 2020, 45.

individuals coupling.[303] Casarotto, Pelgrom, and Stek (through investigation of the areas surrounding Venusia) identify complex networks of villages as playing an important role in "colonial societal organization."[304] The means by which these local communities were systematized and internally governed, henceforth referred to as their 'policy,' will be explored in subsequent sections, as well as the role of sanctuaries in the policies of these communities.

4.2 The Extra-Urban Sanctuary and its Civic Uses

Eliade proposes that no sacred space was ever "chosen," only "discovered."[305] If true, this suggests that Greeks did not plan the placement of their sanctuaries, except perhaps in their decision of which spaces they wished to develop and incorporate into their regular social framework. Therefore, as Turner theorizes, it was the duty of human beings to define sacred space and its limits.[306] While this appears to preclude any extensive planning of a sacred 'network', the practice is tempered by the tradition that sacredness be determined using natural qualities of the landscape as a reference. This means that any space perceived as particularly picturesque or unique may have been deemed sacred, allowing for significant freedom in the placement of these sanctuaries. One need only tailor their definition of "sacredness" as desired. Sacred spaces, Turner continues, are "the centre

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[303] *Pol.* 1280b; Beck 2020, 11.
[304] Casarotto et al. 2016, 583.
[305] Eliade 1976, 380.
[306] Turner 1979, 15.

of reference from which all else is oriented, understood, or valued."[307] Mumford develops this concept further by suggesting that the sacred space served as an impetus for settlement itself, and that the ancient city was first and foremost a "meeting place."[308] While this theory dismisses or at least minimizes the importance of strategic settlement factors such as proximity to natural resources and routes of trade, it serves to highlight the potential importance of sacred space in choosing areas of aggregation and settlement. Ancient authors also emphasize the importance of sanctuaries in the very definition of a city, including Servius: *prudentes Etruscae disciplinae aiunt apud conditores Etruscarum urbium non putatas iustas urbes, in quibus non tres portae essent dedicatae et tot viae et tot templa, Iovis Iunonis Minervae.*[309] It is this phenomenon, of establishing a sacred space as the nucleus of social development, that will be explored below in its rural contexts and as it relates to the chora of Metaponto.

As with all settlers of Magna Graecia, the Achaian settlers of Metaponto would have felt the lack of cultural unity usually defined by a shared history, witnessed physically through structural remains and land use, as it existed among mainland Greek poleis. Extra-urban sanctuaries of the colonies communicate a need to protect (and project) the identity of the founding polis in a new territory, which would have presented ethnic and geographical differences that might threaten to overwhelm the ancestral rituals and norms

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[307] Turner 1979, 33.
[308] Mumford 1961, 115.
[309] *Etruscan scholars say that among the founders of the Etruscan cities, cities were not thought properly founded in those within which there were not three gates, and as many roads and as many temples dedicated to Jove, Juno, and Minerva* (Serv. A. 1.422); Varro describes a ritual focused upon the definition of city walls in Etruscan foundations, in contrast to the foundations described by Servius which favour a cultic focus (Varro *Ling.* 5.143); for a comparison between significance of the sanctuaries of Magna Graecia vs. those of Etruria, see Edlund-Berry 1987, chap. III/IV.

of the settlers. The use of sanctuaries in establishing political boundaries is also well documented and has already been mentioned in brief.[310] The imposition of 'sacred borders' granted divine authority to the division of territory and these liminal zones of the polis, Appadurai suggests, were in need of "special ritual maintenance."[311] Placing borders under the authority of the gods also served to enhance the bonds between polis and periphery.[312] The contestation between Koroneia and Lebadeia presents an example of a dispute which arose over access to and administration of a sacred space (the Altar of Zeus) and suggests the transformation of a sanctuary into a sacred division.[313] A *horos* erected between Megara and Athens (within the Sacred Tract, *hiera orgas* – Thuc. 1.139) decreed that the land must be left undeveloped, by order of the Oracle of Apollo at Delphi, presenting another example of the sacred imposition of borders.[314] François de Polignac regards the Argive Heraion of the classical period to be the most clear representation of a sanctuary which imposes a sovereign border.[315] Here he sees the events immediately preceding its construction (the subjugation of Mycenae, Tiryns, and Nauplio) as impetus for the erection of the temple, forming a visual border across the landscape which clearly identifies the extent of the polis of Argos.[316]

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[310] Lombardo 1983; Guzzo 1987; de Polignac 1995; Sinn 1996, 67–74; Osanna 1999, 283–91; Torelli 1999, 698–705; Calió 2012, 58.
[311] Appadurai 1996, 179.
[312] Beck 2020, 67.
[313] SEG 23.297; Beck 2020, 67.
[314] IG II³ 1 292; Beck 2020, 67. The boundary between opposing sides on a game-board was also referred to as the *gramme hiera*, the 'sacred line' (Alk. Frag, 351), suggesting a more colloquial familiarity with borders as divinely decreed.
[315] de Polignac 1994, 4.
[316] de Polignac 1994, 4.

Much like modern 'Now Entering' signs along busy highways, the Sanctuary of Poseidon at Isthmia may have once been home to a stele indicating the transition from one territory to another (Ionia to the Peloponnese, and vice-versa).[317] The sanctuary (home to a 7th-century temple, altar, and temenos) was located 15 km from the center of Corinth and along a major artery of travel from the Peloponnese (NE) to the *diolkos* (a route of ship transport, or portage).[318] The space is one of transition, representing a Corinthian border, the shift from land to sea, and of access from coast to interior.[319] Also in the Peloponnese are a number of recognized 'border sanctuaries' including that of Artemis Limnatis in Taygetos on the Lakonia/Messenia border and Artemis Hemera at Lousoi on the Akadia/Achaian border.[320] The latter, significant in its ~2,500 diagnostic ceramic fragments, also performed a leading role in the founding of Metaponto: the Achaians are said to have brought the cult of Artemis Himera with them to the banks of the river Casas (identified as the Basento, attributing the sanctuary itself to either that of Pantanello or San Biagio).[321] The Nida River also occupied the border between Elis and Messenia and appears to have acted as a consistent division between the territories from as early as the Bronze Age. A number of sanctuary sites line this river and Pausanias provides evidence of cultic activity performed at its banks.[322] Rivers regularly serve as natural borders, as Strabo attests when describing a lawsuit against Meandros for having changed the path of

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[317] Plut. *Thes.* 25.3-5; Strabo 3.5.5; 9.1; Pettegrew 2006, 83–4.
[318] Pedley 2005, 47.
[319] Pedley 2005, 48.
[320] Artemis Limnatis: *IC* 5, 1 1431; Koursoumis 2014. Artemis Himera: Mitsopoulou-Leon 2009.
[321] Baccylides *Ode 11*; Mitsopoulou-Leon 2009; Carter 2018, 1518.
[322] Paus. 8.41.3; Dunn 2024.

the river, thereby changing the borders of the lands themselves.[323] Frontier sanctuaries are not a concept limited to the Greeks, either. Roman comparison can be found again in the works of Strabo, who describes a festival and sacrifice called the *Ambarouia* at a location which once represented the territorial extent of Rome (5.3.2).[324]

This pattern of river-courses-as-borders is repeated throughout Magna Graecia and, as at Metaponto, Hera often represents a founding deity, especially with regards to liminality. The Heraion at the mouth of Sele marked an important boundary between Poseidonia and the rest of Campania (and shares many qualities, including an archaic date, with the sanctuary of Hera at the Tavole Palatine). At Samos, the 9th-century temple of Hera is identified as a marker of the emergence of the polis.[325] Likewise at Croton, Hera's temple defines the frontier. The extra-urban Temple of Hera (Tavole Palatine) stands at a space of contact between Metaponto and the 'outside,' and established an important boundary between the territory of the Metapontines and that of both the Iapygians and the Tarantines to the east.

Conventionally, the border of Metapontine territory is understood as the Bradano river, a clear physical delimiter in the natural landscape. In the absence of an anthropic border (i.e. a wall), the Tavole Palatine may itself have functioned as a means of telegraphing Metaponto's extent through sightlines. Understanding the extent of these sightlines may reveal a kind of 'visual border' communicated to Metapontines and non-

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[323] Strabo 12.8.19.
[324] See, however, Stek for a discussion of evidence in contradiction of this model, where he ultimately suggests that such festivals constituted a retroactive 'reimagining' of Romulean Rome rather than support for the long-term presence of Roman frontier sanctuaries in early periods (Stek 2014, 93–5).
[325] Sassu 2018, 130.

Metapontines alike and further characterize the nature of this extra-urban sanctuary. These sightlines can be reconstructed using the process of viewshed analysis. The Z-Value (elevation) of the terrain surrounding the remains of the Tavole Palatine, captured from the DSMs produced by the Centro cartografico dipartimentale della Direzione Generale del Dipartimento Ambiente e Territorio of Basilicata, is 55.774 ft. Hera's temple, constructed on this elevated terrain would have represented a structure which dominated its surrounding landscape. Reconstructing the temple for the purposes of determining its original height, however, is challenging. Measurements of the stylobate, columns, and triglyphs/metopes provide approximate measurements for many of the temple features, although this is in the absence of crucial components such as the pediments and acroteria.[326] It is possible to propose a theoretical height based on the exact measurements which we do have, with significant margins of error, however the precision of such an estimate would ultimately be unproductive given the variance in viewer height (on horseback vs. on foot, for example). While we may not have measurements for the pediment, we do know that the pediment of a typical doric temple features an angle roughly between 12.5º and 14º at either end. Using 13.25º as a general average, and half of the base length (which we can interpolate from width of the stylobate, 16.125 m), creating a right-angled triangle, we can calculate the height of this pediment to be approximately 1.9 m (using *h=(a/2)(tanθ)*, where *h* is the height of the pediment, *a* is the base, and *θ* is the average base angle of a doric pediment). This, combined with the known heights of the columns (a reconstructed height of 5.19 m), triglyphs (0.58 m), and architrave (0.84 m) gives a minimum height of 8.51

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[326] Mertens 2005, 27.

m.[327] Since several elements of the cornice are undoubtedly missing, a second viewshed analysis at 10.5 m can be conducted in order to grant an extra 2 m of height, more than enough to compensate for missing components of the entablature and acroteria. We are able, then, to produce an average viewshed between these two. This provides a difference in viewshed area (between these two proposed heights, with and without additional elements of a cornice) of 45.11km^2

Feature	Height
Architrave	0.84 m
Column (reconstructed height)	5.1927 m
Triglyph	0.578 m

Table 6: Height of elements of the Tavole Palatine from Mertens 2005.

Figure 26 offers a visualization of this viewshed, assuming optimal viewing conditions (cloudless sky etc.). The extent of the viewshed is influenced by the curvature of the earth, indicating the place where the viewer would no longer be able to see the top of the temple (an average of approximately 6.5 km from the temple). The Tavole Palatine was therefore visible across large swaths of territory, extending even into that which may have been under

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[327] Mertens 2005.
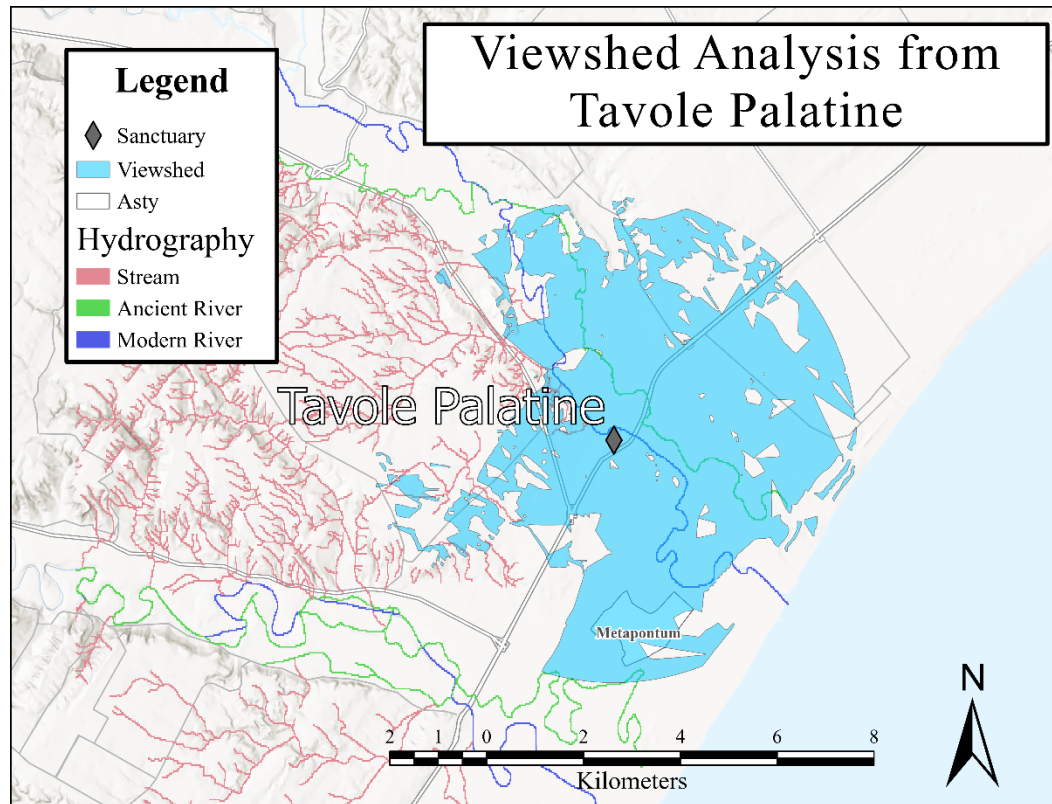
Figure 26: Viewshed Analysis of Tavole Palatine, assuming reconstructed temple height of 8.51 m. (ArcGIS Pro 3.1.1)

Tarantine influence. This was no doubt intentional, communicating Metaponto's border to its rival, Taranto, to the east.

This temple therefore holds political significance, acting both as sacred space and border. Such temples along the *eschatia* are established for more than cult practice; they are a demonstration of political control and an expression of *ethnos*. Beck and Funke describe such spaces as "platform[s] for the expression of tribal cohesion," demonstrating a united front in the face of an 'other.'[328] The Sanctuary of Hera at the Bradano to the north-east, the altar and sanctuary at Cozzo Presepe to the north-west, and perhaps even the

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[328] Beck and Funke 2015, 24.

sanctuary of Incoronata greca to the south-west each established the extent of Metapontine influence.[329] 6th-century Metapontines were acutely aware of the presence not only of Taranto, but also of Croton and Locri to the west. Projecting strength and wealth was an important tactic in maintaining autonomy among the growing polities of the Ionian coast. Over the course of the 6th century, Metaponto remained a survivor of multiple conflicts which saw the reduction of the influence of both Croton and Siris. Metaponto also appears to have avoided any major conflict with Taranto, perhaps with partial credit granted to Metaponto's imposing frontier. Carter notes that several larger sanctuaries appear at regular intervals along the Basento, at a spacing of approximately 3 km.[330] He notes that this is nearly mirrored along the Bradano, although missing a sanctuary between those of Saldone and Cozzo Presepe, and concludes that this is evidence for a clear division of the territory into "a dozen or so larger units."[331] Such water-adjacent sanctuaries, de Polignac suggests, are indicative of an increase in maritime travel and trade, and likely innately maintained aspects of exchange in the use of the ritual space.[332] He draws particular attention to the cult of Artemis in this context, saying, "…the goddess of thresholds and passages between the unknown and the familiar could be patron of the sanctuary of a port-of-call, an intermediary in contacts and exchanges between foreigners and the coastal

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[329] The sanctuary at Cozzo Presepe was particularly effective in establishing a frontier due to its occupation of the same space as a 6th-century *phrourion* (Carter 1994, 177).
[330] Carter 1994, 180: here he includes the sanctuaries at Pantanello, San Biagio, and Sant'Angelo Greco.
[331] Carter 1994, 181.
[332] de Polignac 1994, 6.

residents."[333] Thus our focus is drawn to those sanctuaries with the potential for Artemisian worship; San Biagio and Pantanello in particular.

This type of imposition of borders, often near rivers, is found elsewhere in Italy and Sicily, including the temenos of Olympian Zeus on the right bank of Ciane near Syracuse that was used to hold a register for the *politai*, again granting political significance to a space otherwise used for cultic practice. In Etruria at the Fanum Voltumnae of Viterbo, the sanctuary served as a meeting place for the Etruscan rulers on numerous occasions, its temple acting as a *curia* to the *lucumones*.[334] Suffice it to say, inhabitants of 7th-5th century Italy and Sicily were accustomed to using extra-urban sanctuaries for political purposes. The dual functionality – religious and political – is noted for prominent, built-up sanctuaries. Less understood is whether the same roles were performed by smaller shrines and temenoi in the chora. Sanctuaries which fall immediately outside the limits of the asty also seem to occupy a complex liminal space that is neither urban nor rural.

Emanuele Greco suggests that the land closest to the asty of Metaponto was settled by a 'first wave' of settlers, with lands belonging to wealthy residents of the urban center. A 'second wave' perhaps then settled beyond this primary ring, making up a periphery of less-wealthy agriculturalists, largely cultivating specialized crops which required permanent residency in the chora.[335] A distinction can be made between sanctuaries of this outer and inner chora. Those which fall immediately outside the boundary of the asty might

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[333] de Polignac 1994.
[334] Baffoni et al. 1981, 413.
[335] Greco 2001, 183.

be called 'suburban sanctuaries.' This categorization is one of many posed in a long history

of scholarship on the topic of the Greek sanctuary.[336] De Polignac gives several examples

of these sanctuary of a suburban type, including Apollo at Thebes, Argos, and Delos, and

those dedicated to Artemis at Sparta and Athena at Delphi.[337] This is also supported by

Vallet's classification of all sanctuaries within 1 km of the city as 'suburban.'[338] John

Pedley then defines a category of 'interurban' sanctuaries, within which fall those lying

between polities and understood to be politically neutral to some degree (e.g. Olympia,

Delphi, and sanctuaries often labelled 'panhellenic').[339] Edlund makes an important

distinction in the definition of 'extra-urban sanctuary': a sanctuary which lies outside of

the city, yet maintains social and/or political connections with the city, suggested by

historical or material evidence. This she distinguishes from a 'rural sanctuary,' which does

not maintain those same connections.[340] The sanctuaries examined in this study are

therefore of the 'extra-urban' type, to use Edlund-Berry's typologies. The manner in which

the extra-urban sanctuaries of Metaponto were established indicates a pseudo-

cosmopolitanism among indigenous residents, those of the asty, and those of the chora.

Rita Sassu identifies five theories regarding the motive for the emergence of extra-

urban sanctuaries in the Greek world as they appear in scholarship:

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[336] These include many regional designations, such as 'urban,' 'suburban,' 'rural,' 'extra-mural,' 'extra-urban,' 'interurban,' and 'periurban.' See Pugliese Carratelli 1962; Vallet 1967, 89–91; Edlund-Berry 1987, 41–3; Guzzo 1987; Asheri 1988; Greco 1992; Alcock and Osborne 1994; de Polignac 1995; Leone 1998, 32–5; Greco 1999; Osanna 1999; Torelli 1999; Nafassi 2001; Pedley 2005, 39–52; Williamson 2021, 21.
[337] de Polignac 1984, 32.
[338] Vallet 1967, 81.
[339] Pedley 2005, 40.
[340] Edlund-Berry 1987, 42.

1) spaces of pre-existing indigenous worship

2) spaces of pre-existing Mycenaean worship

3) areas identified in pre-colonial expeditions as ideal for worship

4) areas which possess 'sacred' qualities

5) the marking of territory during the birth of the new polis[341]

Sanctuaries such as Incoronata greca are examples of this first type and those establishing the frontier are certainly of the fifth.[342] Sanctuaries associated with springs or elevated plateaus (see *Table 1*) can easily be categorized within Sassu's fourth type, with the potential to fall among those of the third as well. Considerable overlap among these categorizations is likely. Extra-urban sanctuaries of the third type, identified prior to the establishment of a colonial urban center, seem particularly suited to maintain strong connections with the asty. Rites of passage are often held in conjunction with a pilgrimage - this distance marking a departure from a position within society, to be granted a new position upon return. Extra-urban sanctuaries are therefore the ideal locations for such rites, to be visited by members of the asty temporarily and at pivotal moments in a supplicant's life.[343]

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[341] Oldfather 1912; Ciaceri 1940; Pugliese Carratelli 1962; Gianelli 1963; Sassu 2018. Further subdivisions of sanctuary type are expressed elsewhere: de Polignac 1984; Edlund-Berry 1987; Greco 1992; Lombardo 1993; Leone 1998.
[342] See section 4.3 Indigeneity in the Metapontino.
[343] Jeanmarie 1939; Brelich 1969; Vernant and Vidal Naquet 1991; Greco 1999.

Sanctuary dedications and identification provide insight as to the polis' influence on extra-urban sacred spaces. Lo Porto identifies a shift in the 5th century to move the cult of the chthonic deities Demeter and Kore from the Metapontine chora to the asty, a result of a new cult introduced through interaction with the eastern Tarantines.[344] The appearance of Demeter on city coinage at this time supports this and indicates a need for the asty to pay homage to their dependency on production within the chora. Whether the rural cults devoted to Demeter and her daughter originated as rural sanctuaries and were subsequently adopted by the city, or vice versa, is unclear. Comparatively, Artemis seems to remain a rural deity for the Metapontines. Her worship at the sanctuary of San Biaggio serves to emphasize her relationship with the wild, and of purification with respect to the local water source, the Basento. Dedicatory inscriptions to Zeus Aglaios ('Shining') are also found at San Biagio, perhaps suggestive of a sanctuary devoted to both deities in tandem. As Olbrich explains, the presence of Zeus Aglaios (a deity also worshipped within the city center) may echo that of Zeus Meilichios at Selinous.[345] His presence may also be related to his influence over his domains which are crucial to agriculture, those of the skies and weather.[346] The appearance of water in combination with a sanctuary, as regularly found in the chora of Metaponto, could be an indicator of cult activity related to healing and purification, after Aebischer.[347] François de Polignac presents an exploration of ritual performed at peri/extra-urban sanctuaries, with particular focus on those incorporating the

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[344] Lo Porto 1982, 322.
[345] Olbrich 1979, 88–9.
[346] Edlund-Berry 1987, 99.
[347] Aebischer 1932, 269–71.

gods Demeter, Apollo, and Hera, each of whom receive more attention among western Greeks than those of the mainland.[348] In their capacity as gods disproportionately associated with the cities of Magna Graecia, they often occupy liminal spaces in similar capacities as those along rivers, discussed above. The sanctuary of Demeter Malaphoros at Selinous, for example, suggests a type of territorial demarcation and an indicator for the separation of city and hinterland.[349] The sanctuary of Hera in Argos, at a distance of 9 km from the asty is another representation of this phenomenon.[350] Each of these finds comparison among the sacred spaces of Metaponto, especially within the Temple of Hera along the Bradano river and of Artemis at Pantanello and San Biagio. While these sanctuaries reflect a Metapontine approach to extra-urban cult, their alignment with deities and dedications common among many cities of Magna Graecia yield a nuanced concept of local, regional, and wider 'Greek' identity.

Herodotus reminds us of the importance of cult in defining a sense of this Hellenicity.[351] Yet, despite its significance in a panhellenic tradition, there is a local element to dedication as well. Even at Panhellenic sanctuaries like Olympia, the dedications themselves reflect local grievances and requests, including rivalries between neighbouring communities.[352] Examples of this include a series of 6th-century BCE bronze inscriptions in which Orchomenos celebrates having overcome Koroneia, and Thebes over

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[348] de Polignac 1995, 41–5, 64–5, 111–3.
[349] Beck 2020, 52. Likewise that of Apollo Hyakinthos, located southwest of Sparta at a distance of several kilometers: Beck 2020, 53.
[350] Billot 1997; Piérart 2004; 2006; Beck 2020, 53.
[351] Herod. 8.144.2.
[352] Beck 2020, 126.

Hyettos, among others.[353] This finds precedent in southern Italy as well, where agreements between neighbouring Sybarites and Serdaioi were dedicated at Olympia in ca. 550 BCE.[354] Even the experienced and prolific geographer Pausanias had difficulty characterizing many of the dedications he witnessed at Olympia due to their local diversity. A dedication celebrating the victory of Theognetos of Aigina, for example, curiously featured pine and pomegranate, something which Pausanias attributes to *epichorios logos*, a 'local tradition.'[355] It seems that even large sanctuaries subjected to monumentalization reflect aspects of localism in their dedications.[356] The placement of sanctuaries such as these, as well as those that are smaller and lacking architectural features may communicate aspects of this localism.

The many small, non-monumentalized extra-urban sanctuaries of Metaponto represented a space for local cult, interaction, and mediation, despite their limited material record. In fact, de Polignac interprets early cult spaces as those which are often elusive in the archaeological record. The earliest sanctuaries, he suggests, might have been witness to very simple cult practices which amounted to little more than a sharing of food between members of a regional community, likely at the expense of a local elite.[357] If true, this indicates that the first stirrings of cultic practice among the Greeks were rooted in community and exchange. Those who made use of these spaces enjoyed a familiarity with

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[353] Orchomenos over Koroneia: SEG 11.1208; Thebes over Hyettos: SEG 24.300; others: 11.202, SEG 15.245; Beck 2014.
[354] Beck 2020, 126–7.
[355] Paus. 6.9.1.
[356] Beck 2020, 127.
[357] de Polignac 1994, 10.

the patrons of the sanctuary, a concept confirmed in Xenophon's distinctions used when describing visitors to a shrine he himself had dedicated.[358] Here he separates the citizens of Skillous (for whom he uses the word *politai*) and the individuals of a localized neighbourhood (*hoi proschoroi andres kai gynaikes,* 'the men and women of the land [nearby]'). Beck's interpretation of such a distinction is that the celebrants were identified "by proximity, not by political status."[359] The nature of the communities using these small, regionalized cultic spaces does not suggest any sense of unimportance or low relevance, but rather what Kostas Vlassopoulos has coined as a "composite polity;" a community led by localized, daily interaction and lacking direct governance from a comparatively distant asty.[360] Skillous itself has been identified as a small community of unknown territorial size (again indicating the presence of communities within communities, or 'spheres within spheres').[361] This is not to suggest a complete separation from the asty. Some have even argued for a reciprocal nature in the construction of urban and extra-urban sanctuaries, in which the use of materials from the chora (i.e., the sourcing of stone from outside the limits of the city-center in the construction of inter-mural monumental architecture) suggests a bond created between city and countryside.[362]

Samnite settlement patterns observed by members of the Sacred Landscape Project suggest yet another documented precedent for the role of cultic space in community formation, contemporary with the sites under investigation here. The Samnites, one of

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[358] Xen. *Anab.* 5.3.9.
[359] Beck 2020, 136.
[360] Vlassopoulos 2007, 151; Beck 2020, 136.
[361] Hansen and Nielsen 2004, 545–6.
[362] Beck 2020, 128.

many native Italiot groups in pre-Roman Italy, are represented archaeologically as non-urban settlements of the Italian interior.[363] Sites identified using surface survey were investigated from 2004-2010 (Sacred Landscape Project) with a goal of determining the role of sanctuaries in a non-urban settlement configuration.[364] Members of the project concluded that, "…the cult places were not isolated special-purpose sites, but rather, focal points of rural communities that 'clustered' around the sanctuary, and in farms and villages."[365] Rural cult places appearing within village clusters and areas of high site density have been observed among Roman polities as well. Examples include Ariminum, Alba Fucens, Fregellae, Cellino Vecchio, and Vico-Orano, most of which can be dated to the Late-Republican period.[366]

A number of sanctuary sites within the chora of Metaponto present evidence of use and maintenance by a localized community, a characteristic that is evidently shared by other sites of Basilicata and Apulia. Gert-Jan Burgers regards extra-urban sanctuaries, particularly those along the Ionian coast, as spaces predisposed to providing space for mediation between disparate groups. He discusses these in the context of the archaic extra-urban sanctuaries of Salento (located in the area in which Greek Taranto would be founded), writing, "These central places for worship are clearly situated at some distance from the habitation areas…it can be suggested that these were also the appropriate places for regular contact with outsiders with strongly contrasting cultural characteristics and

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[363] Stek 2018, 1.
[364] Stek 2018, 1.
[365] Pelgrom and Stek 2010; Stek 2018, 1.
[366] Stek 2014, 91–100.

perceived as foreign to one's own culture."[367] Within the Metapontino, the sanctuary-necropolis complex of Pantanello in particular shows convincing evidence of the autonomous activities of this type of local community. A necropolis of 464 tombs served the immediate rural residents west of the asty, which suggests that the entire complex may have functioned as an epicenter and point of aggregation for the surrounding settlements.[368] Emanuele Greco suggests residents in an area of about 4 km surrounding Pantanello-Pizzica, permanent residents of the hills, used this necropolis themselves and concludes that, "…lo spazio funerario sembra indicare almeno un caso di uso collettivo dello spazio, quelloche ci si può aspettare in un agglomerato di Villaggio."[369]

The site of Saldone (approximately 8.4 km from the asty along the Bradano, mirroring San Biagio at the Basento) has produced fragments of Ionian cup wasters that are used as evidence for local ceramic production at scale. The existence of a workshop producing these drinking vessels, rather than importing from the city, suggests a self-sufficient community.[370] This system of production in the chora may be an indication of autonomy held by a defined group - a village under Metapontine influence, but which exercises some degree of political, cultural, and religious independence. We are reminded of the analysis conducted by Lin Foxhall and David Yoon on assemblages southwest of

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[367] Burgers 1998, 217.
[368] Greco 2001, 185; Sassu 2018, 149.
[369] "…the funeral space seems to indicate at least one case of the collective use of space, which can be expected in a village agglomeration," Greco 2001, 185.
[370] Greco 2001, 285. c.f. Foxhall and Yoon 2016.

Metaponto, in the region of Locri, where assemblages were local in nature and largely lacking in indicators of regular trade and contact with an urban center.[371]

While monumental sanctuaries of the chora served a political function for the asty, smaller, non-monumental shrines and sanctuaries were likely influenced and administrated by these smaller, deme-like communities. Rita Sassu compares these communities to the *demoi/damoi* of the Attik and Peloponnesian territories, respectively.[372] Sassu writes, "Poiché il rituale gioca una funzione primaria nel cementare i legami tra i gruppi, l'area sacra diviene nei fatti il polo sociale, oltre che religioso, del distretto produttivo circostante."[373] Maintenance of the sanctuaries was almost certainly a local affair and this is what Ian Morris imagines for many small village communities.[374] While larger early (8th-7th c. BCE) sanctuaries which incorporate temples and other structures were typically the result of dedications from wealthy aristocrats, those which lack this monumentalization were surely managed by those using them most regularly: the locals.[375] Morris would like us to imagine, "hundreds of local initiatives, which did not draw the attention of the text-producing classes."[376] These spaces were thus maintained locally and presented a convenient space for mediation when necessary. Comparanda can be found in Kalapodi

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[371] Foxhall and Yoon 2016.
[372] Sassu 2018, 137.
[373] "Since ritual plays a primary function in the cementing of bonds between groups, the sacred area becomes, in fact, the social as well as the religious center of the surrounding district of production," Sassu 2018, 158.
[374] Morris 2000, 275–6.
[375] Burkert 1996, 25; Morgan 1996, 140; Morris 2000, 275.
[376] Morris 2000, 276.

(Phokis), the Sanctuary of Zeus Homarios (Achaia), and within the cult of Messon on Lesbos, where areas were used as intermediary spaces by those residing nearby.[377]

Other secular uses of sacred spaces are not difficult to imagine. Any area featuring elevated spaces or sloping terrain would be ideal for spectator use in any assembly for social or performative purposes. We are reminded of the images present at these sanctuaries, perhaps depicting the very events which took place there. The famous terracotta image of a mounted departure at San Biagio is an example of a potentially spectated event, and the sanctuary itself certainly boasts enough space to be used in this way. Banqueting (whether religious or secular in purpose) would also have been a potentially regular use of rural sacred space.[378] Excavations at the sanctuary complex of Pantanello have produced a number of terracotta figures and plaques featuring the image of 'Dionysos-Hades' (and satyrs) in reclining and feasting poses.[379] He is often accompanied by a female figure holding either a child or cornucopia. The sanctuary of Hera at the former mouth of the Sele included covered rooms in the stoa for the gathering of "defined groups of individuals" and in the territory of Locri, Centocamere has yielded terracotta plaques of reclining banqueters.[380]

These use-cases of cultic spaces and architecture as centers of aggregation in rural contexts provide parallels for the uses of such spaces in the chora of Metaponto. The similarities in placement, the importance of these spaces in delineating territorial influence,

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[377] Beck 2020, 129.
[378] C.f. Torre di Satriano: Osanna and Sica 2005.
[379] Carter 1994, 193–5.
[380] Barra Bagnasco and Vlad Vorelli 1977, 151–69; Edlund-Berry 1987, 139.

mass use of necropoleis, and the necessity for localized centers for gathering are each

convincing evidence for nucleated and semi-autonomous settlements outside the asty.

4.3 Indigeneity in the Metapontino

The Oenotrians are identified as the primary Italiots inhabiting the regions later

settled by Achaian migrants at Metaponto. Altomare presents Incoronata as one of 74

Oenotrian sites of the Ionian coast, in addition to the asty of Metaponto itself, which

features indications of indigenous presence in the 7th century BCE.[381] Incoronata appears

to have been active at the beginning of the 7th century, the last 30 years of which include

the founding the Greek Metaponto and evidence of mixed presence at the site. Materials of

Oenotrian tradition remain visible at the asty until as late as the 6th century, indicating at

least limited Greco-Oenotrian interaction surrounding the city center.[382] The nature of this

interaction remains elusive and represents a chief goal of the Metaponto Archaeological

Project. While violent confrontation between Greeks and Oenotrians is attested in some

cases, this, Altomarre warns, should not be accepted as a standardized model of interaction;

an overlap in presence of nearly 100 years certainly presents enough time to establish a

system or statute of relations.[383] Massimo Osanna views Incoronata as an example where

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[381] Altomare 2022, 231–2, 234.
[382] Nava 1998, 700; Altomare 2022, 238.
[383] Altomare 2022, 238. Altomare also cautions, "Per l'VIII e il VII secolo a.C., anzi, bisognerebbe riconoscere che le connotazioni etniche di 'Greci' e 'Enotri' non sono che etichette di comodo." / "For the 8th and 7th centuries BC, indeed, it should be recognized that the ethnic connotations of 'Greeks' and 'Oenotrians' are merely labels of convenience." (Altomare 2022, 238).

such interaction (and acculturation) took place, wherein Greeks did not dominate, but were rather welcomed by local elite for the purposes of trade and cultural exchange.[384] Osanna notes the same in the area of Taranto, where the site of L'Amastuola in particular highlights a process of hybridization between Greeks and indigenous Messapians.[385] Despite these contributions, problematic and incomplete publications continue to render the study of indigeneity in the Metapontino difficult.[386] Recent releases investigate artistic traditions among the Oenotrians, yet few address the wider scope of influence Oenotrians had among Greek colonists.[387]

Survey in the area of Salento reveals a complex system of interaction between native inhabitants and Greeks beginning in the Iron age, much the same as is witnessed at Metaponto.[388] Here have been found many non-local Iron-age ceramics, mostly Corinthian and suggestive of contact abroad as early as the 8th century BCE.[389] Hypotheses regarding the nature of this interaction between Greeks and non-Greeks include co-habitation, wherein Greek foreigners developed villages nearby, or even settled among native populations.[390] This can be compared against similar hypotheses regarding Metapontine

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[384] Osanna 2015, 234–6.
[385] On the nature of hybridization: "The new research therefore does not see the creation of a 'colonial' territory but rather an expansion of vibrant indigenous communities who identified new landscapes to inhabit and exploit and who welcomed the Greek newcomers in a profitable and equal relationship," (Osanna 2015, 232).
[386] See Altomare's comments regarding Timpone della Motta and Francavilla Marittma: Altomare 2022, 239.
[387] E.g. Denti 2024. Altomare has rightly highlighted a habitual focus on colonial influence over Oenotrian, obfuscating an understanding of their relationship: Altomare 2022, 233. Limited focus has been drawn towards the interior of Basilicata, but the lifestyles of coastal Oenotrians in the territories surrounding Metaponto remains comparatively unexplored (see Masseria 2000).
[388] Burgers 1998, 192. See also more recent survey: Robinson 2003.
[389] Burgers 1998, 179.
[390] Burgers 1998, 182.

sites, including Incoronata.[391] Interaction likely began slowly, with limited presence in the

7th century BCE where the area "…contained a few small and dispersed Greek hut

nuclei."[392] The Archaic and Classical periods, however, witness a transition in Salento from

Iron-age huts of wattle and daub construction to blocks of rectilinear housing, occasionally

with evidence of flanking roads (e.g. Cavallino di Lecce, Vaste, and Valesio), suggestive

of a dramatic increase in Greek domestic building practices.[393] This, Gert-Jan Burgers

concludes, mirrors development in the chora of Metaponto in many respects (and that of

Croton), where a close relationship between Greek and native communities may also have

been witnessed, and which likely did not feature a Greek imposition of policy, military or

otherwise.[394] Burgers also draws interesting conclusions regarding the use of sacred spaces

in the context of indigenous/Greek contact in Salento, suggesting that sanctuaries, "may

have functioned precisely as the spatial setting for ceremonies held to frame the increasing

native contacts with foreigners (whether or not trade actually took place at these sites or

elsewhere)."[395] This supports a hypothesis for the use of these sacred spaces beyond the

cultic, and places it directly within the context of Greek settlement on the Ionian coast. De

Polignac likewise envisions such sanctuaries as a point of contact between Greeks and non-

Greek inhabitants of a polity, yet extends this reasoning to suggest a certain political

independence at such sites. When discussing the extra-urban sanctuary of Apollo Aleas of

Croton, he writes, "The large number of non-Greek offerings found in the sanctuary, along

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[391] Savelli 2016.
[392] Burgers 1998, 194.
[393] Burgers 1998, 197–8.
[394] Burgers 1998, 209, 214.
[395] Burgers 1998, 217.

with the plain and conservative temple architecture right up to the Hellenistic period, suggest that it was one of the main centers of regular public contact with the peoples of the hinterland who were in the sphere of influence of the city but may not have been, strictly speaking, dependent politically."[396] This lack of dependence upon a distant urban center, discussed in section 4.1 and 4.2 of this chapter, is highlighted once more in the following section.

Torre di Satriano may also present a point of comparison with respect to involvement of sacred space in community formation among indigenous Italiots. The site can be found in the region of Potenza, Basilicata, an area first occupied by the Daunians (with the Oenotrians settling further south), then by the Lucanians beginning in the 5th and 4th centuries BCE.[397] The organization of space here is characterized by the presence of small clusters of habitation which Massimo Osanna identifies as being 'polycentric.'[398] Here, 'palatial' structures have yielded a plethora of material indicative of wealth, status, and banqueting habits, with the earliest material dated to approximately the second half of the 7th century and a terminus ante quem of ~570-560 BCE.[399] The 4th century BCE saw the establishment of Lucanian sacred spaces, first identified based on the discovery of terracotta statuettes.[400] The area was initially explored by Emanuele Greco from 1987-1988 during which time two buildings were unearthed within the sacred complex, dated to the

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[396] de Polignac 1994, 16–7.
[397] Osanna and Sica 2005, 56; Osanna 2014, 109.
[398] Osanna 2014, 110.
[399] A similar palatial complex is identifiable at Braida di Vaglio; Osanna 2014, 114.
[400] Osanna and Sica 2005, 59,61.

4th and 3rd centuries.[401] The lower terrace of the sacred area held the shrine to a deity, while the upper terrace featured an area of banqueting, both of which were likely enclosed within sacred walls (a *temenos*).[402] The similarities in form (i.e. a sanctuary which acted as a space for social nucleation within a village cluster, and one which first functioned as a domestic space, c.f. San Biagio, for example), suggests a repetition of settlement patterns witnessed at Metaponto. The pattern is one in which sacred spaces acted as multi-functional points of contact which shifted in use diachronically among 6th-2nd century inhabitants of pre-Roman Italy. Its proximity to an axial route of access within the territory (mentioned again in section 4.4) also supports comparison between these two areas of Basilicata. The space therefore exemplifies one of acculturation, likely bi-directionally between indigenous and Greek settlers. Osanna makes an important distinction in the process of acculturation as well. He notes that the appropriation of Greek architecture and artifacts within the Italic space is not suggestive of indigenous subjugation or even esteem towards the Greeks; this may instead be evidence of displays of power, where foreign and unfamiliar objects, being difficult to obtain, are a sign of wealth and influence. He suggests it may be unproductive to interpret this otherwise.[403]

Gabriel Zuchtriegal presents a potential parallel to these complex relationships in an examination of burial traditions at Paestum.[404] Here, the Tomb of the Diver represents the only tomb from a Greek city prior to the 4th century BCE featuring figurative scenes,

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[401] Osanna and Sica 2005, 61; Osanna 2015, 241.
[402] Osanna and Sica 2005, 61, 63.
[403] Osanna 2015, 241–2.
[404] Zuchtriegel 2022.

suggesting an influence from Etruscan custom.[405] Ethnic identification of the interred remains unknown (and perhaps unknowable), however a table (identified as a *Schanktisch*) represents Etruscan tradition, the symposium depicted is that of the Greeks, yet the krater featured among the illustrations is of an Oenotrian type.[406] Such traditions (which are witnessed elsewhere in Paestum , albeit lacking a figurative element), Zuchtriegal suggests, may represent social distinction in the area.[407] Such an amalgamation of traditions, specifically between the Oenotrians the Greeks, therefore finds precedent north of Metaponto. Based on these representations of native/Greek interactions, we can imagine a period, at least in the 7th and perhaps the 6th century in which indigenous residents of the Metapontine chora not only visited sacred sites identified in this study, but also may have had a hand in their establishment. Before Greek influence increased in the second half of the 7th century, mixed communities of both Greeks and Oenotrians can be assumed and are exemplified at places like Incoronata.[408] Further investigation, however, of this type of negotiation in ethnic representation is required.

4.4 Journey to the Sanctuary

One need only recall the Athenian Sacred Way to confirm the importance of pilgrimage, connectivity, and sacred routes beyond the Greek asty. Several processions,

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[405] Zuchtriegel 2022, 225.
[406] Colivicchi 2004; Robinson 2011; Zuchtriegel 2022, 225.
[407] Zuchtriegel 2022, 227.
[408] Osanna 2015; Savelli 2016.

similar to that of Eleusis and commonly identified as *pompai*, have been investigated within rural landscapes.[409] Physical evidence of such routes provides tangible proof of a maintained connection between sanctuary and city, and the construction of such routes necessitated intimate, localized knowledge of non-urban landscapes, including their terrain and waterways.[410] Across the Greek Mediterranean sacred routes can be identified, not only textually, but also within the archaeological record.

An inscription at Thasos outlines the procedures for the maintenance of streets adjacent and leading to sanctuaries of the city.[411] The 49-line stele was recovered underwater and includes two paragraphs of boustrophedon using the Parian-Thasian alphabet.[412] Here it is written, "Let each occupier keep the road clean against his own property…From the shrine of Herakles as far as the sea, let the *epistatai* clean this road," (lines 19-25).[413] That roads be managed by those whose homes fronted on them is repeated elsewhere at Pergamon, although William Pritchett finds it difficult to believe residents of any Greek countryside would see such laws enforced.[414] This suggests not only the existence and maintenance of private roads, but also a familiarity with roads attributed to shrines and sanctuaries (here the shrine of Herakles and of the Charites). To quote Susan Cole, "Major streets are here described by their relationship to sanctuaries, and it is the

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[409] Graf 1996.

[410] Hans Beck suggests that many localized pathways reflect modern GPS navigations: 2020, 27.

[411] Duchêne 1992; Cole 1995, 311; 2004, 53–5.

[412] Duchêne 1992.

[413] Translation: Lewis 1993, 402. The *epistatai* used here may be a type of *astynomoi* (or perhaps more appropriately *agronomoi*; see Arist. *Pol.* 6.1321b.28-30 for the use of this word). For *astynomoi* as they relate to roads, see Pritchett 1980 (147-8), where country roads are discussed as being within their purview.

[414] *OGI* 2.483; Pritchett 1980, 149. Plato, in a lengthy passage of his *Laws*, describes a system by which country roads are maintained by 60 young men from each tribe of the polity, whose sole job is to beautify the countryside (6.760b-763c).

sanctuaries that anchor the town."[415] Even the sacred space of the Lucanians at Torre di Satriano saw a similar installment of a 'sacred' pathway, where an arterial road connecting areas of the Basento and Potenza (possibly with further transit towards Vallo di Diano) lay adjacent to the sanctuary.[416]

The sacred way of Miletus represents another such example, where a named road facilitated procession to the Sanctuary of Apollo at Didyma.[417] The Temple of Demeter Chthonia at Hermione in the Peloponnese witnessed a procession every summer, and likewise at Thebes the Daphnephoria put in at important landmarks throughout the chora, including the precinct of Apollo Ismenios and the Galaxion (although the location of the latter is unknown).[418] While details are often shrouded by the nature of mystery cult, it is well attested that the Spartans journeyed outside the city in procession to Amyklai as part of the Hyakinthia and mystery rites performed at the Sanctuary of Demeter at Kelai likely featured procession upon a paved road from the city of Philious.[419] While the routes presented here are those with a cultic incentive for their construction, the system of connectivity present in rural Metaponto was likely less defined and lacking a rigid definition for its use (e.g. canals as roads, roads as property delineation, and/or roads as sacred pathways).

The presence of village clusters within the 6th century at Metaponto present a substitute for a polis center when considering a point of origin in the journey to an extra-

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[415] Cole 2004, 402.
[416] Osanna and Sica 2005, 59.
[417] *Milet* 1.3.133 = LSCG 50, lines 25-30; Sokolowski 1969; Beck 2020, 141.
[418] Beck 2020, 145,147.
[419] Xen. *Hell.* 4.5.11; Paus. 3.10.1, 3.18.6-3.19.3; Thuc. 5.23.5; Beck 2020, 15; Casselmann et al., 39–41.

urban sanctuary. Connectivity among these clusters and to the asty itself are identifiable within the Metapontine landscape; Joseph Carter highlights this in a discussion of route formation in the area of Lago del Lupo, suggesting, "…clusters grew up along such an access of communication. How else could the farmers who lived at these sites, remote from major valleys, have reached their neighbors and eventually the city?"[420] *Tratturi*, roads/tracks for human and animal alike, were identified along the Ionian coast and leading towards the interior, connecting Metaponto with indigenous centers inland and with other urban centers of the coast.[421] Similar axes connecting rural village clusters can be located among the Bakchiads of archaic Corinth (later the Kypselids).[422] The axis Carter (and Adamesteanu) traces through Lago del Lupo is one which follows a constant trajectory, maintains a virtually level plane, and intersects with several of the division lines from aerial survey.[423] The road identified at Pizzica (discussed above in section 2.2 and identified by Carter as a road which once flanked a canal) is complemented by similar evidence at the site of Pantanello. The road here aligns with burials dated to the 6th century BCE yet may represent an even earlier pathway prior to the addition of road-side tombs.[424] The Pantanello road thus falls contemporary with that of Pizzica, dated to the 7th/6th century BCE. The collection of tombs certainly suggests a community of some description, one

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[420] Carter 2011a, 702. A map indicating this proposed axis of communication can be found in Carter 2011a, 703.

[421] Adamesteanu 1963, 50–1; Carter 2011a, 702.

[422] Beck 2020, 63.

[423] "A NE-SW thoroughfare across the chora, connecting the villages of the Central Plateau with the Venella and the Fosso San Marco would have responded to a necessity of the inhabitants of the Early Village Clusters-communication with each other and with the asty on the coast," Carter 2011a, 702–3.

[424] Carter 2011a, 702.

which may be further characterized through the definition of its extent, effectively mapping

out a region for such a community to inhabit within the chora.

4.5 Regions of the Chora

Regionalization within Greek chorai is not an entirely abstract concept. The

Kleisthenian reforms of 510 BCE, which divided Athenian territory into *phylai* and *trittyes,*

represents a division of territory which is easily located in the historical record, but also

one which is largely artificial. The divisions presented below are those which reflect

identity, belonging, and community and therefore are visible physically as a manifestation

of community expression. They are a conflation of settlement models suggested elsewhere

in the region of Basilicata, including those witnessed at Venusia. This area, discussed

initially in Chapter 3, was the subject of study with respect to settlement distribution,

wherein dispersed and agglomerative settlement systems were compared and tested.[425] In

the Piani di Camera in the Ager Venusius, based on the point-pattern analysis performed,

statistically significant dispersion patterns are demonstrated, while evidence also supports

a polynuclear settlement model.[426] What may be witnessed within the Metapontine

landscape is a marriage of these two concepts, one which exhibits physical regularity in

settlement distribution but also a type of *social* agglomeration. The two patterns, when

social regionalism is incorporated, are not mutually exclusive. This is something conceded

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[425] Casarotto et al. 2016.
[426] Casarotto et al. 2016, 579, 583.

by Casarotto, Pelgrom, and Stek when performing this analysis at Venusia.[427] In northern Basilicata, along the border of Campania, similar distributions are witnessed in the Lucanian period. Massimo Osanna notes clustered villages of a 'pseudo-urban' type at Torre di Satriano, where he concludes that survey is able to provide evidence of widespread distribution of farmsteads and small villages indicating a Lucanian awareness of centralized pseudo-urban settlement.[428]

Examples of the successful identification of potential communities exclusively in the archaeological record include those in the area of Haleis in the Argolid, where the lower town features clusters of residential buildings with shared characteristics (e.g. centered courtyards, *andron*, rooms for economic activity).[429] The communal use of extra-urban sanctuaries may present an alternative means of identifying shared practices in the absence of such architectural material, as is the case at the majority of farmsteads identified via surface survey at Metaponto.

Concluding that several of these non-monumentalized rural shrines and sanctuaries acted as centers of aggregation, we can project these onto a map through a combination of the Cost-Distance analysis conducted above, and the division system proposed by Uggeri.[430] For each of the 10 date-bins, the Uggeri divisions thus have been superimposed over the relevant Cost-Distance analysis (i.e. according to its date-bin) and kleroi were 'assigned' to its nearest sanctuary used in this study. This has produced a series of maps

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[427] Casarotto et al. 2016, 583.
[428] Osanna and Sica 2005, 45.
[429] Beck 2020, 23.
[430] Uggeri 1969.

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suggestive of regions within the chora, each falling within a halo of influence of a nearby sanctuary. Maps for all 10 date- bins can been found in Appendix H: Regions of the Chora According to Nearest Sanctuary.

An interesting feature of these maps and one which appears across nearly every date-bin (with the exception of 250) is a clear central division of regions aligning closely with the center of the asty itself and projecting into the interior. An example of this can be seen in *Figure 27* .This vertical delineation follows the ICA division line L15 which, after combing all of its segments, is the longest of the division lines visible in the topography. This is strong evidence for a central thoroughfare bisecting the countryside and providing communication from the asty to the further chora. A cluster of LCP segments towards the north-west of this delineation also suggests a branching system of communication in this area, mimicking the plateiai of the asty. LCPs 10 and 11 interact with L15f at nearly a right angle, further suggestive of this interior route system. Note also that the region identified in *Figure 27* as 477 (corresponding to site/sanctuary 477) incorporates Lago del Lupo, the area in which Carter proposes the formation of numerous village clusters and associated axes in the 6th century BCE.[431]

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[431] Carter 2011a, 703.
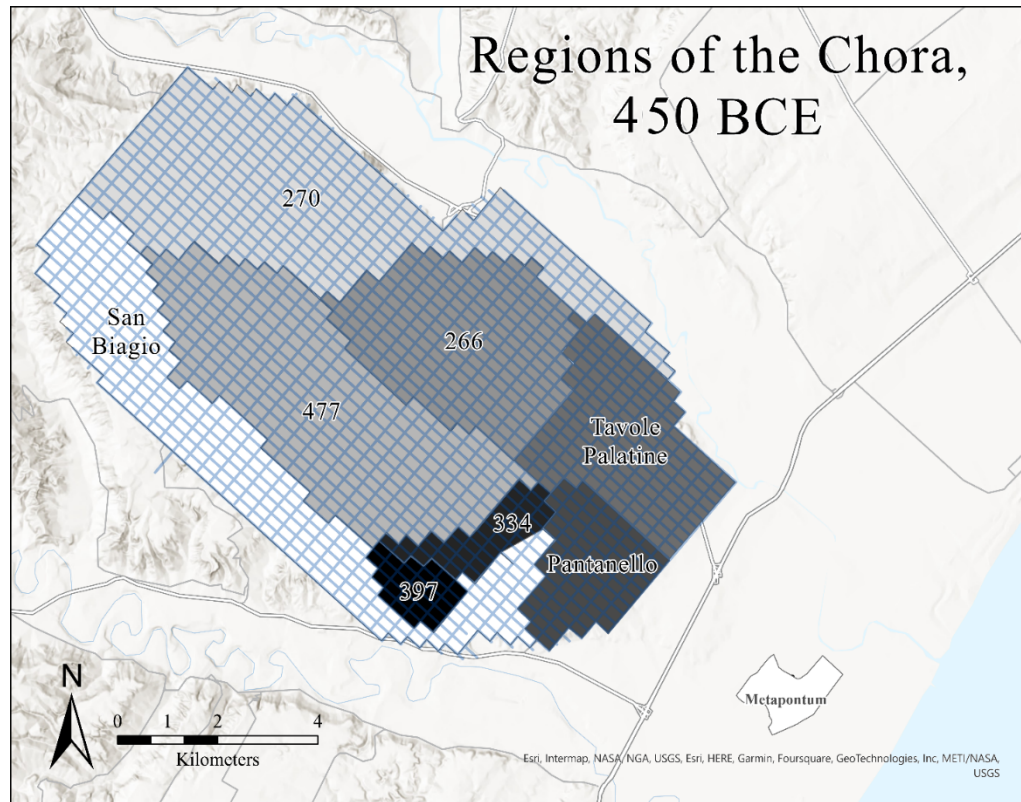
Figure 27: Regions of the chora according to nearest sanctuary, 450. (ArcGIS Pro 3.1.1)

Problematic aspects of these maps include a crucial lack of survey data, especially in areas both very near and very far from the asty. It is highly unlikely, for example, that a rural resident of the chora living in the territory north of modern-day Bernalda would belong to the same community as a resident living south-east of San-Biagio. We are missing a rural sanctuary which may lie deep in the interior of the Basento-Bradano watershed, likely several. Modern urbanization of the city of Bernalda also presents difficulty with respect to further survey (see *Figure 29* for its location with respect to sites used in this study).

Additionally, the regions in these maps vary in size, from a modest 27 kleroi (the region of site 397) to several dozen. It is difficult to imagine a nucleated community

extending more than about 2-4 km from its center (nor would this support the established 'Bintliff model' of community formation), and it is therefore possible that the majority of these regions should be further subdivided into smaller segments.[432] The region defined by site 397 is likely the closest to the reality of these communities in terms of their size. A discovery of significant (i.e. ≥0.95 EAW) sanctuaries in these regions through excavation or survey would serve to divide the areas into more realistic extents. Problematic dating of material from survey also complicates any in-depth study of chronology with respect to these community formations. A forthcoming thesis from Eric del Fabbro investigates these dating discrepancies, following the release of which such investigation will prove far more fruitful.[433]

Visualizing the influence of rural sanctuaries of the chora and combining these with our understanding of property delineation creates this first proposal of community regions in the countryside. While they can no doubt be improved with additional data, the visualization and confirmation of a central axis extending 12 km into the interior (measuring from the crossroads adjacent to the asty agora) offers useful insight into the reconstruction of routes of access outside the city. We can imagine this thoroughfare being used not only by residents of the chora travelling within the countryside to rural sanctuaries, but also by travellers between the chora and the asty, be they urban-dwellers performing initiatic rites at sites like San Biagio, or farmers ferrying their goods into the city agora for sale.

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[432] Bintliff 2014.
[433] del Fabbro *Forthcoming*.

Excavations at the Pantanello necropolis present us with the opportunity to further characterize these communities in the countryside. The necropolis offers unique insight into a community which surrounded and no doubt used the nearby sanctuary of Pantanello. The entire necropolis of Pantanello, located approximately 500 m from the sanctuary proper and 3.5 km from the city center, had not been excavated in full at the time of meticulous paleodemographic analysis of the site.[434] This, in tandem with the limitations of skeletal analysis, prevents us from estimating population of the Pantanello community (or any other) from this data alone (although an attempt will be made below using this data in combination with that which is derived from the analysis of Chapter 3).[435] Erosion of shallow (likely child) graves also impacts our interpretations of the site. An unexpected over-representation of female burials may be explained by social status and prestige in urban burials, perhaps afforded to men of the chora with more frequency than women.[436] If true, this communicates interesting nuances with respect to belonging and citizenship, wherein men of the countryside were intrinsically involved with the urban center, enough to be afforded burial away from their homestead and in an urban necropolis. Elite burials from the 6th century at the urban necropolis of Crucinia provide precedent for a relationship between status and burial near the city.[437] Following a period of rule by tyrants in the 6th century, a 5th-century democracy is generally accepted at Metaponto.[438] In the absence of

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[434] Henneberg and Henneberg 1998.
[435] Henneberg and Henneberg 1998, 509.
[436] Henneberg and Henneberg 1998, 509.
[437] Carter 1998, 10.
[438] Death of Archelaos, a Metapontine tyrant: Plut. *Amatorius*, 760; Despite Carter's frustration that "…documentary sources on the organization of Metapontine society are practically nonexistant…" (1998, p. 7), Diodorus Siculus presents what must be a democratic system, reporting "…τῶν δὲ Μεταποντίνων οὐ

evidence to the contrary, a system not unlike that of late 6th-century Athenian *demoi* suits our present understanding of civic engagement in the chora. It is unclear if a 6th/5th-century division of the Metapontine chora resulted in aristocratic ownership of land, forming phratry-like communities, or if these communities instead mimicked groups less familial in nature and with formal civic representation and leadership, as one would expect of an Attik *demos.* Nevertheless, a system whereby men of the chora were afforded rights of citizenship, including voting within the asty, would provide adequate reason for men to prioritize urban burials on the basis of prestige.

Skeletal analysis at Pantanello suggests that members of rural communities of Metaponto lived to an average age of 41 years for men, and 38 years for women (although an average represents an incomplete model of life expectancy; an abridged life table can be located in Henneberg and Henneberg 1998, pp. 510-511). This average aligns with anticipated life expectancies for early historic periods and is comparable to datasets from Athens and Corinth between the 9th and 4th centuries BCE.[439] While many men and women at Pantanello lived into their 60's, childbirth, disease, and injury caused death for many in their 20's and 30's. Evidence for medical care in the chora is limited but not absent. Healed fractures witnessed in skeletal remains suggest the provision of time for healing of various injuries, and some general care for such injuries can be assumed.[440] It seems that rural residents could afford to take time away from work and receive treatment for negative

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προσεχόντων αὐτῷ…"/"…and when the people of Metaponto did not devote themselves to [Kleonymos]…" (XX.104.3), establishing the Metapontines as collective decision-makers.

[439] Henneberg and Henneberg 1998, 510.

[440] Henneberg and Henneberg 1998, 527.

impacts on their health. However, malaria is recorded definitively at nearby Heraklea (ca. 20 km from Metaponto), and almost certainly affected residents of the Metapontino as well.[441] This was compounded by alluvial flooding suggested between the 6th and 4th centuries BCE, when the water table raised as much as 1 m.[442] This provides an explanation for decreased settlement in the chora during the 4th century. Further evidence from dentition at Pantanello discloses an incessant battle against infection in the chora, and disease appears to have been the primary malefactor with respect to overall health. This suggests a somewhat middling quality of life for rural residents; at-home treatment of acute injuries was possible, while advanced treatment for chronic disease was not. Perhaps treatments were made more readily available to urban-dwellers, but it appears to have escaped those living in the countryside.

The farmsteads which contributed to these community formations varied in structure and size. Architecturally, farmhouses appear in the archaeological record alone or in groups, some with towers and/or courtyards incorporated into their design, and many without.[443] More elaborate households, especially those which communicate a concern for the safety of its contents through the implementation of protective towers (a common phenomenon for rural households of the 4th century across the Mediterranean) provide contrast to the simpler and smaller farmhouses witnessed in the countryside.[444] It is difficult to discern if we ought to interpret these differences as those reflective of status or of

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[441] Henneberg and Henneberg 1998, 529.
[442] Henneberg and Henneberg 1998, 529.
[443] Cabaniss 2019, 2.
[444] Cabaniss 2019, 4.

permanent residency in the chora (does a more elaborate farmhouse communicate wealth accumulation and permanency, or suggest a seasonal home for a wealthy urbanite?). While a definitive answer to this particular question may elude us, Andrew Cabaniss has used statistical techniques to suggest that the data we currently possess with respect to the typical form of a Metapontine farmstead is representative of larger trends throughout the countryside.[445] In other words, while excavation and survey is incomplete across the entirety of the countryside, those sites for which we have structural information are enough to present an idea for the 'typical' rural household at Metaponto.

The rural household, according to Bagnall and Frier (1994), included an average just shy of five members (excluding slaves/non-kin members) in the ancient Mediterranean.[446] Cabaniss has increased this by two members to account for the likely presence of slaves in farming households of the Metapontino, bringing the average rural household up to a total of approximately seven members. Hesiod's farm (the topic of Section 1.5), while not large, evidentially supported a least 6 people.[447] Incidentally, seven is also the number suggested by Giovanni Uggeri in representing the average agrarian household.[448] Based on these estimates of household size, Henneberg and Henneberg (1998) have indicated that a generous caloric surplus in the yields of Metapontine farmlands should be assumed.[449] This in turn allows us to propose that producers in the

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[445] Cabaniss 2019.
[446] Bagnall and Frier 1994, 67-8, 71.
[447] The owner, his wife, a child, and two or more slaves: Hes. *WD* 376-377, 469-471, 607-608, 695-701; Hanson 1996, 107.
[448] Uggeri 1969, 59.
[449] Henneberg and Henneberg 1998, 514.

chora were able not only to adequately provide for their own families, but also to accumulate some level of expendable income, resulting in an increased quality of life. This is supported by the accompanying grave goods of those interred at Pantanello.[450] Analysis of wear on the teeth of those buried here suggest a tendency towards the consumption of cooked, soft foods, and thus the residents of the chora likely enjoyed a variety of foods which may have been locally sourced or acquired from the nearby asty.[451]

The region of 397 identified above (*Figure 27*) features 27 kleroi within the Uggeri system of plots. Using the average of seven household members proposed by Cabaniss and Uggeri, this suggests a region inhabited by nearly 200 individuals (189). While variation in overall population for these communities is a near certainty, a minimum population of 100 seems appropriate, as well as a maximum of approximately 200. This maximum is inspired by the Bintliff's suggestions regarding independent community formation, discussed in section 1.3 of Chapter 1.[452] In keeping with Bintliff's 'Fission-Fusion Model,' these small village clusters were likely then practicing regular contact with a minimum of four neighbouring clusters, allowing for exogamy and genetic diversity beyond the community proper. These population estimates are, by necessity, a diachronic average, although a decline in domestic land use in the chora throughout the early 4th century would, of course, contribute to a decline in population during this period as well.[453]

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[450] Hall 1998.
[451] Henneberg and Henneberg 1998, 536.
[452] Bintliff 2014, 204.
[453] Carter 2011d; Carter 1990, 21.

The members of these rural communities can thus be characterized as middling to moderately wealthy households with frequent health concerns. These individuals enjoyed engagement in civic assembly through their male head-of-household and engaged in more localized assembly at a nearby sanctuary. It was here that they interacted with members of their community, numbering somewhere south of 200 in total. Infrastructure in the countryside (i.e. the 'division lines') served as a constant reminder that, despite inhabiting non-urban spaces, these communities belonged to the larger Metapontine polity, and regular trade and tithes may have resulted in complex concepts of identity; members identifying both as *hoi proschoroi* and as members of the state-at-large.

Conclusions

5.1 Results

Our understanding of life in the countryside of Metaponto relies heavily on the extrapolation of evidence from elsewhere in the Greek world. Thucydides indicates that the vast majority of Attika's population lived outside the city walls, in the fields which fed the city.[454] Elsewhere, however, survey of rural landscapes indicates that the Classical polis was more nucleated.[455] For Metaponto, survey suggests there was a thriving and permanent population in the chora.[456]

Coordinated movement throughout this rural landscape is evident archaeologically through the excavation of roads and on the subject of movement, Ulrich Sinn suggests that remote monumental sanctuaries presented a safe space for passage between neighbouring territories.[457] These sites may have acted as thoroughfares visible at a distance and as spaces for mediation between polities.[458] Even the Laconians gathered at the Sanctuary of Artemis Limnaia to share space with Messenians on days of festival celebration.[459] It is also likely that ritual pilgrimage to remote sanctuaries in the chora was practiced at Metaponto.[460] The

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[454] Thuc. 2.15.1.
[455] Shipley 2005; Bintliff 2006; Lohmann et al. 2019.
[456] Carter and Prieto 2011b.
[457] Excavation of roads at Pizzica and San Teodoro, for example: Nava 2003; Folk 2011; Carter 2020, 220. Regarding safe passage: Sinn 1996, 70–4.
[458] Sinn 1996, 70–4.
[459] Sinn 1996, 71.
[460] Referred to a 'centrifugal processions by Graf 1996; evidence includes the Cyma Frieze ("Departure of Amphiarus") from San Biagio held at the Museo Archeologico Nazionale di Metaponto, depicting a processional scene, Carter 1980, 27.

sanctuaries of Metaponto's chora therefore offer an ideal destination for those living in the city, and in its surrounding landscape. Mapping this movement using Least Cost Path allows us to visualize ancient routes, confirming the most likely places for the establishment of permanent paths (be they roads, roads flanked by canals, or canals used as roads when dry) through comparison with the observed 'division lines.'

A theory of division and routes of access in the chora of Metaponto, however, presents issues. The scope of such a project, with depressions crossing a survey area of approximately 240 km^2, would have necessitated an enormous workforce. Even limiting the project to just those lines which are visible in aerial photographs amounts to 105.72 km of digging, and Carter estimates that the 'division line' system would have required 178,000 person-days (i.e., day's work by a single labourer) and (at a worker's wage of 1 drachma/day) approximately the same in drachmai.[461] With a workforce 100-men strong, the work would have taken at least 10 years.[462] While the numbers are staggering, the project is still not impossible in scope. A division of the *chora* is evident at the site of Tauric Chersonesos, where roads flanked by walls were established between delineated properties ca. the 5th c. BCE.[463] The division here spans an area exceeding 100 km^2 and, while this is still less than half of the size of the proposed division of the Metapontine chora, it presents a story of success with respect to rural infrastructure at scale.[464]

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[461] Carter 2020, 232–3.
[462] Carter 2020, 233.
[463] Adamesteanu and Vatin 1976, 120.
[464] Carter et al. 2000, 713.

The implications of regular travel to remote sanctuaries of the chora are many. Localized decision-making was a necessity in the small clusters of settlements spread across Metaponto's rural landscape. Issues related to farming, property, and shared access to resources (e.g. fresh water) were not those which would be brought to the *asty*, but rather dealt with on a more local scale.[465] Since the use of extra-urban sanctuaries as spaces for mediation (discussed above) suggests a non-cultic function for these sites, it stands to reason that they served a more civic function as well. Clusters of rural farmsteads likely formed 'neighbourhoods,' using local sanctuaries as sites of interaction, likely too of administration.[466] In this way, sanctuaries frequented by local residents represented an aspect of identity, by which areas could be carved out of the landscape and relegated to specific sites of assembly. Thus, by using aspects of cost-distance analysis (including Least Cost Path), we can visualize these ancient communities and better understand the identities of the residents who composed them. Further characterization of these sanctuaries will therefore serve to characterize the Metapontines of the countryside themselves.

The analysis conducted in Chapter 3, which includes an evaluation of statistical significance, confirms that linear topographical anomalies in the chora of Metaponto are, in part, anthropic in nature. While these lines may have served as canals (irrigation), roads, or property delineation, the regularity at which they appear and their conformity to a system of divisions suggested by Giovanni Uggeri in 1969 indicates that the chora was subject to property delineation, likely contemporary with or shortly after the division of the asty in

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465 Foxhall 2020.
466 Carter 2011d, 676; 2011a, 700–2; Foxhall 2020, 2.

the mid-6th century. This is consistent with the division of chorai elsewhere in the Mediterranean (Chersonesos, Korkyra Melaina).[467]

Least Cost Paths serve as a vehicle for visualizing geographic connectivity between farmsteads and sanctuaries within the chora of Metaponto. That the LCPs often conform to a system of kleroi proposed by Uggeri is suggestive of the use of these 'lines' for travel to and from rural sanctuaries.[468] Frequentation at these sanctuaries may not have been exclusively sacred in nature. Secular use of these spaces is suggested by the comparanda outlined in Chapter 4 and suggests that these extra-mural sanctuaries served as points of contact between members of agrarian regions. This analysis indicates a number of nucleated communities centered upon a rural sanctuary, defined by proximity between a farmstead and this communal space, and numbering between 100 and 200 total members each. On the subject of number, significance, and comparative sizes of these communities, Peter Dana's interpolation of a cost-weighted surface for farmsteads based on farm 'importance' (determined by the appearance of fine-ware across time periods) offers some limited insight.[469] Only a cost surface for the period of 350 BCE is provided, yet even so this highlights a relative density of activity in the region of Lago del Lupo, the same area Carter had identified as featuring village clusters and a central axis for travel in the chora.[470] This methodology can be replicated more simply (i.e. without the steps Dana has taken to quantify 'site importance,' which here will instead be replaced with total artifact counts)

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[467] Uggeri 1969.
[468] Uggeri 1969.
[469] Dana 2011, 122.
[470] Dana 2011, 123, Figures 4.27-4.28; Carter 2011a, 703.
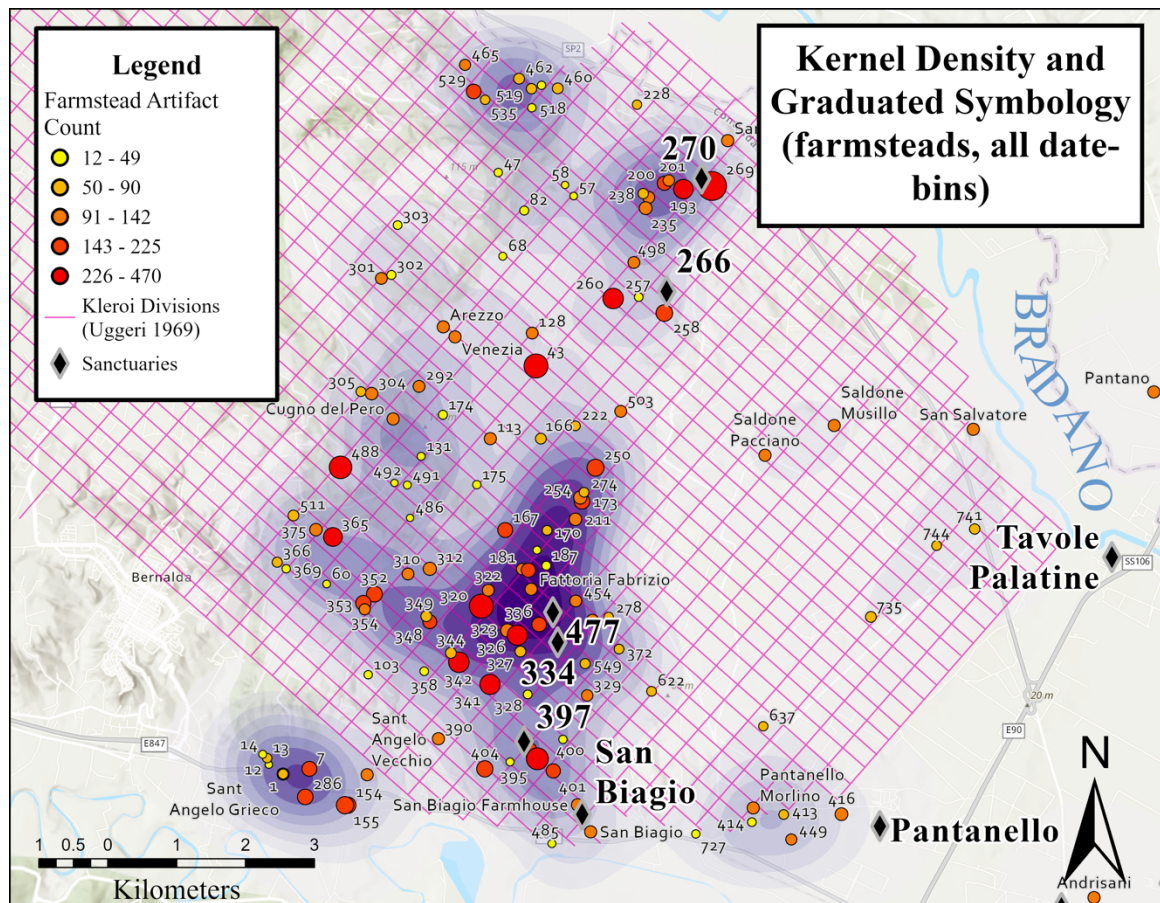
Figure 28: Kernel Density (in purple) and graduated symbology for all farmsteads in site catalogue, across all date-bins. (ArcGIS Pro 3.1.1)

through the use of Kernel Density analysis of farmstead locations, and with graduated symbology representative of total survey material collected.[471] One such map has been produced and provided here (see *Figure 28*).

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[471] The reason for this simplification stems from methodological issues in preparation of such visualizations: survey bias (largely the result of areas inaccessible for survey due to modern urbanization) creates significant voids in the geographical data. The reconciling of excavated sites (e.g. Arezzo, San Biagio, Sant Angelo Vecchio, etc.) and those identified in survey also presents issues with respect to inferred 'importance' of a site. The visualization prepared and included here, therefore, is incomplete in nature. Despite these faults, it serves to provide a theoretical basis for comparison among rural communities.

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Visualizations of Kernel Density are highly influenced by search radius. This is the radius within which density is calculated by identifying the circular 'neighbourhood' of each point, extending radially a number of units specified by a 'search radius' input; too large of a search radius and the resulting visualization will lack detail, while too small will fail to demonstrate spatial relationships between point features. To calculate an appropriate radius for this dataset, a spatial variant of Silverman's Rule of Thumb was used.[472] This resulted in a radius of 1.41 km (or an area of ~6 km^2), which is twice as large as the community sizes suggested by the region of sanctuary site 397 of approximately 27 kleroi, or 3 km^2; see Chapter 4, Section 4.5).[473] Graduated symbology demonstrates the amount of material collected via survey of each farmstead site.[474] An average number of survey materials (114) has been supplied for farmsteads for which we have excavation data rather than artifact numbers collected from surface survey. This is an imperfect solution towards mitigating bias in the significant increase in recorded materials resulting from excavation. The rendered graphic illustrates the presence of 5-8 high-density areas within which we might propose the locations of at least 5 rural communities (see *Figure 28*). These communities are as follows:

1) The most evident of these densities falls approximately 5 km East of the modern city of Bernalda, in the Venella Valley (the area of Fattoria Fabrizio and sanctuary sites 334 and 477). It contains approximately 23 farmsteads. This is immediately North of the

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[472] Silverman 1986, 76.
[473] Cell size: 5 m.
[474] Where 'revisits' to survey areas are present, only the number of artifacts recovered in the first visit has been recorded.

community outlined in Section 4.5 above, surrounding sanctuary site 397. The ~23 farmsteads identified within this region of the Kernel Density map also fall near to the proposed 27 farmsteads/kleroi predicted above for approximate community size.

2) Two densities are identifiable south of the Bradano river, in Giampasquale, the region of sanctuary site 270, and both contain approximately 8 farmsteads.

3) A collection of 10 farmsteads in the Basento Valley, 4 km West of San Biagio creates another apparent density.

4) Lastly, a small collection of farmsteads 1.4 km West of the Pantanello Sanctuary likely represents the community making civic use of the Pantnello Sanctuary itself. 7 farmsteads are collected here.

3 additional site densities are visible in the areas of sanctuary site 397 (the locality of Avinella), Cugno del Pero, and Scarciullo, although they are comparatively less convincing than those listed above. Should we speculate that there was indeed uniform distribution of such communities in the chora due to a process of land division, that these communities typically reached 3 km^2 in size, and that the total size of the developed (i.e. delineated) chora was approximately 240 km^2 (see Carter 2020), we are able to propose the presence of approximately 80 communities. A total population of the countryside, assuming approximately 200 members in each community, therefore, amounts to 16,000 rural inhabitants, split between the Bradano-Basento and Basento-Cavone watersheds. While survey of the Basento-Cavone watershed is incomplete, we can speculate that there were comparable but likely fewer residents here than on the opposing side of the river,

given the natural barrier it posed in journeying to the city. We can perhaps then account for this discrepancy by lowering the estimate by 20%, leaving a population of 12,800 residents of the chora. These estimates do not account for the inverse relationship in settlement numbers as distance from the urban center increases (see Chapter 1, Section 1.4), for which there is not enough survey data to make such estimations (at Metaponto or elsewhere).

If, due to the speculative nature of these estimates, only half as many communities were present in the chora, these figures nevertheless represent a robust and thriving countryside of thousands. It suggests that religious and civic regionalism formed, composed of *amphiktyones* centered upon the shrines and sanctuaries nearest to them. Among these landscapes, collections of *hoi proschoroi* shared in the responsibility of maintaining their region, meeting to discuss localized issues and building strong bonds and identities which extended beyond those imposed by the urban polis. Nevertheless, the nature of governance in the chora is elusive. Presumably assemblies were a component of land use at rural sanctuary sites, a symptom of the use of these spaces for social-political purposes. This is evidenced by images of feasting at Pantanello, sites of independent production in the chora, and the use of monumentalized sanctuaries to define territorial borders. Assemblies consisting of residents of the chora may have met for the purpose of discussing recent yields and agricultural challenges within the territory, local production and supply independent from the urban center, or perhaps even constructing a report for delivery to the asty. Evidence of these types of recordkeeping in sanctuary spaces is witnessed elsewhere in the Greek West (Syracuse, Poseidonia), and is therefore easy to imagine here as well.

In the absence of additional survey data (a request that should not diminish the scale of data collection already completed, since projects at Metaponto offer a wealth of survey data already), the definition of regions in the chora remains incomplete. Regions surrounding sites 397 and 334 are the most realistic in terms of size, and the best practice would be to extrapolate an approximate (and conservative) region size from these (~30 kleroi, or 1.5-2 km^2).

5.2 A Path Forward

Methods of recognizing community identity include artisanal epistemology, in which localized production practices are recognized and compared in order to reveal collections of shared preferences in production.[475] This method necessitates large sample data and enough variability between samples to identify collections of characteristics. The survey conducted (and currently being conducted) within the chora of Metaponto may therefore yield further evidence of the regionalization suggested here. The analysis could also be augmented through the use of more detailed aerial survey. While in practice this is a simple process via the use of a drone, flown over sites of interest (in this case the areas of LCP-division line interaction), the reality necessitates a series of permissions from landowners and the Soprintendenza Archeologica of Basilicata. This is a process which historically requires 2 or more years to complete, but it may nevertheless be a valuable

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[475] Beck 2020, 28.

addition to the results outlined here. Private drone survey would produce elevation models with a horizontal accuracy of less than 5 cm, a stark contrast to the 5 m resolution used in the initial analysis. These elevation models may further elucidate the nature of land use surrounding these division lines and the resolution of such survey may even yield evidence of level pathways that are impossible to distinguish in the 5 m DEMs.

Additionally, more surface survey remains a priority in the expansion of this research, specifically within the Basento-Cavone watershed, south of the survey area used in the above analysis. This is an objective of the Metaponto Archaeological Project, and several years of survey have produced promising results with respect to the expansion of the chora across the Basento, in particular with relation to the sanctuary of Incoronata. While these data are not published as of yet, their incorporation into the project GIS already presents a useful canvas upon which further analysis can be developed. The ICA has identified division lines within this watershed which do not align with those of the Basento-Bradano, suggestive of a distinct system of linear anomalies. Whether or not these lines served the same purpose (or, more accurately, purposes) as those north of the Basento has not been determined conclusively. Comparison may also be found among the sites surrounding nearby Heraklea, where preliminary investigation of the countryside has begun.[476]

Finally, it is a hope that this methodology is one which has broad applications in the study of urban development in antiquity. While the use of Least Cost Path as a tool for

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[476] Zuchtriegel 2022, 223.

ancient path-finding is not novel in and of itself, there are no other applications which combine this with theories regarding ktisis, division of land, and extra-urban community formation. The urban orthogonal grid is well documented in both the literary and archaeological record, yet its use in rural contexts is less established. In the chorai of Greek poleis which have been the subject of survey, Cost-Distance Analysis and Least Cost Path offer a unique opportunity to analyze physical and social connectivity at scale, and to investigate evidence of rural land division in Magna Graecia.

The division of land in the Greek chora is suggestive of advanced levels of social-political cohesion and foresight and is especially important for a city for which we have no voice – no Metapontine authors who relate to us how the city developed and interacted with its environment over its lifetime of 5 centuries. It indicates the existence of political bodies, assembly, a specialized understanding of calculating topographies, and of a thriving coastal settlement fed by an extensive agricultural industry. These qualities may not be unique to Metaponto, however, and it remains to be seen if similar conclusions can be made elsewhere among the many apoikiai of the ancient Greek world.

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Appendices

Appendix A : Site Catalogue

A.1 Farmsteads in Study:

Site Name	Latitude	Longitude	Pre 600 Activity	600 Bin	550 Bin	500 Bin	450 Bin	400 Bin	350 Bin	300 Bin	250 Bin	200 Bin
San Biagio	40.388801	16.7487837	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
San Biagio Torretta	40.3107638	16.7260152				yes	yes					
San Biagio Farmhouse	40.3914972	16.7471034									yes	
Pantanello Morlino	40.391183	16.77001		yes								
Saldone Pacciano	40.4261868	16.7715565			maybe	maybe			yes	yes		
Saldone Musillo	40.4291454	16.7805889			maybe	yes			yes			
San Marco	40.457417	16.766667	yes									
Pantano	40.4324859	16.8222771		yes								
Arezzo	40.438922	16.729568		yes	yes		yes		yes			
Cugno del Pero	40.4297885	16.7230484			yes							
Cozzo Presepe	40.4725943	16.7222215	yes	yes	yes	yes	yes	yes	yes	yes	yes	
Fattoria Fabrizio	40.412898	16.741058		yes	yes	yes	yes	yes	yes	yes		
Venezia	40.437956	16.731119							yes			
San Salvatore	40.428756	16.7987209	yes									
Casamassima	40.4216282	16.7476969									yes	

Site Name	Latitude	Longitude	Pre 600 Activity	600 Bin	550 Bin	500 Bin	450 Bin	400 Bin	350 Bin	300 Bin	250 Bin	200 Bin
Andrisani	40.3822819	16.8144639	yes									
Sant'Angelo Vecchio	16.7196754	40.3944986			yes			yes	yes	yes		
Sant'Angelo Grieco	40.394563	16.708703				yes	yes	yes	yes	yes		
1	40.39456417	16.70870406			yes		yes	yes	yes	yes		
7	40.39505395	16.71213336	yes		yes							
12	40.39549253	16.70684233			yes			yes				
13	40.39612637	16.70662269	yes	yes	yes		yes	yes	yes	yes		
14	40.39649527	16.70604287	yes				yes					
43	40.43505167	16.7416782		yes	yes			yes	yes	yes	yes	yes
47	40.45423276	16.73674882	yes						yes	yes		
57	40.45192235	16.74659491					yes	yes	yes	yes	yes	yes
58	40.45301174	16.74544387			yes				yes	yes		
60	40.41339823	16.7143662						yes			yes	
68	40.44593581	16.73736058						yes	yes		yes	
82	40.45047942	16.74013084						yes	yes	yes		
103	40.40439935	16.71978239	yes	yes	yes	yes	yes	yes	yes	yes	yes	
113	40.42785352	16.73571624					yes	yes	yes	yes	yes	yes
128	40.43831152	16.74116105					yes	yes	yes	yes	yes	yes
131	40.4260966	16.72671229	yes		yes		yes	yes				
154	40.39146682	16.71710868		yes	yes			yes	yes	yes		
155	40.39147207	16.71675536	yes	yes	yes	yes	yes		yes			

Site Name	Latitude	Longitude	Pre 600 Activity	600 Bin	550 Bin	500 Bin	450 Bin	400 Bin	350 Bin	300 Bin	250 Bin	200 Bin
166	40.42784428	16.74231738					yes		yes	yes		
167	40.41877975	16.73766348						yes	yes	yes	yes	
170	40.41873345	16.74313126		yes	yes	yes	yes					
173	40.4216283	16.74769687					yes	yes				
174	40.43019839	16.7295286	yes				yes	yes				
175	40.42328573	16.73394856					yes					
181	40.41490906	16.73986213			yes							
183	40.41479777	16.74067249						yes	yes	yes	yes	yes
187	40.41522151	16.7430406						yes				
193	40.45260638	16.76088153						yes	yes	yes	yes	
195	40.41677172	16.74179592					yes					
200	40.45317536	16.75841995	yes		yes		yes	yes	yes	yes		
201	40.45344572	16.75900483	yes				yes	yes	yes	yes		
211	40.41984896	16.74681395			yes					yes		
215	40.45177424	16.75636692			yes		yes					
222	40.42912761	16.7468183			yes				yes	yes		
228	40.46098588	16.75484958		yes	yes							
235	40.45069903	16.75598516						yes	yes	yes		
238	40.45214518	16.75566904			yes		yes					
250	40.42494435	16.74942121					yes	yes	yes	yes		
254	40.42200106	16.74747078			yes		yes					
257	40.44188483	16.75506007					yes	yes				

Site Name	Latitude	Longitude	Pre 600 Activity	600 Bin	550 Bin	500 Bin	450 Bin	400 Bin	350 Bin	300 Bin	250 Bin	200 Bin
258	40.44030222	16.7584263			yes			yes	yes	yes		
260	40.4417548	16.75175533					yes	yes	yes	yes	yes	yes
269	40.45290021	16.76465101			yes	yes	yes	yes	yes	yes	yes	yes
274	40.42253423	16.74795607			yes		yes					
278	40.41013495	16.75117065						yes	yes	yes	yes	yes
286	40.39226932	16.71159154		yes	yes			yes				
288	40.40981604	16.7490293					yes	yes	yes	yes		
292	40.43302869	16.72640629					yes	yes	yes	yes		
301	40.44374081	16.72150417			yes		yes	yes	yes	yes		
302	40.44408169	16.72280988					yes					
303	40.44901508	16.72363161					yes					
304	40.43231861	16.72025787	yes		yes		yes	yes				
305	40.43251958	16.7188601	yes				yes		yes			
310	40.41441115	16.72499916			yes		yes			yes		
312	40.41490922	16.72784051	yes				yes		yes	yes	yes	
320	40.41120504	16.73456941	yes		yes		yes	yes	yes	yes	yes	yes
322	40.41280438	16.73544726					yes		yes	yes		
323	40.40881224	16.73793734		yes	yes		yes					
326	40.4083425	16.73922158	yes				yes	yes	yes	yes	yes	yes
327	40.40671451	16.73965104					yes	yes	yes	yes	yes	yes
328	40.4024662	16.74060218			yes		yes					
329	40.40234887	16.7483764						yes				

Site Name	Latitude	Longitude	Pre 600 Activity	600 Bin	550 Bin	500 Bin	450 Bin	400 Bin	350 Bin	300 Bin	250 Bin	200 Bin
335	40.40735501	16.7449706					yes	yes		yes		
336	40.40938053	16.74207669	yes	yes	yes		yes					
341	40.40344109	16.73567806						yes	yes	yes	yes	yes
342	40.40566431	16.73159889	yes				yes	yes	yes	yes	yes	yes
344	40.40658051	16.73057356			yes		yes					
348	40.40968453	16.72782469			yes			yes	yes	yes		
349	40.41023187	16.72736729		yes	yes							
352	40.41240495	16.72058729					yes	yes	yes	yes	yes	yes
353	40.41152547	16.71915065	yes				yes	yes	yes	yes		
354	40.41089179	16.71935844	yes					yes	yes	yes	yes	yes
358	40.40474054	16.72710903					yes	yes	yes	yes	yes	
365	40.4180704	16.71519201			yes	yes	yes	yes	yes	yes	yes	yes
366	40.41556551	16.70792711			yes							
369	40.41491756	16.7091011						yes		yes		
372	40.40697098	16.75249098	yes		yes	yes		yes	yes	yes		
375	40.41882401	16.71297169	yes		yes		yes	yes		yes	yes	yes
390	40.39804686	16.72894102						yes	yes	yes	yes	
394	40.39695881	16.74081379	yes					yes	yes	yes	yes	
395	40.39605135	16.74185084	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
400	40.39798271	16.74519985			yes							
401	40.39484874	16.74394067	yes		yes		yes	yes	yes	yes		
404	40.39507348	16.73499182			yes		yes		yes	yes	yes	yes

Site Name	Latitude	Longitude	Pre 600 Activity	600 Bin	550 Bin	500 Bin	450 Bin	400 Bin	350 Bin	300 Bin	250 Bin	200 Bin
413	40.39051786	16.77398988	yes					yes	yes	yes		
414	40.38977078	16.76983497			yes		yes	yes	yes	yes		
416	40.39058223	16.78152002						yes	yes	yes		
449	40.38807046	16.77497417						yes	yes	yes		
454	40.41174076	16.74685171	yes					yes	yes	yes		
459	40.46288591	16.7423971			yes							
460	40.46257492	16.74450023	yes					yes	yes	yes	yes	
462	40.46356066	16.73946594	yes		yes		yes	yes		yes		
465	40.46492779	16.73241263	yes	yes	yes		yes	yes	yes	yes	yes	
485	40.38764473	16.7437548	yes		yes	yes						
486	40.41999252	16.72525962			yes							
488	40.42499209	16.716193	yes	yes	yes		yes	yes	yes	yes		
491	40.42324138	16.72487115						yes	yes			
492	40.42344626	16.72321436			yes							
498	40.44531742	16.75444191	yes					yes	yes	yes	yes	
503	40.43056024	16.75274969	yes		yes		yes	yes	yes	yes		
505	40.39574434	16.73830816	yes	yes	yes							
511	40.42021839	16.71006036	yes					yes	yes	yes		
518	40.46065263	16.7411482						yes		yes		
519	40.46254526	16.74109093			yes		yes	yes		yes		
529	40.4622985	16.73353628	yes					yes	yes	yes		
535	40.46146505	16.73504807	yes		yes				yes			

Site Name	Latitude	Longitude	Pre 600 Activity	600 Bin	550 Bin	500 Bin	450 Bin	400 Bin	350 Bin	300 Bin	250 Bin	200 Bin
549	40.40550596	16.74810458	yes					yes				
622	40.40276238	16.75675357	yes	yes	yes	yes						
637	40.39930601	16.77132194	yes					yes	yes	yes		
727	40.38862146	16.76251226	yes				yes			yes		
735	40.41016164	16.78534797	yes					yes	yes	yes		
741	40.41888775	16.79890927	yes		yes		yes		yes	yes		
744	40.41724494	16.79390349					yes	yes				

A.2 Sanctuaries in Study:

Site Name	Latitude	Longitude	Pre 600 Activity	600 Bin	550 Bin	500 Bin	450 Bin	400 Bin	350 Bin	300 Bin	250 Bin	200 Bin
Pantanello Sanctuary	40.38937820	16.78652270	yes	yes	yes	yes	yes	yes	yes	yes	yes	
San Biagio Sanctuary	40.39055100	16.74770000	yes	yes	yes	yes	yes	yes	yes	yes	yes	
Incoronata	40.36992350	16.74009820	yes	yes	yes							
Tavole Palatine	40.41608400	16.81678880		yes	yes	yes	yes	yes	yes			
Favale	40.38124780	16.81020760		yes	yes		yes	yes				
Pantano	40.43239340	16.82258440			yes	yes	yes	yes				
266	40.44245980	16.75871836			yes		yes	yes	yes	yes	yes	yes
270	40.45365101	16.76326734	yes	yes	yes	yes						
334	40.40763227	16.74450638	yes	yes	yes	yes	yes	yes		yes		
397	40.39778909	16.74011642	yes	yes	yes	yes	yes	yes				
477	40.41061458	16.74387630	yes	yes	yes	yes	yes	yes	yes			

Appendix B: Map of Sites in LCP Analysis
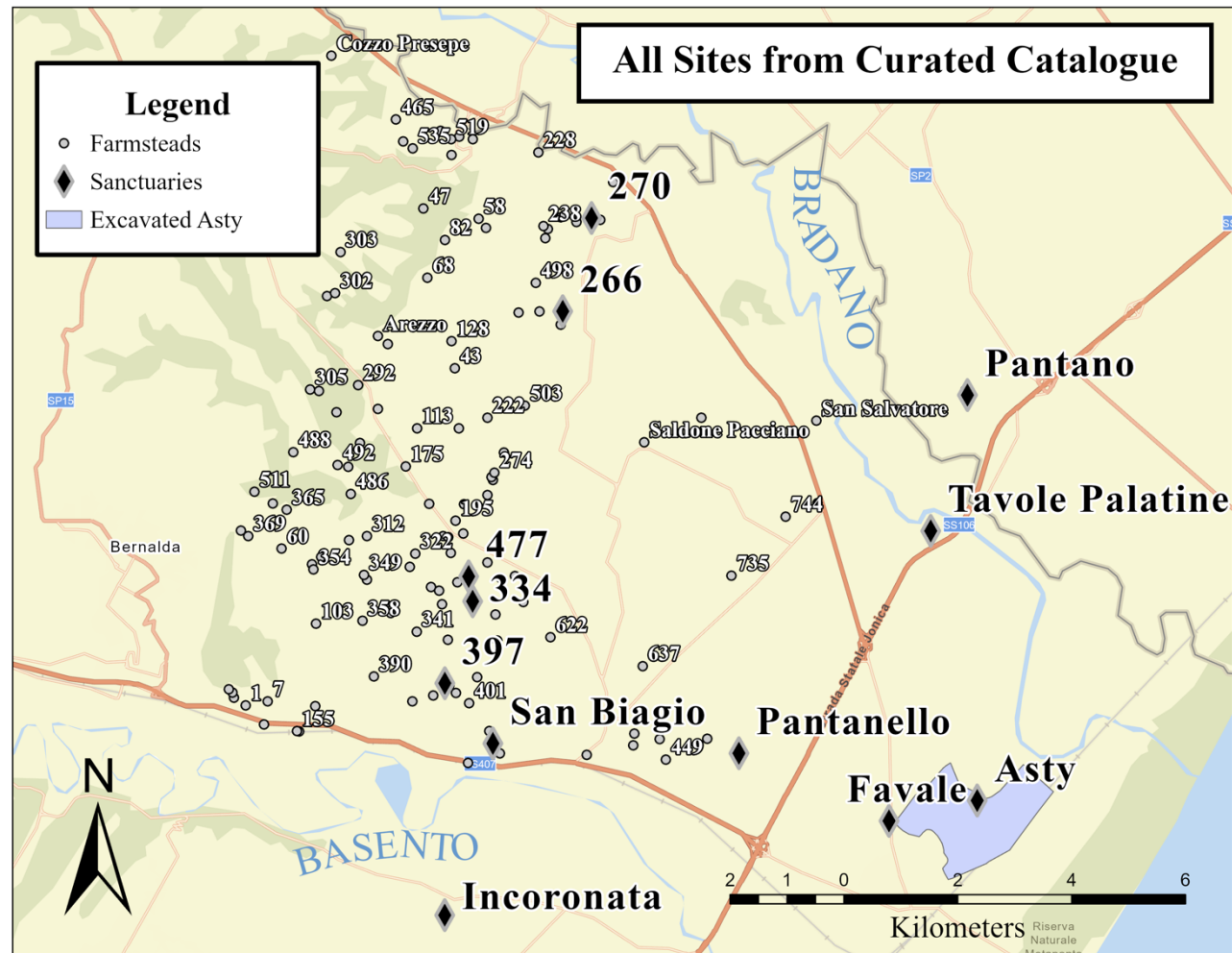
Figure 29: Sites from the curated catalogue. Note that many farmsteads are unlabeled due to label overlap. (ArcGIS 3.1.2)

Appendix C: Western Greek Settlement Data

Table 7: Principle Western Greek settlements in approximate chronological (re: foundation) order including sources for dating and foundation.

Settlement	Location	(Approximate) Foundation	Settlers	Oikist	Sources/Nota Bene
Pithekoussai	Italy, W Island	750 BCE	Euboea (Chalkis, Eretria)	-	Greco/Mertens 1996, 243
Zankle (Messana)	Sicily, NE	735-728 BCE	Euboea	Perieres, Krataimenes	Thuc. 6.4.5; Strab. 6.2.3; De Angelis 2003, 13; Mertens 2006, 39
Naxos (Tauromenium)	Sicily, NE Coast	734 BCE	Euboea, Naxos	Thoucles	Thuc. 6.3.1; Strab. 6.2.3; Mertens 2006, 39; Lentini 2012, 254, 309; Urban plan evident ca. 476 BCE (Lentini 2010, 254)
Syracuse	Sicily, SE Coast	733 BCE	Corinth	Arkhias	Thuc. 6.3.2; Strab. 6.2.4; De Polignac 1995, 90; De Angelis 2003, 12; Di Vita 1996, 270; Urban plan evident mid-7th c. BCE (Mertens 2006, 74)
Leontini	Sicily, E	728 BCE	Naxos	Theocles	Thuc. 6.3.3; Mertens 2006, 40-1; De Angelis 2003, 12; Boardman 1973, 168
Catania	Sicily, E Coast	728 BCE	Naxos	Euarchus	Thuc. 6.3.3; Strab. 6.2.3; Mertens 2006, 40-2
Megara Hyblaia	Sicily, E Coast	728 BCE	Megara	Lamis/ Hyblon	Thuc. 6.4.1; Strab. 6.2.2; De Polignac 1995, 90; De Angelis 2003, 12; Urban plan evident in 8th c. BCE (De Angelis 2003, 20)
Cumae	Italy, W Coast	mid-late 8th c. BCE	Pithekoussa (Euboea)	-	Liv. 8.22.5; Vell. Pat. 1.4.; Greco 1996, 238
Rhegion	Italy, S Coast	720-15 BCE	Chalkis, Messenia	Iocastus	Strab. 6.1.6; Dionys. Hal. 19.2.1; Sakellariou 1996, 177; Carratelli 1996, 146; Boardman 1973, 170
Heloros	Sicily, SE Coast	late 8th c. BCE	Syracuse (Corinth)	-	Di Vita 1996, 274, Owens 1992, 35

Settlement	Location	(Approximate) Foundation	Settlers	Oikist	Sources/Nota Bene
Sybaris	Italy, S Coast	late 8th c. BCE	Achaia (Helike), Rhodes	Ois/Oisthe	Strab. 6.1.13; Hdt. 6.21.1; De Polignac 1995, 100; Petropoulos 2012, 116; Caratelli 1996, 148; Greco 2013, 73; destroyed ca. 510 BCE (Greco 2014, 74), refounded by Athenians 443 BCE (Boardman 1973, 178)
Croton	Italy, S Coast	708 BCE	Achaia	Ripe	Strabo 6.1.12; Carratelli 1996, 148; Greco 2013, 73
Taranto (Taras)	Italy, S Coast	706 BCE	Amyclae	Phalanthus	Strab. 6.3.2; Dionys. Hal. 19.1.1-2; Carratelli 1996, 151
Siris	Italy, S Coast	690-60 BCE	Oenotria, Troy, Colophon, Rhodes?	-	Strab. 6.1.14; De Siena 1996, 997; re-settled by Sybaris/Metaponto 540-38 BCE (Carratelli 1996, 155)
Gela	Sicily, S Coast	688-7 BCE	Rhodes, Crete	Antiphemos, Entimos	Thuc. 6.4.3; De Angelis 2003, 123; Pavini 2014, 377
Locri	Italy, S Coast	679-3 BCE	East Locris	Euanthes	Strabo 6.1.7-8; Paus. 3.19.12; Euseb. Arm. p. 105; Sakellariou 1996, 183
Caulonia	Italy, S Coast	675-50 BCE	Achaia	Typhon/ Croton	Paus. 6.3.12; Sakellariou 1996, 183
Akrai	Sicily, SE	664 BCE	Syracuse (Corinth)	-	Thuc. 6.5.2; Di Vita 1996, 276
Metaponto	Italy, S Coast	after 650 BCE	Achaia	Nestor, Daulius, Leucippus, Epeius	Strabo 6.1.15; Justin 20.2–3; De Polignac 1995, 100; Urban plan evident 6th c. BCE (Greco/Mertens 1996, 252)
Himera	Sicily, N Coast	648/7 BCE	Zankle (Chalkis)	Euclides, Simus, Sacon	Thuc. 6.5.1; Strab. 6.2.6; De Angelis 2003, 128; Urban plan evident 575-550 BCE

Settlement	Location	(Approximate) Foundation	Settlers	Oikist	Sources/Nota Bene
Selinous	Sicily, SW Coast	651-0, 628 BCE	Megara Hyblaia	Pammilos	Thuc. 6.4.2; De Angelis 2003, 124; Urban plan evident 580-70 BCE (De Angelis 2003, 132-3)
Casmenae	Sicily, S	640 BCE	Syracuse	-	Thuc. 6.5.2; Carratelli 1996, 153
Poseidonia (Paestum)	Italy, SW Coast	620-600 BCE	Troezen/ Sybaris	-	Strab. 6.1.1; Hdt. 1.167.4; De Polignac 1996, 100; Mertens 2006, 54; Urban plan evident 6th c. BCE (Owens 1992, 41)
Kamarina	Sicily, S Coast	598-97 BCE	Syracuse	Daxon, Menecolus	Thuc. 6.5.3; Di Stefano et al. 2018, 2
Akragas (Agrigentum)	Sicily, S Coast	580 BCE	Gela	Aristonoüs, Pistilus	Thuc. 6.4.4; Strab. 6.2.9; De Angelis 2003, 203; Owens 1992, 46; Urban Plan evident end of 6th c. BCE (Di Vita 1996, 294)
Thourioi (Thurii)	Italy S Coast	444 BCE	-	-	Diod. 11.90.1; Diod. 12.10.6; Greco/Mertens 1996, 259; Urban plan evident 5th c. BCE (Greco/Mertens 1996 259-60)
Heraklea	Italy, S Coast	433-2 BCE	Siris, Taranto	-	Strab. 6.1.14; Boardman 1973, 183

Appendix D: Bacchylides' Ode 11

The following ode, dedicated to Alexidamus of Metaponto, is provided in full with a translation by Diana Svarlein (1991).

Νίκα [γλυκύδωρε, μεγίσταν
σοὶ πατ[ὴρ ὤπασσε τιμὰν
ὑψίζυγ[ος Οὐρανιδᾶν
ἐν πολυχρύσῳ δ᾽ Ὀλύμπῳ
5 Ζηνὶ παρισταμένα
κρίνεις τέλος ἀθανάτοι-
σίν τε καὶ θνατοῖς ἀρετᾶς.
ἔλλαθι, [βαθυ]πλοκάμου
κούρα [Στυγὸς ὀρ]θοδίκου: σέθεν δ᾽
ἔκατι
10 καὶ νῦν Μεταπόντιον εὐ-
γυίων [κατέχ]ουσι νέων
κῶμοί τε καὶ εὐφροσύναι θεότιμον
ἄστυ:
ὑμνεῦσι δὲ Πυθιόνικον
παῖδα θαητὸν Φαΐσκου.
15 ἵλεῳ νιν ὁ Δαλογενὴς υἱ-
ὸς βαθυζώνοιο Λατοῦς
δέκτο βλεφάρῳ: πολέες
δ᾽ ἀμφ᾽ Ἀλεξίδαμον ἀνθέων
ἐν πεδίῳ στέφανοι
20 Κίρρας ἔπεσον κρατερᾶς
ἧρα παννίκοιο πάλας:
οὐκ εἶδέ νιν ἀέλιος
κείνῳ γε σὺν ἄματι πρὸς γαίᾳ
πεσόντα.
25 φάσω δὲ καὶ ἐν ζαθέοις
ἁγνοῦ Πέλοπος δαπέδοις
Ἀλφεὸν παρὰ καλλιρόαν, δίκας
κέλευθον
εἰ μή τις ἀπέτραπεν ὀρθᾶς,
παγξένῳ χαίταν ἐλαίᾳ
30 γλαυκᾷ στεφανωσάμενος
πορτιτρόφ[ον ἂν πεδίον πάτ]ραν θ᾽
ἱκέσθαι.

[οὔ τι δόλος κακόφρων]
παῖδ᾽ ἐν χθονὶ καλλιχόρῳ
ποικίλαις τέχναις πέλασσεν:
ἀλλ᾽ ἢ θεὸς αἴτιος, ἢ
35 γνῶμαι πολύπλαγκτοι βροτῶν
ἄ]μερσαν ὑπέρτατον ἐκ χειρῶν γέρας.
νῦν δ᾽ Ἄρτεμις ἀγροτέρα
χρυσαλάκατος λιπαρὰν
ἡμέ]ρα τοξόκλυτος νίκαν ἔδωκε.
40 τᾷ ποτ᾽ Ἀβαντιάδας
βωμὸν κατένασσε πολύλ-
λιστον εὔπεπλοί τε κοῦραι:
τὰς ἐξ ἐρατῶν ἐφόβησεν
παγκρατὴς Ἥρα μελάθρων
45 Προίτου, παραπλῆγι φρένας
καρτερᾷ ζεύξασ᾽ ἀνάγκᾳ:
παρθενίᾳ γὰρ ἔτι
ψυχᾷ κίον ἐς τέμενος
πορφυροζώνοιο θεᾶς:
50 φάσκον δὲ πολὺ σφέτερον
πλούτῳ προφέρειν πατέρα ξανθᾶς
παρέδρου
σεμνοῦ Διὸς εὐρυβία.
ταῖσιν δὲ χολωσαμένα
στήθεσσι παλίντροπον ἔμβαλεν
55 νόημα:
φεῦγον δ᾽ ὄρος ἐς τανίφυλλον,
σμερδαλέαν φωνὰν ἱεῖσαι,
Τιρύνθιον ἄστυ λιποῦσαι
καὶ θεοδμάτους ἀγυιάς,
60 ἤδη γὰρ ἔτος δέκατον
θεοφιλὲς λιπόντες Ἄργος
ναῖον ἀδεισιβόαι
χαλκάσπιδες ἡμίθεοι
σὺν πολυζήλῳ βασιλεῖ.
νεῖκος γὰρ ἀμαιμάκετον

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65 βληχρᾶς ἀνέπαλτο κασιγνητοῖς ἀπ᾽
ἀρχᾶς
Προίτῳ τε καὶ Ἀκρισίῳ·
λαούς τε διχοστασίαις
ἤρειπον ἀμετροδίκοις μάχαις τε
λυγραῖς.
λίσσοντο δὲ παῖδας Ἄβαντος
70 γᾶν πολύκριθον λαχόντας
Τίρυνθα τὸν ὁπλότερον
κτίζειν, πρὶν ἐς ἀργαλέαν πεσεῖν
ἀνάγκαν·
Ζεύς τ᾽ ἔθελεν Κρονίδας,
τιμῶν Δαναοῦ γενεὰν
75 καὶ διωξίπποιο Λυγκέος,
παῦσαι στυγερῶν ἀχέων.
τεῖχος δὲ Κύκλωπες κάμον
ἐλθόντες ὑπερφίαλοι κλεινᾷ πόλει
κάλλιστον, ἵν᾽ ἀντίθεοι
80 ναῖον κλυτὸν ἱππόβοτον
Ἄργος ἥρωες περικλειτοὶ λιπόντες.
ἔνθεν ἀπεσσύμεναι
Προίτου κυανοπλόκαμοι
φεῦγον ἄδματοι θύγατρες,
85 τὸν δ᾽ εἷλεν ἄχος κραδίαν, ξεί-
να τέ νιν πλᾶξεν μέριμνα·
δοίαξε δὲ φάσγανον ἄμ-
φακες ἐν στέρνοισι πᾶξαι.
ἀλλά νιν αἰχμοφόροι
90 μύθοισί τε μειλιχίοις
καὶ βίᾳ χειρῶν κάτεχον.
τρισκαίδεκα μὲν τελέους
μῆνας κατὰ δάσκιον ἠλύκταζον
ὕλαν
95 φεῦγόν τε κατ᾽ Ἀρκαδίαν
μηλοτρόφον· ἀλλ᾽ ὅτε δὴ
Λοῦσον ποτὶ καλλιρόαν πατὴρ
ἵκανεν,
ἔνθεν χρόα νιψάμενος φοι-
νικο[κραδέμνοι]ο Λατοῦς
100 κίκλ[ησκε θύγατρα] βοῶπιν,
χεῖρας ἀντείνων πρὸς αὐγὰς
ἱππώκεος ἀελίου,
τέκνα δυστάνοιο λύσσας
πάρφρονος ἐξαγαγεῖν·

105 ἄζυγας φοινικότριχας.
τοῦ δ᾽ ἔκλυ᾽ ἀριστοπάτρα
θηροσκόπος εὐχομένου· πιθοῦσα δ᾽
Ἥραν
παῦσεν καλυκοστεφάνους
κούρας μανιᾶν ἀθέων·
110 ταὶ δ᾽ αὐτίκα Ϝοι τέμενος βωμόν τε
τεῦχον,
χραῖνόν τέ μιν αἵματι μήλων
καὶ χοροὺς ἵσταν γυναικῶν.
ἔνθεν καὶ ἀρηϊφίλοις
ἄνδρεσσιν ἐς ἱπποτρόφον πόλιν τ᾽
Ἀχαιοῖς
115 ἕσπεο, σὺν δὲ τύχᾳ
ναίεις Μεταπόντιον, ὦ
χρυσέα δέσποινα λαῶν·
ἄλσος τέ τοι ἱμερόεν
Κάσαν παρ᾽ εὔυδρον πρὸ να-
120 οῖ᾽ ἐσσαμένων, Πριάμοι᾽ ἐπεὶ χρόνῳ
βουλαῖσι θεῶν μακάρων
πέρσαν πόλιν εὐκτιμέναν
χαλκοθωράκων μετ᾽ Ἀτρειδᾶν.
δικαίας
ὅστις ἔχει φρένας, εὑ-
ρήσει σὺν ἅπαντι χρόνῳ
125 μυρίας ἀλκὰς Ἀχαιῶν.

θύσω δέ τοι εἴκοσι βοῦς

Victory, giver of sweet gifts—to you alone the father ... seated on high ... in golden
Olympus, standing beside Zeus, you judge the achievement of excellence for
immortals and mortals alike. Be gracious, daughter of Styx with her long hair, the
upright judge. For your sake even now Metapontion, the city honored by the gods,
is filled with delight and with victory processions of young men with fine limbs.
They sing the praises of the Pythian victor, the marvellous son of Phaiscus. The
Delos-born son of deep-waisted Leto received him with a propitious eye; and many
garlands of flowers fell around Alexidamus on the plain of Cirrha because of his
all-conquering powerful wrestling. The sun did not see him, on that particular day,
falling to the ground. And I will declare that in the sacred precinct of revered
Pelops, beside the beautiful stream of the Alpheus, if someone had not turned aside
the straight path of justice, the gray-green olive for which all compete would have
crowned his head as he returned to his fatherland, calf-nurturing Italy. [For down
to the earth?] he brought the young man, by his crafty wits, in the land of lovely
choruses. But either a god was responsible, or else the wandering judgment of men
took the highest honor out of his hands. But now Artemis of the wilds with her
golden distaff, the Soother, famous for the bow, gave him shining victory. To her
once the son of Abas and his daughters with beautiful robes set up an altar where
many prayers are offered. All-powerful Hera drove these daughters in fear from
the lovely halls of Proetus; she yoked their minds to a violent maddening
compulsion. For, while still virgins, they entered the sanctuary of the purple-belted
goddess, and said that their father far surpassed in wealth the golden-haired consort
of holy, widely powerful Zeus. In anger at them, she put a twisted thought into
their minds, and they fled to the wooded mountain with terrible screams, leaving
behind the city of Tiryns and its god-built streets. For it was now the tenth year
since the heroes with their bronze shields, fearless in battle, had left Argos, the city
loved by the gods, and lived in Tiryns with their much envied king, because an
insurmountable quarrel had arisen, from a slight beginning, between the brothers
Proetus and Acrisius. They were destroying their people with lawless feuding and
grievous battles, and the people entreated the sons of Abas that, since they had as
their share a land rich in barley, the younger one should be the founder of Tiryns,
before they fell under ruinous compulsion. And Zeus son of Cronus, honoring the
race of Danaus and of horse-driving Lynceus, was willing to put an end to their
hateful woes. And the mighty Cyclopes came, and toiled to build a most beautiful
wall for the glorious city, where the godlike far-famed heroes lived when they had
left behind horse-pasturing Argos. It was from Tiryns that the dark-haired
unsubdued daughters of Proetus rushed in their flight. And woe overcame Proetus'
heart, and an alien thought smote him. He decided to plant a double-edged sword
in his chest; but his spearmen restrained him with calming words and with the force
of their hands. For thirteen whole months his daughters roamed wildly through the
shadowy forests and fled through sheep-nurturing Arcadia. But when their father

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came to the beautiful stream of Lusus, he washed his skin with its water and called
100 on Leto's daughter with her crimson headdress, the ox-eyed goddess, stretching his
hands to the rays of the steed-swift sun, and asked her to deliver his children from
105 their deranged miserable madness. "I will sacrifice to you twenty unyoked red
oxen." And the huntress, whose father is the highest god, heard him praying. She
110 persuaded Hera, and stopped the godless mania of the bud-garlanded girls. They
built her a sanctuary and an altar right away, and stained it with the blood of sheep,
and set up choruses of women. From there you accompanied battle-loving Achaean
115 men to their horse-nurturing city; and with good fortune you dwell in Metapontion,
golden mistress of the people. And a lovely precinct beside the fine waters of the
120 Casas ~ their ancestors established? ~ when at last, by the counsels of the blessed
gods, they sacked the well-built city of Priam together with the Atreidae with their
125 bronze breastplates. Whoever has a just mind will find, throughout all time,
countless deeds of valor done by the Achaeans.

Appendix E: Cost-Distance Allocations
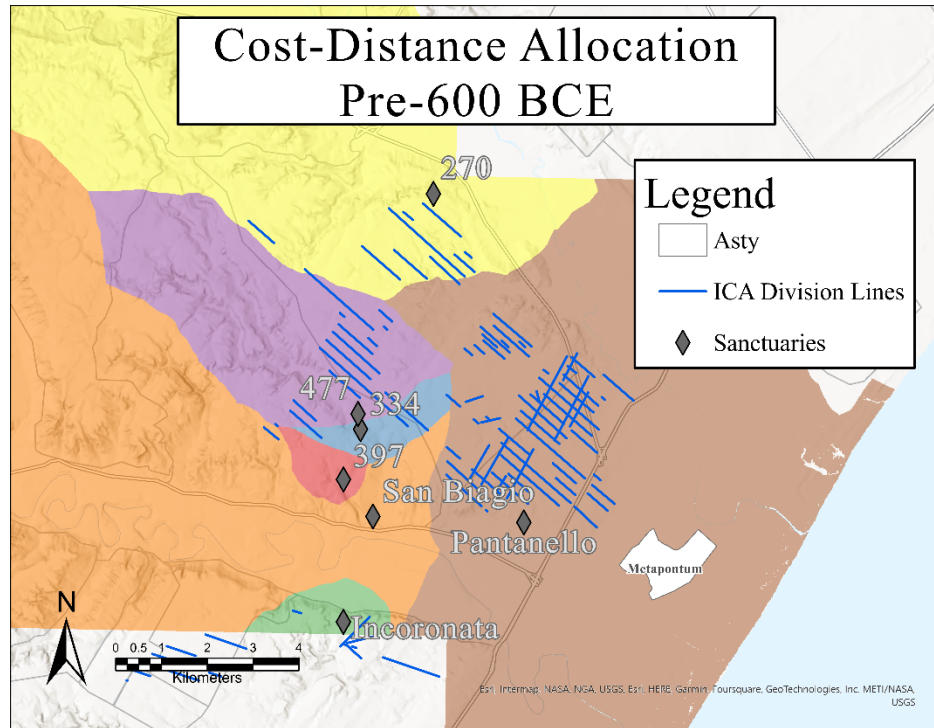
Figure 30: Cost-Distance Allocation raster of sanctuaries pre-600. (ArcGIS Pro 3.1.1)
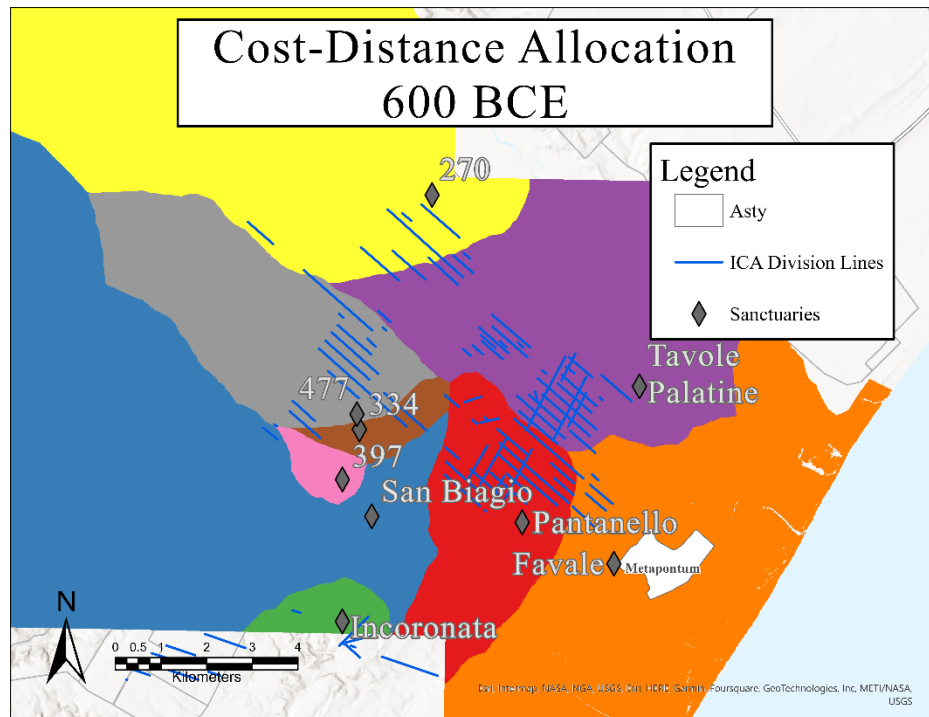
Figure 31: Cost-Distance Allocation raster of sanctuaries 600. (ArcGIS Pro 3.1.1)
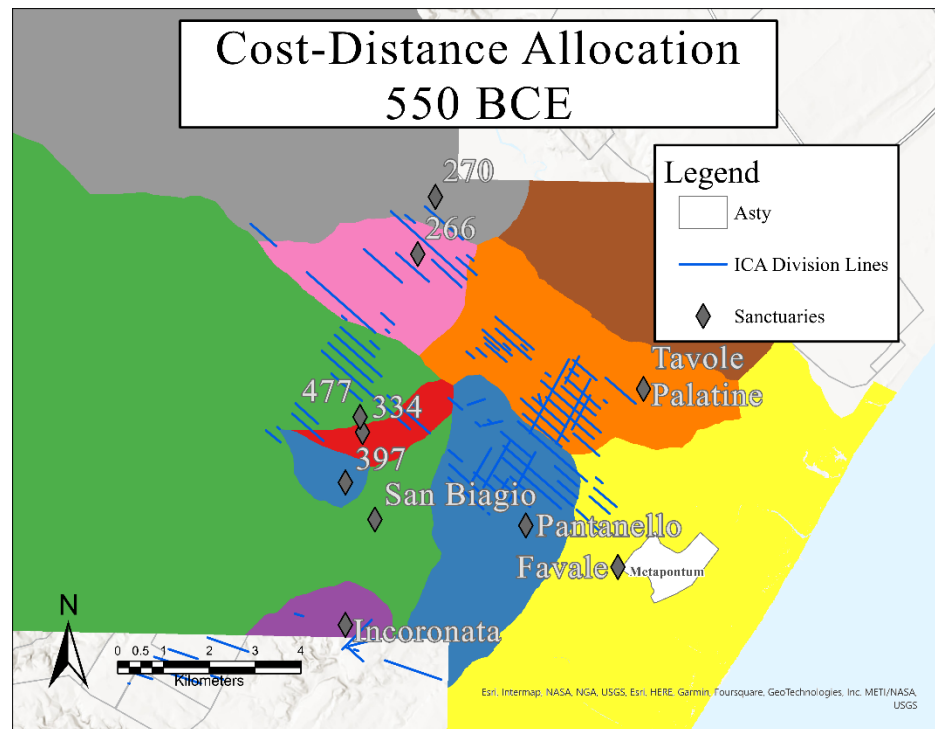
Figure 33: Cost-Distance Allocation raster of sanctuaries 550. (ArcGIS Pro 3.1.1)
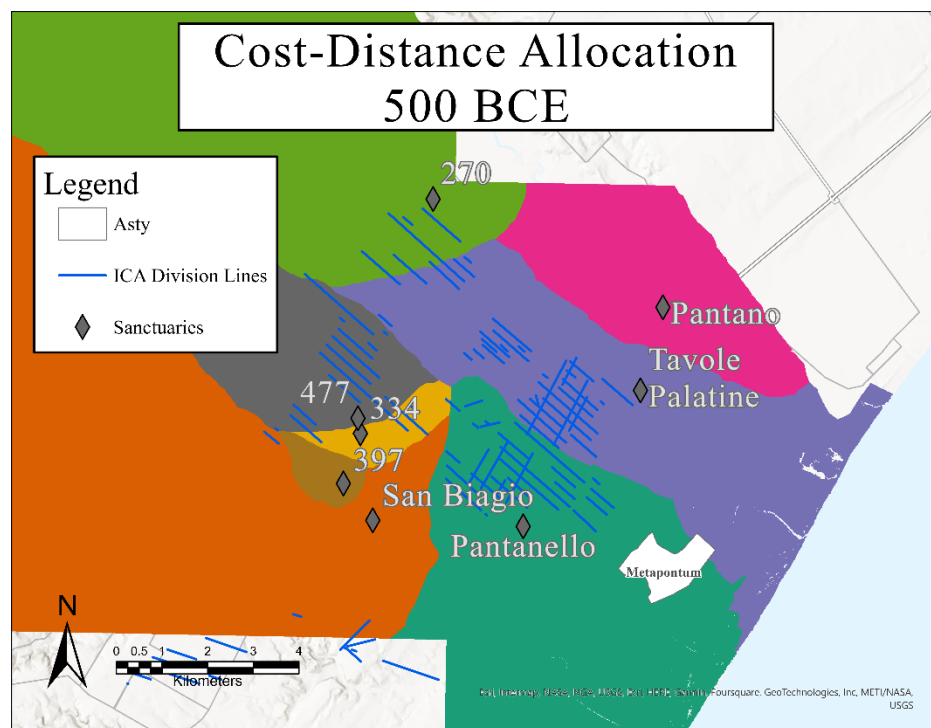
Figure 32: Cost-Distance Allocation raster of sanctuaries 500. (ArcGIS Pro 3.1.1)
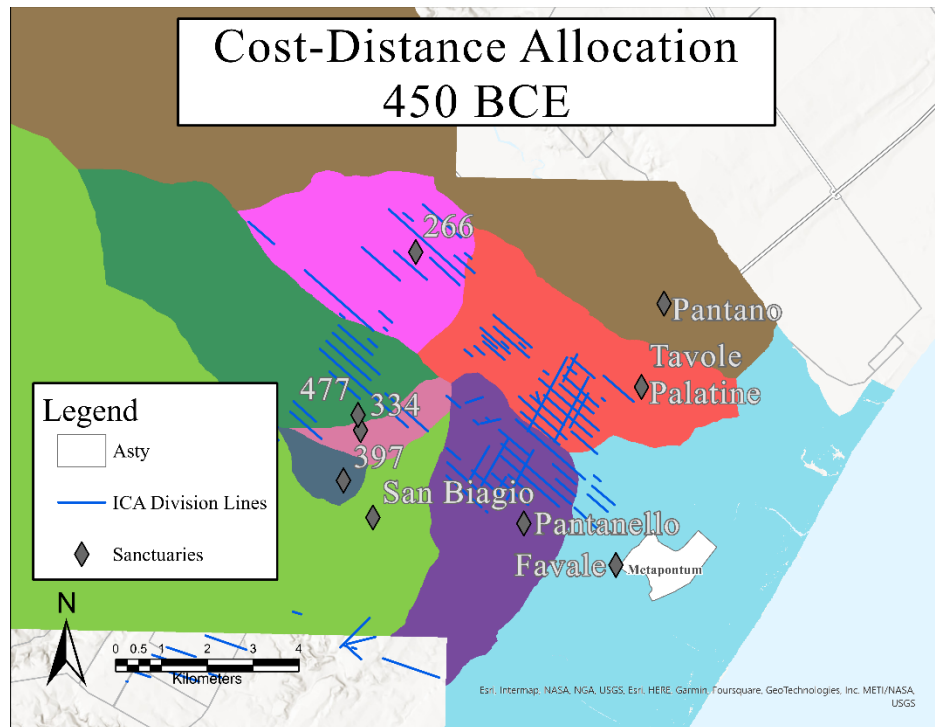
Figure 35: Cost-Distance Allocation raster of sanctuaries 450. (ArcGIS Pro 3.1.1)
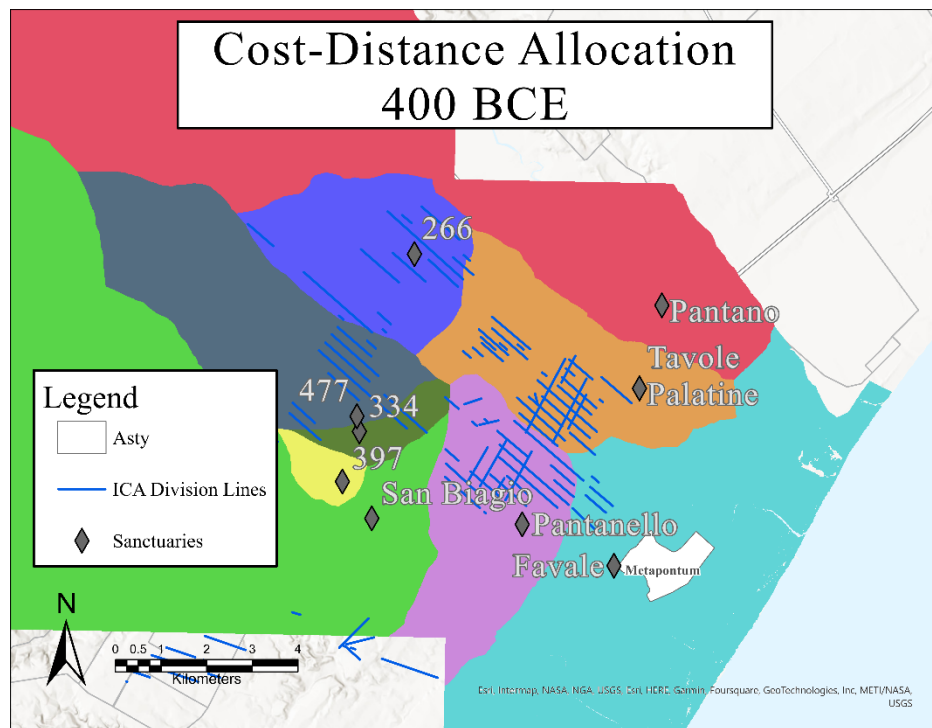
Figure 34: Cost-Distance Allocation raster of sanctuaries 400. (ArcGIS Pro 3.1.1)
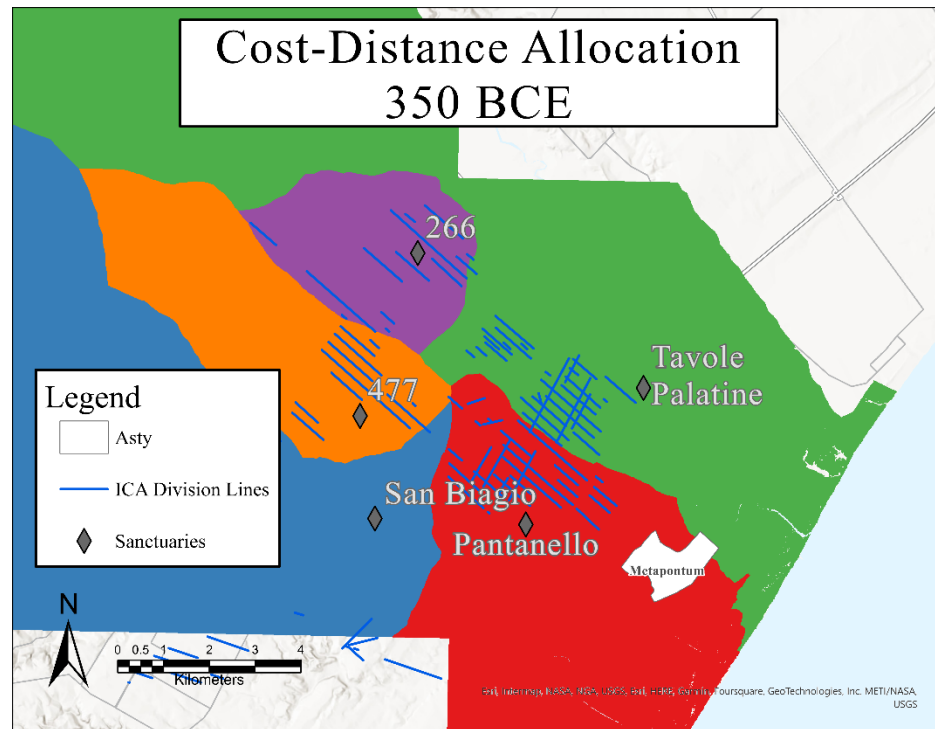
Figure 37: Cost-Distance Allocation raster of sanctuaries 350. (ArcGIS Pro 3.1.1)
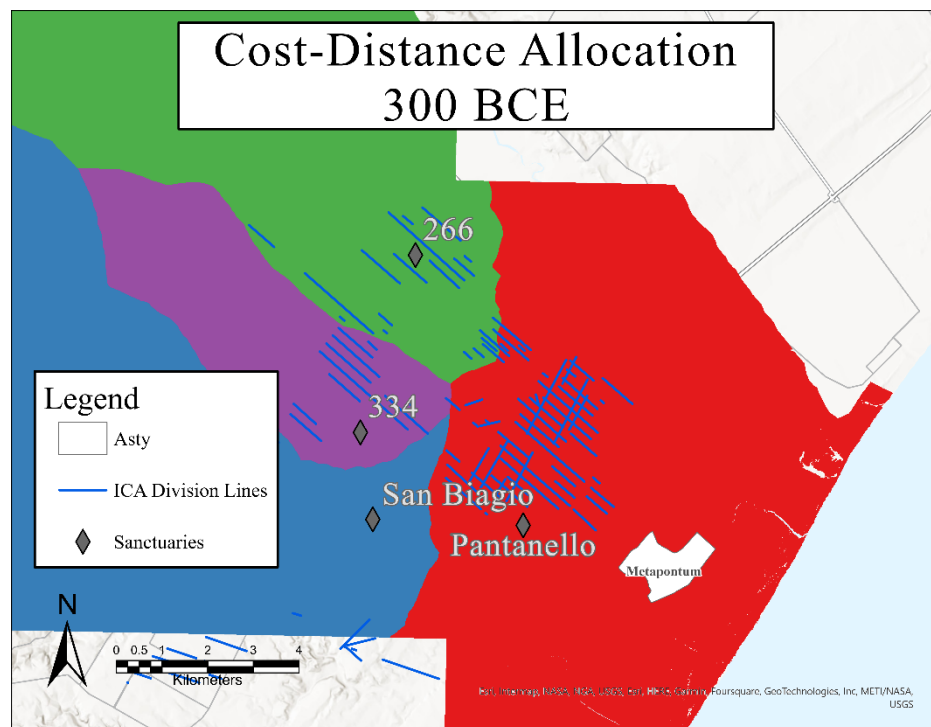
Figure 36: Cost-Distance Allocation raster of sanctuaries 300. (ArcGIS Pro 3.1.1)

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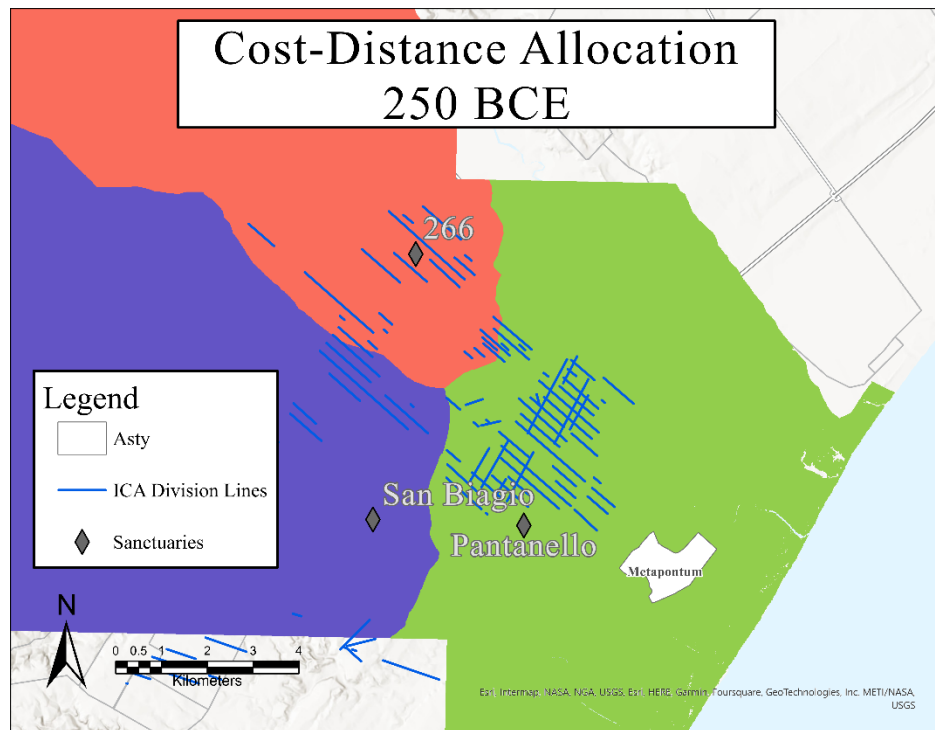
Figure 39: Cost-Distance Allocation raster of sanctuaries 250. (ArcGIS Pro 3.1.1)
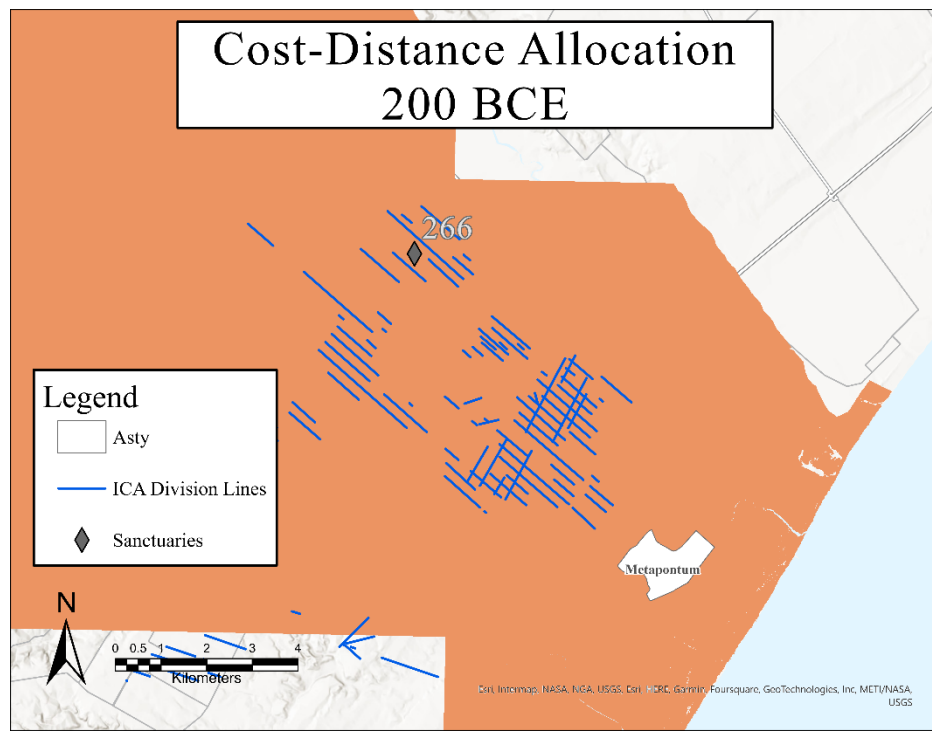
Figure 38: Cost-Distance Allocation raster of sanctuaries 200. (ArcGIS Pro 3.1.1)

Appendix F: LCPs by 50-Year Date Bin
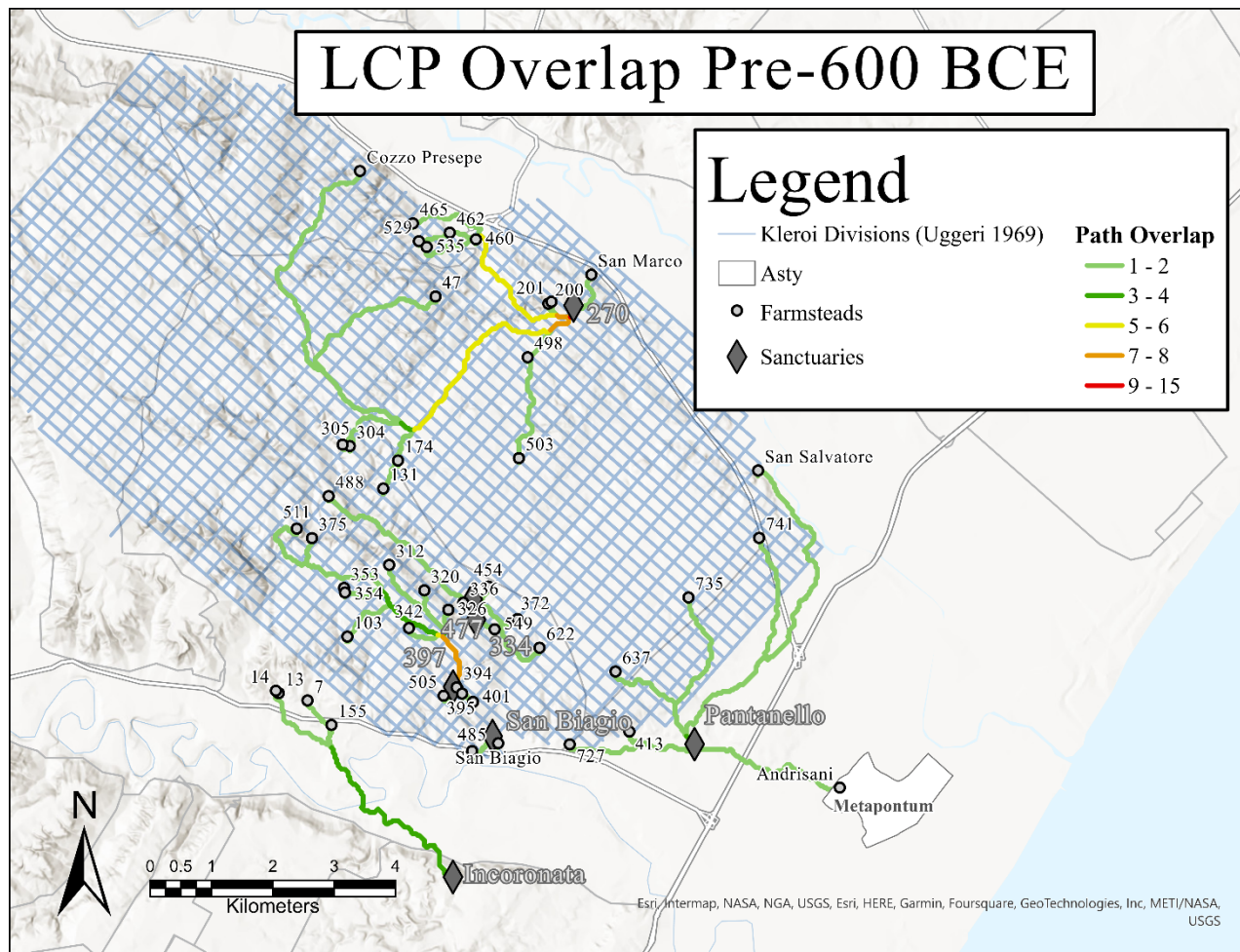
Figure 40: All LCPs in Pre-600 date bin. (ArcGIS Pro 3.1.1)
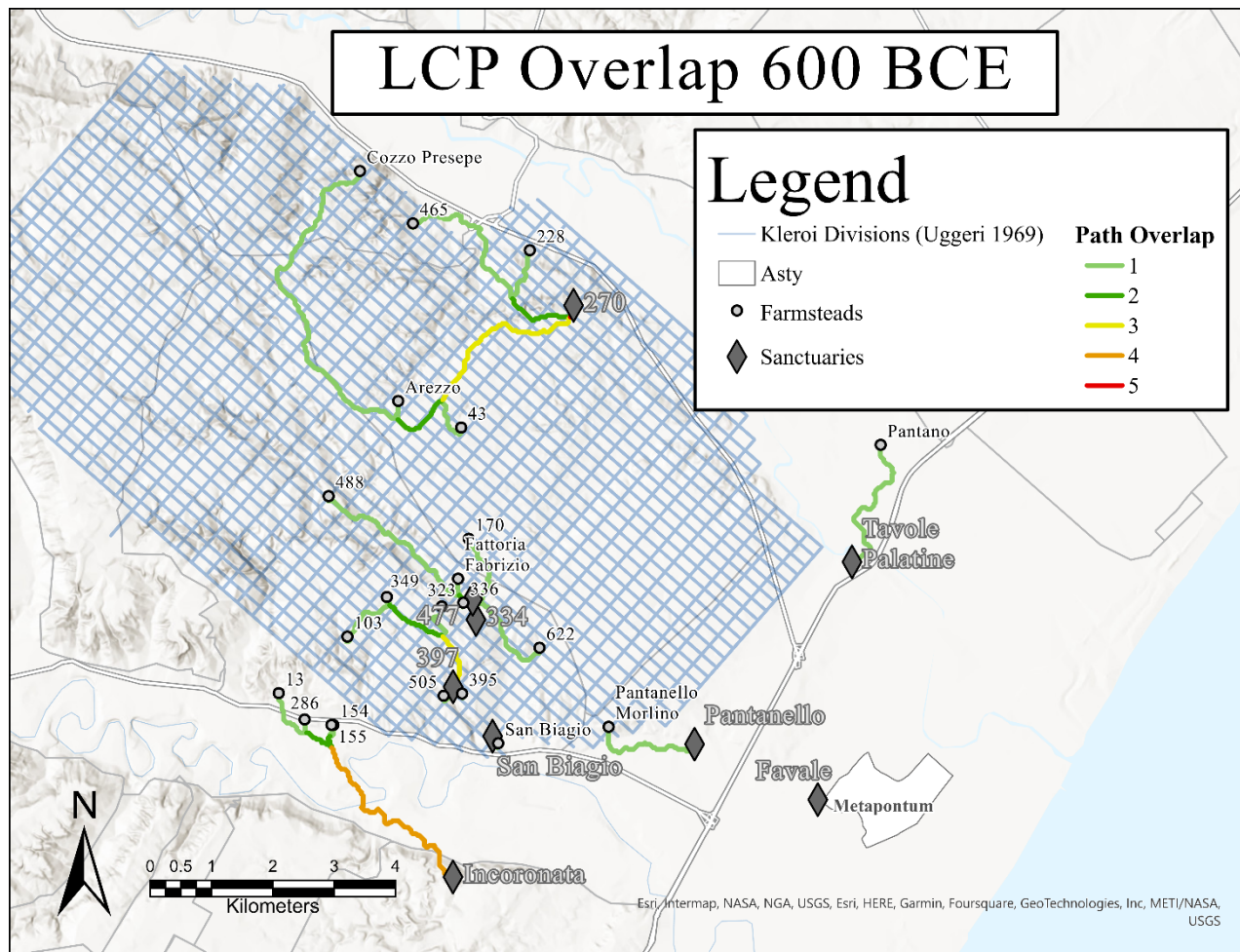
Figure 41: All LCPs in 600 date bin. (ArcGIS Pro 3.1.1)
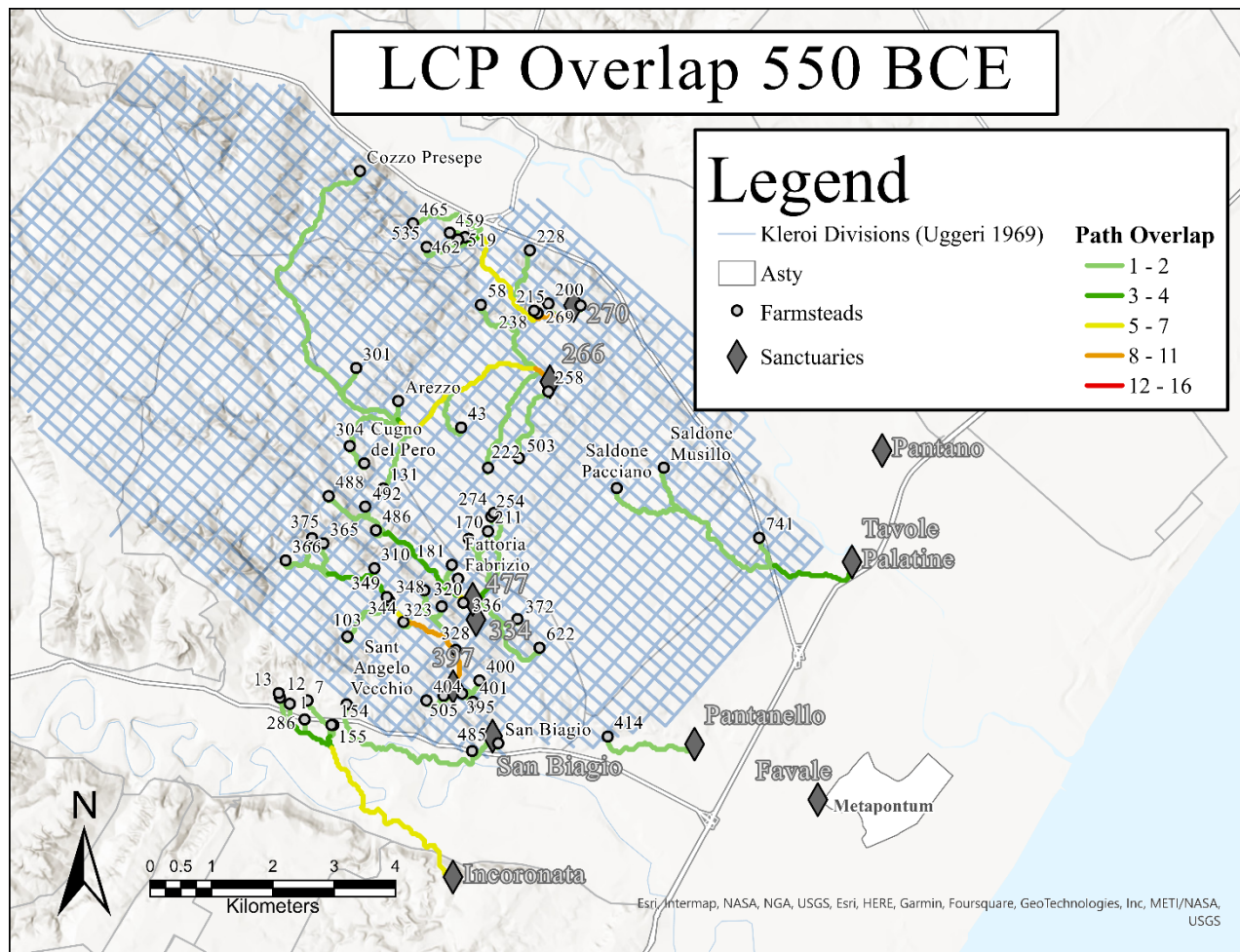
Figure 42: All LCPs in 550 date bin. (ArcGIS Pro 3.1.1)
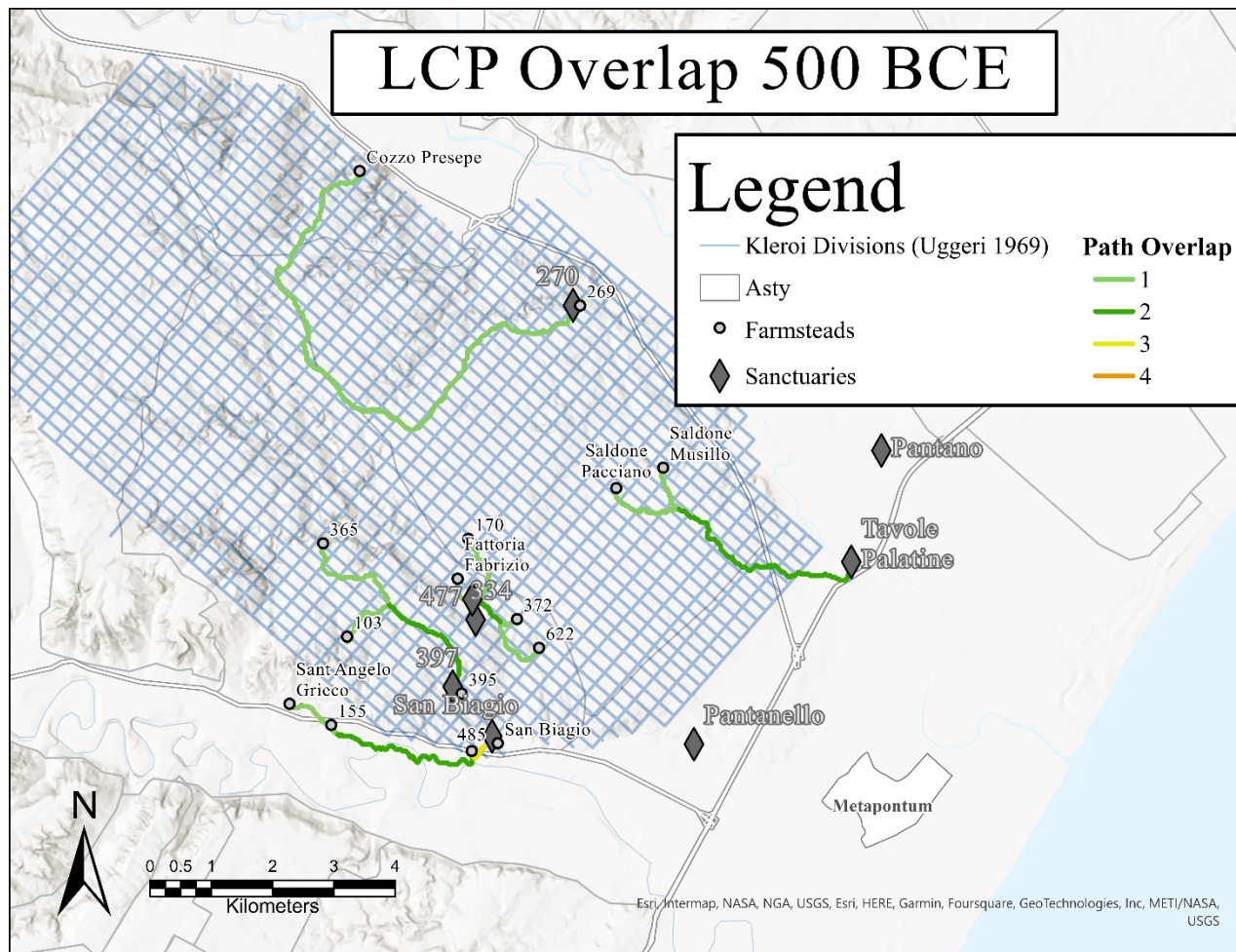
Figure 43: All LCPs in 500 date bin. (ArcGIS Pro 3.1.1)
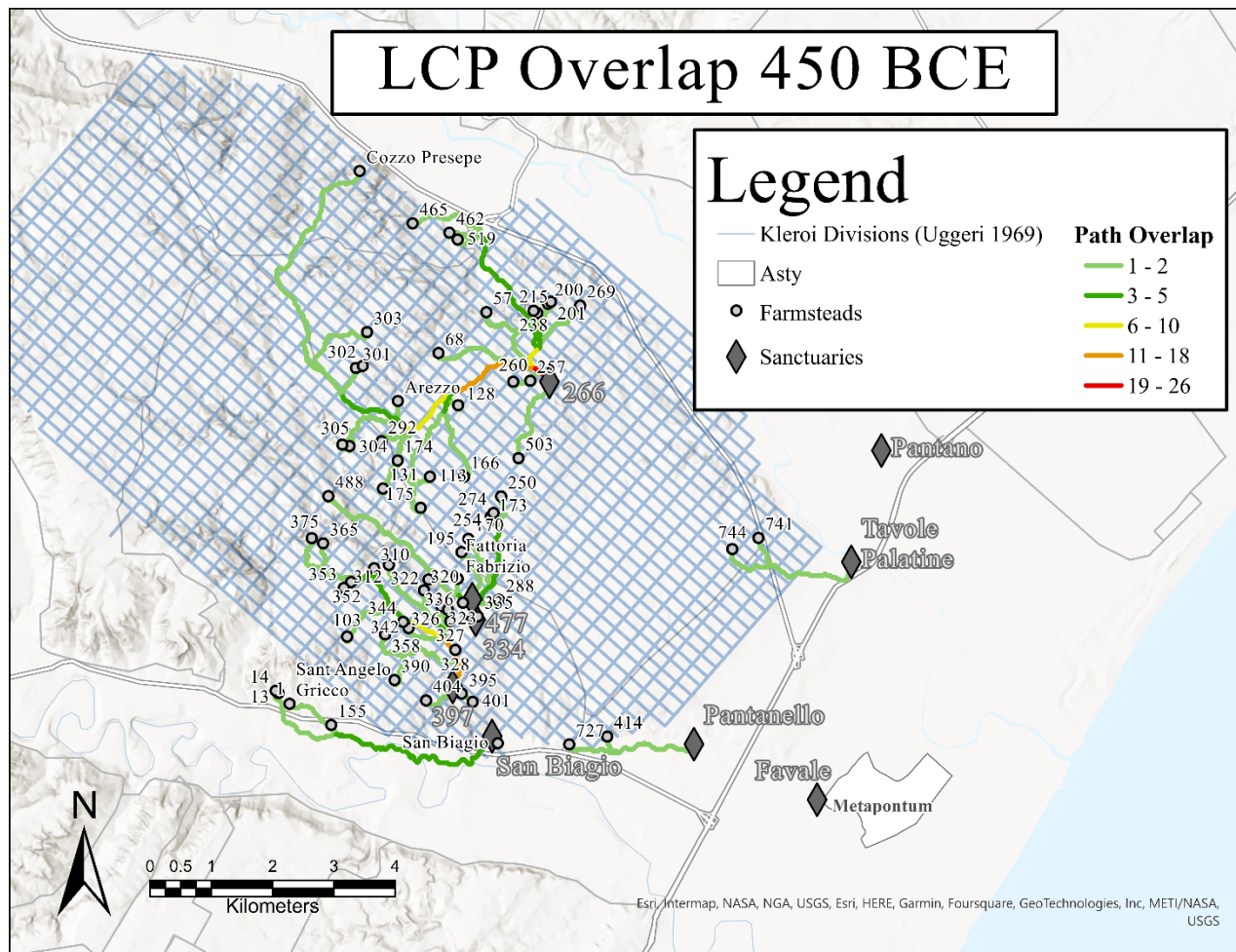
Figure 44: All LCPs in 450 date bin. (ArcGIS Pro 3.1.1)
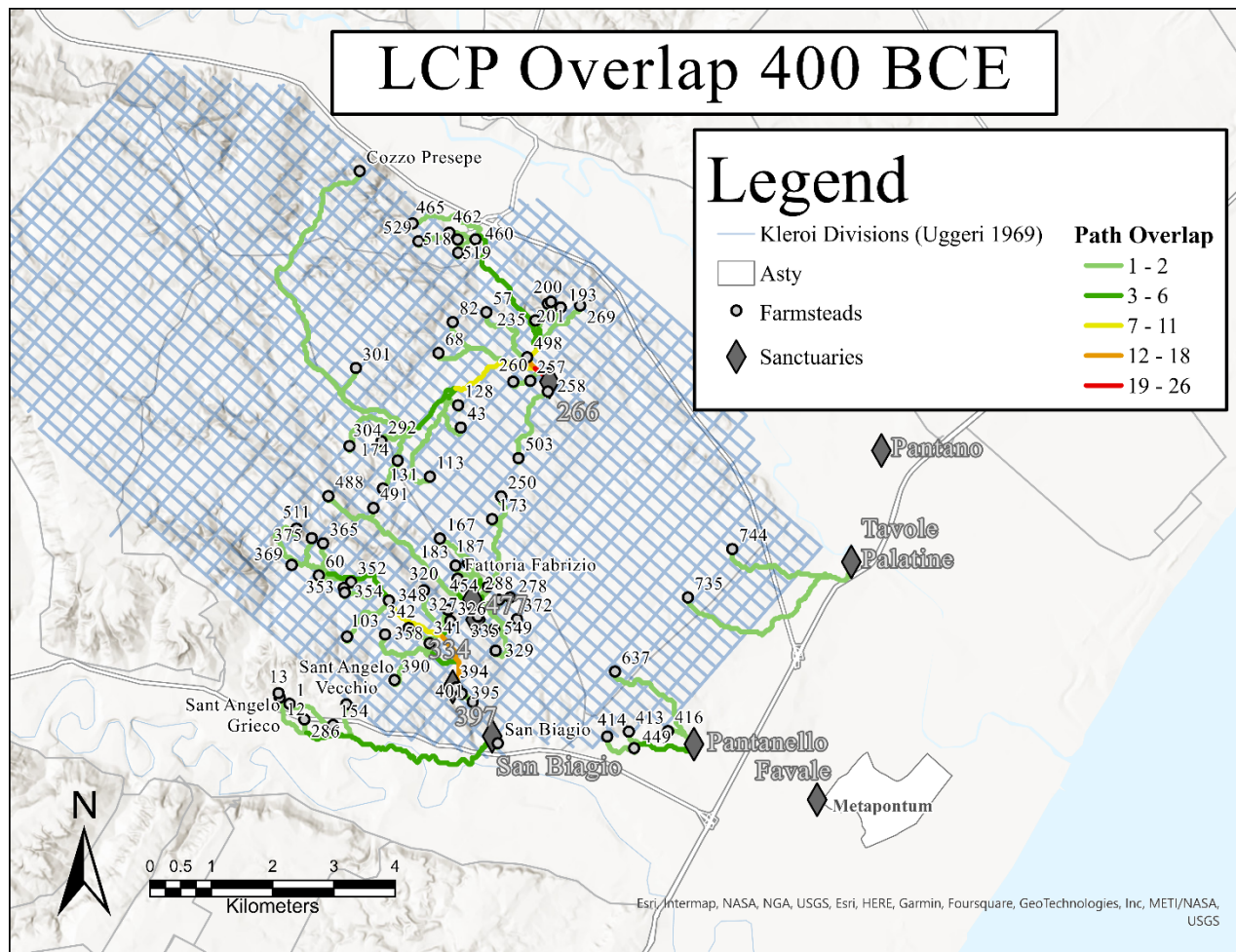
Figure 45: All LCPs in 400 date bin. (ArcGIS Pro 3.1.1)

Figure 46: All LCPs in 350 date bin. (ArcGIS Pro 3.1.1)
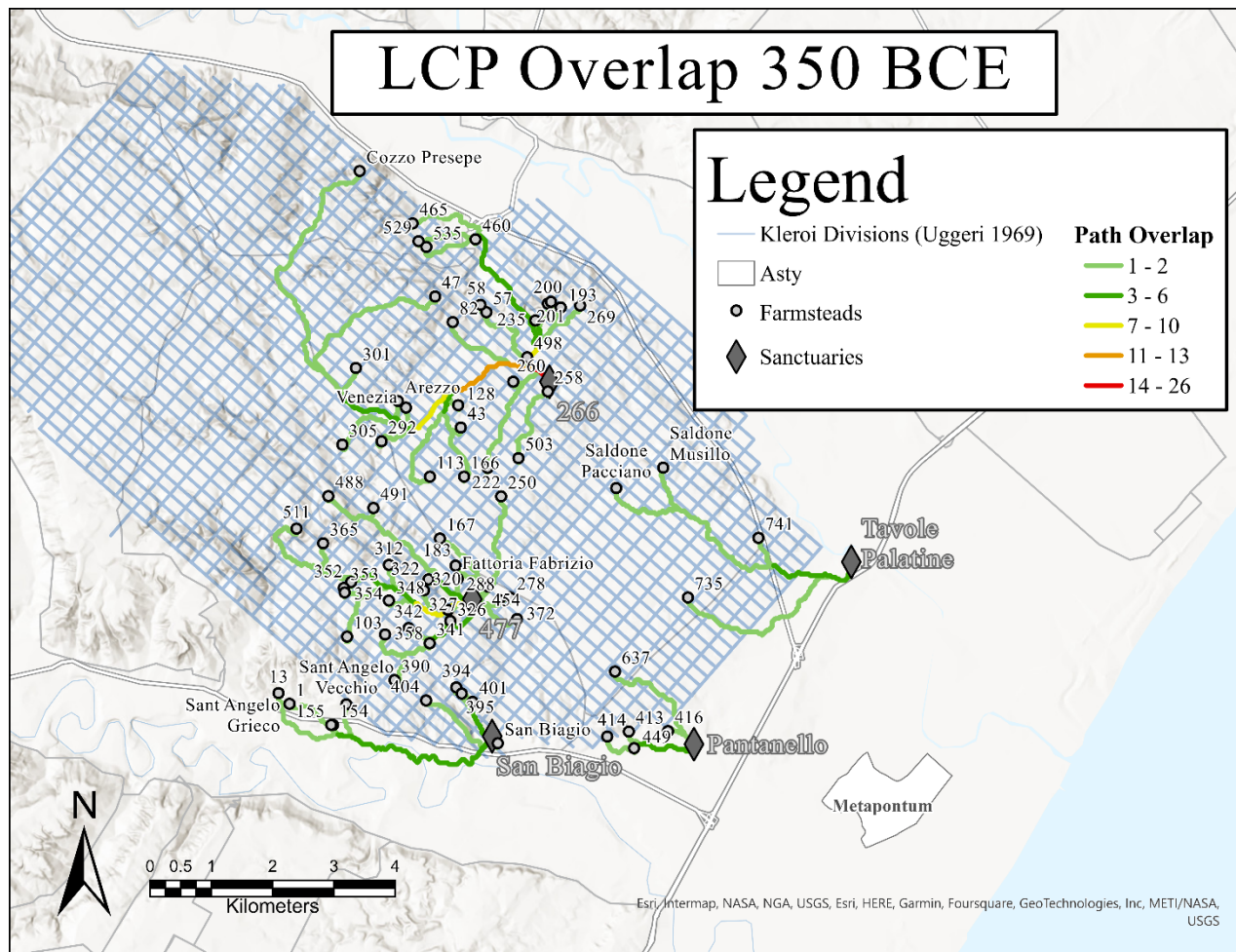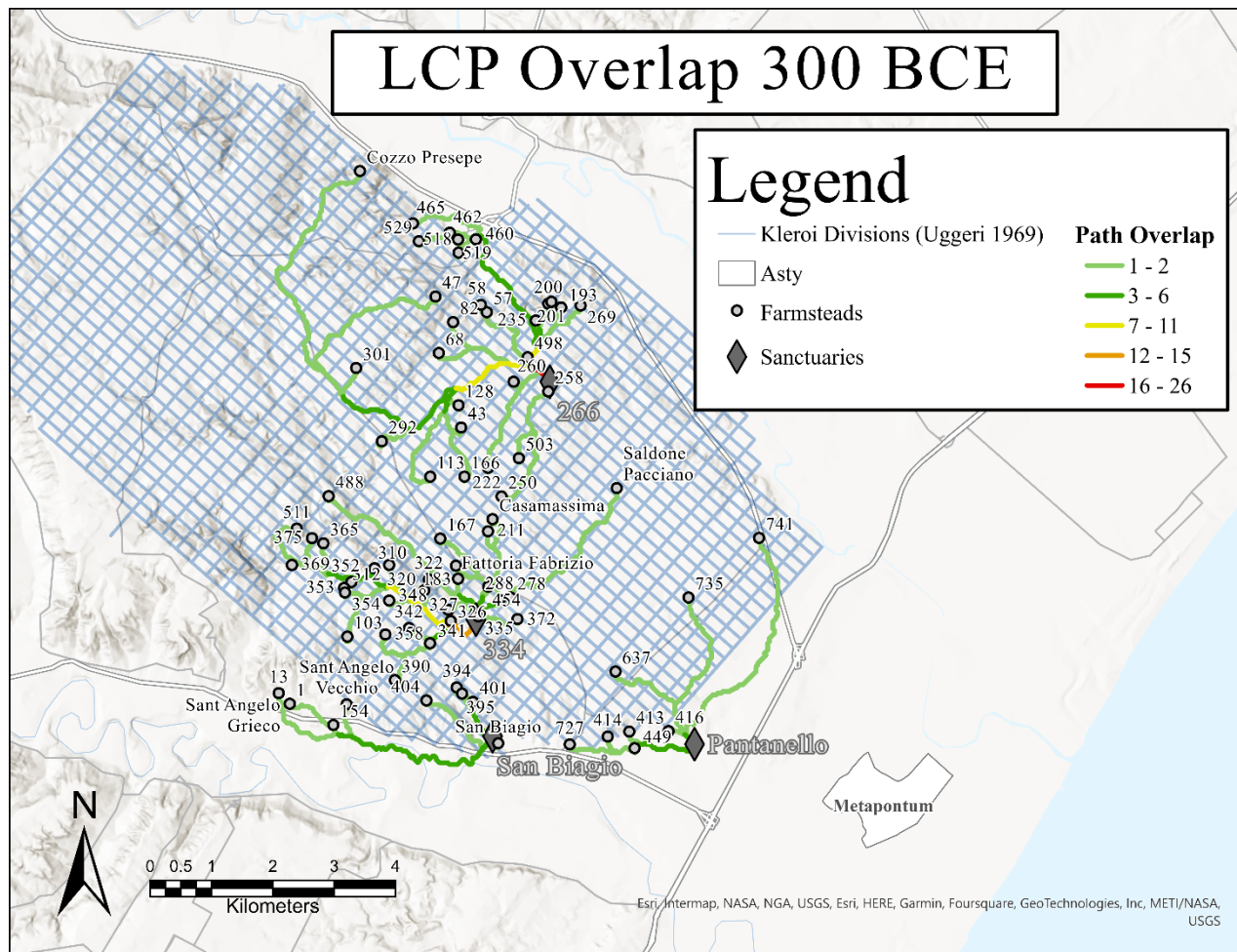
Figure 47: All LCPs in 300 date bin. (ArcGIS Pro 3.1.1)
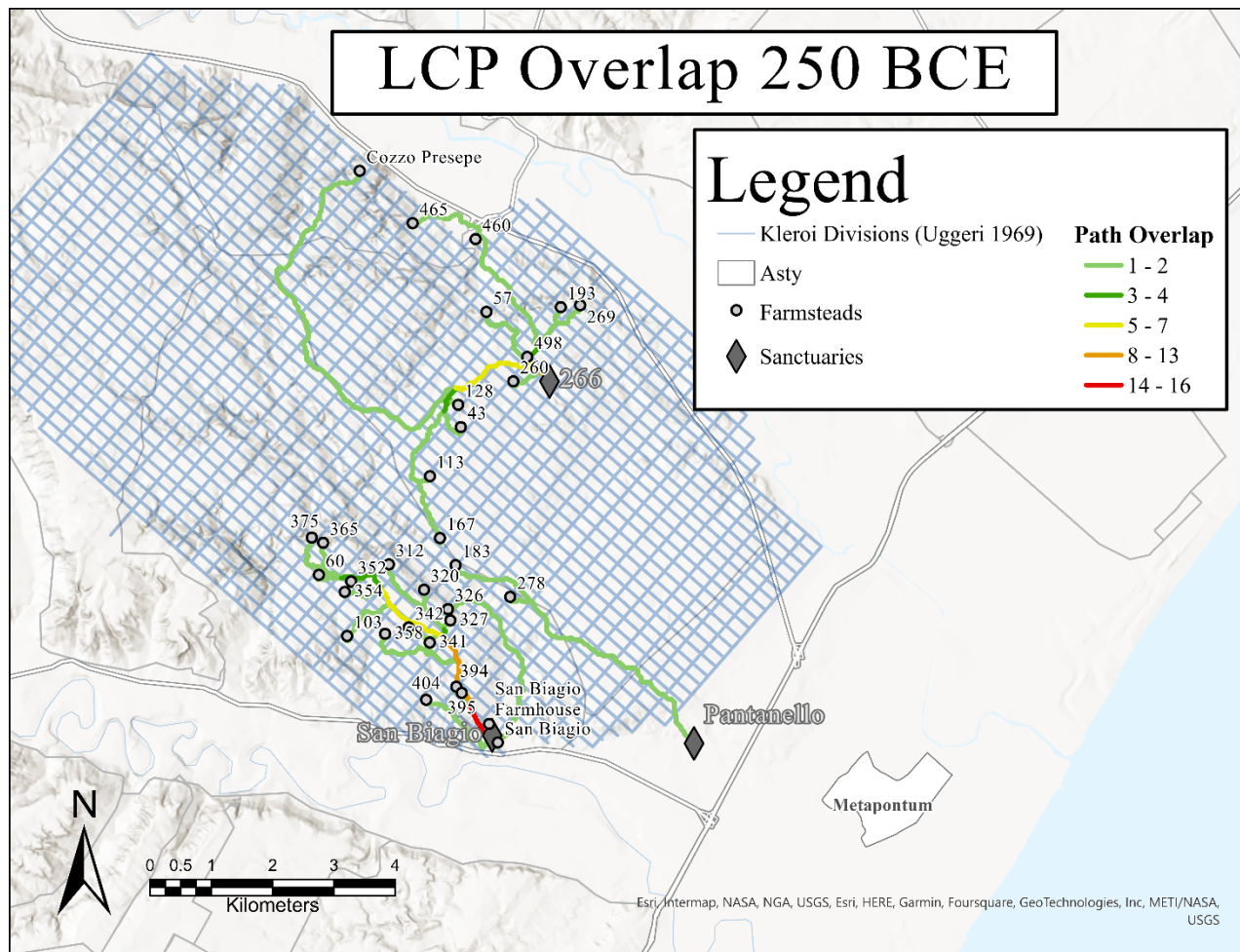
Figure 48: All LCPs in 250 date bin. (ArcGIS Pro 3.1.1)
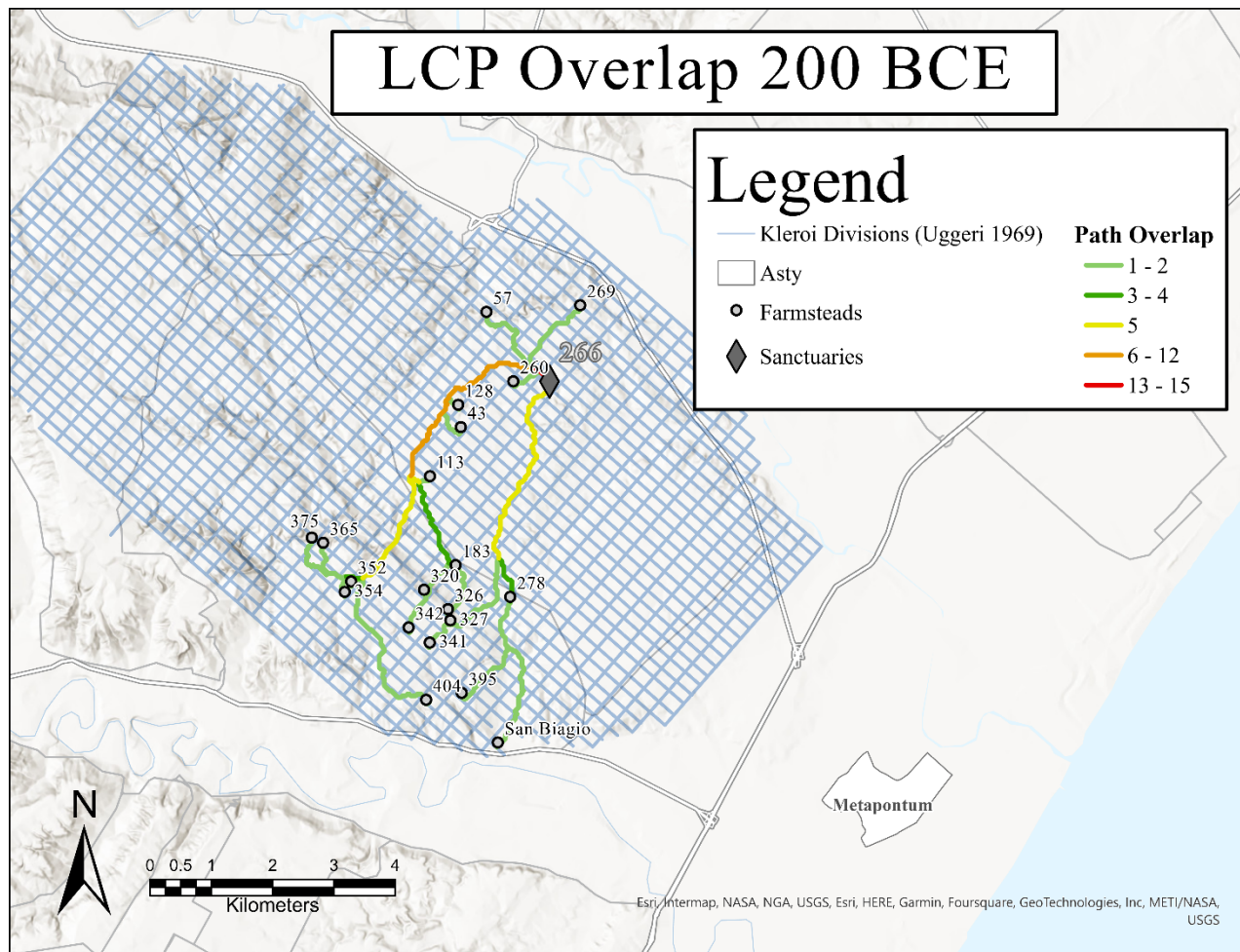
Figure 49: All LCPs in 200 date bin. (ArcGIS Pro 3.1.1)

Appendix G: Uggeri Transverse Lines

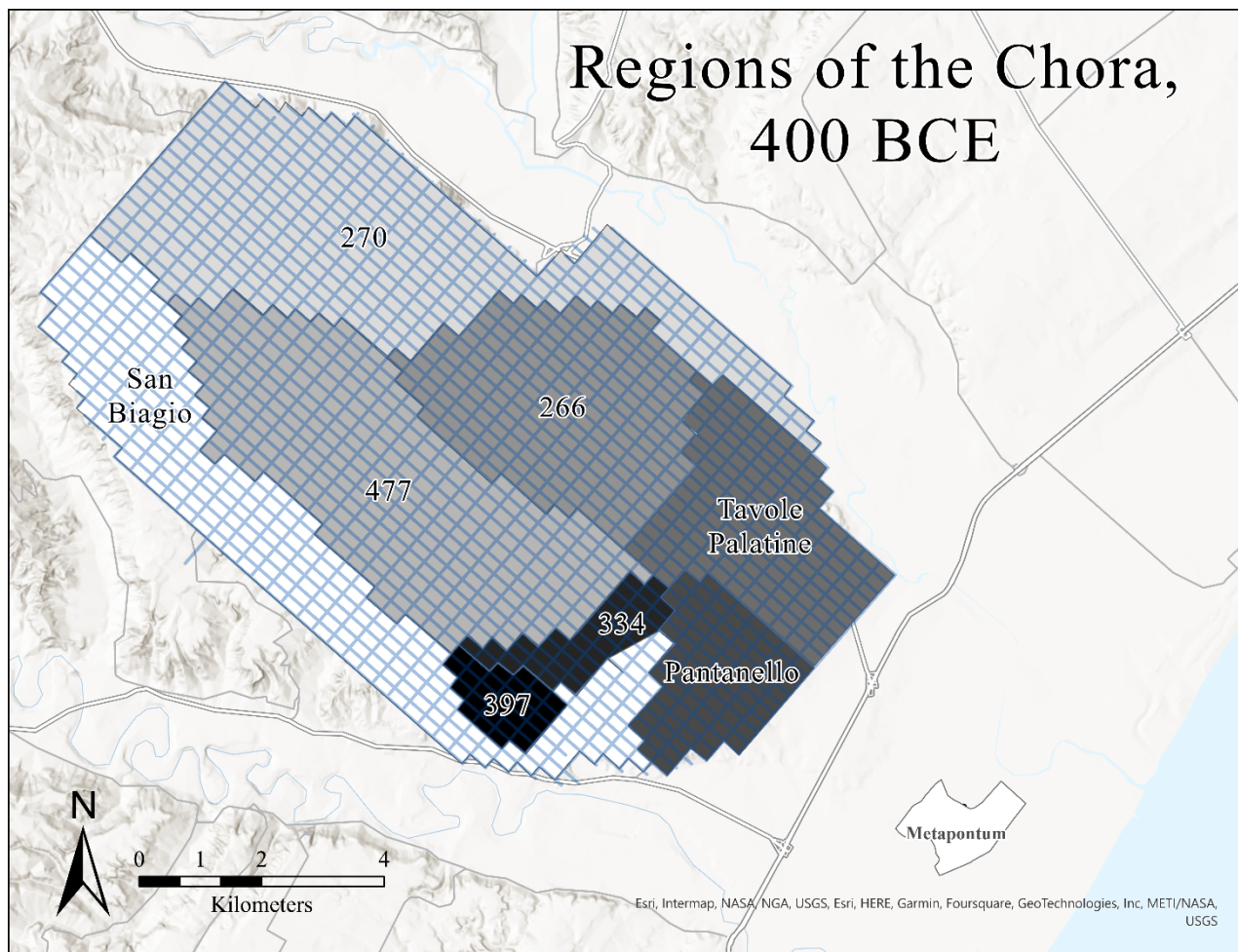Giovanni Uggeri's division of the chora (Uggeri 1969, 55):
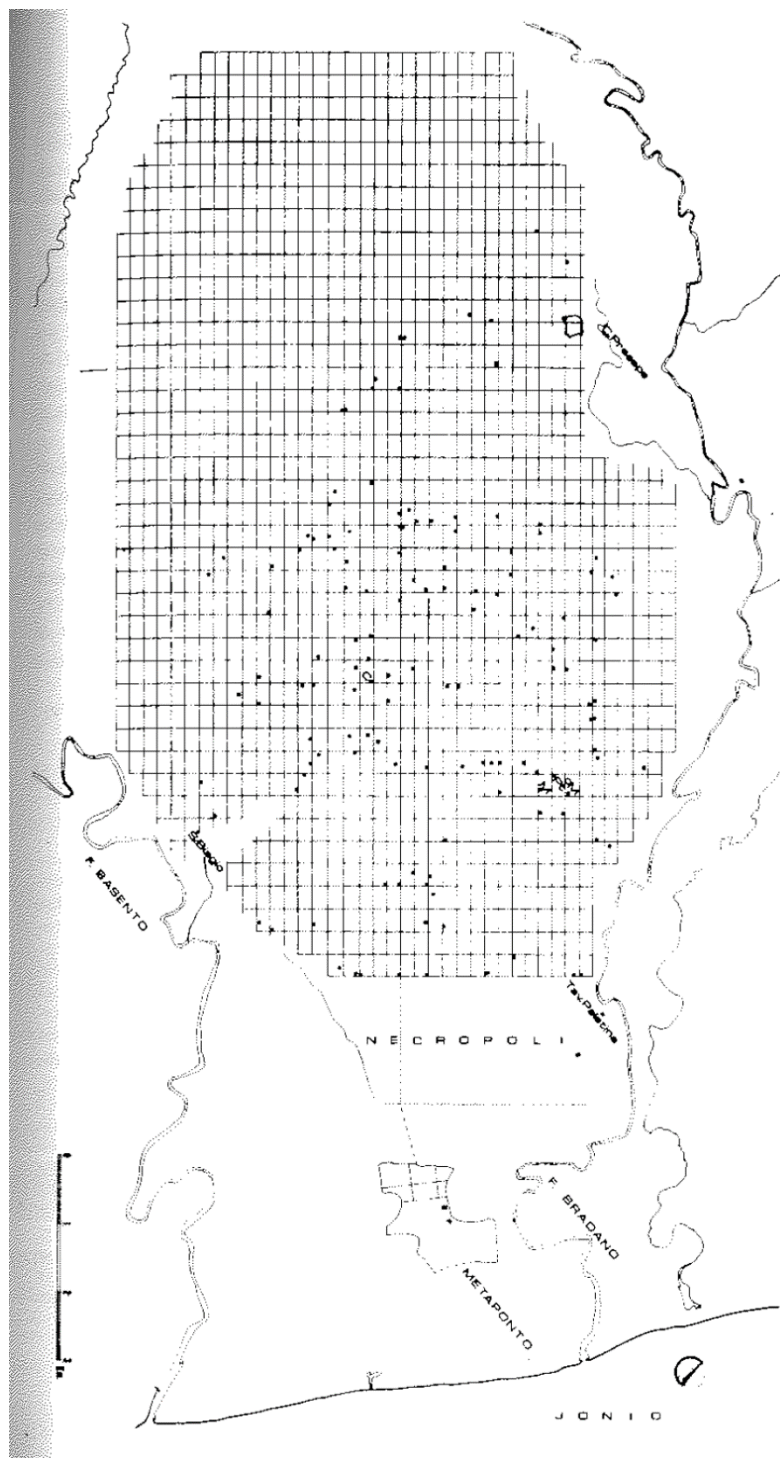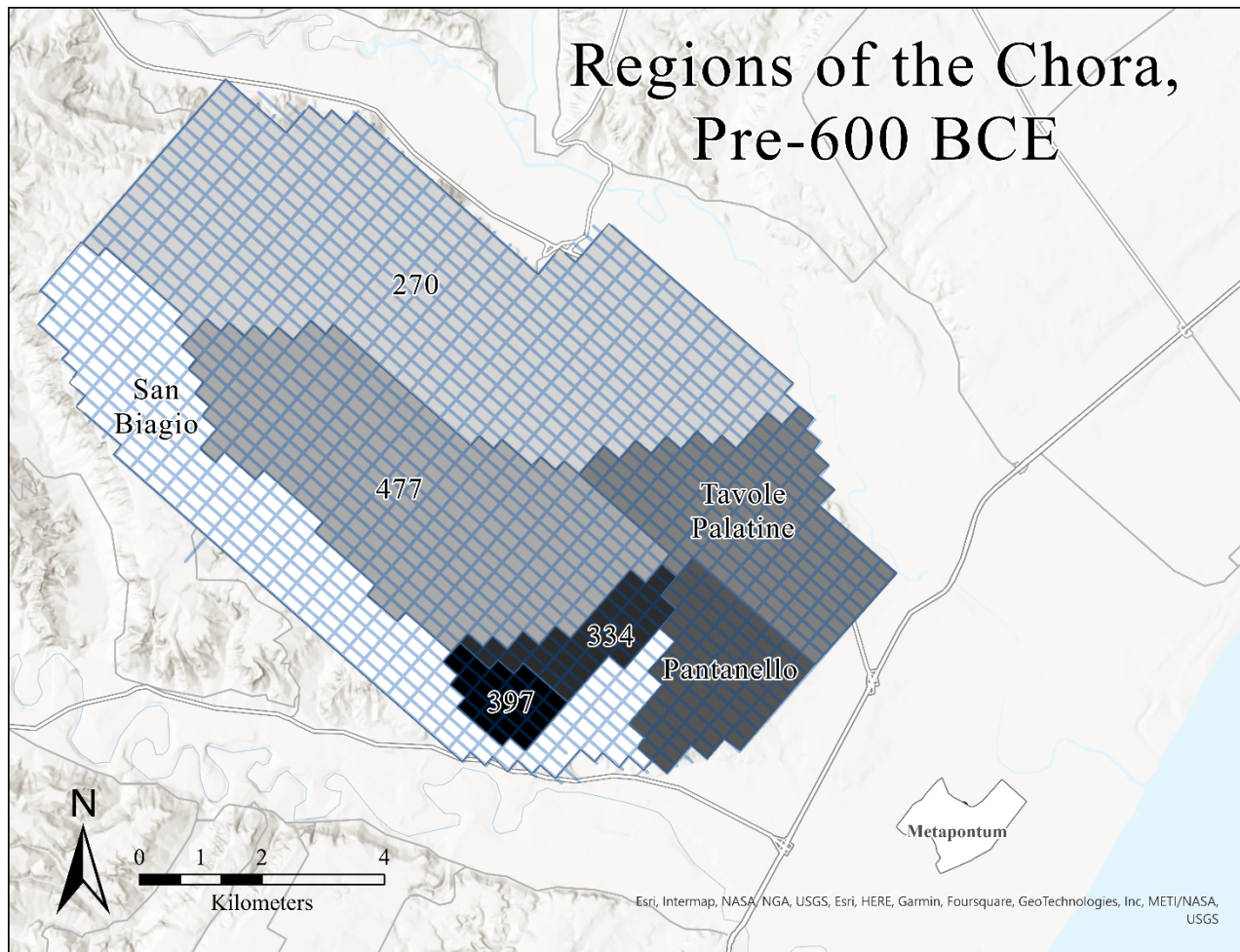
Figure 50: Regions of the chora according to nearest sanctuary, Pre-600. (ArcGIS Pro 3.1.1)
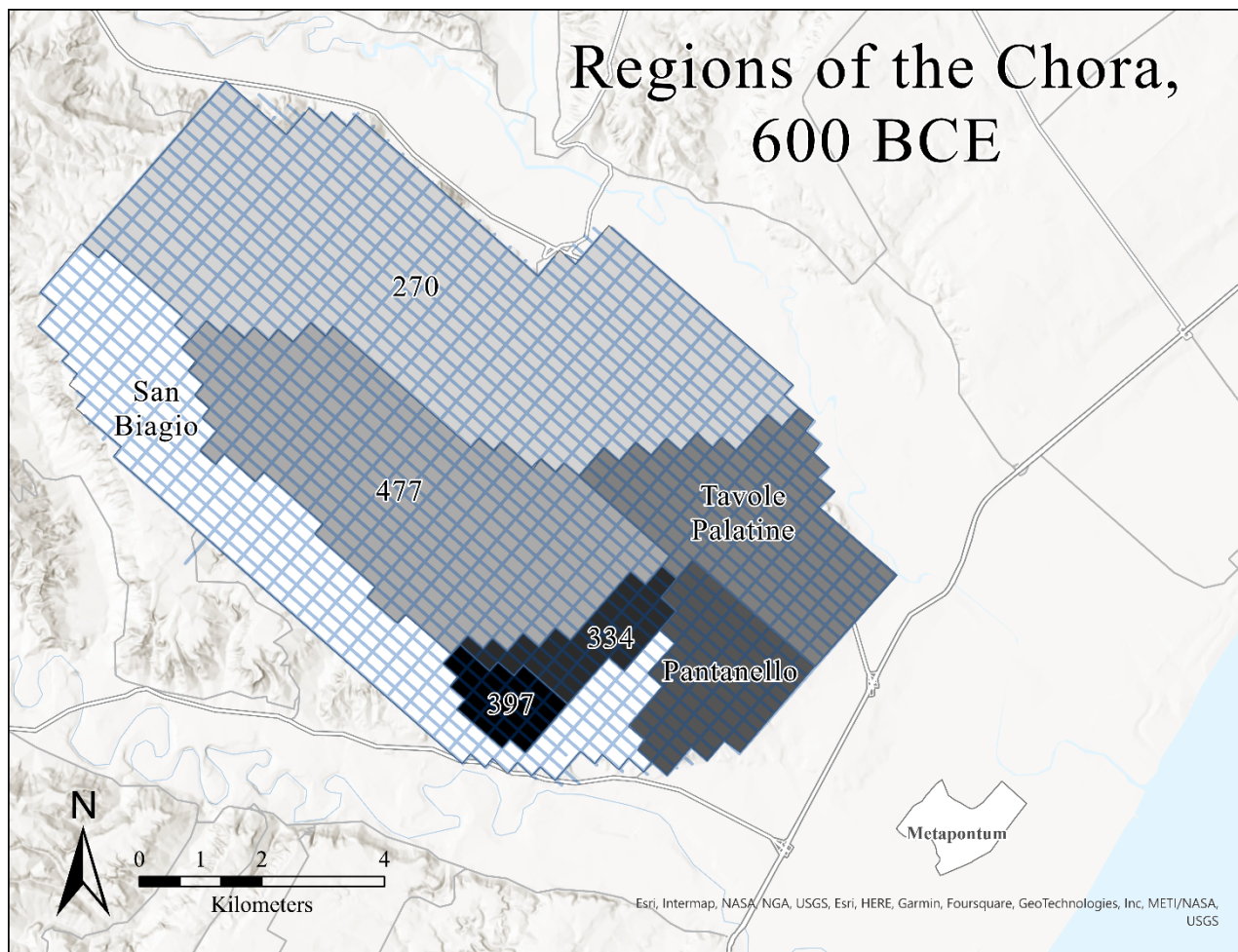
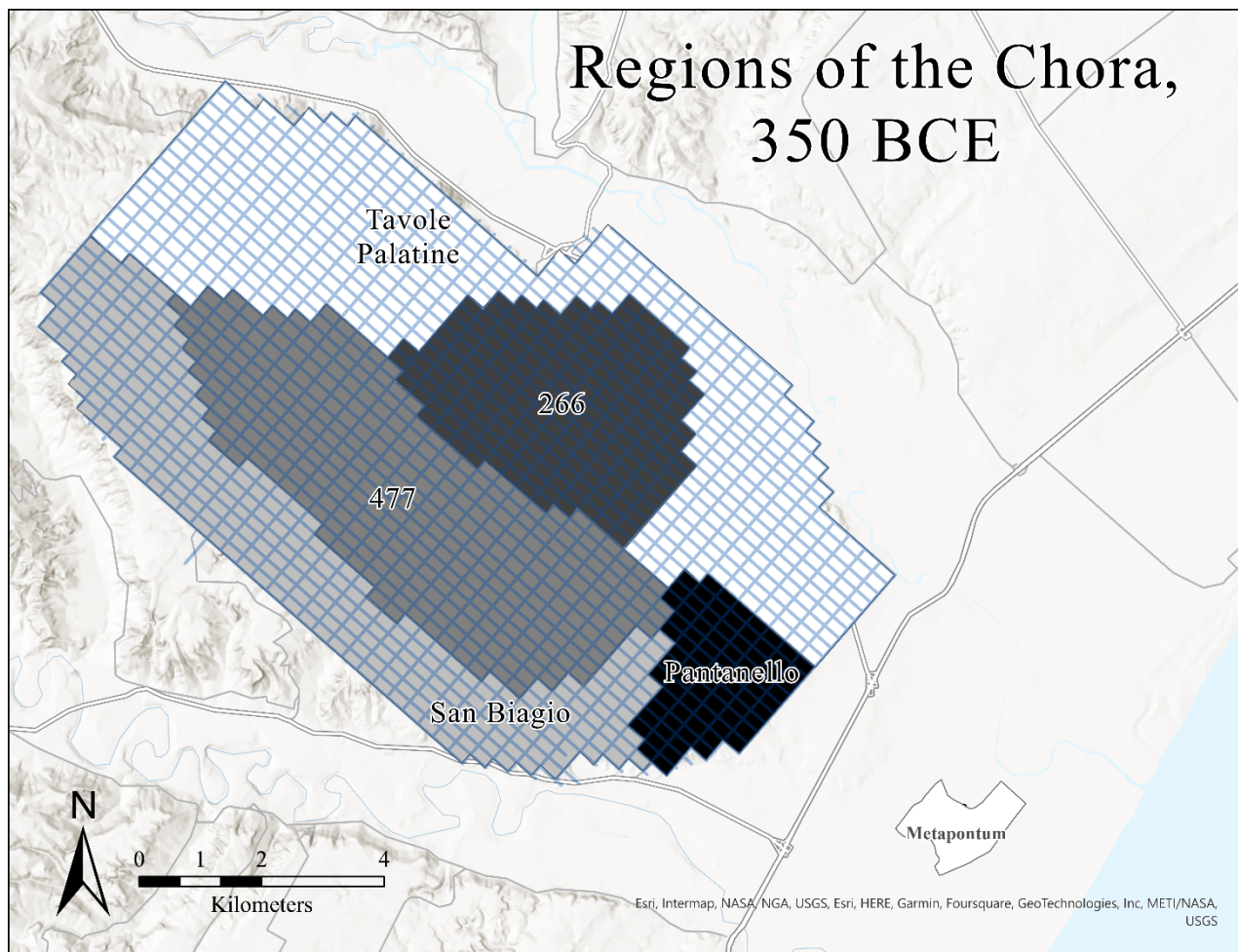Figure 51: Regions of the chora according to nearest sanctuary, 600. (ArcGIS Pro 3.1.1)
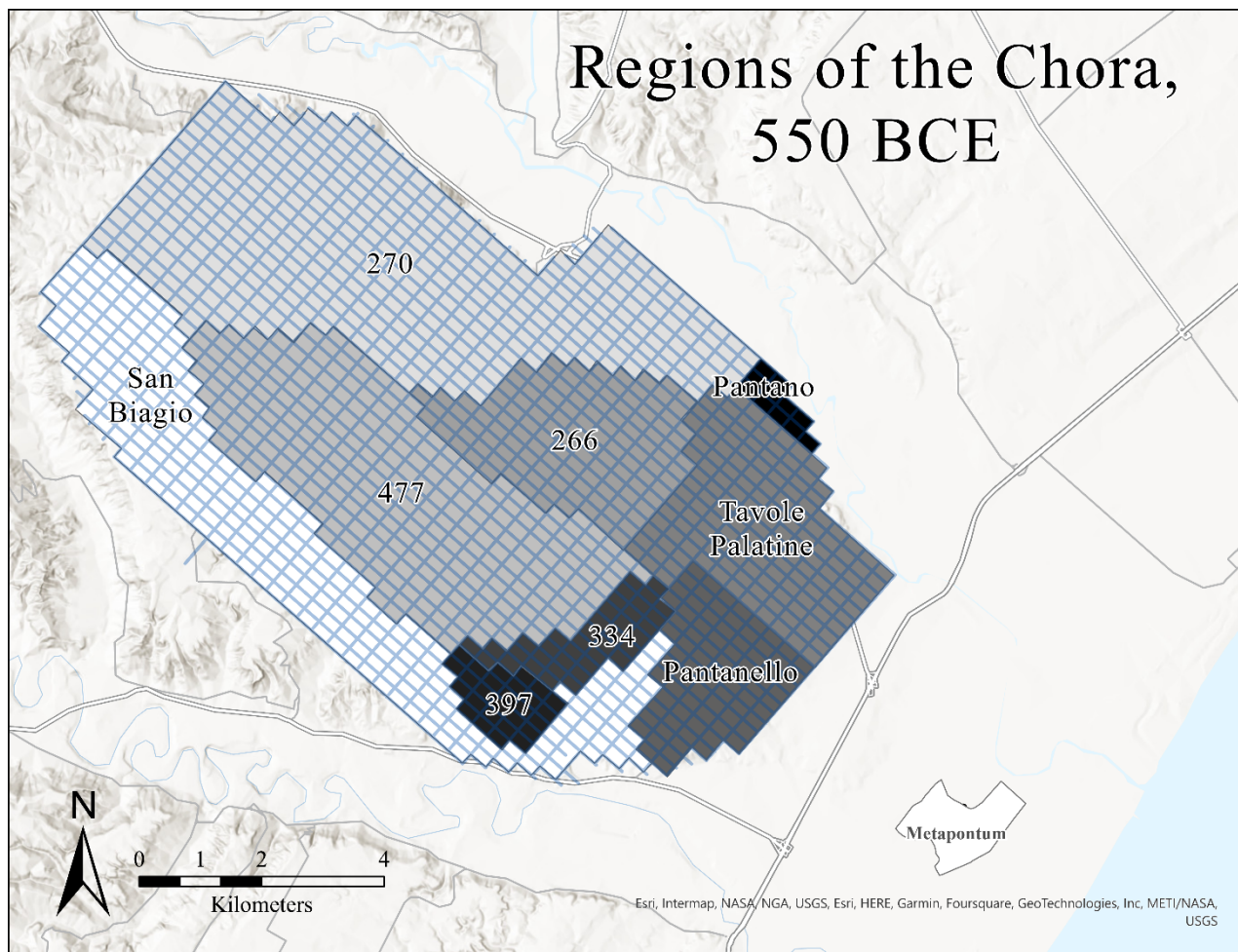
Figure 52: Regions of the chora according to nearest sanctuary, 550. (ArcGIS Pro 3.1.1)
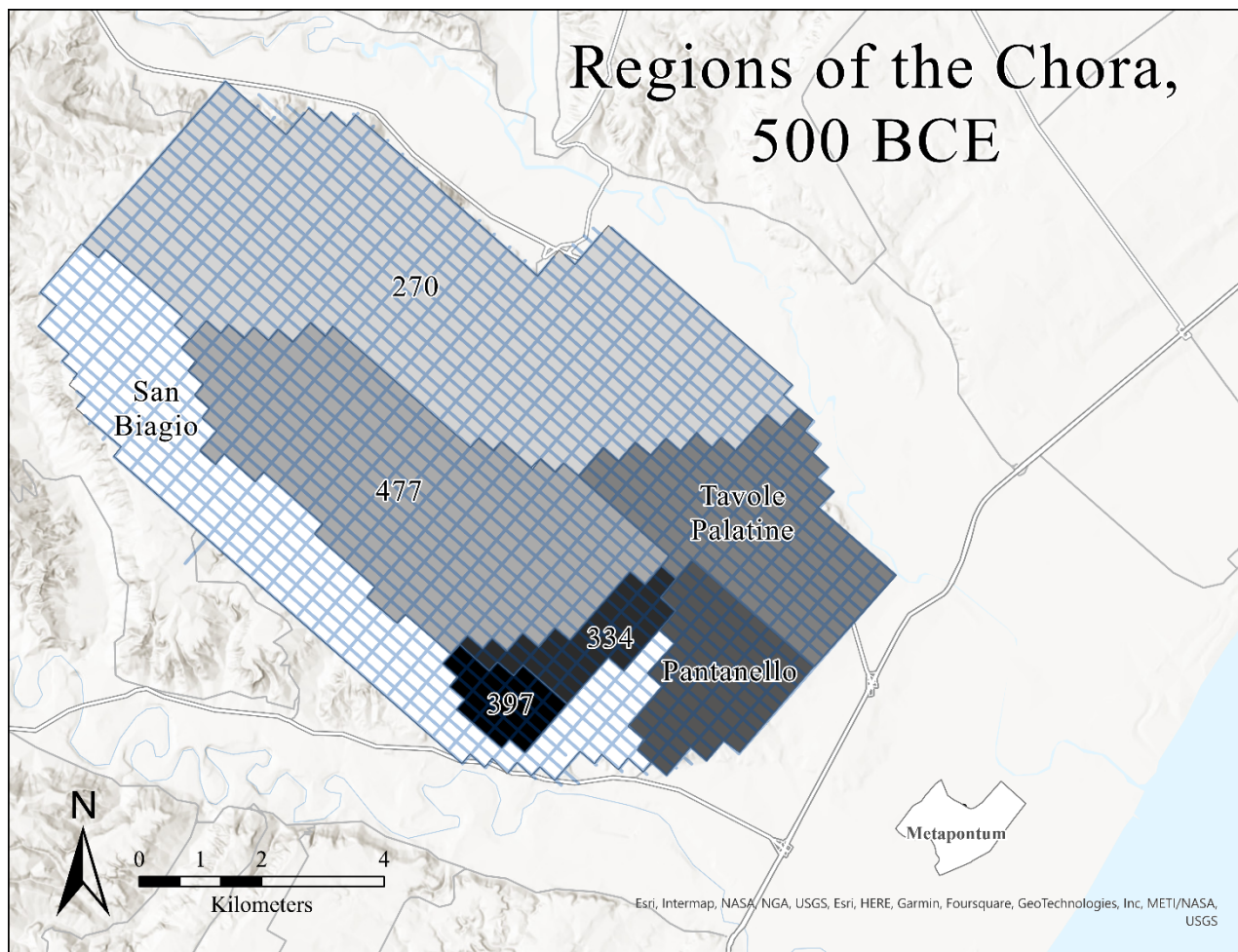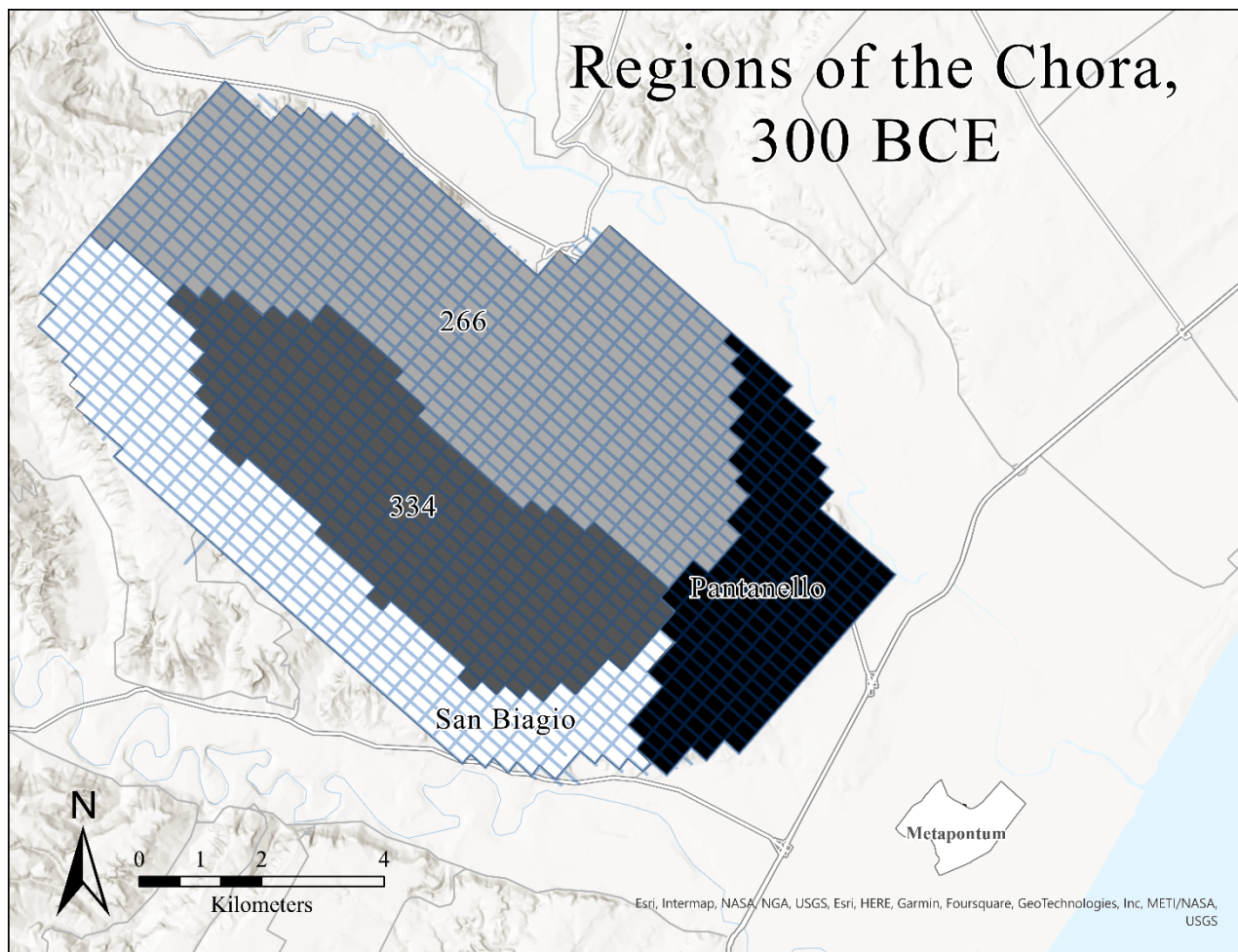
Figure 53: Regions of the chora according to nearest sanctuary, 500. (ArcGIS Pro 3.1.1)
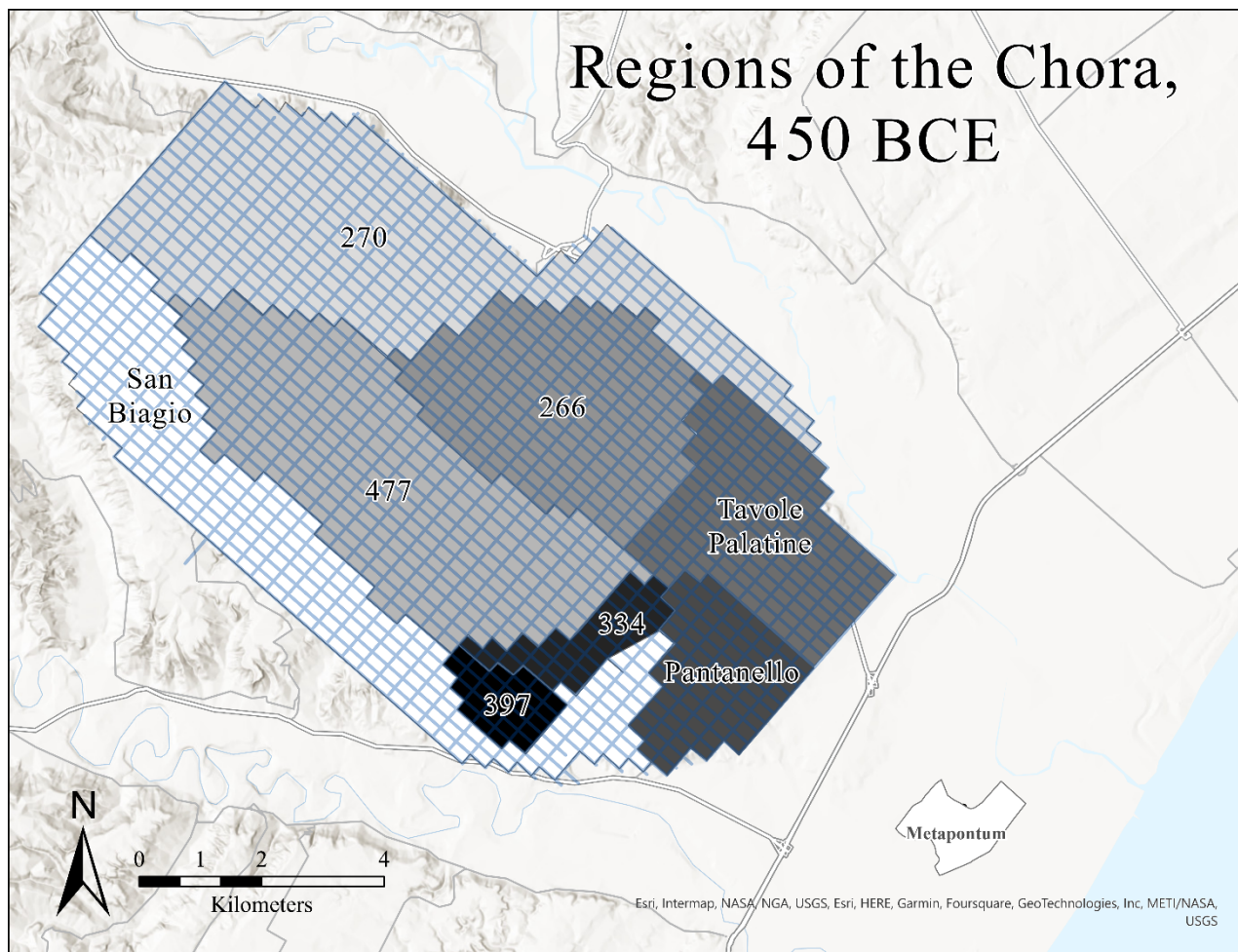
Figure 54: Regions of the chora according to nearest sanctuary, 450. (ArcGIS Pro 3.1.1)

Figure 55: Regions of the chora according to nearest sanctuary, 400. (ArcGIS Pro 3.1.1)

Figure 56: Regions of the chora according to nearest sanctuary, 350. (ArcGIS Pro 3.1.1)

Figure 57: Regions of the chora according to nearest sanctuary, 300. (ArcGIS Pro 3.1.1)
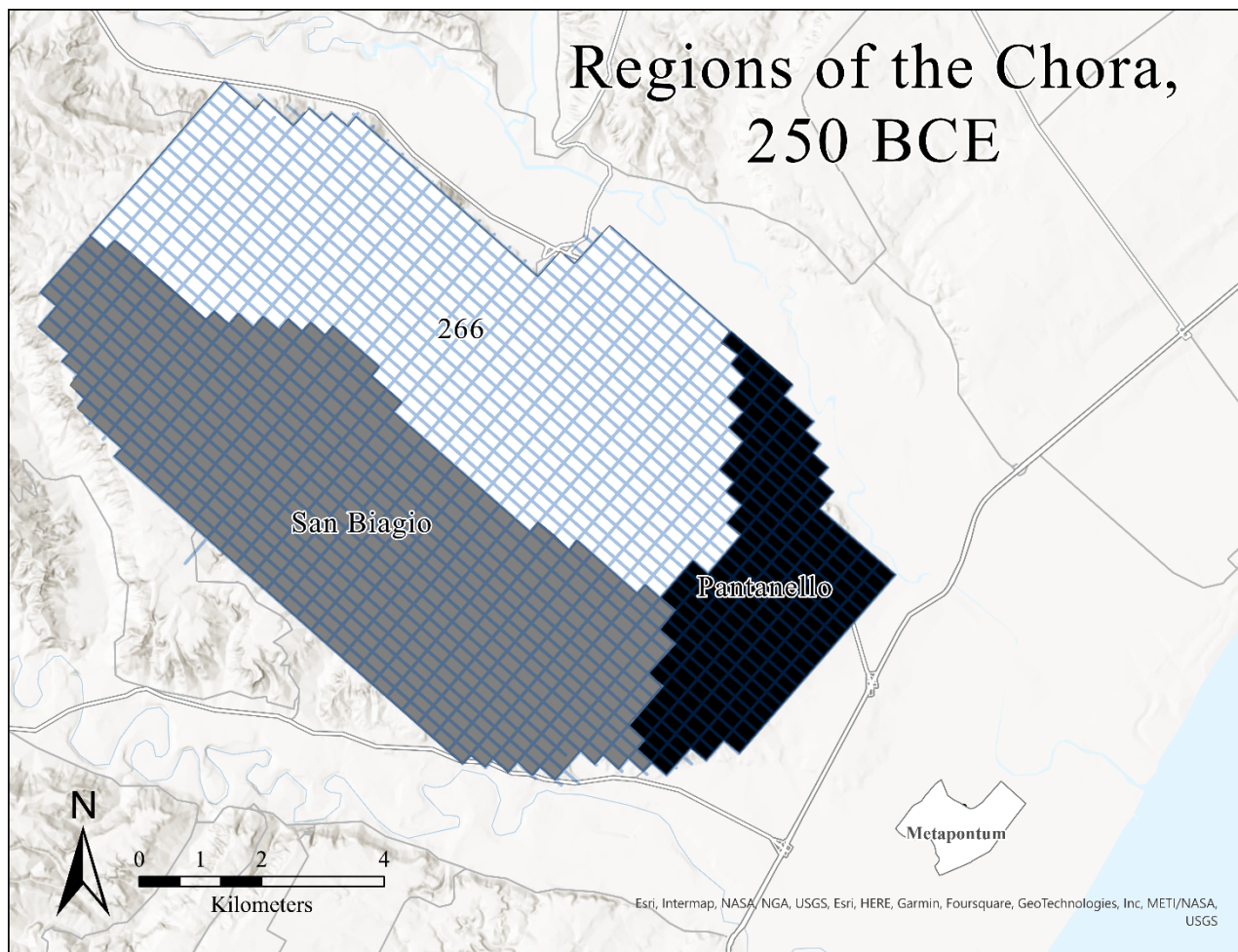
Figure 58: Regions of the chora according to nearest sanctuary, 250. (ArcGIS Pro 3.1.1)
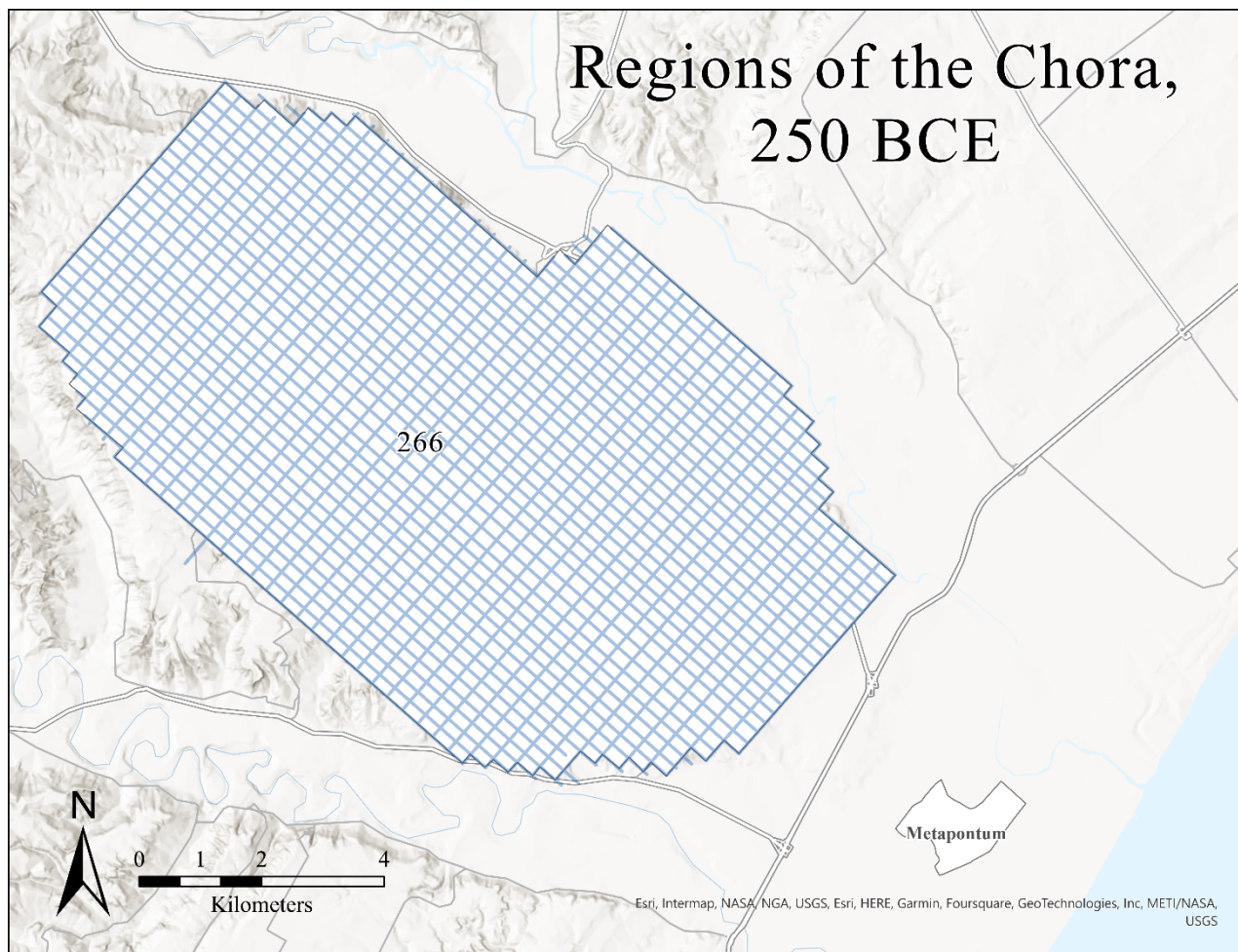
Figure 59: Regions of the chora according to nearest sanctuary, 200. (ArcGIS Pro 3.1.1)