Title

Macro-scale Political History of the Lake Titicaca Region, Peru and Bolivia: A Synthesis and Analysis of Archaeological Settlement Patterns

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A dissertation submitted in partial satisfaction
of the requirements for the degree
Doctor of Philosophy in Archaeology

by

Karl Jeffrey La Favre

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Abstract of the Dissertation

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Professor Charles S. Stanish, Chair

Archaeologists have extensively surveyed the Lake Titicaca region of Peru and Bolivia over the past three decades. These surveys have provided large, rich datasets on the nature, date, and distribution of prehistoric and early Colonial settlements. These data allow us to conduct broad synthetic and comparative analyses to test social, political, economic, and ideological factors in the development of complex societies in the region. The present study reworks nine survey datasets from different projects into a uniform analytic framework that focuses on political and demographic variables. The distribution of standardized site population estimates through time and space provides the foundation for a model of Titicaca political history from 2000 B.C. to A.D. 1600. I conclude that Titicaca societies' politics and geography centered on agricultural production and its demographic consequences. From the beginning of the Formative period (2000 B.C.–A.D. 600), people strongly oriented their settlement to agricultural productivity. By the Middle Formative (1300–200 B.C.), larger population sizes created incentives for integrative political and religious institutions, but the relationship between population nucleation and population growth varied considerably between regions. During the Late Formative (200 B.C.–A.D. 600) and Tiwanaku (A.D. 600–1000) periods, agricultural intensification supported unprecedented scales of political integration and demographic growth. Tiwanaku's political economy therefore elaborated on Late Formative political economies. However, whereas shifting political affiliations created dynamic Formative demographic landscapes, Tiwanaku period political integration created landscapes with extensive demographic growth. Altiplano period (A.D. 1000–1450) peoples rejected the Late Formative/Tiwanaku organizational form, and Altiplano period political economies supported smaller, more diffuse populations. The Inca state reversed this population trend via immigration from outside the Titicaca region, and reorganized settlement towards higher agricultural productivity. However, the nature of Inca period (A.D. 1450–1540) political integration fundamentally contrasted with Tiwanaku political integration. Whereas Tiwanaku profoundly centralized the political economy and demography of the Titicaca region, Inca period societies created highly integrated political economies at the local scale, even as the Inca state incorporated them into a far larger political organization. A diverse Early Colonial (A.D. 1540–1600) political geography created incentives for major migrations in some regions, whereas some others inherited Inca period structure.

The dissertation of Karl Jeffrey La Favre is approved.

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Jerry D. Moore

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University of California, Los Angeles

2016

For my mothers, Adrienne La Favre and Sadhna Kalra

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Acknowledgments

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CHAPTER 1

From Huatacoa to Copacabana: Lake Titicaca Societies in Macro-space and Macro-time

Around 1300 B.C., at the site of Huatacoa near the northern-most shores of Lake Titicaca (see Figure 1.1), a small group of people came together to construct a particularly early sunken court (Cohen 2010: 157). The sunken court architectural style (see Figure 1.2) went on to spatially anchor ritual and political life throughout the Lake Titicaca region for more than two millennia (Mohr Chávez 1988; Hastorf 2003; Stanish 2003: 2–7,198–199,278–279). This longevity stemmed not from an ahistoric traditionalism of the societies which continued to create these courts, but rather from the style's deep cultural viability, its capacity for incorporation into very different, dynamic social contexts. For instance, two millennia and 250 kilometers away from Huatacoa's first builders, at the site of Tiwanaku several sunken courts were central components of a four $km.^2$ city (Janusek and Blom 2006; Bandy 2013; Benítez 2013; Kolata 2003c), a setting which the first builders of Huatacoa could never have imagined.

Moreover, deeply different political entities commonly re-used or appropriated *specific* sacred spaces in the Titicaca region. For instance, within Lake Titicaca itself, the Island of the Sun and the neighboring city of Copacabana have held a central place in the sacred geography of the Lake Titicaca region for at least 1500 years. The Island of the Sun's Chucaripupata, a sacred site of regional importance by about A.D. 600, can 900 years later be found just 100 meters away from the Titikala, origin place of the sun in some accounts and one of the few most important sacred spaces in the entire, enormous Inca empire (Bauer and Stanish 2001: 1–22,48–51,149–154; Seddon 2004). In turn, the Titikala is today just a short boat trip from Copacabana, home of the basilica of Bolivia's patron saint and other holy places visited each

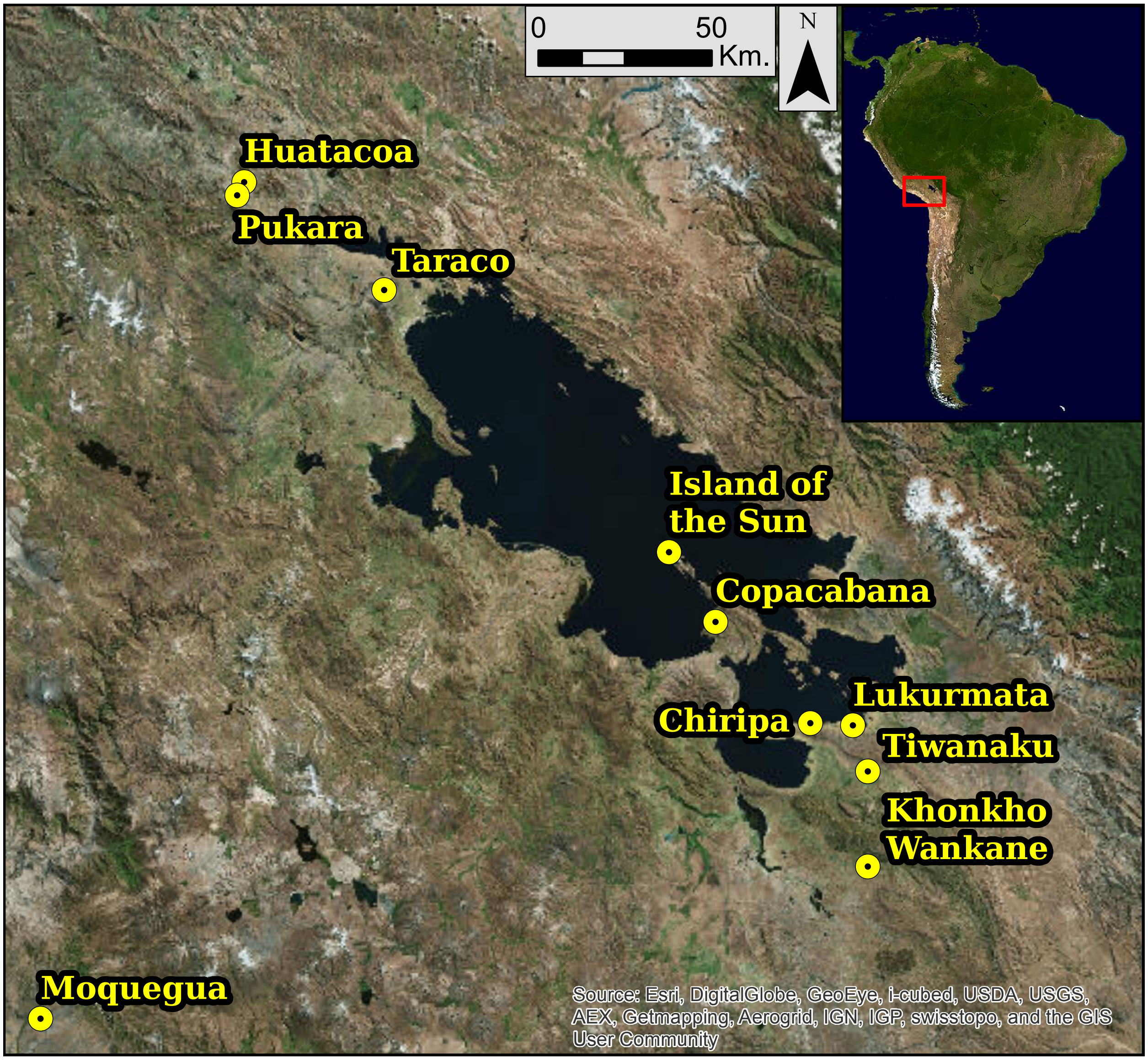


Figure 1.1: Lake Titicaca Region with Sites Mentioned in Chapters 1 and 2

Figure 1.2: A Sunken Court (at Pukara)

year by thousands of ethnically diverse pilgrims from many cities and villages of Bolivia and Peru (Elías 1978: 171–175; Salles-Reese 1997: 17–18; MacCormack 1984: 55).

This study seeks to understand such continuities and dis-continuities across macro-space and macro-time, from the sunken court at Huatacoa to the basilica at Copacabana. This is not the first Lake Titicaca study conducted at this spatio-temporal scale (e.g., Stanish 2003; Griffin and Stanish 2007), but its approach differs from previous Lake Titicaca studies. This study begins by aligning a number of very differently formatted but fundamentally similar datasets: the accumulated settlement pattern data created by two generations of Lake Titicaca archaeologists. This study is a synthesis, but it is more bottom-up, more inductive, and more specific than what is normally termed synthetic. In this study, the distribution of standardized site population estimates through time and space will provide the foundation for a model of Titicaca political history from 2000 B.C. to A.D. 1600.

A definition of politics is necessary. Conceptions of politics tend to emphasize either structure ("organization") or event ("decision-making"), but since each partially generates the other, a more integrated concept is preferable. Rather than structure or event alone, politics must be a form of "systemic history" or "structured historical processes and dynamics" (Thomas 1989: 96). Thus, by "politics" I mean the continuous reproduction and redefinition of supra-household social relationships, whether in response to novel conditions or not. Since the concept of the household is thus elemental to my definition of politics, I must confront the fact that some scholars reasonably argue that the very notion of the household is inappropriate for many Andean social contexts (Collins 1986). I essentially agree with this argument, but instead see its basis as a reflection of the great strength of small-scale political relationships in many Andean contexts. I should also mention that, while I conceive of politics as fundamentally supra-household, the other side of this coin is that supra-household relationships deeply affect social relationships within the household, and vice-versa.

1.1 The Titicaca Region

A strict definition of what the Titicaca region includes is of little use, but some definition must be made for clarity's sake. Many scholars opt for "the Titicaca Basin," which is reasonable since this is at least clearly definable, but I prefer a vague social definition to an exact hydrological one. When I refer to the Titicaca region I mean the heartlands of peoples associated with Yaya-Mama, Tiwanaku, northern Aymara, and other related cultures. This can be very roughly approximated as the area depicted in Figure 1.1. This definition is fairly similar to Stanish's (2003: 30–32) definition of the south-central Andean highlands. In practice within this study, I deemphasize areas which are especially distant from Lake Titicaca even if they fit within this cultural definition. A major example is the Moquegua Valley (see Figure 1.1). There is no good theoretical reason for doing this, only a practical one insofar as it makes the spatial extent of the area I analyze more manageable. A future version of this study will incorporate these more distant areas.

Some scholars consider Lake Titicaca to be inappropriately decontextualized when used as the center of an analytical frame (e.g., Isbell 2004: 210–213,232,235). It is true that, no matter how one defines the Lake Titicaca region, its history was always intertwined with other regions' histories. Certainly, linkages of fundamental importance to some particular questions will be severed or marginalized by centering the analytical frame on the lake. However, Lake Titicaca is a suitable anchor for at least the first approach to a great many questions. As will become clear over the course of this study, I advocate a multi-scalar approach. For the moment, however, the broadest analytical frame will be the Titicaca region as defined above, and in practice it will mostly exclude regions especially distant from the lake.

Some sense of the relative size of this region will be helpful. If one includes the surface area of the lake itself (8,000 $km.^2$), it would be difficult by anyone's cultural or natural definition to reduce the region's size below 20,000 $km.^2$. A figure several times this size is equally plausible. Lake Titicaca's drainage basin is about 70,000 $km.^2$ (Craig 2005: 120), and cultural definitions of the region could reasonably exceed this. A comparison of this spatial extent to some well-known Mesoamerican macro-regional study areas is helpful. An analytically defensible ancient Oaxaca region (composed of both highland Zapotec and highland Mixtec areas) is at least 10,000 km.^{2} in extent (Balkansky 2006: 68,79). The "Central Mexican Symbiotic Region" (the Basin of Mexico and its neighbors), on the other hand, is about 18,000 km.^{2} (Sanders 1999: 12). The Lake Titicaca region's size is thus roughly comparable to these regions, if not larger. The extent of completed full-coverage archaeological surface survey is greater in these Mesoamerican regions, however, due first of all to the Mesoamerican survey tradition's earlier origins around 1960, and second of all to a legion of Mesoamerican survey archaeologists' intense efforts (see Balkansky 2006: 59–72).

Although the extremity of the Titicaca region is often exaggerated in both scholarly and popular portrayals, certainly a good first approximation is that it is a cold, high elevation area. It is critical to recognize the varying degrees of this within the region, however. The most fundamental environmental distinction within the Titicaca region is between the *suni* (see Figure 1.3) and the *puna* (see Figure 1.4). The suni is more important to this study: it is composed of the near-lake areas between 3800 and 4000 masl (Pulgar Vidal 1981: 102–103). Certainly this environment is challenging in some respects, but Titicaca peoples have for millennia been successful at making it quite productive. The puna is higher, colder, drier, more rugged, and better suited for pastoralism than agriculture (Pulgar Vidal 1981: 102–103,119–120,134). The puna is home to a very long and fascinating cultural history, but, with one exception, the surveys discussed in this study have primarily focused on the suni. The puna has more often attracted scholars investigating the Titicaca region's pre-agricultural societies and/or its rock art traditions.

The Titicaca region's chronology will be presented in detail below, but a thumbnail history will be necessary before proceeding. Early foraging peoples settled the Titicaca region a few millennia later than they did the neighboring Pacific coast, around 9000 cal B.C. (Aldenderfer 2006: 362). Primarily agricultural, more sedentary peoples inhabited much of the Titicaca region by about 2000 or 1500 cal B.C. (Bandy 2005b: 112; Stanish 2003: 99–102), and this is the beginning of the sequence addressed in this study. Thus begins the Formative period in the Titicaca region, but it is a long and diverse period. By the Late Formative (200 B.C.–A.D. 600), several quite large and complex political groups had developed. In fact, a

Figure 1.3: *Suni* (western shores of Lake Titicaca)

Figure 1.4: *Puna* (Qawra Thaki survey area)

minority of scholars even considers some of these societies, especially Pukara, to have been states (e.g., Tantaleán 2009). In contrast, it is quite common to view Tiwanaku as a state during the Tiwanaku period (A.D. 600–1000/1100). The Altiplano period societies (A.D. 1000–1450) which follow Tiwanaku's collapse were not long ago characterized by scholars as "kingdoms," mainly because of their depiction as such in ethnohistoric documents. However, archaeological evidence suggests much more decentralized societies, and these societies are better characterized as segmentary societies (e.g., Arkush 2014). The subsequent Inca period (A.D. 1450–1540) represents the first period during which the Titicaca region was incorporated into a political organization centered outside the Titicaca region. It was a brief period but one of substantial change. Finally, the early Colonial period follows, and we are fortunate that most of the Titicaca region's archaeological surveys did not restrict themselves to prehistory, and have documented its settlement patterns.

Considering that survey archaeology in the Titicaca region only really began in the late 1980s, a lot has been accomplished. Figure 1.5 displays most of the Titicaca region's surveys to date. Only about half of these surveys have been incorporated into this study's database (see below); incorporating the remaining surveys is a key future priority. It is very important that further survey work be completed in the near future before the evidence is lost: major destruction of surface evidence is transpiring in the Titicaca region at the decadal time scale or faster (see Stanish et al. 2014: 188). It is especially critical that our relative lack of data for the eastern shores of Lake Titicaca is rectified. However, we have certainly already reached a point where synthesis and comparative analysis of this major collection of data can be quite illuminating.

1.2 Database

This study's database is composed of two parts: 1) unified data from nine full-coverage surveys (Appendix A), and 2) an identically formatted dataset composed of data for 21 of the most important sites outside the nine surveys' areas (Appendix B). Figure 1.6 displays the nine surveys, and Figure 1.7 displays the 21 inter-survey sites. It should be noted that

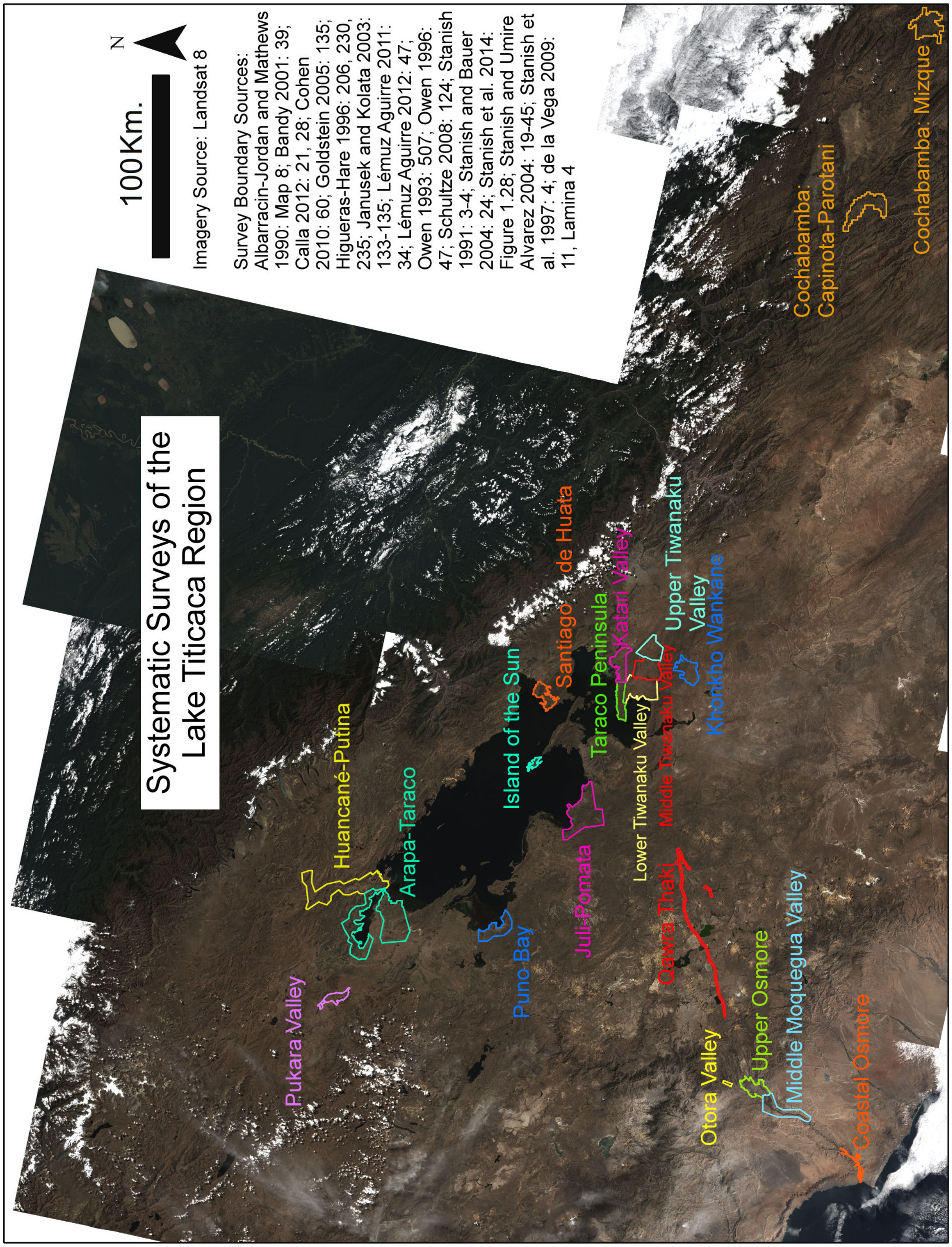


Figure 1.5: Systematic Surveys of the Lake Titicaca Region

the inter-survey dataset is presently much stronger for the Formative and Tiwanaku periods than for the post-Tiwanaku periods.

The key information contained in the database includes geographic coordinates, component sizes, and component types (the types are non-exclusive types including habitation, corporate ritual, human burial, and defensive). The most important characteristic of the database is that the sizes and types are defined at the component level rather than the site level (in other words, the sizes and types are phase-specific). Given the varying levels of ambiguity in the evidence for type, the component types are each assigned a confidence of "confident," "possible," or "evidence absent." For reasons discussed in Section 2.1.2, surface evidence for habitation sites typically does not include architecture, so a "confident habitation" type is assigned unless there is good reason to believe a sherd scatter is from disturbed burials or some atypical depositional context. Neither a "possible" nor a "confident" defensive type is assigned based on topographic location alone: fortification must be evident (however, the database includes elevation data, so a coarse redefinition of the defensive type would be simple, or a more sophisticated topographic redefinition could be accomplished using the XY coordinates and a digital elevation model). The database also includes information on ceramic sample counts, whenever available, though this data is rarely used in this study. Since surveyors sometimes report that the evidence for a particular phase at a particular site is ambiguous, the database also includes information on the confidence of the chronological assignment; however, for simplicity all components are treated in the same way throughout the analyses in this study. For further detail on the database's fields, see Table A.1.

Figure 1.8 presents the chronological framework for each survey (also see Appendix C). There is some significant variation in the chronologies used by the various surveys, arising from three causes: 1) the differing state of knowledge at the time each survey was conducted and published, 2) different conclusions reached about the timing of certain events, such as the collapse of Tiwanaku, and 3) actual regional variations in chronology. I have of course preserved variations arising from the third cause. The first and second causes are sometimes mixed with each other, but I have attempted to correct for the first cause while remaining fairly neutral in cases of the second cause. In summary, the chronology presented in Figure 1.8

Figure 1.6: Surveys Included in this Study's Database

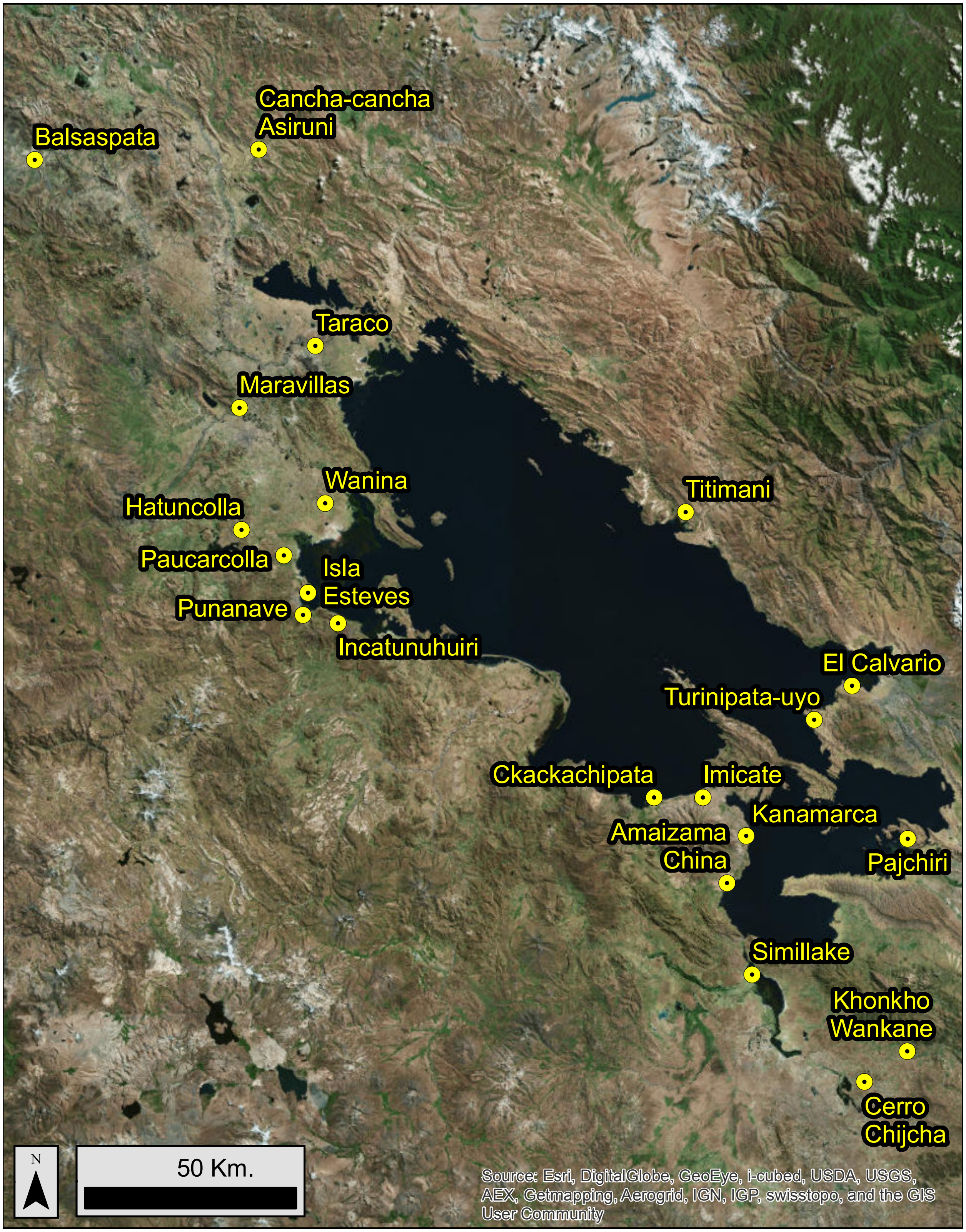


Figure 1.7: Inter-Survey Sites Included in this Study's Database

and used in this study is only a moderately critical/revisionist take on the Titicaca region's survey chronologies: except for a handful of particularly important changes (noted at the bottom of the figure), I have mostly just used the chronologies as presented by the surveyors. Other important changes will be made in the future, for example combining the Tiwanaku Valley's Tiwanaku IV and V phases into a single phase (see Janusek 2003b: 55–56,81–82; Bandy 2001: 45,207–210).

1.3 Analyses

This study will create a macro-scale interpretation of the Titicaca region's political history, via a multiscalar approach which employs both macro-scale synthesis and meso-scale comparison. As often as possible, the analyses in this study are repeated at three different scales: the survey scale, the supra-survey scale, and the pan-Titicaca scale. The survey scale simply treats each survey's data separately. The pan-Titicaca scale combines the data from all of the surveys and from the inter-survey dataset. The supra-survey scale is intermediate between these two, and combines data from the surveys and the inter-survey dataset into three supra-survey groups. These groups are: 1) the northern Titicaca region, 2) the four southern contiguous surveys (Lower Tiwanaku; Middle Tiwanaku; Taraco Peninsula; Katari Valley), and 3) all other southern Titicaca data. The division between the northern and southern Titicaca regions is made at the Ilave River for the western Titicaca region and at the Suches River for the eastern Titicaca region, following Stanish (2003: 129,145,170,189,196–197).

The first analyses presented (Sections 3.1.2 and 3.1.3) track population size through time at the pan-Titicaca and survey scales. Population size itself is not the interest, but rather how population size shaped and was shaped by political history. The next set of analyses (Section 3.1.4) examines some simple measures of population distribution or nucleation: the number of sites through time in each survey region, and the fraction of the regional population which resided in each survey region's largest site, through time. Section 3.1.5 presents a more detailed examination of population distribution, this time in actual geographic space.

The next set of analyses (Section 3.2.1) is more specifically focused, on political hierarchy

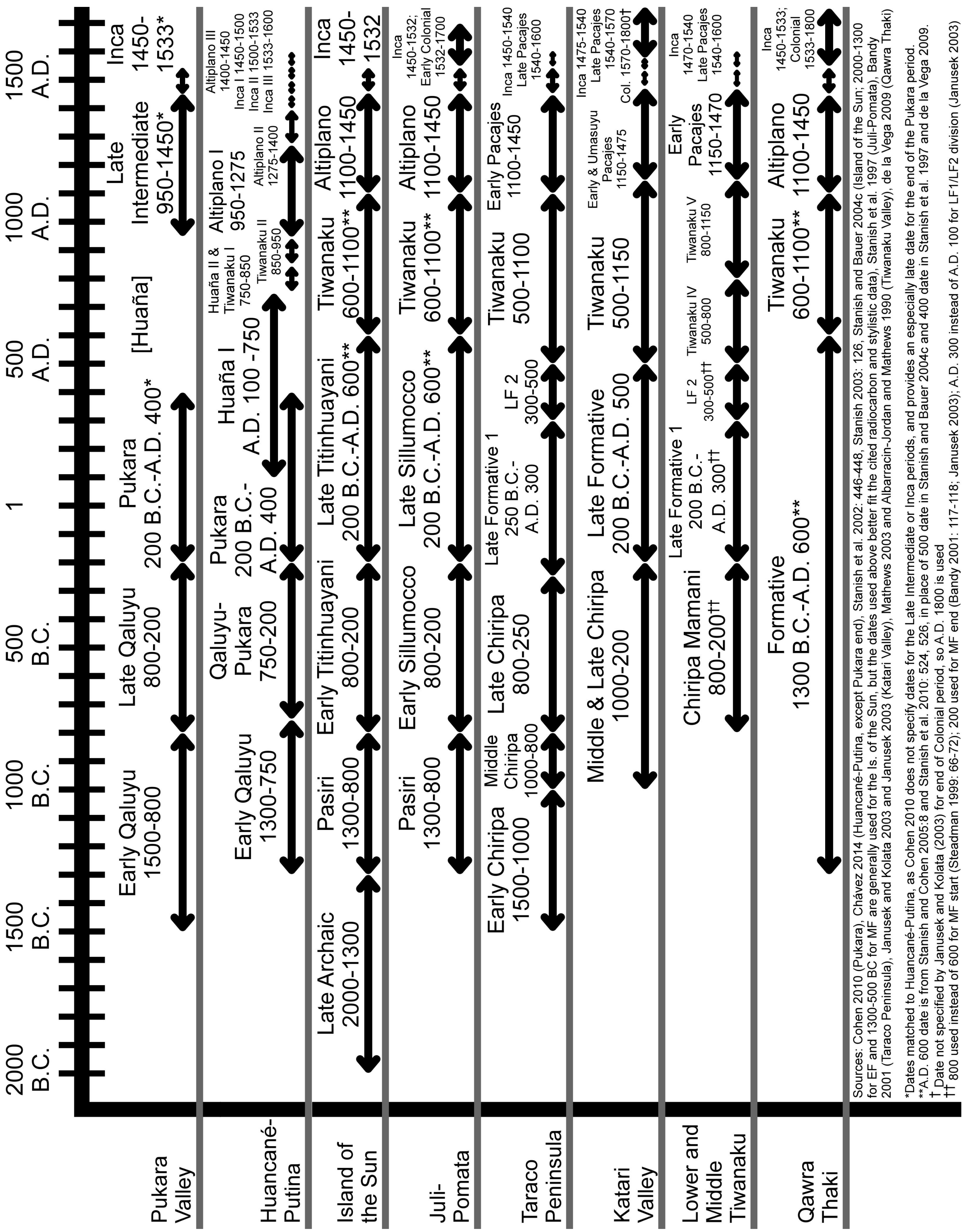


Figure 1.8: Survey Chronologies

and political integration. These topics are examined via population size histograms and rank-size graphs. A closely related topic is political grouping, and this is examined via spatial cluster analysis (Section 3.2.2).

Section 3.3 examines the roles of corporate ritual and defense/conflict in the Titicaca region's political history. This section makes the most focused use of the database's component type data.

Chapter 4 presents a final pair of analyses. The stimulus for this pair of analyses is archaeologists' increasing recognition of deep variability in how political power is funded, regardless of how hierarchical a society may be. The particular axis of variation I examine here is that between "staple finance" and "wealth finance" (see, e.g., D'Altroy and Earle 1985; Earle 1997: 70–75,209–211), though I will suggest that this terminology can be usefully viewed as one description of a more general axis of social variation. The analysis conducted with an eye towards staple finance (Section 4.3) is essentially catchment analysis, though with attention to catchments' contrasting values under unintensive versus intensive production. Section 4.4 is a fusion of network analysis with least-cost-path analysis, aimed at understanding wealth finance.

This study's macro-regional approach will be of interest to archaeologists beyond the Titicaca region. The R and Python code presented in Appendices D and E can serve as a springboard to macro-regional analyses not only for the Titicaca region, but also other parts of the Andes and beyond. While these implementations will be of interest, most of the analysis is conceptually familiar for archaeologists. On the other hand, my network/least-cost-path analysis offers both new methodological ideas and an implementation of them. Other scholars have begun to fashion related analytical techniques (e.g., Verhagen et al. 2013), but the fusion of network analysis with least-cost-path analysis is an approach still in its infancy, and one whose implementation can be technically demanding.

1.4 Conclusions and Theoretical Context

Agricultural production was not the guiding orientation of this study's analysis. In fact, throughout most of the course of my analysis I was more intent on examining the political relevance of exchange networks. However, this study's analytical results, many of which are independent from each other, collectively suggest that Titicaca societies' dominant political issue has frequently been agricultural production and its demographic consequences.

My more specific conclusions are as follows. Formative period (2000 B.C.–A.D. 600) settlement was strongly oriented to optimize agricultural productivity (Section 4.3.2), with major political and demographic consequences (Sections 3.1.2 and 3.3). By the Middle Formative (1300–200 B.C.), the neolithic demographic transition (see Bandy 2005b) had created incentives for new integrative political and religious institutions (see Bandy 2004a). During the Late Formative (200 B.C.–A.D. 600) and Tiwanaku (A.D. 600–1000) periods, agricultural intensification (Section 4.3.2) supported unprecedented scales of political integration (Section 3.2.1) and demographic growth (Section 3.1.2). Tiwanaku demographic growth was qualitatively different from Formative demographic growth, however: Formative demographic landscapes were highly dynamic due to vote-with-your-feet politics, whereas Tiwanaku's administered landscapes were the scene for nearly monolithic demographic growth (Section 3.1.5). Altiplano period (A.D. 1000–1450) peoples rejected all of the most fundamental aspects of Formative/Tiwanaku lifeways (Sections 2.1.1 and 3.1.4), including Late Formative/Tiwanaku agricultural intensification and its support of large populations (Section 3.1.2). The Inca state reoriented Titicaca settlement systems to agricultural production (Sections 4.3.2 and 3.1.5) and reversed the Altiplano period demographic trend, largely through immigration from outside the Titicaca region (Section 3.1.2). Inca period (A.D. 1450–1540) political integration was fundamentally different from Tiwanaku period political integration, however: whereas Tiwanaku profoundly centralized the political economy of much of the Titicaca region, Inca period local sub-systems were highly integrated internally (Section 3.2.1). During the early Colonial period (A.D. 1540–1600), some regions inherited their Inca period spatial organization, whereas the political geography of other regions encouraged large-scale migrations

(Section 3.1.5).

Much in these conclusions is similar to Alan Kolata and colleagues' most fundamental conclusions regarding the political economy of the more specific case of Tiwanaku during the Tiwanaku period (e.g., Kolata 1986, 1991, 2003a; Janusek and Kolata 2003). My conclusions also resonate, though with greater differences regarding the specific politics, with Clark Erickson's perspective on the social centrality of agricultural production in the Titicaca region (e.g., Erickson 1993). Before beginning with the Titicaca region itself, though, we should examine the theoretical and cross-cultural context of my conclusions about agricultural production.

The links which my conclusions make between agricultural production (especially agricultural intensification), demography, and political integration are familiar ones. My treatment of agricultural intensification as a deliberate but costly strategy devised in relation to a demographic context can be traced to the well-known work of Boserup (1965). Likewise, linking intensive agricultural systems to large-scale political integration is an idea with a long and prominent history (e.g., Steward 1949). On the other hand, it is absolutely clear that large and complex intensive agricultural systems can be organized and regulated outside the control of a society's dominant political powers (e.g., Lansing 1987). It is also absolutely clear that demography is not the only relevant factor for any of the variable, multiscalar courses of agricultural intensification (e.g., Morrison 1994, 2007).

In other words, I do not have a universalizing intent when I suggest links between agricultural production, demography, and political integration. I must emphasize this point, since similar links are major parts of some of the dominant universalizing narratives within archaeology's intellectual history. Nevertheless, and in contrast to my expectations, I do believe that these links are the best present explanation for the collective results of my analysis of the Titicaca region. Instead of a contribution towards a universalizing narrative, I intend this study as a contribution to the comparative study of large-scale political histories. The question thus becomes how my conclusions about agricultural production in the Titicaca region compare to other world regions' political histories. I offer a few observations towards this question here; in a future study, I intend to complement my analysis of the Titicaca region with comparable, direct analyses of other major settlement pattern datasets from other world regions.

Even if we examine other regions' use of raised fields—essentially the same technology as that at the core of the Titicaca region's agricultural intensification strategies—quite contrasting relationships to centralized political power and demography are apparent. In some cases, large polities created new settlement systems oriented to raised field agriculture, as in the Casma Valley on the northern Peruvian coast (Moore 1988). These cases are similar to the Titicaca region, according to my interpretation. In other cases, raised field systems emerged in contexts with neither political centralization nor demographic pressure. For example, in the Lake Pátzcuaro Basin, Mexico, raised fields came and went independently of changes in political centralization, and in the absence of population pressure (Fisher 2007). Even the famous *chinampas* in the Basin of Mexico may have had only a modest relationship to centralized political power (Frederick 2007). In making these comparisons, I do not intend to imply that the specific technology (raised fields) is the concern which is relevant to this study. Quite to the contrary, the variability in these examples demonstrates that the specific technology is just a means to different social ends which are pursued in different historical contexts.

Many regions can play counterpoints to the Titicaca region as I have interpreted it, but the Valley of Oaxaca allows a particularly interesting comparison. The Valley of Oaxaca and its surroundings offer some of the world's most extensive and high-quality settlement pattern datasets (see Balkansky 2006). As I will discuss in Section 3.2.1, there is an important similarity between the Titicaca region and the Valley of Oaxaca in the shared phenomenon of extreme demographic concentration into a single site (although this is most apparent in the Oaxaca case during a period with smaller total population than in the Titicaca case). In contrast, the Valley of Oaxaca does not share the political centrality of agricultural production which I suggest for the Titicaca region. In an analysis which has the same basic logic as my subsistence analysis (Section 4.3), Kowalewski (1982) found little relationship between Oaxaca settlement patterns and agricultural productivity. Even when seeking to document agricultural intensification in the Valley of Oaxaca, researchers conclude that it was just one part of complex economies, rather than a dominant influence on settlement systems (Feinman et al. 2007). The same, we will see, was not the case for the Titicaca region.

CHAPTER 2

Prior Studies: Micro- and Meso-scale Perspectives on Titicaca Political History

This study focuses on what may be learned when the analytical scale is zoomed out to macro-scale, to the Lake Titicaca region as a whole. However, it would be impossible to make any sense of these patterns without a prior understanding of the underlying micro- and meso-scales. The goal of this chapter is to establish such an understanding. It first describes characteristic ritual, domestic, defensive, and mortuary micro-contexts (sites or portions of sites) in the Lake Titicaca region. The chapter then moves to the meso-scale by examining the history of settlement pattern studies in the Lake Titicaca region. These studies have primarily examined social scales equivalent to the scales of individual survey projects (regions of tens or hundreds of square kilometers).

2.1 Micro-scale: Ritual, Domestic, Defensive, and Mortuary Contexts in the Lake Titicaca Region

2.1.1 Ritual Micro-contexts

The sunken courts of the Lake Titicaca region are its most widely prominent form of ritual architecture. There is considerable variability in sunken courts but they do form a recognizable genre (Mohr Chávez 1988; Hastorf 2005: 68–80; Cohen 2010: Chapter 9). The stereotypical sunken court is a trapezoidal, un-roofed, semi-subterranean enclosure with a depth of one to two meters and with each side measuring ten to 30 meters. Sometimes sunken courts are placed atop constructed mounds or terraces, and oftentimes a substantial architectural complex surrounds the court itself. The sample size of excavated sunken courts is somewhat small, but human burials appear to have been a quite common feature of sunken court complexes. People in the Lake Titicaca region began to create sunken courts no later than the 14th century cal B.C. (Cohen 2010: 157), and the importance of this tradition continued into the Tiwanaku period (A.D. 600–1000). The end of this tradition (but see Niles 1987; Klarich 2005: 32) was a major part of what was perhaps the greatest cultural upheaval the Lake Titicaca region has ever known, the transition from the Tiwanaku period to the Altiplano period around A.D. 1000 (Stanish and Cohen 2005: 8). Surveys and reconnaissance (e.g., Stanish 2003: 111–120; Stanish et al. 2014: Chapter 3) suggest that there are hundreds of sunken courts in the Lake Titicaca region. In many cases, sunken courts are suggested by surface evidence (e.g., Stanish et al. 2014: Chapter 3); in other cases, they surprise excavators who are pursuing other research objectives (e.g., Hastorf 1999a).

Karen Mohr Chávez (1988) placed the sunken courts at the center of what she defined as the Yaya-Mama Religious Tradition, and interpreted the sunken court complexes as "temple-storage centers." The storage aspect of this argument is based on what Mohr Chávez argued to be "bins" in the structures surrounding the sunken courts at Chiripa and Pukara (similar features are also present at Huatacoa (Cohen 2010: 168)). The evidence for this interpretation includes plant and basketry remains in and near the bins and the form and size of the bins themselves. Mohr Chávez argued that these bins were not for every-day domestic storage, given the high degree of architectural elaboration evident in the structures and the fact that access to the bins at Chiripa was greatly restricted by small, ornate windows with no sign of frequent wear. Like Mohr Chávez, Hastorf (2003) also argued that consumption was an important activity at sunken court complexes. However, Hastorf emphasized burials within the sunken court complexes, and furthermore suggested that the "bins" at Chiripa held mummy bundles rather than large quantities of food. She argued that the quantity of plant remains in the bins does not suggest food storage and that the remains may instead be from burned offerings (2003: 324). Hastorf argued that activities at sunken court complexes centered on ancestor worship and lineage politics: "Renewal of collective memory through ceremony could build lineage cohesion as well as become a locus for maneuvering political claims in the descent groups" (2003: 316). Hastorf's arguments are compelling, but regardless of the exact nature of the "bins," it is clear that food and drink consumption was an important part of activities at sunken courts (e.g., Hastorf 2005: 77; Bandy 2007: 137,141; Klarich 2005: 247–249; but see Roddick 2009: Chapter 9).

Sunken courts were eventually incorporated into much larger architectural complexes with diverse parts. A particularly notable arrangement is a trio of a sunken court, a larger above-ground enclosure, and a massive, terraced platform mound. At least in some cases, the latter two parts incorporated further sunken courts (e.g., Kolata 2003c: 183–184). This trio is best known as the core of the site of Tiwanaku's extensive ceremonial precinct, or perhaps better the core of one half (Kolata 2003c), but this may be just one expression of a widespread style dating back to the Late Formative (Stanish 2003: 141). Although the site of Tiwanaku's three elements within the trio were not constructed simultaneously, it is important to understand the trio not as three independent components, but instead as three architectural types welded into a single complex via a logic of astronomical alignments (Benítez 2013; Kolata 2003c: 198). In fact, from the viewpoint within the sunken court at Tiwanaku, the above-ground enclosure and the platform mound "usurped" alignments with ideologically important mountains (Benítez 2013: 104).

Sunken courts' absence from the Altiplano period's ritual repertoire, after more than two millennia of importance, is one reflection of what was perhaps the deepest ideological shift in the Titicaca region's history (also see Stanish and Cohen 2005: 8). In fact, it is not just sunken courts but the materialization of ideology more generally which is nearly absent during the Altiplano period (Arkush 2009: 200–202,217), a rather dramatic departure from the Formative and Tiwanaku periods. Warfare was probably central to Altiplano period ideologies, at least in the later Altiplano period (see the discussion of defensive micro-contexts shortly below). Along with this ideological emphasis on warfare (or better yet, likely highly tangled with it), was a transformation of a long tradition of the importance of ancestral dead (see the discussion of mortuary micro-contexts shortly below). New types of mortuary architecture probably were the new ritual foci which in some sense replaced sunken court complexes (Arkush 2012: 308,310). Besides these mortuary contexts, however, there is also a small amount of possible evidence for other types of gathering places (Arkush 2012: 308–310). It is also possible that non-architectural, landscape-based ritual practices were very important (Arkush 2009: 201).

The Titicaca region's Inca period perhaps has the widest spectrum of ritual practices. On the one hand, the Inca state made monumental investments in revitalizing and appropriating Tiwanaku period sacred places, especially at the Island of the Sun and at Tiwanaku itself (e.g., Bauer and Stanish 2001; Yaeger and López Bejarano 2004). On the other hand, much of Inca period ritual practice in the Titicaca region was decentralized, landscape-based, and sometimes quite small-scale (Arkush 2005).

An absolute or strict dichotomy between ritual and domestic space fails to capture the complex reality of any human space (Moore 2012: Chapters 5,9), and moreover may be especially inappropriate in many Andean contexts (see Marsh 2012: 274; Janusek 2003a: 268; Roddick 2009: 335; Klarich 2005: 98–99). On the other hand, it seems almost certain that *some* significant emic distinction was made between, say, a sunken court and typical sleeping quarters, and that this distinction mainly related to which social identities were most salient at each type of place. If even this unelaborated minimum is true, using a simplistic ritual/domestic dichotomy to "code" the many and diverse places scattered about the Lake Titicaca region is a reasonable step towards a macro-scale social history of the region.

2.1.2 Domestic Micro-contexts

Even when explicitly sought, domestic structures in the Lake Titicaca region have often proved elusive (e.g., Hastorf 1999a: 123; Bruno 2007: 19; Marsh 2012: 58–59). This is largely because of the prevalence of quickly-eroding/collapsing adobe superstructure in Titicaca domestic architecture. In an ethnoarchaeological study, Goodman-Elgar (2008: 3067) documented an adobe house in the Titicaca region with walls which had lost half of their height in less than a century. Bermann (1994: 54) has observed even faster disintegration in the Titicaca region. One consequence of this rapid destruction, particularly important for my study, is that surface evidence of domestic contexts typically lacks architecture. Collapsed structures may remain as small mounds (e.g., Janusek and Kolata 2003: 133), but in many other cases artifact scatters are the only remaining surface evidence of domestic contexts (e.g., Stanish et al. 1997: 18; Bandy 2001: 40–41,61). In yet other cases, geophysical research has pointed to important domestic contexts with little to no surface evidence at all (Klarich 2005: 10,50,105–110,141,177–178,263–264; Williams et al. 2007).

In the Titicaca region, archaeologists who *do* find domestic contexts usually identify and delimit them with the help of stone foundations. The main purpose of mortared stone foundations was likely to prevent rising damp, whereas un-mortared stone foundations have a more ambiguous intent (Goodman-Elgar 2008: 3057–3058,3067–3070). It is likely that our image of the Titicaca region's domestic contexts is biased towards architecture with stone foundations, at the expense of more expedient constructions. In some, perhaps most, Titicaca domestic contexts, collapsed adobe walls rapidly become indistinguishable from other sediments (Goodman-Elgar 2008: 3066–3069). It therefore appears that a large portion of the Titicaca region's ancient homes is effectively invisible even to excavators.

A second bias results from the fact that excavators of Titicaca households have primarily worked at atypical sites: sites which are unusually large and have exceptionally rich ceremonial architecture. The representativeness of this sample is an important unknown, and is of particular concern for my study since it seeks to understand entire social landscapes surely composed of diverse intertwined parts. Nevertheless, household archaeology in the Titicaca region has provided a critical foundation for this study: it permits the definition of an approximated "standard household" which can be used in analysis of settlement pattern data (see Section 3.1.1).

Middle Formative domestic contexts are poorly understood (Marsh 2012: 58; Bruno 2007: 19). Much of our understanding of prehistoric Titicaca domestic contexts comes from Late Formative or Tiwanaku period contexts at the major sites of Tiwanaku, Lukurmata, Khonkho Wankane, and Pukara. At all of these sites, there is at least some evidence for compound walls which enclosed multiple buildings and associated patios (Janusek 2003a: 269,273–274,276–278,286; Bermann 1997: 97–99; Marsh 2013; Klarich 2005: 177–179,251). As described by Janusek (2003a: 280) for the site of Tiwanaku, "Bounded compounds or barrios formed the most salient unit of social differentiation… Even though this pattern was repeated across the city, compounds differed greatly in size, internal spatial organization, residential density and social activities, implying that the nature of resident social groups also varied considerably." Domestic areas at Tiwanaku, Lukurmata, and Khonkho Wankane commonly have evidence for hearths, fuel and food storage areas, refuse areas, sleeping areas, very active outdoor areas, human burials, and offerings (Janusek 2003a: 269–278,284–287; Bermann 1997: 98,103–104; Marsh 2012: 268,278–363). Areas between separate compounds contained drainage ditches, refuse areas, and footpaths (Janusek 2003a: 271–272). Even at the site of Tiwanaku, craft production was primarily carried out in domestic contexts rather than separate workshops, and discrete neighborhoods were sometimes composed of people pursuing a particular craft (Janusek 1999). In addition to horizontal distinctions between barrios at Tiwanaku, there may have been several hierarchical strata of domestic space (Janusek 2003a: 279–282).

Pukaras were fortified sites on hills which were a major component of Altiplano period settlement patterns (see the discussion of defensive micro-contexts shortly below). Many but not all pukaras were permanently inhabited (see below). Clusters of small circular house foundations are typically apparent in pukaras' surface evidence (Arkush 2008: 348,372). It seems that individual houses had short use-lives, even though pukaras were in some cases inhabited for long periods of time (Arkush 2008: 348). Domestic space within pukaras was divided by segmentary rather than hierarchical distinctions (Arkush 2014: 209–212).

2.1.3 Defensive Micro-contexts

Defensive sites in the Lake Titicaca region are most often associated with the Altiplano period (A.D. 1000–1450). Indeed, *pukaras* (fortified sites on hills) are one of the few most defining features of the Altiplano period (Stanish 2003: 206–220). Many pukaras were also permanent habitation sites, whereas others were temporary refuges (Stanish 2003: 209–210; Arkush 2008: 348,356–357; Arkush 2014: 208; but see Arkush 2012: 314). The former are particularly striking, as "Pukaras are not convenient places to live, and the fact that numerous families felt it necessary to relocate to these cold heights, far from water sources, fields, and routes of travel, is telling" (Arkush 2014: 209). During conflicts, many pukaras likely received additional populations from lower-lying nearby areas (Stanish 2003: 209,216–220; Arkush 2008: 348–349,354; Arkush 2014: 213,216).

Pukaras' fortification walls were imposing, typically one and a half meters thick and one and a half to five meters tall (Arkush 2014: 209). An individual pukara would have one to seven of these walls arranged concentrically, in sum up to several kilometers of walls (Arkush 2014: 209). Slinging stones was a major method of defending these walls: parapets (additional walls to shelter defenders) are a common feature of the walls, and slingstones are often found piled next to the walls (Arkush 2012: 302–303). Slings must have been quite effective defensive weapons in these hilltop contexts: an ethnoarchaeological study in the Lake Titicaca region documented that, even just on flat land, slingers can throw stones as far as 130 meters (Brown Vega and Craig 2009: 1267–1268).

Radiocarbon dating suggests that the building and defensive use of pukaras mainly took place during the *late* Altiplano period, about A.D. 1275–1450, well after the collapse of the Tiwanaku state around A.D. 1000 (Arkush 2008: 349–359). Drought was likely a key factor in the initial escalation of warfare around A.D. 1275, and this high level of conflict remained locked-in until the end of the Altiplano period despite climate amelioration in the A.D. 1400s (Arkush 2008: 359–365). The relative lack of Inca ceramics at pukaras and the founding of Inca sites below pukaras indicate that populations mostly moved out of and remained out of pukaras during the subsequent Inca period (Arkush 2008: 357). Notable exceptions include possible pukara use during rebellion and, though rare, apparently ceremonial Inca architecture on pukaras in areas that were particularly volatile (Arkush 2008: 357–358).

There is also evidence for Formative period warfare, both at fortified and unfortified sites. There are a handful of Formative radiocarbon dates and many substantial Formative ceramic assemblages known from sites which later became Altiplano period pukaras or which were in other defensive locations (Arkush 2008: 349–350; Stanish et al. 2014: 198,212,264,268). There is also evidence for the violent destruction of the site of Taraco, a non-hilltop political center, during the Late Formative (Stanish and Levine 2011).

The importance of warfare during the Tiwanaku period is a difficult question. There is some probable evidence that public sacrifices of war captives were important political acts (Blom et al. 2003; Knudson et al. 2004: 12–13; Kolata 2003c: 190–193). An argument can also be made that some important stone sculptures at Tiwanaku were forcibly captured from other polities (Stanish 2003: 173–174; Kolata 2003c: 197). However, as a whole, the evidence for Tiwanaku warfare is considerably more modest than for several other large Andean polities, such as Wari (Arkush and Tung 2013: 333–334). The best interpretation possible at present may be that warfare was of moderate ideological importance in Tiwanaku politics, but that the (alleged) threat of force was much more of a common reality than actual warfare. Ideologies of violence can thrive in social contexts where actual violence is very rare (Arkush and Tung 2013).

2.1.4 Mortuary Micro-contexts

The most dramatic change in the Titicaca region's history of mortuary practices began during the Altiplano period. At this time, above-ground tombs made a purposefully conspicuous entrance into the mortuary repertoire (e.g., Stanish 2012). Whereas almost all previous tombs were below-ground, beginning in the Altiplano period a significant portion of tombs became highly visible markers on social landscapes (e.g., Bongers et al. 2012; Stanish 2012: 203,213–214). Aside from the social significance, this also raises a methodological issue: post-Tiwanaku mortuary contexts are much more likely to be identified by survey archaeologists, thanks to these above-ground tombs (it should also be kept in mind, though, that this same visibility has encouraged destruction by looters). The above-ground styles include the famous "*chulpas*" (a probable misnomer for burial towers) as well as various styles of below-ground burials ringed above with stones, tomb complexes set into rock shelters, and other styles (Stanish 2012: 203–212). Along with their visibility, above-ground tombs are distinguished from other styles by the above-ground tombs' collective interment of multiple individuals (Stanish 2012: 203,210,213). Chulpa doors suggest that chulpas were long-term ritual foci and were reopened as a lineage's history unfolded (Stanish 2012: 217–218).

Chulpas were likely the spiritual centers of Altiplano period communities (Arkush 2012: 307–308). The social centrality of mortuary contexts, however, was nothing new in the Titicaca region. In a different form, mortuary contexts had become intensely central to social life no later than the Middle Formative (Hastorf 2003). As previously mentioned, burials appear to have been common at Formative sunken courts. In some cases, in fact, they likely were the primary focus of activity at sunken courts (e.g., Hastorf 2003). At least in some parts of the Titicaca region, Late Formative mortuary practices seem to have shifted to a less spatially centralized (though no less socially key) form (Smith and Pérez Arias 2015). Although understanding of Formative mortuary contexts has improved substantially over the past couple decades, it remains embryonic, especially outside the most important political/ritual centers.

Since Tiwanaku was the largest polity to develop within the Titicaca region, an important question is what its mortuary record suggests about social stratification. While there is fairly clear mortuary evidence of Tiwanaku period stratification, the distinctions are much more subtle than might be expected (Korpisaari 2006: Chapters 6,8). The only known Tiwanaku-related burials which could reasonably be called ostentatious actually come from areas which were Tiwanaku peripheries at best (Cochabamba and perhaps Chile), and likely say more about the local politics of those regions than about Tiwanaku itself (Korpisaari 2006: 106–107,156). There are many possible explanations for the relative lack of evidence for dramatically expressed mortuary stratification. One particularly important potential explanation is that prestige was primarily marked with textiles which have not survived decay (Korpisaari 2006: 157). Ultimately, however, we must seriously consider the possibility that Tiwanaku's politics were deeply corporate-based (sensu Blanton et al. 1996), and that therefore actual differences in power were ideologically masked rather than ideologically accentuated.

2.2 Meso-scale: A Brief History of Settlement Pattern Studies in the Lake Titicaca Region

The surveys of the middle and lower Tiwanaku Valley near the end of the 1980s (Albarracin-Jordan and Mathews 1990; Albarracin-Jordan 1992, 1996a,b, 2003; Mathews 1992, 2003; McAndrews et al. 1997) initiated a new era in Titicaca region settlement pattern studies. Certainly, there had already been key research conducted at the scale of entire landscapes in the Titicaca region (e.g., Kidder 1943; Hyslop 1976), but the Tiwanaku Valley surveys were the first large-scale, broadly diachronic, full-coverage, intensive, systematic surveys. It is not surprising that the Tiwanaku Valley was the setting for this pioneering effort, for several reasons. First and most obviously, Tiwanaku's monumentality has no parallel in the Titicaca region, not to mention the fact that it has only a handful of parallels in the Andes as a whole. Second, the scale of research in the Tiwanaku Valley and the Katari Valley during the 1980s and 1990s was staggering, as can be seen, for example, in the heft of the two volumes of *Tiwanaku and Its Hinterland* (Kolata 1996, 2003b). Third, the vision of Tiwanaku which was being pursued by this research clearly demanded settlement pattern surveys, since Kolata had early on grounded his understanding of Tiwanaku in administered agricultural landscapes (e.g., Kolata 1986).

For reasons which will be discussed in detail in Chapter 3, the state of knowledge in the 1980s regarding the Formative period in the Tiwanaku Valley was insufficient for secure conclusions to be made from settlement pattern studies. Certainly the nature of Tiwanaku's presence in the valley during the Tiwanaku period was the key concern, but Albarracin-Jordan (the head surveyor of the lower Tiwanaku Valley) and Mathews (the head surveyor of the middle Tiwanaku Valley) came to fairly different conclusions. There are some substantial differences between settlement patterns in the middle Tiwanaku Valley and settlement patterns in the lower Tiwanaku Valley, but it is probably fair to say that the differing conclusions can be mainly traced to different theoretical orientations. Mathews's (1992; 2003) conclusions are in fundamental agreement with Kolata's vision of administered landscapes, whereas Albarracin-Jordan's (1992; 1996a; 1996b; 2003) conclusions sharply contrast. Drawing on ethnographically/ethnohistorically documented *ayllu* nested organization, Albarracin-Jordan argued that Tiwanaku was a segmentary state, far more decentralized than understood by Kolata. The lower and middle Tiwanaku Valley surveys also provided important post-Tiwanaku findings. Most fundamentally, the extreme extensiveness of Altiplano period settlement remains was immediately apparent (Albarracin-Jordan and Mathews 1990: 141).

Conducted at almost the same time as the lower and middle Tiwanaku Valley surveys, the Juli-Pomata survey provided the first perspective from outside the immediate surroundings of Tiwanaku (Stanish 1994, 1997; Stanish et al. 1997, 1999). One of the most important findings of the Juli-Pomata survey was that substantial use of raised fields (a form of agricultural intensification) began before the Tiwanaku period (Stanish 1994). Another key finding was that the Titicaca region's Formative cultural and political landscape was more diverse than previously recognized and hosted a larger number of major peer polities than previously thought (Stanish et al. 1997: 113–115; also see Stanish 2003: Maps 1.3,1.4). A finding which was probably quite surprising at the time was the fact that Tiwanaku period settlement patterns elaborated on, rather than revolutionized, Late Formative settlement patterns in the Juli-Pomata region (Stanish et al. 1997: 54–55,116–117). As in the Tiwanaku Valley, the Juli-Pomata survey documented an extreme dispersion into very extensive settlement patterns during the Altiplano period (Stanish et al. 1997: 55,64–65). Finally, the Juli-Pomata survey found a major population increase during the Inca period, attributed to immigration into the Juli-Pomata region, and then an early Colonial settlement pattern very similar to the Inca pattern (Stanish et al. 1997: 58–59).

In the 1990s, full-coverage survey of the Katari Valley (Janusek and Kolata 2003, 2004) and then the Taraco Peninsula (Bandy 2001, 2004a,b, 2005b; Bandy and Janusek 2005) admirably created a large continuous block of surveyed area joined to the Tiwanaku Valley survey areas. As will be discussed in Chapter 3, a critical point is that these surveys were able to use improved Formative period ceramic chronologies unavailable at the time of the Tiwanaku Valley surveys. The Katari Valley survey, like previous research in the Katari Valley, was largely aimed at understanding Tiwanaku period agriculture, especially raised fields. The survey was complemented by a very large amount of excavation at both raised fields and sites, and extensive radiocarbon dating of raised fields. Drawing on this diverse and substantial body of evidence, Janusek and Kolata made a strong argument that the Katari Valley's raised fields were primarily used during the late Tiwanaku period. The survey also added yet further evidence for Altiplano period population dispersal (Janusek and Kolata 2003: 154,165–166).

The Taraco Peninsula survey focused on population dynamics. Certainly, something similar could be said about most archaeological surveys in some sense, but the Taraco Peninsula survey's orientation to population was much more rigorous and interesting than is typically the case. Although Bandy produced rich insights into later periods as well (e.g., Bandy and Janusek 2005), the Formative period was the guiding interest of the Taraco Peninsula survey. Based on changes in settlement fissioning, Bandy (2004a) made a convincing argument that corporate architecture and related innovations helped people to create larger villages beginning around 800 B.C. Bandy (2004b) also identified the important political ramifications of lake level changes which placed the Taraco Peninsula along optimal regional travel routes around 400 B.C. One of Bandy's major conclusions regarding the Late Formative was that emigration from the Taraco Peninsula around A.D. 300 was the primary source of early growth at the site of Tiwanaku (Bandy 2001: 196–198; also see Bandy 2007: 142).

Also in the 1990s, the Island of the Sun (and the Island of the Moon and other smaller nearby islands) were surveyed (Bauer and Stanish 2001; Stanish and Bauer 2004a,c). This is probably the most unique of the Titicaca region's surveys, due both to the setting on islands and to the research questions leading to the survey. Ethnohistorical sources indicate that the Island of the Sun was a place of almost unparalleled religious importance in the Inca empire (Bauer and Stanish 2001: 1–22,48–51). The fundamental research questions driving this project, therefore, were first of all how this was reflected in the archaeological record during the Inca period, and second of all if the Inca period importance had earlier roots (Bauer and Stanish 2001: 1–3). Extensive research, including not only the survey but excavation, historical, and archaeoastronomical research, presented a nuanced picture of the Inca period. Furthermore, evidence was identified for a Tiwanaku period precursor to the Inca period ritual center (Bauer and Stanish 2001: 149–154). As in the Juli-Pomata region, a major spike in settlement was identified for the Inca period, and attributed to immigration (Stanish and Bauer 2004c: 41–42).

Beginning in the late 1990s, the northern Titicaca region became the scene of extensive survey. It is unsurprising that one of the earlier surveys was of the Pukara Valley (Cohen 2010), given the prominence of the site of Pukara and the Pukara culture in the history of the northern Titicaca region. And yet the most interesting result of the survey related to much earlier history: the survey led to excavations at Huatacoa which identified its very early sunken court, first constructed about a millennium before Pukara's prominence. Somewhat similar to the middle and lower Tiwanaku Valley surveys' Formative ceramic chronology problem, the Pukara Valley survey was conducted before an adequate ceramic chronology was available for the post-Pukara/pre-Altiplano time span (the mid and late first millennium A.D.). This problem was lack of knowledge regarding northern Titicaca ceramic styles during this period, but interestingly the Pukara Valley survey also identified the near absence of the much better understood Tiwanaku style ceramics from the same period (Cohen 2010: 68–69).

The Huancané-Putina survey (Stanish et al. 2014) and the Arapa-Taraco survey are contiguous and together cover a very extensive portion of the northern Titicaca region. The Huancané-Putina survey is incorporated into this study's database, but the Arapa-Taraco survey is not. Incorporating the Arapa-Taraco survey would be a major improvement to the database. These surveys also faced the post-Pukara/pre-Altiplano problem mentioned above when discussing the Pukara Valley survey. However, the final data are based on an improved ceramic chronology (Chávez Justo 2014) which, among other accomplishments, has illuminated this time span (see Stanish et al. 2014: 22). As already alluded to above, one particularly interesting finding of the Huancané-Putina survey was the importance of defensive sites throughout the Formative period (Stanish et al. 2014: 198,212,264,268). The survey also identified a quite large number of clear and potential Formative sunken courts (Stanish et al. 2014: Chapter 3). The presence of Tiwanaku in the Huancané-Putina region in relation to non-Tiwanaku-affiliated settlement is a very interesting question which can be addressed thanks to Chávez Justo's (2014) major improvements to the regional ceramic chronology. This question will be addressed at length in Chapter 3.

The most recent survey included in this study's database is the Qawra Thaki survey (de la Vega Machicao 2009; Stanish et al. 2010). I participated in this survey's fieldwork. As with the Island of the Sun, the geography of the survey and the research questions leading to the survey are unique. The Qawra Thaki survey area is a long, thin corridor, because the motivating research question was the nature of the route between the site of Tiwanaku and the Moquegua Valley, which had a major Tiwanaku presence (Stanish et al. 2010). Rather than an Inca-style, Tiwanaku-administered route, the survey identified a locally-managed route, where local people received Tiwanaku material culture as a part of reciprocity-based relationships (Stanish et al. 2010).

The above history has discussed the survey projects whose data have been incorporated into this study's database. However, there are several other Titicaca surveys with important findings, and these surveys are absent from this study's database only because of time restrictions. Along with the Arapa-Taraco survey as mentioned above, two surveys which would be exceptionally valuable additions to this study's database are the Santiago de Huata survey (Lémuz Aguirre 2012) and the upper Tiwanaku Valley survey (Calla Maldonado 2012; Albarracin-Jordan et al. 1993; Lémuz Aguirre and Paz Soria 2001). The Santiago de Huata survey is very important because it provides rare data from the eastern side of Lake Titicaca. The upper Tiwanaku Valley survey is also very important, because it further extends the large continuous block of contiguous survey areas around Tiwanaku.

Indeed, it is immediately clear that the Santiago de Huata region has an extremely interesting Formative period history, with important differences from other regions. The Santiago de Huata region has a Middle Formative history with rich evidence for integrative corporate ritual (Lémuz Aguirre 2012: 262–265,298–299), similar to, say, the Taraco Peninsula. Its Late Formative period history provides more of a contrast to other regions. Although there are some important parallels with the Taraco Peninsula's Late Formative history, Santiago de Huata's early Late Formative can also be compared, more surprisingly, to the Titicaca region's Altiplano period pattern. This is because the early Late Formative in the Santiago de Huata region was a period of movement out of political/ritual centers, reduced materialization of ideology, and increasing habitation in defensive sites (Lémuz Aguirre 2012: 267–272,300–

303). Later, the Santiago de Huata region had a major Tiwanaku presence associated with population nucleation and significant agricultural intensification (Lémuz Aguirre 2012: 287–289,305–306).

The upper Tiwanaku Valley had quite substantial Tiwanaku period settlement (Calla Maldonado 2012: 102–103,106,109–111). More surprising and of great interest, the upper Tiwanaku Valley survey identified quite extensive Late Formative settlement (Calla Maldonado 2012: 88–89), in contrast to even recent evaluations of the lower and middle Tiwanaku Valley (see Bandy 2013). For this and many other reasons, the upper Tiwanaku Valley survey provides a key addition to the large block of contiguous surveys around Tiwanaku, a combined analytical window of considerable size.

There are several other important Titicaca surveys, including (but not limited to) the Khonkho Wankane survey (Lémuz Aguirre 2011), the Puno Bay survey (Schultze 2008, 2013), and the Quilcamayo-Tintiri survey (Tantaleán 2010; Tantaleán et al. 2012). Moving farther from the lake, for example to the Moquegua Valley or the Cochabamba Valley, would make this list much longer yet.

CHAPTER 3

Macro-scale Study I: Political Structure and Dynamics

3.1 Basic Political-Demographic Dynamics in the Lake Titicaca Region

In this study, population size and distribution are of less interest in of themselves or as etic objects of study, and instead of more interest as social issues central to the political lives of the people who themselves were parts of these populations. This is not to say that all population change with political ramifications occurred on spatiotemporal scales which allowed the changes to be perceived by members of the population. Nevertheless, demographics are a significant product of and a significant producer of political life. For example, political innovations such as the Lake Titicaca sunken courts likely were instrumental to the creation and maintenance of villages with larger populations (Bandy 2004a: 330–331; Stanish and Haley 2004: 60–65). In turn, regional population growth to the point of extensive landscape occupation was likely a key pressure providing incentive for this innovation (Bandy 2004a: 324,330–331). Or, to take an example from some societies in the U.S. Southwest, moments of population fissioning can be the only time when hierarchical distinctions become apparent, as first-comer rights come into play during times of stress (McGuire and Saitta 1996: 209–212). This dissertation will only modestly address the many such intersections of politics and demography, but at minimum it should continuously maintain an awareness that demography is as much about social reproduction as it is about biological reproduction.

3.1.1 Population Estimation

The first issue is how to estimate population size from archaeological remains. Population estimation is perhaps the most routinely and casually dismissed type of archaeological inference, but it is critical to consider what fills the void left by surrendering to methodological difficulties: an a priori assumption either of what a demographic history was like or that it doesn't matter to processes of interest. Furthermore, some of the skepticism seems unwarranted. The question itself at least has the benefit of being a simpler question than many that archaeologists ask ("How many people inhabited a given space at a given time?"), and likewise many of the relevant considerations are obvious even if not easily answered (e.g., "What is the relative visibility, after taphonomic biasing, of remains from different periods?", "How many people composed a typical household?"). The key problem with population estimation—uncertainties about the long formation processes of an archaeological record—is no more severe in the case of population estimation than for many other archaeological inferences.

Proceeding, then, Lake Titicaca archaeologists are fortunate to have an ethnographically- and taphonomically-informed method of population estimation already devised (Bandy 2001: 59–74; also see Bandy and Janusek 2005: 276–279). This method is used for all population estimates in this study. Bandy begins with an observation that a typical modern Aymara household compound occupies a 30 meter by 30 meter area, and that the household archaeology of the Titicaca region suggests that roughly similar households have been typical since the Formative period. Rather than directly using this area to interpret the area of archaeological scatters, Bandy's archaeological signature of a household extends this 30 meter by 30 meter area with a ten meter "splash zone" on all sides, to account for deposition outside the habitation area and post-depositional spreading. Thus, to determine an estimate for the number of households corresponding to an archaeological scatter, the scatter has ten meters subtracted from each side, and the remaining area is divided by .09 ha (30 m. by 30 m.). A population estimate is then calculated from this number of households, using an ethnographic estimate of six persons per household. The most important ramification of Bandy's approach is that smaller sites (components) are more strongly affected by the ten meter splash zone than large sites (components) are, since only a small portion of a large artifact scatter is treated as splash zone, or in other words in a large site most households' splash zones are other households' habitation areas (Bandy 2001: 65,67–68).

The long duration of typical archaeological phases is a key methodological problem for any population estimation method. The problem is present at both the site scale and the regional scale, or what Bandy (2001: 68–70,73–74) calls the problems of "point contemporaneity" and "sector contemporaneity," respectively. At the site scale, it is possible that an extensive component's remains were actually created by a series of occupations which were each small in area but which moved around within the site at a quick rate relative to the phase's duration. At the regional scale, the settlement pattern archaeologist is confronted with the problem of "overestimated maps" (Ammerman 1981: 77–78): not only might the individual sites' sizes be exaggerated, as just discussed, but furthermore the number of sites occupied simultaneously at any single point in time might be exaggerated when all sites from a phase are lumped together. As discussed by Bandy (2001: 68–70,73–74), the site scale problem is probably relatively minor in the Titicaca region, and the regional scale problem is probably relatively minor for the Formative period and the Tiwanaku period. In contrast, it will be important to remain conscious of the fact that, for post-Tiwanaku phases, a faster rate of site abandonment has likely resulted in overestimated maps.

3.1.2 Pan-Titicaca Scale Population Size

The first demographic question is how total population size changed through time, at various scales. Figure 3.1a presents an estimate at the pan-Titicaca scale. Note that the estimated population sizes are for the combined survey and inter-survey data within this study's database, rather than for the entire population of the Lake Titicaca region. The figure's points (depicted as crosses) were calculated at an arbitrary interval of a century. At the beginning of each century, all of the survey-specific and inter-survey-specific phases with ranges containing that year were selected (in cases where the year was the transition point between two phases, only the later phase was selected). Then, all of the population size estimates for these phases were added together to produce the points. Because many of the surveys lack data before 1300 B.C. and after A.D. 1540, points were not calculated before or after these years to avoid misleadingly low figures. The line is intended as a visual aid rather than a fit to the points in any meaningful sense.

3.1.2.1 Population Size Change

The most fundamental dynamic evident in this plot is that of continual but punctuated increase, with the exception of a major decrease from the Tiwanaku period to the Altiplano period. Nothing in this pattern, however, can be taken at face-value. First of all, any continuously increasing population proxy should be cautiously viewed since taphonomic processes alone create similar patterns (Surovell and Brantingham 2007). Figure 3.1b is an attempt to account for this, using the method described by Surovell et al. (2009). This method uses a general (geographically unspecific) model of taphonomic bias, empirically derived from a global geological radiocarbon dataset, to correct population proxy frequency distributions. As is evident in Figure 3.1b, the continual population increase in the Titicaca dataset remains clear even after this taphonomic correction, although other aspects of the demographic curve are substantially changed. It should be noted that my application of Surovell et al.'s method to this demographic curve is somewhat idiosyncratic, since I am applying the method to a derivative of spatial area (one which, furthermore, is already taphonomically-informed), rather than to radiocarbon date counts or site counts which are closer analogues to the geological dataset used to create the method. However, if this has created a distortion in this case it is likely an exaggeration rather than an underestimation of the effect of taphonomy, and therefore, at least in regards to the question of continual population increase, isn't problematic. The likelihood of having exaggerated the taphonomic effect in this case is due to the fact that large sites substantially contribute to the shape of the demographic curve, and the fact that archaeologists' estimates of these large sites' extents have likely been far less impacted by taphonomy than radiocarbon records have been. Regardless, a useful future research project would be the creation of a taphonomic correction

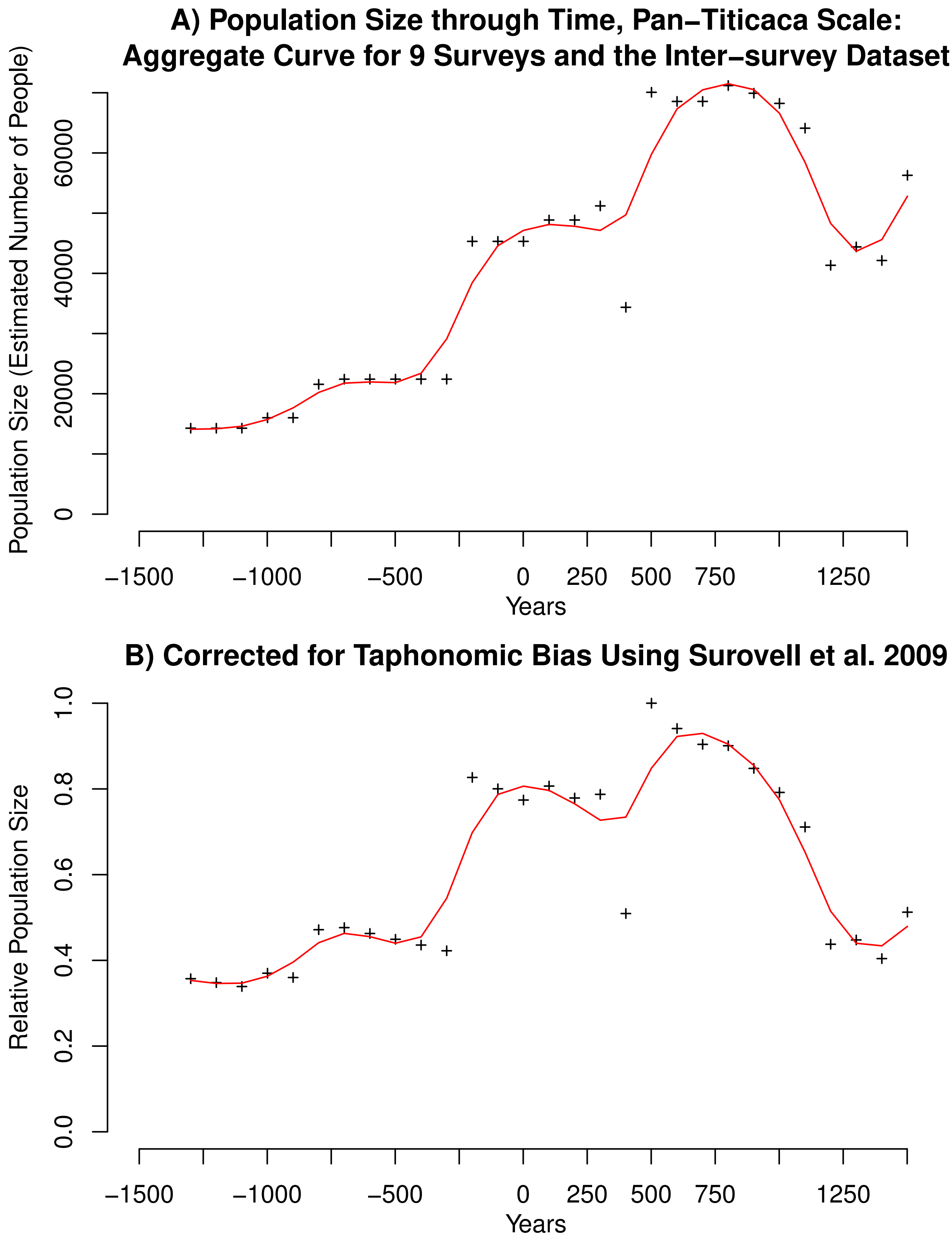


Figure 3.1: Population Size, Pan-Titicaca Scale (See Listing D.21 for R source code)

which is designed specifically for the Titicaca region (see Surovell et al. 2009: 1719–1720,1723) and which addresses how taphonomy differently affects site areas, site counts, and radiocarbon counts.

Thus, the continual and significant population growth evident in Figure 3.1 seems reasonable. In contrast, the punctuated nature of this population increase, visible in the plateaus in both plots, is a methodological artifact. While it is possible that population increase in the Titicaca region took such a form, in this case the pattern is due to the coarseness of the ceramic chronologies underpinning the demographic curve. Likewise, small increases and decreases in Figure 3.1a are primarily due to variations in the chronologies employed by different surveys, and should not be over-interpreted.

Of all aspects of Figure 3.1's demographic curves, the major decrease from the Tiwanaku period to the Altiplano period most demands explanation. It is the most distinct part of the curve, and represents a significant population loss. Scholars have come to dramatically different conclusions regarding the existence of an Altiplano period population collapse to accompany the political collapse of Tiwanaku. Stanish (2003: 12,216) has argued for no population collapse, whereas Bandy (2001: 243–247), using mostly the same data but different population estimation methods, has argued for a severe depopulation. Simplifying the analysis to a single pan-Titicaca scale demographic curve, as in Figure 3.1, lends some weight to the argument for a major population decline. For better or worse analytically, a single site (Tiwanaku) is largely responsible for the difference in population estimates for the Tiwanaku and Altiplano periods, even at the pan-Titicaca scale. If there were a large degree of uncertainty regarding the population size of the site of Tiwanaku, then an argument for an Altiplano period population decline would be more difficult to make, but it is reasonably clear that the site's size and population were quite large (however, see Bandy 2013: 79–81). Thus, it appears that the massive depopulation of the site of Tiwanaku was not compensated for by correspondingly massive increases in the populations of Altiplano period settlements in the rural surroundings of Tiwanaku or in any of the other regions included in this study's database of systematic surveys. This is despite the fact that, as discussed above, a shorter typical site occupation duration in the Altiplano period has likely resulted in a much more "overestimated map" for this phase. It should also be noted, however, that this study's inter-survey database is weaker for post-Tiwanaku phases; a better database would soften but not eliminate the Altiplano period population decline.

The specific level to which the Altiplano period population descended is then of interest. There is a striking correspondence in Figure 3.1a between the Altiplano period population level and the Late Formative population level; there is likewise a very close similarity in Figure 3.1b between the Altiplano period population level and the Middle Formative population level. Regardless of which curve is more accurate (the taphonomically corrected or uncorrected), it is significant that population fell to a level similar to the Middle/Late Formative levels despite the fact that the Altiplano period settlement pattern is profoundly different from the Formative settlement patterns (for example, there is no Altiplano period equivalent of the massive Late Formative site of Pukara, and defensive and pastoral needs are much more prominent location factors for Altiplano sites). The similarity in population levels suggests that people of the Tiwanaku period, and possibly the Late Formative period, created some specific political institutions with subsistence/demographic ramifications which did not survive into the Altiplano period. The Altiplano period population decline therefore illuminates the Tiwanaku period just as much as it does the Altiplano period itself.

To put the Altiplano period population loss in some perspective, it is useful to calculate an annual population loss rate (regarding the method, see the discussion of Table 3.1, below). If the loss is modeled as an exponential decay from A.D. 1000 to 1450, the Altiplano period annual loss rate is .1% for the taphonomically uncorrected data and .14% for the taphonomically corrected data. Compare this to the annual loss rate for an extremely severe population decline at a similar time scale of 400 years: the Native North American population collapse between A.D. 1500–1900, which most likely had an annual loss rate somewhere between .32% and .73% (Thornton 1997: 310,312). While the Titicaca region's Altiplano period population decline was clearly much less severe, the fact that it is even remotely comparable to a population loss driven by disease, genocide, and colonial oppression (Thornton 1997) indicates its gravity.

Figure 3.1 also illustrates a severe population decline at the point calculated for A.D. 400.

This is because the large site of Pukara ceases contributing to the curve at this point. This issue will be discussed below in Section 3.1.3, but for the moment it should be noted that this decline is primarily a methodological artifact rather than a demographic reality. This methodological artifact arises from a ceramic chronology problem and from the incomplete regional coverage of this study's database.

3.1.2.2 Political Implications

This demographic history suggests some key aspects of a political history. First, since it has been established that this demographic history is overwhelmingly characterized by population growth, it is important to ask if this population mainly came from internal growth or if instead migrations from outside the Titicaca region significantly contributed to some periods' growth. The internal or external source of new population can dramatically affect the political response to any stresses arising from the population growth itself or from other forces. For example, a political ideology of first-comer rights (e.g., McGuire and Saitta 1996: 209–212) might help explain some fissioning dynamics in a population with social memory of migration events. To determine if migration likely contributed to a phase's population growth, one can calculate an annual growth rate and compare this to a value expected for internal growth alone (see Bandy 2001: 74–77).

Table 3.1 presents annual growth rates, calculated for both the taphonomically corrected data and the uncorrected data. If .1% is taken as the typical annual growth rate for preindustrial agricultural populations not experiencing immigration or emigration (Bandy 2001: 75–76), then Table 3.1 suggests that most population growth at the pan-Titicaca scale is best explained by internal growth rather than immigration. The one clear exception is the Inca period, which has high growth rates in both the taphonomically uncorrected and corrected data. This probably reflects substantial immigration directed by the Inca state into the Titicaca region. This is also strongly supported by ethnohistoric accounts of *mitimas* (populations relocated by the Inca state for economic and strategic reasons) moved to the Titicaca region (Stanish 2003: 259–261) and by other archaeological lines of evidence, such as

Table 3.1: Annual Population Growth Rates, Pan-Titicaca Scale

Phase	**No Taphonomic Correction**	**Corrected for Taphonomic Bias**
800–200 B.C.	ln(22422/16010)/600*100= **+.06%**	ln(0.4223479/0.3599833)/600*100= **+.03%**
200 B.C.–A.D. 300	ln(48862/22422)/500*100= **+.16%**	ln(0.7788692/0.4223479)/500*100= **+.12%**
A.D. 300–1000	ln(69920/48862)/700*100= **+.05%**	ln(0.8478348/0.7788692)/700*100= **+.01%**
A.D. 1000–1450	ln(44393/69920)/450*100= **-.10%**	ln(0.4476556/0.8478348)/450*100= **-.14%**
A.D. 1450–1530	ln(56287/44393)/80*100= **+.30%**	ln(0.5124367/0.4476556)/80*100= **+.17%**

the abandonment of the major site of Hatuncolla at the end of the Inca period, presumably by Inca period immigrants (Stanish 2003: 242).

In contrast, the other period of elevated growth rates apparent in Table 3.1, 200 B.C. to A.D. 300, has a less clear meaning. For one thing, the growth rates are only modestly above .1%, but even more important is the fact that the site of Pukara probably attracted substantial numbers of immigrants from areas which are within the Titicaca region but which have not been intensively surveyed or are not included in this study's database of surveys. Therefore, although more research is necessary for the period from 200 B.C. to A.D. 300, it appears that population growth internal to the Titicaca region best explains all population growth in the Formative and Tiwanaku periods, but not in the Inca period.

Ironically, the most famous hypothesized immigration into the Titicaca region, an Aymara immigration after or coinciding with Tiwanaku's collapse (see Browman 1994; Stanish 2003: 220–223), would not be apparent in Table 3.1, since the Altiplano period at the pan-Titicaca scale is a period of population decline. This immigration hypothesis is not generally favored by Titicaca archaeologists (e.g., Browman 1994; Stanish 2003: 220–226), and, if anything, Table 3.1 and Figure 3.1 support this skepticism. This is because the population loss is already quite catastrophic, before adding large-scale immigration which *further* population loss would have to balance out. Ultimately, however, other methods are better suited for the question of Aymara origins.

The next question is then how people of the Titicaca region changed their political economies to accommodate this internal population growth. As mentioned above, the specific level to which Altiplano period populations descended suggests particularly major changes to political economies during the Tiwanaku period and possibly the Late Formative period. The clearest candidate for the foundation of these new political economies is large-scale raised field agriculture, but the chronology, productivity, labor demands, and politics of these fields have all been major topics of debate in Titicaca archaeology (e.g., Erickson 1993; Stanish 1994; Janusek and Kolata 2004; Bandy 2005a). Currently available data best support the argument that raised fields were most substantially used during the Tiwanaku period, especially later within the phase (Janusek and Kolata 2004: 409–414,419–421; but see Erickson 1993: 383–389), and were also used to some significant degree during the Late Formative period (Stanish 1994: 321–326; Janusek and Kolata 2004: 422). Regarding productivity and labor demands, it is best to view raised fields as a significant, though not spectacular, improvement to productivity, but at considerable labor expense (Bandy 2005a).

Given these conclusions regarding the chronology, productivity, and labor demands of raised fields, the demographic history apparent in Figure 3.1 and Table 3.1 suggests a certain relationship between demography and politics during the Tiwanaku period and to a lesser extent the Late Formative period. These polities used raised fields to maintain larger populations (Kolata 2003a: 10; also see Bandy 2005a: 286; Erickson 1993: 414), some members of which consumed agricultural surplus produced by other members' intensified labor (Stanish 1994: 315,329; Bandy 2005a: 289–292; Janusek 1999: 124; Erickson 1993: 411–412). The political innovations supporting this arrangement did not survive the collapse of Tiwanaku, and the large, economically diverse population of Tiwanaku declined to Middle or Late Formative levels. Population probably steadily grew during Tiwanaku's long political success, and the population size peak may be reflected in the particularly heavy use of raised fields late in the Tiwanaku period.

While this population peak was high, it was nowhere near some scholars' early estimates for Tiwanaku's actual population size (e.g., Binford and Kolata 1996: 48,50; Kolata 1991: 112) or its carrying capacity population size (e.g., Kolata 1991: 109–112). This is in part because these population estimates relied on overestimates of raised field productivity (see Bandy 2005a). Even if it only depicts a modest post-taphonomic sample, Figure 3.1 nevertheless suggests that the combined population for *all* regions included in this study's intensive surveys database was far less than Kolata and colleagues' early estimates for just the much smaller Tiwanaku core, which ranged from 285,000 to 570,000 people (Binford and Kolata 1996: 48,50; Kolata 1991: 112). Furthermore, the argument that Tiwanaku's population always remained distant from carrying capacity (Kolata 1991: 109–112) is not supported by the demographic history presented in this study. While Tiwanaku period absolute population sizes are striking, population *growth* during the Tiwanaku period, as presented in Table 3.1, was actually much lower than the .1% expected for preindustrial agricultural populations (see above). This indicates that, despite the fact that raised fields permitted otherwise impossible population growth, population growth still strained against the productive potential of the raised field systems. This is precisely what would be expected with a more realistic view of raised field productivity (see Bandy 2005a). However, it should also be remembered that this growth rate has been calculated for the pan-Titicaca scale, and that separating the northern and southern Titicaca regions would probably be better for this particular question.

The key political innovation underlying Tiwanaku's large population may have been the political, economic, and ritual creation and maintenance of an agricultural labor calendar which separated household production from alienated surplus production. Such a calendar would take advantage of the fact that raised field surplus production could be scheduled to not conflict with the seasonal labor schedule of household rain-fed subsistence agriculture (Bandy 2005a: 287–293). Bandy is right to portray this non-conflicting scheduling as an issue of making the system logistically feasible and not blatantly objectionable in the first place. However, I would add that a temporal, spatial, and technological separation between rain-fed production/distribution and raised field production/distribution was probably ideologically useful to elites as well, since, as in the Marxist account of alienated labor, "it obscures the process of how value is created… convenient[ly] for those who might wish to extract value they did not play much of a role in creating" (Graeber 2007: 141).

3.1.3 Survey Scale Population Size

Figure 3.2 presents the same demographic history but at the survey scale. This permits examination of regional deviations from the patterns apparent at the pan-Titicaca scale. Unlike Figure 3.1, points are not calculated for each century; instead, the points' X values are the midpoints of each survey's phases. No correction for taphonomic bias has been applied to these curves. Figure 3.3 presents a normalized version of this graph, in which each survey's Y-axis values are percents of that survey's maximum population size. This makes most surveys' trends clearer, since in Figure 3.2 many lines are densely packed into the bottom portion of the graph due to the middle Tiwanaku Valley's unusually high peak.

Figure 3.4 compares the trends in population estimates to the trends in simple number of occupied hectares, to demonstrate what effects the population estimation method used here has. This shows that while occasionally the population estimate produces a significantly different history (for example, in the Inca to Colonial trend in the middle Tiwanaku Valley), for the most part the patterns are fairly similar.

Figure 3.5 displays the same demographic history as Figure 3.2, but as population densities rather than population sizes. The densities are calculated using the area enclosed by each survey's boundaries. Because some surveys' boundaries enclose more of their region's peripheral, sparsely populated parts than other surveys do, this graph must be used with caution and an eye on population spatial distribution within each survey's boundaries. Nevertheless, Figure 3.5 proves to be a helpful alternative to Figure 3.2 for some analyses.

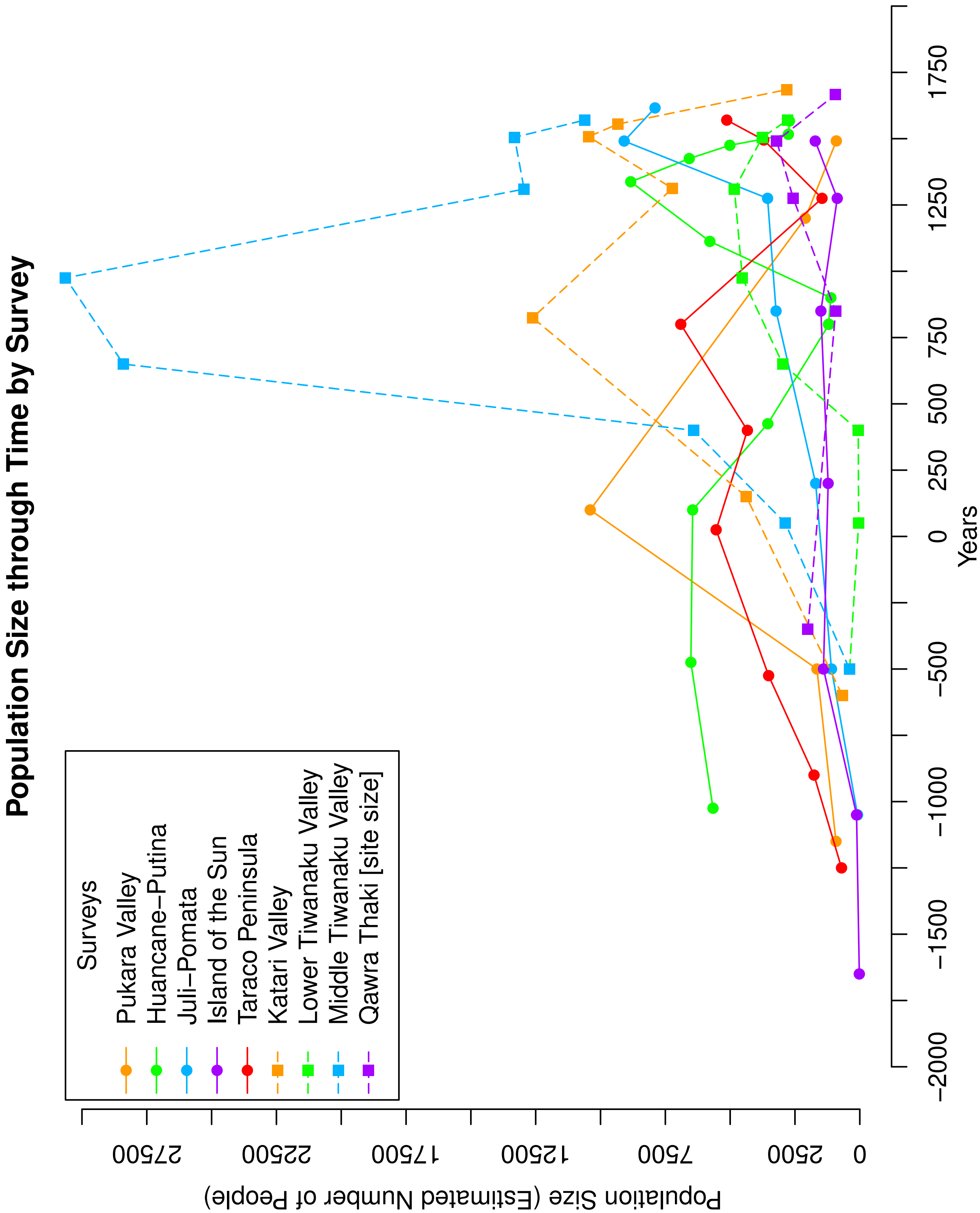


Figure 3.2: Population Size, Survey Scale (See Listing D.22 for R source code)

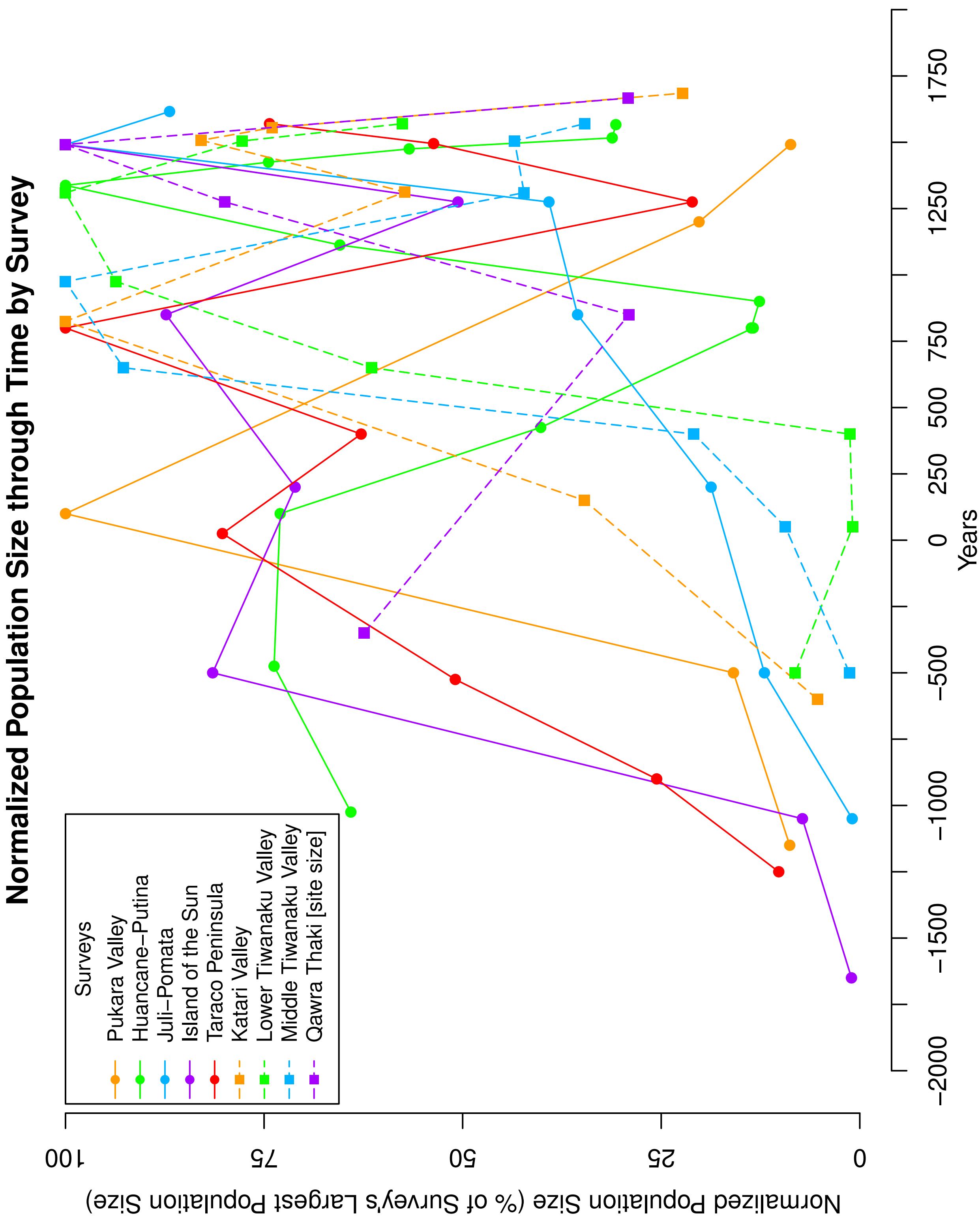


Figure 3.3: Normalized Population Size, Survey Scale (See Listing D.23 for R source code)

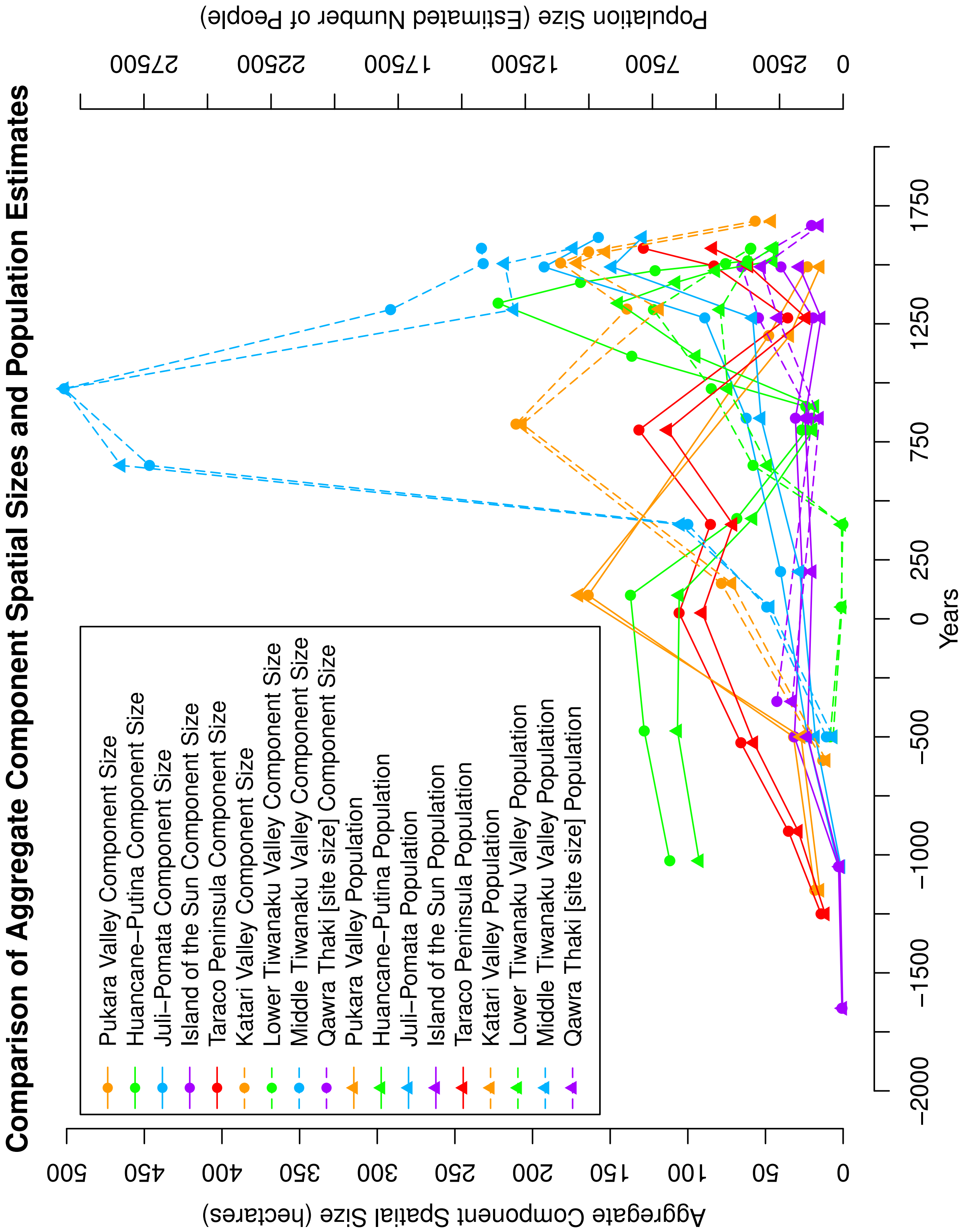


Figure 3.4: Comparison of Component Sizes to Population Estimates (See Listing D.34)

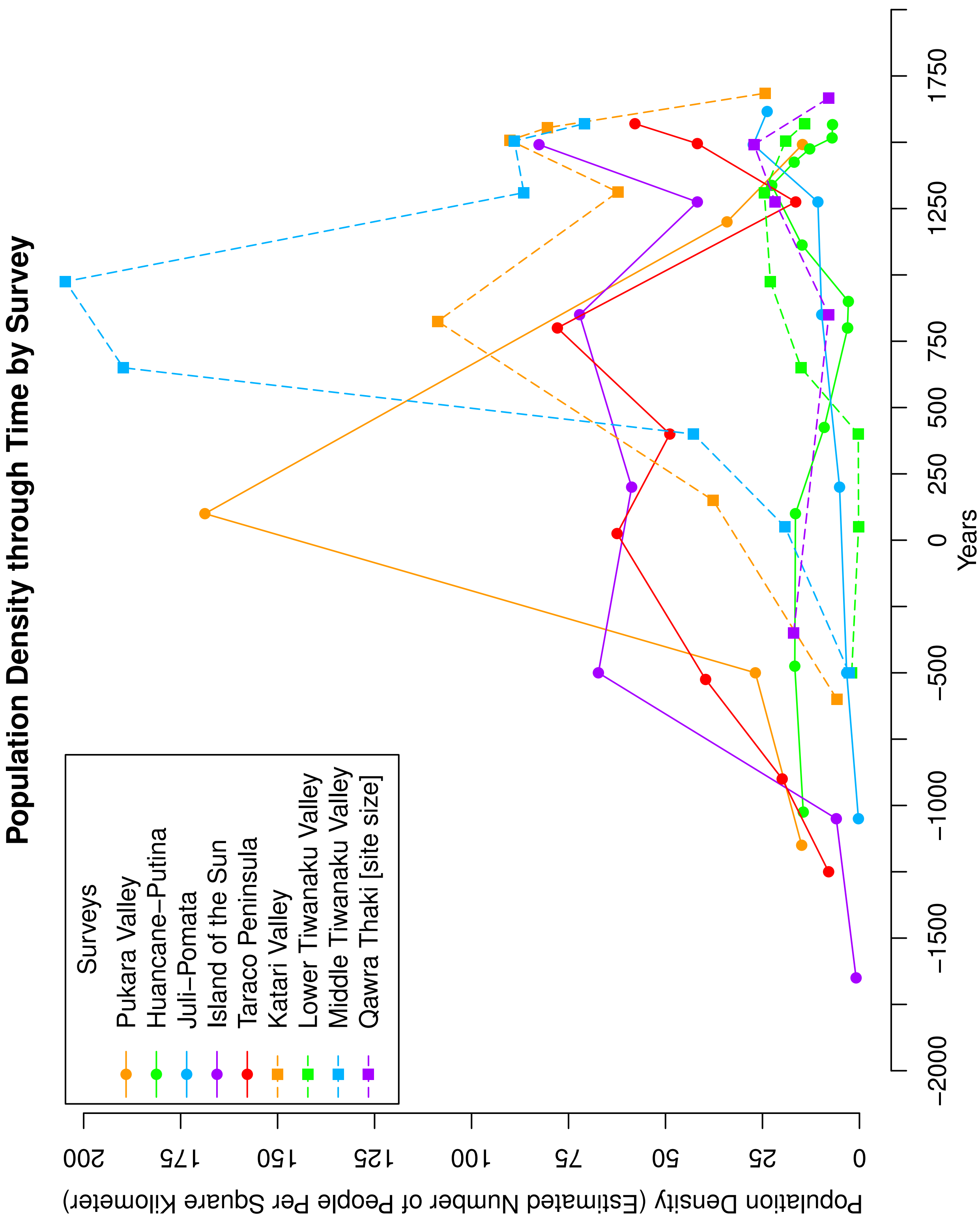


Figure 3.5: Population Density, Survey Scale (See Listing D.24 for R source code)

3.1.3.1 Huancané-Putina

The Huancané-Putina region has a demographic curve that is dramatically different from the pan-Titicaca scale demographic curve in almost every way. This is particularly important since the Huancané-Putina and Arapa-Taraco surveys provide the best current approximation of demographic history for the broader northern Titicaca region.

The Huancané-Putina region's Formative period population was unusually stable, in contrast to the more general pattern of growth. Then, opposite the pan-Titicaca scale trend, population size declined during the late Late Formative (Huaña I) and the Tiwanaku period. However, Figure 3.2 and Figure 3.3 are partially misleading for this time span in the Huancané-Putina region, due to a quirk in this survey's chronology. There are actually two simultaneous "phases," Huaña II and Tiwanaku I, both centered on the year A.D. 800, but this is invisible in the graphs because both "phases" have populations of about 1200. Therefore, Figure 3.2's point at A.D. 800 should actually have a Y value of about 2400, and Figure 3.3 should likewise have its point at A.D. 800 doubled.

Even with the correction at A.D. 800, the population decline in the Huancané-Putina region is still substantial. However, more research will be necessary to confirm or disprove that population declined during the late Late Formative and the Tiwanaku period. In fact, Figure 3.2 and Figure 3.3 would display essentially no population for the late Late Formative and Tiwanaku periods in the Huancané-Putina region, if it were not for very recent advances in the ceramic chronology for the northern Titicaca region (see Stanish et al. 2014: 19,22,32–33). Further advances will likely increase the population figures for this time span, to some unknown degree. Interestingly, the Huancané-Putina region's population figure for the early Altiplano period (Altiplano I) is almost exactly the same as the figures for most of the Formative (Formative I, II, and III). Therefore, it seems most likely that the Huancané-Putina region actually had a very stable population size throughout the time span from the Formative period to the early Altiplano period, and that methodological problems alone account for the late Late Formative and Tiwanaku period decline.

Finally, the Huancané-Putina region shows a profound difference from the pan-Titicaca scale's late demographic history, as it reaches its peak during the Altiplano period (Altiplano II) and then declines. This decline might be partly due to inter-regional migration (Stanish et al. 2014: 278), but it is probable that the decline is primarily a methodological artifact arising from the very short durations of the Altiplano III and Inca I, II, and III periods, each of which is only about 50 years long. If this is correct, then the middle Altiplano to early Colonial population of the Huancané-Putina region may have had a quite stable size.

In sum, the Huancané-Putina region, and any northern Titicaca regions which may have had similar demographic histories, appear to have had very stable population sizes for most of their agricultural-era history. It appears that the neolithic demographic transition (see Bandy 2005b) transpired quickly here, finishing by the end of the first phase used by the Huancané-Putina survey (Formative I), and that population levels remained at roughly the same level thereafter, increasing moderately only in the middle Altiplano period and then remaining roughly stable again. It therefore appears that the village societies of the Huancané-Putina region politically resisted intensified production, in great contrast to the pan-Titicaca scale pattern discussed above. The timing of the middle Altiplano period population increase is then interesting, not because it signals intensification, but because it comes at a time of increased conflict. Arkush (2008: 349–359) has demonstrated that warfare intensified in the northern Titicaca region around A.D. 1275, which is the beginning of the Huancané-Putina survey's Altiplano II phase, the phase of its peak population. While drought is probably the most important factor shaping this increased conflict (Arkush 2008: 359–365), the Huancané-Putina demographic history suggests that population growth may have also been a relevant pressure and/or response (see Arkush 2011: 204–205,211).

The late first millennium A.D. in the Huancané-Putina region is a particularly interesting part of the region's political history, and the recent advances in ceramic chronology discussed above shed considerable light on it. This is because a window has opened on the politics of Tiwanaku-related settlement (Tiwanaku I and II) versus contemporaneous non-Tiwanaku-related settlement (Huaña II). I will initially discuss this time span using the Huancané-Putina survey's chronology: Huaña II and Tiwanaku I both from A.D. 750 to 850, and then Tiwanaku II alone from A.D. 850 to 950 or 1000 (Stanish et al. 2014: 30,268). However, for reasons which will become clear, I ultimately will suggest that Huaña II should be redefined as fully contemporaneous with Tiwanaku I *and* II, and that, relatedly, Tiwanaku's political control of the Huancané-Putina region was always very incomplete.

The contemporaneous Tiwanaku I and Huaña II settlement patterns in the Huancané-Putina region have very similar population sizes (their estimates are 1206 and 1185). This already hints that neither small Tiwanaku enclaves nor massive Tiwanaku hegemony characterizes the Huancané-Putina region during Tiwanaku I and Huaña II. If Tiwanaku I components were primarily in large sites and Huaña II components were primarily in small sites, then a major Tiwanaku political presence would still be likely. However, the actual distribution of Tiwanaku I and Huaña II components is very different from this scenario. The actual distribution is instead one of segregation between Tiwanaku I and Huaña II villages. As has already been noted elsewhere, less than half of the sites with Huaña II components also have Tiwanaku I components (Stanish et al. 2014: 268), despite the fact that Tiwanaku I components are not rare. Even more striking is the population distribution: 76% of the Huaña II population lived in sites without Tiwanaku I components.

One might argue that Tiwanaku simply lacked interest in some parts of the Huancané-Putina region, and this would be to some degree true. But the Huancané-Putina region's settlement pattern suggests in several ways that a better argument is the reverse, that some parts of the Huancané-Putina region seriously lacked interest in Tiwanaku's political and religious ideologies. Tiwanaku ideology was probably unpalatable to many people, particularly far from the capital, because of its relative resistance to adaptation and syncretism. For example, Stanish (2003: 290) has highlighted the inflexibility of Tiwanaku ceramic style and other material canons relative to the Formative's more liberal mixing. Such incompatibility would explain the highly segregated nature of Tiwanaku I and Huaña II settlement in the Huancané-Putina region. The small amount of overlap in this case would have been created mainly by shifting allegiances within the phase. If Tiwanaku simply lacked interest in incorporating some ready-and-willing villages, these villages would have emulated and perhaps adapted Tiwanaku style to some degree. The stark absence of Tiwanaku-like material culture at Huaña II sites therefore indicates an active resistance to Tiwanaku ideology.

The political geography of the Huancané-Putina region also strongly suggests conflict between Tiwanaku ideology and older, more local, or alternative ideologies. The northern part of the Huancané-Putina region has only one site (126) with a Tiwanaku I component (see Stanish et al. 2014: Figure 4.11). This component, in fact, is only .25 hectare in extent and is represented in the survey's surface collection by just a single Tiwanaku I sherd (see Appendix A). In contrast, the northern part of the Huancané-Putina region has two Huaña II components which are each five hectares in extent (at sites 14 and 30), as well as one smaller Huaña II component (at site 157). Critically, both of the five hectare components are located at major landscape choke-points, where the topography permits control of travelers' passage through the area (see Stanish et al. 2014: Figure 4.10; regarding the same issue at these sites in the Formative period see Plourde and Stanish 2006: 250–251). In sum, large villages with effectively zero interest in Tiwanaku ideology inhabited the northern Huancané-Putina region, and these very same villages controlled passage between this part of the Titicaca highlands and the neighboring forested slopes, about 100 km. to the northeast.

Even the Tiwanaku II components are nearly absent from the northern Huancané-Putina region. Site 126, the site mentioned above as having the only Tiwanaku I component in the northern Huancané-Putina region, also has a Tiwanaku II component. Additionally, site 42 in the extreme northeast has a Tiwanaku II component (see Stanish et al. 2014: Figure 4.12). Certainly site 42 is intriguing, given its position far to the northeast and near a chokepoint. However, the total extent of these Tiwanaku II components is one hectare, and they are represented by just six sherds in the survey's surface collections (see Appendix A). When compared to the substantial Huaña II settlement in the northern Huancané-Putina region and to the substantial Tiwanaku II settlement in the central and southern Huancané-Putina region, this northern Tiwanaku II settlement is best interpreted as evidence for the northern Huancané-Putina region's essentially complete lack of interest in Tiwanaku ideology. Following from this, at least in the northern Huancané-Putina region, Huaña II should be considered a dominant tradition parallel to both Tiwanaku I and II, and the chronology of Huaña II should be redefined from A.D. 750–850 to A.D. 750–950/1000. This is highly preferable to a scenario in which sites 14 and 30, strategically located and large during the

A.D. 750–850 period, were abandoned during the A.D. 850–950/1000 period.

This interpretation of the A.D. 850–950/1000 period in the Huancané-Putina region contrasts with the argument made in the major publication on the Huancané-Putina survey. For this period, this publication suggests "geopolitical control by groups incorporated into the Tiwanaku orbit... with Tiwanaku-affiliated sites along the entire roadway and with access to the eastern slopes" (Stanish et al. 2014: 268) and "significant suppression of Huaña traditions" (Chávez Justo 2014: 30) (but also see an argument intermediate between this and my argument in Stanish 2009). It is indeed true that the central and southern Huancané-Putina region had substantial Tiwanaku II settlement (see Stanish et al. 2014: Figure 4.12). However, the northern Huancané-Putina region as interpreted above casts a very different light on the central and southern Huancané-Putina region. It suggests that villages of both the northern Huancané-Putina region and the central/southern Huancané-Putina region were deeply interested in exotic goods and ideologies, but ultimately chose different sources: the neighboring forested slopes and Tiwanaku, respectively. In other words, the presence of Tiwanaku style material culture in the central/southern Huancané-Putina region tells us more about the central/southern Huancané-Putina region itself than it does about Tiwanaku.

The neighboring forested slopes, about 100 km. to the northeast, were already a well-established source by this time period in the Huancané-Putina region, having been important in the Formative period (Plourde and Stanish 2006: 250–251), whereas Tiwanaku was a new alternative. In this region distant from the Tiwanaku capital, it is critical to emphasize local desires more than Tiwanaku's strategic desires. The northern Huancané-Putina region had exercised control of passage to and from the neighboring forested slopes for a long time before Tiwanaku ideology arrived, and therefore two apparent outcomes are both unsurprising: the northern Huancané-Putina region resisted Tiwanaku ideology, whereas the central/southern Huancané-Putina region embraced it. In contrast to Stanish et al.'s (2014) argument for Tiwanaku control of the passage to the neighboring forested slopes, control of this passage encouraged rejection of Tiwanaku by northern villages, who maintained a vibrant Huaña culture. Following from this, then, the Tiwanaku presence in the central and southern Huancané-Putina region reflects local interest in Tiwanaku more than it reflects Tiwanaku's deep strategic interest in the route to the forested slopes or other resources to be obtained in the Huancané-Putina region. Villages of the central/southern Huancané-Putina region found Tiwanaku's ideology and a relationship of some kind with Tiwanaku to be an attractive alternative to the goods and ideas which had to pass through the northern Huancané-Putina region's tight control.

While Tiwanaku wielded some coercive power, possibly even in some fairly distant regions like the Moquegua Valley (e.g., Stanish 2003: 290–291; but see Goldstein 2005: 1,164; Bandy 2005a: 291), the Huancané-Putina region is reasonably distant from the Tiwanaku core and probably did not have incentives comparable to, say, the Moquegua Valley. Furthermore, as discussed above, the demographic history of the Huancané-Putina region suggests that it had little previous experience even with more local forms of staple finance, and this may have hindered the portability of Tiwanaku ideology and politics to this region (for a related argument, see Bandy 2005a: 291). Ultimately, this was apparently overcome in the central/southern Huancané-Putina region but not the north.

This argument for regionally incomplete Tiwanaku control at best, and better yet a more locally-driven patchwork affiliation with Tiwanaku, is also supported by an aspect of the Huancané-Putina region's demographic history which is otherwise difficult to explain. This aspect is the fact that the population size for Tiwanaku II settlement is estimated at 1116 (see Figure 3.2), whereas Huaña II and Tiwanaku I settlements have population estimates of about 1200 each (2400 total). In other words, if Tiwanaku II settlement is the complete settlement pattern for the period from A.D. 850 to 950/1000, as suggested by Stanish et al. (2014), then the population was less than half the size of that for the period from A.D. 750 to 850. This would be a truly extreme population decline in a short period of time. Also recall that our ability to identify Huaña settlements is very recent, as discussed above, such that if anything their frequency is presently underestimated. More Huaña II settlements will likely be identified in the Huancané-Putina region, and if they are attributed to only the period from A.D. 750 to 850, then the decline to Tiwanaku II's population estimate of 1116 would be even more extreme. Much more plausible, therefore, is the scenario, outlined above, that Huaña II is the material manifestation of political groups that remained substantial and powerful during the A.D. 850 to 950/1000 period.

Locally-driven Tiwanaku affiliation also better explains post-Tiwanaku ceramic developments in the Huancané-Putina region. Chávez Justo (2014: 29–33) argues that Altiplano I ceramics developed out of Huaña ceramics, though with some Tiwanaku influence on ceramic forms. Since Tiwanaku style ceramics in the Huancané-Putina region were primarily produced locally (Chávez Justo 2014: 33), it is not as if the supply of an exotic good dried up for external reasons; demand instead appears to have dried up. Whatever changes might have occurred in the Huancané-Putina region's relationship with the Tiwanaku polity, they were not followed by much effort to create material culture that was even somewhat recognizably Tiwanaku. It is important to keep in mind that even in the Tiwanaku capital, elite control of craft production was mostly moderate (Janusek 1999). There is no reason to believe, therefore, that Altiplano I ceramics would not have been more Tiwanaku-like, had that been the desire of people within the Huancané-Putina region. The best explanation for the modest Tiwanaku influence on Altiplano I ceramics is therefore that it represents a rejection of Tiwanaku ideology in favor of a vibrant Huaña culture that had never even come close to disappearing from the Huancané-Putina region.

Finally, the far southern Huancané-Putina region has an interesting history which further supports the argument that Tiwanaku and Huaña were competing, incompatible ideologies. The (present-day) immediate lakeshore area has a number of Tiwanaku sites (219, 246, 247, 248, 251, 255, 261, 280), and it has a single Huaña II site (281) (see Stanish et al. 2014: Figures 4.10–4.12). Of all of these sites, there are three with Huaña II or Tiwanaku component sizes greater than one hectare: sites 219 (two hectares, Tiwanaku II), 280 (four hectares, Tiwanaku I and II), and 281 (four hectares, Huaña II). All of these three sites had long histories as major sites, each having had even larger component sizes from Formative I through Huaña I, the one exception being that 281 lacks a Huaña I component. The segregation of Tiwanaku and Huaña II populations into two equivalently large sites (280 and 281) is already interesting, but it is particularly interesting when the previous history of the lakeshore sites is considered. *All* of the Huaña I lakeshore villages (219, 246, 248, 280) were later associated with Tiwanaku, as is the pattern for the central and southern Huancané-Putina region. The sole Huaña II site, conversely, reoccupied a location which had been a major Formative site (indicating its general desirability for major settlement) but which had then been abandoned during the Huaña I phase. This appears to be a very important case where most of the region's population chose to affiliate with Tiwanaku ideology but a dissenting group left the newly Tiwanaku-affiliated villages to create a new village nearby at an abandoned major site. Confirmation of this history would require at least an intensive surface survey at site 281 targeting Huaña and Tiwanaku ceramics, however. Among other things, such a confirmation would strongly demonstrate that Tiwanaku ideology was not forced upon the villagers of the Huancané-Putina region, since the apparent splinter site (281) is surrounded by many Tiwanaku-affiliated sites and is just two and a half kilometers from the large site 280.

3.1.3.2 Pukara Valley

Compared to the pan-Titicaca scale, the Pukara Valley had a fairly similar but accelerated demographic history. Thanks almost entirely to the site of Pukara itself, the region had a dramatic annual growth rate from 200 B.C. to A.D. 400 of ln(10396/1653) / 600 * 100 = +.31%. Given the expected growth rate of .1% (see above), this strongly suggests immigration from outside the Pukara Valley. This rate is essentially the same as that for the pan-Titicaca scale during the Inca period, a period of known (though very different) immigration (see above). Considering the difference in time spans between the Inca and Pukara periods (less than a century versus a half millennium), this is quite striking: either Pukara sustained high growth rates for a very long time or it had a history of punctuated growth with some truly dramatic increases. In fact, it might be better to calculate the growth rate using a shorter time span of 200 B.C. to A.D. 200 (see Levine 2012: Figure 3.4), which results in a growth rate of ln(10396/1653) / 400 * 100 = +.46%. Furthermore, while this study uses the Pukara Valley survey's figure of 150 hectares for Late Formative Pukara (Cohen 2010: 413), it probably would be better to use a figure closer to 220 hectares (see Klarich and Román Bustinza 2012: 117–118).

The Pukara Valley's population size in the mid to late first millennium A.D. is unknown, because the Pukara Valley survey was conducted before Huaña ceramics had been well defined (see above, regarding the Huancané-Putina survey, but also see Cohen (2010: Figure 3.9)). Further survey targeted at this phase would provide a very interesting perspective on the Pukara polity's collapse. However, what can already be said is that the Altiplano and Inca period population sizes were very similar to the pre-Pukara population sizes. In other words, if there was a delay between Pukara political collapse and Pukara Valley demographic collapse, it was at least not a very long delay. Given that much of Pukara's growth appears to be due to immigration from outside the Pukara Valley, it seems likely that much of the post-Pukara demographic collapse was in the form of emigration back to the same regions.

3.1.3.3 Juli-Pomata

The population size graph presented here for the Juli-Pomata region is essentially identical to that presented in the major publication on this survey, despite difference in population estimation methods (Stanish et al. 1997: 59–60,68). In other words, as already discussed in that previous publication, the demographic signal remains clear even as a range of reasonable corrections is applied to the data.

As Stanish et al. (1997: 58) pointed out, a particularly notable aspect of the Juli-Pomata region's demographic history is that immigration-driven population growth during the Inca period was very high: "Extrapolating from the previous population growth rates, there was about twice the population during the Late Horizon than expected." In fact, this description is too conservative, and the Juli-Pomata region's Inca period growth represents one of the most dramatic demographic events in the Titicaca region's history. The Inca period annual growth rate as calculated with this study's methods is $\ln(9088/3556) / 82 * 100 = +1.14\%$, compared to the Juli-Pomata region's Altiplano period growth rate of $\ln(3556/3229) / 350 * 100 = +.03\%$. This 1.14% growth rate is nearly four times higher than the pan-Titicaca scale's Inca period growth rate. In part this may be because the Juli-Pomata region had a relatively low population density which the Inca "filled in" to a moderate degree (see Figure 3.5, but also note that the Juli-Pomata survey boundaries enclosed an unusually large area of peripheral, sparsely-populated zones, in addition to its more densely populated near-lake zone). Regardless, the Juli-Pomata region must have had especially high political and economic importance to the Inca state in order to witness such dramatic growth.

3.1.3.4 Island of the Sun

The Island of the Sun had a unique demographic history, partially because an island is inherently different from, say, a valley, and partially because the Island of the Sun was a place of exceptional cultural and political importance (Bauer and Stanish 2001: 1–22,48–51,149–154). First of all, as is apparent in Figure 3.5, the Island of the Sun had population densities exceeded only by densities influenced by a large urban component (variously at the sites of Tiwanaku, Pukara, and Lukurmata). The only non-urbanized region in this study's database with population densities comparable to the Island of the Sun's is the historically important Taraco Peninsula. Granted, the Island of the Sun's high density in part reflects the simple fact that it is a moderately sized island rather than a full region, but it also reflects a long history of unique importance.

This importance is also apparent in the fact that the Island of the Sun reached a near-maximum population size earlier than any other region in this study's database, as is most visible in Figure 3.3. No later than 200 B.C., the Island of the Sun already had a population size which was 82% the size of its Inca-period maximum. Islands in general might be expected to fill up more quickly given their boundedness, but this does not adequately explain the Island of the Sun's early fluorescence. It is important to keep in mind that the Inca period maximum population of the Island of the Sun included a large number of religious specialists (Bauer and Stanish 2001: 55–56,161,236–240). While agriculture on the Island of the Sun itself was unusually productive and its produce was even ideologically important (Bauer and Stanish 2001: 72–75,161–163), it is possible that this specialist population was provisioned to a significant degree using surplus from outside the Island of the Sun (but see Stanish and Bauer 2004c: 39–40). In fact, the early 17th century chronicler Ramos Gavilán wrote that on the mainland near the Island of the Sun there were "… *colcas* [storehouses], where all the food was collected, as much for the sustenance of the soldiers as for the ministers of the temples and for the pilgrims that attended them" (Ramos Gavilán quoted in Bauer and Stanish 2001: 215–216,275). While it is possible that these "ministers" were of temples on the mainland rather than the island, it seems more likely to have been both. Furthermore, the Inca-period material record must have been amplified by the large number of non-resident pilgrims, at least some of whom stayed in *tambos* (inns) on the island itself (Bauer and Stanish 2001: 222). And finally, the Inca period record has been subjected to taphonomic processes for a much shorter time span than the Formative record has been. Given all these facts, it is very striking that by 200 B.C. the Island of the Sun had a population size so close to that of the Inca period.

The Island of the Sun's growth rate from 800 to 200 B.C. was ln(1399/124) / 600 * 100 = +.40%. It is probable that this figure is exaggerated by difficulty identifying sites from the previous phase, but the figure is high enough to nevertheless suggest substantial immigration to the island during the 800 to 200 B.C. period. Recall that the Pukara Valley had a similar growth rate during the massive site of Pukara's period of major population growth.

Even in terms of absolute population sizes, the Island of the Sun is remarkable. As visible in Figure 3.2, among the surveys included in this study's database, only the Taraco Peninsula and the Huancané-Putina region have appreciably larger absolute population sizes than the Island of the Sun during the period leading up to 200 B.C., despite the fact that the Island of the Sun is much smaller than these regions. Regarding this and the related points made above, it should be noted that the manner of reporting component sizes for the Island of the Sun (see Stanish and Bauer 2004c: Table 2.1) may have exaggerated the Middle Formative component sizes relative to some other surveys in this study's database. Nevertheless, the early fluorescence of the Island of the Sun by 200 B.C. seems significant.

Bauer and Stanish have dedicated substantial research effort to determining the chronology of the Island of the Sun's ritual importance. They argue that, aside from being one of the few most important ritual places within the Inca empire (Bauer and Stanish 2001: 1–22,48–51), the Island of the Sun was a major pilgrimage center during the Tiwanaku period (Bauer and Stanish 2001: 149–154,242–243). In turn, they argue that the section of the Island of the Sun which later became the ritual center was a local (Island-scale only) place of special ritual importance during the Late Formative (200 B.C. to A.D. 600) (Bauer and Stanish 2001: 146–154,242–243). For the Middle Formative period (800 B.C. to 200 B.C.), they argue that there is no evidence of any precursor to the ritual center (Bauer and Stanish 2001: 143–146). However, given the comparisons to other parts of the Titicaca region discussed above, their interpretation of the Middle and Late Formative may be a bit too conservative. While obviously the above inter-regional comparisons do not trump Bauer and Stanish's excavation- and settlement pattern-based interpretations, these comparisons do suggest that the Island of the Sun was a regionally unique place even during the Middle Formative. While it might be tempting to attribute this solely to uniquely high agricultural productivity (see Bauer and Stanish 2001: 72–73), this agricultural productivity can't be totally separated from ideological importance. During the Inca period on the Island of the Sun itself, agricultural production had profound ideological dimensions (Bauer and Stanish 2001: 73–75). Moreover, during the Middle Formative period in the Titicaca region more generally, the theme of agricultural productivity seems to have been ideologically key (Hastorf 2003: 325). So, the possibility that the Island of the Sun was ritually significant beyond its own shores during the Middle and Late Formative should not yet be discounted.

3.1.3.5 Southern Contiguous Surveys

The Taraco Peninsula, Katari Valley, lower Tiwanaku Valley, and middle Tiwanaku Valley surveys together cover a large contiguous area with a demographic history which is fairly similar to the pan-Titicaca scale's demographic history. This is not surprising since this combined region makes an enormous contribution to the pan-Titicaca scale's demographic history. Nevertheless, there is some important regional variability.

First of all, however, a major methodological issue must be raised. The middle and lower Tiwanaku Valley surveys (but not the Katari or Taraco surveys) were conducted using a ceramic chronology which was clearly inadequate for the Late Formative (Bandy 2001: 45–46,163–165). This is particularly obvious for the immediately pre-Tiwanaku time span from about A.D. 300 to 500 (Late Formative 2), for which the middle and lower Tiwanaku Valley surveys identified almost literally no settlement. Luckily, Carlos Lémuz Aguirre and Matthew Bandy have completed an important re-study of the Tiwanaku Valley using an improved Formative ceramic chronology (Bandy 2013: 83). Incorporation of this new data into this study's database is a key future priority. Of most immediate concern, however, are the restudy's figures for the total number of hectares occupied during the Formative and Tiwanaku phases (see Bandy 2013: 84). A comparison of this study's figures (derived from the original survey data) and the restudy's figures is presented in Table 3.2.

Note that not all of the differences evident in Table 3.2 are due to Lémuz Aguirre and Bandy's use of an improved ceramic chronology. This study's figures are also different in some cases because this study's component size data for the middle Tiwanaku Valley are less precise than Lémuz Aguirre and Bandy's component size data. This is because the original middle Tiwanaku Valley survey reported component sizes as ranges (for example, one to three hectares) rather than as specific sizes. I was often able to narrow these ranges for individual components by using site size data and other information, but nevertheless this study's data are not as precise as Lémuz Aguirre and Bandy's restudy data.

Also note that while this study has followed the original middle and lower Tiwanaku Valley surveys in using separate Tiwanaku IV and Tiwanaku V periods for the Tiwanaku Valley, in the future it would be better to merge these data into a single Tiwanaku IV/V phase. The original surveys' distinction between Tiwanaku IV and Tiwanaku V settlement is based on an inaccurate ceramic chronology (Janusek 2003b: 55–56,81–82; Bandy 2001: 45,207–210).

Despite these concerns, some important conclusions can be made from Table 3.2. Most fundamentally, while the scarcity of Formative settlement in the Tiwanaku Valley (outside the site of Tiwanaku itself) formerly appeared to be a problem of ceramic chronology, this scarcity is now best viewed as a historical reality (Bandy 2013: 83–87). While Lémuz Aguirre and Bandy's restudy has increased the clearly incorrect Late Formative 2 figures, they remain surprisingly small. The Middle Formative and Late Formative 1 figures also remain small, and not meaningfully different from this study's figures. The new Tiwanaku period figures for the

Table 3.2: Comparison of Figures for the Tiwanaku Valley's Total Hectares of Occupation: This Study Versus Restudy by Lémuz Aguirre and Bandy

Phase	**Region**	**Hectares, This Study**	**Hectares, Bandy 2013: 84**
Middle Formative	Middle Tiwanaku Valley (without site of Tiwanaku)	10.8	10.9
	Site of Tiwanaku	0.0	0.0
	Lower Tiwanaku Valley	8.4	5.4
Late Formative 1	Middle Tiwanaku Valley (without site of Tiwanaku)	12.2	8.1
	Site of Tiwanaku	37.0	37.0
	Lower Tiwanaku Valley	1.2	2.7
Late Formative 2	Middle Tiwanaku Valley (without site of Tiwanaku)	0.0	10.2
	Site of Tiwanaku	100.0	100.0
	Lower Tiwanaku Valley	0.1	3.3
Tiwanaku Period	Middle Tiwanaku Valley (without site of Tiwanaku)	46.7 (Tiwa IV) 101.6 (Tiwa V)	about 65
	Site of Tiwanaku	400.0	385.0
	Lower Tiwanaku Valley	58.0 (Tiwa IV) 84.9 (Tiwa V)	43.7

middle Tiwanaku Valley (excluding the site of Tiwanaku) and the lower Tiwanaku Valley are significantly smaller than this study's Tiwanaku V figures, and this recasts the relationship between urban and rural Tiwanaku Valley settlement (see Bandy 2013). However, in terms of the *total* occupation and population size of the Tiwanaku Valley during the Tiwanaku period, this difference in rural population size is mostly washed out by the large size of the site of Tiwanaku. In sum, while Lémuz Aguirre and Bandy's restudy has made a critical contribution to understanding the relationship between urban and rural settlement in the Tiwanaku Valley, it has only fairly minor effects on the demographic history presented in Figures 3.1, 3.2, 3.3, and 3.5.

Returning to these graphs, then, most of the four surveys' demographic histories are quite similar to the pan-Titicaca scale demographic history. There are two important exceptions. First is the fact that the Taraco Peninsula had a population decline during the Late Formative 2. Bandy (2001: 196–198) has persuasively argued that a significant portion of the Taraco Peninsula's population emigrated to the site of Tiwanaku during the Late Formative 2, and that this emigrant population formed a large portion of the site of Tiwanaku's Late Formative 2 population (also see Bandy 2007: 142). Relatedly, this also helps explain how an urban site grew at Tiwanaku during the Late Formative even as its immediate rural surroundings in the Tiwanaku Valley were very sparsely populated (Bandy 2013: 84–86).

Second, the lower Tiwanaku Valley contrasts with the other three surveys with its lack of a post-Tiwanaku demographic collapse. In this respect, the lower Tiwanaku Valley is more similar to the Juli-Pomata and Huancané-Putina regions, a surprising condition considering its proximity to the site of Tiwanaku. This is much less surprising, however, when the lower Tiwanaku Valley's Tiwanaku period population size, density, and distribution are considered. Its Tiwanaku period population size and density are by far the lowest of the four contiguous surveys. Its largest site during the Tiwanaku period is only seven hectares; compare this to the urbanized middle Tiwanaku Valley and Katari Valley, and the Taraco Peninsula which had six sites with sizes from seven to 14 hectares (see Appendix A). So, the lower Tiwanaku Valley's Altiplano period population size was not affected negatively by decentralization, but probably instead positively as some populations from larger sites in the other three, more densely populated survey areas moved to the lower Tiwanaku Valley.

There is a problem with the Katari Valley graphs which should be mentioned: the Inca period (A.D. 1475–1540) and Late Pacajes period (A.D. 1540–1570) populations are higher than they should be. The Katari Valley sources used in constructing this study's database lack component size data for these two periods, as well as for the subsequent Colonial period. Rather than using arbitrary but more realistic figures in the database, I chose to set the component sizes for these periods to ranges expressing the full possible range given the available data. Because the graphs in this study use the midpoint of ranges when absolute component sizes are not available, this has led to some clearly incorrect component sizes for these periods in the Katari Valley. This problem is especially severe for the site of Lukurmata, which is treated in these graphs as having a 60 hectare component for the Inca period and Late Pacajes period, a considerable problem considering the site probably had about 100 people occupying it during these time periods (see Bermann 1994: 242). This will be easy to correct in the future with more precise data obtained from the surveyors (also see Bandy and Janusek 2005: 280), but for the moment it can simply be noted that the population estimate for the Inca period should be reduced from 10500 to 7900, and the population estimate for the Late Pacajes period should be reduced from 9300 to 5200 (Bandy and Janusek 2005: 282,284).

3.1.3.6 Qawra Thaki Survey Area

There are several unusual features of the Qawra Thaki survey which must be mentioned before its demographic data can be examined. First, the shape of the survey is atypically long and thin, because the survey's research questions required the survey of an area which had been hypothesized to be a trade route between the Tiwanaku Valley and the Moquegua Valley (Stanish et al. 2010: 528–529). If the region's population was concentrated close to this optimal path, then the demographic data would be exaggerated in comparison to the other surveys within this study's database. Second, the Qawra Thaki survey's chronology employed one Formative phase (1300 B.C. to A.D. 600), in contrast to the other surveys' subdivisions of the Formative phase. This has probably led to the Qawra Thaki survey's Formative population figures being somewhat exaggerated relative to its own other phases and to the Formative population figures of other surveys. Finally, at present, only site size rather than component size data is available for the Qawra Thaki survey. In this study's analyses, Qawra Thaki components for each phase are simply assigned the site size as if it were a component size.

The sharp decrease in population size from the Formative period to the Tiwanaku period in the Qawra Thaki demographic data is probably a methodological artifact. It arises from the long length of the Formative period used in the Qawra Thaki survey's chronology and from lack of knowledge about local Tiwanaku-era ceramics. In reality the Qawra Thaki survey's region appears to have had population growth during each phase, with the possible exception of the Colonial period.

The Qawra Thaki population densities are probably exaggerated by the atypical shape of the survey, but nevertheless it is quite notable that the population densities are close to those of several other regions, especially during the Altiplano and Inca periods. Even if the Qawra Thaki figures are exaggerated, they are surprisingly high given the rather extreme environment of the Qawra Thaki survey's region, a cold and dry area between 4000 and 5000 masl. This supports the argument that the Qawra Thaki survey's region was an important passage between the Titicaca region and the western Andes (see Stanish et al. 2010), apparently for the entire sequence from the Formative period to the Inca period.

3.1.4 Population Nucleation and Dispersal

Having examined the above aggregate demographic measures, a next step is to see how these populations were distributed among sites. This section will examine two simple measures of population nucleation and dispersal. First of all, Figure 3.6 presents the number of sites within each survey area, through time. Figure 3.7 presents a normalized version of Figure 3.6, in which the number of sites for each phase of each survey is depicted relative to that survey's highest number of sites. Figure 3.8 presents a taphonomically corrected version of Figure 3.6, made using the method described by Surovell et al. (2009) (regarding this method, see above discussion of Figure 3.1b).

Second, this section will examine how much of a survey area's population inhabited the largest site within the survey area, through time. Figure 3.9 presents the fraction of the population in the largest site for each phase of each survey. Figure 3.10 presents a normalized version, in which the fraction of population in the largest site is depicted relative to each survey's maximum fraction.

Figures 3.11 and 3.12 compare trends in these two new variables to the previously discussed survey-scale trends in normalized population size.

The most important transition in the data on number of sites is from the Tiwanaku period to the Altiplano period. Noting the increase in site numbers during this transition is nothing new: as Bandy (2001: 239) has stated, "All settlement archaeologists working in the Titicaca Basin recognize the general shift from nucleated to dispersed habitation at the end of the Middle Horizon [Tiwanaku period]. This fact is entirely beyond controversy. It is one of the defining features of the Early Pacajes [Altiplano] phase... ." The fresher perspective which Figure 3.6 brings is that there are significant inter-regional differences in the magnitude of this change. Different surveys use different methods when splitting/lumping sites, and of course the survey areas are of different sizes, so inter-regional comparisons of numbers of sites should be made with some caution. Nevertheless, there are some striking inter-regional differences evident in Figure 3.6. The Tiwanaku Valley (both middle and lower) and the Huancané-Putina region have enormous numbers of sites during the Altiplano period, both relative to other surveys' Altiplano period site counts and relative to their own regions' earlier site counts. As evident in Figure 3.8, the intra-regional diachronic differences remain, in attenuated but still stark form, even after correction for taphonomic bias.

Some of the Altiplano period increase in numbers of sites is probably due to decreased duration of site occupation (see Bandy 2001: 69,73–74). But the major inter-regional differences suggest that decreased duration of site use is not even the primary, let alone sole, cause of higher site numbers, at least for the Tiwanaku Valley and the Huancané-Putina

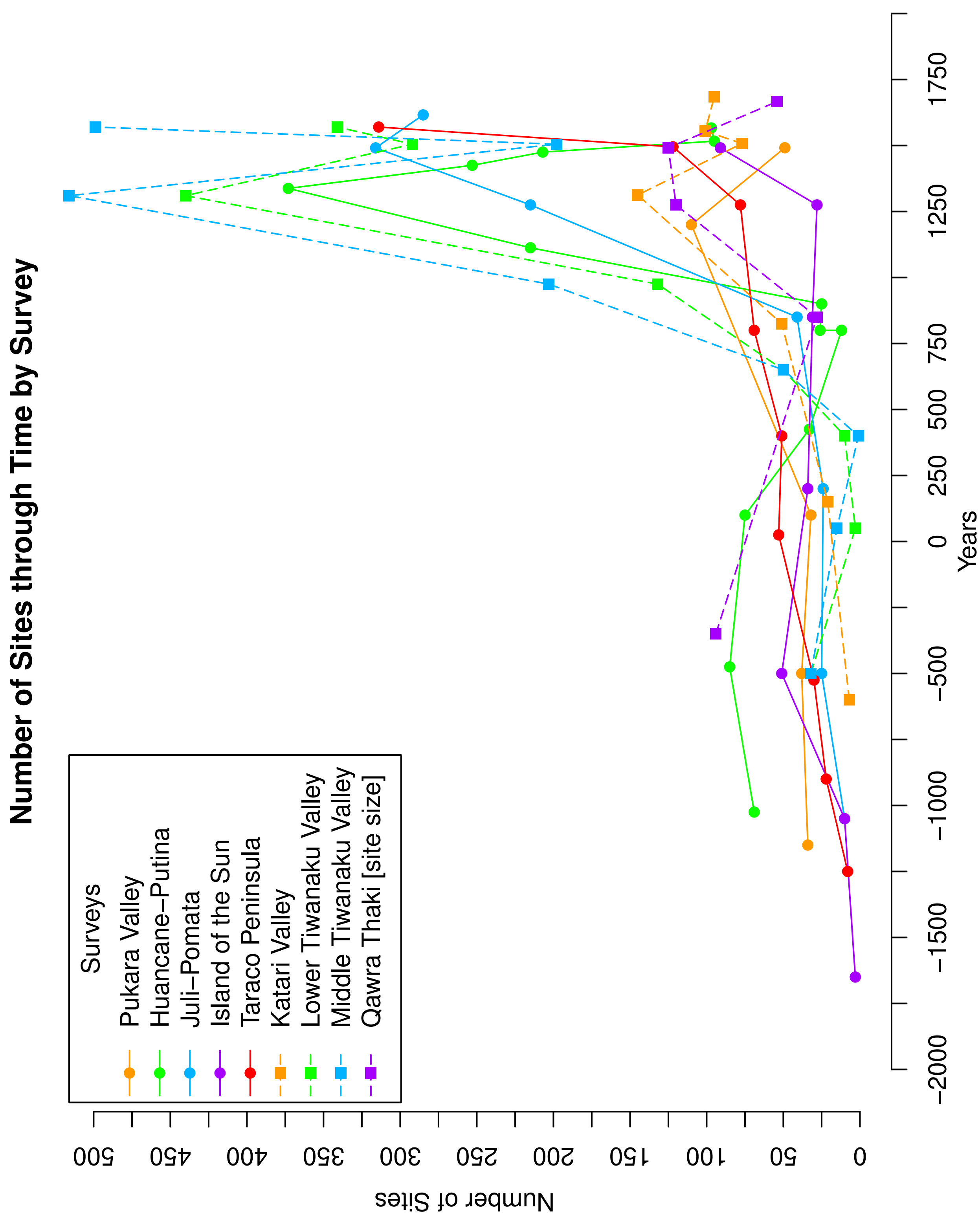


Figure 3.6: Number of Sites, Survey Scale (See Listing D.18 for R source code)

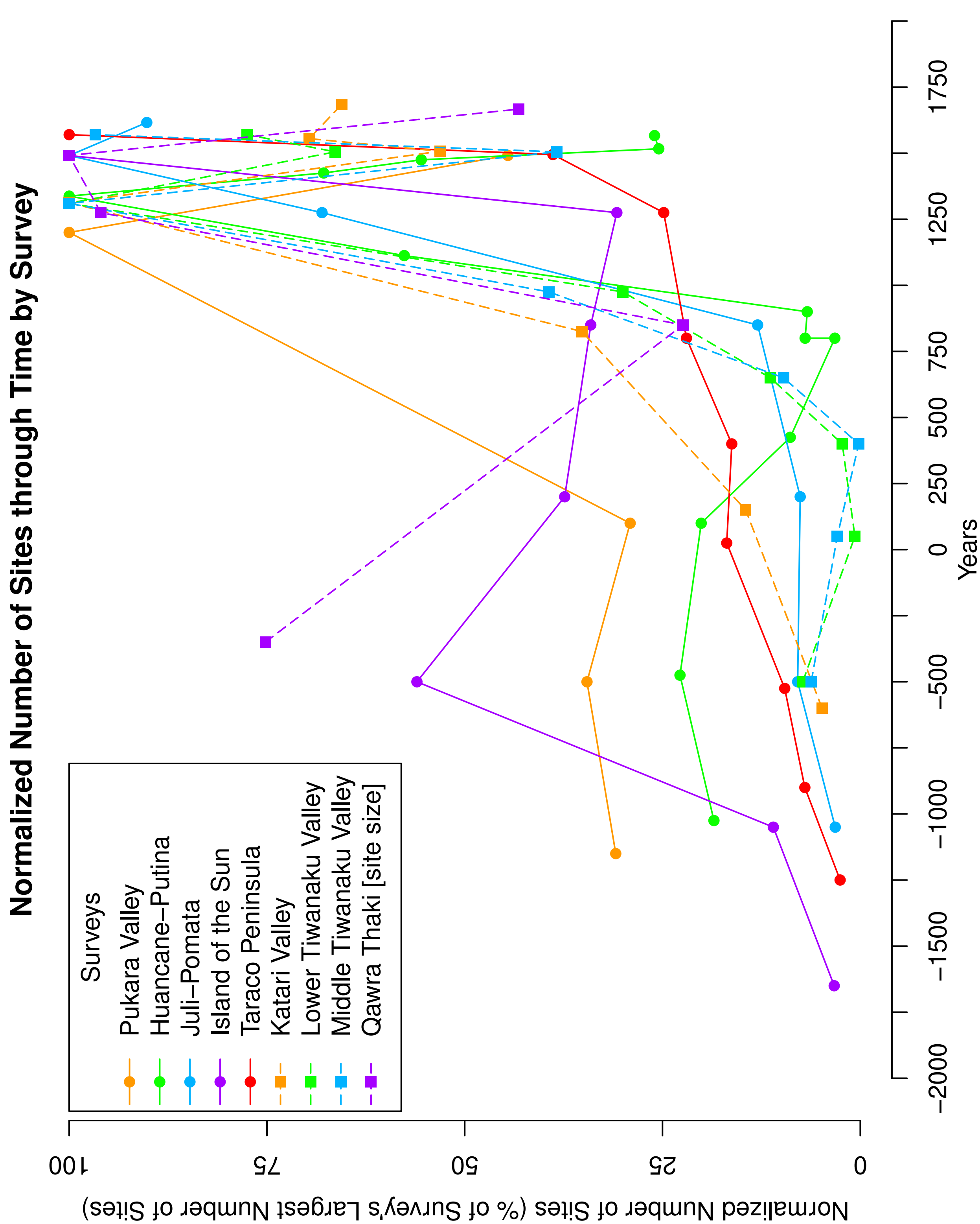


Figure 3.7: Normalized Number of Sites, Survey Scale (See Listing D.19 for R source code)

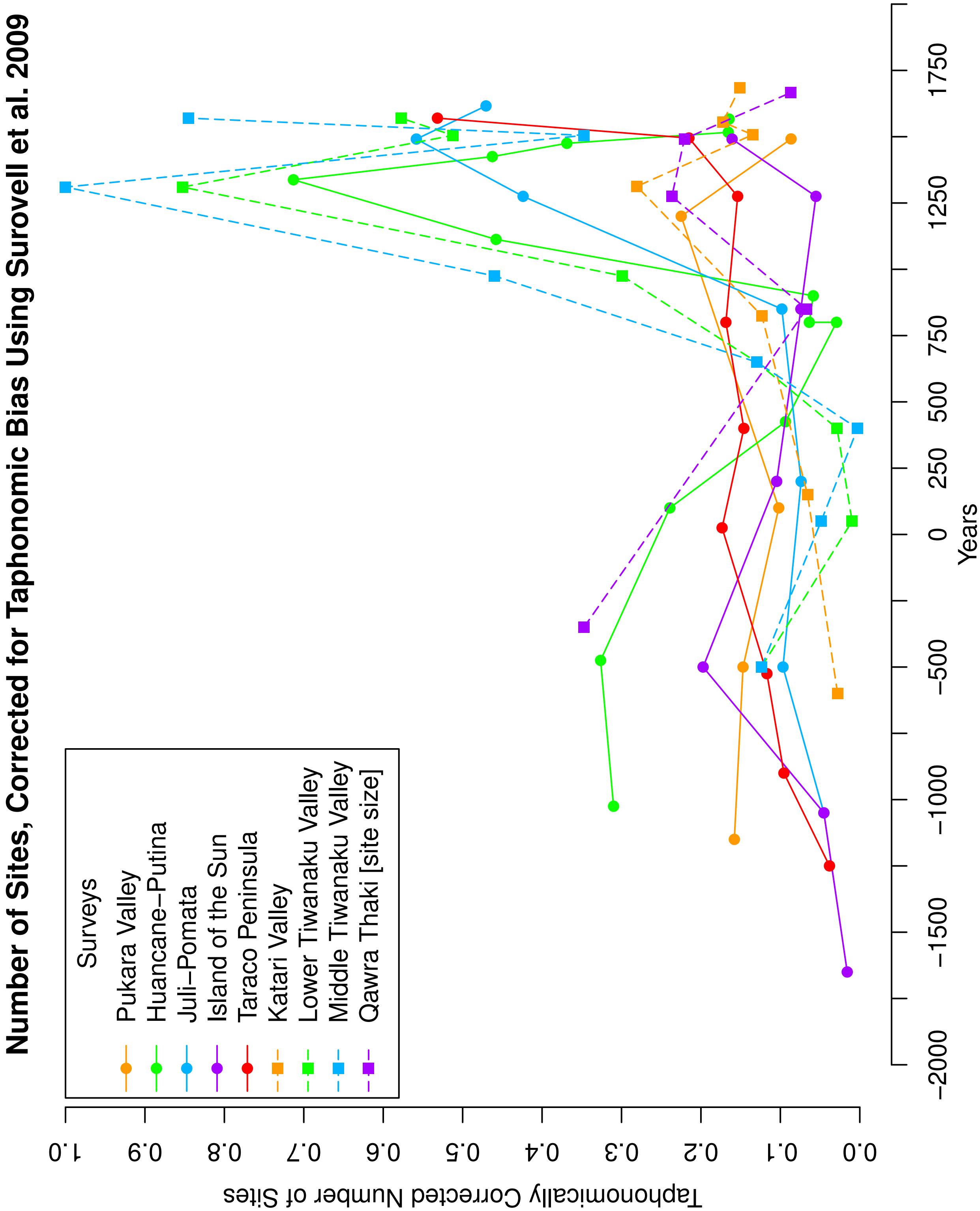


Figure 3.8: Taphonomically Corrected Number of Sites, Survey Scale (See Listing D.20)

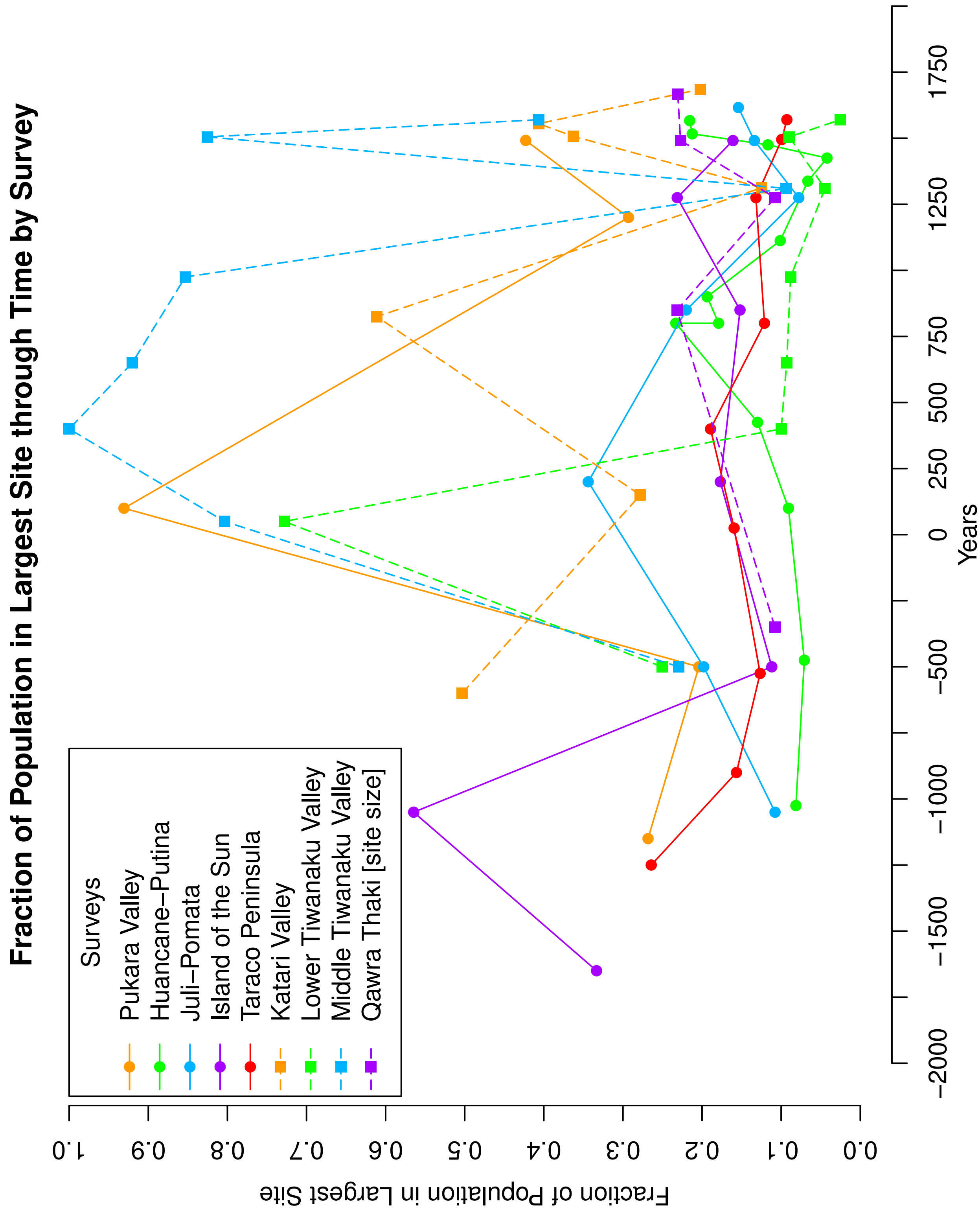


Figure 3.9: Fraction of Population in Largest Site, Survey Scale (See Listing D.25)

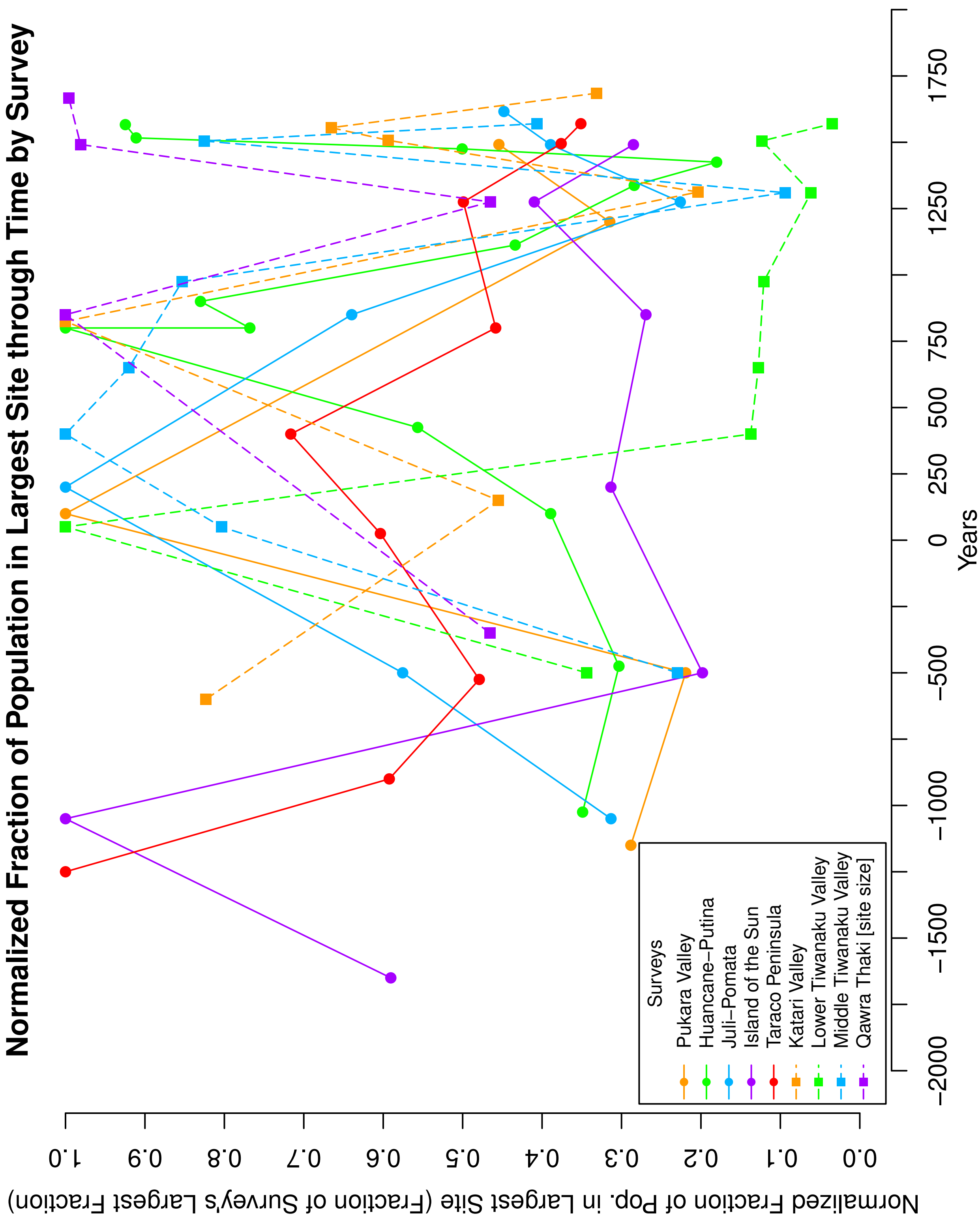


Figure 3.10: Normalized Fraction of Pop. in Largest Site, Survey Scale (See Listing D.26)

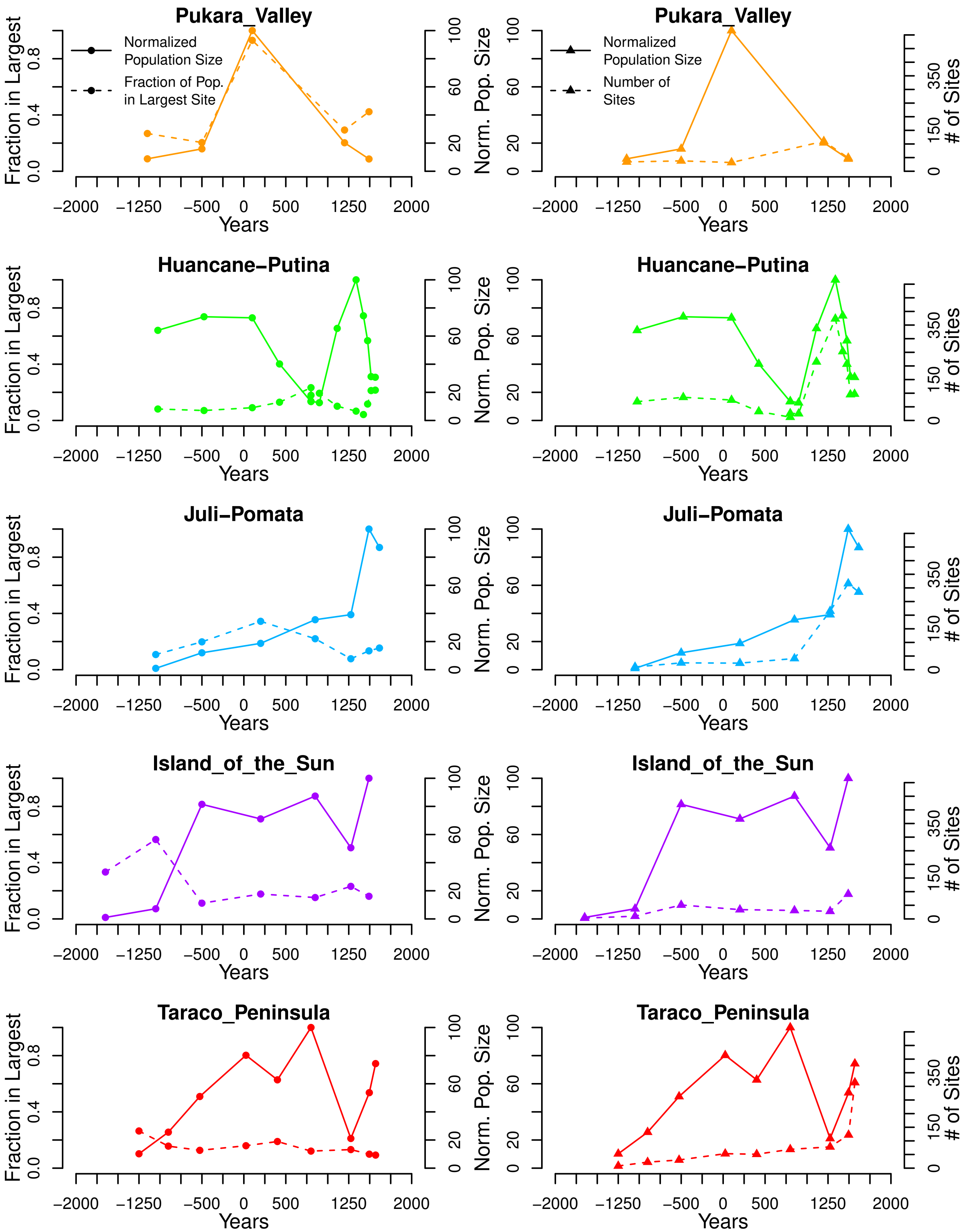


Figure 3.11: Demographic Variables Comparison, Page 1 (See Listing D.35)

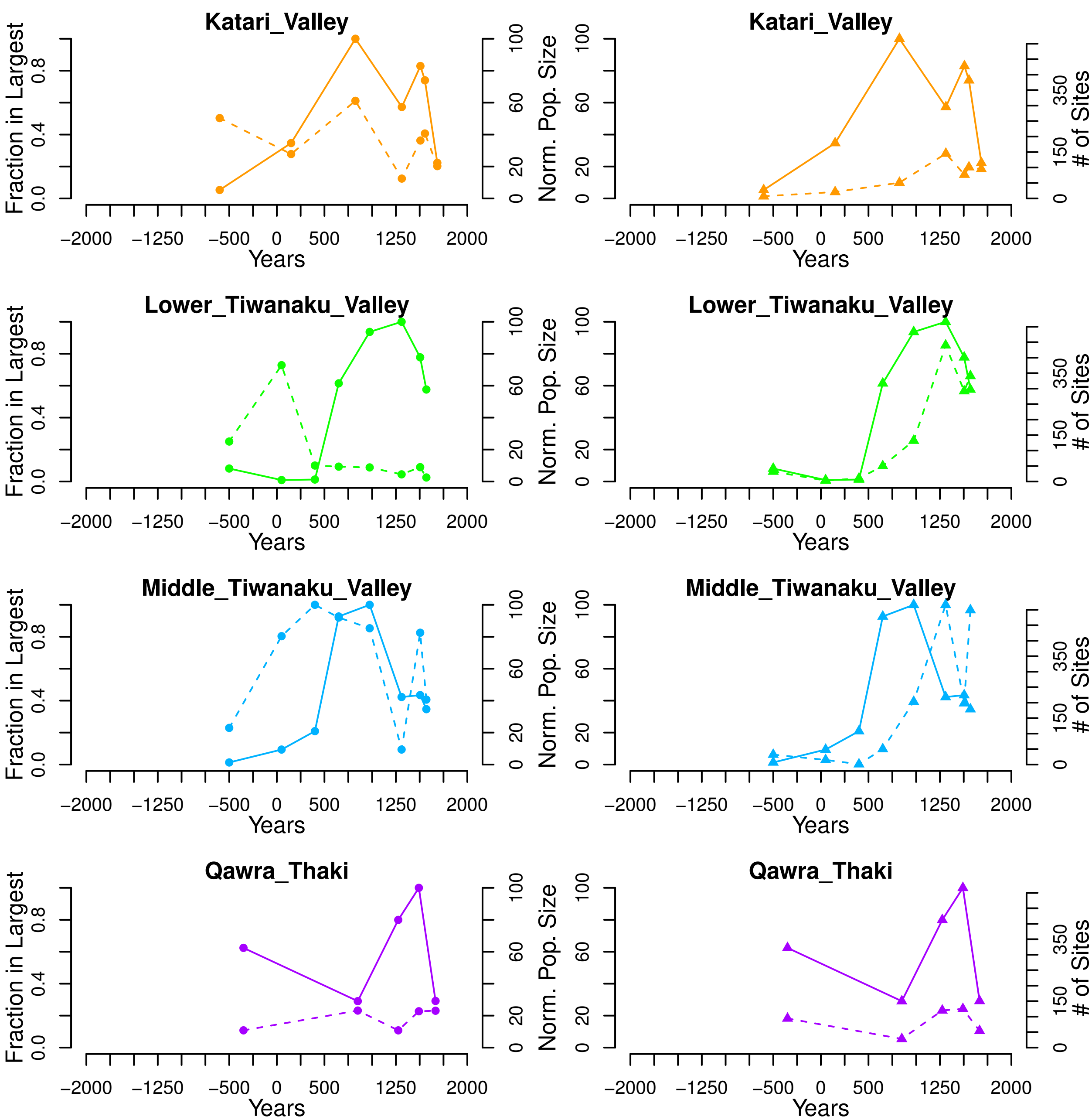


Figure 3.12: Demographic Variables Comparison, Page 2 (See Listing D.35)

region. While methods need to be developed to better address occupation duration for the Altiplano period, it is hard to imagine that Altiplano period occupation duration would be different enough in the Tiwanaku Valley and Huancané-Putina regions to cause such stark inter-regional differences. At least in these regions and probably in others, it is more likely that a profound social and political transformation is reflected in the increases in site numbers: Altiplano period societies were more socially and politically decentralized than any other post-Archaic societies in the Titicaca region. This supports the (already well-supported) argument (e.g., Arkush 2014) that the ethnohistoric depiction of Altiplano period "kingdoms" is untenable when compared to archaeological evidence. The fact that the sharpest increases in numbers of sites are in regions as different and distant as the Tiwanaku Valley and the Huancané-Putina region demonstrates that the social and political changes were less about the erosion of Tiwanaku's political institutions and more about the erosion of social and political traditions which originated in the Formative period and which Tiwanaku built upon.

Much of the logic of Altiplano period population dispersal probably revolved around changes in the subsistence roles of pastoralism and raised fields (e.g., Bandy 2001: 241–242; Bandy 2005a: 291–292) and in climate (e.g., Bandy 2005a: 291–292; Arkush 2008: 359–365). However, it would be a mistake to view this subsistence change as anything less than deeply intertwined with deliberate political decisions. An almost poetic example is provided at the site of Palermo in the Juli-Pomata region, where a major corporate ritual area became a camelid corral during the Altiplano period (Stanish et al. 1997: 73–74). Although not always leaving behind such nicely stratigraphic evidence, the same change was occurring across the Titicaca region at this time, as subsistence changes transpired in concert with the abandonment of the Formative and Tiwanaku period traditions of ritual politics. Subsistence change was neither a simple cause nor a simple effect of political change, but rather in some measures both a means towards and an impetus for political decentralization. In fact, there is good reason to believe that increasingly pastoral lifeways were a key strategy of later political resistance to Spanish colonialism in the Titicaca region (Bandy and Janusek 2005: 268): despite the very different political contexts of the Altiplano and Colonial periods, it appears that there are some deep continuities in how people in the Titicaca region sought political autonomy. The Altiplano period's wholesale abandonment of political and religious traditions which had persisted in some recognizably similar form for over two millennia was certainly not some requisite corollary of environmentally-induced subsistence change. Had Altiplano period societies wanted to continue organizing themselves in at least vaguely similar ways, it would have happened and it would have left material evidence for archaeologists to observe.

Also notable is the fact that the unusually early fluorescence of the Island of the Sun before 200 B.C., discussed in terms of population size in Section 3.1.3, is also apparent in the data on numbers of sites. Figure 3.7 demonstrates that, other than the Qawra Thaki survey region which has an inflated figure due to its long Formative period, the Island of the Sun has by far the highest normalized number of sites for the time span leading up to 200 B.C. Perhaps even more striking is the fact that, as presented in Figure 3.8, after taphonomic correction the Island of the Sun has its maximum number of sites during the time span leading up to 200 B.C., rather than during the Inca period when it was a place of extreme importance.

The second measure of nucleation and dispersal examined in this section is the fraction of a survey area's population which inhabited the largest site within that survey area (Figures 3.9 and 3.10). First of all, the effect of the data from the Tiwanaku Valley restudy by Lémuz Aguirre and Bandy (see discussion of Table 3.2) should be considered. As discussed above, our understanding of the Late Formative 2 (A.D. 300–500) has been the most affected by the restudy. If Figure 3.9 were to use Lémuz Aguirre and Bandy's data instead, the middle Tiwanaku Valley's Late Formative 2 figure would be reduced from 1 to .91, essentially the same as the Pukara Valley's figure for the Late Formative. Also important is the fact that the lower Tiwanaku Valley's high Late Formative 1 (200 B.C.–A.D. 300) figure would probably be substantially reduced, although an examination of the full restudy dataset would be necessary to confirm this.

The fact that the middle Tiwanaku Valley and the Pukara Valley have high peak values is unsurprising given their urbanism, but it is striking just how high these values are. It must be kept in mind that the Pukara Valley survey area is about 40% of the middle Tiwanaku Valley survey area, and that an expansion of the Pukara survey area to comparable size would reduce the Pukara Valley Late Formative value to some unknown degree. Nevertheless, the Pukara Valley's figure is so close to the middle Tiwanaku Valley's Late Formative and Tiwanaku period figures that it seems likely that there were some major similarities in these two regions' urban-rural relationships. Bandy's (2013: 84) argument regarding the Tiwanaku Valley's urban-rural relationship probably applies to the Pukara Valley as well: "... Tiwanaku did not exist in order to ritually service a rural population and to mediate and negotiate relations among dispersed ayllu groups resident in the surrounding countryside."

Several of the regions have somewhat surprisingly high fractions in their early demographic histories. The Island of the Sun is again quite atypical for this measure in its early demographic history, this time even earlier during the period from 1300 to 800 B.C. This time, however, the uniquely high value should be considered an artifact of sample size: all of the ten sites from this period are in fact quite small. The Taraco Peninsula sample size for its first period (1500 to 1000 B.C.) is also small (eight sites), but several of these sites are somewhat large, up to three and a half hectares. The Katari Valley's first phase (1000 to 200 B.C.) is fairly similar, with seven sites, one of which is six hectares. The sample size for the Pukara Valley's first phase (1500 to 800 B.C.) is better (34 sites, though 32 of these are only phased to a coarser Early-Middle Formative, which continues to 200 B.C.), and it has two fairly large sites both at four and a half hectares (only one is used for calculating the fraction of the population in the largest site). In summary, while the Island of the Sun's high early value is a methodological artifact, the high "starting" values for the Taraco Peninsula, Katari Valley, and Pukara Valley may reflect a surprising degree of nucleation and political centralization at the beginning of village life in these regions.

The Inca period (A.D. 1470–1540) in the middle Tiwanaku Valley also has a surprisingly high value. The site of Tiwanaku had a resurgence at this time (Yaeger and López Bejarano 2004: 341–342), and while it was surrounded by a large number (197) of rural sites, 100% of these sites were quite small (below 2.75 hectares, and mostly much smaller).

It should be noted that the Katari Valley figures for the Inca period (A.D. 1475–1540) and Late Pacajes period (A.D. 1540–1570) suffer from the same problems discussed in Section 3.1.3, and therefore should be lower.

When the patterns discussed in this section are compared to the survey-scale population size patterns discussed in Section 3.1.3 (see Figures 3.11 and 3.12), it is quite clear that there is no simple relationship between population growth/decline and population nucleation/dispersal. The substantial inter-regional variation demonstrates that neither the population size nor the population size trend of a region at a point in time explains its trajectory towards population nucleation or dispersal. For example, the Huancané-Putina region shares a population nucleation trajectory with the Pukara Valley and the middle Tiwanaku Valley, and yet its population size trajectory is an almost perfect mirror image of the Pukara Valley's or the middle Tiwanaku Valley's (though see the discussion of the Huancané-Putina region's ceramic chronology in Section 3.1.3). Or for example, the Juli-Pomata region shares the same population nucleation trajectory with the three regions just mentioned, and yet has a population size history which is dramatically different from those of all three. Or for a final example, one can observe the Taraco Peninsula and the Island of the Sun, which have nucleation histories which are comparatively stable, despite significant changes in population size. In a word, the natures of Lake Titicaca societies' social and political organizations were not induced by population pressure, but rather were products of individuals' and social groups' deliberate choices made regarding their association with others.

3.1.5 Political-Demographic Dynamics in Spatial Perspective

While the previous section put Lake Titicaca demographic history in a somewhat more spatial perspective, this section examines Lake Titicaca population history in actual geographic space. Figures 3.13 to 3.24 present a population estimate grid for each time span within a series of time spans defined by a combination of cultural chronology and the changing level of Lake Titicaca. Figures 3.25 to 3.35 do the same except for population size change rather than population size. In both types of map, each grid cell is a three km. by three km. area, the value of which aggregates the population estimates for all archaeological components within its space. Note that both the intensive surveys database (see the maps' white boundary lines) and the inter-survey database are used for these maps. Also note, however, that the inter-survey database is better developed for the Formative periods and the Tiwanaku period than for the post-Tiwanaku periods. Because the lake can be expected to significantly influence settlement, its changing level is modeled alongside population in these maps.

Cultural phases often must be subdivided into time spans with different lake levels; this explains why some of the population change maps display little to no change. On the other hand, sometimes two adjacent cultural phases had the same lake level, and therefore the break between time spans has been made for cultural historical reasons rather than lake level history: this is the case for both the start and end breaks for the A.D. 600–1000 time span and for the end break for the Inca period. Mapping (correlating) the cultural phases to the largely lake-level-defined time spans is not a task with always unambiguous answers. Table 3.3 presents the mapping I have used.

Table 3.3: Mapping of Archaeological Phases to Cultural/Limnological Time Spans

Time Span	**Lake Level (meters below present)**	**Archaeological Phases Assigned**
1500–1100 B.C.	5	Pukara: 1500–800BC; Is. Sun, Juli: 1300–800BC; Taraco P.: 1500–1000BC; Huancané-P.: 1300–750BC; Qawra Thaki: 1300BC–AD600; Inter-Survey: 2000–1300BC
1100–850 B.C.	15	Same as above except: switch Taraco P. to 1000–800BC; switch Inter-Survey to 1300–200BC; add Katari 1000–200BC
850–450 B.C.	0	Pukara, Is. Sun, Juli, Mid. Tiwanaku, Lower Tiwanaku: 800–200BC; Taraco P.: 800–250BC; Huancané-P.: 750–200BC; Qawra Thaki: 1300BC–AD600; Katari: 1000–200BC; Inter-Survey: 1300–200BC
450–250 B.C.	15	Same as above

Table 3.3 continued

Time Span	**Lake Level (meters below present)**	**Archaeological Phases Assigned**
250–1 B.C.	0	Pukara, Huancané-P.: 200BC–AD400; Is. Sun, Juli, Inter-Survey: 200BC–AD600; Taraco P.: 250BC–AD300; Qawra Thaki: 1300BC–AD600; Katari: 200BC–AD500; Mid. Tiwanaku, Lower Tiwanaku: 200BC–AD300
A.D. 1–250	15	Same as above except: add Huancané-P. AD100–750
A.D. 250–600	0	Is. Sun, Juli, Inter-Survey: 200BC–AD600; Taraco P.: AD300–500; Huancané-P.: 200BC–AD400 and AD100–750; Qawra Thaki: 1300BC–AD600; Katari: 200BC–AD500; Mid. Tiwanaku, Lower Tiwanaku: AD300–500
A.D. 600–1000	0	Is. Sun, Juli, Qawra Thaki: AD600–1100; Taraco P.: AD500–1100; Huancané-P.: AD750–850 and AD850–950; Katari: AD500–1150; Mid. Tiwanaku, Lower Tiwanaku: AD500–800 and AD800–1150; Inter-Survey: AD600–1000
A.D. 1000–1150	0	Pukara: AD950–1450; Is. Sun, Juli, Taraco P., Qawra Thaki: AD1100–1450; Huancané-P.: AD950–1275; Katari, Mid. Tiwanaku, Lower Tiwanaku: AD1150–c.1475; Inter-Survey: AD1000–1450
A.D. 1150–1450	15	Same as above except: add Huancané-P. AD1275–1400 and AD1400–1450

Table 3.3 continued

Time Span	Lake Level (meters below present)	Archaeological Phases Assigned
A.D. 1450–1540	0	Pukara, Is. Sun, Juli, Taraco P., Qawra Thaki, Inter-Survey: AD1450–c.1532; Huancané-P.: AD1450–1500 and AD1500–1533; Katari, Mid. Tiwanaku, Lower Tiwanaku: c.AD1475–1540
A.D. 1540–1600	0	Juli: AD1532–1700; Taraco P., Huancané-P., Mid. Tiwanaku, Lower Tiwanaku: c.AD1532–1600; Qawra Thaki: AD1533–1800; Katari: AD1540–1570 and AD1570–1800

In some cases a time span has several phases from the same survey assigned to it. For example, the time span A.D. 1150–1450 has three phases from the Huancané-Putina survey. In such cases, when one site has multiple components corresponding to the same time span, only the largest component is used. If there are multiple (equally sized) largest components, only one is used.

I have modeled Lake Titicaca's depth through time based on data in Abbott et al. (1997: Fig. 4), and I have modeled the corresponding horizontal extent of Lake Titicaca through time based on bathymetric maps (Boulangé and Aquize Jaen 1981: Fig. 4; Lazzaro 1981: Fig. 1) and, for the present-day level, Landsat 7 satellite imagery. I have modeled the lake at three different levels: present-day, five meters below present-day, and 15 meters below present-day. For sections of the lake for which the cited bathymetric maps lacked a depiction of the desired level, I roughly estimated the level's bathymetric line based on the maps' available bathymetric lines for that lake section. For the present-day level, I used Landsat 7 scenes "LE70020711999294CUB00" and "LE70010711999255COA01"; I intentionally chose imagery from a particularly dry period (1999) so that the present-day lake level would be conservatively modeled. This is of some advantage for the analysis discussed here, but is of much greater

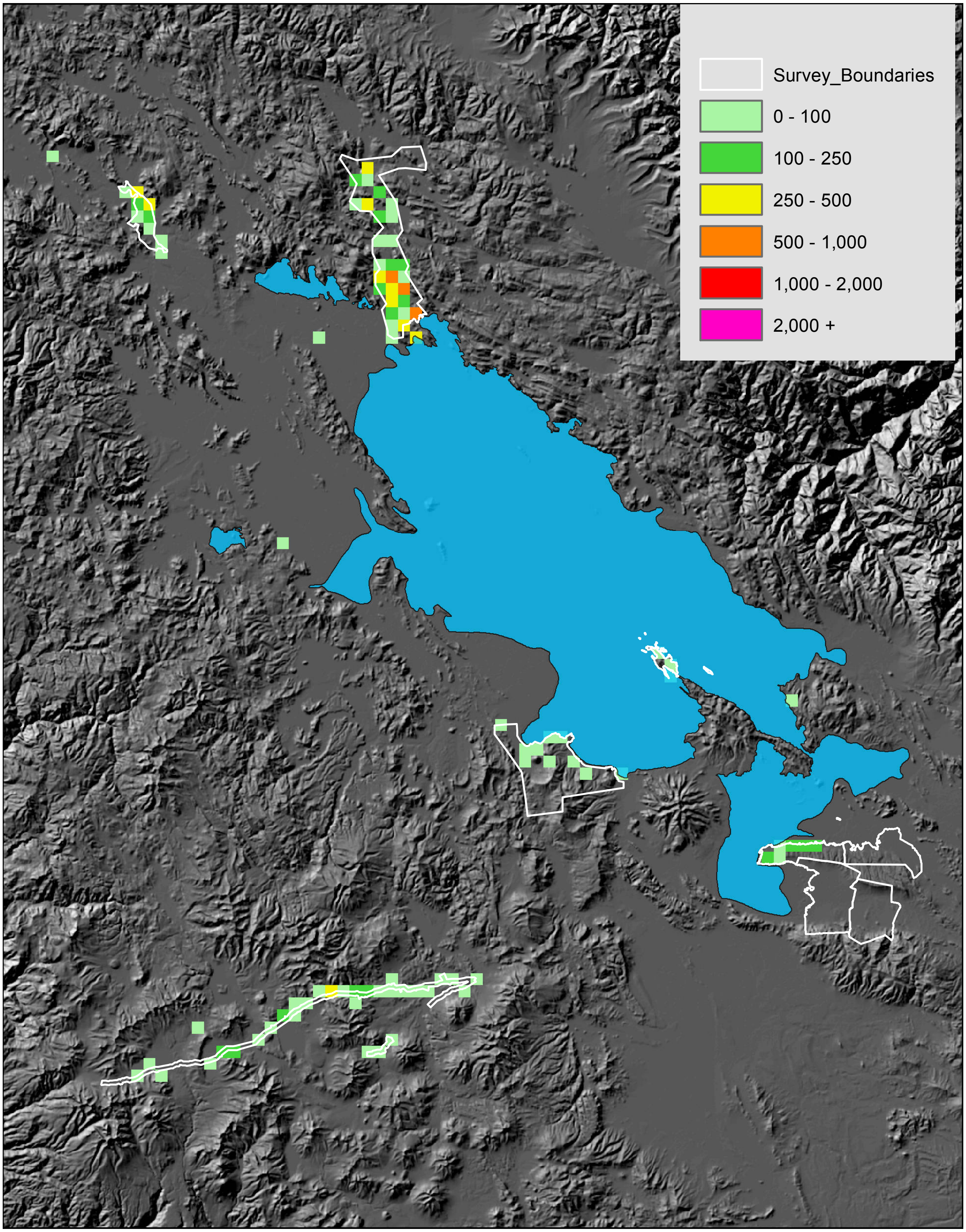


Figure 3.13: Population Map, 1500–1100 B.C. (See Listing D.41 for Python source code)

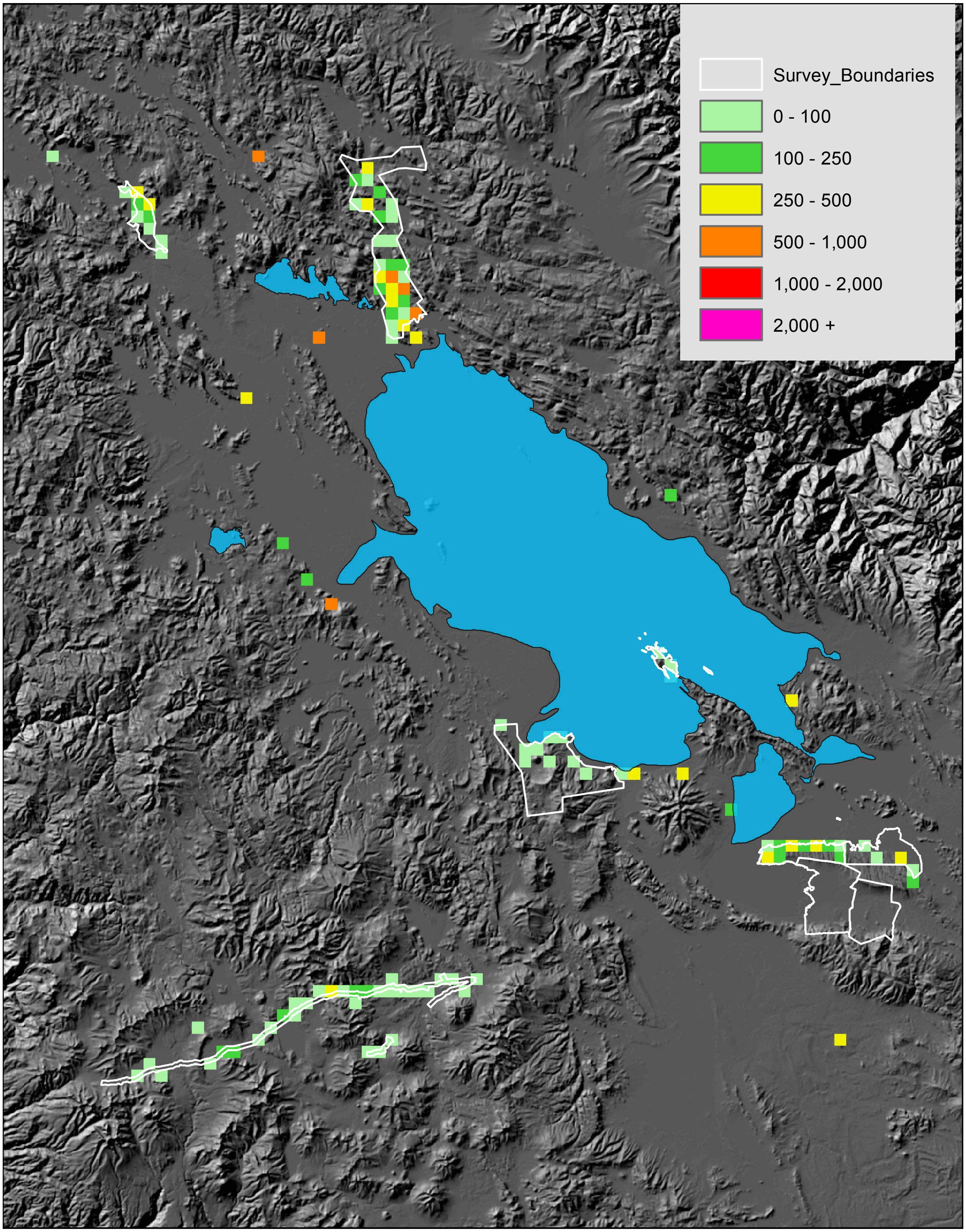


Figure 3.14: Population Map, 1100–850 B.C. (See Listing D.41 for Python source code)

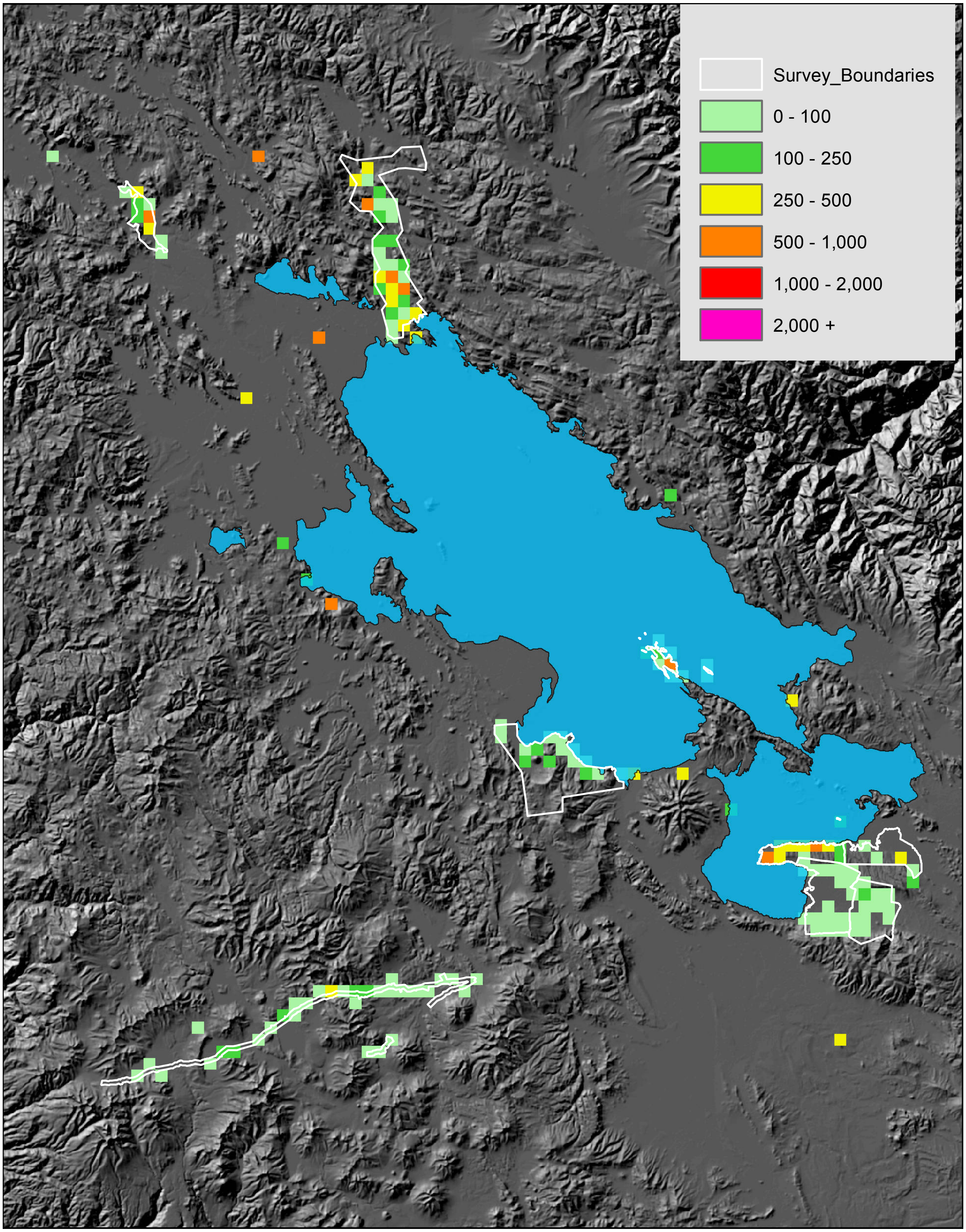


Figure 3.15: Population Map, 850–450 B.C. (See Listing D.41 for Python source code)

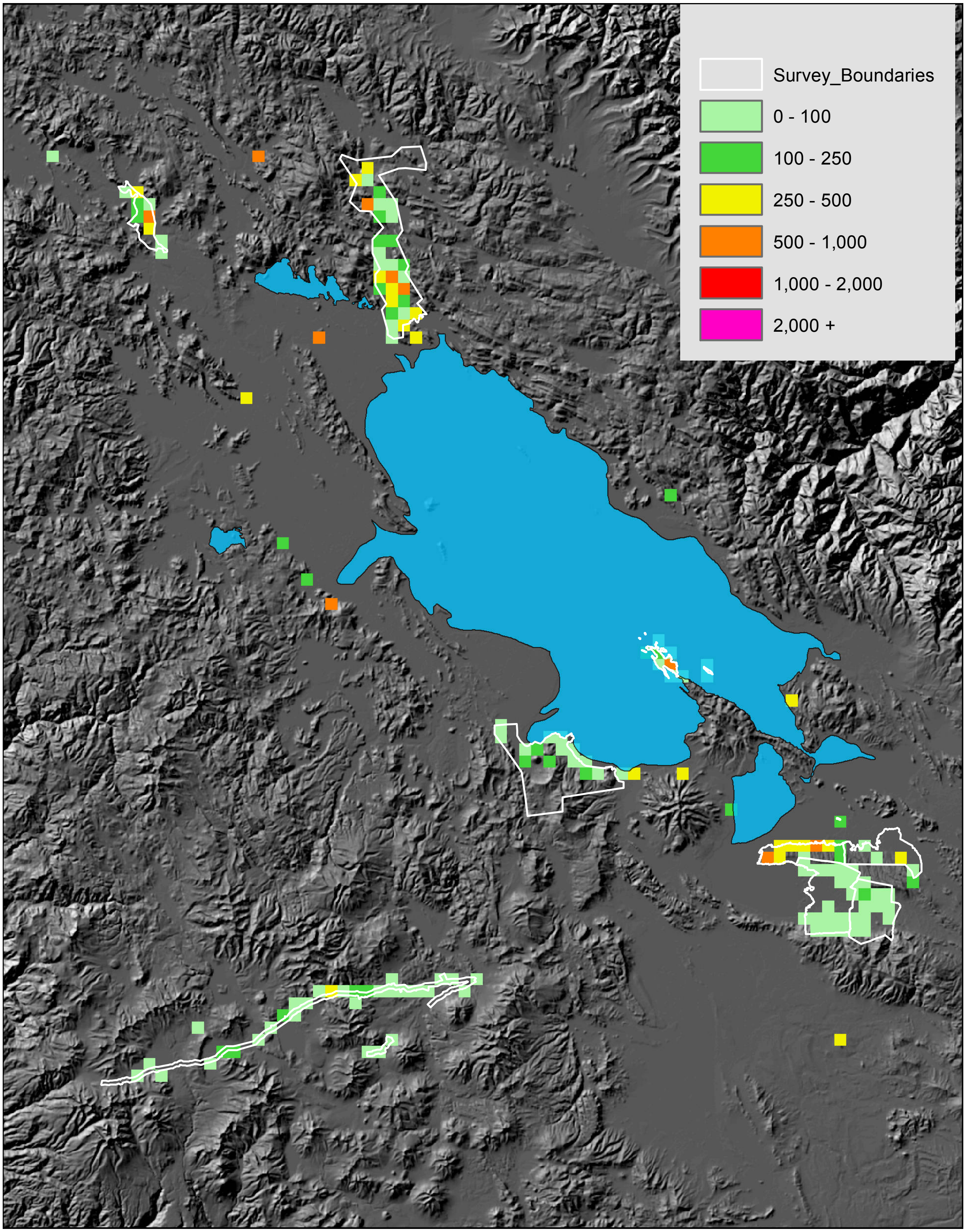


Figure 3.16: Population Map, 450–250 B.C. (See Listing D.41 for Python source code)

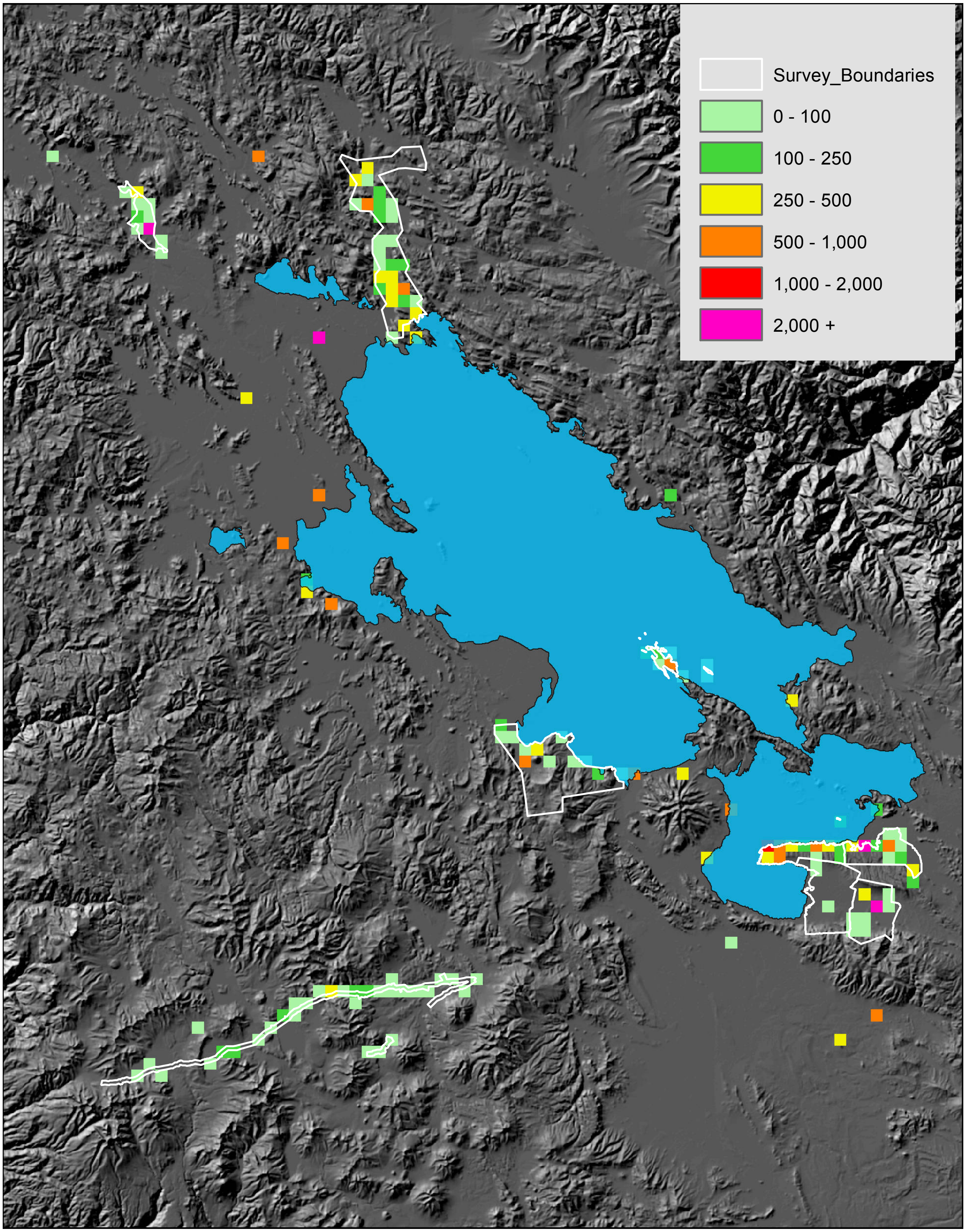


Figure 3.17: Population Map, 250–1 B.C. (See Listing D.41 for Python source code)

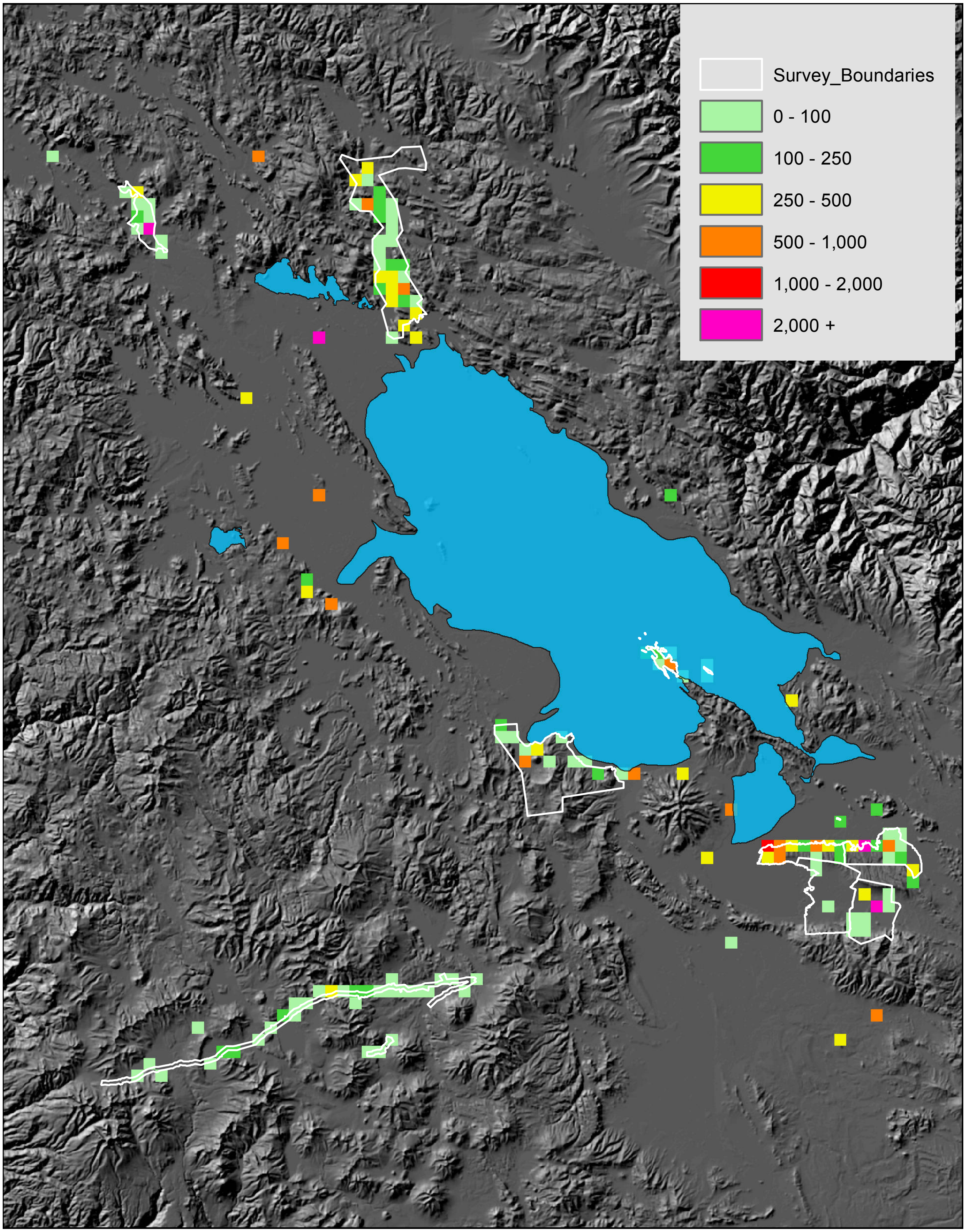


Figure 3.18: Population Map, A.D. 1–250 (See Listing D.41 for Python source code)

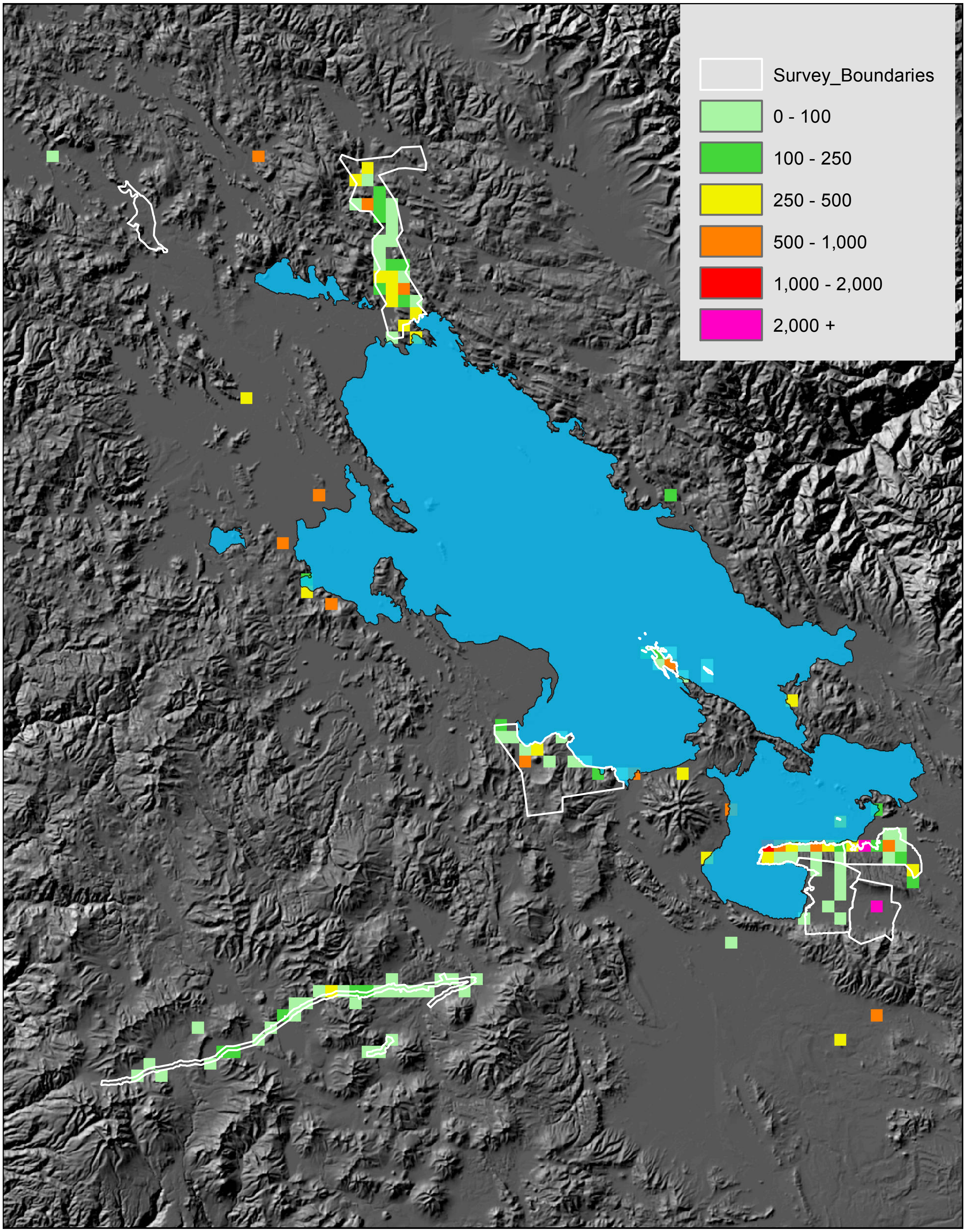


Figure 3.19: Population Map, A.D. 250–600 (See Listing D.41 for Python source code)

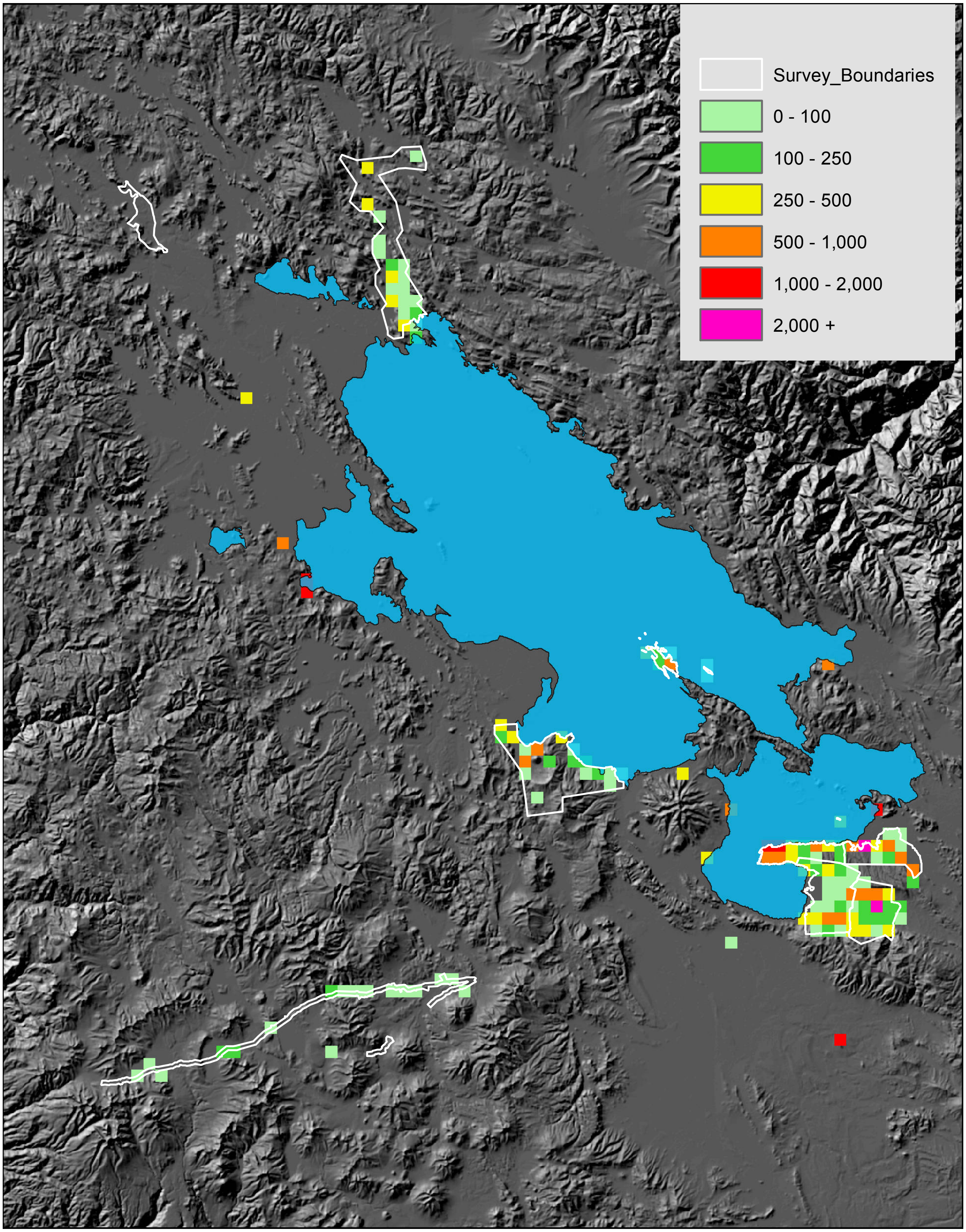


Figure 3.20: Population Map, A.D. 600–1000 (See Listing D.41 for Python source code)

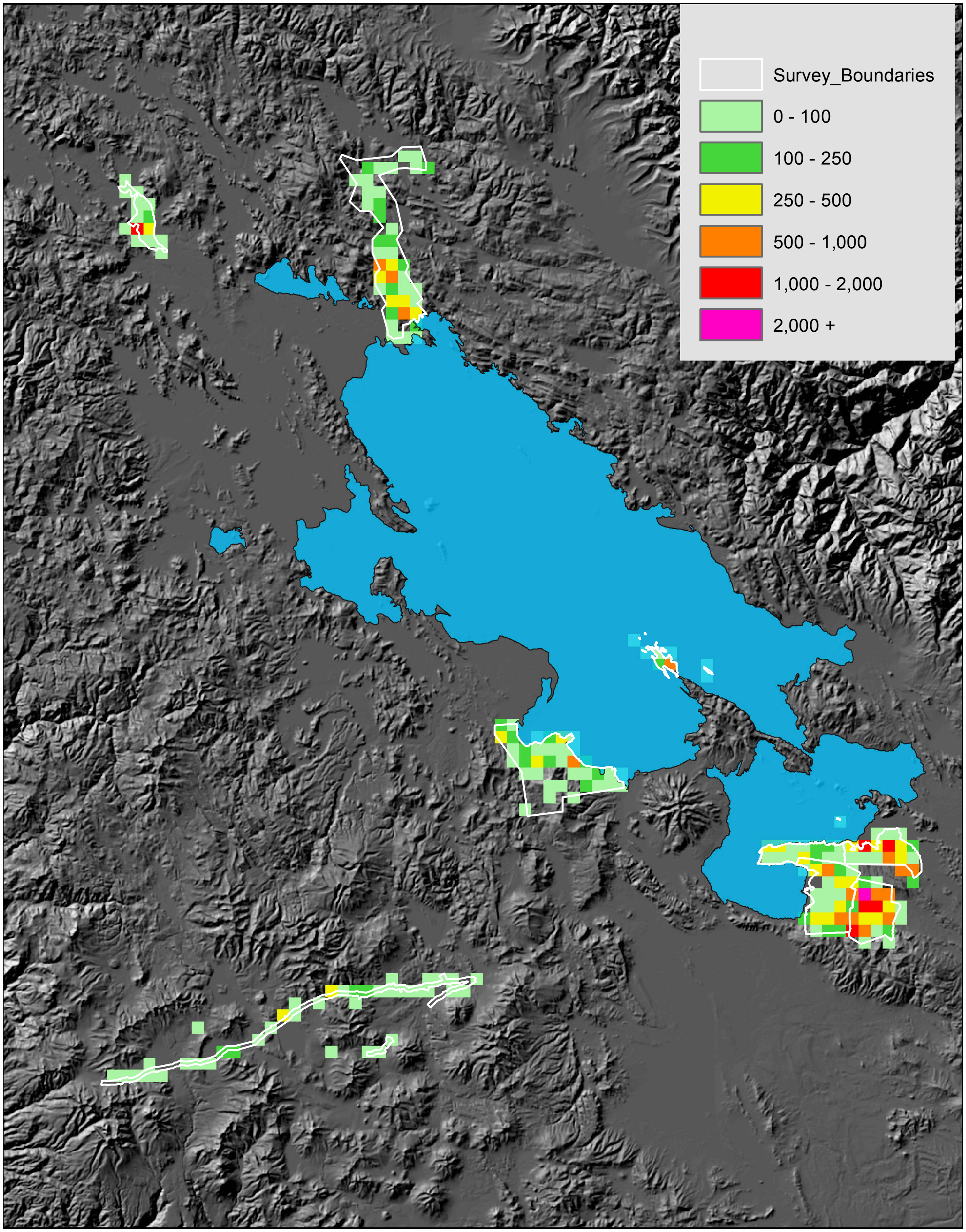


Figure 3.21: Population Map, A.D. 1000–1150 (See Listing D.41 for Python source code)

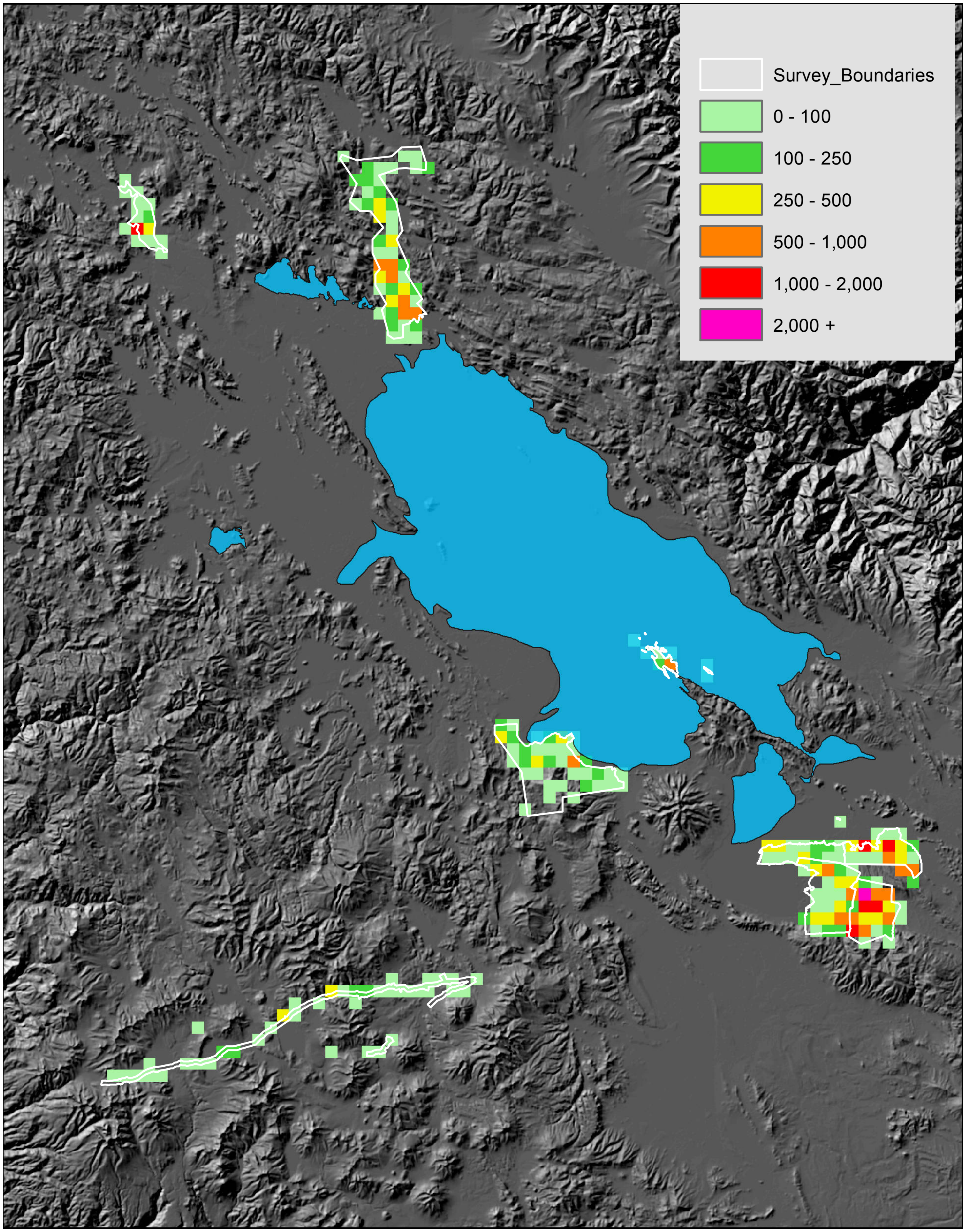


Figure 3.22: Population Map, A.D. 1150–1450 (See Listing D.41 for Python source code)

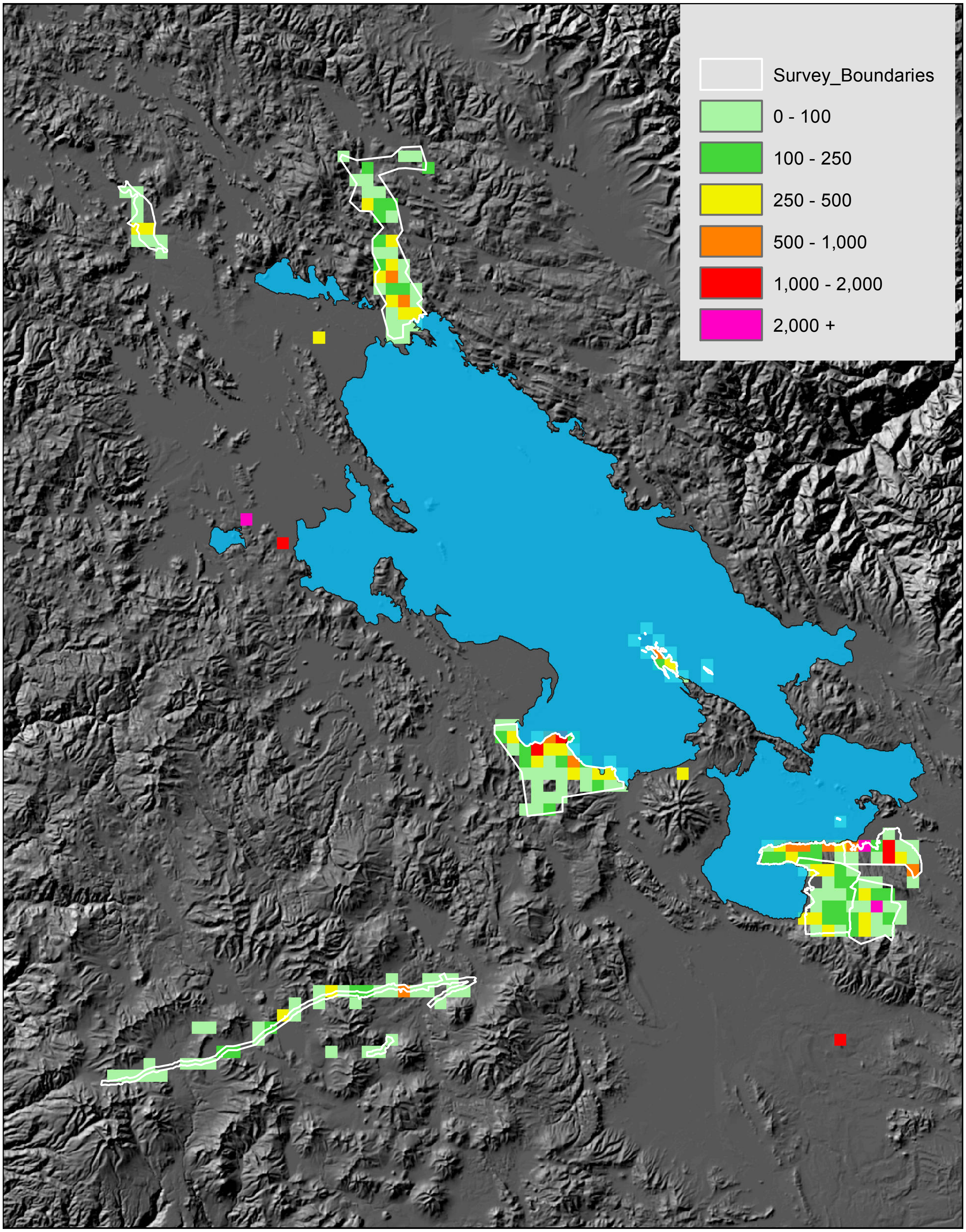


Figure 3.23: Population Map, A.D. 1450–1540 (See Listing D.41 for Python source code)

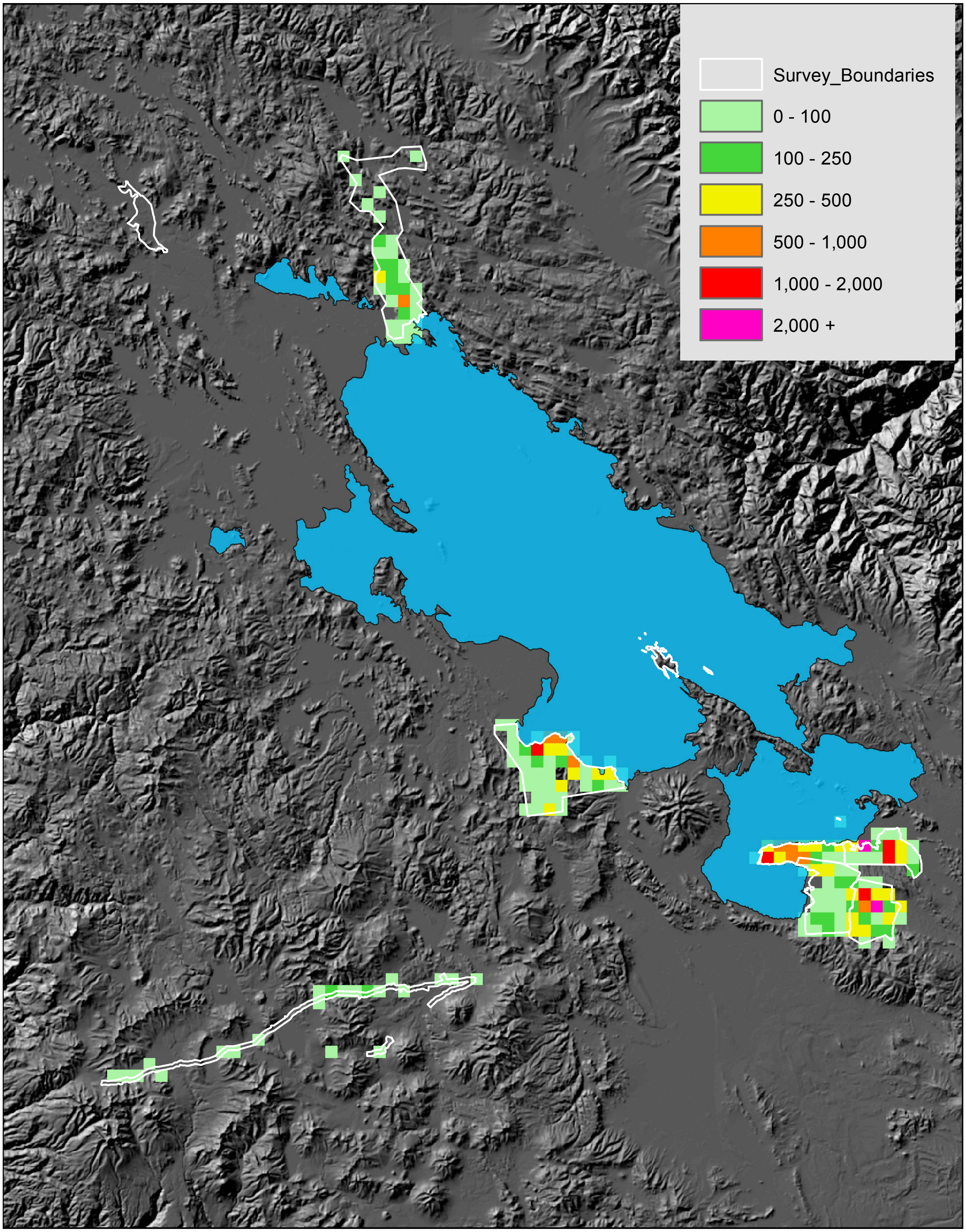


Figure 3.24: Population Map, A.D. 1540–1600 (See Listing D.41 for Python source code)

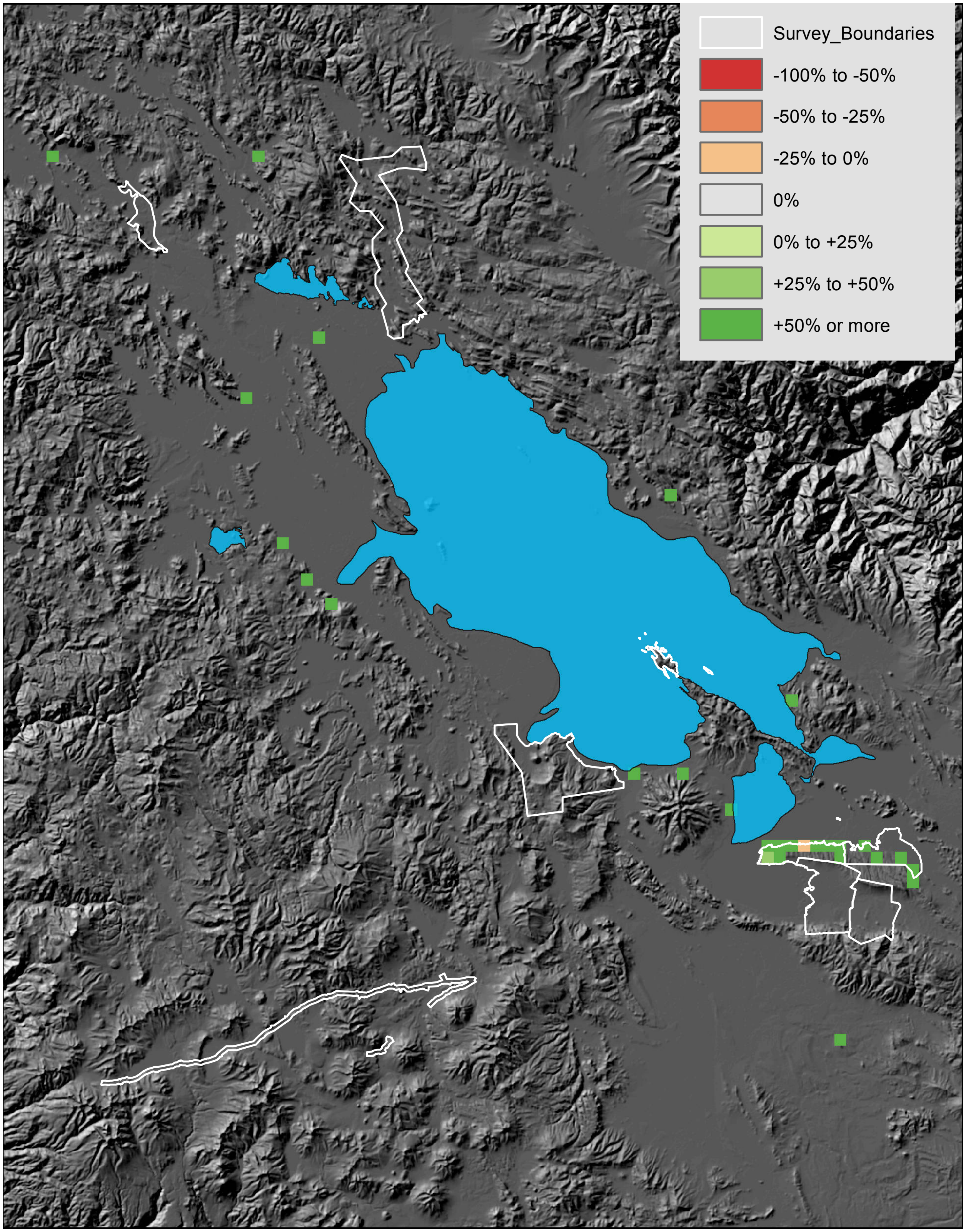


Figure 3.25: Population Change from Previous Phase to 1100–850 B.C. (See Listing D.41)

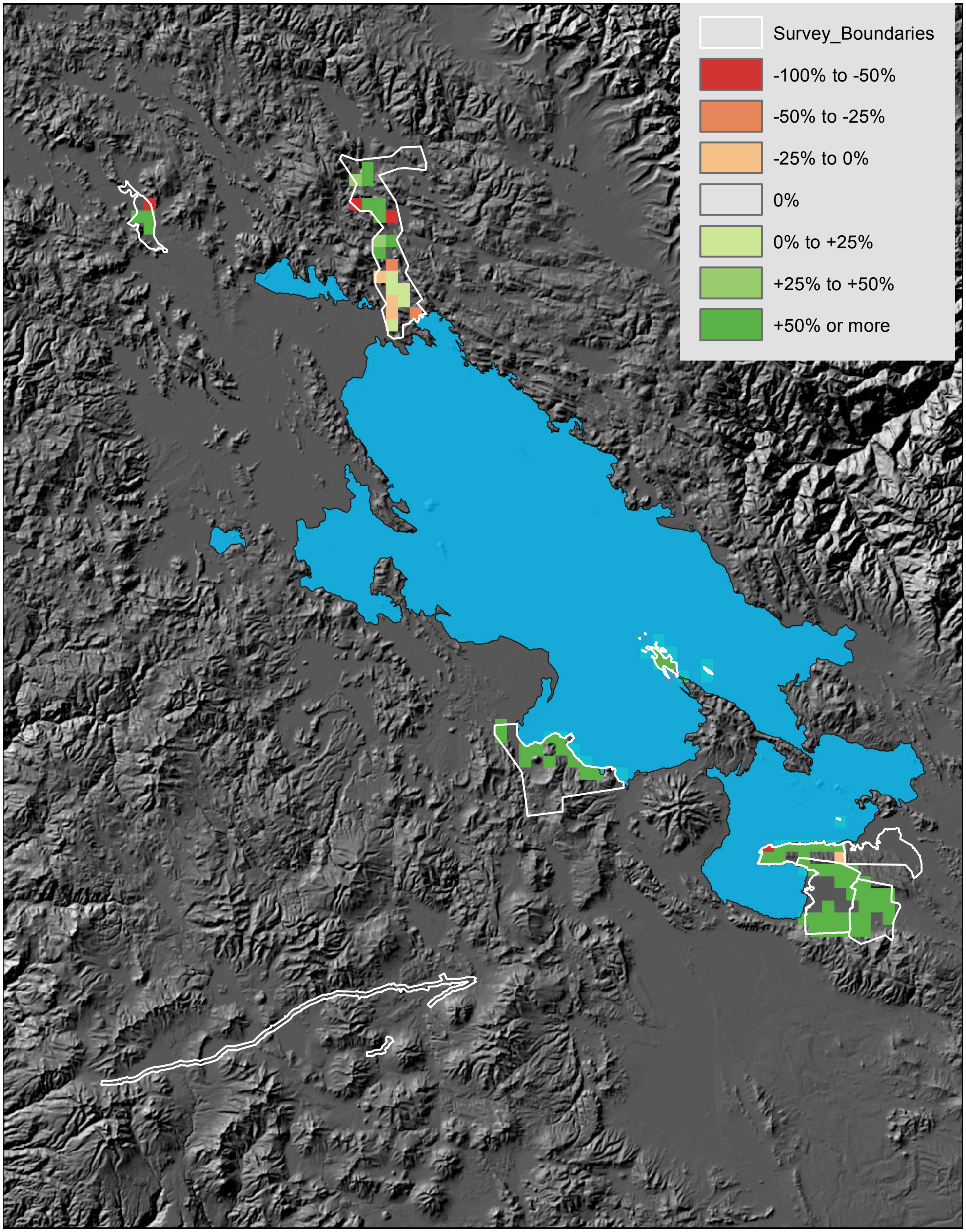


Figure 3.26: Population Change from Previous Phase to 850–450 B.C. (See Listing D.41)

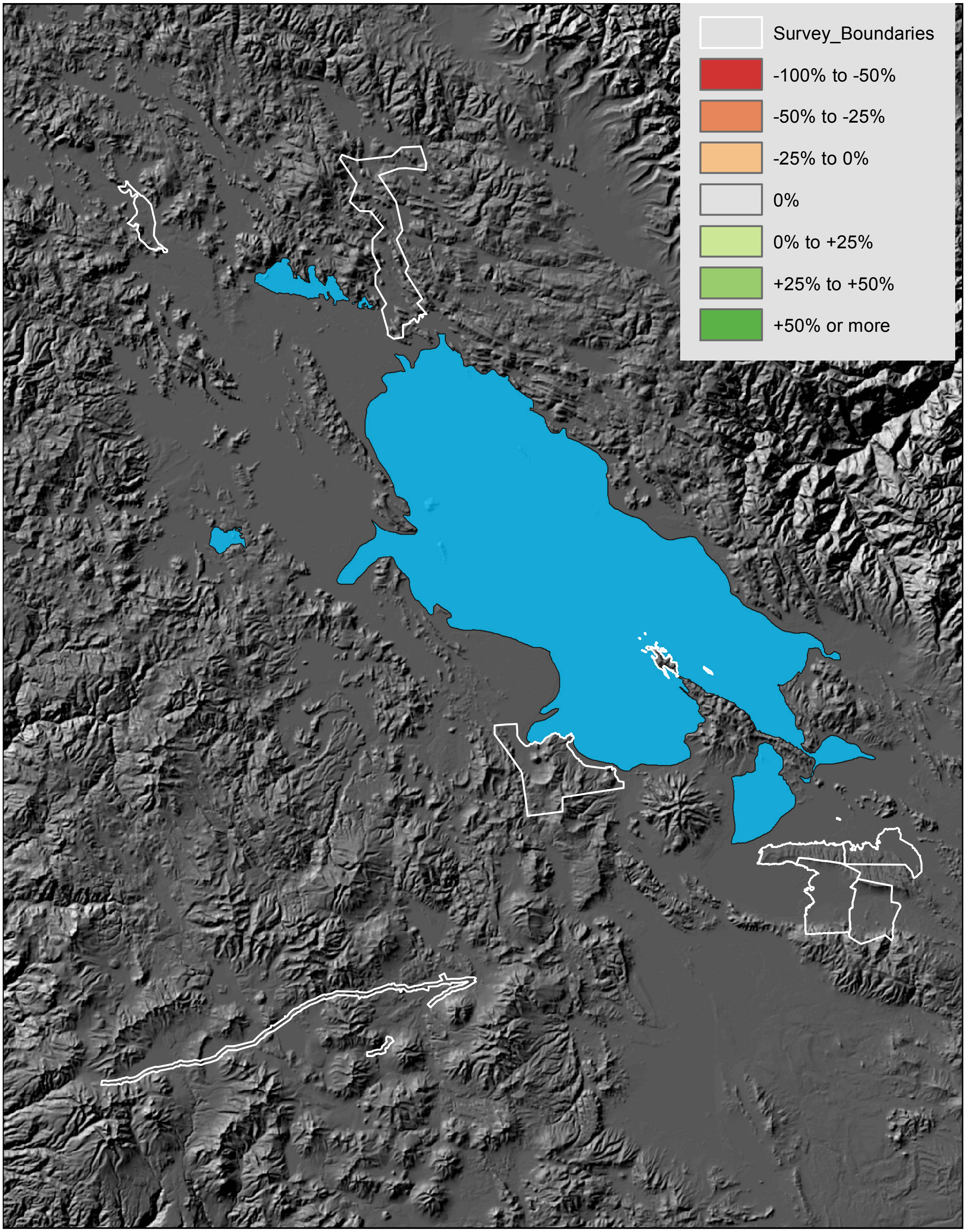


Figure 3.27: Population Change from Previous Phase to 450–250 B.C. (See Listing D.41)

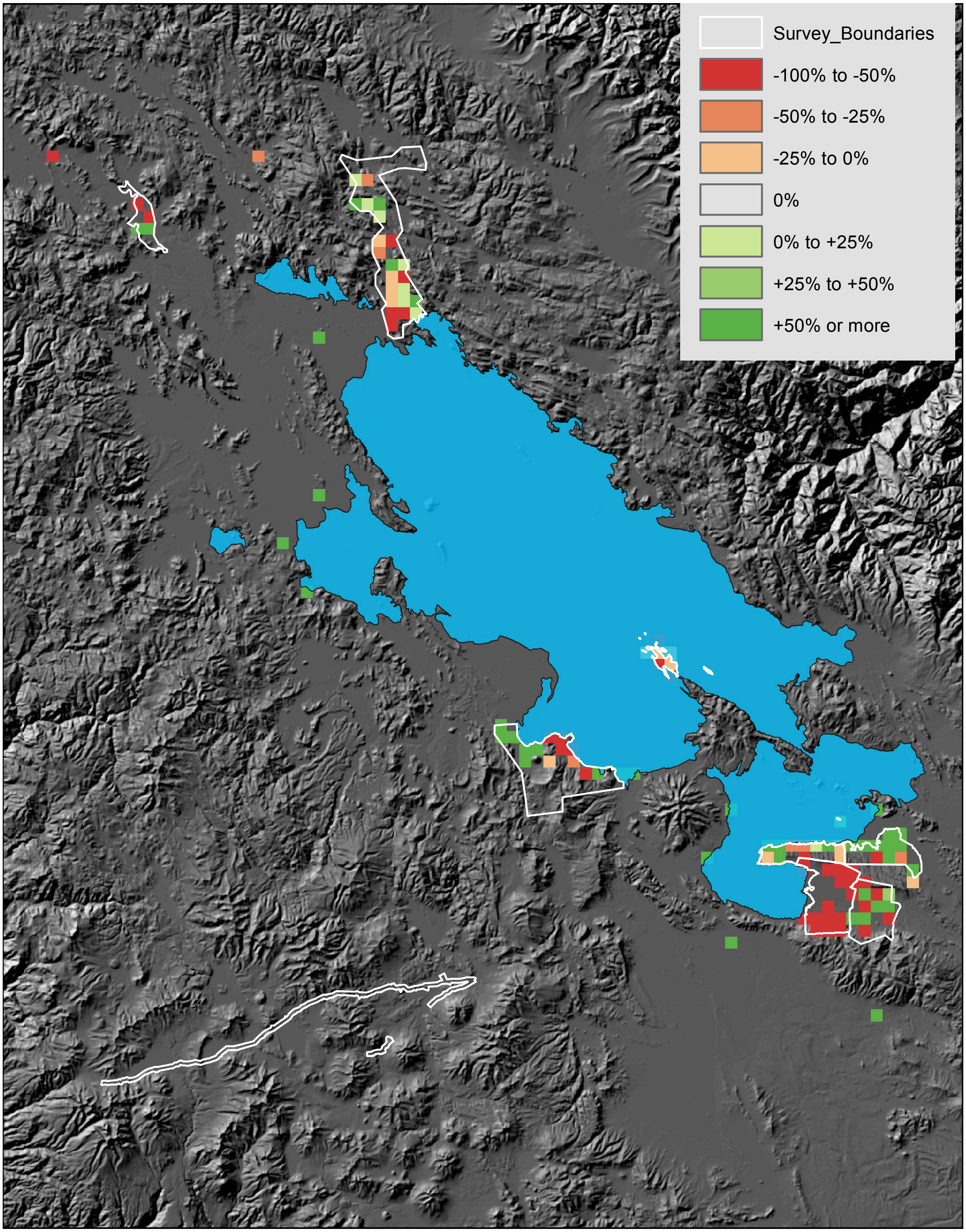


Figure 3.28: Population Change from Previous Phase to 250–1 B.C. (See Listing D.41)

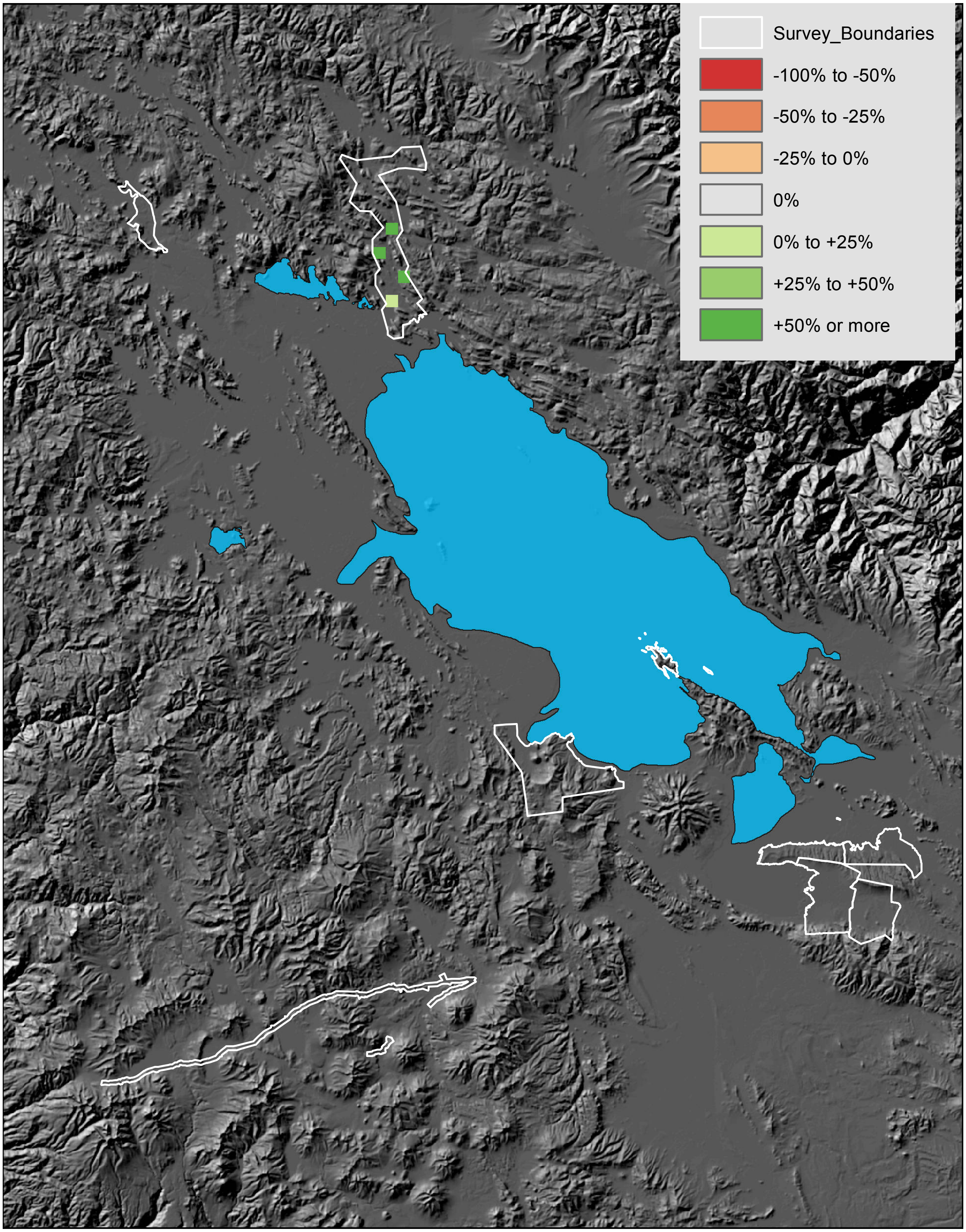


Figure 3.29: Population Change from Previous Phase to A.D. 1–250 (See Listing D.41)

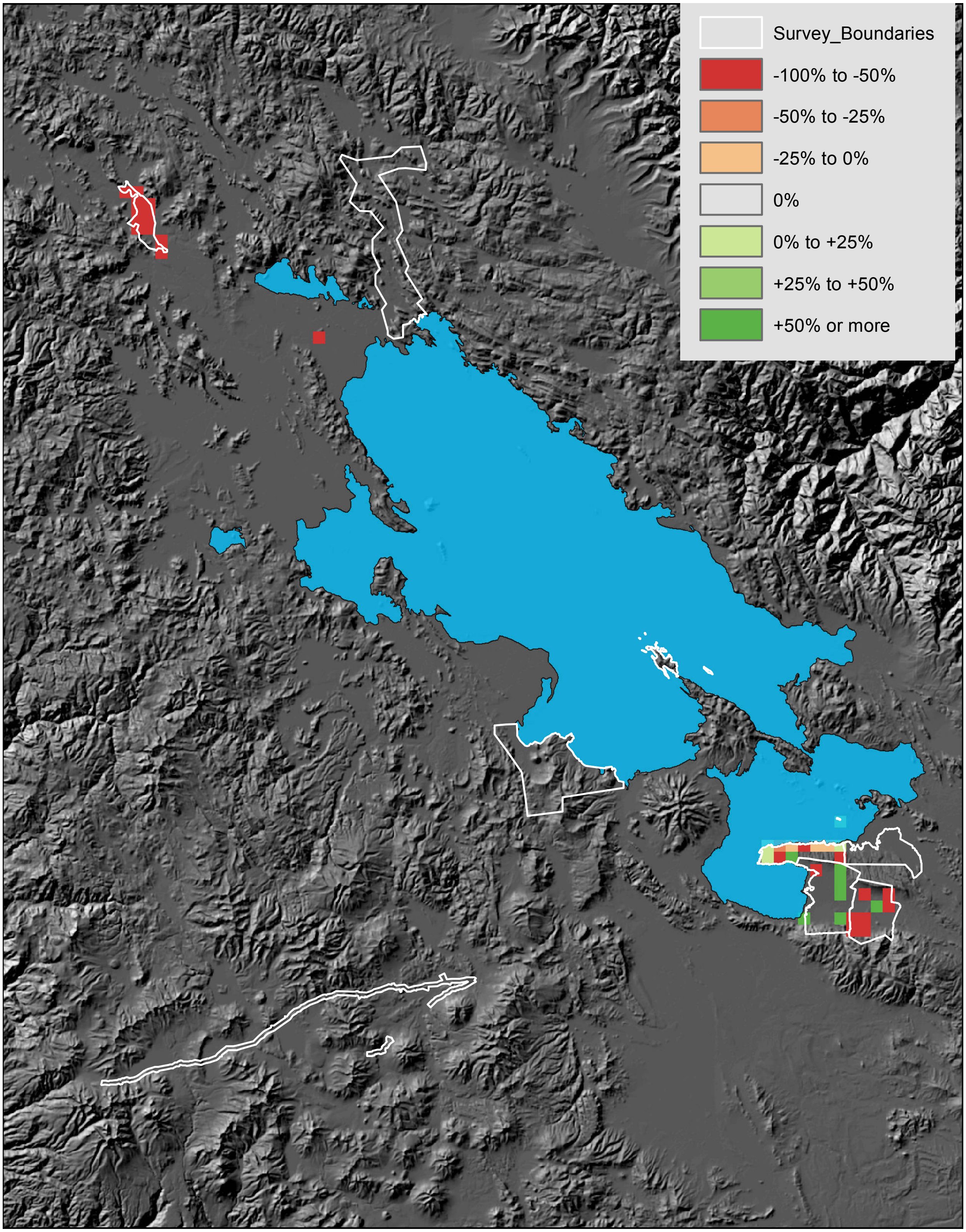


Figure 3.30: Population Change from Previous Phase to A.D. 250–600 (See Listing D.41)

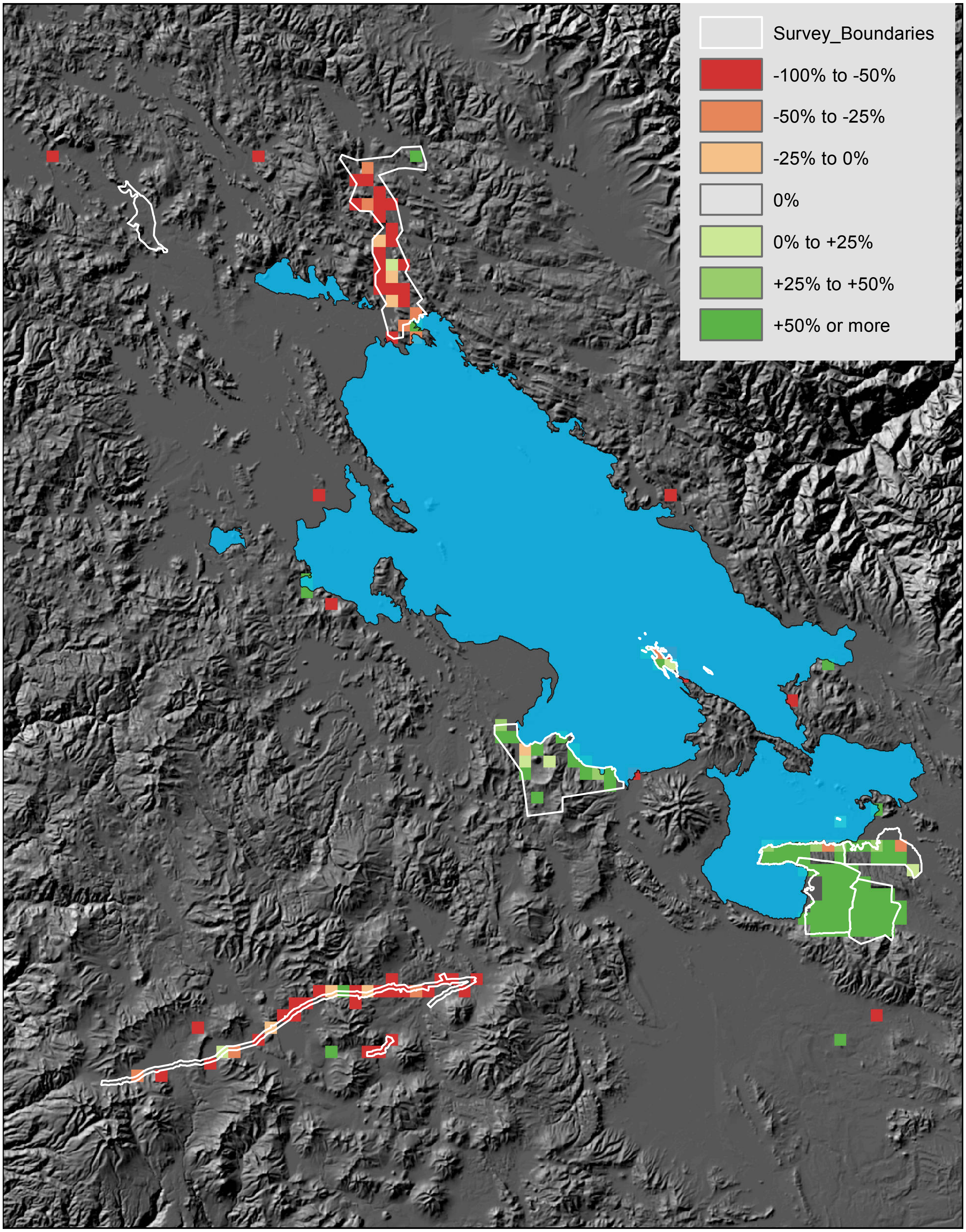


Figure 3.31: Population Change from Previous Phase to A.D. 600–1000 (See Listing D.41)

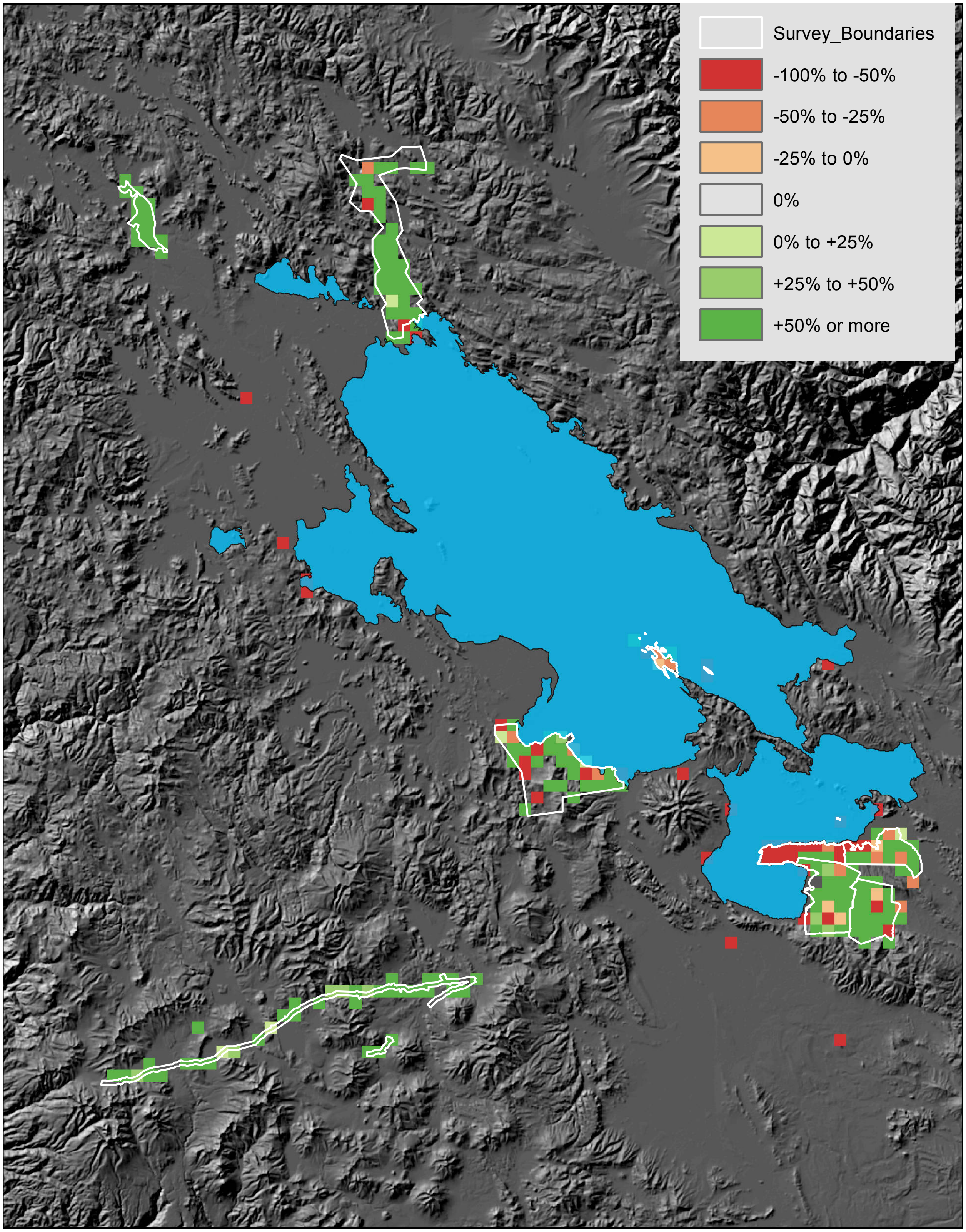


Figure 3.32: Population Change from Previous Phase to A.D. 1000–1150 (See Listing D.41)

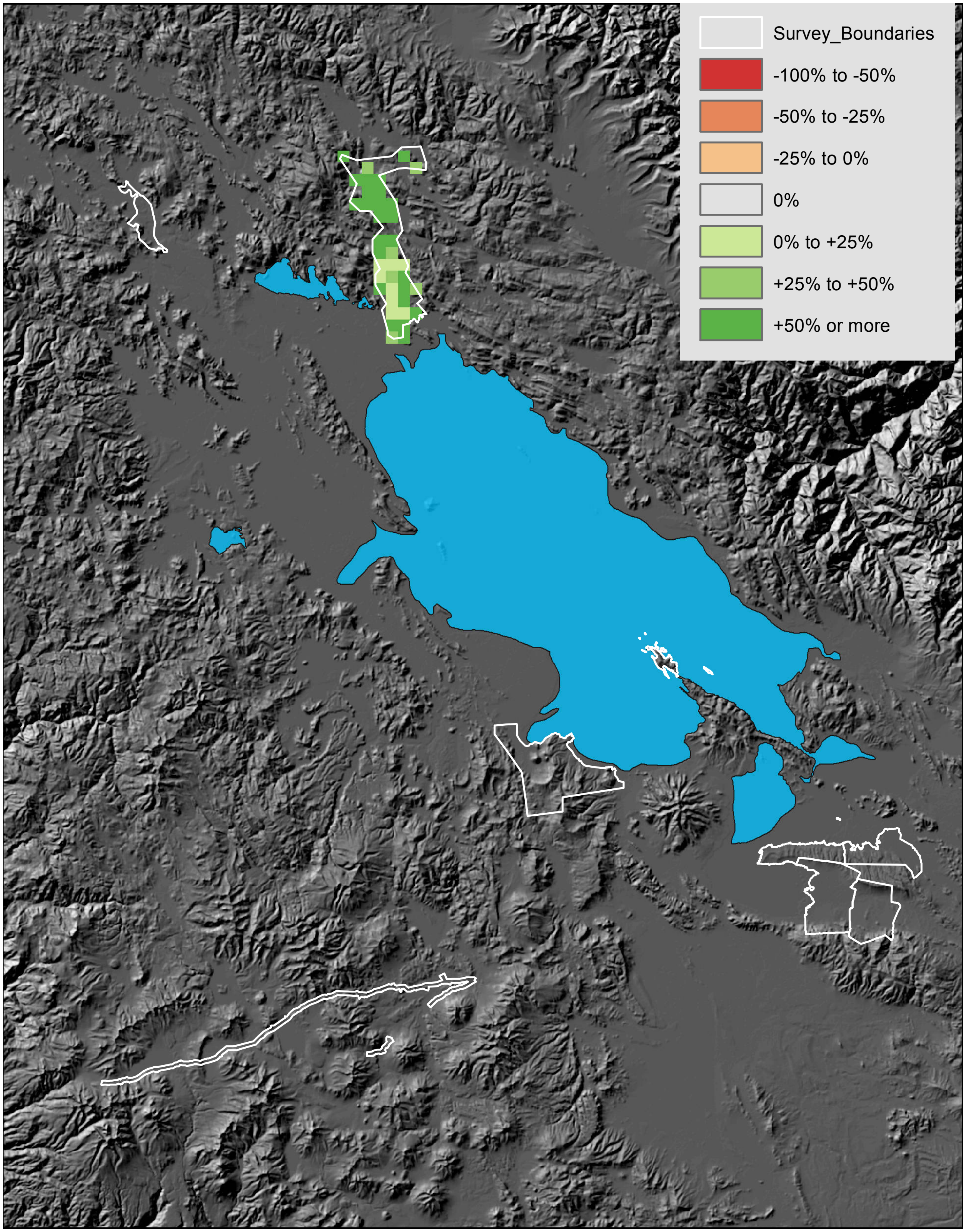


Figure 3.33: Population Change from Previous Phase to A.D. 1150–1450 (See Listing D.41)

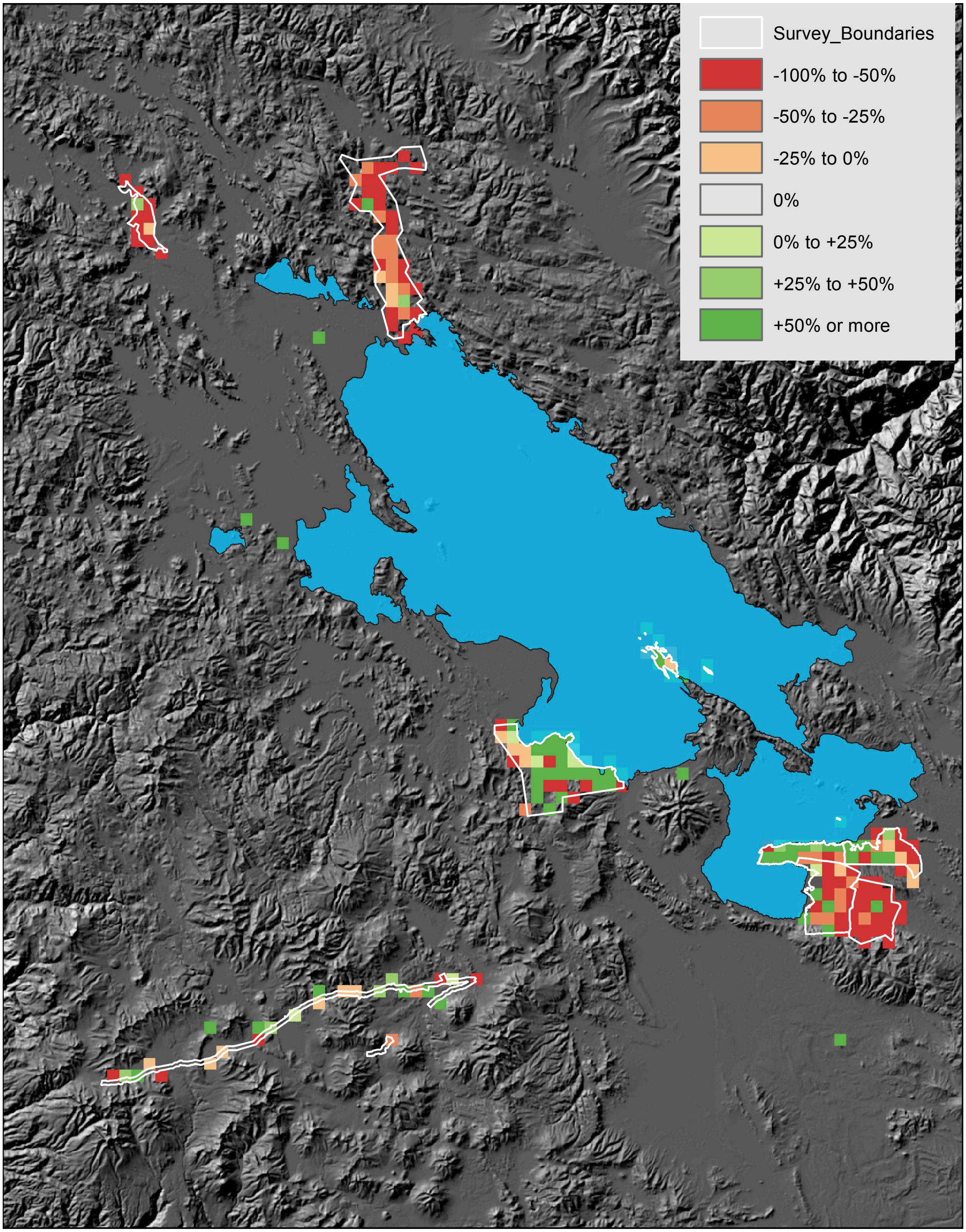


Figure 3.34: Population Change from Previous Phase to A.D. 1450–1540 (See Listing D.41)

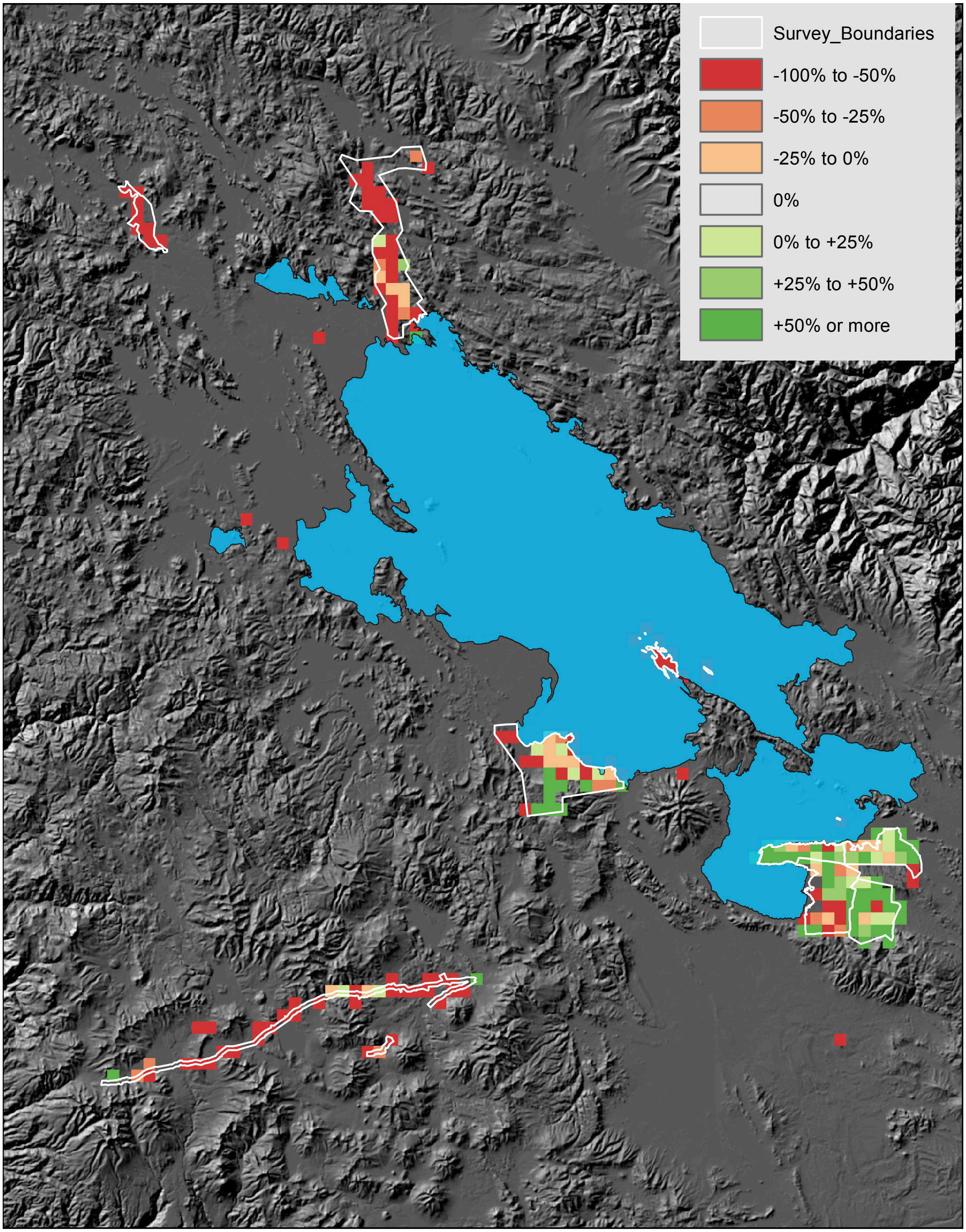


Figure 3.35: Population Change from Previous Phase to A.D. 1540–1600 (See Listing D.41)

importance for later analyses in this study which involve modeling transportation costs. This decision to conservatively model the present-day lake level is further supported by the fact that almost all time periods which I have modeled as having present-day lake level in fact had slightly lower lake levels (see Abbott et al. 1997: Fig. 4). The same Landsat 7 imagery was used to model the Arapa and Umayo lagunas for all time periods (the level of these small lakes was modeled as static, which could be improved if applicable data could be found).

These maps display some important dynamics which were not evident in any of the above depictions of demographic history. First, there is a major transition from demographic expansion to demographic reorganization. This transition occurred at different times in different regions. The Lake Titicaca region as a whole was characterized by demographic expansion until demographic reorganization became more prominent in the 850–450 B.C. or 450–250 B.C. period. This is visible in the predominance of green cells in Figure 3.25 versus the significant number of red cells in Figure 3.26. A transition at this time is visible at the survey scale for the Huancané-Putina region, the Pukara Valley, the Island of the Sun, and the Taraco Peninsula. However, the transition occurs later, in the 250–1 B.C. or A.D. 1–250 period, for the Juli-Pomata region, the lower and middle Tiwanaku Valley, and the Katari Valley. This transition in the Tiwanaku Valley is not contradicted by the newer data of the restudy by Lémuz Aguirre and Bandy (see Bandy 2013: Fig. 7.3). At the same time (250–1 B.C. or A.D. 1–250), the scale of demographic reorganization also dramatically increased in the regions with earlier transitions (Huancané-Putina, Pukara Valley, Island of the Sun, and Taraco Peninsula).

There are some methodological problems with chronological frameworks varying between regions (see Table 3.3), but overall this argument for a transition with varying regional timings is the best fit to the presently available data. These regional variations in the transition from demographic expansion to demographic reorganization are not well explained by environmental differences between the regions. For example, near-shore areas had variously early (Taraco Peninsula) and late (Juli-Pomata) transitions, and inland areas had variously early (Pukara; northern Huancané-Putina) and late (Tiwanaku Valley) transitions. Population pressure may have been a factor behind the regional variation, but not the sole or even the primary one.

As apparent in Figures 3.3 and 3.5, while regions with later transitions were somewhat less densely populated, a wide variety of population growth histories and population densities characterized both regions with early transitions and regions with late transitions. A better explanation is that different regions had significantly different political histories, with peoples of some regions experimenting with new social forms and economic organizations earlier than peoples of other regions.

Another notable aspect of the early maps is the uniquely early dense nucleus of population in the southern Huancané-Putina region. As visible in the 1100–850 B.C. population map, no other place in any of the intensive survey areas has anything comparable. Although certainly near the lake compared to many places, it is important to observe that this nucleus developed at a time of low lake levels, and was therefore somewhat distant from the lake. Interestingly, this early nucleation did not translate to dominance a half millennium later: the truly major population nuclei which began to develop at that time were all in other places (see the 250–1 B.C. population map).

If proximity to the lake is of moderate importance at best in understanding the Huancané-Putina region's early population nucleus, one might view the 850–450 B.C. population map as evidence that proximity to the lake was much more important in the southern Titicaca region, given the Taraco Peninsula's dense populations relative to its neighboring regions. However, this is a good example of a probable illusion arising from the imperfect correlation between archaeological phases and lake level change. The populations depicted in the 850–450 B.C. population map are actually the populations for the period from about 800 to 200 B.C. (see Table 3.3). Although it is essentially by definition impossible to know how population varied within a phase, it is probable that the population estimates better reflect population sizes at the end of the archaeological phase, given the general history of population growth during the Formative period. Therefore, the dense populations on the Taraco Peninsula would be better viewed in comparison to the lake level in the 450–250 B.C. map, when the lake was much more distant. In fact, Bandy (2004b: 100–107) has persuasively argued that the dominance of the Taraco Peninsula at this time was in large part due to the precise opposite of proximity to the lake: he has argued that lake level change put the Taraco Peninsula along an optimal transportation route which had earlier been under Lake Titicaca's waters.

Bandy's (2013) model of urban development without significant surrounding rural populations, discussed above in Section 3.1.4, is nicely illustrated by the population map for the 250–1 B.C. or A.D. 1–250 period. Just as the Tiwanaku Valley strongly contrasts with the extensive high population densities of the Taraco Peninsula, the Pukara Valley contrasts with the southern Huancané-Putina region's smaller but much more extensive population nucleus.

With the exception of changes on the Taraco Peninsula, little of the change in the periods from A.D. 1 to 250 and from A.D. 250 to 600 is methodologically secure, for a variety of reasons discussed in Section 3.1.3. As mentioned above in Section 3.1.3, the change which is apparent on the Taraco Peninsula is best explained by Bandy's (2001: 196–198) argument for emigration to the site of Tiwanaku. The population decline in the A.D. 250–600 maps at the northern Titicaca region's Taraco (not to be confused with the Taraco Peninsula, it is visible between the Huancané-Putina region and the Pukara Valley) has been modeled individually in these maps rather than using the chronology used for the rest of the inter-survey dataset, to account for the site's destruction around A.D. 100 (Stanish and Levine 2011).

For reasons discussed in Section 3.1.3, most of the population decline evident in the A.D. 600–1000 maps (in the northern Titicaca region and the Qawra Thaki region) is probably a methodological artifact. For reasons also discussed in Section 3.1.3, the very extensive population increase in the Tiwanaku Valley is *not* a methodological artifact, something we can say with confidence thanks to the restudy of the Tiwanaku Valley by Lémuz Aguirre and Bandy (Bandy 2013). In all of the survey regions with reliable demographic data for this time period except the Island of the Sun (Juli-Pomata; four contiguous surveys), there is a nearly monolithic spatial extensiveness of population growth (i.e., a nearly full coverage of green cells in the population change map). This is an enormous contrast to the Titicaca region's preceding Middle and Late Formative periods. The dynamic Formative demographic landscape created by voting with one's feet gave way to a demographic landscape largely engineered by a powerful and far-reaching polity. Still, most of the Tiwanaku Valley itself remained surprisingly sparsely populated, both in absolute terms and relative to, say, the far end of the Taraco Peninsula, or even several areas covered by the inter-survey dataset (see the population map for A.D. 600–1000). This is a nice example of territory taking the shape of a network rather than an all-encompassing inkblot even in a powerful polity (Smith 2007), something which has already been well established for Tiwanaku at various scales by other scholars (Stanish 2009; Smith and Janusek 2014).

Since most of the population decline in the Tiwanaku period maps is methodologically problematic, the subsequent Altiplano period increases in the northern Titicaca region and the Qawra Thaki survey region are also problematic. A more reliable picture of a mosaic of growth and decline is evident in the other regions, as expected from the population decline discussed in Section 3.1.2 and the population dispersal discussed in Section 3.1.4. Something not apparent in previous sections' depictions of the demographic data is the fact that, even as population in the middle Tiwanaku Valley was dispersing out of the site of Tiwanaku, a considerable population nucleus remained in the area surrounding the site of Tiwanaku. In fact, as visible in the population map for A.D. 1000–1150 or A.D. 1150–1450, the grid cell with the largest population in all of the Titicaca region is a grid cell adjacent to the site of Tiwanaku. It should be noted that estimates for the timing of Tiwanaku's collapse differ somewhat, and that therefore the population change depicted in the A.D. 1000–1150 maps for the four contiguous southern surveys could be pushed to the A.D. 1150–1450 maps.

While the northern Titicaca region's Altiplano period population increases are methodologically problematic, its decreases should not be. In the Huancané-Putina region, the somewhat substantial Tiwanaku-period Huaña villages in the northern part of the survey area disappeared during the Altiplano period. These populations appear to have dispersed into the surrounding areas still within the northern Huancané-Putina region, but it is also possible that some of the population moved to the more densely populated southern Huancané-Putina region or to other regions. It should be noted when examining the population change map for A.D. 1150–1450 that, although there was population growth from the early Altiplano period to the middle Altiplano period in the Huancané-Putina region (see Figure 3.3), negative population change in the maps is impossible for the Huancané-Putina region since the early Altiplano phase is included in both the A.D. 1000–1150 map and the A.D. 1150–1450 map (see Table 3.3).

For the most part, the Inca period (A.D. 1450–1540) was a time of re-nucleation: red cells dominate the population change map (Figure 3.34), despite the increase in total population size (see Figure 3.1). As discussed in Section 3.1.3, the Juli-Pomata region is dramatically different, probably because of substantial colonization orchestrated by the Inca. The Taraco Peninsula likewise had widespread growth. As Bandy (2001: 266–267,272) has argued, this probably reflects immigration from neighboring regions as part of a lakeshore-focused reorganization of agricultural production by the Inca. As noted by Stanish et al. (1997: 58) and visible in the A.D. 1450–1540 population map, the lakeshore area was also the focus of settlement in the Juli-Pomata region. Although the Inca and Colonial period maps need some corrections for the Katari Valley (see above), even after such corrections the Katari Valley would be even more heavily settled than the Taraco Peninsula was during the Inca period (Bandy and Janusek 2005: 282).

The early Colonial period (A.D. 1540–1600) has a good deal of inter-regional variation in its population dynamics. As argued by Stanish et al. (1997: 31,58–59), the Juli-Pomata region largely inherited the spatial structure created during the Inca period: the most densely populated areas remain along the central portion of the region's lakeshore, while at the same time the Altiplano/Inca trend towards increased use of higher elevation areas distant from the lake continued. Population change in the four southern contiguous surveys' region was more dynamic and varied. The Inca period emphasis on the Taraco Peninsula intensified to a new level during the early Colonial period (also see Bandy and Janusek 2005: 283–287). Other parts of the four southern contiguous surveys' region also had quite a bit of change, both increases and decreases. Bandy and Janusek (2005) have convincingly argued that the Taraco Peninsula's much higher growth was due to the fact that it was governed directly by the Spanish crown, whereas the surrounding regions were *encomiendas* (granted to individual Spaniards, who were typically very oppressive). Since the Juli-Pomata region was also a crown territory rather than encomiendas (Julien 1983: 19), this helps explain its relative Inca-to-Colonial demographic stability. The Huancané-Putina region at first appears to be the most different region of all, with very extensive depopulation on the maps, but this pattern does not hold up when the finer chronology available for the Huancané-Putina region is used. While there is a lot of difference between the early Inca and early Colonial settlement patterns, the late Inca and early Colonial settlement patterns are quite similar (see Stanish et al. 2014: 279–281; also see this study's Figures 3.2 and 3.6). The "depopulations" apparent in the maps for the Pukara Valley and the Island of the Sun are only due to an absence of settlement pattern data for the early Colonial period.

3.2 Political Structure in Lake Titicaca Societies

This chapter's above analyses provide a foundation for a more direct examination of political structure. This section will present two types of analysis: an analysis of political hierarchy and integration using population size histograms and rank-size graphs, and an analysis of political grouping using cluster analysis.

3.2.1 Political Hierarchy and Integration

For most of the histograms, the X-axis has population size bins (ranges or "categories") and the Y-axis has the number of archaeological components whose sizes fall within each bin. Some of the histograms' Y-axes instead display density, or in other words what fraction of the components falls within each bin; this allows comparison between survey regions or supra-survey regions even when the regions have very different numbers of components. Figures 3.36 and 3.37 present population histograms for the pan-Titicaca scale, Figures 3.38 and 3.39 for the supra-survey scale, and Figures 3.40 and 3.41 for the survey scale. Two figures are presented for each scale because in each pair the first figure shows the entire histograms and the second figure shows only the bottom left portion of each histogram at a finer resolution (narrower bin widths). This is done because the entire histogram is necessary to see the right-side outliers, which are of key importance to understanding the overall structure of the settlement system, but displaying such wide axes obscures breaks in the left side (ranges of X with 0 Y), which are of key importance to identifying intermediate tiers within a settlement hierarchy. Note that in each pair of figures, the first figure's X-axes are logarithmic, whereas the second figure's are not. The boundary used in distinguishing “northern” from “southern” Titicaca for the supra-survey scale histograms is at the Ilave River for the western Titicaca region and at the Suches River for the eastern Titicaca region, following Stanish (2003: 129,145,170,189,196–197).

Even before beginning to search for hierarchical structure within these population histograms, it is important to be aware that political hierarchy is not the only condition or process which can result in archaeological settlement pattern hierarchies. Duffy (2015) has identified, and provided a useful framework for assessing evidence for, a range of alternative social histories which equally lead to settlement pattern hierarchies either in the actual living landscape or else later in the archaeological record. These alternative histories can hinge less, or not at all, on political hierarchy and more on seasonal aggregation and dispersal, longer-term aggregation and dispersal (e.g., related to histories of warfare), village fissioning histories, ecological differences, or non-hierarchical spatial specialization (e.g., regional gathering places) (Duffy 2015: 87–89).

Despite the utility of Duffy’s (2015) framework, most hierarchical settlement patterns through time and space in the Titicaca region are presently best explained by the more conventional interpretation that they reflect political hierarchies. With the exception of the Altiplano period, which was characterized by a great deal of warfare and more mobile subsistence systems, seasonal subsistence or longer-term defensive concerns seem unlikely to have created settlement hierarchies via histories of aggregation and dispersal. The potential role of village fissioning should be considered for the Formative period, but in a very in-depth study of village fissioning in the Titicaca region (the Taraco Peninsula, more specifically), Bandy concluded that the settlement system was comparatively stable from the start (Bandy 2004a: 329) and that it became completely stable (non-fissioning) quite early on, around 800 B.C. (Bandy 2004a: 330–331). Substantial ecological differences do exist within the Titicaca region, most notably the contrast between lakeshore and inland areas, but as discussed above in relation to the population maps, the lake, while rich, is not a good primary explanatory factor for settlement nucleation except for the Inca period.

Thus, two of the idealized scenarios outlined by Duffy (2015) remain: political hierarchy and non-hierarchical spatial specialization. There is, moreover, very good evidence for either

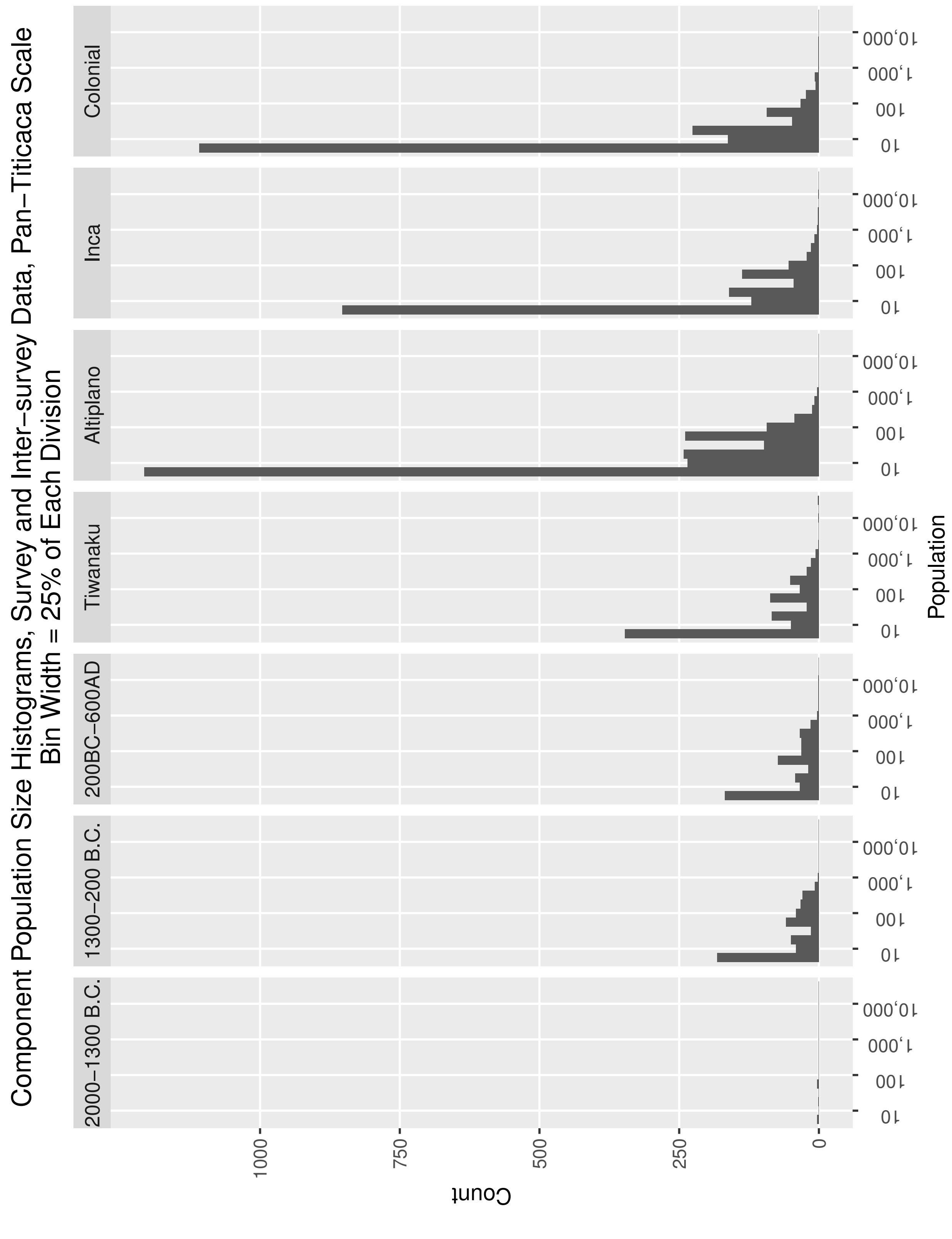


Figure 3.36: Population Histograms, Pan-Titicaca Scale (See Listing D.27 for R source code)

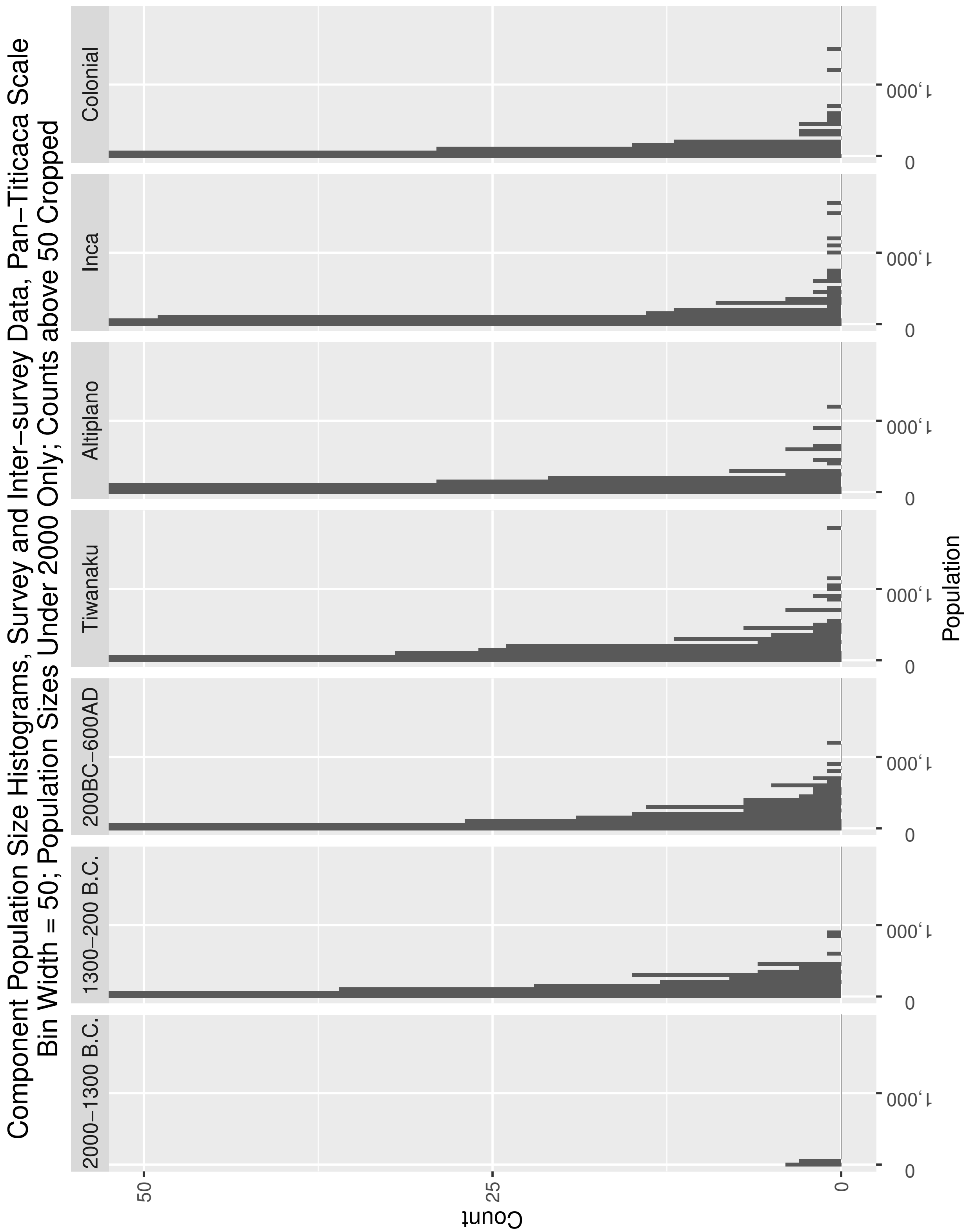


Figure 3.37: Cropped Population Histograms, Pan-Titicaca Scale (See Listing D.27)

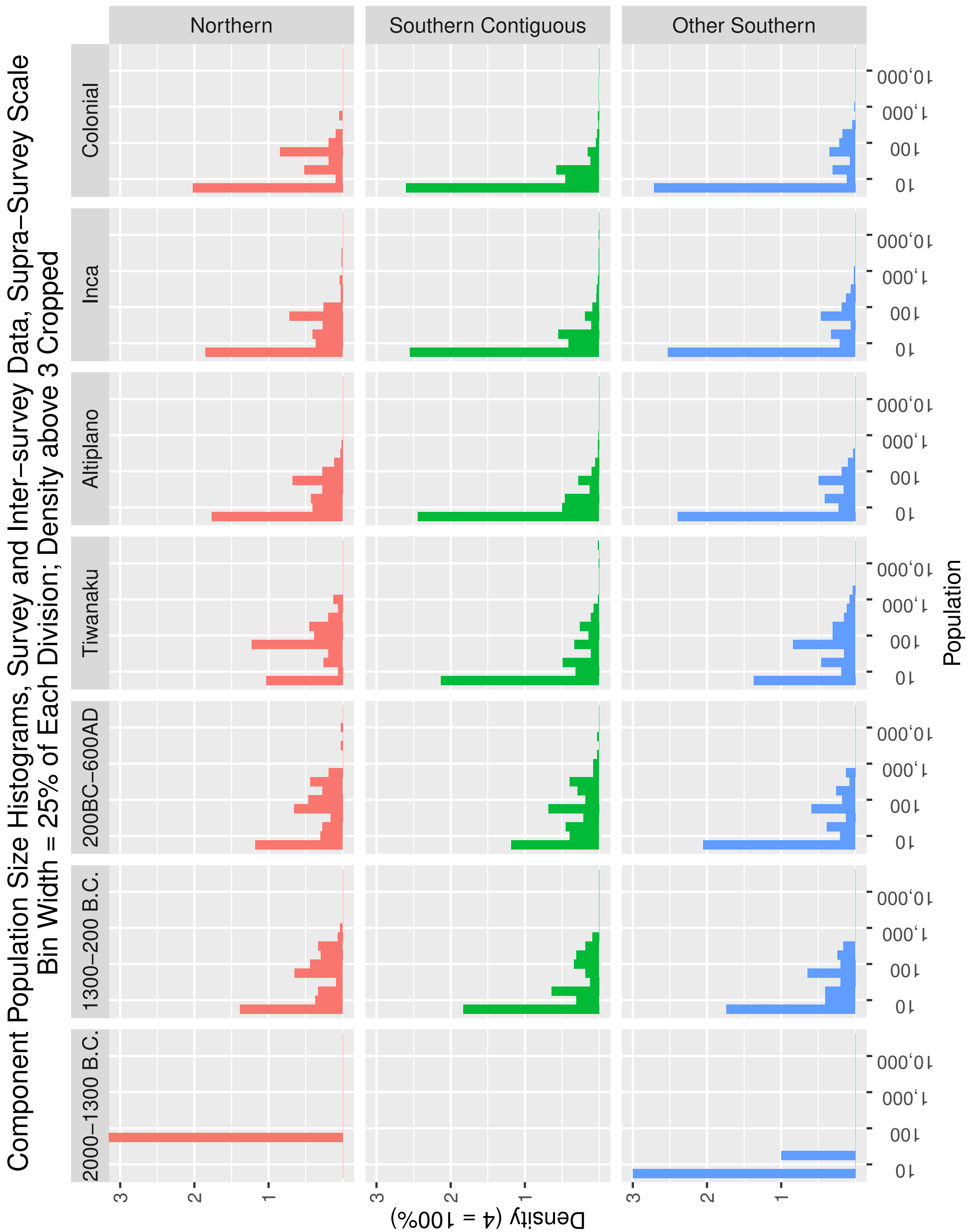


Figure 3.38: Population Histograms, Supra-Survey Scale (See Listing D.27 for R source code)

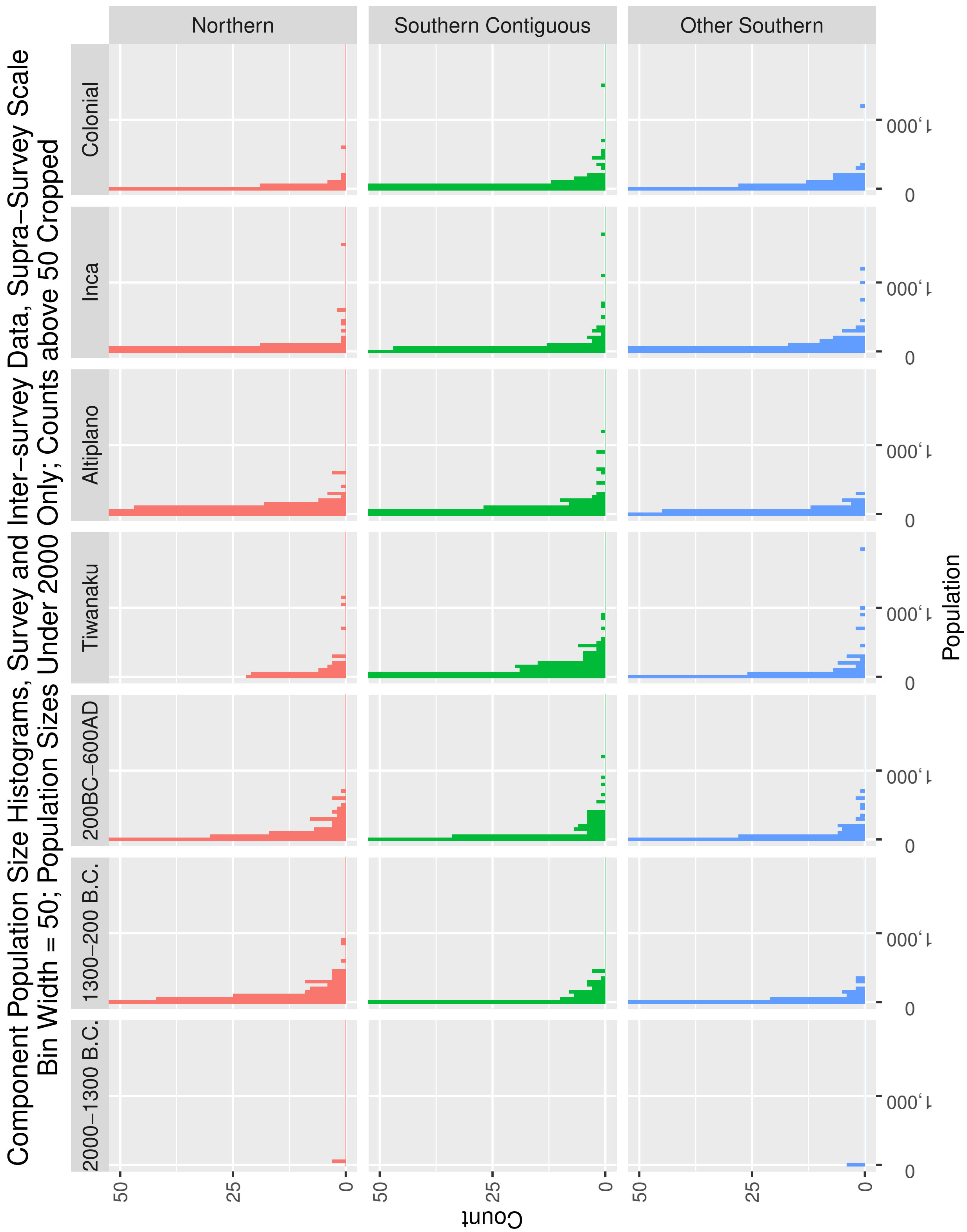


Figure 3.39: Cropped Population Histograms, Supra-Survey Scale (See Listing D.27)

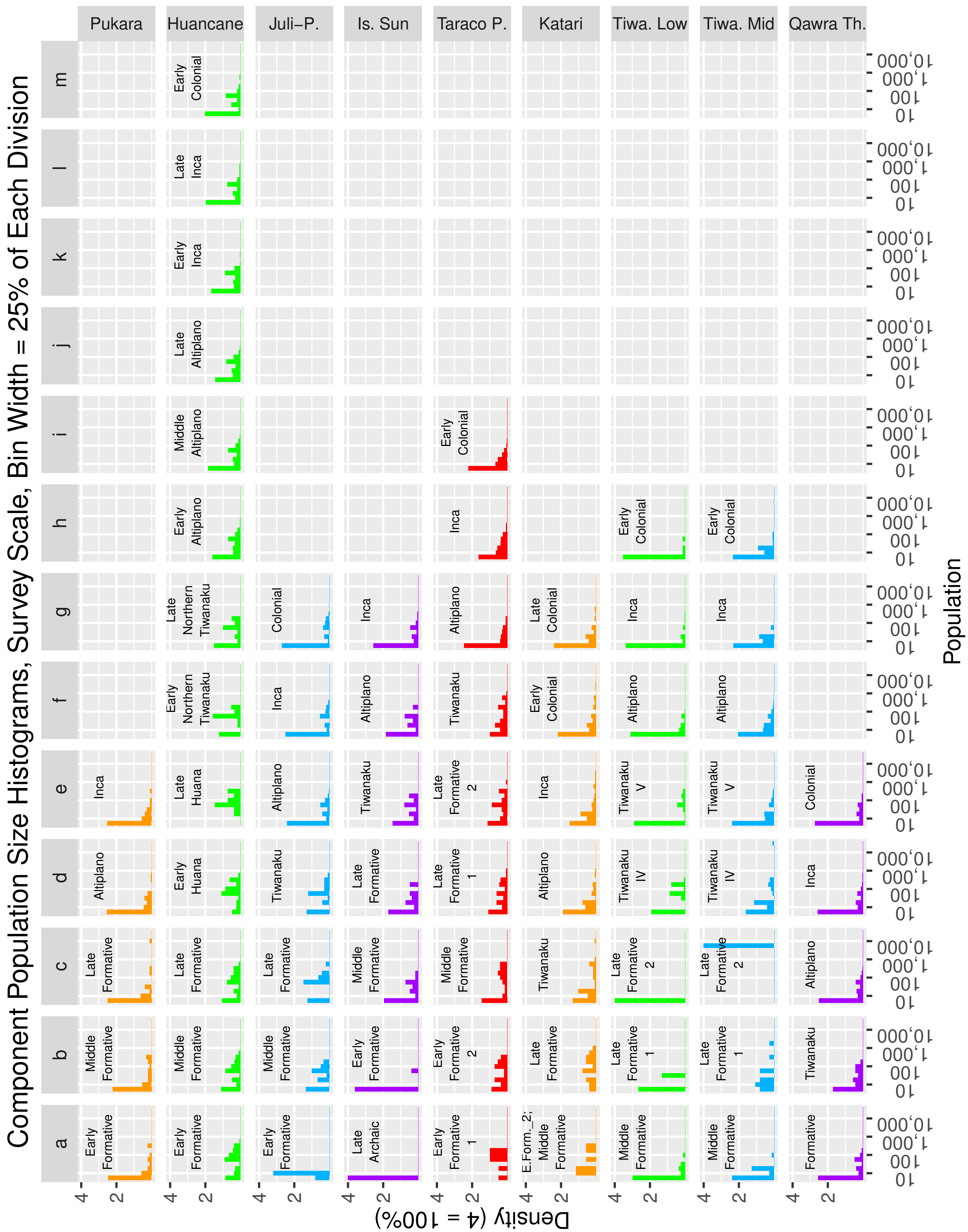


Figure 3.40: Population Histograms, Survey Scale (See Listing D.28 for R source code)

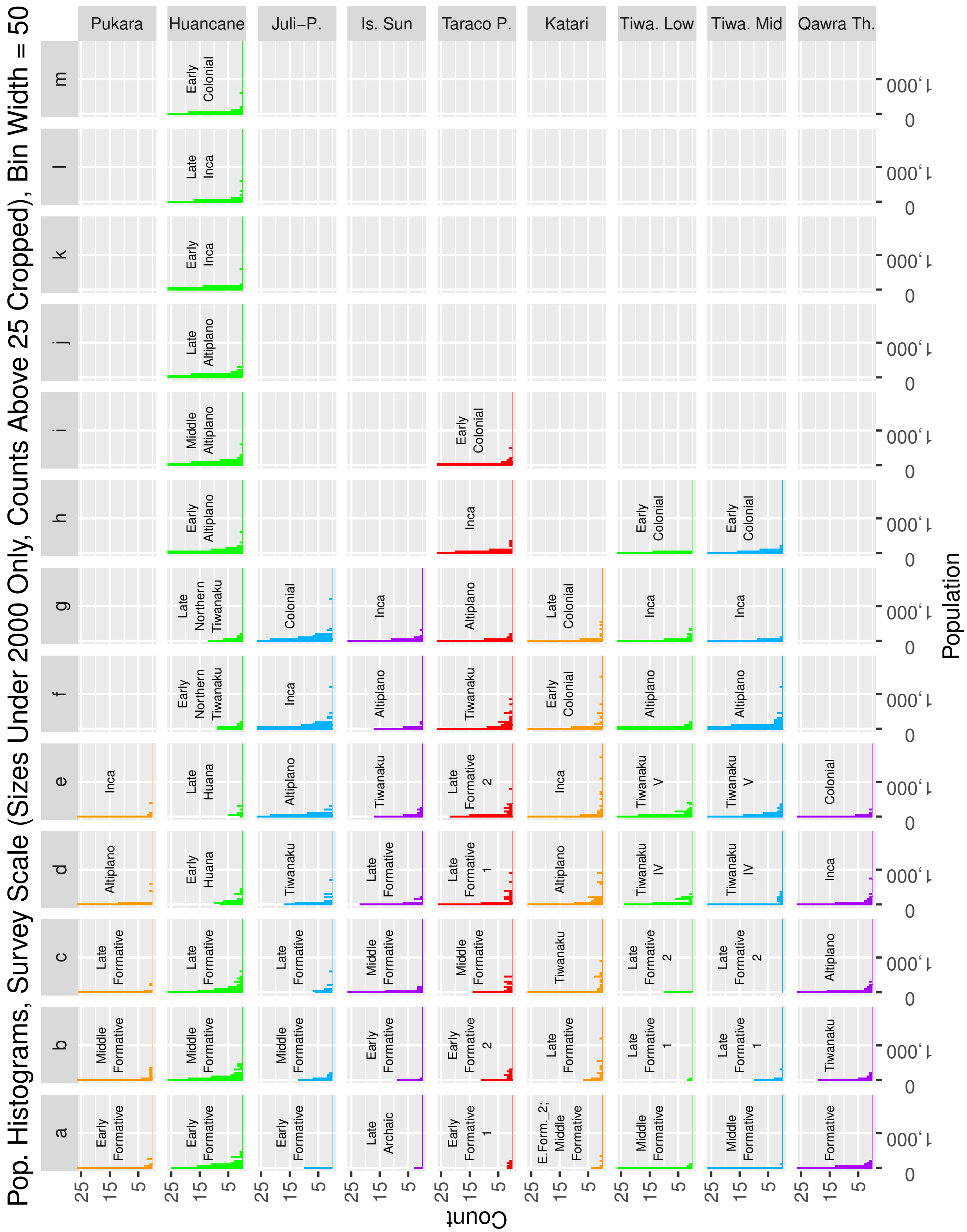


Figure 3.41: Cropped Population Histograms, Survey Scale (See Listing D.28)

of these scenarios in the form of what Duffy terms "integrative architecture" preferentially located at large sites. This evidence will be presented in detail below in Section 3.3. Both political hierarchy and non-hierarchical spatial specialization had some role in creating the Titicaca region's settlement hierarchies, but I believe that the best argument at present is that political hierarchy is mainly responsible. Non-hierarchical spatial specialization was of importance in some cases (e.g., Janusek 2015: 130–131; Smith and Pérez Arias 2015; relatedly also see Janusek and Blom 2006; Marsh 2012: 58–59), but at a more fundamental level most large sites in the Titicaca region probably did not primarily exist to gather or otherwise temporarily attract non-residents (e.g., Bandy 2004a; Bandy 2013).

Before examining the population histograms it should also be noted that some of the raw data used to construct the intensive surveys database (see Appendix A) is in the form of component size ranges rather than absolute component sizes. It therefore requires caution to not confuse discrete tiers arising from the data's quantification with discrete tiers in the actual settlement patterns.

With possible exceptions for the Tiwanaku, Inca, and Colonial periods, the pan-Titicaca histograms aggregate what were actually quite discrete settlement systems. An identification of hierarchical structure within these histograms therefore does not carry the implication that a significant part of the Titicaca region was politically integrated via this structure. Nevertheless, it is useful to begin the search for hierarchical structure at the pan-Titicaca scale. For one thing, this may help avoid illusory patterns created by partitioning any settlement system which was in fact integrated. For another thing, beginning at this scale provides a summary of the data which will make for quicker understanding of the finer scales. The non-cropped version of the pan-Titicaca histograms (Figure 3.36) does not present any pattern which is surprising in light of the above discussions. The later periods have histograms with more of the distribution concentrated at the extreme left, which accords well with the discussion of increased dispersion above in Section 3.1.4. Also as expected, the large major sites of the Late Formative, Tiwanaku, Inca, and Colonial periods give these periods' settlement systems a distinct upper tier which is absent during the other periods (or, for the Tiwanaku period at least, two upper tiers). The cropped version of the pan-Titicaca histograms (Figure 3.37) suggests that the low-end for all periods except the Early Formative can be separated into at least two tiers. In summary, the Middle Formative and Altiplano period settlement systems are best described as two-tier, the Late Formative, Inca, and Colonial settlement systems as three-tier, and the Tiwanaku period settlement system as four-tier. If the Inca and Colonial periods were viewed at a wider Andean scale, they would also have four-tier settlement systems. A reasonable alternative interpretation of the histograms would be to increase all periods' tier counts by one, since it can be argued that single-household sites (the most common size in all periods) should be separated out as a fundamentally different social and political type. Regardless, in the following discussion I will use the first set of tier count figures.

Shifting to the supra-survey scale (Figure 3.38), patterns quite similar to the pan-Titicaca scale pattern are evident for both the northern Titicaca region and the four contiguous southern surveys. The only major exception is that the northern Titicaca region lacks a Tiwanaku-period upper tier. In contrast, the southern Titicaca region outside the four contiguous surveys' area lacks upper tiers for all periods, but most of this area could be included in broader Tiwanaku, Inca, and Colonial settlement systems with upper tiers. While the northern Titicaca region appears to have two separate upper tiers for the 200 B.C.–A.D. 600 period, this is in fact an illusion created by the coarseness of the chronology: the two "tiers" correspond to the sites of Pukara and Taraco, and Pukara likely reached its maximum size after Taraco had become a relatively minor site (see Stanish and Levine 2011). The cropped supra-survey histograms (Figure 3.39) also display patterns similar to the pan-Titicaca scale's low-end pattern: in all three of the supra-survey regions, all periods after the Early Formative have at least two discrete low-end tiers. The low-end tiers are less clearly discrete in the northern region's Late Formative, the southern contiguous survey region's Middle Formative, and the rest of the southern region's Middle Formative and Altiplano periods, but two discrete low-end tiers is still the best approximation for these times and places as well.

Before moving on to the survey scale, a note on the Katari Valley is necessary. Due to the issues with this study's database for the Katari Valley's Inca period and early Colonial period (discussed above), Bandy and Janusek's (2005: 280–281) Inca and early Colonial histograms are superior to this study's Katari Valley histograms. Although their histograms are actually for a combined region of the Katari Valley, the Taraco Peninsula, and the lower Tiwanaku Valley, the histograms and Bandy and Janusek's discussion of them provide all the information necessary for a correction of this study's Katari Valley histograms. The Katari Valley's Inca period histogram should have a third (upper-most) tier which is further to the left than the one in this study's histogram but which is still certainly a discrete tier (specifically, the tier should be moved from 3800 to 2100). On the other hand, the Katari Valley's early Colonial period third (upper-most) tier should be removed.

The hierarchical structure is reduced for some periods in some regions at the survey scale (Figures 3.40 and 3.41), but this is mainly because some settlement systems are partitioned at this scale. Essentially, the effect of zooming from the supra-survey scale to the survey scale is that the hierarchical structure is reduced from four or three tiers to two tiers for: 1) the Late Formative in the Huancané-Putina region, the Taraco Peninsula, the Katari Valley, and the lower Tiwanaku Valley, 2) the Tiwanaku period in the Taraco Peninsula and the lower Tiwanaku Valley, 3) the Inca period in the Pukara Valley, the Huancané-Putina region, the Taraco Peninsula, and the lower Tiwanaku Valley, 4) the early Colonial period in the Huancané-Putina region, the Taraco Peninsula, the Katari Valley (see previous paragraph), and the lower Tiwanaku Valley. In all of these cases, it is best to view this as an artifact of partitioning a larger Pukara, Tiwanaku, Inca, or Colonial settlement system (for a related discussion, see McAndrews et al. 1997: 73–74).

In summary, the best perspective on hierarchical structure is provided by the supra-survey scale histograms for the northern Titicaca region and the four southern contiguous surveys. The latter are essentially similar to the pan-Titicaca scale histograms, whereas the northern Titicaca region is primarily distinguished from these by its less hierarchical Tiwanaku period structure. This is not an artifact of partitioning a larger system, because it is best to treat the northern Titicaca region as having a Tiwanaku-period settlement system which was fundamentally separate from the southern Titicaca settlement system. For a lengthier discussion of the political presence of Tiwanaku in the northern Titicaca region, see the above discussion of the Huancané-Putina region in Section 3.1.3. However, also note that some other parts of the northern Titicaca region were clearly well integrated into Tiwanaku's settlement system (Stanish 2003: 186–189). While some of these northern Tiwanaku sites were somewhat large, it is clear from the supra-survey histograms that they do not constitute a tier even remotely comparable to the Late Formative's northern and southern upper tiers or to the Tiwanaku period southern upper tiers.

Rank-size graphs provide an important complement to the histograms discussed above. A conventional rank-size graph plots site ranks on a logarithmic axis and site sizes on a logarithmic axis. It then defines a "log-normal" line which, for comparison to the actual rank-size curve, illustrates a relationship in which the site with the second highest rank is one half the size of the first highest ranked site, the site with the third highest rank is one third the size of the first highest ranked site, and so on. Whereas the histograms above were useful for distinguishing political tiers, the rank-size graphs allow a better perspective on what these tiers, especially the upper-most, actually represent. Most importantly, rank-size graphs should help distinguish between an upper-most settlement tier composed of distinct peer polities and an upper-most settlement tier which functions to either help integrate or else dominate an entire settlement system. Generally, a convex rank-size curve above the log-normal line reflects a situation in which the settlement pattern data have "pooled" or aggregated multiple discrete political-economic systems (Johnson 1981). On the other hand, a convex rank-size curve can equally be the result of partitioning a larger system (Johnson 1981: 165–171); while it may seem confusing at first that opposite political scenarios therefore produce the same rank-size convexity, in practice one can usually easily distinguish between the two political scenarios. Establishing that a region's rank-size convexity is caused by system partitioning rather than system pooling is accomplished by identifying one or more regions with non-convex rank-size curves among the neighbors of the region with a convex curve, and identifying other lines of evidence (such as ceramic distributions) which indicate that the convex and non-convex regions are best viewed as parts of one system. If a rank-size curve isn't convex, it is either roughly log-normal or roughly concave. A roughly log-normal rank-size curve reflects an integrated settlement system with a high degree of interdependency (Johnson 1981). And finally, a concave rank-size curve below the log-normal line (at least on the left side) reflects various situations in which the largest settlement dominates the system (i.e., vertically but not horizontally integrates the system) and/or is better connected to a larger system (Johnson 1981). If vertical integration suppresses horizontal integration, then a "primo-convex" curve is expected, which has a concave left side and a convex right side (Johnson 1981: 173–175).

Figures 3.42 to 3.44 present rank-size graphs for the survey scale. Creating rank-size graphs for the supra-survey and pan-Titicaca scales would be useful, but this will be reserved for a future study. All of the rank-size graphs use (normalized) component population estimates for size, rather than component spatial sizes. Figure 3.42 presents rank-size curves grouped together by phase, whereas Figures 3.43 and 3.44 present each phase of each survey individually. Figures 3.43 and 3.44 also present a summary statistic, "coefficient *A*," for each phase of each survey. "Coefficient *A*" was devised by Drennan and Peterson (2004), and can be roughly defined as the area between a rank-size curve and the log-normal line (the black line in my rank-size graphs), where area above the log-normal line is positive (and is scaled to a maximum of one) and area below the log-normal line is negative. Although Drennan and Peterson have made a computer program for calculating this coefficient available online, it was temporarily unavailable at the time I was conducting this rank-size analysis. I therefore coded my own implementation in R (see Listing D.10), but, importantly, I did not attempt to implement Drennan and Peterson's bootstrapping procedure for establishing statistical confidence, due to time constraints. Listing D.10 may be of interest to an analyst who wants to customize Drennan and Peterson's ideas, but before it can be considered a substitute to their "rsboot" program, my code's calculation of coefficient *A* needs to be rigorously tested against Drennan and Peterson's program, and the code needs to be extended to incorporate bootstrapping.

Figure 3.42 provides a perspective on the general pattern through time and the major regional deviations from it. Figures 3.43 and 3.44 can be used when a high density of rank-size curves prevents a clear picture of an individual curve in Figure 3.42, or when comparisons of coefficient *A* values across time or space is helpful. The settlement systems of the 1500–800 B.C. period are all convex, suggesting the existence of multiple political groups within each

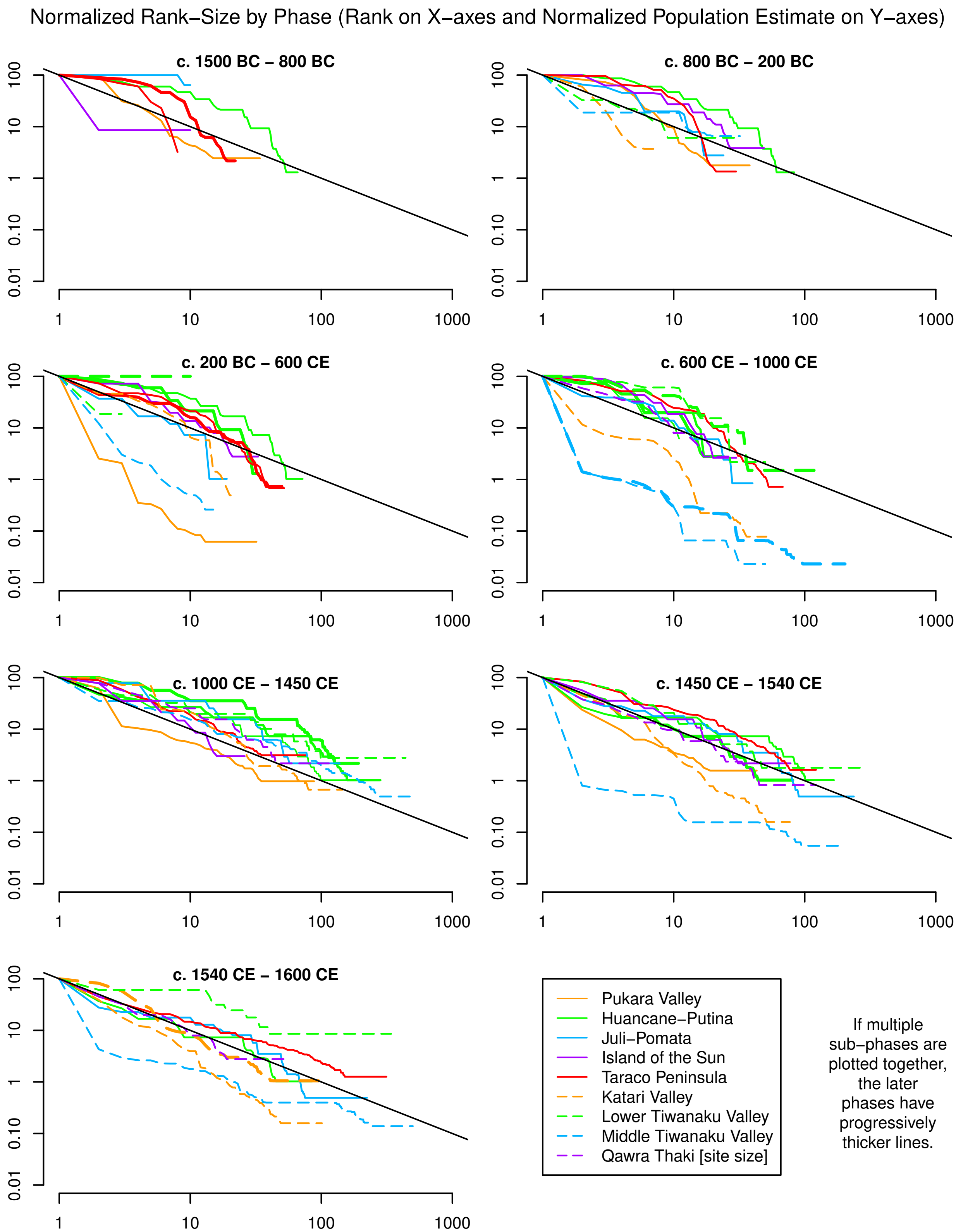


Figure 3.42: Rank-Size by Phase, Survey Scale (See Listing D.29 for R source code)

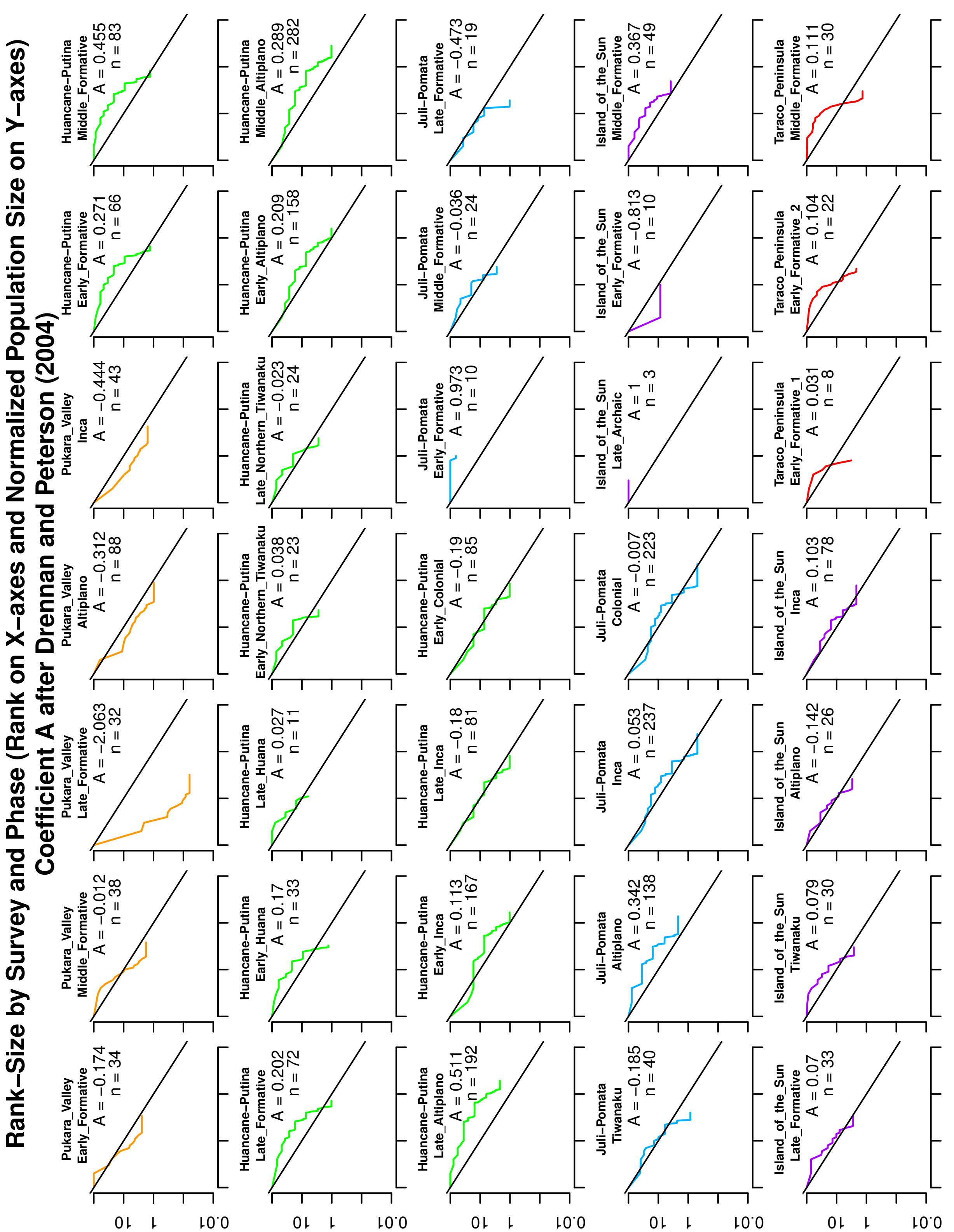


Figure 3.43: Rank-Size, Each Phase of Each Survey Individually, Page 1 (See Listing D.30)

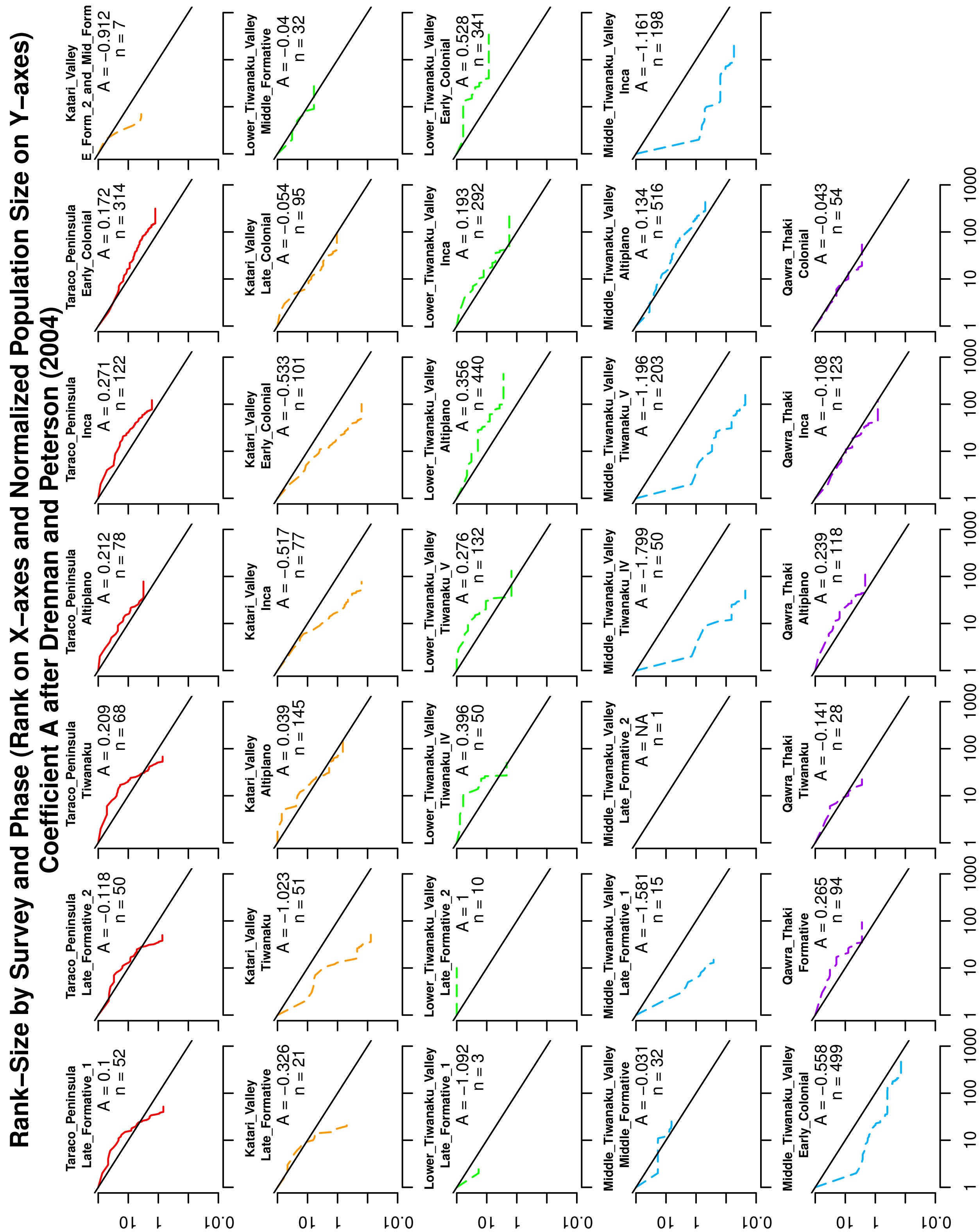


Figure 3.44: Rank-Size, Each Phase of Each Survey Individually, Page 2 (See Listing D.30)

region. The Island of the Sun's rank-size curve for this period should be disregarded, because the normalization of the population sizes obscures the fact that all of these sites were very small (the largest is one and a half hectares, and this may be an overestimate arising from the very multicomponent nature of this site).

At first glance the graph for the 800–200 B.C. period might seem somewhat different, but there is actually a clear logic linking it closely to the 1500–800 B.C. graph. All of the regions with curves displayed for the 1500–800 B.C. period continue to have convex curves during the 800–200 B.C. period (though Juli-Pomata and Pukara are more borderline). It is the three "new-comer" regions which have log-normal or concave rank-size graphs (lower and middle Tiwanaku Valley; Katari Valley). The best explanation for this is that these three regions were relatively peripheral regions during both the 1500–800 B.C. and 800–200 B.C. periods, and that while they were in some sense more integrated than the other regions, they were in reality different from the other regions only by virtue of being more peripheral. In other words, if any pair were made by combining any of these three regions with each other or with their more prominent neighboring region on the Taraco Peninsula, a convex rank-size curve would result.

The rank-size graph for the Late Formative period (200 B.C.–A.D. 600) is dramatically different. In nearly all cases there was a reduction of rank-size convexity, and in the middle Tiwanaku Valley and the Pukara Valley this was to an extent where quite dramatically concave curves appear. Interestingly given Tiwanaku's longer and more extensive political success, the Pukara Valley appears to have had a more concave Late Formative rank-size curve than even the middle Tiwanaku Valley. However, incorporation of Lémuz Aguirre and Bandy's Tiwanaku Valley restudy data, and a test of statistical significance like Drennan and Peterson's, would be necessary to confirm this. Note that the middle Tiwanaku Valley rank-size curve displayed in Figure 3.42 is for the Late Formative 1 period alone.

The Juli-Pomata region, the Island of the Sun, the Taraco Peninsula, and the Katari Valley have Late Formative rank-size curves which are close to log-normal. For the Juli-Pomata region, this fits very well with Stanish's (2003: 6,148–150) argument that during the Late Formative the Juli-Pomata region corresponds to the whole territory of a single independent polity, rather than the territory of multiple smaller polities or part of Pukara or Tiwanaku's territory. For the Island of the Sun, Stanish (2003: 153–154) has argued that it is unclear if only one or instead two Late Formative polities existed on the island. Although one of Stanish's main reservations is reflected well in the left-side convexity of the rank-size curve, overall the rank-size curve is a somewhat better fit to the scenario of a politically unified island. For the Taraco Peninsula, the roughly log-normal curves accord well with Bandy's (2001: 162–163,176,192–204) argument that the Taraco Peninsula sees its first "multi-community polity," encompassing most of the peninsula, during the Late Formative 1 period, and then sees increasing integration with the Tiwanaku Valley during the Late Formative 2 period. For the Katari Valley during Late Formative 2, we have a very nice example of Johnson's (1981) scenario of a single site being better connected to a larger system. This is because the site of Lukurmata (large by Late Formative standards at 20 hectares) had a much closer connection to Tiwanaku than did other Late Formative 2 Katari Valley sites, as evident in ceramic assemblages (Janusek and Kolata 2003: 139,145). While the rank-size curve presented here for Late Formative Katari is more log-normal than the concave curve expected by Johnson (1981) for such a scenario, more precise settlement pattern data for the Katari Valley might produce a more concave curve (recall that in this study's database, the Katari Valley component sizes are primarily based on size ranges rather than absolute sizes).

During the Tiwanaku period in the middle Tiwanaku Valley and the Katari Valley, the rank-size curves are quite concave (or perhaps primo-convex), as expected given the size and dominance of the sites of Tiwanaku and Lukurmata (but regarding Lukurmata also see Bandy 2005a: 291). While it is tempting to equate these curves' stair-like shape with exceptionally discrete political tiers, these "steps" are primarily an artifact arising from the fact that this study's middle Tiwanaku Valley and Katari Valley component sizes were primarily derived from size ranges rather than absolute sizes. Relatedly, no stair-like shape is evident in the primo-convex rank-size graphs presented by McAndrews et al. (1997: Fig.s 12 and 14) for the combined middle and lower Tiwanaku Valley (these may have been made using more precise component size data than this study's). Griffin (2011: Fig. 5) has calculated a coefficient A

value of -0.98 for McAndrews et al.'s (1997: Fig. 12) Tiwanaku IV curve for the combined middle and lower Tiwanaku Valley.

The Tiwanaku period rank-size curve for the Juli-Pomata region is very similar to its (roughly log-normal) Late Formative rank-size curve. This supports the argument for "co-option of existing political and economic institutions by the Tiwanaku state [in the Juli-Pomata region], as opposed to the imposition of new ones" (Stanish et al. 1997: 116). Most of the other regions (lower Tiwanaku Valley; Taraco Peninsula; Island of the Sun) have convex curves, which is the expected result of partitioning (see Johnson 1981: 165–171,173–175) what is best treated as a larger Tiwanaku settlement system centered on the very rank-size concave middle Tiwanaku Valley. More historically-specific arguments both support and nuance this interpretation of the convexity. The Tiwanaku period rank-size curve for the Island of the Sun is somewhat convex, and this is best attributed to a high degree of site specialization, with multiple equally large sites serving distinct roles. As Stanish and Bauer (2004c: 37) have argued, "Chucaripupata was a major ritual center during the Tiwanaku period... Wakuyu, the other large site on the island at the time, was, along with nearby Kurupata, the principal political and population center on the island." Similarly, the moderate convexity of the Taraco Peninsula's Tiwanaku period rank-size curve fits very well with a historically-specific argument made by Bandy. Bandy (2001: 222–226) argues, based on differences in site growth rates, that Tiwanaku politically targeted sites which had been second-tier rather than first-tier sites during the Late Formative. He argues that this was a strategy specific to the Taraco Peninsula, given rather different settlement histories in other regions such as the Katari Valley.

In the Huancané-Putina region, both the Late Huaña and the Tiwanaku settlement systems have roughly log-normal curves, though the Late Huaña curve has more left-side convexity than the Tiwanaku rank-size curves. These log-normal curves fit well with the argument made above in Section 3.1.3 that the Huaña and Tiwanaku settlement systems in the Huancané-Putina region were not well integrated with each other due to incompatible ideologies, and instead represent two internally well-integrated political groups. If the Late Huaña and Tiwanaku (either Tiwanaku 1 or Tiwanaku 2) data were combined, a quite convex rank-size curve would result: the six highest-ranked sites would all have sizes between three and five hectares. In other words, Huaña and Tiwanaku settlement systems in the Huancané-Putina region are roughly log-normal/integrated when treated separately, but quite convex/unintegrated when treated together. The log-normality of the Tiwanaku-only settlement in the Huancané-Putina region also fits well with the companion argument made above in Section 3.1.3 that the Tiwanaku presence in the Huancané-Putina region is more a matter of locally-driven affiliation rather than externally imposed authority. In the latter scenario, a more concave rank-size curve could be expected, reflecting an upper settlement tier's greater connectivity to the larger Tiwanaku system. Admittedly such concavity is more like the opposite of the pattern for the regions discussed in the previous paragraph, which do have evidence for a more direct Tiwanaku presence, but it is important to emphasize that the Huancané-Putina region was far more peripheral to Tiwanaku than these other regions. For example, the Huancané-Putina region is much closer (spatially) to the Pukara Valley, which has essentially no evidence of a Tiwanaku presence of any kind (Cohen 2010: 68). Given this fact, if Tiwanaku had exercised a strong hand in the Huancané-Putina region, it would be reasonable to expect a site there more like, say, Isla Esteves/Huajje. Isla Esteves/Huajje was a large Tiwanaku complex (about 15 hectares) located about half way between the Juli-Pomata region and the Huancané-Putina region (see Stanish 2003: 187), or in other words located in an area more distant from Tiwanaku than any of the regions discussed in the previous paragraph, but still less distant from Tiwanaku than the Huancané-Putina region.

Given the discussion of Altiplano period decentralization in Section 3.1.4, substantial rank-size convexity would be the expectation for this period. Such convexity is to some degree apparent in the Altiplano period rank-size curves, but overall the convexity is less than expected, and several regions' curves are better characterized as log-normal (the Pukara Valley, the Island of the Sun, and the middle Tiwanaku Valley; furthermore, the Taraco Peninsula and the Katari Valley are borderline). For the Pukara Valley and the Island of the Sun, this is partially attributable to the relatively small sizes of the regions. For the middle Tiwanaku Valley, this is mainly attributable to the fact that the site of Tiwanaku, while extremely small compared to its Tiwanaku period size, was still significantly larger than other sites in the Tiwanaku Valley. However, for the Titicaca region as a whole there is a more fundamental explanation for the unexpectedly low convexity, and this is the effect of pronounced warfare on the settlement pattern. Except for the middle Tiwanaku Valley (again, the site of Tiwanaku continues to make it not comparable to other regions) and possibly the Qawra Thaki region, in every survey region the first highest ranked Altiplano period site, or occasionally the second highest ranked, was a pukara (hilltop fort). There are two reasons why pukaras make the rank-size curves less convex than expected for decentralized, relatively unintegrated societies. The first reason is essentially methodological: pukaras are simply a quite different type of site, and the sizes reported by surveyors probably reflect the defensive structure of the site more than the population size. But even more important than this methodological concern is the fact that Altiplano societies were segmentary (Arkush 2014), or in other words were fundamentally decentralized but would aggregate and disaggregate over the course of dynamic histories of warfare. This is evident, for example, in the geography of pukaras, which form malleable nested networks rather than delineating identifiable territories (Arkush 2014). If we were able to construct a series of rank-size curves for Altiplano period societies at the temporal scale of individual years or decades, it is likely that they would alternate between curves like the ones we see in Figures 3.42 to 3.44 on the one hand, and much more convex curves on the other hand. Because the pan-Altiplano-period rank-size curves in Figures 3.42 to 3.44 are fundamentally shaped by the short-term historical moments of highest aggregation, we are left with surprisingly little convexity in the curves.

The rank-size curves for the Inca period, and the relatively similar curves for the early Colonial period, as a whole display less convexity than any of the other periods' collections of curves. The Inca period and early Colonial period curves are almost all close to log-normal. Bandy and Janusek's (2005: 280–282) Inca period rank-size curve for a larger region combining the Taraco Peninsula, the Katari Valley, and the lower Tiwanaku Valley is also clearly log-normal (their early Colonial curve is somewhat more convex). There are only two real exceptions to Inca and Colonial period log-normality in the various Titicaca survey regions' curves. The first is the concavity (or primo-convexity) of the middle Tiwanaku Valley's curves, due to the Inca state's appropriation of the site of Tiwanaku's former great significance (Yaeger and López Bejarano 2004). The second exception is the convexity of the lower Tiwanaku Valley's early Colonial curve, which is a result of the surprising fact that all of the sites are no larger than one and a half hectares. In part this reflects a methodological problem, however, because historical documents suggest that the lower Tiwanaku Valley site of Guaqui was a rather large site at this time (Albarracin-Jordan 1996a: 55,311). Beyond methodological factors, though, the convexity also reflects flight from the region's *encomiendas* to the neighboring Taraco Peninsula (see Bandy and Janusek 2005: 285–287).

The general pattern of log-normal curves during the Inca and early Colonial periods is somewhat surprising. Both the general Johnson (1981)-inspired interpretive framework which I have used thus far and the Tiwanaku period rank-size curves suggest that the non-core survey regions should have somewhat convex curves for periods when they constitute partitions of a larger settlement system centered elsewhere. In contrast, the rank-size graphs suggest that Inca and early Colonial period political economies in the Titicaca region were typically more horizontally integrated (i.e., sites were more interdependent) at the survey scale than were Tiwanaku political economies. This is surprising given the fact that the Inca state forced an extreme restructuring of the Titicaca region's political economies via population relocations, roads serving to integrate the empire as a whole, the founding of major sites in new locations, reorganization of agricultural production, and substantial labor extraction (e.g., Stanish 1997: 200–212). Under such conditions I would expect primo-convex rank-size curves in survey regions with major administrative centers (which were better connected to the Inca capital at Cusco) and moderately convex curves in other survey regions. The first expectation is roughly met in the middle Tiwanaku Valley and probably is also met for some other regions which do not have rank-size curves presented here, such as the regions surrounding Hatuncolla or Chucuito (see Stanish 2003: 240). The second expectation is not met, and this deserves a deeper examination than I can give here. For the moment, I suggest that the same restructuring which brought Titicaca societies into much larger extractive systems also allowed local elites to craft smaller systems with unprecedented integration. Morris and Covey's (2006: 151–152) conclusions regarding some other parts of the Andes are worth keeping in mind for the Titicaca region: "Inka labor tribute demands may have been specific, but their implementation appears to have been left up to local elites. A canny administrator could easily have hidden people, flocks, and materials from inspectors and would have used imperial infrastructure [to their own advantage]... Spanish administrators in the Colonial period were surprised with the ease with which Andean elites learned to exploit the Spanish imperial legal system... provincial elites clearly gained some of their savvy as intermediates under the Inka."

The coefficient A values presented in Figures 3.43 and 3.44 are also useful for making comparisons to other parts of the Andes and other regions across the globe. I am aware of two other Andean regions for which researchers have published coefficient A values: the Santa Valley on the Peruvian north coast (Drennan and Peterson 2004: 543–545) and the Cotahuasi Valley, outside but fairly close to the Titicaca region (300 km. from the lakeshore) in the highlands of southern Peru (Jennings 2006: 360–361). Jennings presents two rank-size curves for the Cotahuasi Valley, one for the period between 900 B.C. and A.D. 600, and another for the period between A.D. 600 and 1000 (the latter a period during which Cotahuasi had some relationship with the Wari polity, rather than with Tiwanaku). The coefficient A values are effectively the same for both, at .701 and .709 (Jennings 2006: 361). This makes for a very interesting comparison to the Titicaca region's rank-size curves, because the Cotahuasi curves have higher, typically much higher, coefficient A values than all of the Titicaca curves presented in Figures 3.43 and 3.44 (the Juli-Pomata region's Early Formative curve, the Island of the Sun's Late Archaic curve, and the lower Tiwanaku Valley's Late Formative 2 curve have higher values but should be disregarded because all of their sites are extremely small and because, for the most part, these regions' component size data for these periods are too imprecise for rank-size analysis).

Moving to the more distant Andean case, the Santa Valley, two of the five coefficient A values calculated by Drennan and Peterson (2004: 545) are of the most interest here. The first is for the Cayhuamarca phase (A = .391), which as the first primarily agricultural phase (Drennan and Peterson 2004: 543) is most comparable to the Titicaca region's early Formative. The second is the Late Suchimancillo phase (A = .247), which as a phase of some disintegration following a phase of integration (Drennan and Peterson 2004: 544–545), is mildly comparable to the Titicaca region's Altiplano period (though not in absolute chronology, and with a contrasting form of disintegration via additions to an upper settlement tier rather than collapse of an upper tier, as discussed by Drennan and Peterson). The value of coefficient *A* for the Santa Valley's Late Suchimancillo is comparable to most of the Titicaca Altiplano period values. In contrast, the value for the Santa Valley's Cayhuamarca phase is higher than every Titicaca region's first Formative phase value (excluding the Juli-Pomata region, for reasons discussed above).

Thus, both of the Andean regions with available coefficient *A* values suggest that, while Titicaca societies' integration changed dramatically over the course of their histories, they always had a higher "baseline" degree of integration than might be expected given other Andean regions' settlement patterns. Other regions outside the Andes also support this. For example, the Valley of Oaxaca's Tierras Largas (early Formative) phase has a coefficient *A* value of .731 (Drennan and Peterson 2004: 546), much more similar to the Cotahuasi Valley's values than to any of the Titicaca regions' values. Another example, this time from the opposite (late) end of the prehispanic Mesoamerican chronology, comes from the northern Tlaxcala region in the highlands near Mexico City: Carballo and Pluckhahn (2007: 618,624–626) report a coefficient *A* value of .524 for the Tlaxco phase (a local Postclassic phase). This value is higher than the coefficient *A* values for all phases in all of the Titicaca regions presented here (see the notes above regarding the high values for the Juli-Pomata region's Early Formative, the Island of the Sun's Late Archaic, and the lower Tiwanaku Valley's Late Formative 2 and early Colonial periods).

At the other end of its spectrum of rank-size curves, the Titicaca region in cross-cultural perspective has exceptionally low coefficient *A* values for the Pukara Valley (-2.063 for the Late Formative) and the middle/lower Tiwanaku Valley (-0.98 for the Tiwanaku period, as calculated by Griffin (2011: Fig. 5)). Although comparability to other world regions' rank-size curves would be increased by additional survey of the Pukara Valley's surrounding regions, and by analytically combining the Tiwanaku Valley with its surrounding regions, these are nevertheless strikingly low values. For example, the coefficient *A* value for the San José period in the Valley of Oaxaca is -1.030 (Drennan and Peterson 2004: 546), and this is itself a fairly extreme case caused by a great degree of regional nucleation at the site of San José Mogote (though not as extreme as Teotihuacan's case, as illustrated by Drennan and Peterson (2004: 548)). The Titicaca values' comparability to the San José period's coefficient A value is all the more striking when it is considered that Tiwanaku and Pukara at their height were more similar in demographic and political scale to the Valley of Oaxaca's early Monte Albán than to its (San José period) San José Mogote (see Feinman et al. 1985: 340,346,348,362). The coefficient A values for the Monte Albán phases never dip below -.361 (Drennan and Peterson 2004: 546), considerably higher than the Pukara and Tiwanaku values. This fits very well with Bandy's (2013) conclusion that the Tiwanaku polity had an exceptionally intense political and demographic focus on the site of Tiwanaku itself, and with my suggestion above in Section 3.1.4 that the same likely applies to Pukara as well.

3.2.2 Political Grouping

Population histograms and rank-size graphs provide a very useful perspective on political structure, but they do not allow a full view of political affiliation because they are essentially non-spatial. Cluster analysis can provide a more spatially-informed perspective on organization within and demarcation between political groups. Two different types of cluster analysis will be presented here: nearest neighbor analysis (Clark and Evans 1954) and Ripley's K-function analysis (Ripley 1977; also see Bevan and Conolly 2006). I have chosen Ripley's K because it is multiscalar (e.g., it can identify clustering of clusters). Nearest neighbor analysis is not multiscalar, but I have chosen to also use it because it lends itself to much more compact displays of its results when it is applied simultaneously to many datasets.

Figures 3.45 and 3.46 present nearest neighbor analysis for the survey scale. Figure 3.47 presents nearest neighbor analysis for the combined four southern contiguous surveys. At both scales, nearest neighbor analysis is applied separately to different site types (most importantly, 1. all habitation sites, 2. habitation sites with population estimates of 60 or higher, and 3. habitation sites with evidence of corporate ritual).

Nearest neighbor analysis first determines a set of points' mean distance to nearest neighboring point, and then divides this mean by an expected mean for a random set of points of the same spatial density (Clark and Evans 1954: 447). Thus, this ratio (called R) will have a value of 1 for a randomly placed set of points, a value below 1 (to a minimum of 0) for a clustered set of points, and a value above 1 (to a maximum of about 2.15) for a set of points with greater than random spacing (Clark and Evans 1954: 447). Different methods are available for determining if a calculated value of R is statistically different from 1; for Figures 3.45 to 3.47, Monte Carlo simulation of spatial randomness is used to determine whether a set of points has a R value not equal to 1 at a 95% confidence level.

Figures 3.48 to 3.58 present Ripley's K-function analysis for the survey scale. Figures 3.59 to 3.64 present Ripley's K-function analysis for the combined four southern contiguous surveys. As with the nearest neighbor analysis, the Ripley's K-function analysis is applied separately to different site types (the same types as for the nearest neighbor analysis, except for the addition of a type for sites with population estimates of 120 or higher, for the southern contiguous surveys). If a survey/phase's sample size for a particular site type is too small for meaningful analysis, the results are omitted from the graphs (except for the all-habitation graphs).

Ripley's K-function analysis is multiscalar because it does not restrict itself to nearest neighbors, instead examining the number of neighbors within circles of *different* radii (Ripley 1977: 173; Bevan and Conolly 2006: 218–221). After some modifications to Ripley's K (see Ripley 1977: Fig. D2; Bevan and Conolly 2006: 221), a plot can be constructed in which X = the circles' radii lengths, and Y = 0 for randomly placed points. If Y is greater than 0 for a given X (radius length), this indicates clustering at the scale of that radius. If Y is less than 0 for a given X, this indicates greater than random spacing at the scale of that radius. Figures 3.48 to 3.64 display a gray band around Y = 0 (the dotted red line representing spatial randomness): this band is produced by Monte Carlo simulation of spatial randomness, and represents a confidence level of 95% (or in one case, 99%). Thus, in order for the black lines' deviations from Y = 0 to be considered statistically significant, they must be outside the gray band. The X-axis values in the Ripley's K graphs are in meters.

Before examining these graphs, previous cluster analyses conducted by other scholars

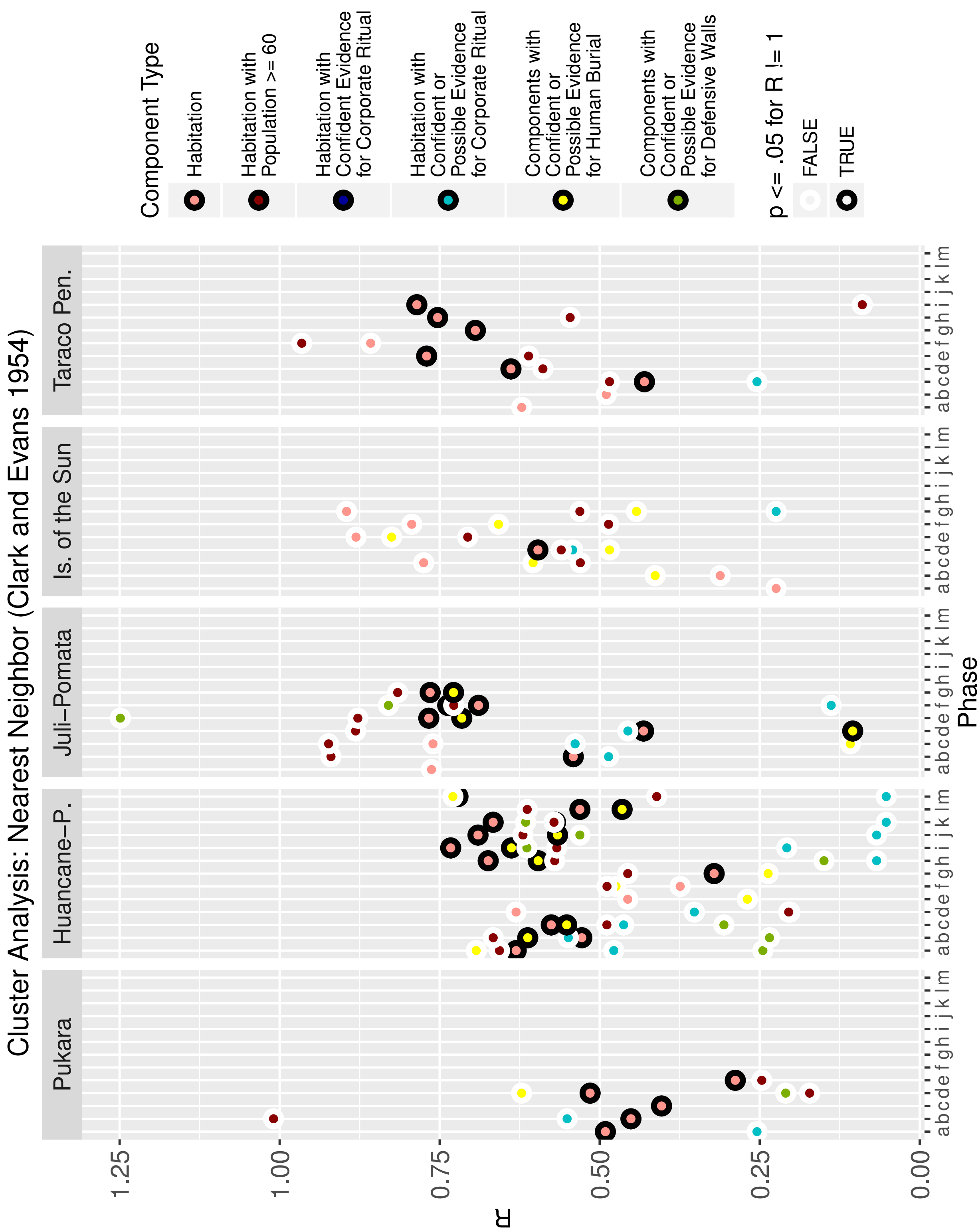


Figure 3.45: Nearest Neighbor Cluster Analysis by Survey, Page 1 (See Listing D.39)

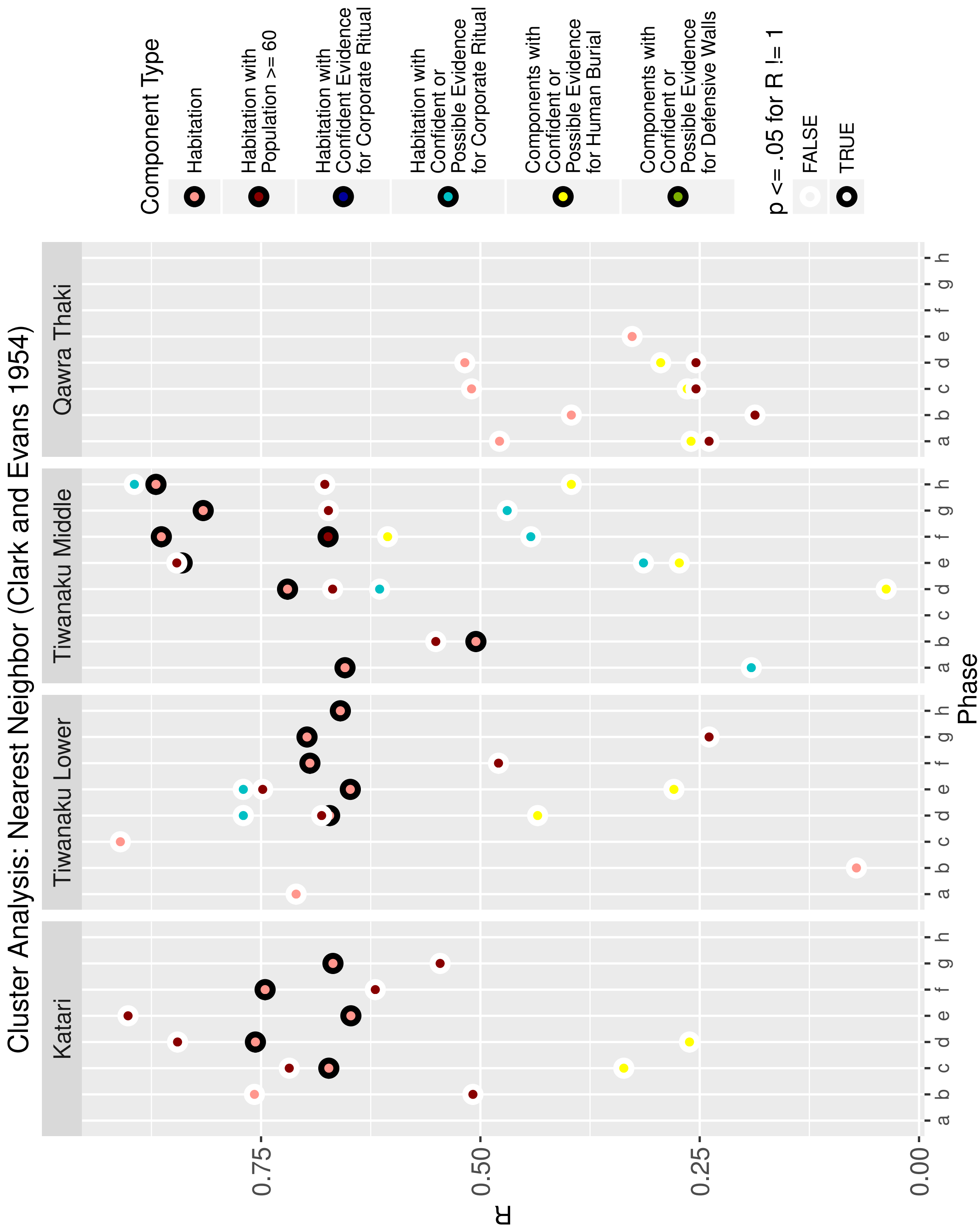


Figure 3.46: Nearest Neighbor Cluster Analysis by Survey, Page 2 (See Listing D.39)

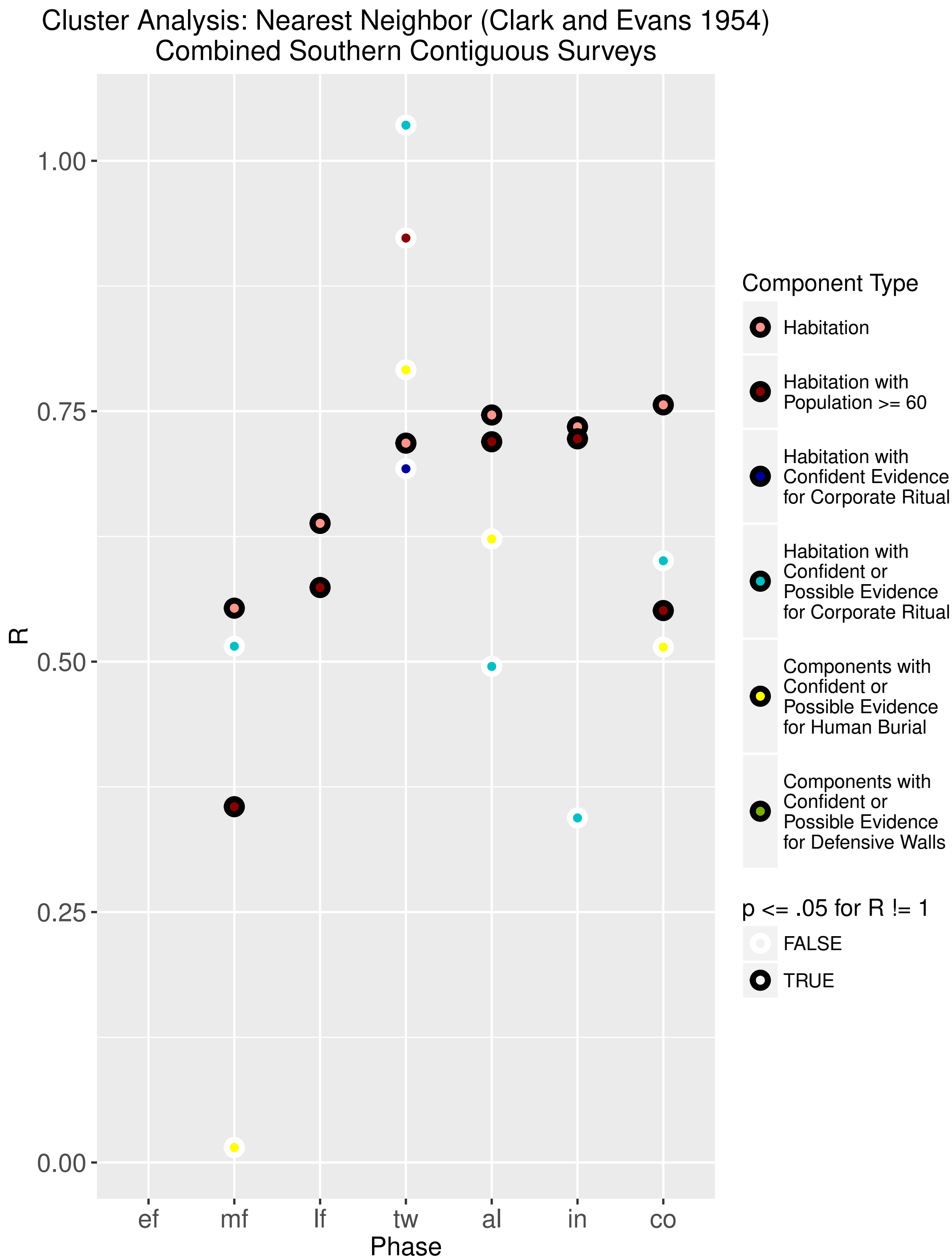


Figure 3.47: Nearest Neighbor Analysis, Combined Southern Surveys (See Listing D.39)

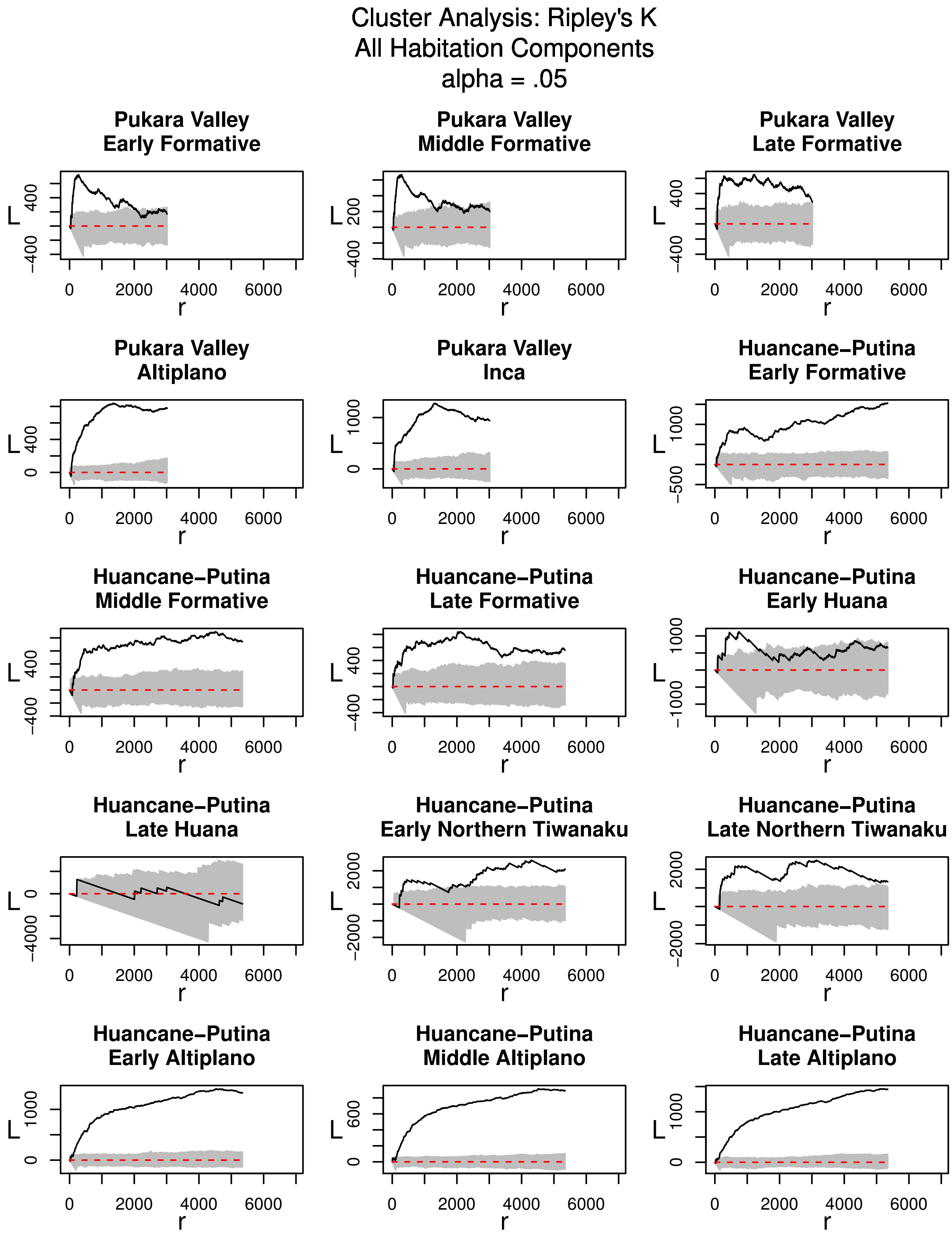


Figure 3.48: Ripley's *K*, Survey Scale, All Habitation Components, Page 1 (See Listing D.40)

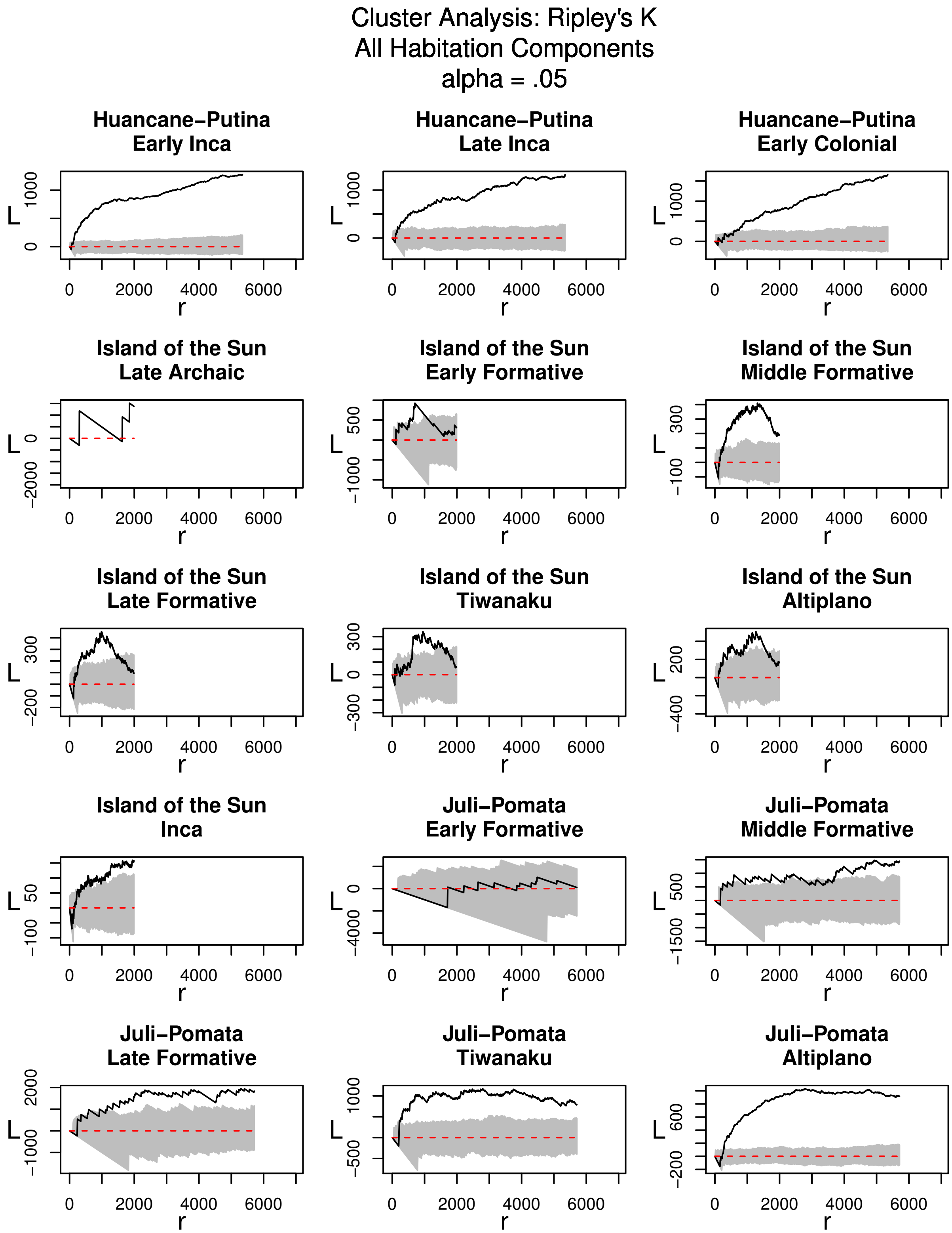


Figure 3.49: Ripley's K, Survey Scale, All Habitation Components, Page 2 (See Listing D.40)

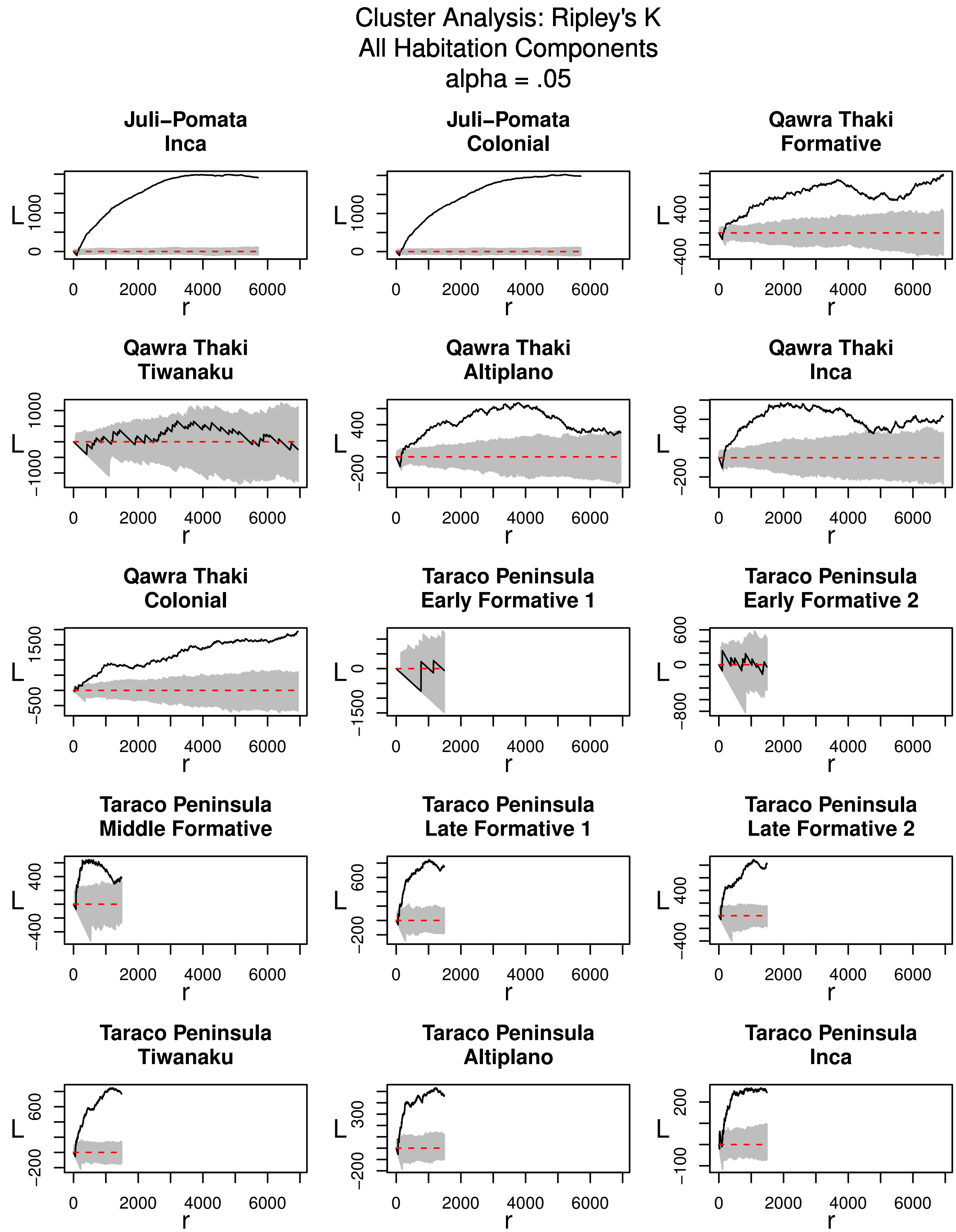


Figure 3.50: Ripley's K, Survey Scale, All Habitation Components, Page 3 (See Listing D.40)

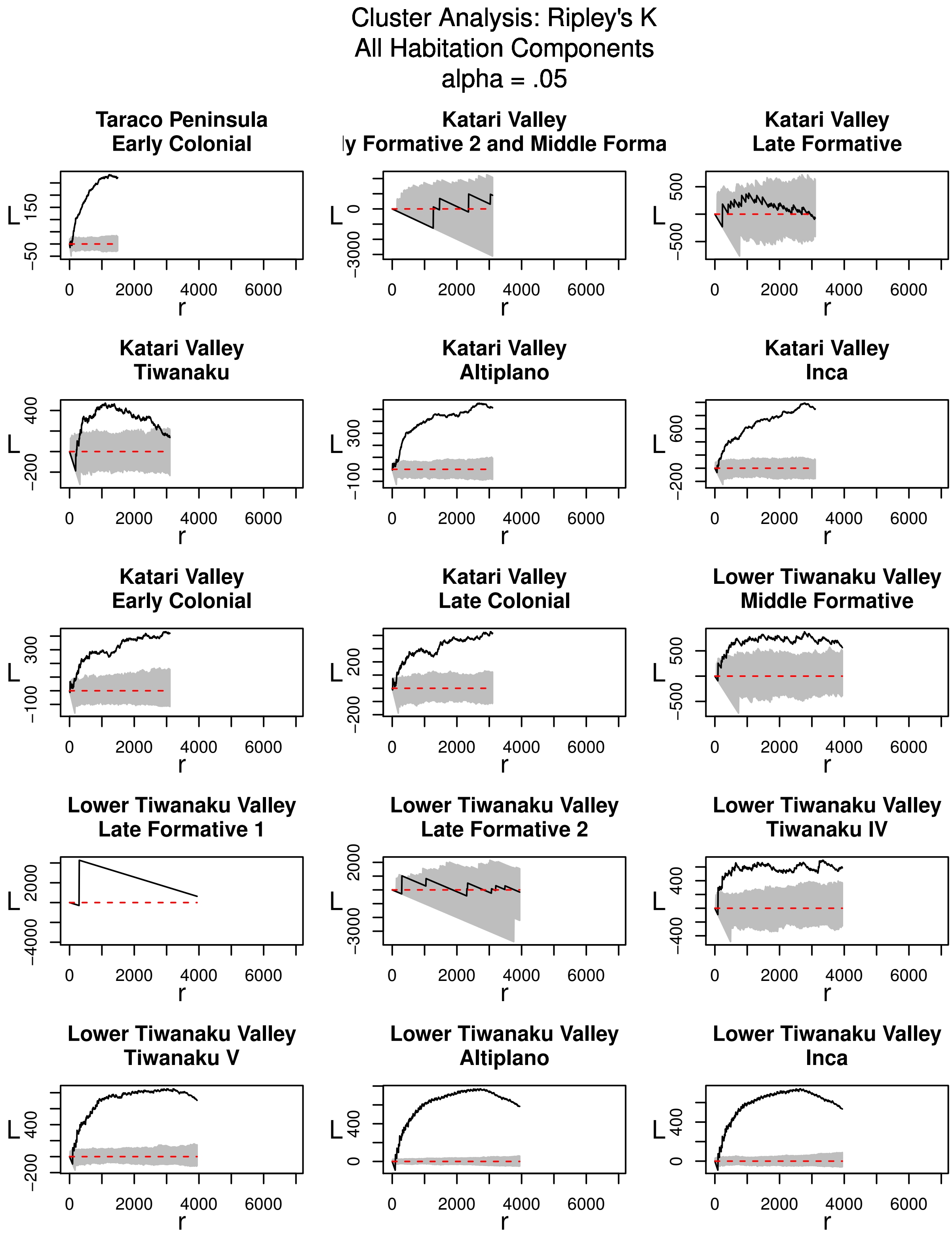


Figure 3.51: Ripley's *K*, Survey Scale, All Habitation Components, Page 4 (See Listing D.40)

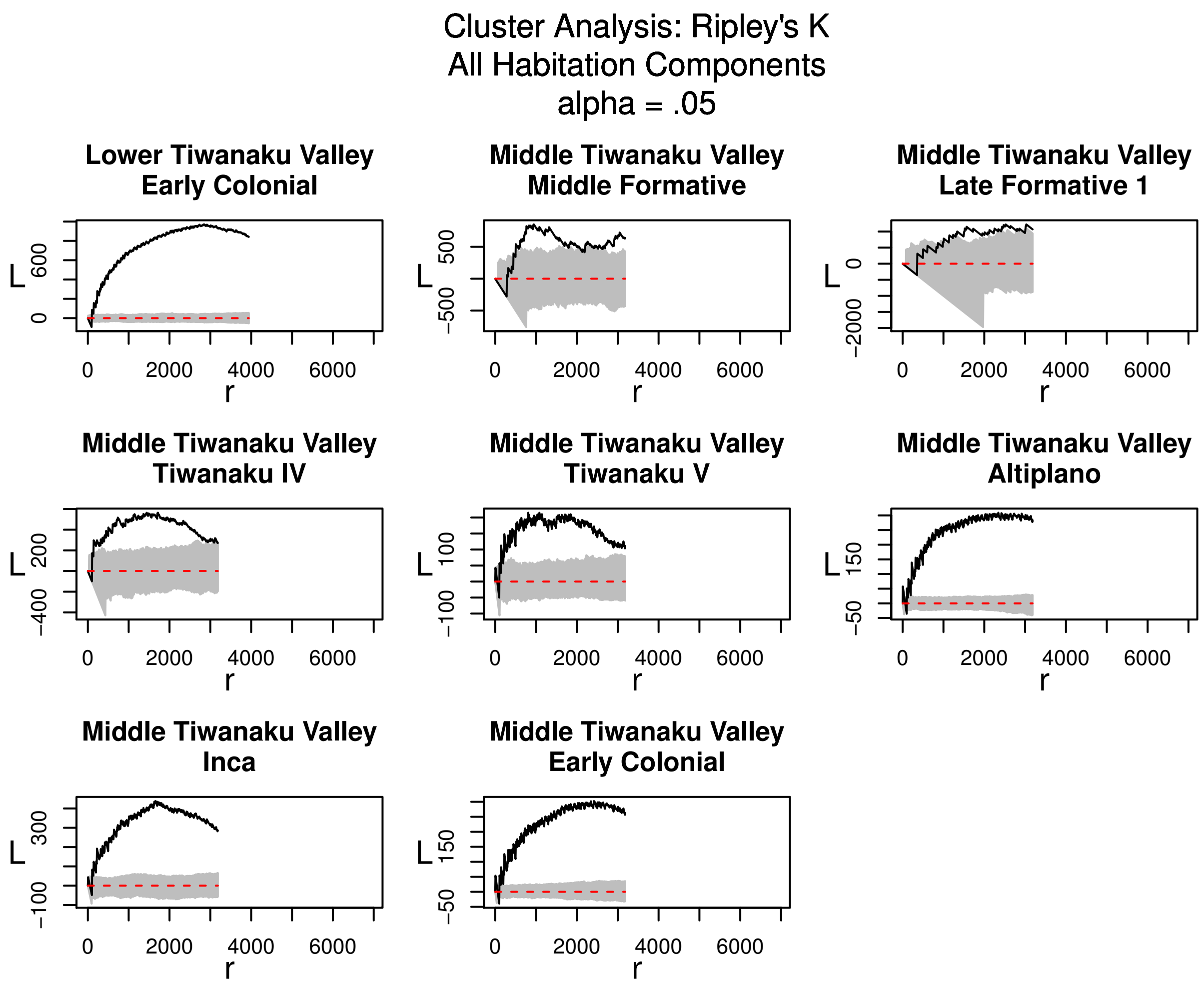


Figure 3.52: Ripley's K, Survey Scale, All Habitation Components, Page 5 (See Listing D.40)

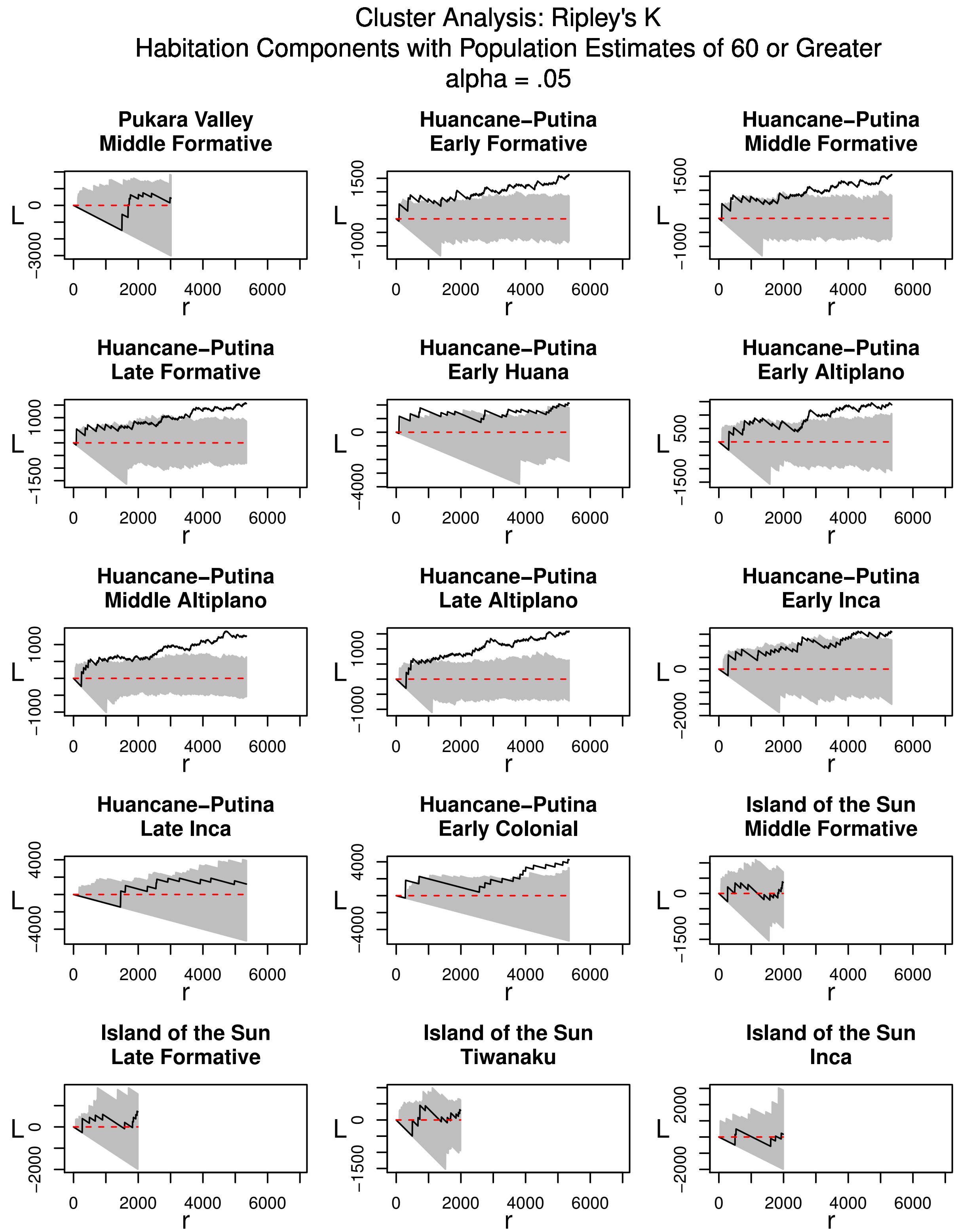


Figure 3.53: Ripley's K, Survey Scale, Hab. Comp.s w/ 60+ Pop., Page 1 (See Listing D.40)

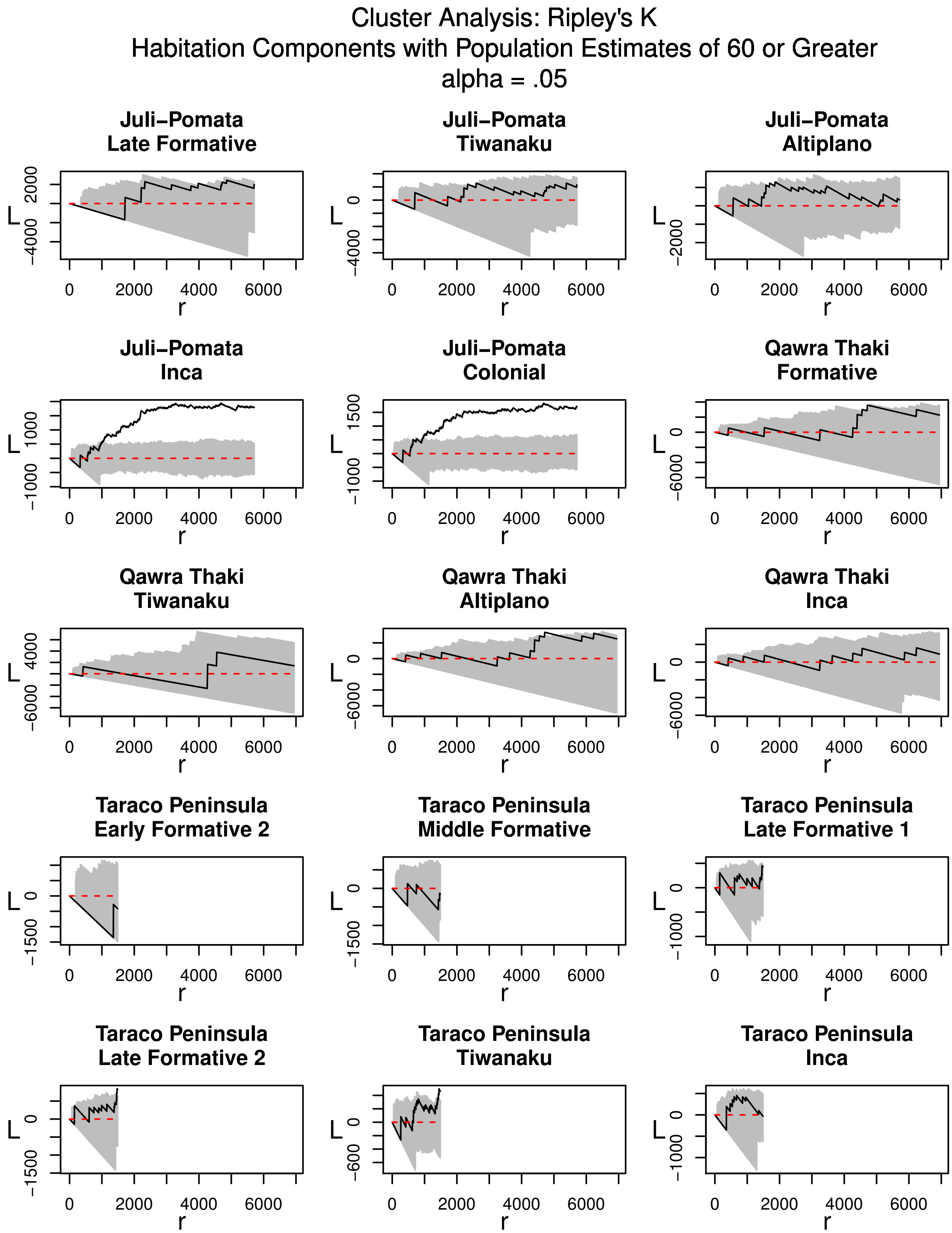


Figure 3.54: Ripley's *K*, Survey Scale, Hab. Comp.s w/ 60+ Pop., Page 2 (See Listing D.40)

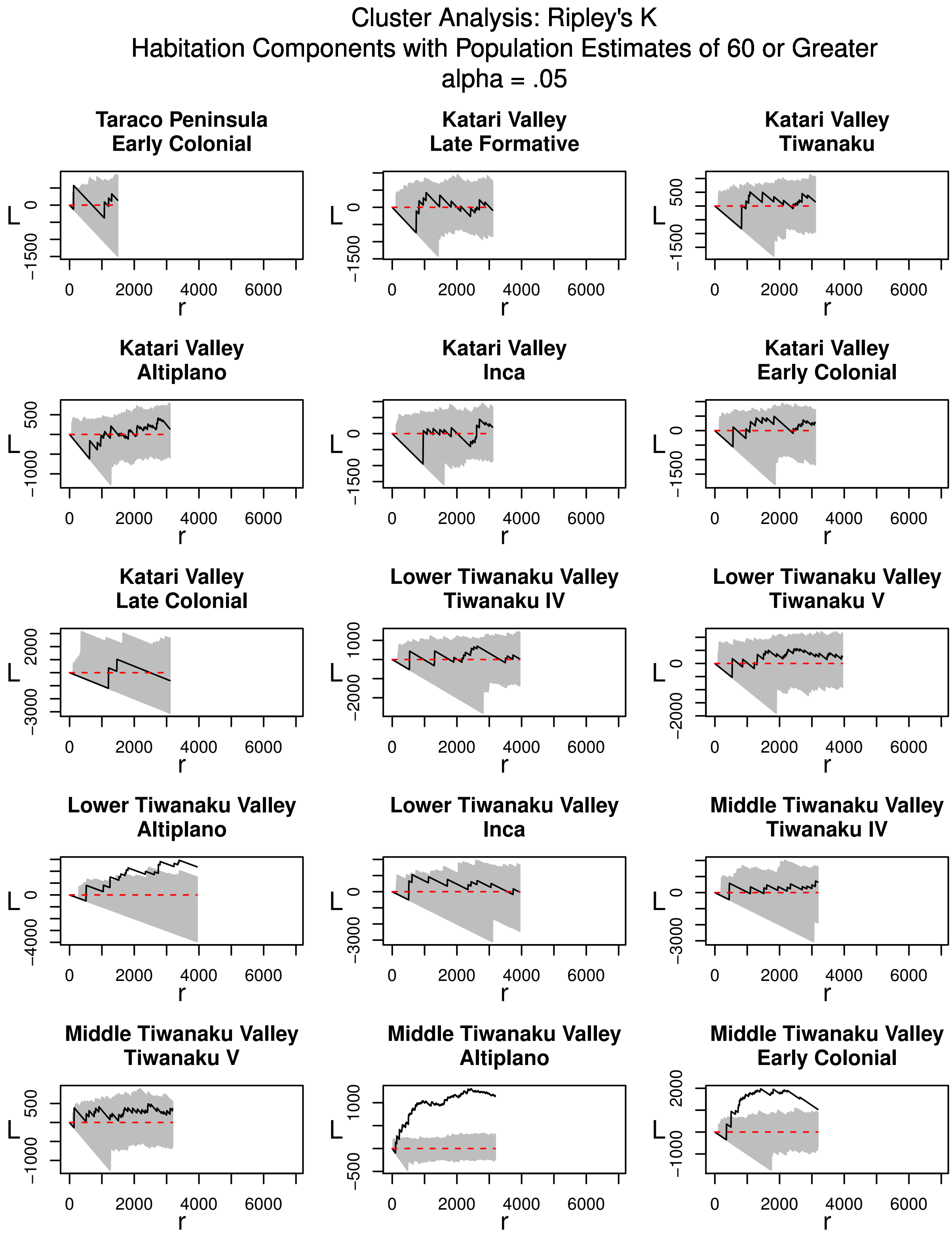


Figure 3.55: Ripley's *K*, Survey Scale, Hab. Comp.s w/ 60+ Pop., Page 3 (See Listing D.40)

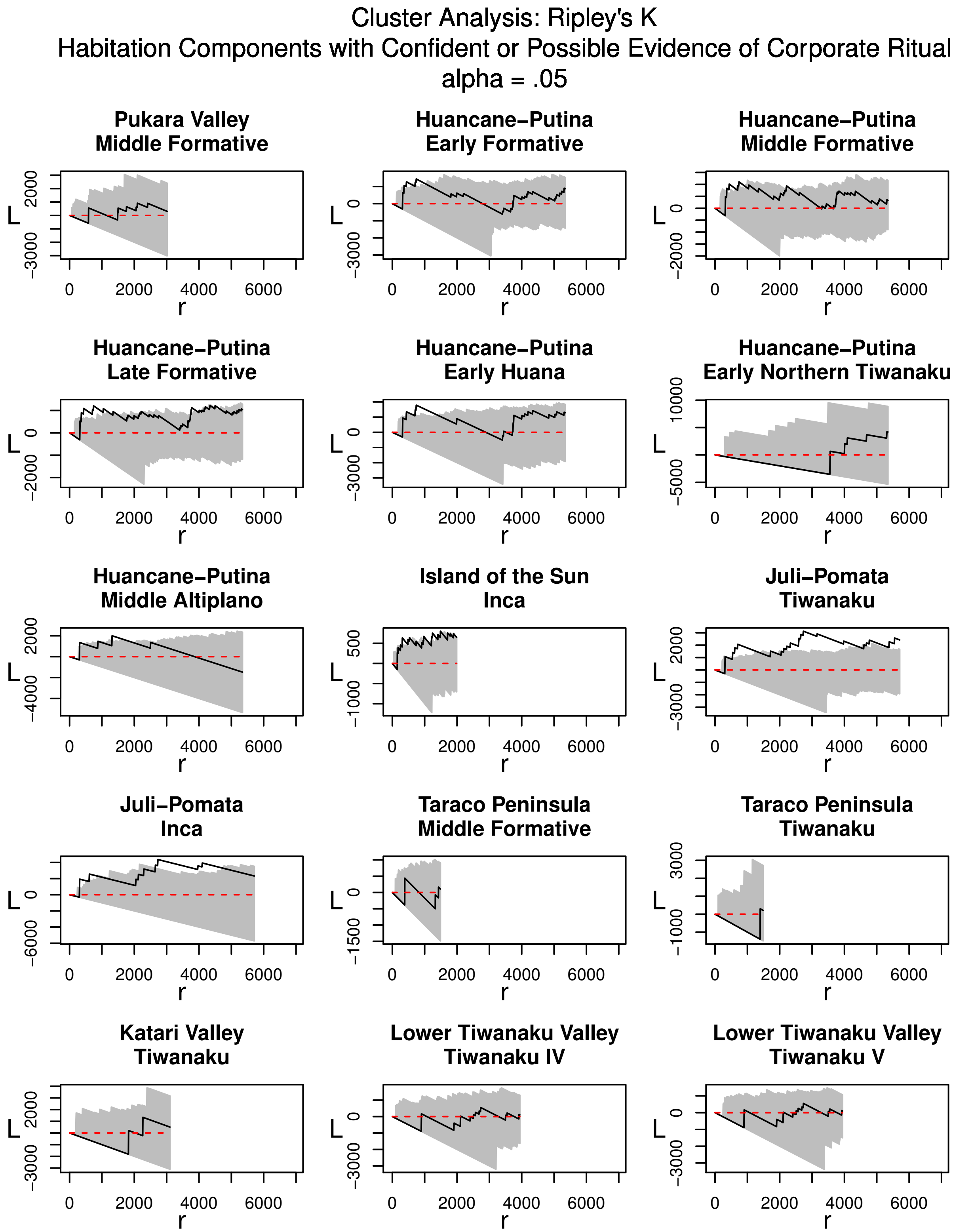


Figure 3.56: Ripley's K, Survey Scale, Possible Ritual Comp.s, Page 1 (See Listing D.40)

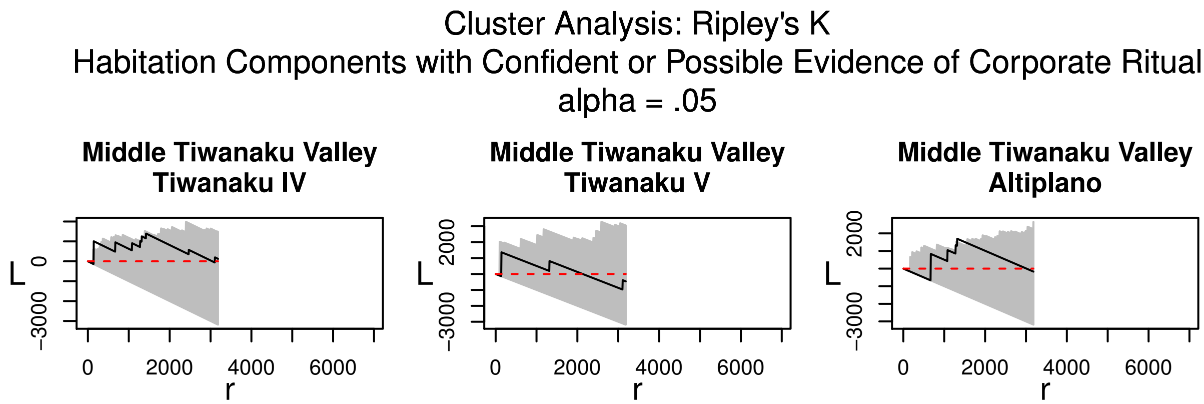


Figure 3.57: Ripley's K, Survey Scale, Possible Ritual Comp.s, Page 2 (See Listing D.40)

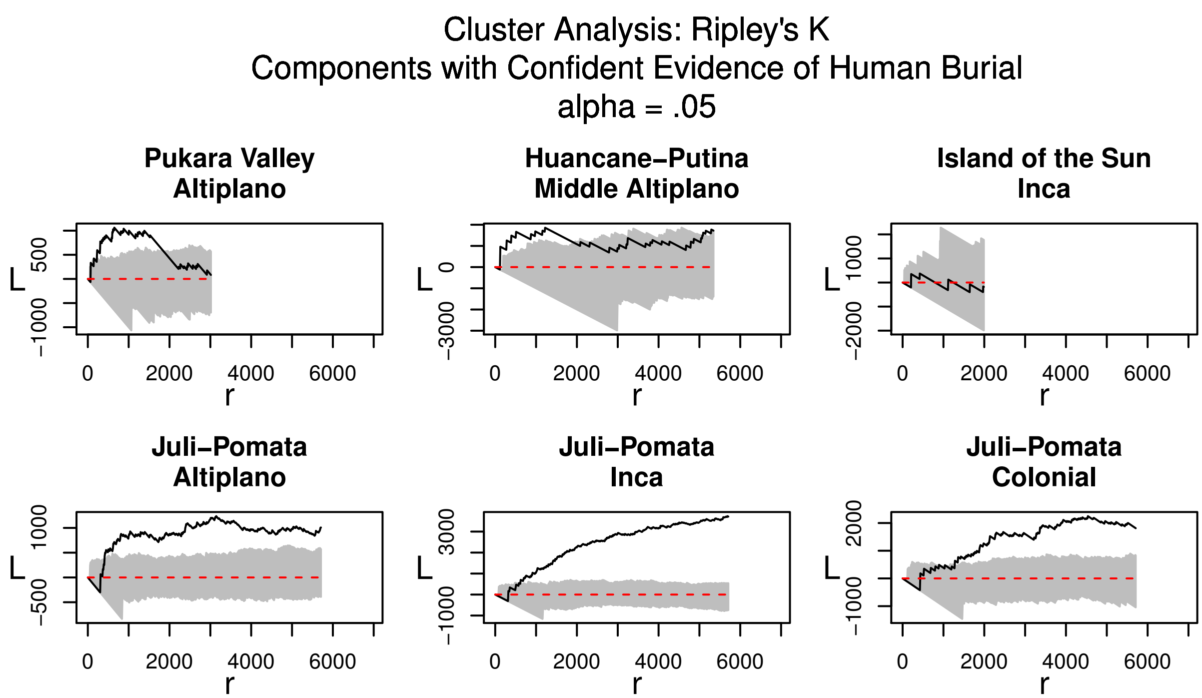


Figure 3.58: Ripley's K, Survey Scale, Burial Components (See Listing D.40)

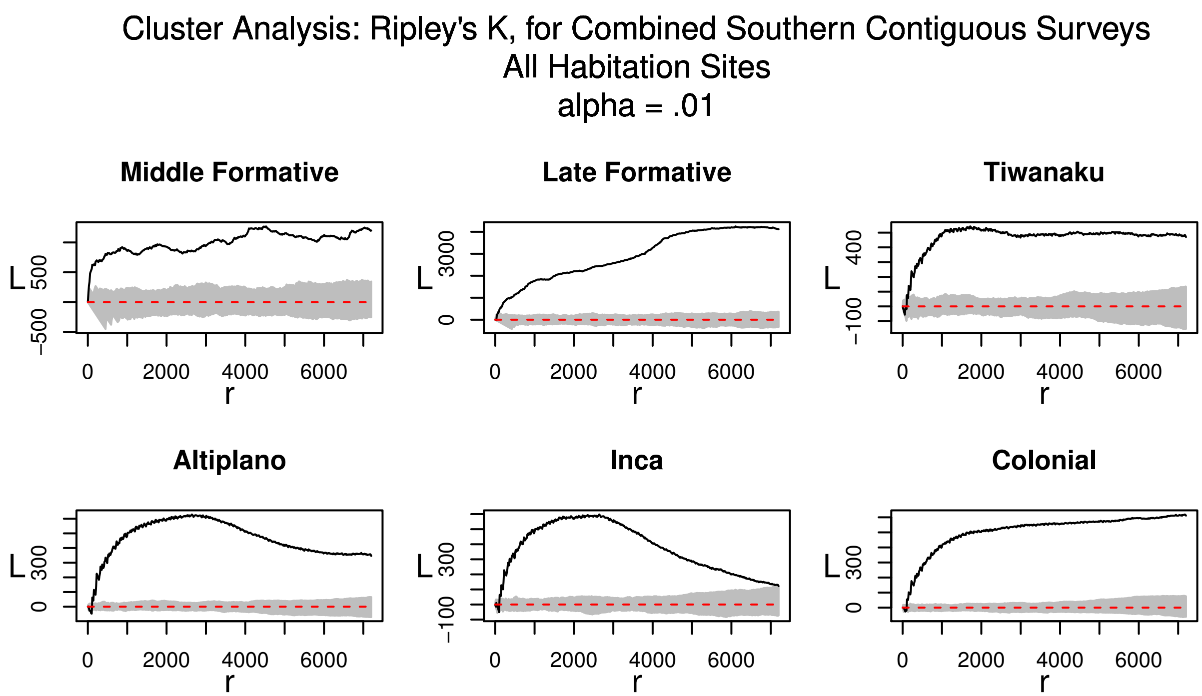


Figure 3.59: Ripley's K, Combined Southern Surveys, All Hab. Comp.s (See Listing D.40)

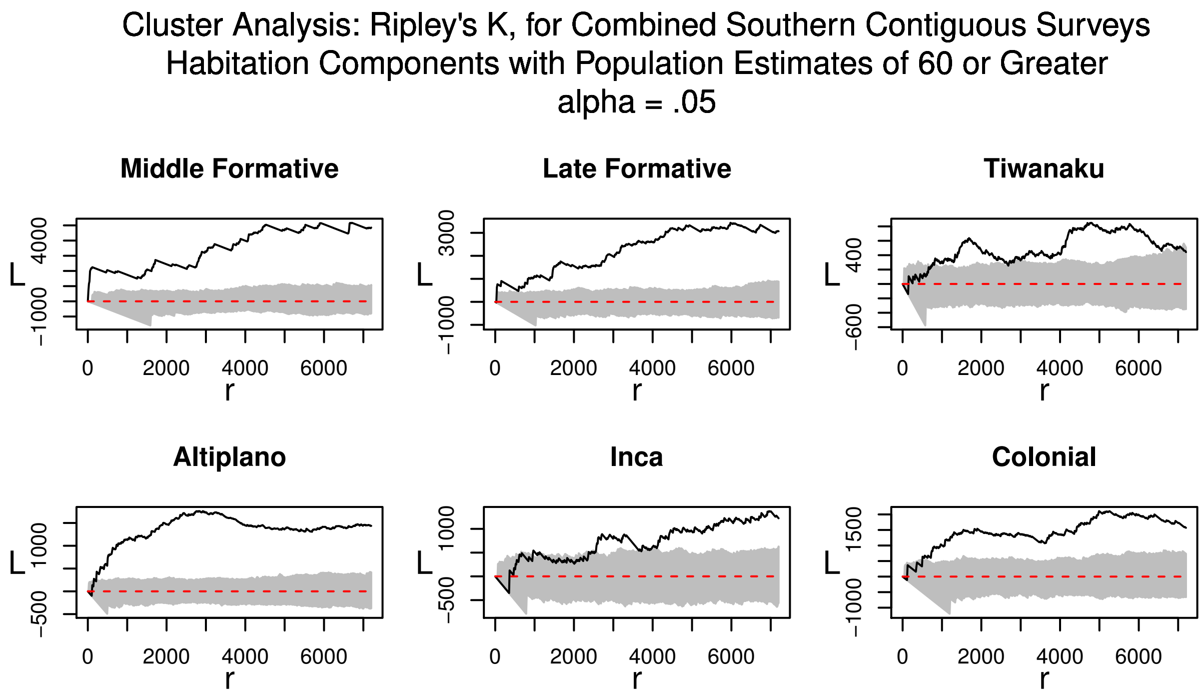


Figure 3.60: Ripley's K, Combined Southern Surveys, Hab. Comp.s w/ 60+ Pop. (See Listing D.40)

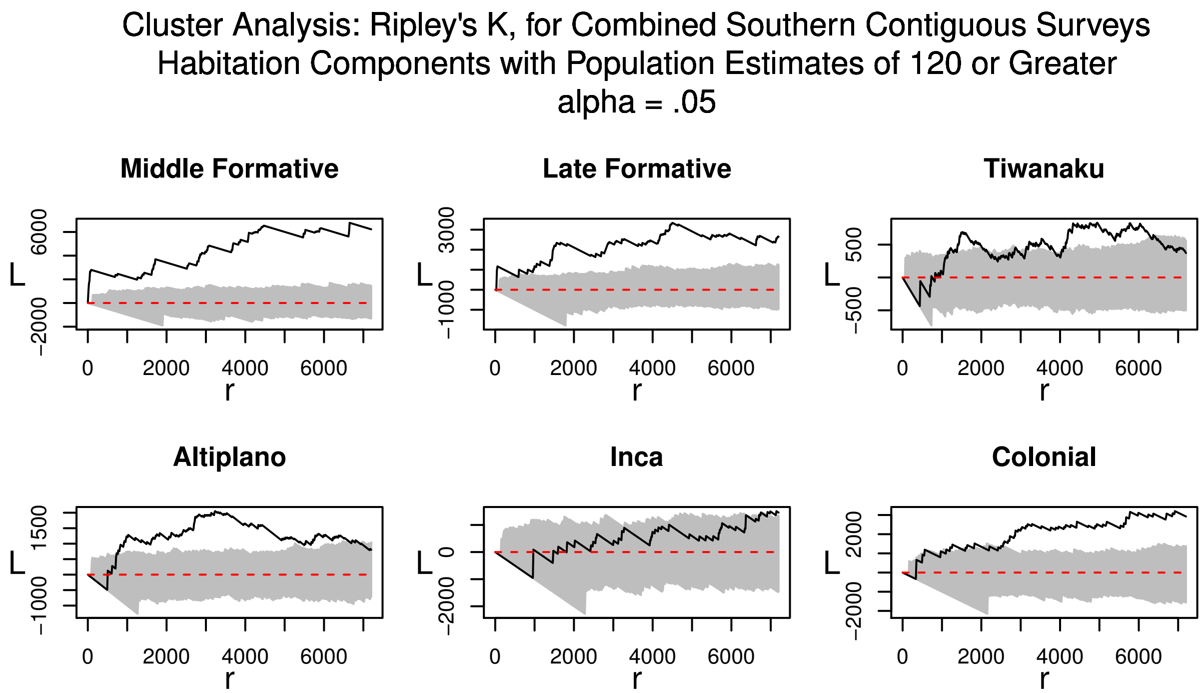


Figure 3.61: Ripley's K, Combined Southern Surveys, Hab. Comp.s w/ 120+ Pop. (See Listing D.40)

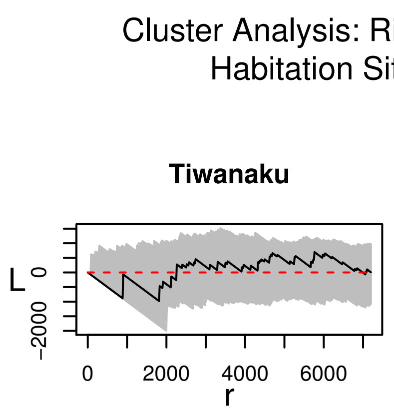


Figure 3.62: Ripley's K, Combined Southern Surveys, Confident Ritual Comp.s (See Listing D.40)

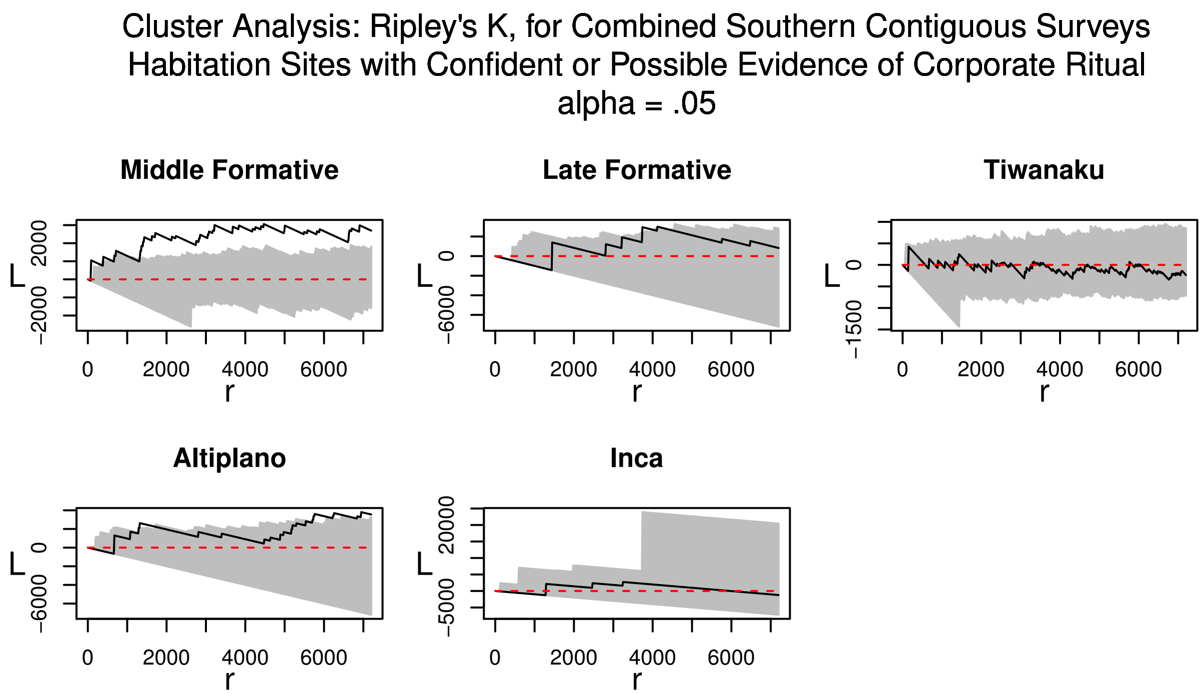


Figure 3.63: Ripley's K, Combined Southern Surveys, Possible Ritual Comp.s (See Listing D.40)

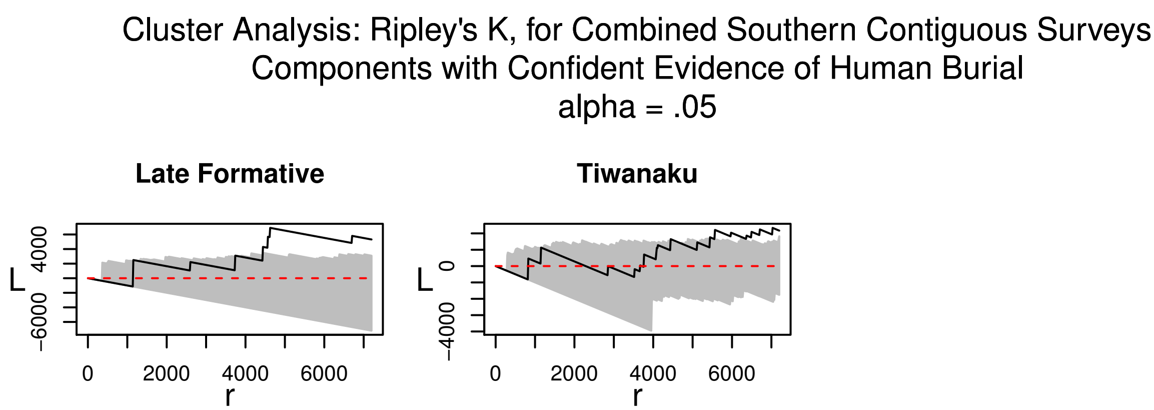


Figure 3.64: Ripley's K, Combined Southern Surveys, Burial Components (See Listing D.40)

for the Titicaca region should be reviewed. Albarracin-Jordan (1996a: 92–93,164–167,229–230,272–273,306–307,312–313) conducted nearest neighbor analysis for the lower Tiwanaku Valley (also see Albarracin-Jordan 1996b: 197–199). His key conclusion was that Tiwanaku sites larger than three hectares were regularly spaced, while smaller sites clustered around these large sites (Albarracin-Jordan 1996b: 198–199). My nearest neighbor analysis is not very comparable to Albarracin-Jordan's, since I have avoided using site classes as large as his larger-than-three-hectares class because, generally, few statistically significant results are produced for such a class due to small sample sizes. Another type of cluster analysis, k-means cluster analysis, was conducted by McAndrews et al. (1997: 75–78) for the middle and lower Tiwanaku Valley's Tiwanaku period. This type of analysis is fundamentally different from my analysis, because it seeks to delineate specific clusters. More recent Titicaca region cluster analyses include those by Lémuz Aguirre (2012) and Calla Maldonado (2012).

The most obvious result of my nearest neighbor analysis is that not even a single case of greater than random spacing was identified. Certainly further analysis using different site typologies and/or different spatial windows might produce some contrasts to this result, but nevertheless this is a striking result given the wide range of regions and site types used in this analysis. In a word, Titicaca settlement patterns through time and space were always clustered (note that almost every all-habitation case is statistically different from 1). Even more important is the fact that this general emphasis on clustering is also quite obvious in the multiscalar perspective provided by the Ripley's K-function analysis: most commonly, statistically significant clustering is apparent at all scales for the all-habitation cases.

This result deserves to be extended with further analysis beyond what is possible in this study. For the moment, I propose two semi-alternative explanations for the great emphasis on clustering through space and time in the Titicaca region. The less interesting alternative is that this clustering is caused by spatial heterogeneity in topography, resources, or some other environmental variable. For example, some survey regions (e.g., Juli-Pomata) include two or more environmental zones with dramatically different attractiveness to people with certain subsistence practices. Some of the clustering apparent in my analyses is certainly caused by such issues. However, while further analysis will be necessary to really address this, for the moment I believe that environmental heterogeneity is not the primary cause of the general emphasis on clustering. For example, it is probably fair to say that the Juli-Pomata region has much greater regional-scale environmental heterogeneity than any other survey region, since it has a substantial lakeshore area, a very substantial high elevation area over 4000 masl., and a variety of areas between the two. If environmental heterogeneity were the primary cause of clustering in the Titicaca data, I would expect the Juli-Pomata region to have nearest neighbor R values clearly lower than those of most other survey regions, as well as a clear emphasis in its Ripley's K graphs on clustering at a particular scale which reflects the major environmental zones. Neither of these expectations is met.

Therefore, I provisionally advocate an alternative explanation for the emphasis on clustering in the Titicaca region. The key is that the Ripley's K graphs generally display clustering at all scales. A reasonable explanation for this is that it reflects nested social/political groups. In other words, polities of the largest scale were composed of distinguishable social groups *roughly* analogous to smaller-scale autonomous polities (but without the autonomy), which were in turn composed of distinguishable groups roughly analogous to even smaller-scale autonomous polities, and so on. My argument has *some* important similarities with arguments made by Albarracin-Jordan (2003) for a Tiwanaku period segmentary state, and by Arkush (2014) for segmentary Altiplano period societies. Arkush's (2014) argument is very convincing, but the argument I am making is more general while her argument is specifically about Altiplano period societies. Albarracin-Jordan (2003) might be correct in perceiving ethnographically/ethnohistorically documented *ayllu* organization as far back as Tiwanaku: this does fit well with the results of my cluster analysis (though other culturally specific organizational principles could also fit just as well). However, in contrast to Albarracin-Jordan (2003), as should be clear from my above analysis of rank-size graphs, I do not advocate a view of Titicaca polities as heterarchical confederations (while Albarracin-Jordan (2003) does not use this terminology, it is a reasonable cross-cultural translation). Such an argument is convincing to me only for the Altiplano period (Arkush 2014). Instead, I argue that nested organization was a constant in Titicaca political organization despite dramatic changes in hierarchical differentiation between the nested groups. On one end of the spectrum were the

Altiplano period societies, well characterized as segmentary (Arkush 2014). On the other end of the spectrum were Inca period societies: despite intensely hierarchical organization, they had (a much more bureaucratic version of) fundamental nesting evident in the decimal organization of labor tribute, for example (see Julien 1988).

This argument receives some additional support from the fact that, in each individual region, there is generally a surprisingly high consistency through time in the absolute values of nearest neighbor R (for example, every phase in the Katari Valley has a value of about .65 or .75 for the all-habitation points). This suggests that, despite considerable changes in political and subsistence organization between the phases, at the lowest level there was a fundamentally similar logic of association. However, the exceptions to this are of course also important, and include higher clustering in the Pukara Valley's Inca period, the Huancané-Putina region's Tiwanaku II period, the Juli-Pomata region's Middle Formative and Tiwanaku periods, the Taraco Peninsula's Middle Formative period, and the middle Tiwanaku Valley's Middle Formative and Late Formative 1 periods. Cases of unusually high clustering therefore seem to be associated with at least two different types of centralization: the Middle Formative's early experiments with centralization and the Tiwanaku period's much larger scale centralization.

I had hoped that nearest neighbor analysis would be useful for distinguishing between habitation sites as a whole on the one hand, and sites with evidence of corporate ritual and/or larger populations on the other hand. For example, I had hoped that while habitation sites generally were clustered, sites with evidence of corporate ritual and/or larger size might be shown to have had greater than random spacing from each other for some periods. Unfortunately, sample size is a problem for most of the site types other than the all-habitation type: it is fairly rare to have 95% statistical confidence that their R values are not equal to 1, even for exceptionally low observed R values. The situation for the combined four southern contiguous surveys is better due to increased sample size, but the pattern here mostly appears to be the opposite of expected: larger sites and perhaps sites with evidence for corporate ritual tend to be more, rather than less, clustered than the habitation sites as a whole. The one possible exception is for the Tiwanaku period: larger sites and sites with possible or confident evidence for corporate ritual have spacings closer to random than to the habitation sites' degree of clustering. It is tempting to see something of Tiwanaku's uniqueness here, but it is not a particularly strong difference from the other periods once statistical and site typing uncertainties are taken into account.

For both the survey scale and the combined southern surveys, the Ripley's K-function graphs also do not support the expectation of greater than random spacing for sites with larger populations or evidence of corporate ritual. Sample size is again a problem, but every statistically significant deviation from spatial randomness is one of clustering rather than greater than random spacing.

3.3 Ritual and Defense in Lake Titicaca Political History

An important aspect of this study's database is that "site" types are defined at the component level (i.e., typing is phase-specific). This section examines the demography of different component types: habitation components without evidence for corporate ritual, corporate ritual components, components with burials, and fortified components. This permits a perspective on the roles of ritual and defense in the Titicaca region's macro-scale political history.

Figures 3.65 to 3.70 plot all components' population or spatial sizes individually, by type, at the pan-Titicaca scale. A more condensed view is provided by box-and-whisker plots by type in Figures 3.71 to 3.79, at the pan-Titicaca, supra-survey, and survey scales. The boxes represent the two middle quartiles, the line within the boxes represents the median, the whiskers each have a maximum length of one and a half times the box's range, and outliers are depicted as points past the whiskers. In all of the box-and-whisker plots, transparent (lighter) boxes are for components with possible evidence for a type, whereas solid (darker) boxes are for components with confident evidence for a type. Most of the box-and-whisker plots use component spatial size rather than population; population box-and-whisker plots are similar enough that they are not presented here, except for the pan-Titicaca scale.

The individual component plots and the box-and-whisker plots provide an understanding of the contrasting natures of each component type through time. However, they don't give an entirely clear picture of how prominent each type was at a particular point in time and space. Figures 3.80 to 3.82 help address this, by presenting how much of a region's total population was living in places of each type, through time.

A comparison of Figure 3.65 to Figure 3.66 makes it immediately clear that large sites always have evidence of corporate ritual. The largest components without evidence for corporate ritual become progressively larger through time, but they remain fairly small. In fact, the pattern is even clearer than Figure 3.65 suggests, because its two largest points should be disregarded (these are for Inca and Colonial Lukurmata; see above). There is a rather inflexible relationship between a site's population size and its apparent need for corporate ritual architecture. This demonstrates that Bandy's (2004a) argument for ritual alleviation of scalar stress during the Taraco Peninsula's Formative period has much broader spatiotemporal applicability (also see Stanish and Haley 2004). However, many of the Late Formative and later components without evidence for corporate ritual are considerably larger than the Taraco Peninsula's Early Formative fissioning threshold of about 300 people, the threshold which was surmounted with the help of corporate ritual (Bandy 2004a: 330–331). This is probably because these sites' ritual focus was shifted to other sites as they became integrated into larger political economies. Some of these sites, however, may yield evidence for corporate ritual upon excavation.

The association between larger sites and corporate architecture is clear, but some explanation must be made for the still considerable number of small sites with evidence for corporate ritual (see Figure 3.66). These sites provide further support for the argument made in Section 3.2.2 that the clustering patterns suggest nested social organization. Many people living at these smaller sites would have participated in ritual events at the larger sites, but ritual practices were also sometimes important to more local political organization. The argument for social nesting may also be supported by the fact that human burials occur across the entire spectrum of component sizes (see Figure 3.69). Of course this might be explained more simply by individuals' burial near their residence, but considering the importance of ancestral dead to much of Titicaca politics (e.g., Hastorf 2003; Bongers et al. 2012), the location of burials should not be taken lightly.

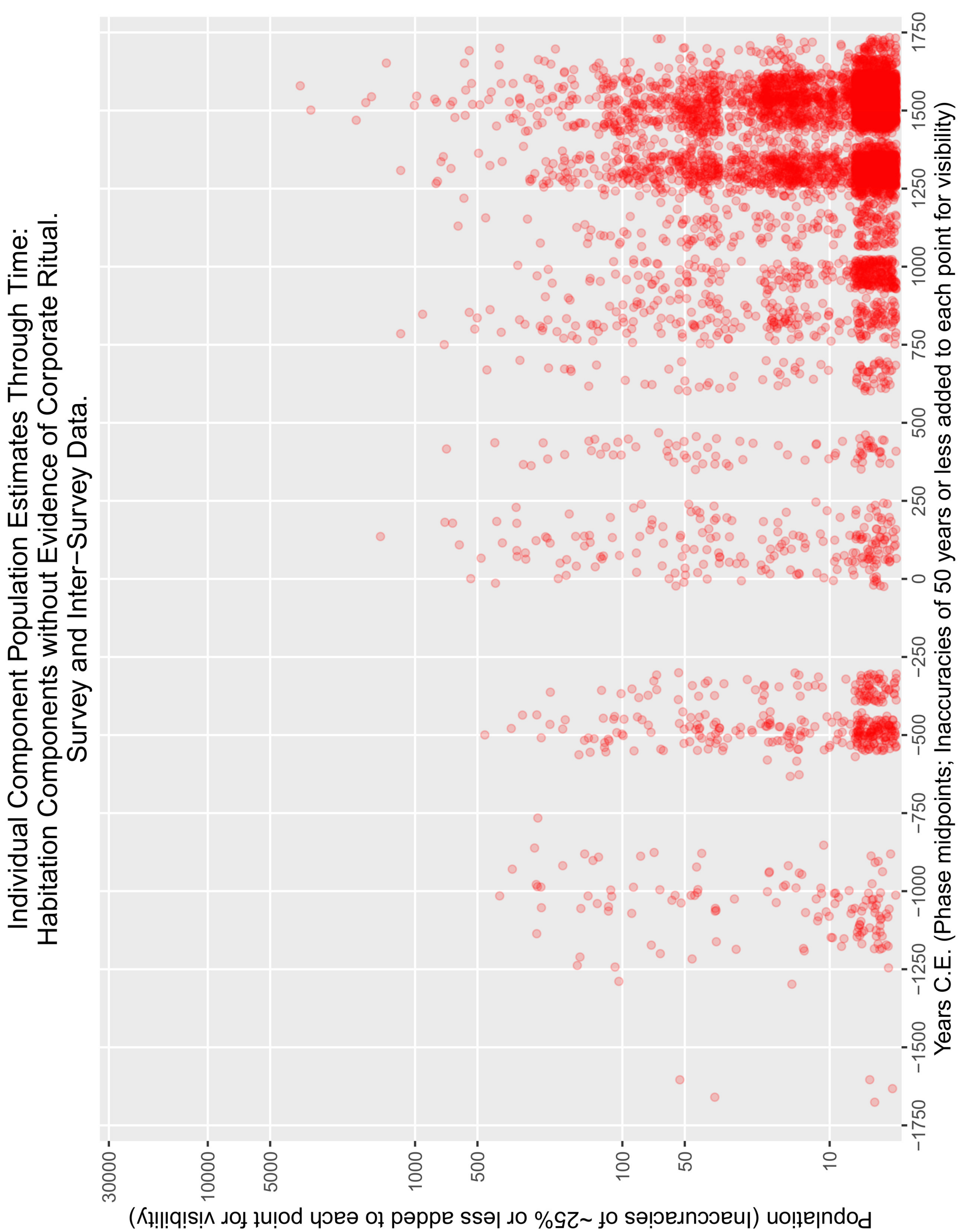


Figure 3.65: Individual Component Pop.s, Hab. Comp.s w/o Ritual (See Listing D.31)

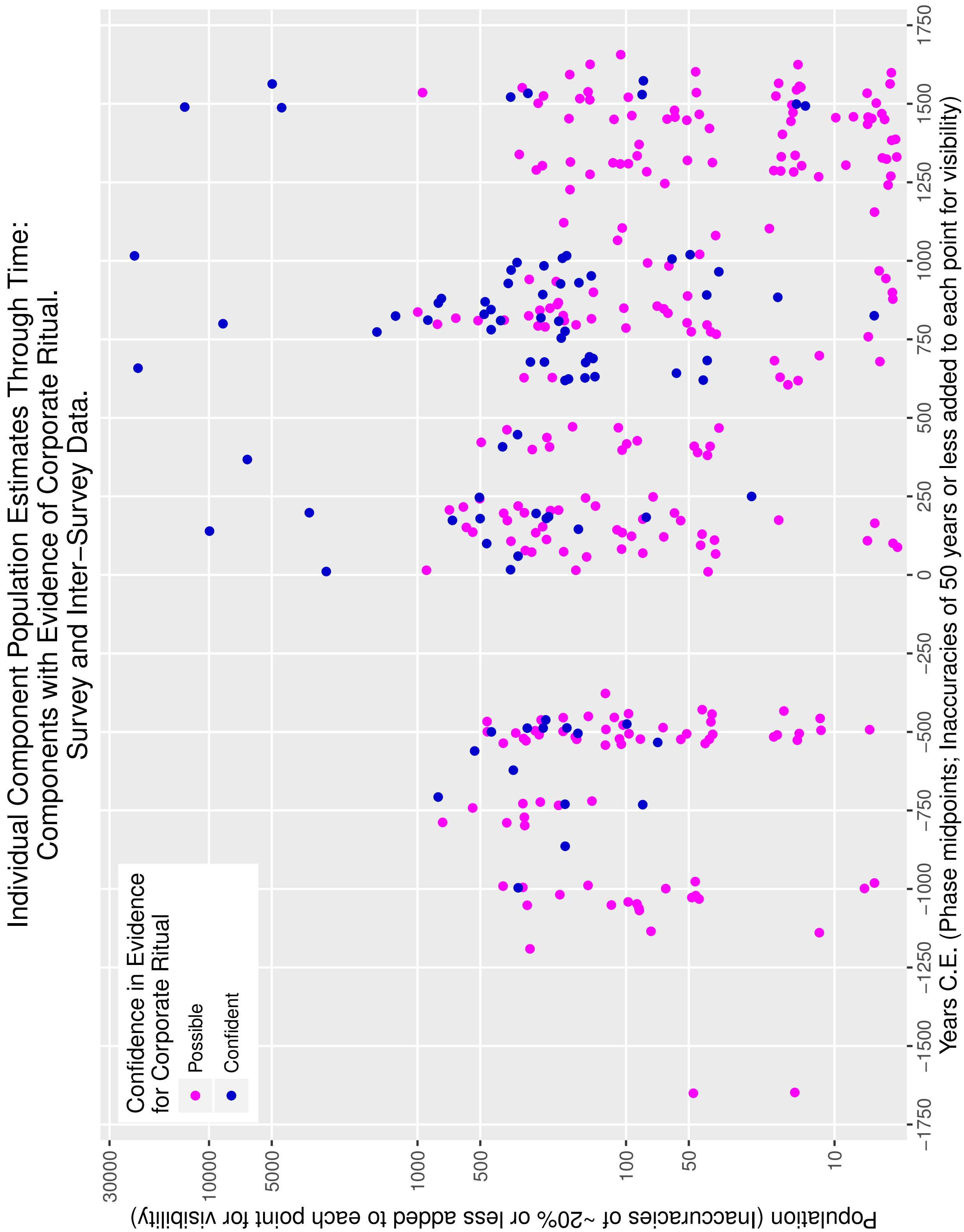


Figure 3.66: Individual Component Pop.s, Comp.s w/ Ritual (See Listing D.31)

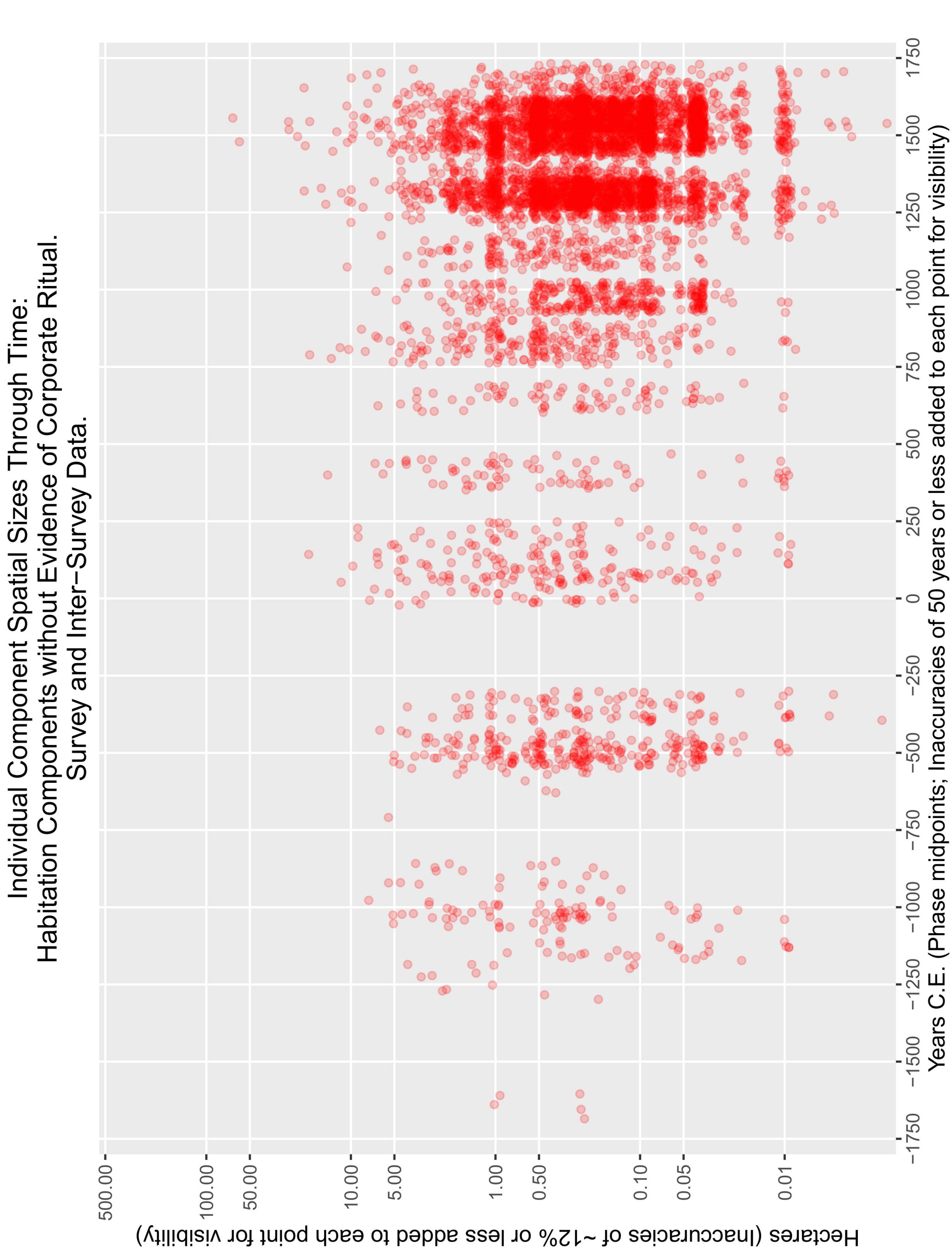


Figure 3.67: Individual Component Sizes, Hab. Comp.s w/o Ritual (See Listing D.31)

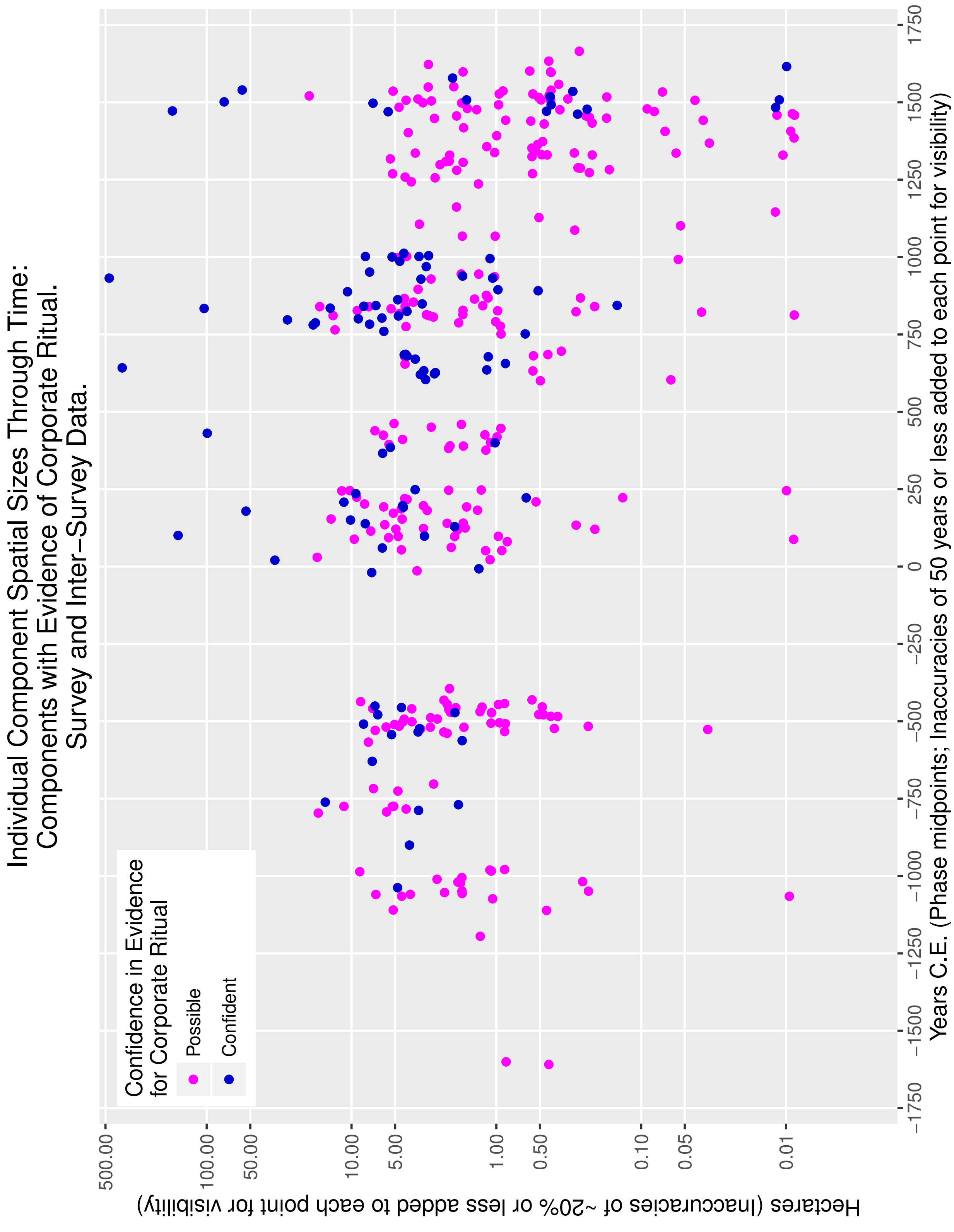


Figure 3.68: Individual Component Sizes, Comp.s w/ Ritual (See Listing D.31)

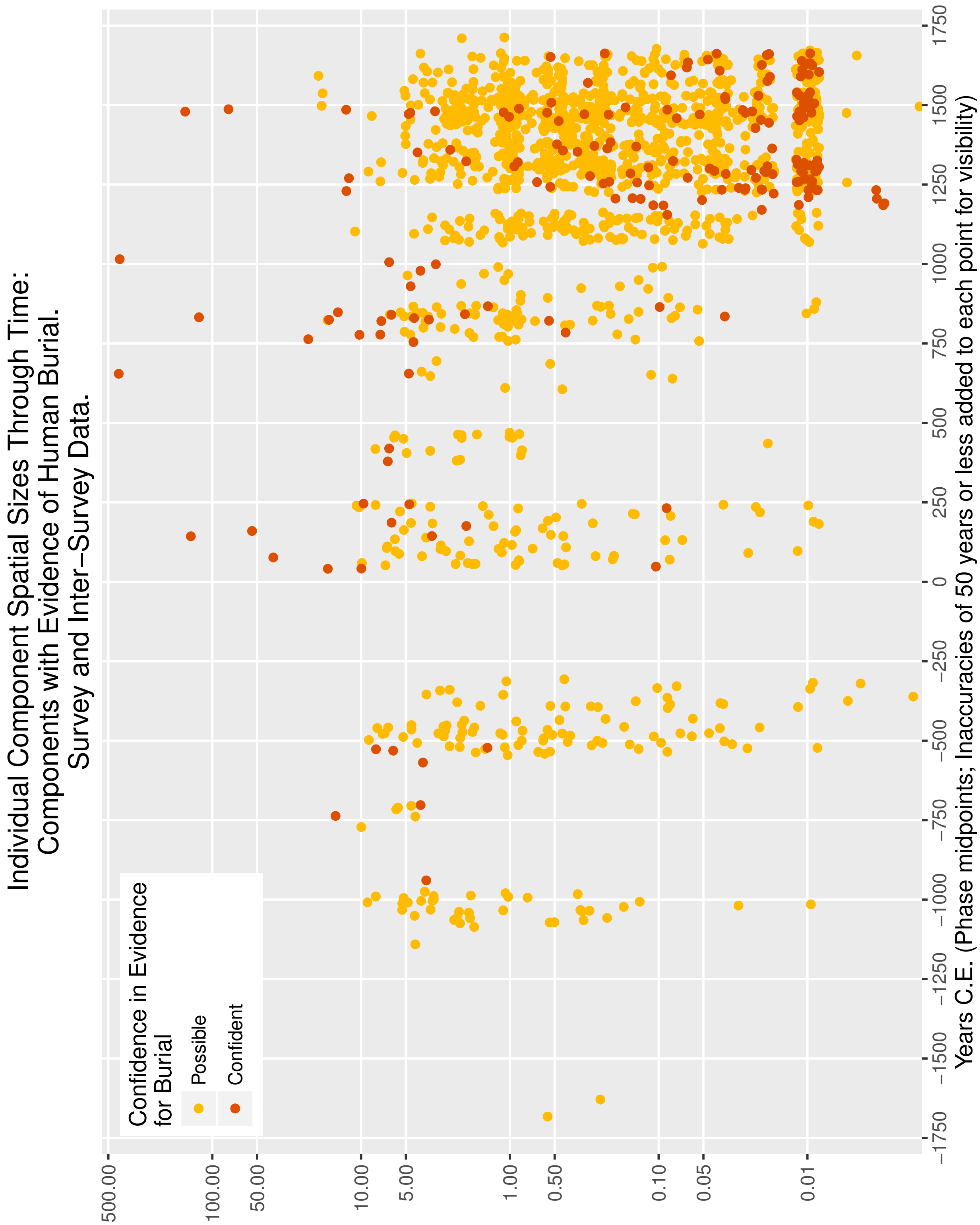


Figure 3.69: Individual Component Sizes, Comp.s w/ Burial (See Listing D.31)

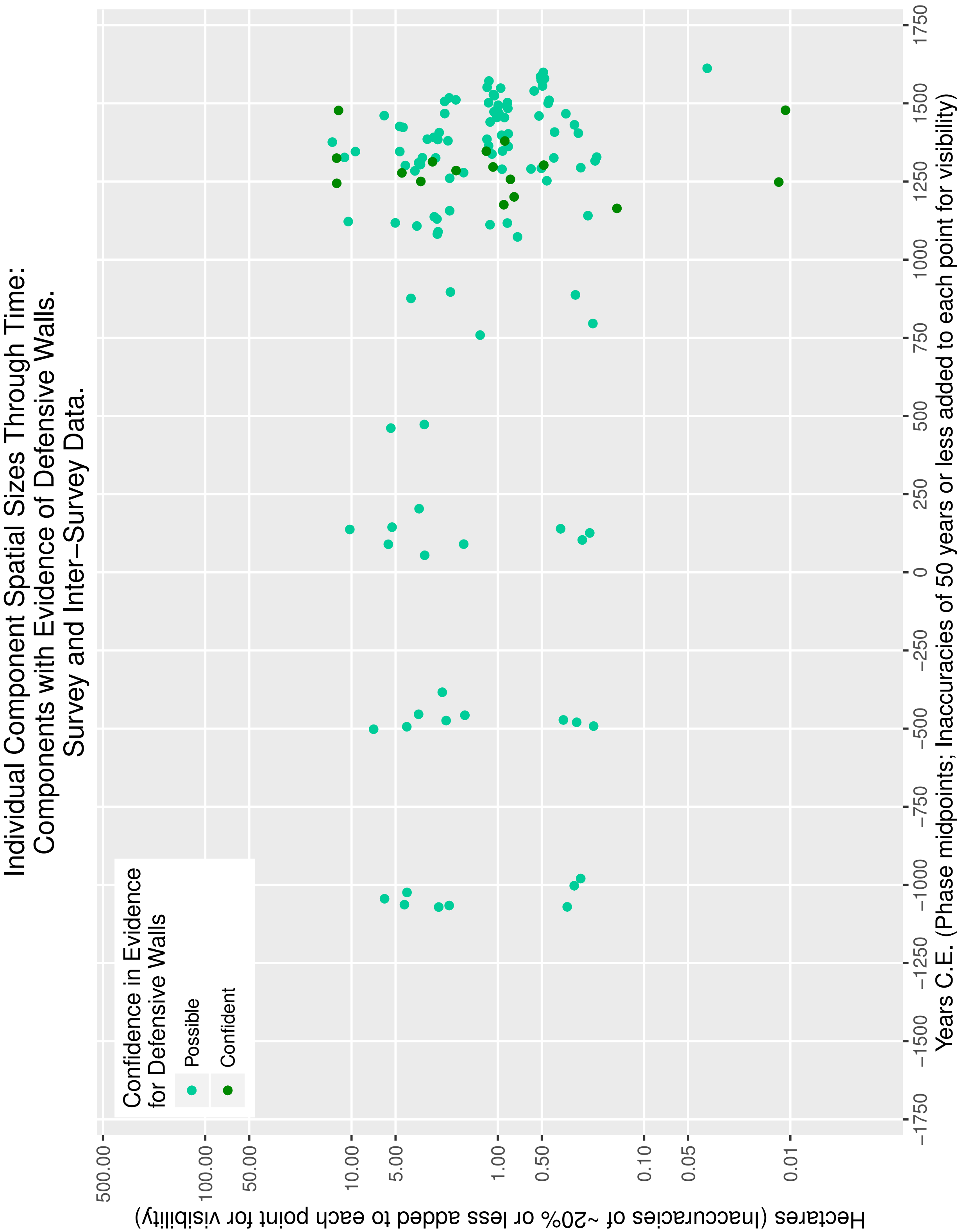


Figure 3.70: Individual Component Sizes, Comp.s w/ Fortification (See Listing D.31)

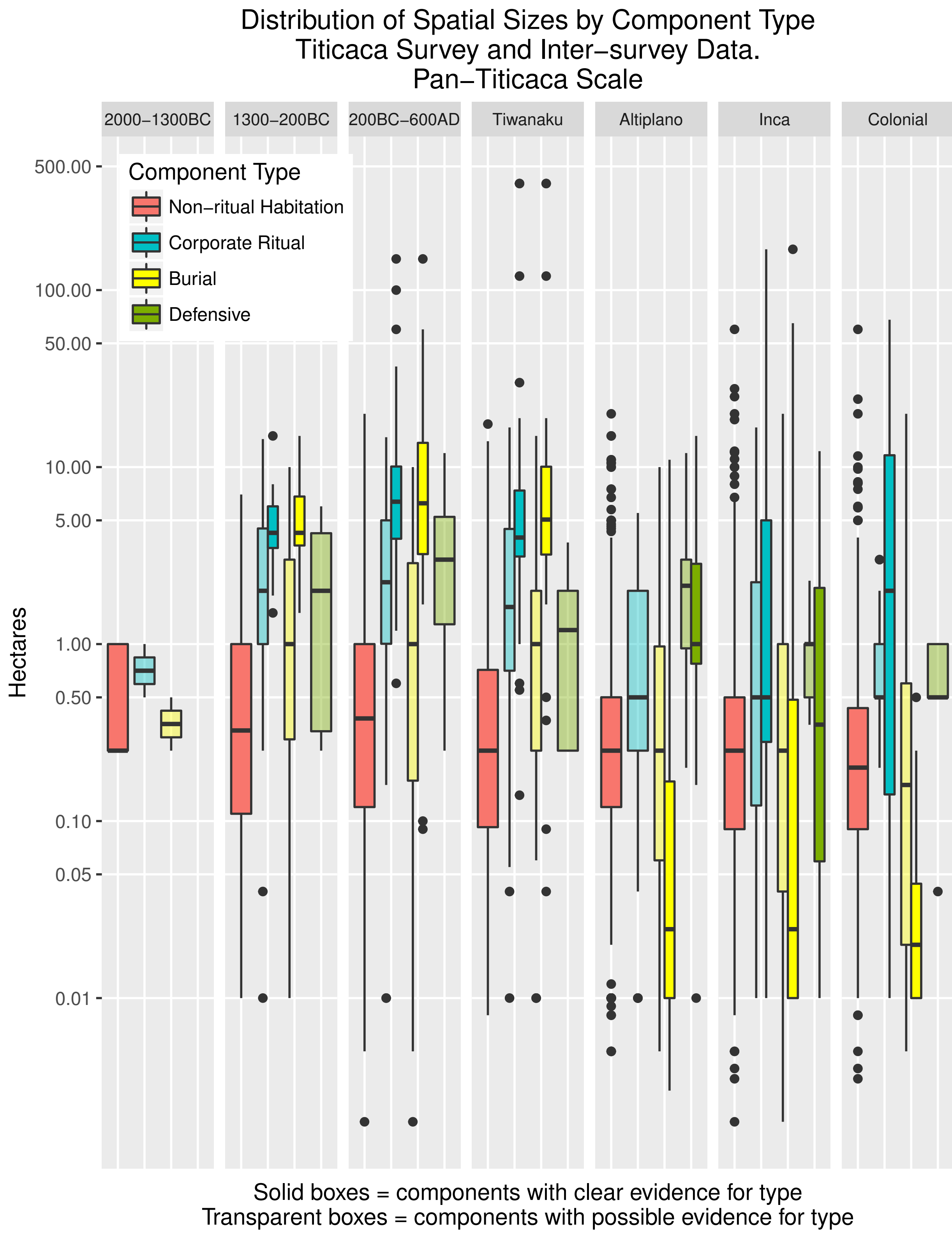


Figure 3.71: Comp. Size Boxplots by Comp. Type, Pan-Titicaca Scale (See Listing D.33)

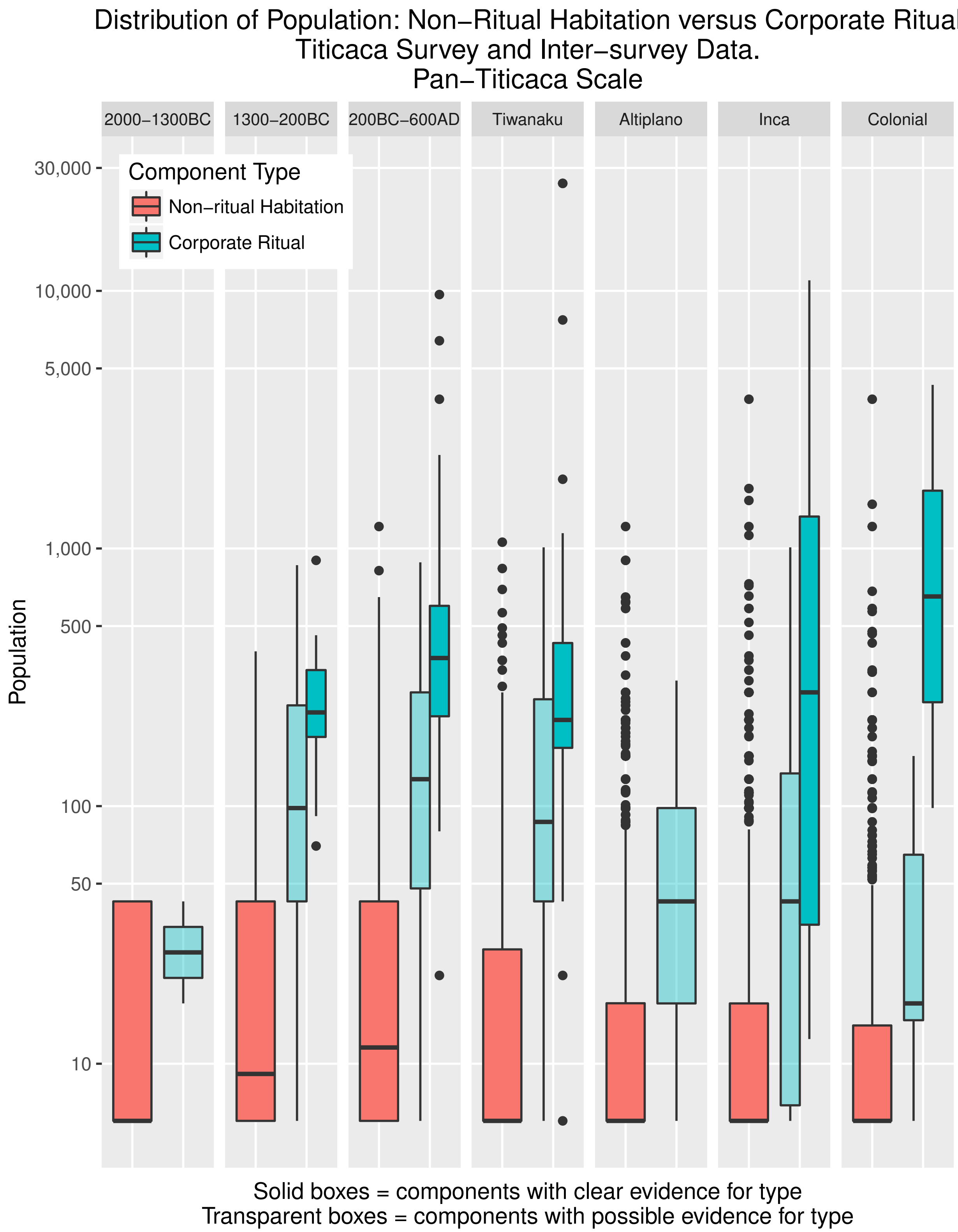


Figure 3.72: Pop. Size Boxplots by Comp. Type, Pan-Titicaca Scale (See Listing D.33)

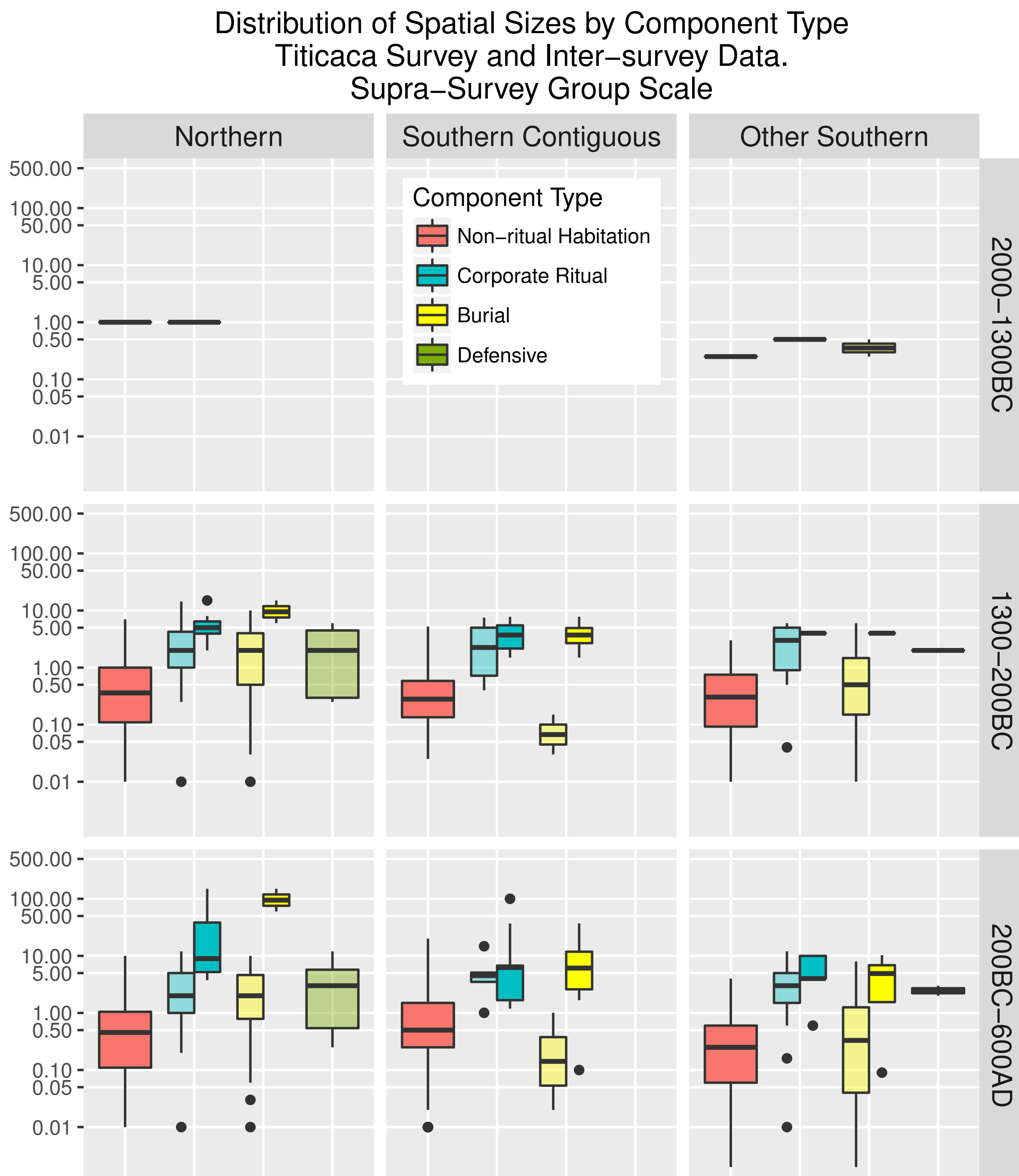


Figure 3.73: Comp. Size Boxplots by Type, Supra-Survey Scale, Page 1 (See Listing D.33)

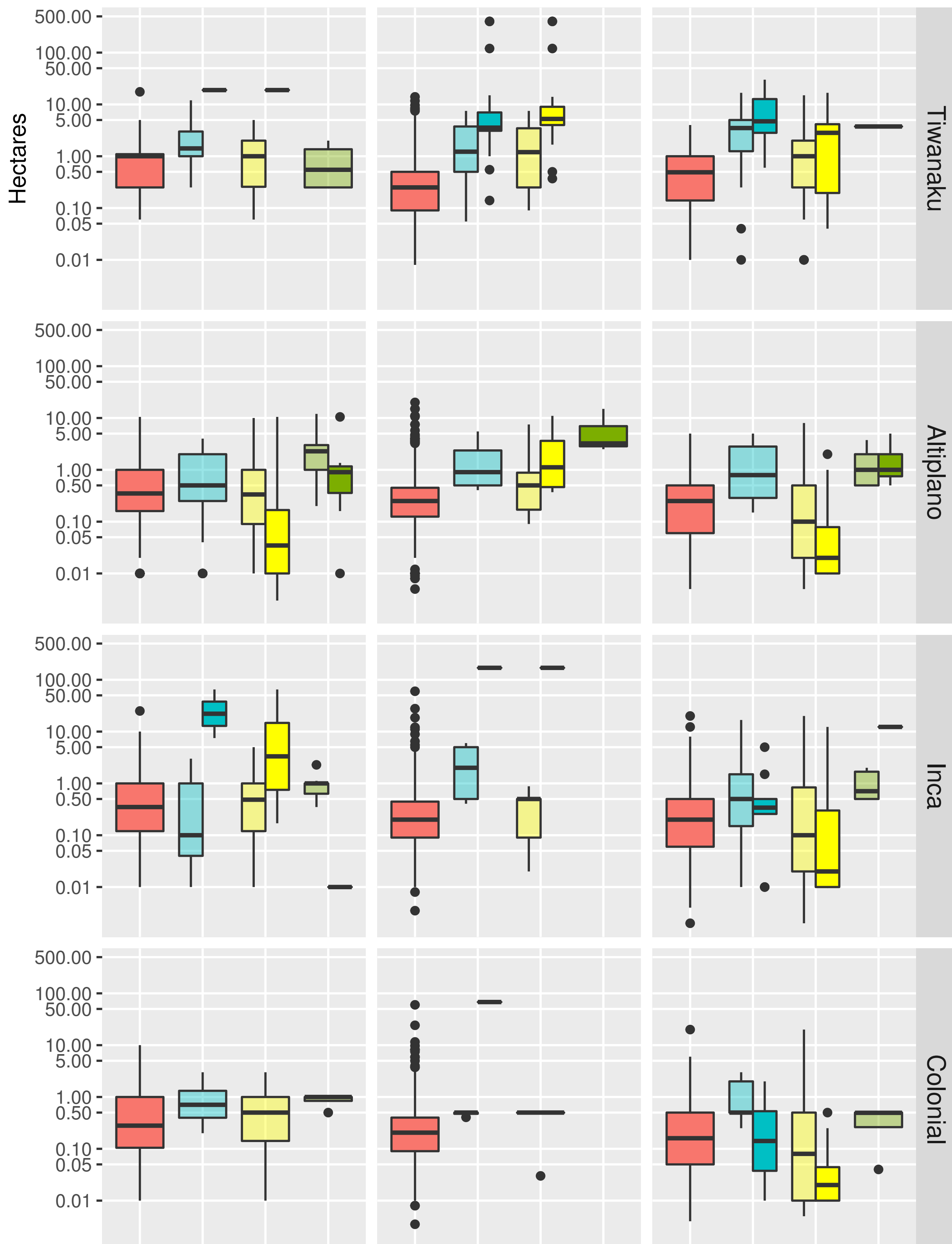


Figure 3.74: Comp. Size Boxplots by Type, Supra-Survey Scale, Page 2 (See Listing D.33)

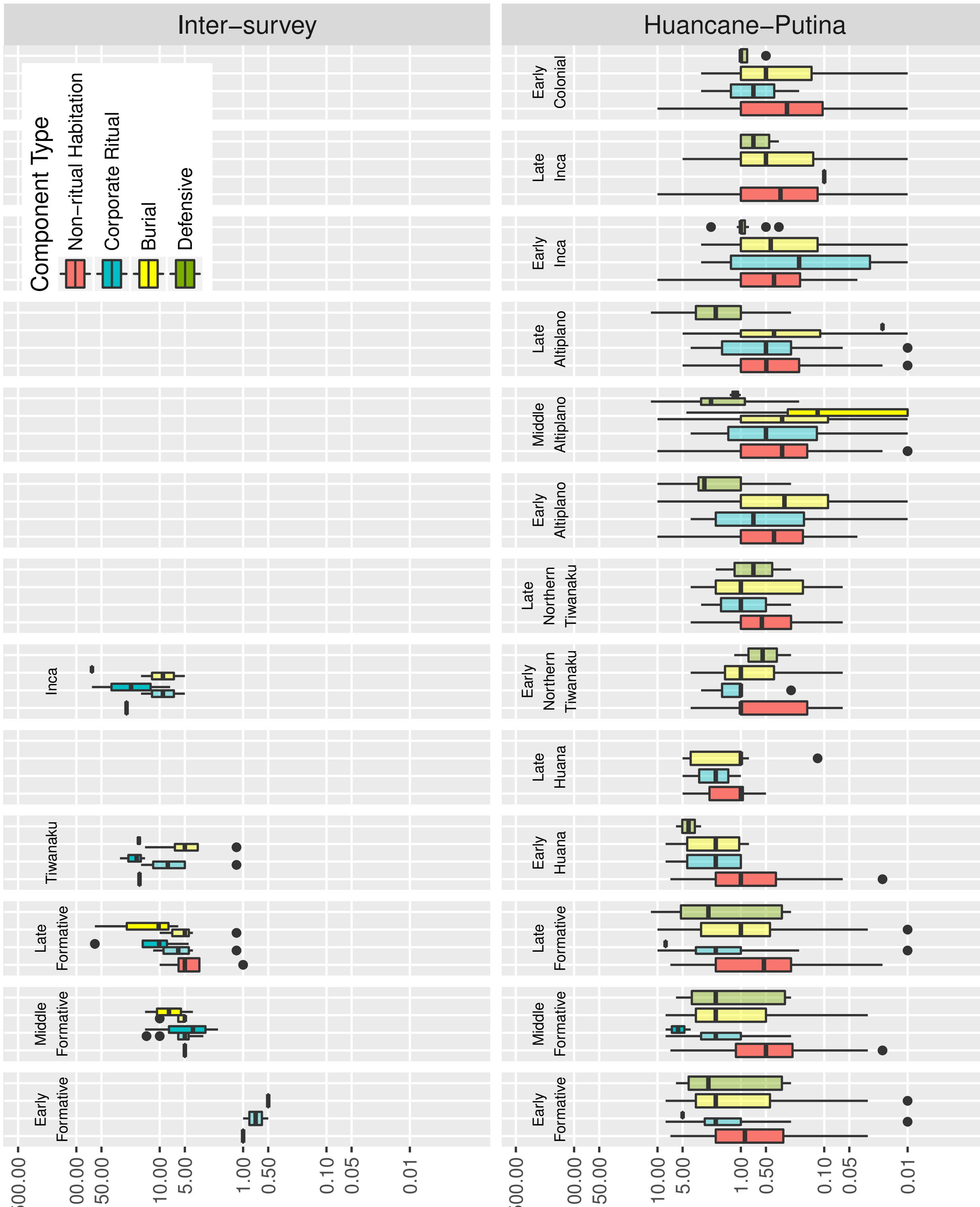


Figure 3.75: Comp. Size Boxplots by Comp. Type, Survey Scale, Page 1 (See Listing D.33)

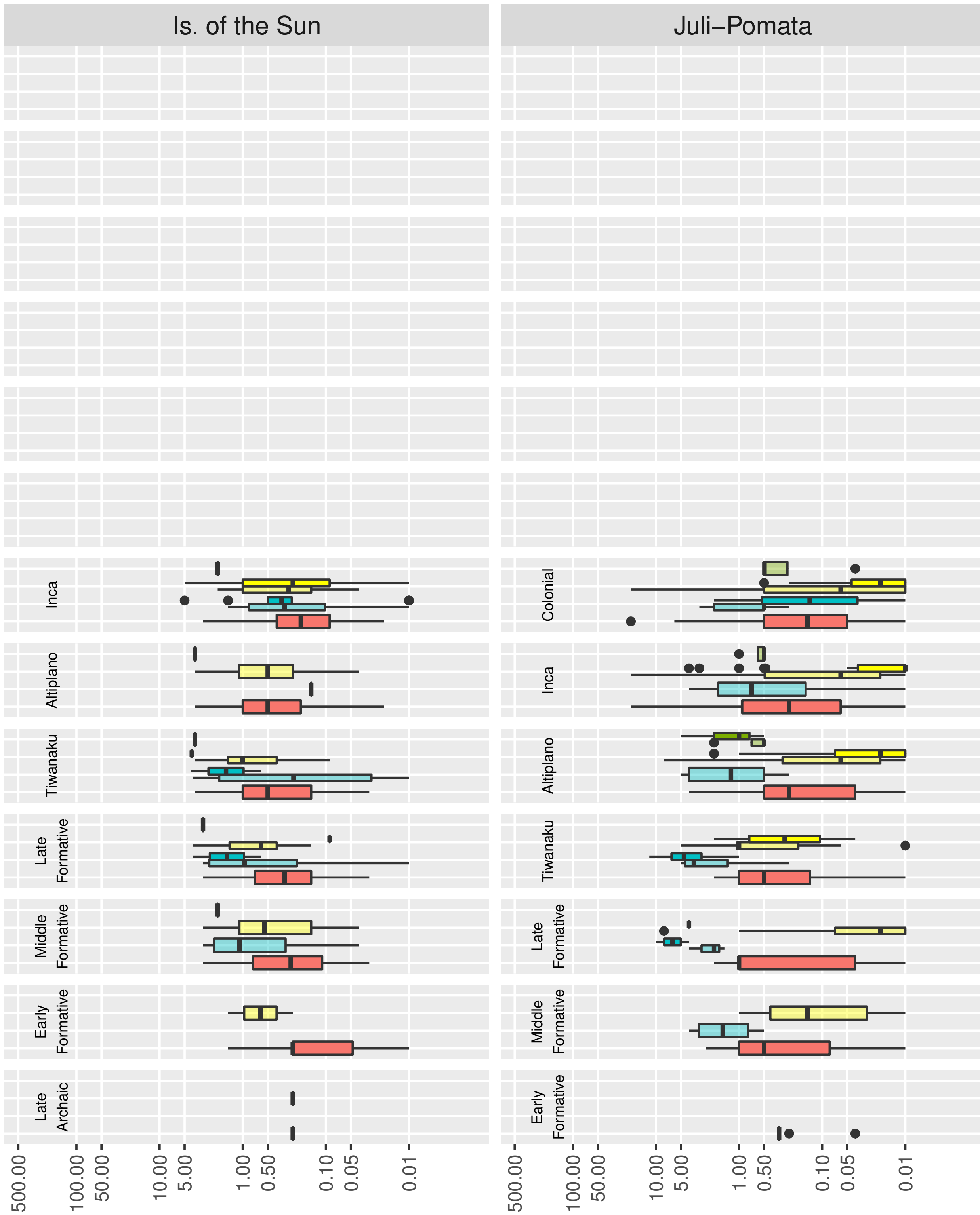


Figure 3.76: Comp. Size Boxplots by Comp. Type, Survey Scale, Page 2 (See Listing D.33)

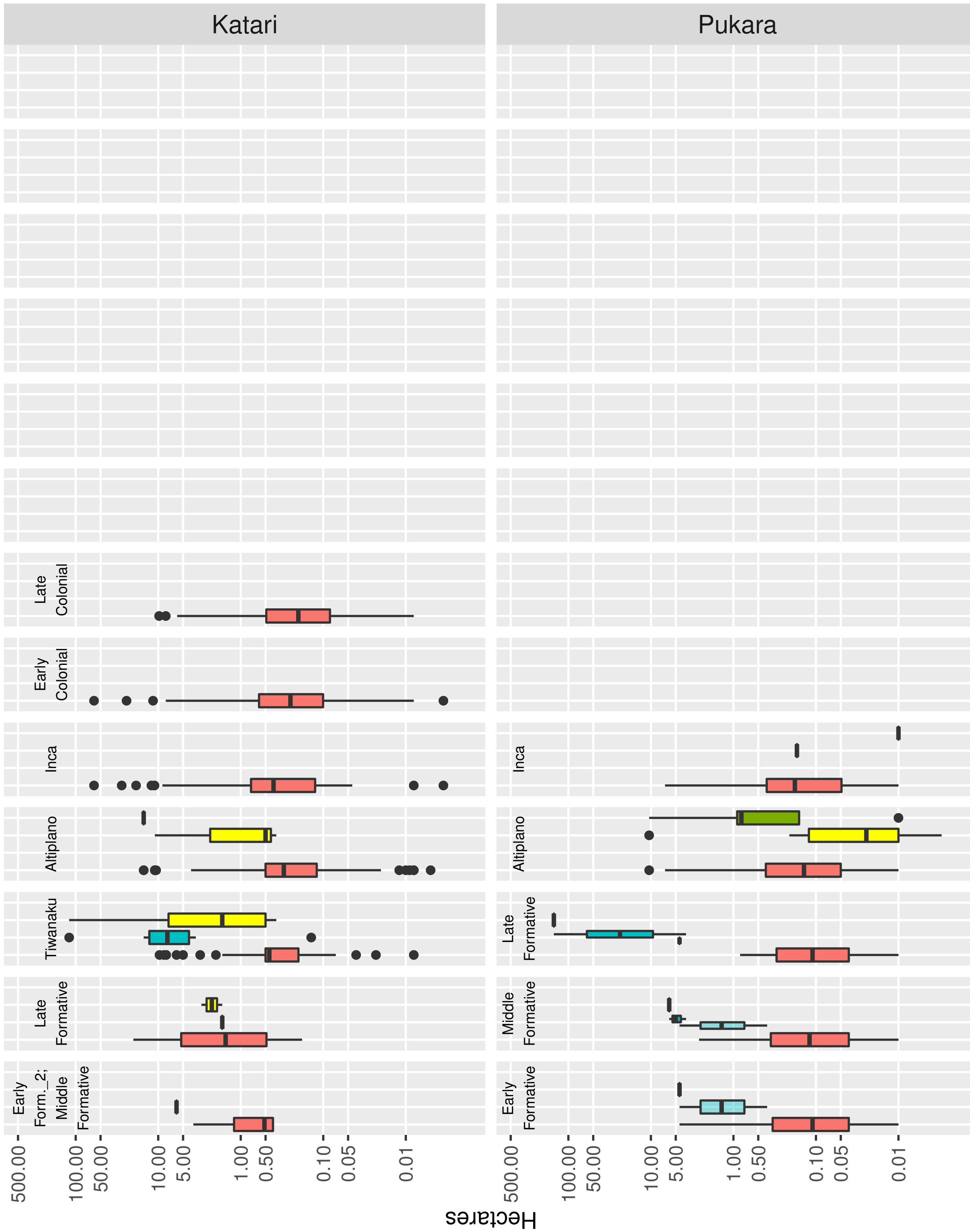


Figure 3.77: Comp. Size Boxplots by Comp. Type, Survey Scale, Page 3 (See Listing D.33)

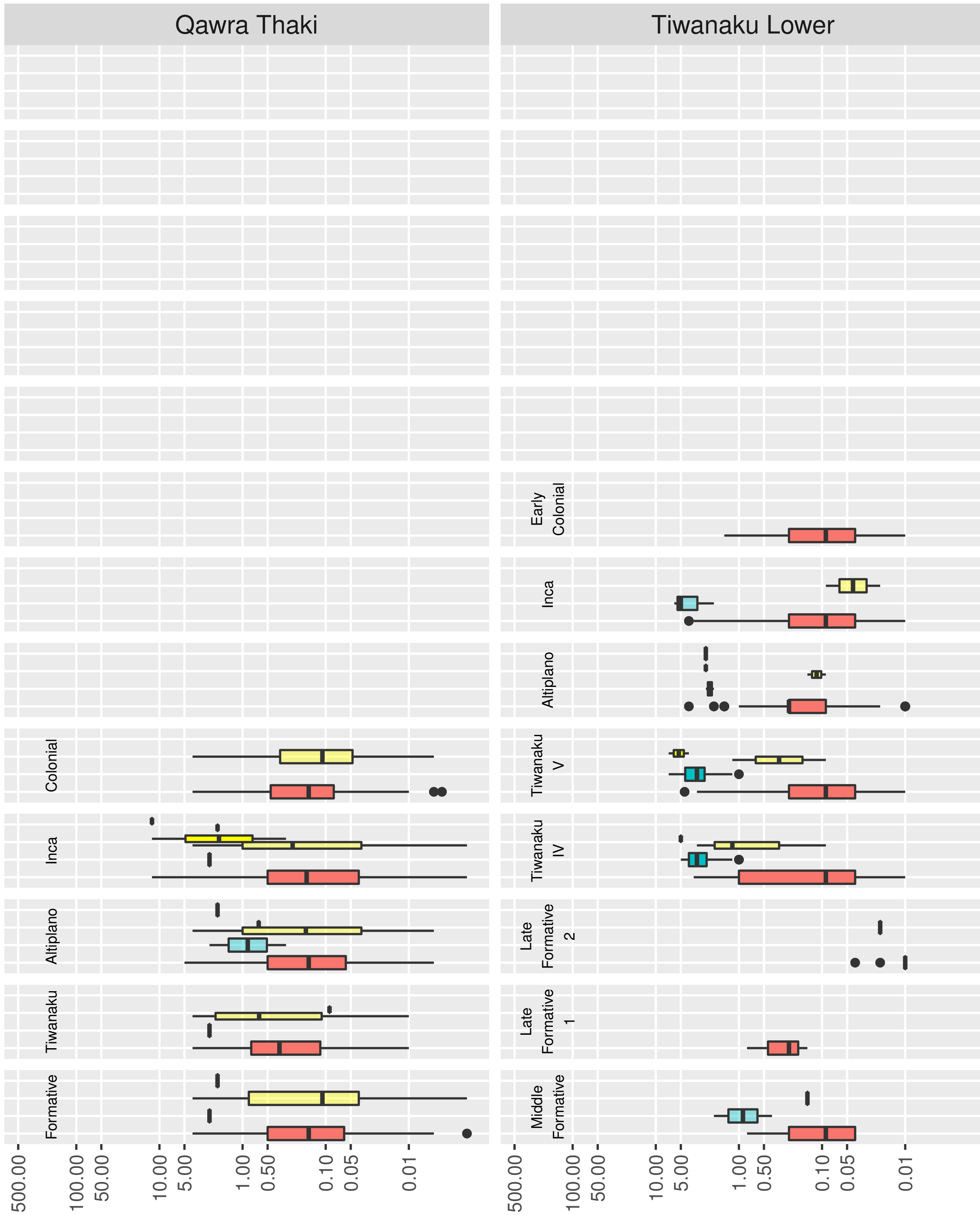


Figure 3.78: Comp. Size Boxplots by Comp. Type, Survey Scale, Page 4 (See Listing D.33)

Figure 3.79: Comp. Size Boxplots by Comp. Type, Survey Scale, Page 5 (See Listing D.33)

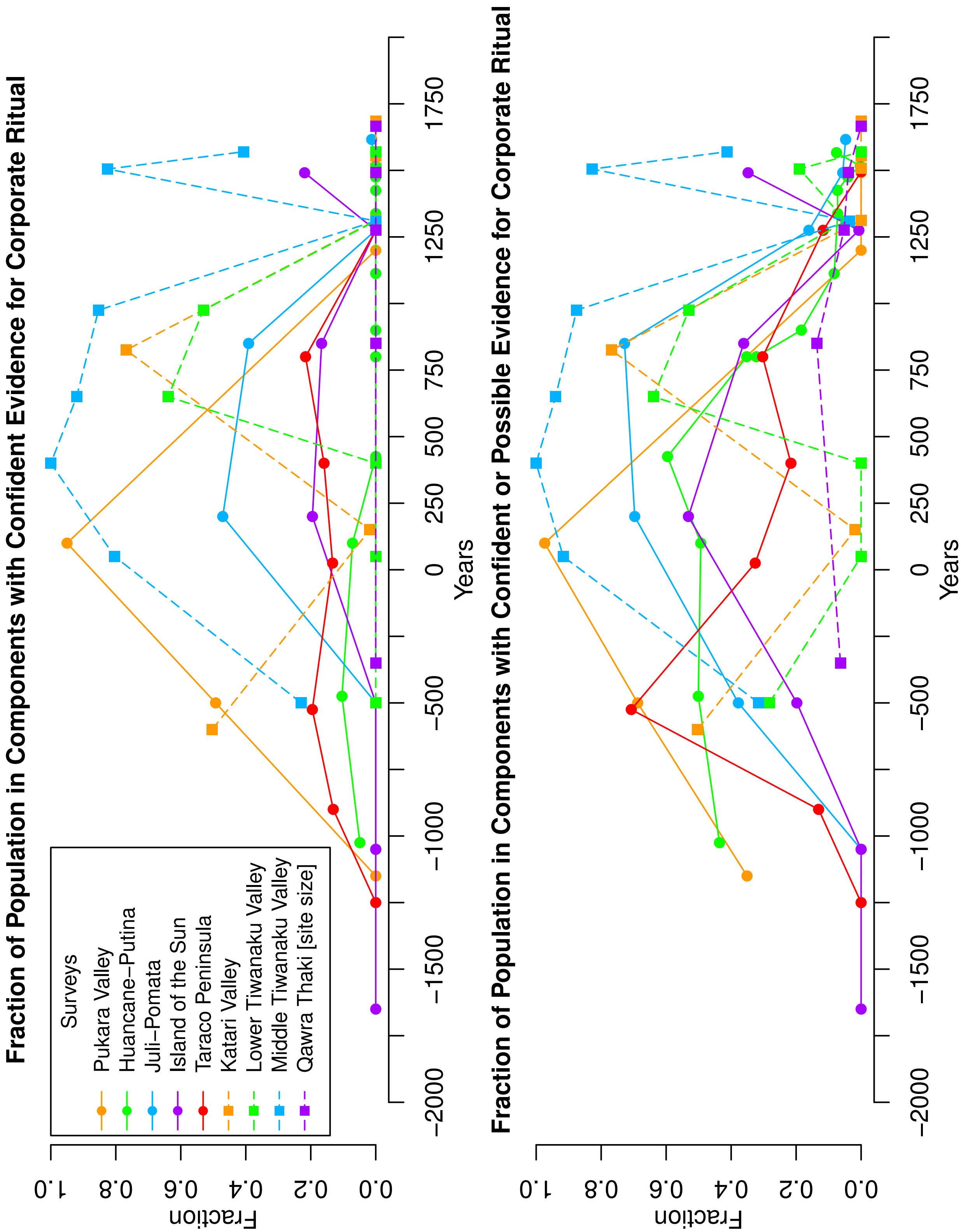


Figure 3.80: Fraction of Population in Comp.s w/ Corporate Ritual (See Listing D.32)

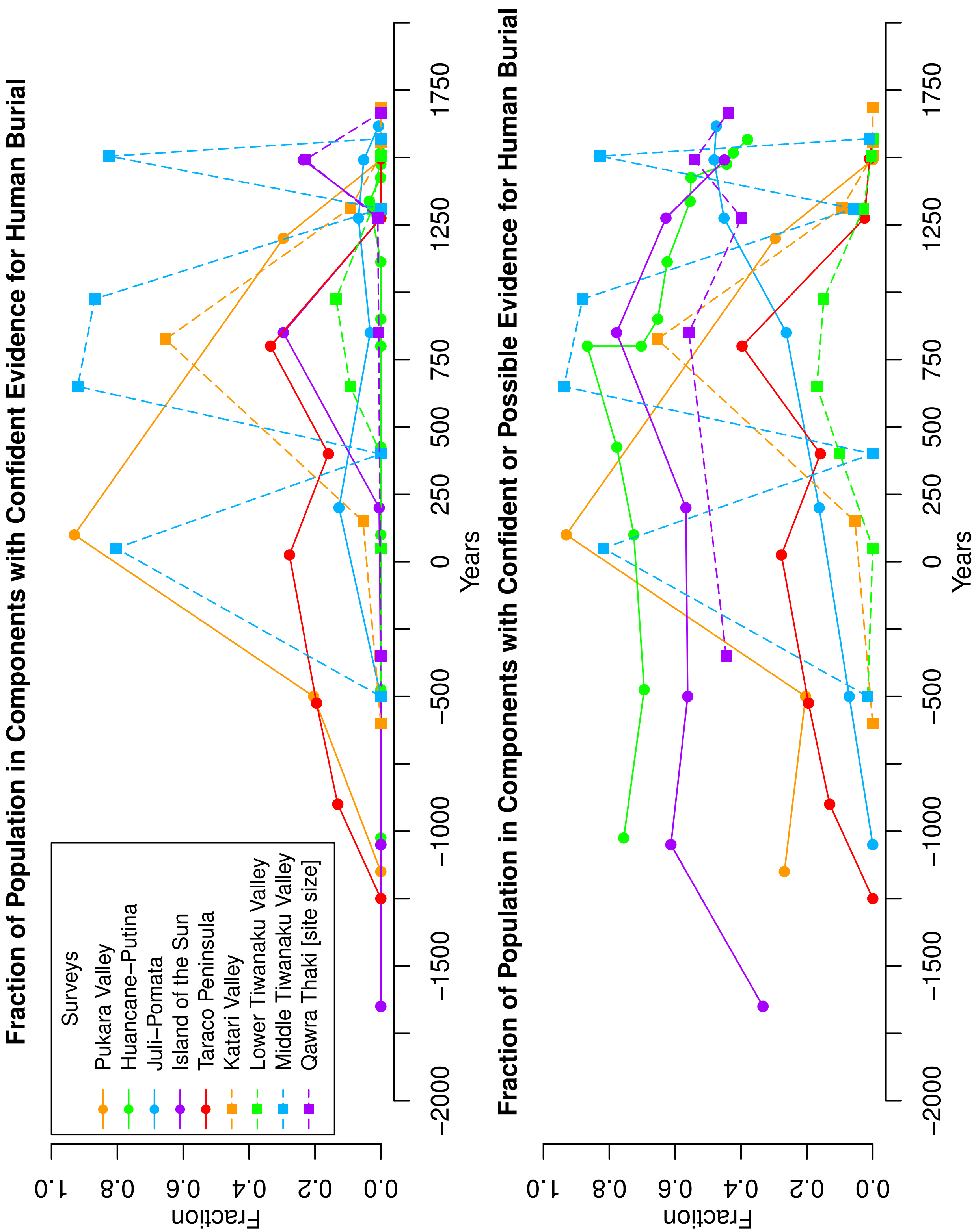


Figure 3.81: Fraction of Population in Comp.s w/ Human Burials (See Listing D.32)

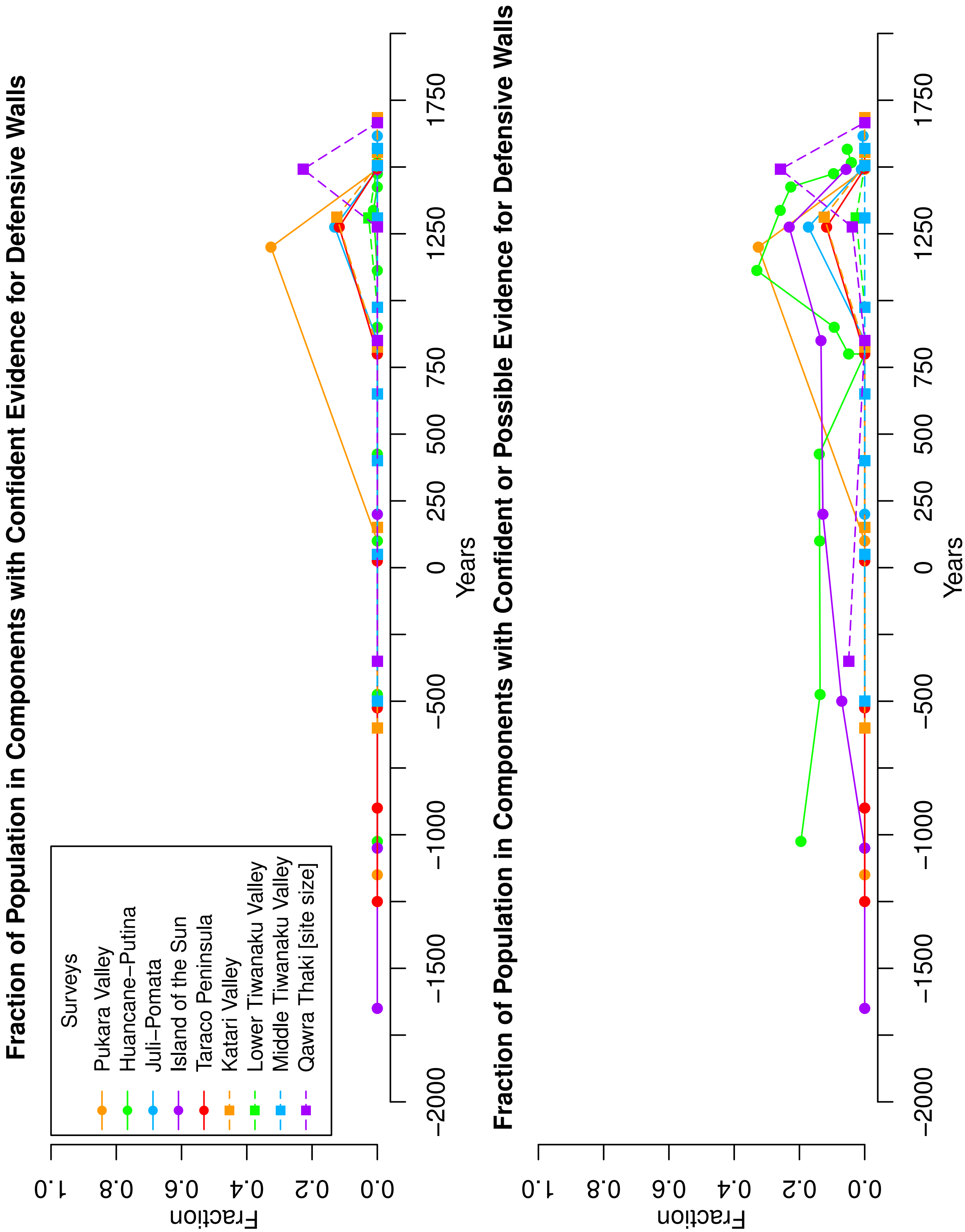


Figure 3.82: Fraction of Population in Comp.s w/ Fortifications (See Listing D.32)

Another important pattern evident in Figure 3.65 is that all periods' settlement patterns are anchored by a large number of small non-ritual sites. This will be useful to keep in mind for when the box-and-whisker plots are examined soon below.

The difficulty of dating fortifications makes conclusions from Figure 3.70 somewhat tenuous except for the Altiplano period. For the Altiplano period, it is clear that defensive sites had a wide range of sizes, as is already well established (e.g., Stanish 2003: 209–210). This diversity of sizes is due to rapidly shifting affiliation and confederation in the segmentary Altiplano period societies, rather than to an increase in the size of fortified sites as the Altiplano period progressed (Arkush 2009: 205). There appears to also have been considerable size variation in fortified sites of other periods, but confirmation and explanation of this will require further research.

The box-and-whisker plots (Figures 3.71 to 3.79) provide some additional insights. While it is still clear that there are plenty of small components with evidence of corporate ritual, the pan-Titicaca scale box-and-whisker plots make it more obvious that the typical non-ritual and ritual components have quite contrasting sizes. This contrast reaches its peak during the Late Formative (200 B.C.–A.D. 600), though of course there is a greater contrast between the Tiwanaku *outlier* ritual components and the Tiwanaku non-ritual components. The boxplots also make it further clear that, throughout the entire sequence, a major stratum of very small non-ritual sites always anchored the settlement patterns. Figure 3.71 at first seems to suggest a major change after the Tiwanaku period, with Altiplano, Inca, and Colonial ritual components becoming closer in size to non-ritual components. However, Figure 3.72 demonstrates why this is at least partially a methodological artifact: small non-habitational ritual sites (i.e., ones without population estimates and therefore excluded from Figure 3.72) are more commonly identified for post-Tiwanaku phases. A somewhat similar issue exists for burial components as well. A major difference in the sizes of components with burials occurs beginning with the Altiplano period: previously, burials were found mainly at large sites, whereas in the Altiplano period they shifted to small sites. There may be an underlying social transformation reflected in this data, but for the moment it is better considered a methodological artifact. Because Altiplano period tombs shifted (partially) to above-ground styles, small burial sites are far more likely to be identified by surveyors beginning with the Altiplano period.

Moving to the supra-survey scale (Figures 3.73 and 3.74), it is clear that the same fundamental patterns characterize all three supra-survey regions. Even the typical absolute component sizes for each type are mostly quite similar across the supra-survey regions. At first the Inca period corporate ritual components seem to have considerable variation between supra-survey regions, but this is mainly an artifact of low sample sizes.

The survey scale boxplots (Figures 3.75 to 3.79) mostly have the same patterns and similar absolute sizes, but there is one particularly notable regional deviation. The Huancané-Putina region has a less clear difference between ritual and non-ritual components. This is in part because non-ritual components are typically a bit larger than those of other regions, and in part because the region's components with possible ritual evidence typically have modest sizes. Because much of the relevant surface evidence is ambiguous, a considerable amount of excavation would be required before a confident argument could be made regarding this issue. For the moment, however, it appears that ritual sites in the Huancané-Putina region had a somehow different "pull" in attracting new residents, leaving non-ritual sites unusually large and ritual sites modest. Such a scenario also fits well with Figure 3.9: for most periods, the Huancané-Putina region's fraction of population in the largest site is very low compared to other regions. It should also be kept in mind, however, that despite some apparent difference in "pull," the Huancané-Putina region nevertheless may have had a substantial fraction of its population inhabiting ritual sites (see Figure 3.80).

Although the sites of Pukara and Tiwanaku have already been shown above to have intensely nucleated their regional populations, Figure 3.80 presents another angle on this. Both sites during the Late Formative and then Tiwanaku alone during the Tiwanaku period created a situation in which essentially all of their regional populations inhabited sites with ritual sectors. Such single-site massive demographic implosion was not the only way to gather the majority of a region's population into residing at ritual sites, however: it also happened in the Pukara Valley before Pukara was even the Pukara Valley's largest site, in the Juli-Pomata region during the Late Formative (or at least very nearly), in the Katari Valley during the Middle Formative and Tiwanaku periods, in the lower Tiwanaku Valley during the Tiwanaku period, and quite possibly on the Taraco Peninsula during the Middle Formative. Furthermore, many people who did not primarily reside in ritual sites would have had strong connections to other, ritually important sites. The essentially non-existent fractions for the Altiplano period probably mostly reflect the difficulty of identifying corporate ritual in the absence of clearly distinct architecture (an argument could be made, however, for classifying Altiplano period cemeteries as corporate ritual sites, unlike in this study's database). The very low fractions for most regions during the Inca period are a bit more surprising given the massive investment in ideological projects apparent at the Island of the Sun. However, this does fit well with Arkush's (2005) finding that a more typical Titicaca region's Inca period ritual practices were more landscape-based and decentralized.

The major inter-regional differences visible in Figure 3.81's presentation of the burial data are caused by the simple fact that the sites of Tiwanaku, Pukara, and Lukurmata had burials during their phases of peak size. This pattern therefore does not illuminate much which hasn't already been made clear above. The consistently high fraction for the Taraco Peninsula is much more interesting. Since I have classified components as having "confident" evidence for human burial primarily by reference to excavation data, this most likely simply reflects the large amount of excavation which has been conducted on the Taraco Peninsula. It is certainly tempting, however, given the demonstrated importance of ancestral dead to Taraco Peninsula societies (Hastorf 2003), to imagine a real inter-regional difference. A considerable amount of excavation in other regions would be required to address this.

Figure 3.82 is difficult to interpret, except to a degree for the Altiplano period, again because of the difficulty of dating fortifications. The Huancané-Putina region may have had an unusually high fraction of its population living in fortified sites during the Formative and early Huaña periods, but further fieldwork will be required to evaluate this. When examining the fractions for the Altiplano period, the rapidly shifting nature of Altiplano period confederations must be kept in mind (see above discussion of Altiplano period rank-size graphs). The fractions presented here do not have fine enough temporal resolution to be reliable for such a spatially and politically dynamic period. Nevertheless, even though these fractions should not be interpreted as representative of any particular moment in time, the inter-regional variations in the fractions may represent differences in the intensity of conflict when this conflict is “summed” for the entire Altiplano period. Before examining the graphs with this in mind, one additional concern must be addressed. For the Altiplano period in the Huancané-Putina region, the “possible” fortified components are probably more accurate than the “confident” fortified components. This is because the very fine resolution of the Huancané-Putina survey’s Altiplano period chronology makes classifying a component as a “confident” fortified component very unusual, when using my procedure for this study’s database. With this in mind, Figure 3.82 suggests higher intensity of conflict in the Huancané-Putina region and the Pukara Valley. The fact that these two regions are in fairly close proximity to each other lends some weight to this interpretation (they are the only northern survey regions). This pattern also fits well with Stanish’s (2003: 214) observation that fortified sites are less common in the southern Titicaca region.

CHAPTER 4

Macro-scale Study II: Staple and Wealth Finance

4.1 Concepts

This chapter seeks an understanding of how the funding of political power in the Titicaca region changed through time. I adopt the terminology of “staple finance” and “wealth finance” (see, e.g., D’Altroy and Earle 1985; Earle 1997: 70–75,209–211) to frame this analysis, though I believe this framework is even more powerful when considered alongside several other related conceptual dichotomies. “Staple finance” refers to the political creation and distribution/redirection of subsistence surplus, via a focus on either the subsistence goods themselves or the labor necessary to produce them. Earle (1997: 71) has characterized its aim in the following manner: “The critical problem is to maximize the gross ‘surplus’...from the subsistence economy that can be deployed to support elite projects ranging from ritual occasions to craft activities to a warrior cadre. To mobilize a surplus for finance requires intensification, and the process of intensification creates conditions that often allow land to be more easily controlled.” Although I would leave more room for some configurations of staple finance which are less elite-focused and more consensus-based, this concept provides a useful contrast to “wealth finance.” “Wealth finance” refers to the political creation and distribution of goods whose values are (even) more socially mediated than subsistence goods’ values. Or, to use D’Altroy and Earle’s (1985: 188) phrasing: “Wealth finance involves the manufacture and procurement of special products (valuables, primitive money, and currency...) that are used as a means of payment.”

The concepts of staple finance and wealth finance can be used to distinguish different spheres within one society’s economy (e.g., D’Altroy and Earle 1985), or the concepts can be used comparatively to characterize different societies' contrasting emphases on one type of finance or the other (e.g., Earle 1997: 209–211). The use of these concepts in this study will be more like the latter use, though oriented to change through time in a single region.

"Dual-processual theory" (see, e.g., Blanton et al. 1996; Feinman 1995) provides a useful complement to the concepts of staple finance and wealth finance. In fact, Blanton et al. (1996: 6) themselves indicate as much. Dual-processual theory's foundation is the identification of two idealized political-economic strategies. The first of these two political-economic modes is "network-based," and the second is "corporate-based." Both will simultaneously be present in the politics of any particular society at a given time, but one will tend to dominate due to tensions between the two. Network-based political strategies rely on leaders' (or aspiring leaders') connections to outside groups of people, for example connections helpful in attaining exotic goods. Corporate-based political strategies, on the other hand, rely on leaders' (or aspiring leaders') ability to use and shape group identities and ideas about social solidarity and interdependency, in order to guide economic and ritual action. Leaders who employ network strategies tend to be individualized, recognized, and conspicuously marked as leaders, whereas leaders who employ corporate strategies tend to be relatively undifferentiated from other group members in terms of explicit marking. This reflects the basis of their power: a network-based leader's power arises from his or her external connections and therefore from his or her *individual* identity, whereas a corporate-based leader's power arises from his or her mediation of *group* identities. Network strategies permit social exclusion and differentiation within a society because the ultimate source of power lies outside that society. Corporate strategies, conversely, use social inclusivity as their very currency of power. Dual-processual theory's idealized archaeological imprint of network strategies includes evidence of marked individuals in burials, marked individuals in iconography and texts, elite housing, substantial long-distance trade, and emphasized craft specialization. Dual-processual theory's idealized archaeological imprint of corporate strategies includes evidence of complex architecture permitting participation of large numbers of people in communal ritual, burials' expression of group rather than individual identities, and emphasis on cosmological themes, group identity, and interdependency in iconography and the spatial structure of constructed places.

Thus, the concept of wealth finance can be related to the concept of network strategies, and the concept of staple finance can be related to the concept of corporate strategies. This four-part idealization provides a fuller picture than either of the two-part versions alone. As with staple and wealth finance, I would prefer more conceptual room for some less elite-focused political economic configurations (also see Pauketat 2007: 29–39,83–84; Hodder 1996), but I nevertheless consider dual-processual theory a very useful heuristic framework.

Blanton et al. (1996: Tables 2 and 3) point out the conceptual linkages between their corporate/network dichotomy and several other dichotomies identified by other scholars. To this list I would add another, one which may in fact be the most fundamental. Graeber (2001: Chap. 4) has argued for a widely cross-cultural conceptual division regarding visibility, power, and value. On the one hand is a person or object's invisible, future-oriented, generic capacity for action on (other) people. On the other hand is a person or object's highly visible, past-oriented being/identity which persuades (other) people to respond in certain ways. Some of Graeber's examples of the former include hoarded money, the very generic *Ranakandriana* spirits of Malagasy cosmology, and the male person/body according to European dominant ideology since the 18th century. Some of Graeber's examples of the latter include objects of adornment and, though occupying highly contrasting positions of power, both the noble's person/body and the female person/body according to European dominant ideology. Though certainly formulated with rather different intents in mind, Graeber's dichotomy can be viewed as the deepest human basis for the contrast between staple/corporate and wealth/network. Staple finance and corporate ideologies have a basis in Graeber's generic capacities for action, whereas wealth finance and the individualizing at the core of network strategies have a basis in Graeber's highly visible persuasive identities.

Many different analyses could be conducted within the framework sketched above; this chapter only presents a preliminary few. Here, staple finance will be considered via some simple catchment analyses, with an eye towards catchments' different values under intensive versus unintensive production. Wealth finance will be considered via a fusion of network analysis with least-cost-path analysis. It should already be hinted, then, that my analysis of wealth finance is restricted to exchange, whereas craft production can be a no less critical element of wealth finance. This is not done for any theoretical reason, but simply arises from the nature of my database.

4.2 A Pre-Analysis Perspective

Before examining the analyses just mentioned, it will be helpful to outline what picture of staple and wealth finance is suggested by other evidence from the Titicaca region. First of all, I suggest that other lines of evidence reveal a major shift from staple to wealth finance (or from corporate to network strategies) in many parts of the Titicaca region during the late Middle Formative and early Late Formative (roughly the later half of the first millennium B.C.). The evidence for this includes increasing control/restriction of access to ritual locations, changes in ceramics which reflect changes in serving practices, marked individuals in burials, increasing frequencies of exotic goods, and iconographic shifts. For example, around 400 B.C. at Chiripa and its surrounding area, ceremony was increasingly restricted to one site (Chiripa), access and visibility into the Chiripa mound as a whole was increasingly restricted architecturally, and access and visibility into special sections of the mound was increasingly restricted (Beck 2004; Hastorf 2003: 322–327). Klarich (2005) has documented a similar history at Pukara. There, around the end of the first millennium B.C., an open, visible space for food preparation for inclusive ceremony was transformed into a space cut off from ceremonial activity in an increasingly restricted area (Klarich 2005: 242,259–265). Such architectural changes are nicely mirrored by changes in ceramic assemblages at other sites. At both a major southern site (Kala Uyuni) and a major northern site (Taraco), there is a change from larger communal serving vessels to smaller individual serving vessels, roughly around the end of the first millennium B.C. (Bandy 2007: 141; Levine et al. 2013: 300–302). This likely reflects a shift from ritual organization where "the roles of host and guest were distributed widely among a congregation" to "a better-defined status of 'host,' and a mode of commensality that could be described as 'one-to-many"' (Bandy 2007: 141). Thus, both architectural and ceramic evidence suggest a shift from an inclusive, highly communal ritual focus to ritual practices which served to highlight individuality, a shift which accords well with a change from corporate- to network-based political strategies.

The Titicaca region's Formative period mortuary record as presently known is probably too biased to atypical contexts for a secure analysis of changes in intra-population differentiation, but some argument can be made for increasing marking of individuals. At Huatacoa, people constructed a mortuary platform with an interred individual with a glittery red substance covering the bones sometime between 800 and 200 B.C., at least a half millennium into a sequence of sunken court construction (Cohen 2010: 168–172). The high degree of architectural elaboration, the uniqueness of being associated with the sunken court, and the treatment of the bones with a special substance suggest a highly marked individual. On the other side of the lake at the Chiripa mound, excavations of just three of the 14 structures surrounding the sunken court during the period from 400 to 250 B.C. have found 34 burials, and additional burials may have resided in the "bins" of these structures (Hastorf 2003: 324). Some of these burials contained valuable metal, ceramic, and lithic grave goods (Hastorf 2003: 324). The very high degree of architectural elaboration and the valuable grave goods suggest marking of special individuals.

A very long-term trend of increasing long-distance trade, both within the Titicaca region itself and between the Titicaca region and other regions, began as early as the late Archaic and reached great heights in the later half of the first millennium B.C. (Stanish 2003: 156–163; Bandy 2004b; Plourde 2006: 370–398; Hastorf 2008: 549–554; Levine et al. 2013). In fact, Stanish (2003: 159–160) has argued that Pukara and Tiwanaku gained dominance at this time (or slightly later) due in part to their location at places which afforded easy access to neighboring regions to both the east and west. Similarly for a slightly earlier period, Bandy (2004b) has argued that the elaborate architecture and the distinction enjoyed by some individuals at the Chiripa mound in the 400–250 B.C. period was permitted by Chiripa's location along a trade route opened by low lake levels in that period. A different type of example of the increasing political importance of long-distance exchange is evident at Huatacoa. There, a particular construction phase was ritually closed with a cache that included a fine ceramic vessel in a style of the distant central or south coast of Peru (Cohen 2010: 185–189,289). Although later analyses have shown the vessel to have been manufactured in the Titicaca region itself (Levine 2012: 323), this vessel's interment appears to have been part of a highly symbolic act referencing the increasing importance of network-based political power. In fact, this closed phase was the same construction phase that transformed a more corporate place into one with a mortuary platform highlighting a single individual (see above). Given the intentional, symbolic nature of a closing cache, I suggest that the closing cache is not just a reflection of a change in practices of power towards network strategies but moreover an explicit statement about the new foundation of power practiced in this ritual place. Finally, the site of Cachichupa in the Huancané-Putina region provides a variety of evidence for the importance of the eastern forested Andean slopes to highland Titicaca network strategists. This large Formative site is located well for control of trade routes between the highlands and the forested slopes, and artifactual evidence suggests that this was indeed an important concern in this area by the later half of the first millennium B.C. and perhaps earlier (Plourde 2006: 295–297,373–375,appendices). This evidence includes probable hallucinogenic paraphernalia (Plourde 2006: 294–295) and basket-impressed ceramics of a style characteristic of western Amazonia (Plourde 2006: 375–376). The basket-impressed ceramics are also found at other important nearby sites (Plourde 2006: 376), and basket-impressed and other types of ceramics with possible sources in the forested slopes or lowlands were also deposited at Pukara (Klarich 2005: 254–255).

Finally, Titicaca iconography suggests a shift from implication in corporate strategies to implication in network strategies sometime between 800 and 400 B.C. Iconography prior to this time emphasized animals related to water and wet areas, likely ultimately referring to fertility (Hastorf 2003: 325). The Yaya-Mama iconographic style then emerged, changing the dominant theme from zoomorphic to anthropomorphic (Hastorf 2003: 325–326). A variety of particular motifs are combined with the canonical elements of the Yaya-Mama style in a standardized way, the variable motif always placed in the same location (Stanish 2003: 132). These particular motifs likely represented particular elite identities (Stanish 2003: 132–133), thus suggesting the increasing importance of network strategies.

Thus, it seems clear that during the late Middle Formative and the early Late Formative a major shift from staple/corporate to wealth/network took place. The next question, therefore, is whether Tiwanaku reversed this change or not. As I have argued in Chapter 3, I believe there is good reason to agree with Kolata's fundamental point about Tiwanaku, which I would phrase as Tiwanaku being a state with a foundation in staple finance. Bandy (2004b: 107) has also argued that, even though the lake level shift around A.D. 300 would have situated Tiwanaku ideally for long-distance exchange, this was probably of secondary importance to the role of raised fields in Tiwanaku's political economy. It is also relevant to recall that Tiwanaku mortuary evidence suggests surprisingly little marking of social status (see Section 2.1.4), something quite in line with corporate-based political power. However, an argument for the importance of long-distance exchange to Tiwanaku political economy can still be made (e.g., Smith and Janusek 2014). Thus, analysis aimed at staple and wealth finance and corporate- and network-based political power is certainly warranted for the Tiwanaku period.

The Altiplano period is not very directly addressed by the framework I have set up for this chapter. Both staple and wealth finance were probably of minor consequence relative to the political relevance of warfare during the Altiplano period (also see Earle 1997: 209). One might say, however, that the segmentary structure and dynamics of Altiplano period societies (see Arkush 2014) must have been animated by the kind of ideologies associated with the corporate political mode.

The Inca period political economy was in fact the very topic addressed by D'Altroy and Earle's (1985) original formulation of the concepts of staple and wealth finance (though more generally, rather than for the Titicaca region). D'Altroy and Earle (1985) emphasize wealth finance within the Inca political economy, but it is important to understand that this is in large part because Inca staple finance is so obviously important and frequently discussed. Also of clear importance to the upcoming analysis is the Inca system of roads (e.g., Hyslop 1984), which had a considerable impact on the Titicaca region's settlement patterns as a whole (Stanish 1997: 205,208; Stanish 2003: 263). However, it must be kept in mind that in addition to the roads' role as economic infrastructure, they served important military, religious, and other roles (Hyslop 1984: 248–249).

In the most literal of senses, we have very specific data on staple and wealth finance for the early Colonial period. This is because historical documents (Espinoza Soriano 1964; Cook 1975) are available which detail exactly how much of each kind of tribute was demanded from the different parts of the Titicaca region, at quite high spatial resolution. A thorough analysis based on these documents would be a very interesting complement to the analysis presented below, but this will have to be the subject of a future study.

4.3 Analysis: Staple Finance

4.3.1 Methods

In this section I will describe how I have modeled subsistence catchments' space and value. This is a coarse and preliminary model, but it does produce interesting results.

The first step in the catchment analysis is the creation of a pan-Titicaca scale "map" of unranked, qualitative land classes. In fact, three maps are required, to account for the frequent changes in lake level from the Formative to the early Colonial period (see Section 3.1.5). In the very simple land classification used in this analysis, only topography and hydrology are considered. Improvements, such as consideration of soils, should be made in the future. The digital elevation model used to define topography is the GMTED2010 7.5-arc-second digital elevation model. This is a relatively low resolution digital elevation model, with a resolution of about 230 meters. Since the simple land classification made for this analysis is concerned only with gross topography, this dataset provides sufficient resolution. The hydrological data used are the diachronic lake level models previously discussed (see Section 3.1.5) and several digital datasets for rivers. For the Peruvian side of the Lake Titicaca region, the Peruvian 1:100,000 scale *Carta Nacional* is used for rivers (as shapefiles downloaded from http://sigmed.minedu.gob.pe/descargas/). For the Bolivian side of the Lake Titicaca region, the Bolivian 1:1,000,000 scale Instituto Geográfico Militar maps' data are used for rivers (obtained as shapefiles using QGIS's WFS capabilities, from http://geo.gob.bo/geoserver/igm/wfs , an address which I identified using http://geo.gob.bo/mapfishapp/). It is important to note that the river datasets for the two nations do not have a comparable level of detail. Creating or obtaining a more uniform river dataset for the Titicaca region as a whole would be a considerable improvement.

The unranked, qualitative land classes defined in this first step include: 1) low *pampas* without river, 2) high *pampas* without river, 3) hillsides without river, 4) *puna* without river, 5) near-lake without river, 6–10) the same as classes 1–5, except near-river, and 11) in lake. This land classification is inspired by Griffin and Stanish (2007: Appendix A), though it is slightly simpler and uses different data/methods to spatially identify areas belonging to each class. *Pampas* (roughly, plains or prairie) are defined in this analysis as areas whose immediate surroundings have similar elevations; low pampas are below 3900 masl., whereas high pampas are between 3900 and 4000 masl. Areas which are below 4000 masl. but whose surroundings do not have similar elevations are defined as hillsides. *Puna* is defined as any area above 4000 masl. Arbitrary distances are used to define near-lake and near-river areas: a definition based on agricultural engineering and social factors would be preferable. The resulting land classification map for the modern lake level is displayed in Figure 4.1.

These qualitative land classifications must be transformed into quantitative spatial models/maps of subsistence productivity (in other words, each land class must be assigned a value in kilocalories-per-hectare). In fact, two separate models must be made for each lake level: one for unintensive production and one for intensive production. Griffin and Stanish (2007: Appendix A) again provide the main inspiration for this part of the subsistence models' construction (also see Stanish 2003: 34–40). To avoid confusion, note that I use kilocalories in a different sense than Griffin and Stanish (2007) do: in my use, one calorie is the energy required to heat one gram of water one degree Celsius, and one kilocalorie (kcal.) is 1000 of these calories. Griffin and Stanish (2007) use "kcal." to indicate a unit 1000 times larger than my "kcal."

The final step is to define the spatial extent of catchments. I have experimented with two different ways of doing this, but only one of them proved to be useful for this dataset. The useful method defines catchments as buffers, or in other words as circular polygons of a standard size around each site (sites near to each other can have overlapping catchments with this method). The buffers are defined for both the survey and inter-survey data. The other

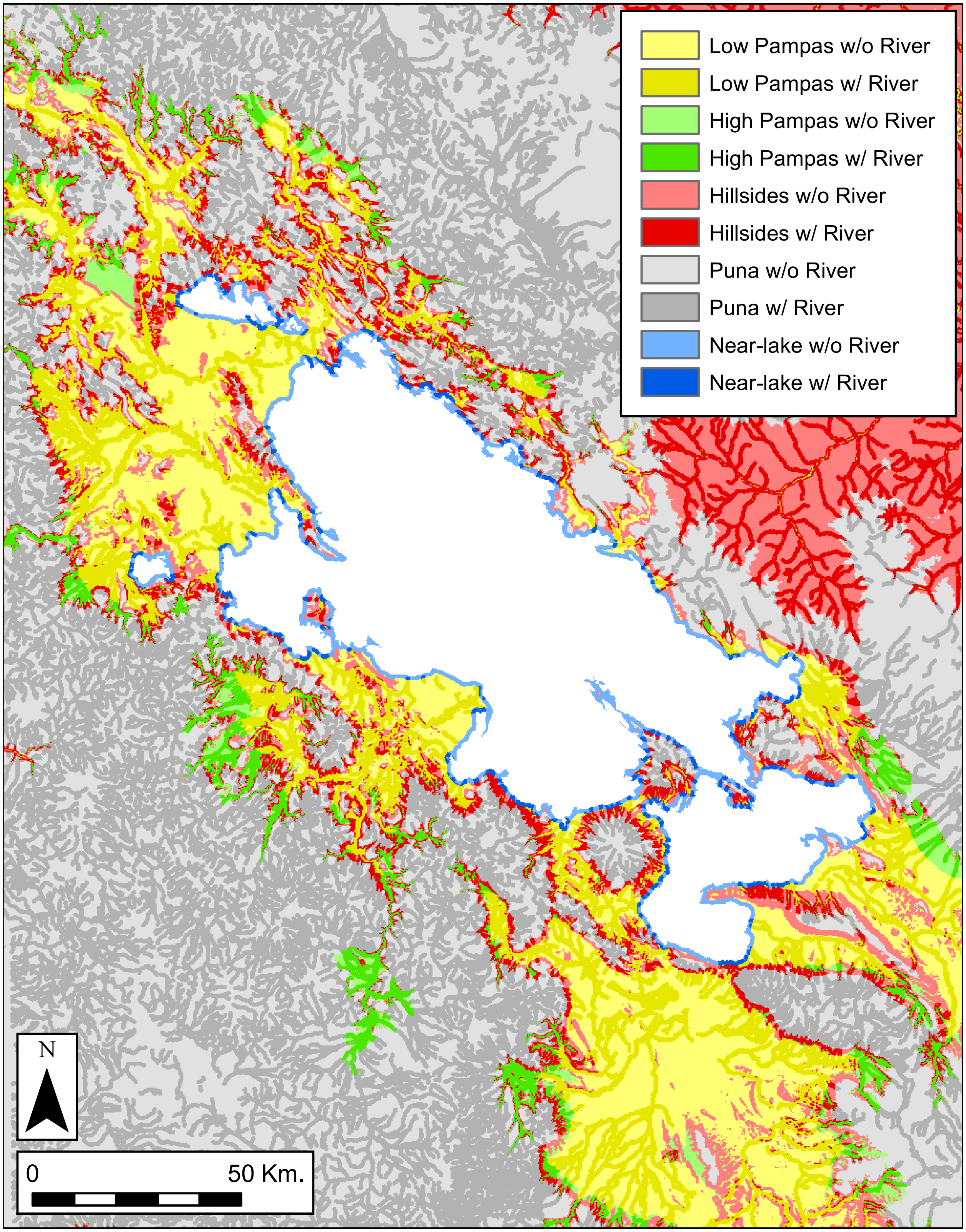


Figure 4.1: Land Classification, Modern Lake Level (See Listing E.1)

method I attempted was to define catchments as Thiessen polygons (polygons representing all of the area which is closer to a given site rather than any other site). This method is not very useful for the datasets analyzed here, because changes in catchment values mainly just track the significant changes in the numbers of sites. Thus, my catchment analysis will rely on buffer catchments. The standard size of the buffers will be discussed momentarily, but another concern must be raised first.

There is one key addition to Griffin and Stanish's (2007) model which is necessary to make it work for catchment analysis: to account for the subsistence value of fishing, the in-lake areas in the subsistence models/maps must be given some value. However, it doesn't quite make sense to assign a kilocalorie value to a hectare of lake (as is done for the land classes), since it is access to the lake more generally which is important. Therefore, fishing kilocalorie amounts are assigned to catchments based on how large the in-lake fraction of the catchment is. A catchment with half of its area in the lake is given the kilocalories equivalent to a year's fishing (in addition to the kilocalories from the other half's land values). Catchments with smaller or larger fractions in the lake will have proportionally fewer or more kilocalories assigned to them from fishing. Although I will ultimately use a social scale larger than a single household to define catchment size, first some sense of a single household's typical fishing productivity must be determined. I have defined a single household's annual fishing yield in the following manner. A typical fishing trip on Lake Titicaca returns 11 kg. of fish, and a typical month of fishing includes 20 trips (Orlove 2002: 89). Thus, a typical annual raw yield is 2640 kg. If 90% of fish weight is usable meat (Stark and Voorhies 1978: 280), then this is reduced to 2376 kg. (note, however, that the Titicaca native species seem to be bonier than average fish (e.g., Orlove 2002: 133), so a Titicaca-specific figure for usable meat would be preferable). If one kg. of usable fish meat has approximately 1000 kilocalories (Stark and Voorhies 1978: 280), then a single household's annual kilocalorie fishing yield is 2,376,000 (again, a Titicaca-specific figure for kcal./kg. meat would be preferable). Note that it appears that newer fishing technologies, such as nylon gill nets, have not inflated the annual raw yield figure (Orlove 2002: online appendix Seasonality_fishing.xls, but also see pages 140,230). Likewise, note that the modern introduction of non-native fish species into

Lake Titicaca seems to not have inflated the annual raw yield figure: native species make up a large portion of the fish caught in Orlove's survey, and individual fishers who have catches almost entirely composed of native species can have high total catches (see Orlove 2002: online appendices Fish_Dist.xls and Ret_per_fman.xls). Finally, because the 20th century fishers who produced the quantitative data on fish catch are often also substantially involved in agriculture (Orlove 2002: 113–114), I have made the annual yield equivalent to 50% of a catchment rather than 100%.

Choosing a size for the buffer catchments is not straightforward. The most important concern is that the buffer size creates a reasonable balance between the subsistence value of land/agriculture and the subsistence value of the lake/fishing as defined above. Recall that the caloric value of a catchment's lake area is defined using the fraction of the catchment which is in the lake, rather than the catchment's absolute number of hectares in the lake: therefore, the catchment size must be defined such that the labor required to fish half of a catchment is roughly equivalent to the labor required to farm half of a catchment. For this and other reasons related to labor organization (see Collins 1986) and population distribution, it makes more sense to define catchment size with an idealized village in mind rather than a single household. More specifically, a catchment defined with a single household's agricultural productivity in mind would be too small to capture the actual options provided by a site's surroundings, since per-hectare agricultural labor demands are high enough to prevent extensive land use by a single household (see, e.g., Griffin and Stanish 2007: Table A-2). On the other hand, the "standard" village defined for the analysis should not be very large, since in all periods in the Titicaca region's prehistory most sites were small (see Figures 3.36 to 3.41).

I have used a somewhat arbitrary figure of ten households per catchment, in an attempt to balance these various concerns. Thus, the fishing annual kilocalorie yield for a catchment with half of its area in the lake is 23,760,000. In defining the catchment spatial extent so that it is appropriate for the agricultural capacities of ten households, I have focused on two concerns: the number of hectares which ten households can annually cultivate, and how often agricultural land needs to be fallowed. Of course, the number of hectares which ten households can cultivate is dependent on how intensive the technology used is, but in the interest of simplifying this model, I will use a single "standard" figure of 20 hectares. I arrive at this figure by first acknowledging that the labor demands of Titicaca region agricultural production are exceptionally concentrated into short-duration "crunch-times" (see Bandy 2005a: 287–289). This is the fundamental limit on the number of hectares which can be cultivated, and the result is that even with relatively unintensive methods, the potential extensiveness of cultivated land is low. Even for the most unintensive technology and the least labor-demanding crop within Bandy's (2005a: Table 5) model for Titicaca region agriculture, the annual labor demand is about 60 person-days per hectare, almost all of which would be required during a month or so at planting time and especially a month or so at harvest time (see Bandy 2005a: Fig. 8). Two hectares therefore seems a reasonable or even a liberal "standard" for a household's potential annual cultivation. This is also supported by Collins's (1986: 659,663) figures for a particular household in the northern Titicaca region: this household had one and a half hectares in landholdings, .65 hectare of which was in fallow, and spent about 550 hours working this land in September and about 650 hours in March. As discussed by Collins (1986: 659–660), a household might or might not be able to meet these labor requirements with the household's labor alone, depending on the number of children in the household and their ages. So, two hectares of cultivation for a household is about right or even a bit too high. Rather than setting the ten-household catchment size to 20 hectares, though, some accounting for fallowing requirements is necessary, because fallowing is of critical importance to Titicaca region agriculture (see Bandy 2005a: 276–278). In a typical multi-year cycle in the Titicaca region, about half of the years are fallow years (Bandy 2005a: 278), so the 20 hectares should be doubled to 40 hectares. Expecting these 40 hectares to be the closest 40 to the site would be assuming rather simplistic agricultural strategies and a great deal of environmental homogeneity, so I have arbitrarily doubled this figure again, to 80 hectares. Thus, a catchment size of 80 hectares is used (the buffer is created with a radius of 500 meters), but the sum of this land's subsistence values is multiplied by .25, to account for only 20 of the hectares being cultivated in any particular year.

Since the Titicaca region's lake level history does not have a simple relationship with its archaeological chronology, the chronological framework for the catchment analysis needs to account for both. For details on how I have attempted to do this, see Table 3.3 and my discussion of it.

4.3.2 Results

Figures 4.2 and 4.3 present the catchment analysis results. Descents of the lines to 0 should be ignored: these simply represent lack of data for a time span. It should be noted that, in the graph for unintensive production, the Taraco Peninsula, Juli-Pomata region, and inter-survey data have an oscillating pattern during the Formative period which is primarily caused by lake level shifts. This may be a desirable feature of the model, but only if its cause is recognized.

One of the most fundamental expectations is that Inca period catchments should have higher mean values than Altiplano period catchments. This is because, as discussed both in Chapter 3 and Section 4.2, staple finance was clearly fundamental to Inca period settlement reorganization. The results fit this expectation fairly well: with the major exception of the Juli-Pomata region, for both unintensive and intensive production the mean values rise for most surveys. The Juli-Pomata region's deviation is unsurprising, since there the high elevation puna areas were increasingly used during the Inca period (Stanish et al. 1997: 31,58). As discussed in Section 3.1.3, it appears that the Inca state "filled in" the Juli-Pomata region, which had a somewhat low population density previously. Therefore, the Inca period decrease in catchment values in the Juli-Pomata region should be understood as related to expanded, more extensive subsistence resource exploitation, rather than a decrease in the importance of subsistence resources.

While the relationship between Inca period and Altiplano period catchment values is as expected, it is perhaps surprising that Formative period catchment values are typically higher than or similar to Inca period catchment values. On the other hand, it does make sense that earlier periods with lower total populations and less extensive landscape fill-in would have higher mean catchment values. Another way of viewing this is that early settlement was located with a strong orientation to the best areas for subsistence production, as might be

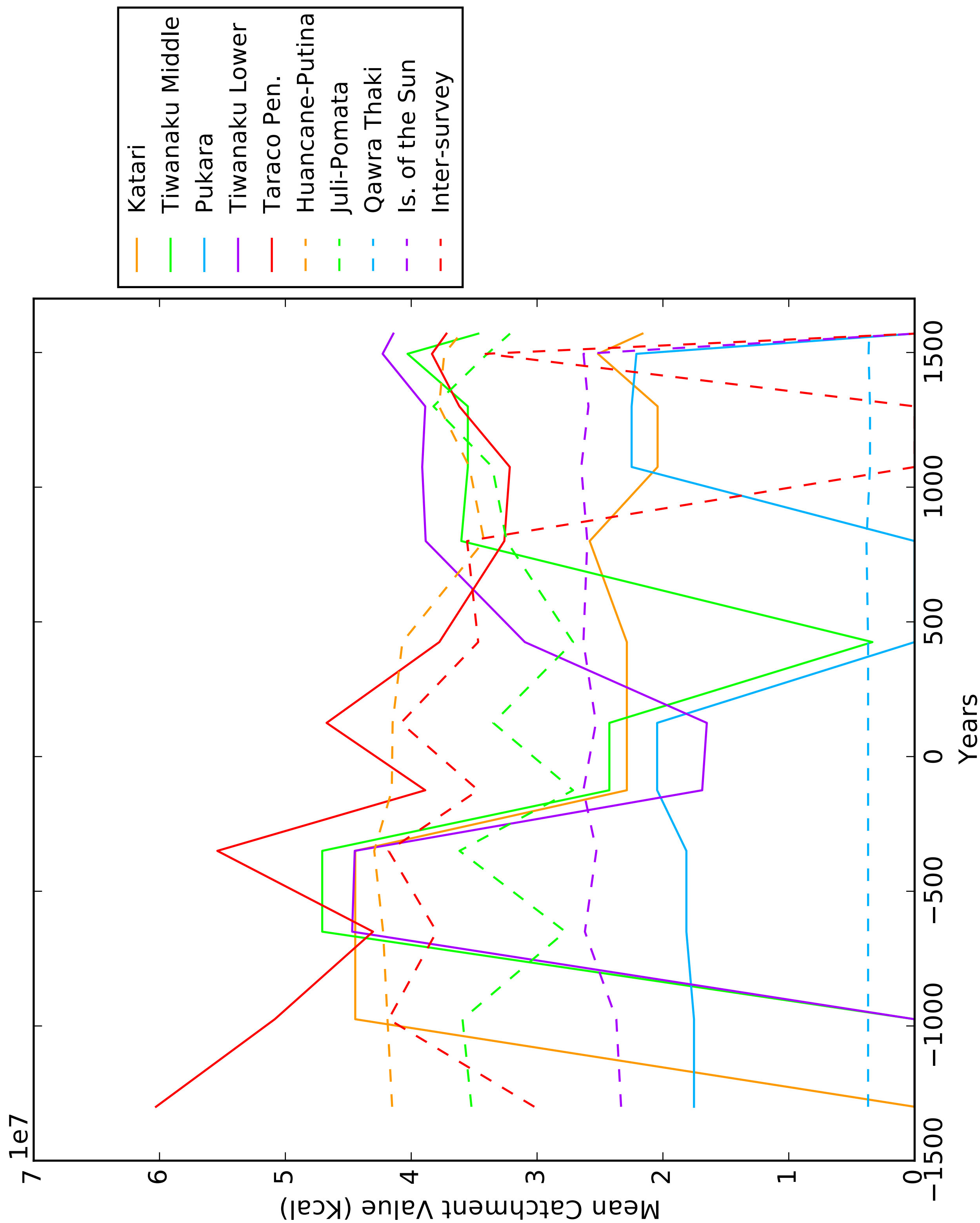


Figure 4.2: Mean Buffer Catchments, Unintensive Prod., Survey Scale (See Listing E.3)

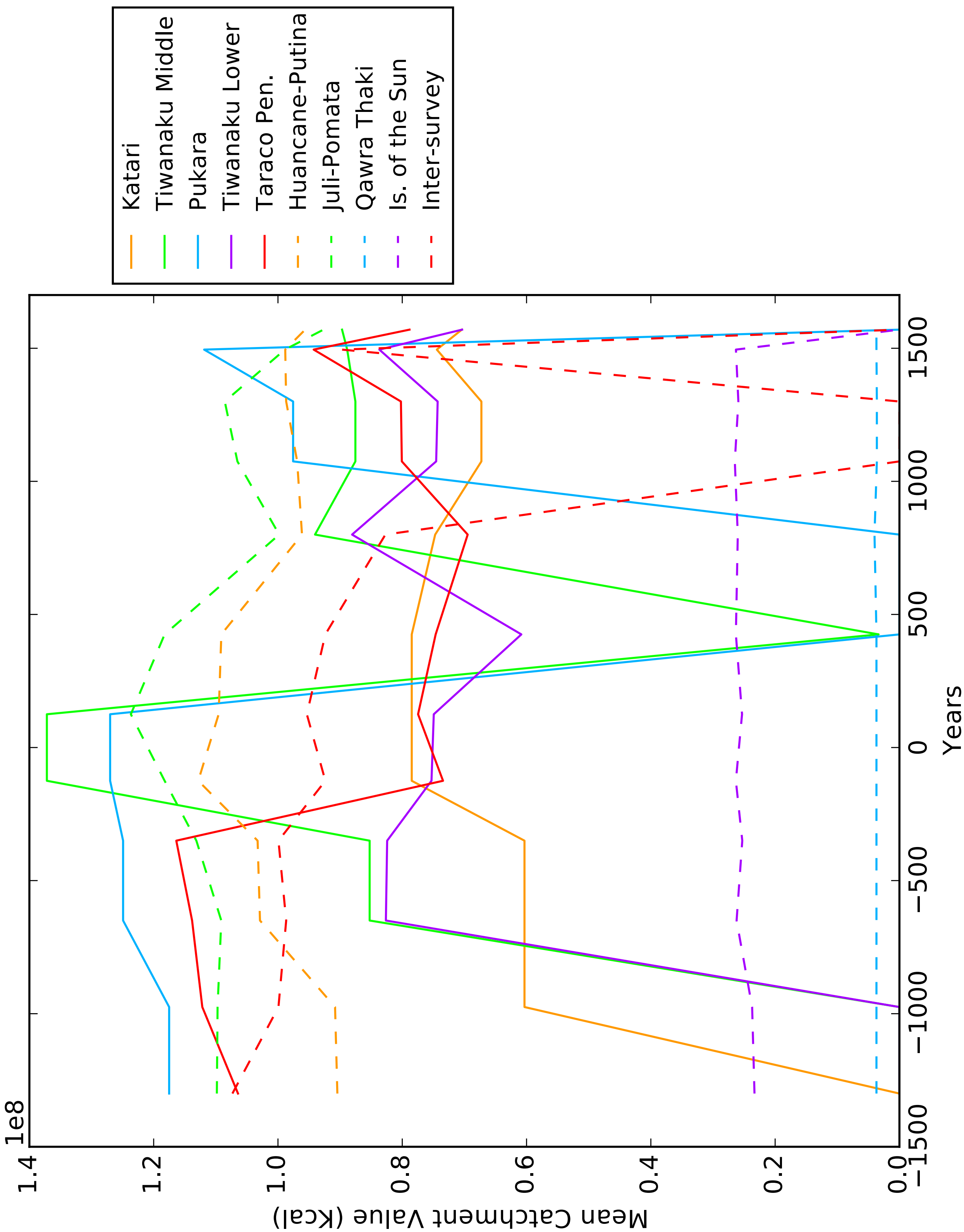


Figure 4.3: Mean Buffer Catchments, Intensive Prod., Survey Scale (See Listing E.3)

expected when population densities are relatively low.

Based on the interpretation of the Middle Formative to Late Formative transition discussed in Section 4.2, one might expect a decrease in the mean catchment values for the Late Formative. The results for the Taraco Peninsula meet this expectation. For the other regions, the unintensive and intensive results provide contrasting pictures: unintensive production values typically meet the expectation, whereas intensive production values typically increase. An appealing interpretation of this, and one which contradicts the expectation set up in Section 4.2, is that intensive production generally increased during the Late Formative. In fact, this is what would be expected based on Stanish's (1994) finding that, in the Juli-Pomata region, substantial raised field use began in the Late Formative.

The Tiwanaku period intensive production values at first seem to indicate a problem with the model, since the clear expectation for the southern Titicaca region is for increasing intensive production values. However, on further examination the results make some sense. The high Late Formative values for the middle Tiwanaku Valley are best ignored: these are based on too small of a sample size to support such anomalously high values. The Middle Formative values for both the middle and lower Tiwanaku Valley are a better baseline due to larger sample size, and the Tiwanaku period values for both the lower and middle valley are a bit higher than their Middle Formative values. Moving to the Katari Valley, certainly it is an understatement to say that Janusek and Kolata's (2003; 2004) results trump the results of my model, and their results clearly indicate a dramatic increase in the importance of raised fields in the Katari Valley during the Tiwanaku period. However, some sense can be made of my model's results. First of all, it is a good sign that the Tiwanaku period *intensive* production value is higher than the Middle Formative value, whereas the Tiwanaku period *unintensive* production value is lower than the Middle Formative value. Second, the lack of a Tiwanaku period increase over the Late Formative intensive production value makes some sense when Janusek and Kolata's (2003; 2004) argument is examined in greater detail. Janusek and Kolata (2003: 163,165) argue that in the early Tiwanaku period, "Rather than imposing settlements on the local geopolitical landscape, authorities initiated changes by building on preexisting settlements. Relatively few new settlements were established throughout the entire

Tiwanaku period. . . . Until A.D. 800 local groups and identities, though certainly transformed, were left intact following Tiwanaku's predominant incorporative regional strategy." Since it is presently impossible to distinguish early from late Tiwanaku period surface assemblages (Janusek 2003b: 55–56,81–82; Bandy 2001: 45,207–210), it is possible that my model would indicate increasing intensive catchment values from early to late Tiwanaku, if this settlement pattern data were available. Moving to the Taraco Peninsula, the lack of a Tiwanaku period increase is unsurprising, since there is no evidence of major raised field use on the Taraco Peninsula (Bandy 2001: 225–226). Finally, the Juli-Pomata region's decrease makes sense when it is considered that 63% of Late Formative sites were in raised field areas, in contrast to 41% during the Tiwanaku period (Stanish et al. 1997: 31).

Another Tiwanaku period pattern of note is the Huancané-Putina region's low values. The Huancané-Putina region has its lowest unintensive production values during the Tiwanaku period, and near-lowest intensive production values during the Tiwanaku period. This can be viewed as evidence for the interpretation made in Section 3.1.3, that the Huancané-Putina region's relationship with Tiwanaku was one of locally-driven affiliation rather than Tiwanaku dominance. Since Tiwanaku political economy in its heartland revolved around staple finance (Bandy 2005a), the Huancané-Putina region's mean catchment values fit better with a political economy grounded in exchange relationships with both Tiwanaku and the neighboring forested slopes, rather than Tiwanaku-organized staple finance.

Inter-survey comparison of absolute catchment values was not the motivation of the model, but an interesting result is that particularly high Formative period values are observed for unintensive production on the Taraco Peninsula and intensive production in the Pukara Valley. Perhaps the Middle Formative fluorescence on the Taraco Peninsula and the Late Formative fluorescence in the Pukara Valley had some relation to this exceptional subsistence productivity.

4.4 Analysis: Wealth Finance

4.4.1 Methods

The foundation for all of this chapter's wealth finance analyses is a least-cost-path "map" at the pan-Titicaca scale. Usually, archaeological least-cost-path analysis involves identifying two particular locations of interest and then using a digital elevation model and a travel cost model to determine the cheapest route between the two locations. In contrast, the analysis conducted here calculates a very large number of least-cost-paths between arbitrary points spread across the entire Titicaca region. A particular location's general attractiveness for travel can therefore be defined using the relative frequency of least-cost-paths which cross that location (see Figure 4.4). This attractiveness will have been determined by the location's topography and by the location's relationship with Lake Titicaca (since, with the lake defined as impassable, skirting the lakeshore will often be the cheapest route between two points separated by the lake). Modeling long-term changes in Lake Titicaca's levels is therefore of key importance, and is done in the same way as discussed for other analyses in Section 3.1.5 (thus, there will actually be three separate maps). The potentially enormous importance of lake level change to the political geography of prehistoric wealth finance in the Lake Titicaca region has been very well illustrated by Bandy (2004b), a key inspiration for this analysis.

More specifically, the least-cost-path maps are created in the following manner. A grid of points is created, with the initial spacing between the points set to ten kilometers. After this initial grid is created, each point is randomly moved up to two and a half kilometers: this helps reduce grid-like structuring of the least-cost-paths as a whole. In my initial models I simply calculated least-cost-paths between these grid points, but, inspired by Verhagen et al. (2013), I have switched to creating a ring of points around each grid point and calculating least-cost-paths to each point in the ring. These rings have a radius of 100 km., and a point is placed every 15 km. along the circumference of the ring.

The travel cost model used in this study to calculate the least-cost-paths relates slope to travel time. Such models are often generic, but Andean archaeologists are fortunate to have an ethnographically-based travel cost model available for llama caravan travel (Tripcevich

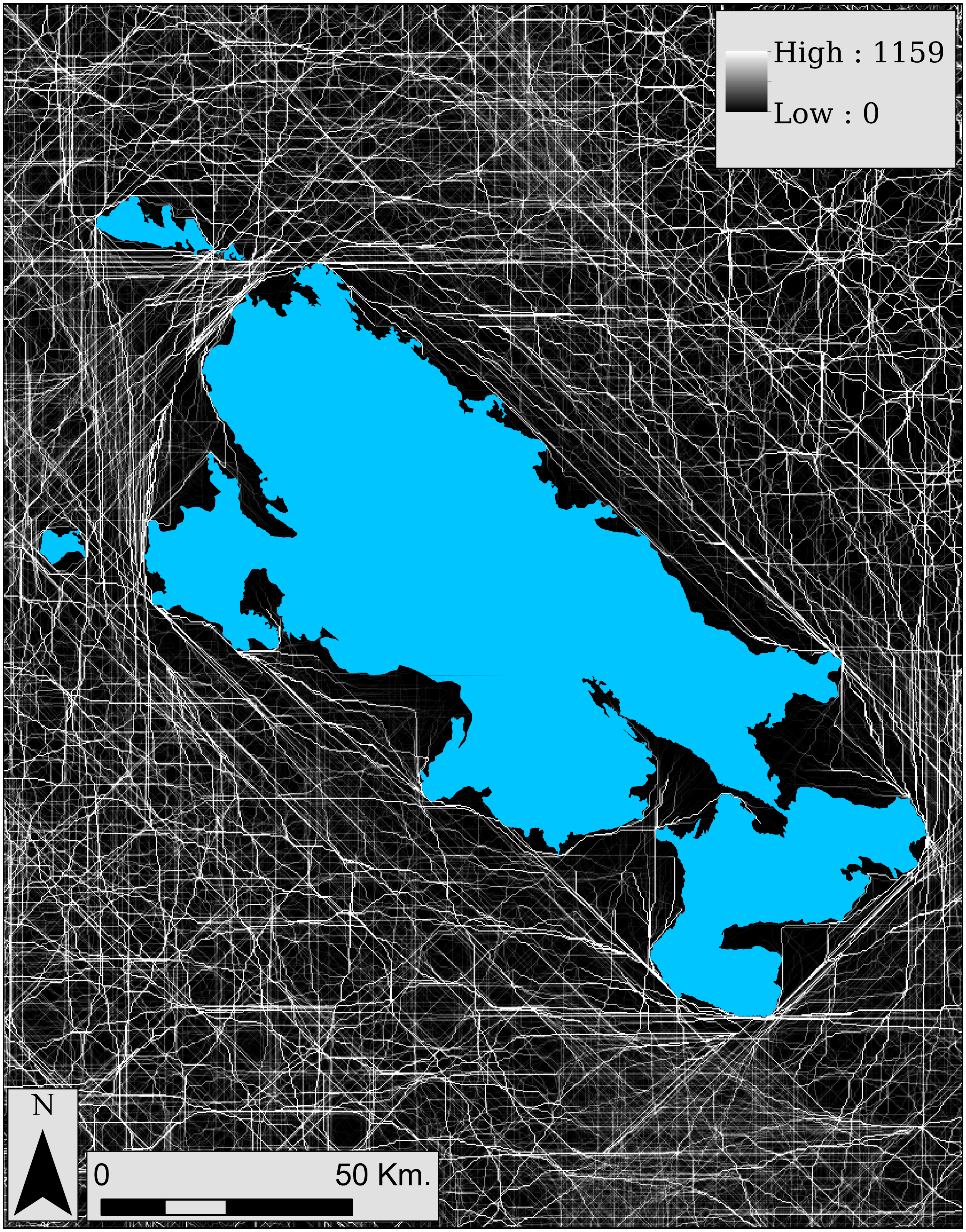


Figure 4.4: Least-cost-path Map, for Modern Lake Level (See Listing E.4)

2008). Tripcevich's (2008) ethnographically-derived function is used for all modeling of travel costs within this study.

The digital elevation model used in these analyses is again the GMTED2010 7.5-arc-second digital elevation model. It should be noted that in this digital elevation model, elevations within the (modern level) lake are all set to the same elevation (the surface elevation of the modern lake). A more sophisticated analysis would modify the digital elevation model such that dry-period travelers have to descend into and ascend out of the modern-day lake areas. This could be accomplished using bathymetric data.

The least-cost-path maps are grids in which each cell's value represents the number of least-cost-paths which cross it. "Major routes" cells are defined as those cells which are in the top 5%, or in other words those cells which have more least-cost-paths than 95% of the cells (calculated *after* excluding the large number of cells with 0 least-cost-paths). I chose the 5% figure by subjectively assessing how realistic the results for different figures seemed. Figures 4.5 to 4.7 display the "major routes" for each lake level.

For all of the wealth finance analyses, the chronological framework is based on both archaeological chronology and lake level chronology (see Table 3.3 and my discussion of it).

These least-cost-path maps will be used for two different kinds of analysis. The first analysis examines the proximity of archaeological components or populations to the "major routes." First of all, for each time span, the components' mean and median travel times from the closest "major route" are calculated. These measures are useful because they can be compactly depicted (Figures 4.8, 4.9, and 4.10). However, these measures treat each component in the same way, so a useful alternative is to instead look at how *population* is distributed spatially relative to the "major routes." In other words, since a component with one household and a component with 1000 households contribute equally to the mean and median travel times, a useful alternative is to use population as the unit of analysis. Thus, to complement the mean and median travel times, histograms are constructed with bins for ranges of travel times, and the fraction of the population inhabiting each travel time range is represented by a histogram bar (Figures 4.11, 4.12, and 4.13).

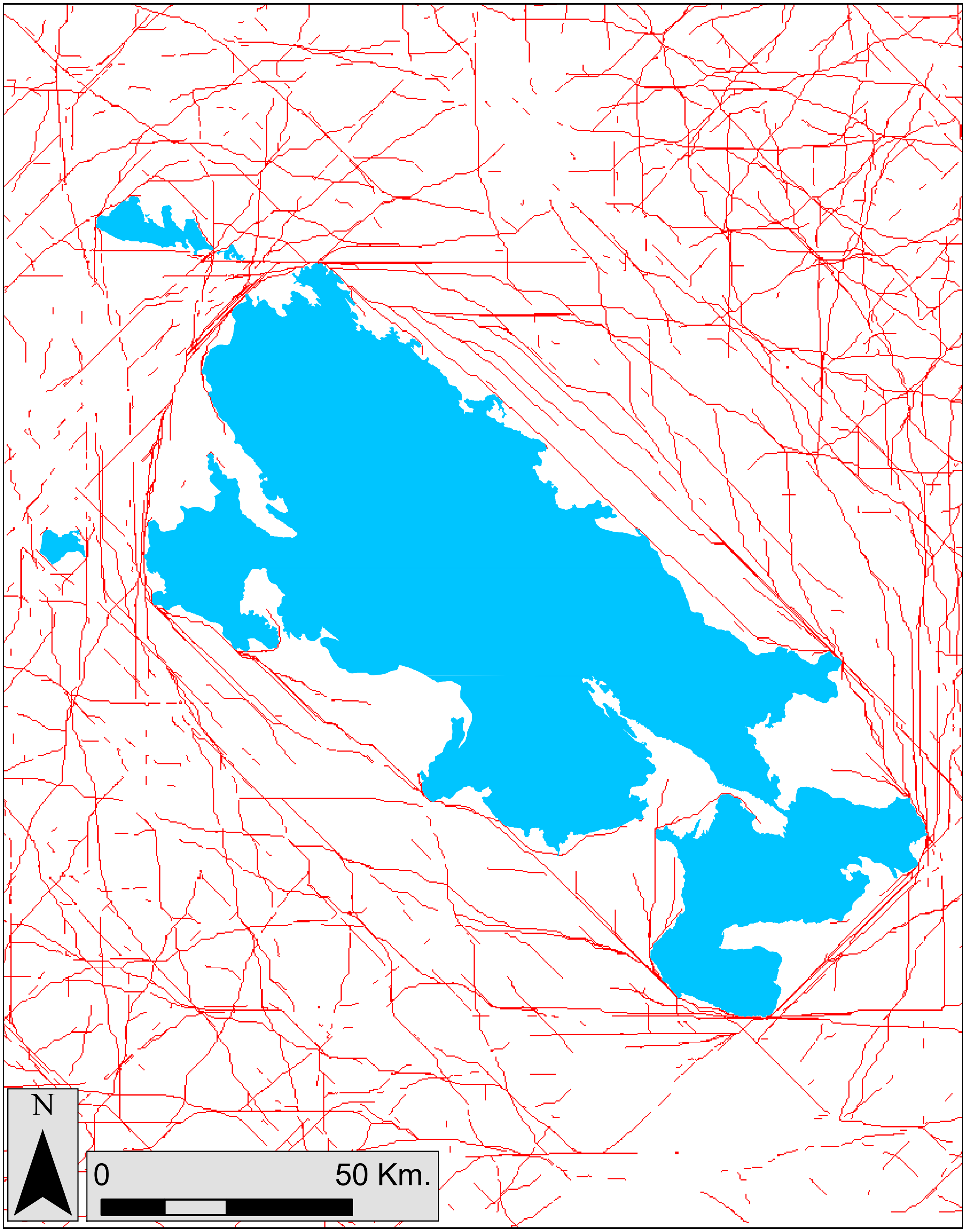


Figure 4.5: Major Routes, for Modern Lake Level (See Listing E.5)

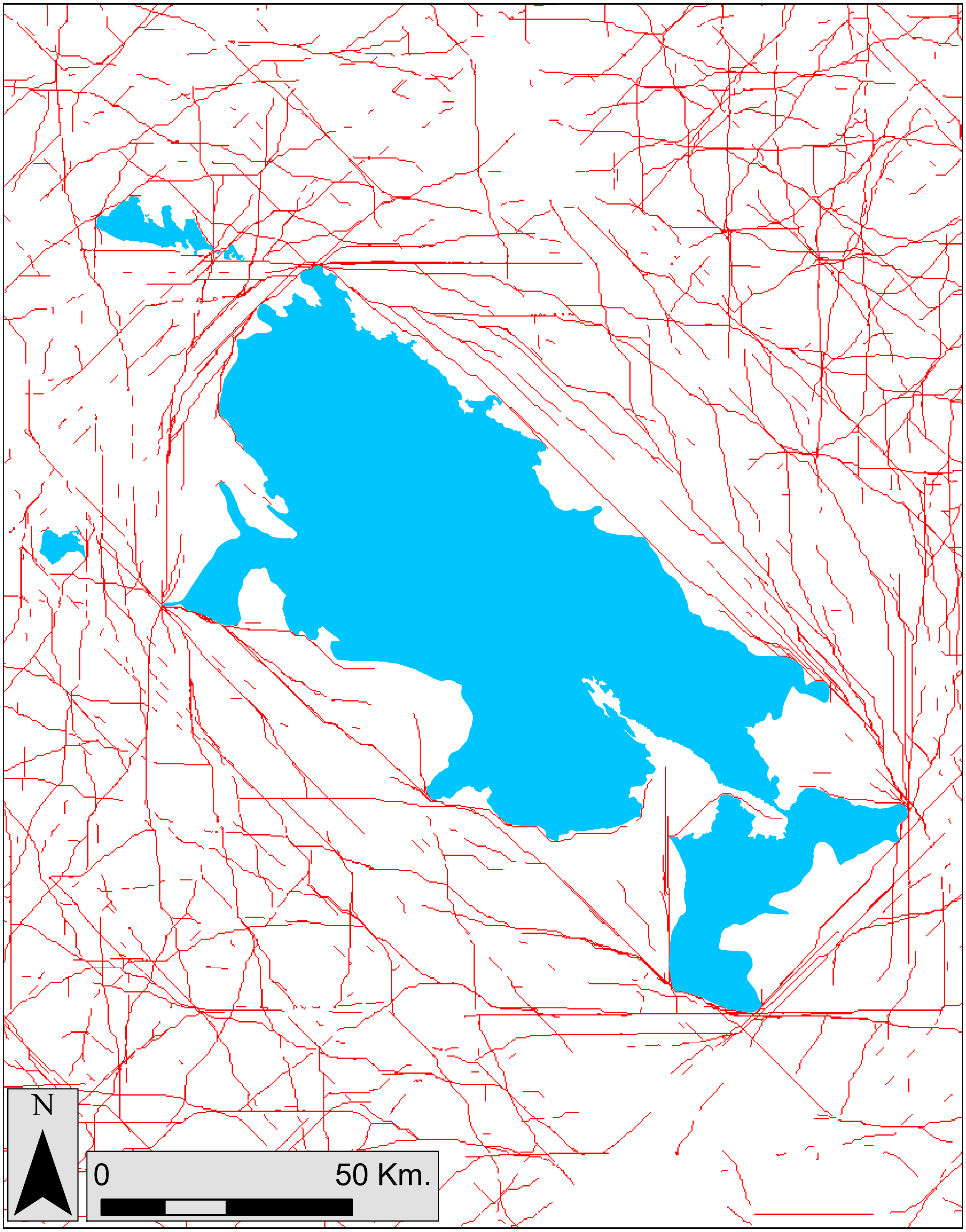


Figure 4.6: Major Routes, for 5 m. Below Modern Lake Level (See Listing E.5)

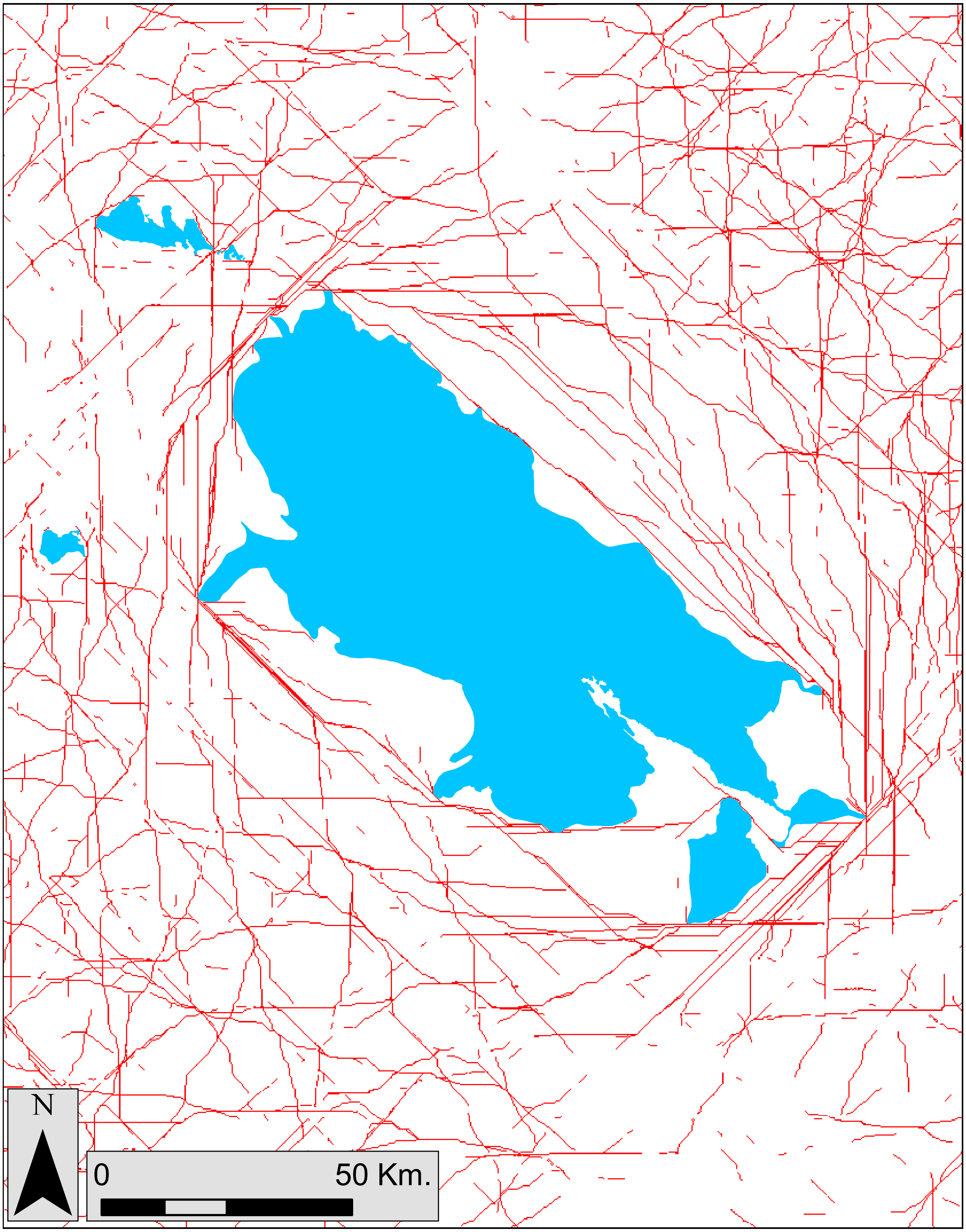


Figure 4.7: Major Routes, for 15 m. Below Modern Lake Level (See Listing E.5)

Before discussing the second type of analysis, I should warn the reader that I do not consider its results to presently be of much use, for reasons which will be discussed. I present this analysis nevertheless because I believe that it is the most methodologically innovative (and demanding) part of this study, and that the problem is that an appropriately extensive database is not yet available. The second type of analysis begins by defining components which are near the "major routes" as "travel hubs." To be defined as a travel hub, a component must be within 15 minutes of travel time from a "major routes" cell. Since lake level changes shift the locations of "major routes," a site can have some components which are travel hubs and some components which are not. Once these travel hubs have been defined, one network is constructed for each time span. I mean "network" in the sense of a model composed of nodes (points) and edges (connections between the points, represented as lines). A time span's travel hubs are its network's nodes. The next issue is when and when not to create an edge between a pair of nodes. Before defining these criteria, it will be necessary to clarify what the intent of this network model is. The intent is, of course, to model social relationships, but it is a quite specific type of social relationship which is of interest here. The relationships of interest are exchange relationships which weld places within the Titicaca region not only to each other but to much more distant places. As was seen in the discussion of the Huancané-Putina region's landscape choke-points on the route to the neighboring forested slopes (see Section 3.1.3), these relationships can involve a great deal of territoriality. Or in other words, a place's extra-local relationships are heavily mediated locally. With this in mind, I have used the following four criteria in determining when edges should be defined between nodes:

1) To receive an edge, a traveler must be able to travel between the two nodes without leaving "major routes" cells for more than 40 minutes. The figure of 40 minutes is of course somewhat arbitrary, but I have selected it in an attempt to balance two concerns. First, the figure must be low enough to ensure that edges are not created between travel hubs which are not along the same "major route." On the other hand, the figure should not be so low that it creates unrealistically rigid constraints. It should also be kept in mind that travel

between the travel hubs and their closest "major route" cells must be accounted for within these 40 minutes as well.

2) Only those paths ("paths" in the network analysis sense: sequences of edges) which correspond to the shortest travel time between two nodes should be retained. For example, a path that travels along three quarters of Lake Titicaca's shore, counterclockwise, to connect two nodes, will not be retained when there is a different path that travels along one quarter of the shore, clockwise, to connect those two nodes. The shortest travel time is determined by least-cost-path analysis employing Tripcevich's (2008) travel cost model, the digital elevation model, and the lake level models (rather than some network measure, for example the number of edges within the paths). Importantly, the travel time between each node within a path (regardless of whether it is an intermediate or end node within the path) and its closest "major route" cell is excluded when determining which paths have the shortest travel times. This is important because otherwise, typically, all paths with any intermediate nodes would be excluded, since the shortest travel time between two nodes will be along a route which never leaves the "major routes" cells to travel to any intermediate nodes which are slightly off the "major routes" cells. Criterion 2 is useful for two reasons: first, it is a reasonable criterion in of itself, and second, once applied, it makes criterion 3 a reasonable criterion.

3) Of the paths which remain after the application of criterion 2, only the longest path between a pair of nodes (i.e., the one with the largest number of edges) should be retained. This models landscape territoriality, since a path can't skip over a node positioned between the two end nodes. This criterion would not make sense, however, prior to the application of criterion 2, since a much longer travel time would also typically result in a path with a higher number of edges.

4) To receive an edge, the travel time between the nodes must be less than 35 hours. When constructing early versions of the model, I believed that such a maximum travel time would be a key criterion and one which would need a rigorous, ethnographically-based definition.

However, I eventually realized that a better model allows global structure to emerge from local structure, and I have therefore reduced the importance of this criterion and given it a fairly high value. I retain it as a minor criterion to prevent unreasonable edges between very distant nodes.

Because some time spans have a very large number of components, the required computation time for the model as defined above and as currently implemented (see Appendix E) can be prohibitive. This can be surmounted in the future with better hardware and more efficient implementation, but for the moment some modification of the model is necessary for time spans with many components. For all post-Tiwanaku time spans, I have made the following modification: to be defined as a travel hub, a component must be within .05 hour travel time from its closest "major route" cell (instead of .25 hour).

Once the networks have been constructed according to the four criteria, they are analyzed using network centrality measures. Centrality measures are some of the most important tools which have been devised for studying networks. These measures attempt to characterize the relative importance of each node within the network, where "importance" can be understood in many different senses thereby leading to many, quite different centrality measures (Newman 2010: 168–169). The results of applying five different centrality measures to each network will be presented in varying detail, but one of these centrality measures is of most interest and will therefore be discussed here. This measure is random-walk betweenness centrality. Before discussing random-walk betweenness centrality, it will be helpful to consider the "original" betweenness centrality measure. To calculate this measure (see Newman 2010: 185–190), one first examines each pair of nodes within a network and determines what the shortest path between each pair is (i.e., which sequence of edges connects the two nodes with the minimum number of edges). Then, for each node in the network, one determines how frequently that node lies within the shortest paths between other nodes (this is that node's betweenness centrality). This measure clearly has an intent which fits well with the intent I had in defining criterion 3 above: *control* over the flow of something over the network's structure is captured well by this measure. In fact, my main initial motivation in conducting network analysis on the Titicaca settlement pattern data was to see if betweenness centrality values correlated with components' sizes or types. After inspecting the results of applying various centrality measures to the networks, however, a variant on betweenness centrality seems a bit more useful: random-walk betweenness centrality. Random-walk betweenness centrality relaxes the constraint that movement must be only along the shortest paths (see Newman 2010: 190–192). The random walks referred to by this measure's name are paths created by starting at a particular node and randomly moving to other nodes until a target node is reached (Newman 2010: 157,159,192). To calculate random-walk betweenness centrality (see Newman 2010: 192), one first performs many such random walks between each pair of nodes within a network. Then, for each node in the network, one determines how frequently that node lies within the random walks between other nodes (this is that node's random-walk betweenness centrality). Thus, control of flow across a network is still captured well by random-walk betweenness centrality, but in a less rigid way than with betweenness centrality (see Newman 2010: 190–193).

All of the calculated centrality measures will be presented such that the centrality values can be compared to component sizes and components' evidence for corporate ritual (Figures 4.28 to 4.32). Furthermore, because random-walk betweenness centrality is the main concern, each network will be visualised with random-walk betweenness centrality values (Figures 4.16 to 4.27). In these network visualisations, the nodes are placed geographically. The random-walk betweenness centrality values are color-coded: darker reds indicate higher centrality values. The depicted size of a node is proportional to the square root of its component size in hectares.

Although closeness centrality and information centrality are not of much concern to this analysis, it should be noted that they have been calculated with the travel times between nodes as edge weights.

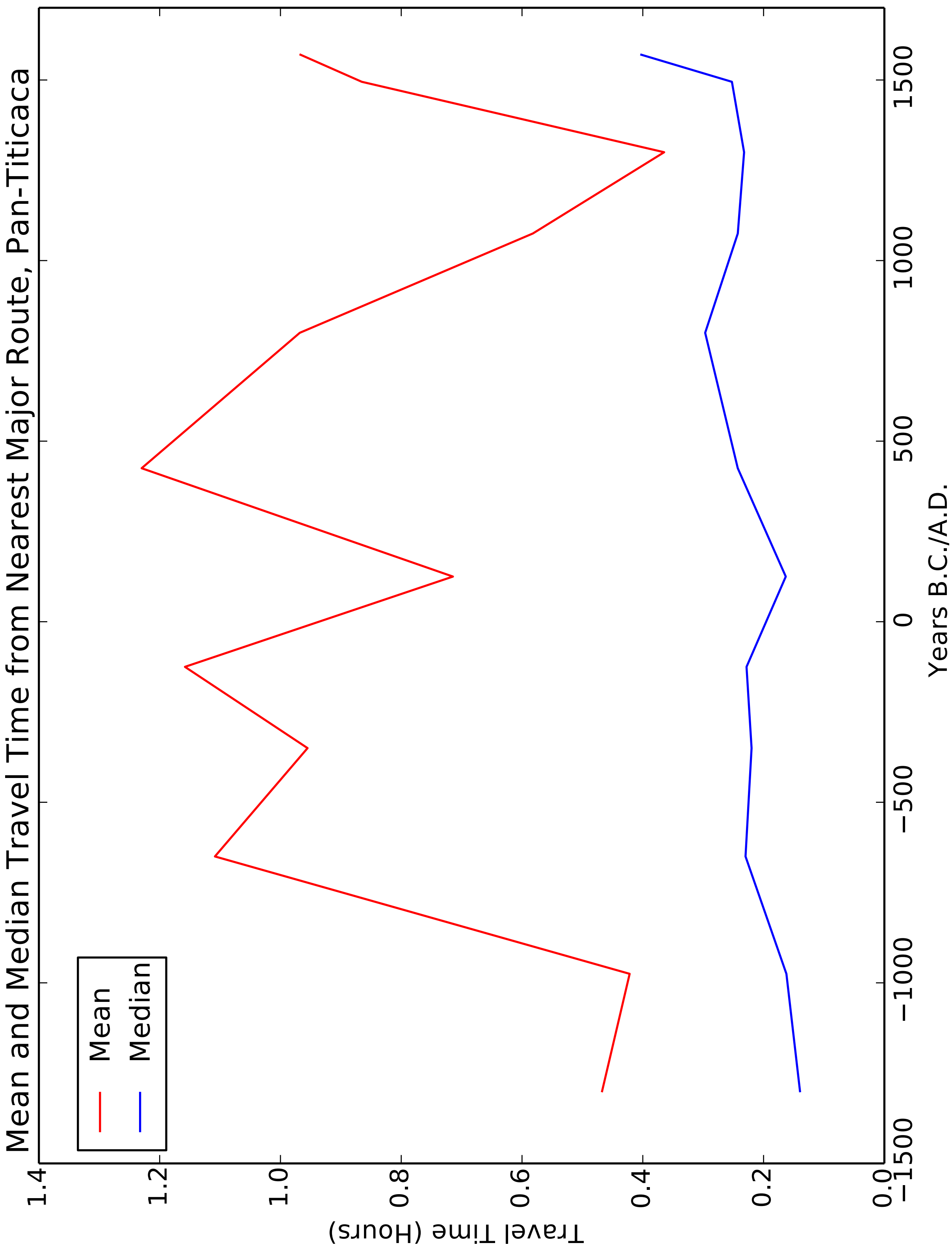


Figure 4.8: Mean/Median Travel Time from Routes, Pan-Titicaca Scale (See Listing E.11)

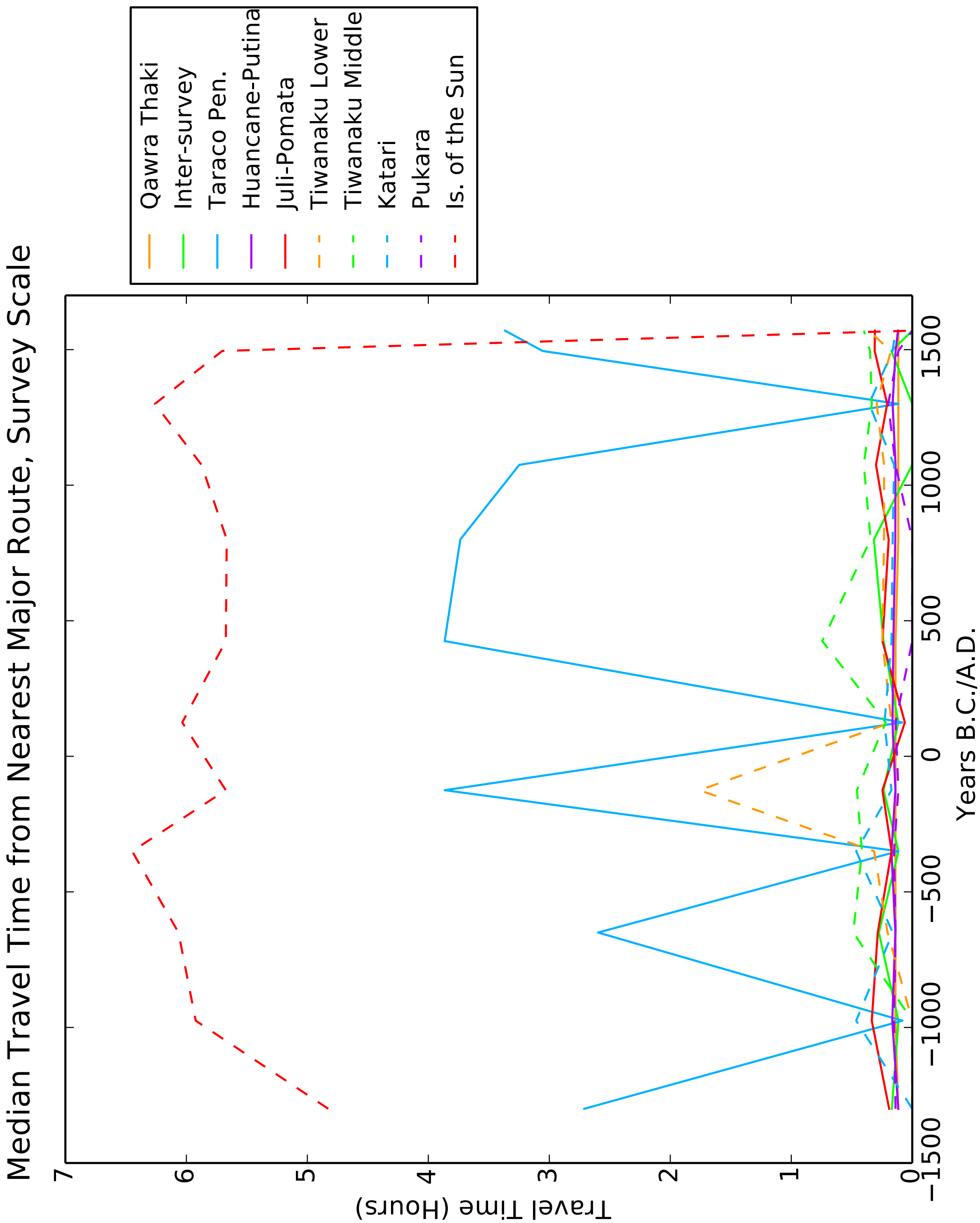


Figure 4.9: Median Travel Time from Routes, Survey Scale (See Listing E.11)

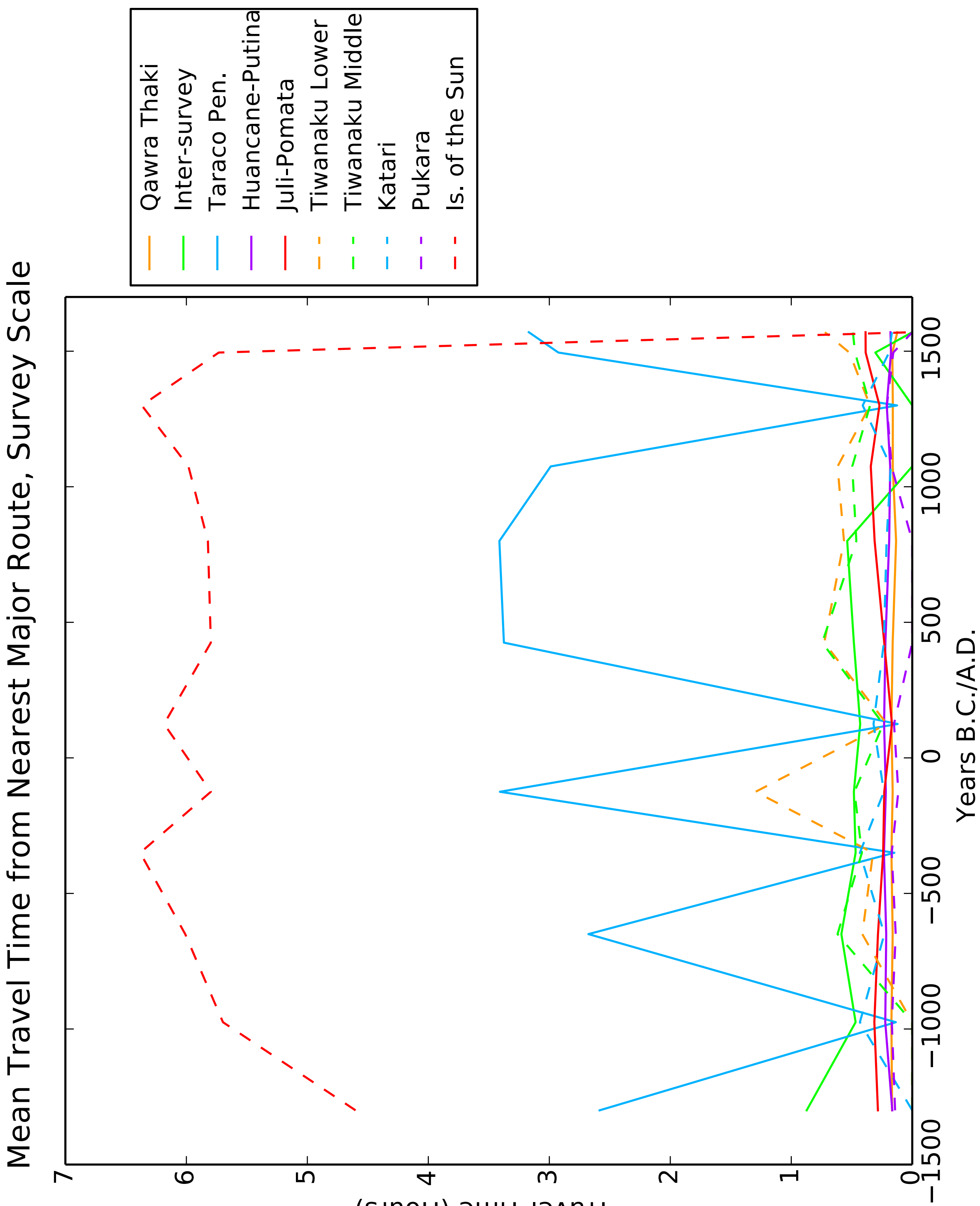


Figure 4.10: Mean Travel Time from Routes, Survey Scale (See Listing E.11)

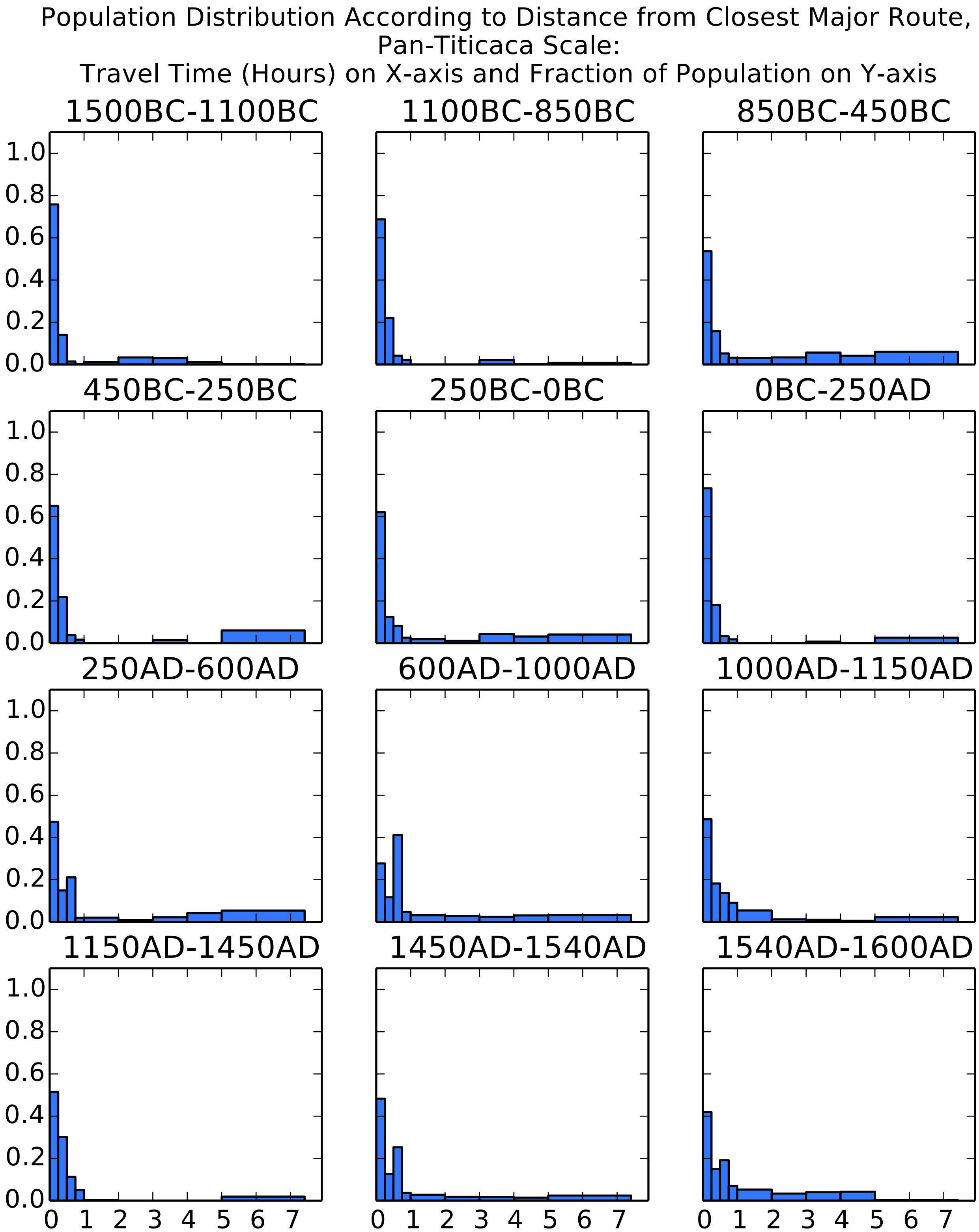


Figure 4.11: Pop. Distribution by Travel Time from Routes, Pan-Titicaca (See Listing E.11)

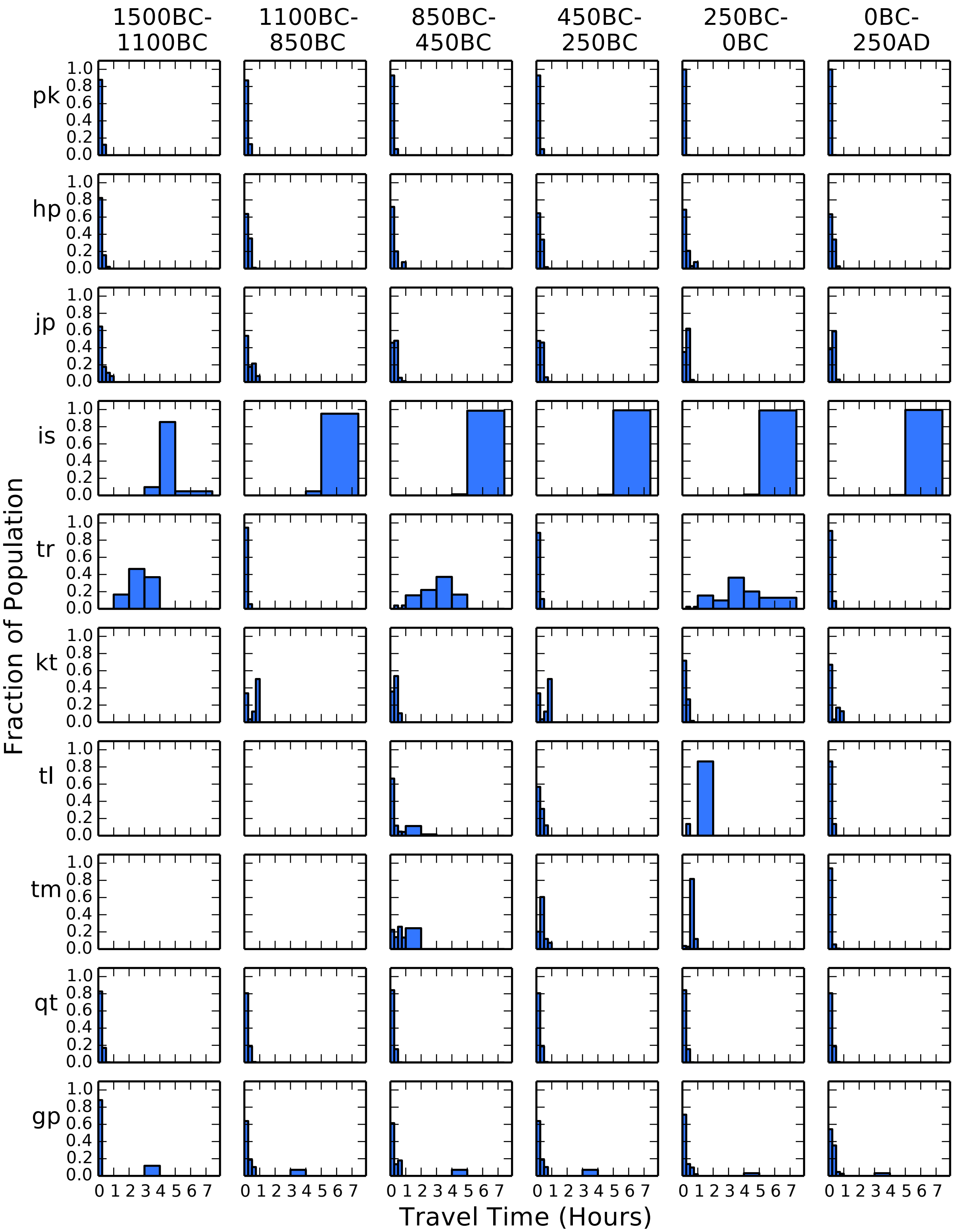


Figure 4.12: Pop. Distr. by Time from Routes, Survey Scale, Page 1 (See Listing E.11)

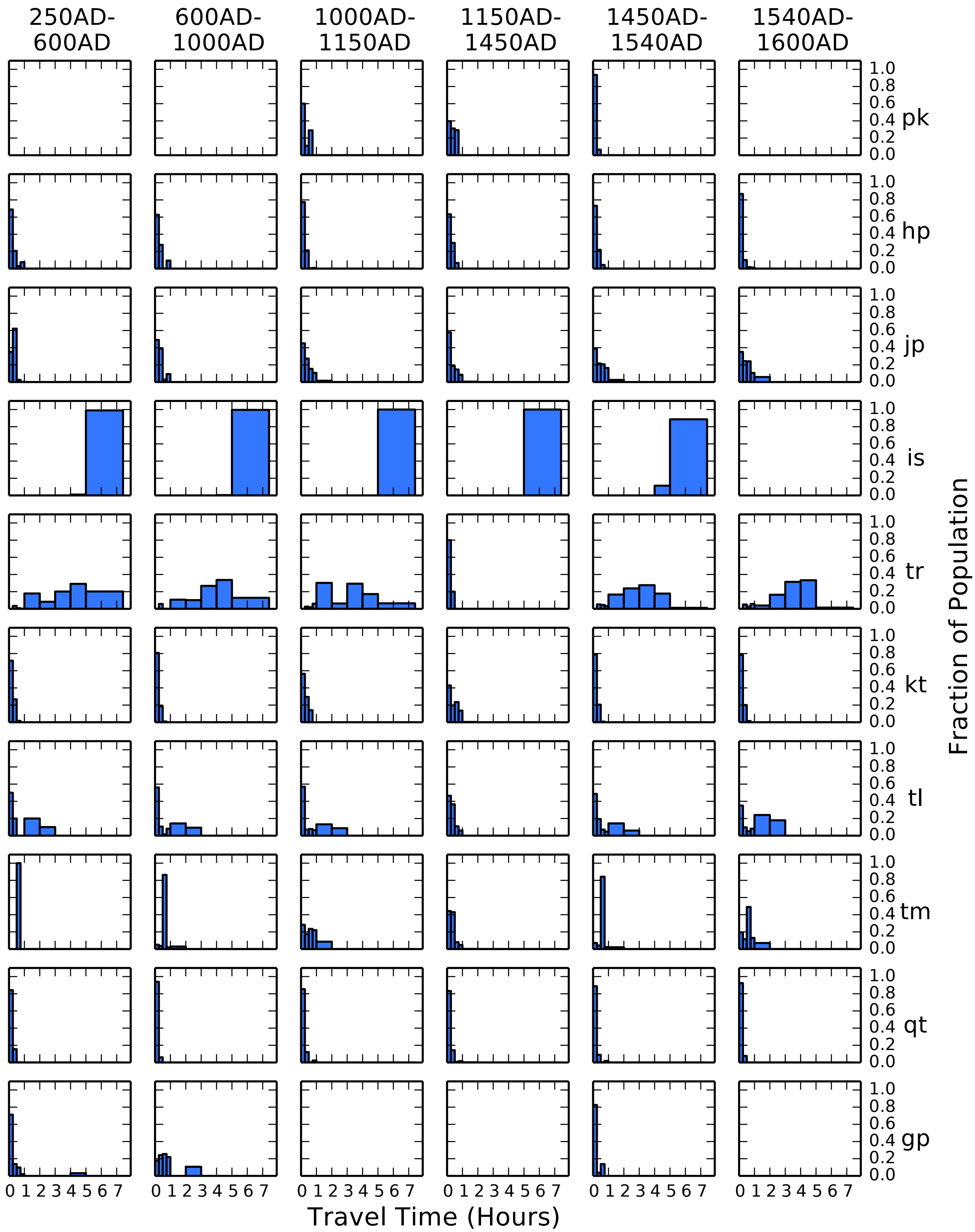


Figure 4.13: Pop. Distr. by Time from Routes, Survey Scale, Page 2 (See Listing E.11)

4.4.2 Results

4.4.2.1 Proximity to Major Routes

The pan-Titicaca scale's mean proximity to nearest major route (Figure 4.8) is not particularly useful, because of the dramatic inter-regional variation (see Figure 4.10). The pan-Titicaca median proximity displays no meaningful change through time, and this is a reasonable summary characterization of the model's results for the Titicaca region as a whole.

At the survey scale, the only prominent changes in means/medians are those corresponding to changes already identified by Bandy (2004b) for the Taraco Peninsula (as well as some analogous later ones on the Taraco Peninsula). Values of 0 in Figures 4.9 and 4.10 should be ignored, since they represent lack of data for a time span. The Island of the Sun has values because, in contrast to the model's general procedure, travel across water is allowed at its strait.

Although the model's main intent was to examine change through time, it is also notable that the middle and lower Tiwanaku Valley consistently have the highest mean/median values other than the outliers of the Taraco Peninsula and the Island of the Sun. This sounds a note of caution for arguments regarding the role of wealth finance in Tiwanaku's origins, but there is a more important contrasting point to be made shortly below as well.

Like the pan-Titicaca mean values, the pan-Titicaca population distributions (Figure 4.11) suffer from high inter-survey variability. Changes in the pan-Titicaca population distributions essentially just track changes on the Taraco Peninsula.

The survey-scale population distributions (Figures 4.12 and 4.13) provide the most insight. First of all, while the middle and lower Tiwanaku Valley were clearly better for travel than the Taraco Peninsula was during periods of higher lake levels (also see Bandy 2004b), the middle and lower Tiwanaku Valley have the same intra-regional diachronic pattern in population distributions as the Taraco Peninsula. In other words, while in absolute terms the lake level changes created an oscillation in travel preferability between the Taraco Peninsula and the Tiwanaku Valley, both have the same history in intra-regional relative terms, with population distributed closer to "major routes" during periods with low lake levels. This is, in fact, closely related to an extremely interesting result of the model. According to the model, during periods with a lake level about 15 meters below modern, a "major route" is opened up in the northern Tiwanaku Valley which runs along the site of Tiwanaku's northern border, along the river (Figures 4.14 and 4.15). This is the lake level for the 450–250 B.C. and A.D. 1–250 time spans. The site of Tiwanaku became an atypically large site (37 hectares) during the latter time span (Janusek 2004a: 115; Bandy 2013: 84). This route should not be interpreted as the primary factor behind Tiwanaku's precise location, because this is almost certain to instead have been astronomical alignments (Benítez 2013: 98–103). Still, a significant part of Tiwanaku's earliest political and demographic momentum may have related to its location along this dry-period route (see the Late Formative 1 area of Tiwanaku in relation to the route, in Figure 4.15).

The Katari Valley, on the other hand, has the mirror image of the Taraco Peninsula/Tiwanaku Valley relative diachronic pattern in population distribution (though it never has extreme distributions like the Taraco Peninsula's high-lake-level periods). In other words, population in the Katari Valley was distributed closer to "major routes" during periods of high lake levels. This is because, while the northern Katari Valley has "major routes" regardless of the lake level, the rest of the Katari Valley is only crossed by "major routes" during periods of higher lake levels (see Figures 4.14 and 4.15). Lukurmata is fairly close (less than a kilometer) to "major routes" regardless of the lake level.

The other major pattern evident in the survey-scale population distributions is that Altiplano period populations often lived farther away from "major routes." This is evident for the Pukara Valley, the Juli-Pomata region, and the Katari Valley. Although Altiplano period settlement patterns were deeply influenced by warfare (see Section 2.1.3), it should also be kept in mind that Altiplano period settlement was simply far more extensive as well (Section 3.1.4).

Most fundamentally, this analysis does not suggest a lot of wealth-finance related settlement shift for the Titicaca region as a whole. Of course, the model simply might not be sensitive to actual changes of importance, but since the model accurately reproduces Bandy's (2004b)

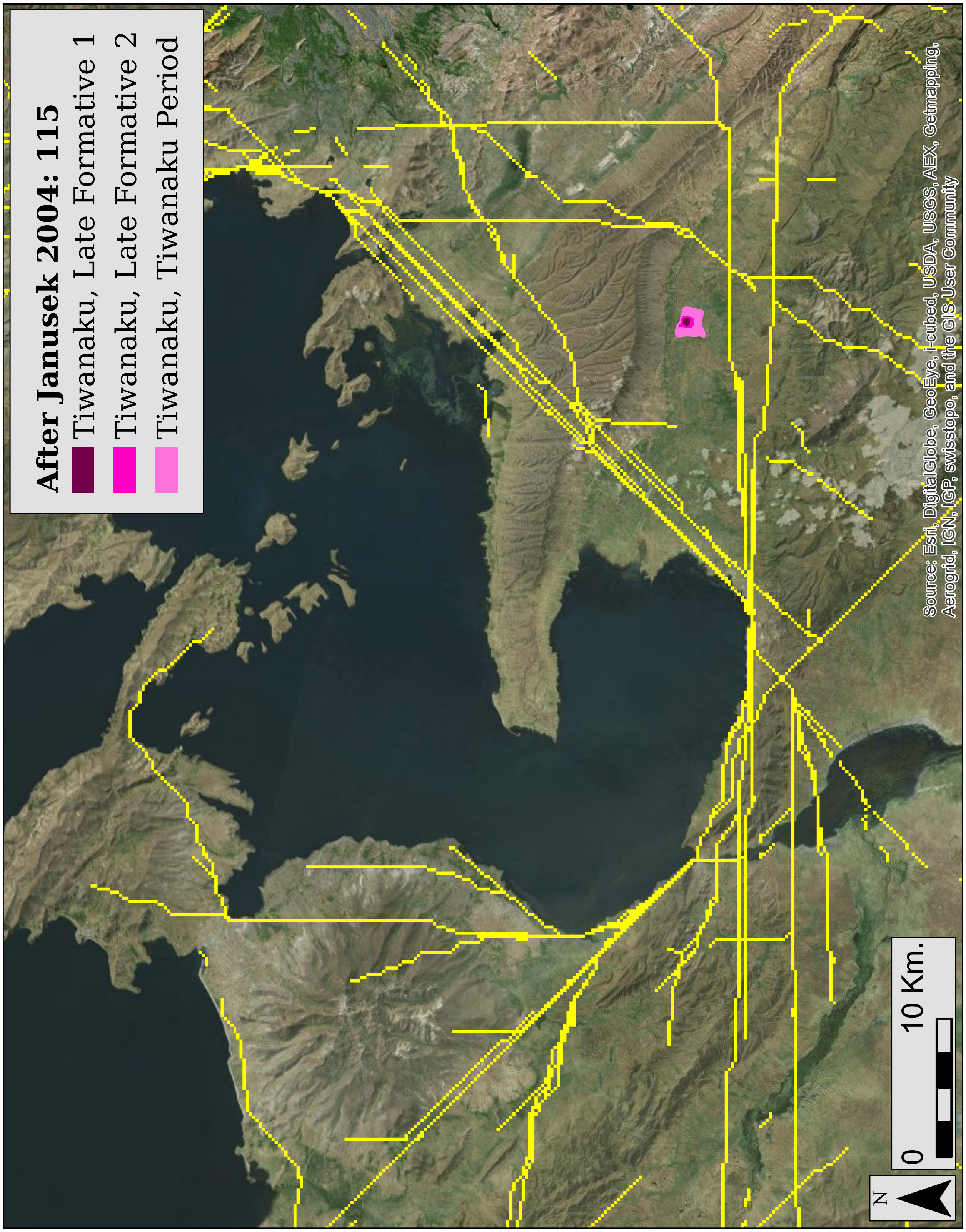


Figure 4.14: Tiwanaku's Surrounding Major Routes, Modern Lake Level

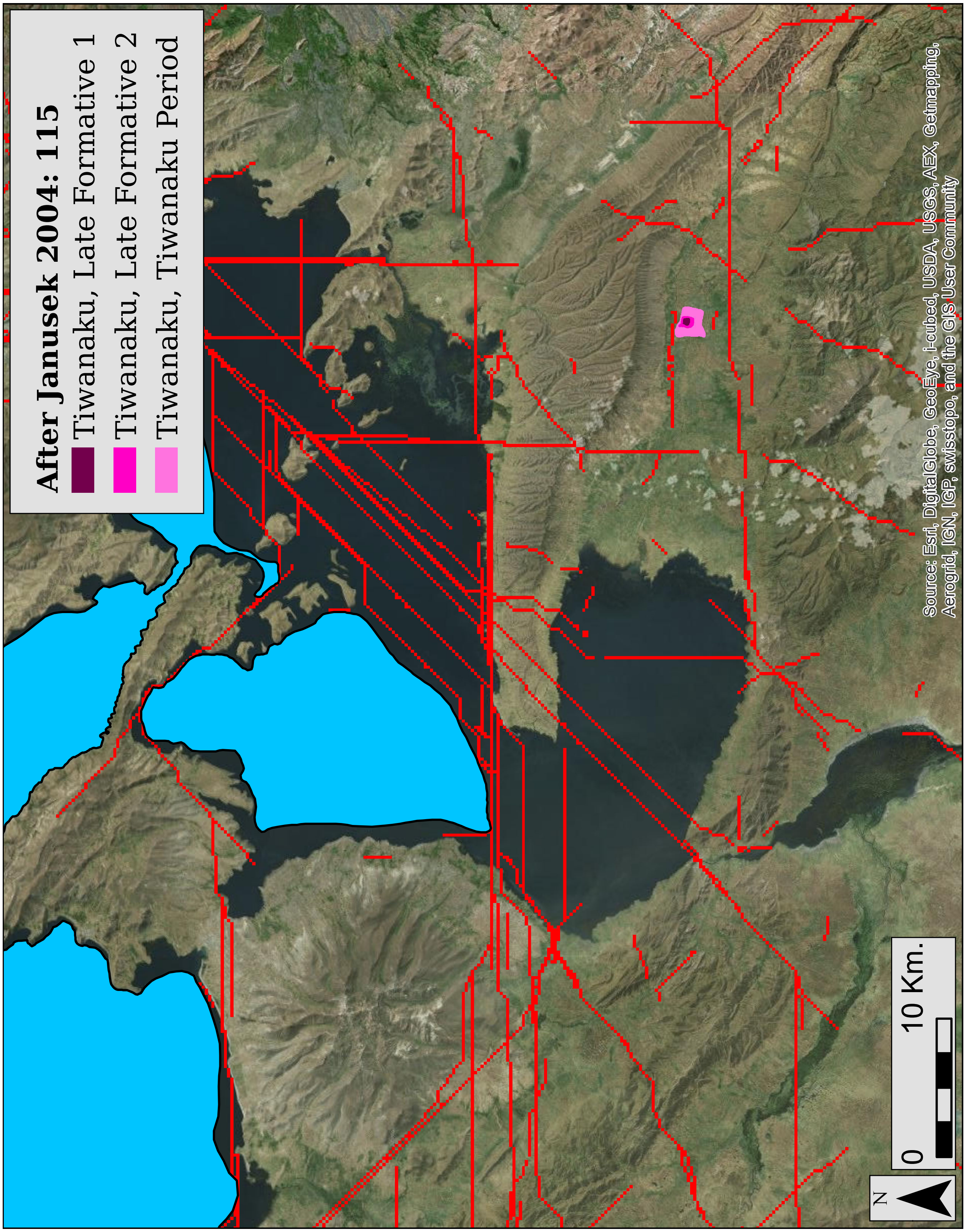


Figure 4.15: Tiwanaku's Surrounding Major Routes, 15 Meters Below Modern Lake Level

conclusions for the Taraco Peninsula, perhaps the model's contrasting picture of little change in other regions should also be taken seriously. Most of the Titicaca region's population through time and space was fairly close to optimal routes, probably as a byproduct of unrelated impacts of topography and lakeshore geography on settlement, but people did not make obvious shifts to get even closer to optimal routes during periods when it would appear to be to their advantage (especially the Late Formative). This suggests that, while a location somewhat near an optimal route could be advantageous, as well demonstrated by the Taraco Peninsula's political history, for the most part people did not choose their settlement locations based on close proximity to optimal routes. Thus, other factors appear to be more important, a major one being subsistence productivity, as illustrated by the catchment analyses.

4.4.2.2 Network Analysis

In Figures 4.28 to 4.32, corporate ritual components have centrality values considerably different from those of non-ritual components only for the A.D. 250 to 600 period. Given the expectation for the Late Formative set up in Section 4.2, it is tempting to interpret this as providing some support for the expectation of increased importance of wealth finance during the Late Formative. However, this would be premature. The three components from this time span with confident evidence for corporate ritual and high centrality values are all from the inter-survey dataset. Until these sites' surroundings are filled in with more settlement pattern data, their high centrality values should be assumed to be a methodological artifact.

Likewise, while Figures 4.28 to 4.32 suggest that many periods show a correlation between high centrality values and high component sizes, Figures 4.16 to 4.27 show that much of this is a methodological artifact arising from the fact that the inter-survey dataset is biased to large sites.

While I do believe that the method applied here has potential, and might be usefully applied to other macro-regions or to smaller parts of the Titicaca region, at present the data coverage in the Titicaca region as a whole is too limited for this analysis to produce useful results at this spatial scale.

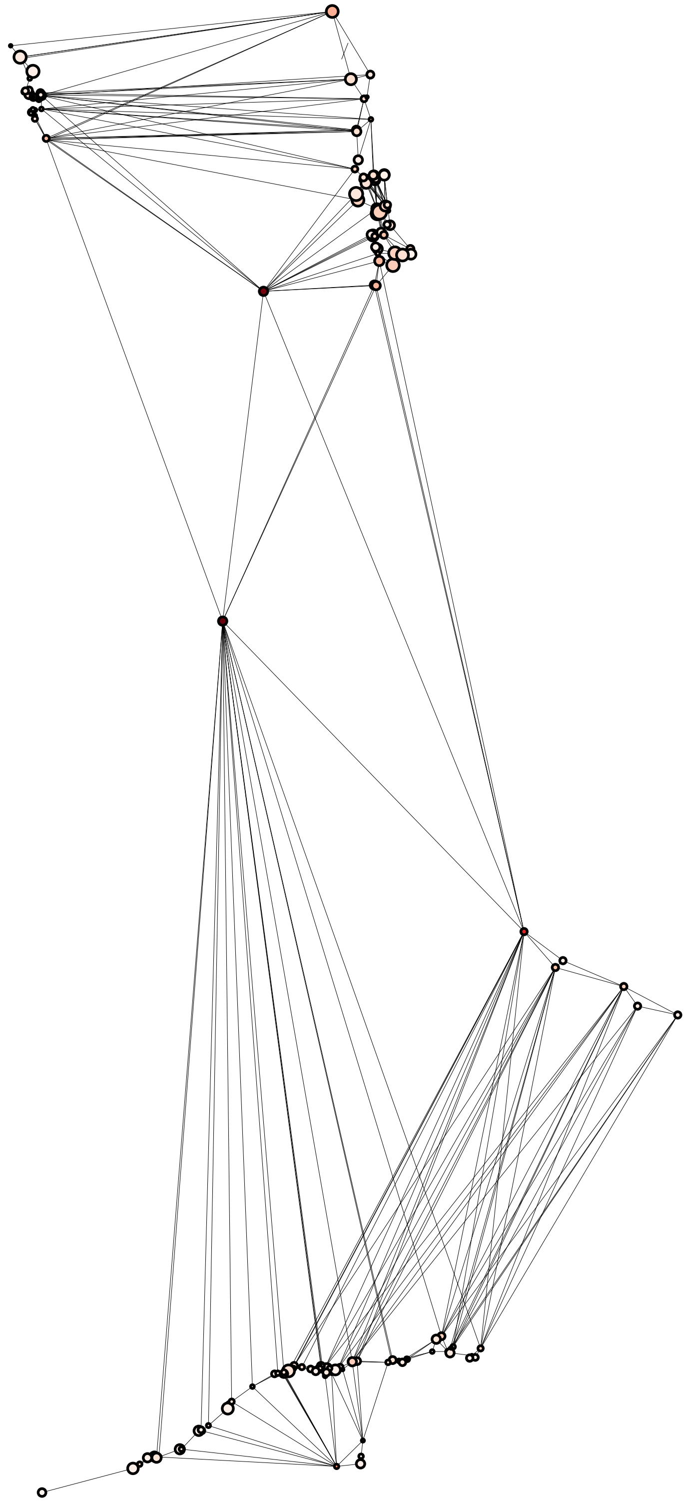


Figure 4.16: Network, 1500–1100BC, with Random-Walk Btwn. Cent. (See Listing E.10)

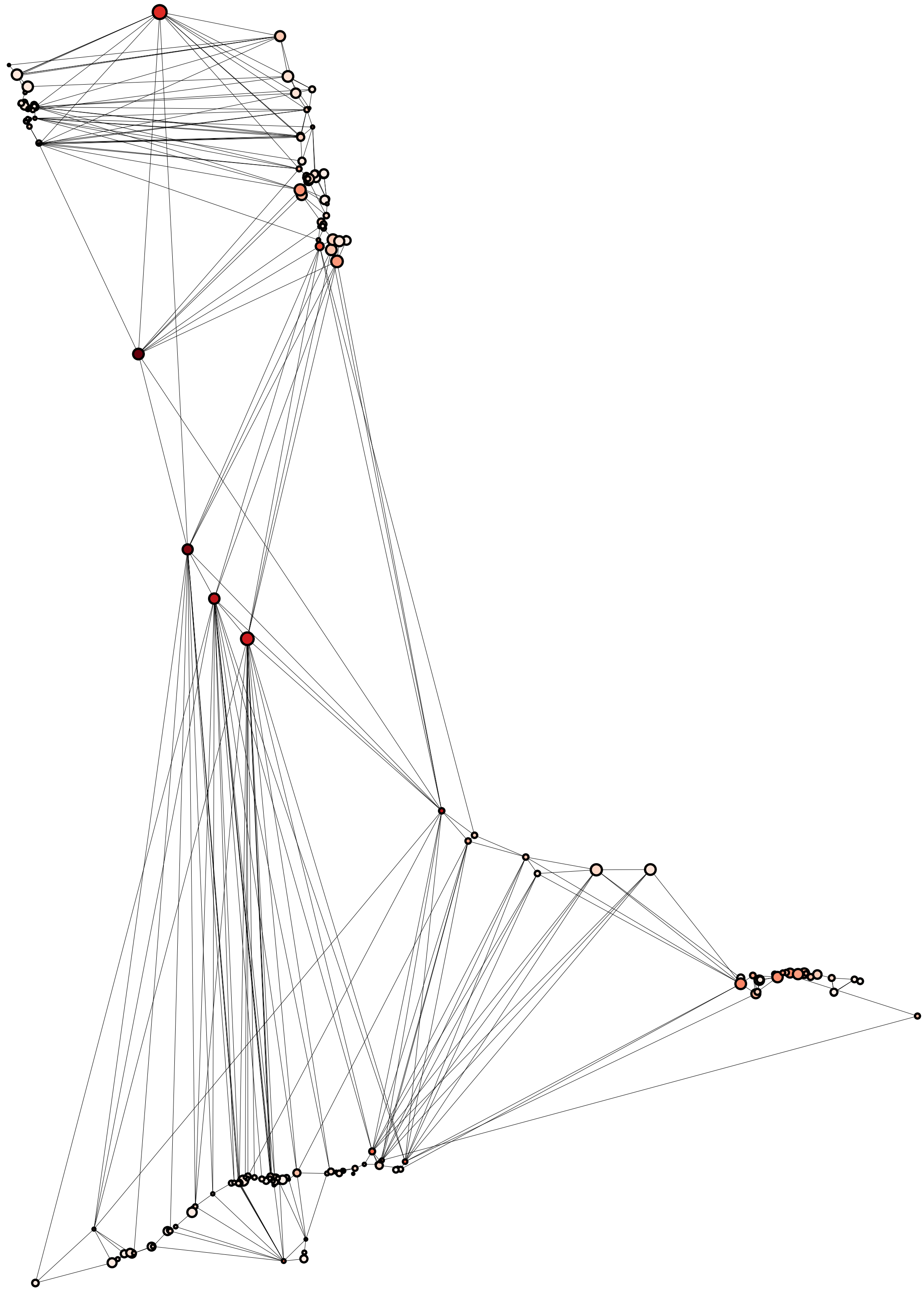


Figure 4.17: Network, 1100–850BC, with Random-Walk Btwn. Cent. (See Listing E.10)

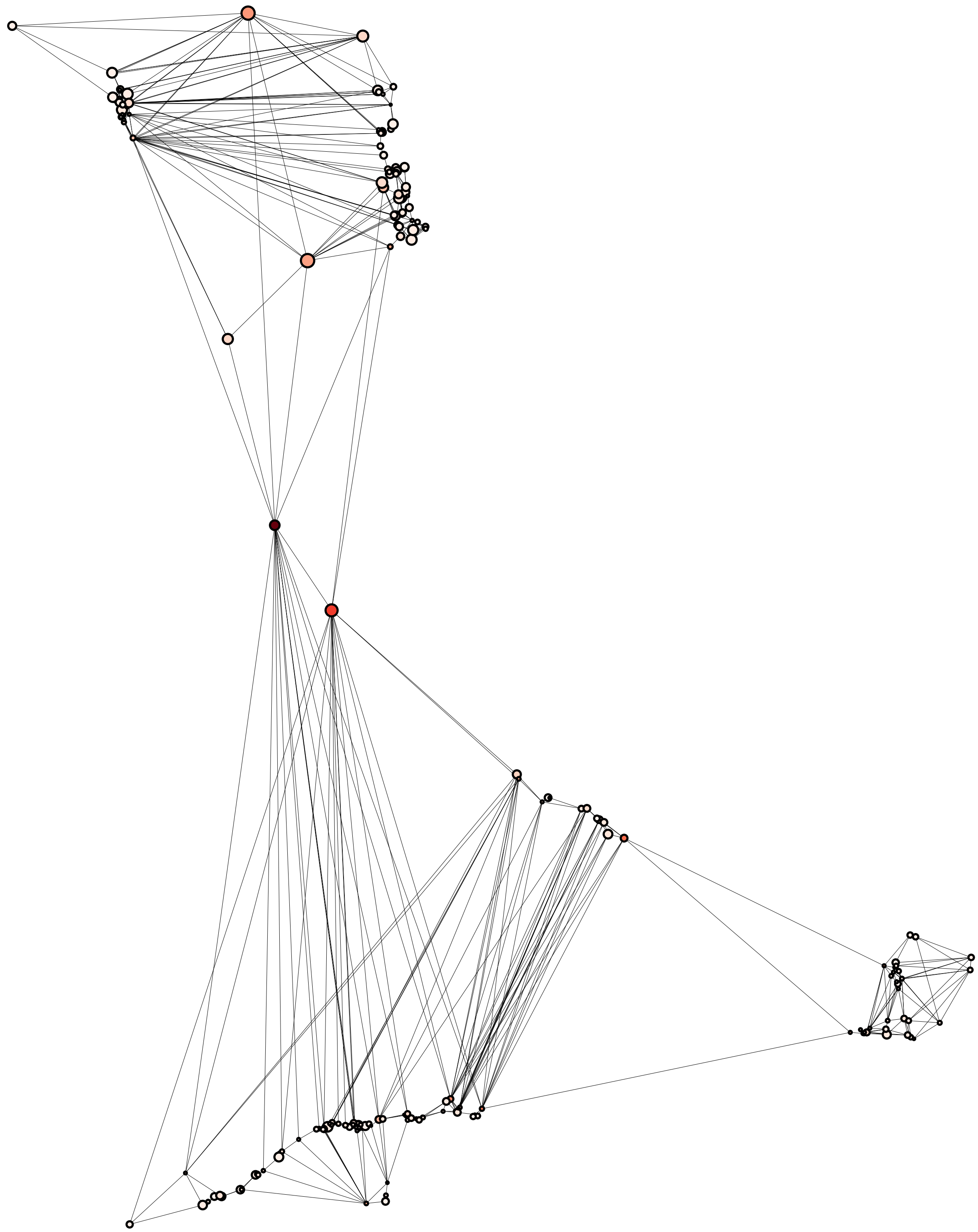


Figure 4.18: Network, 850–450BC, with Random-Walk Btwn. Cent. (See Listing E.10)

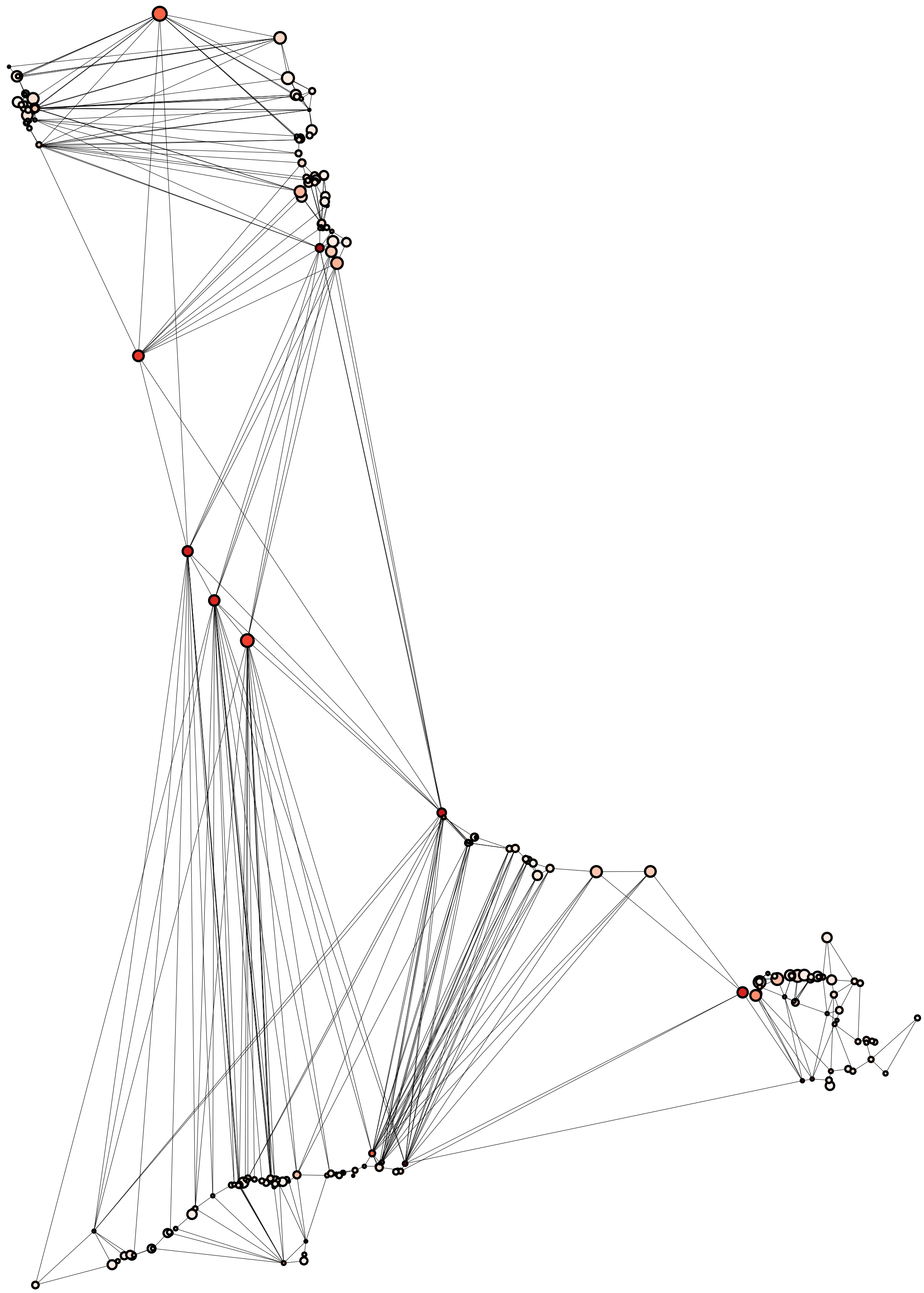


Figure 4.19: Network, 450–250BC, with Random-Walk Btwn. Cent. (See Listing E.10)

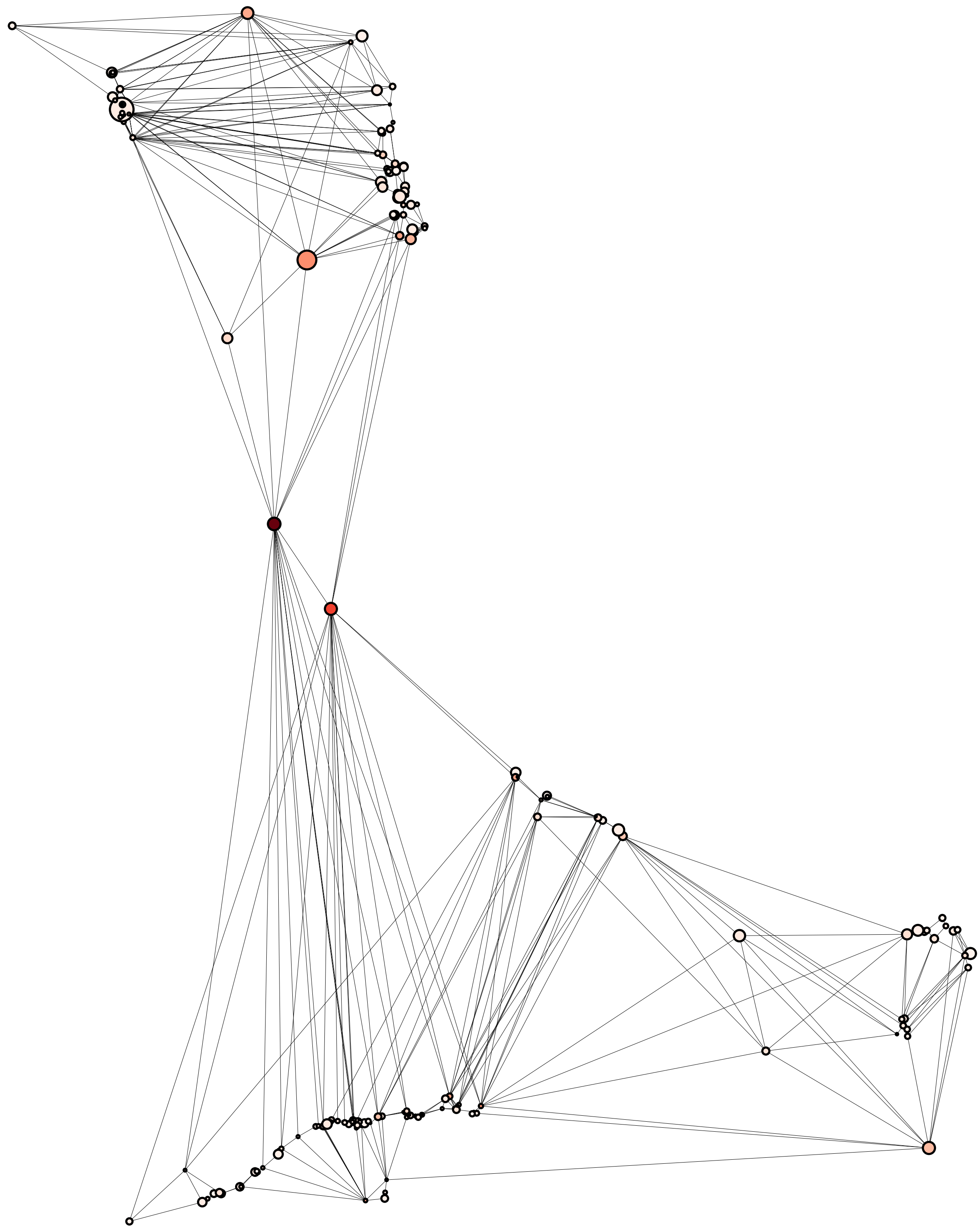


Figure 4.20: Network, 250–1BC, with Random-Walk Btwn. Cent. (See Listing E.10)

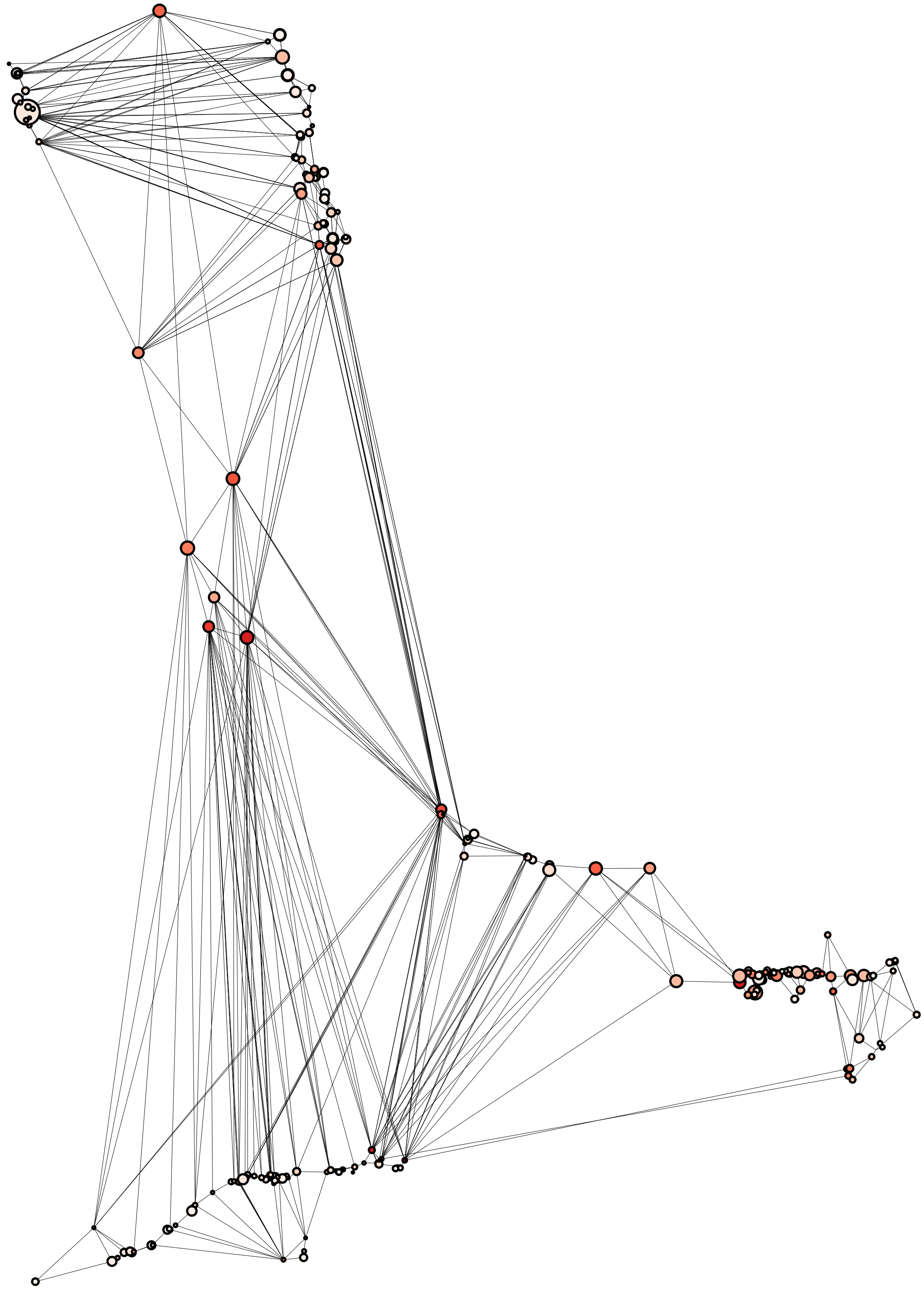


Figure 4.21: Network, 1–250AD, with Random-Walk Btwn. Cent. (See Listing E.10)

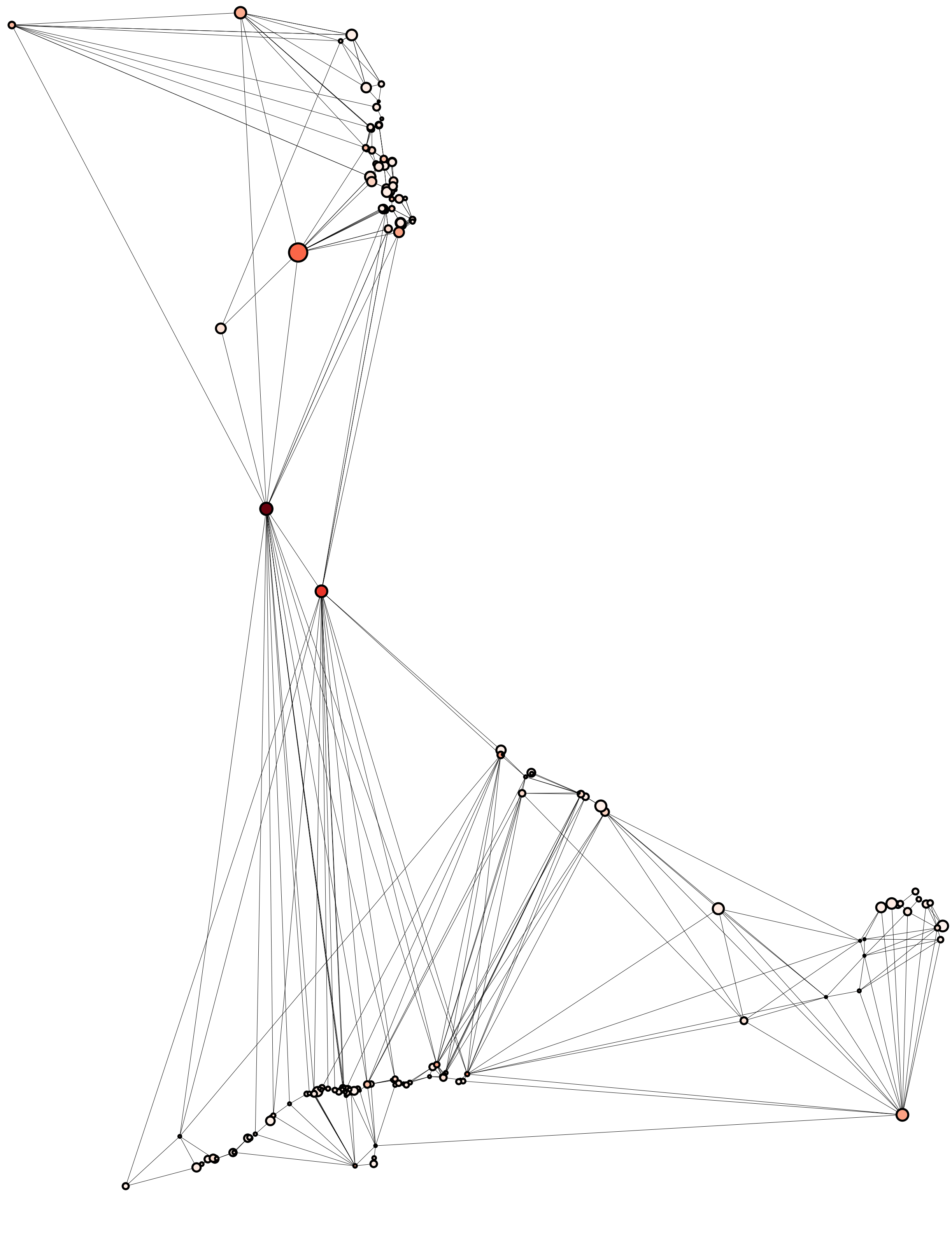


Figure 4.22: Network, 250–600AD, with Random-Walk Btwn. Cent. (See Listing E.10)

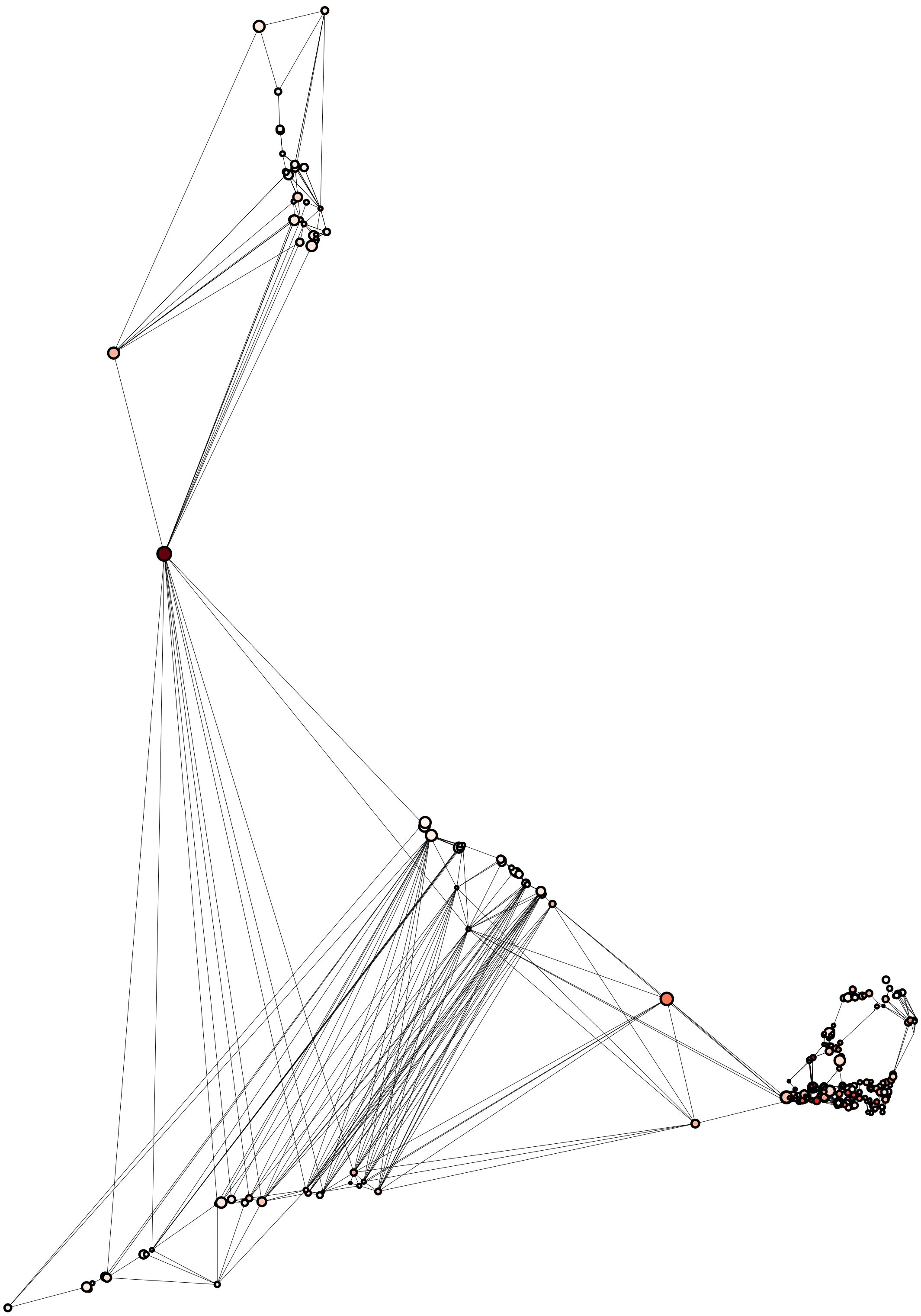
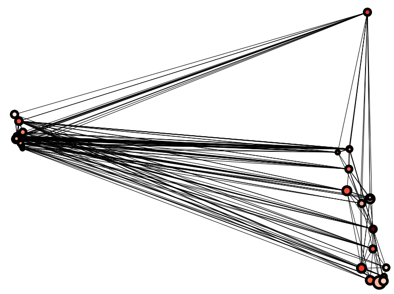


Figure 4.23: Network, 600–1000AD, with Random-Walk Btwn. Cent. (See Listing E.10)



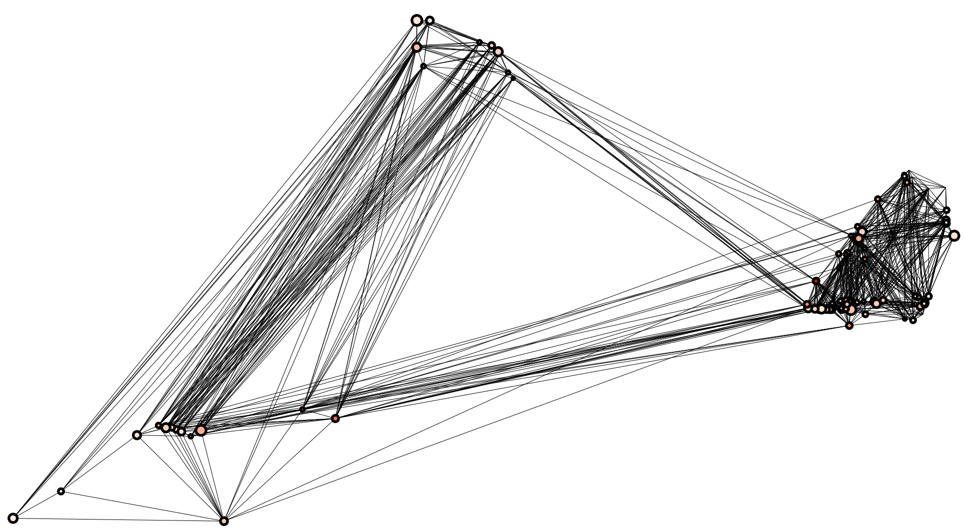
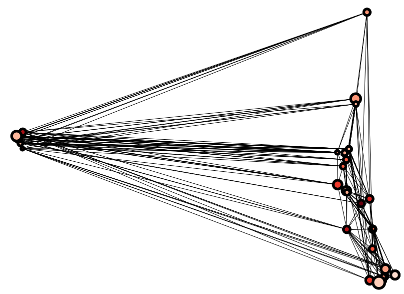


Figure 4.24: Network, 1000–1150AD, with Random-Walk Btwn. Cent. (See Listing E.10)

Figure 4.25: Network, 1150–1450AD, with Random-Walk Btwn. Cent. (See Listing E.10)



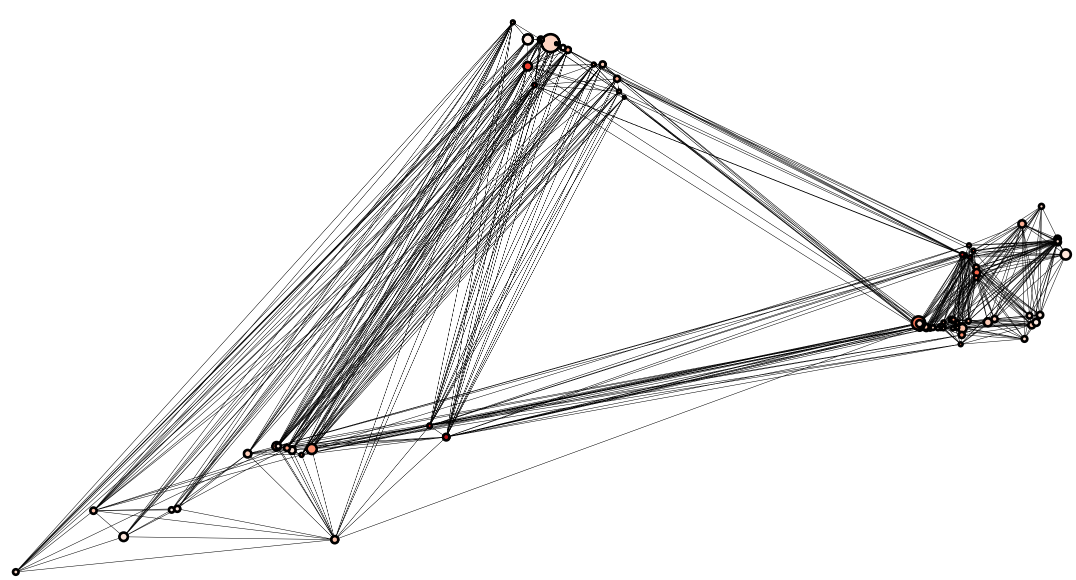


Figure 4.26: Network, 1450–1540AD, with Random-Walk Btwn. Cent. (See Listing E.10)

Figure 4.27: Network, 1540–1600AD, with Random-Walk Btwn. Cent. (See Listing E.10)

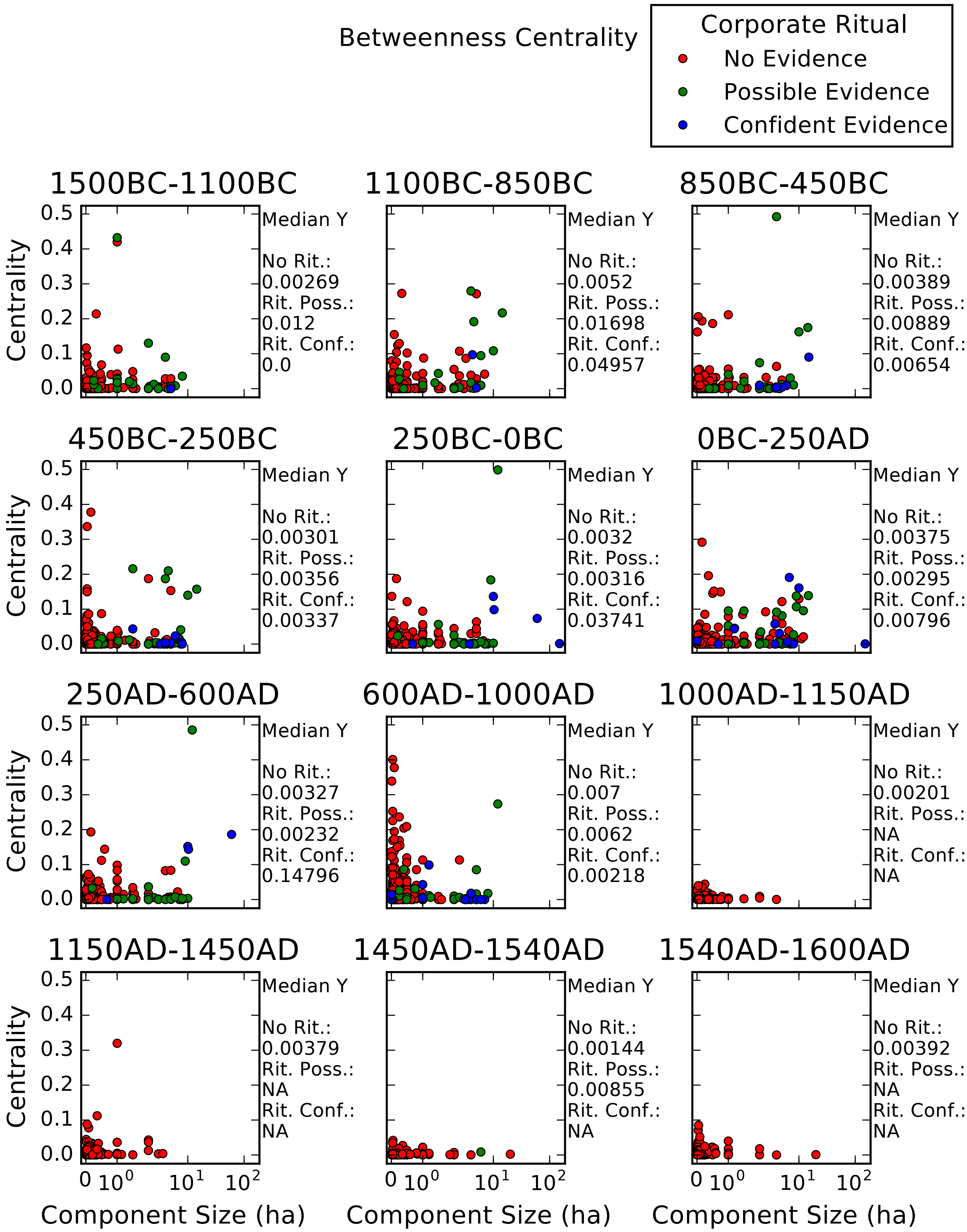


Figure 4.28: Betweenness Centrality Values by Component Size and Type (See Listing E.10)

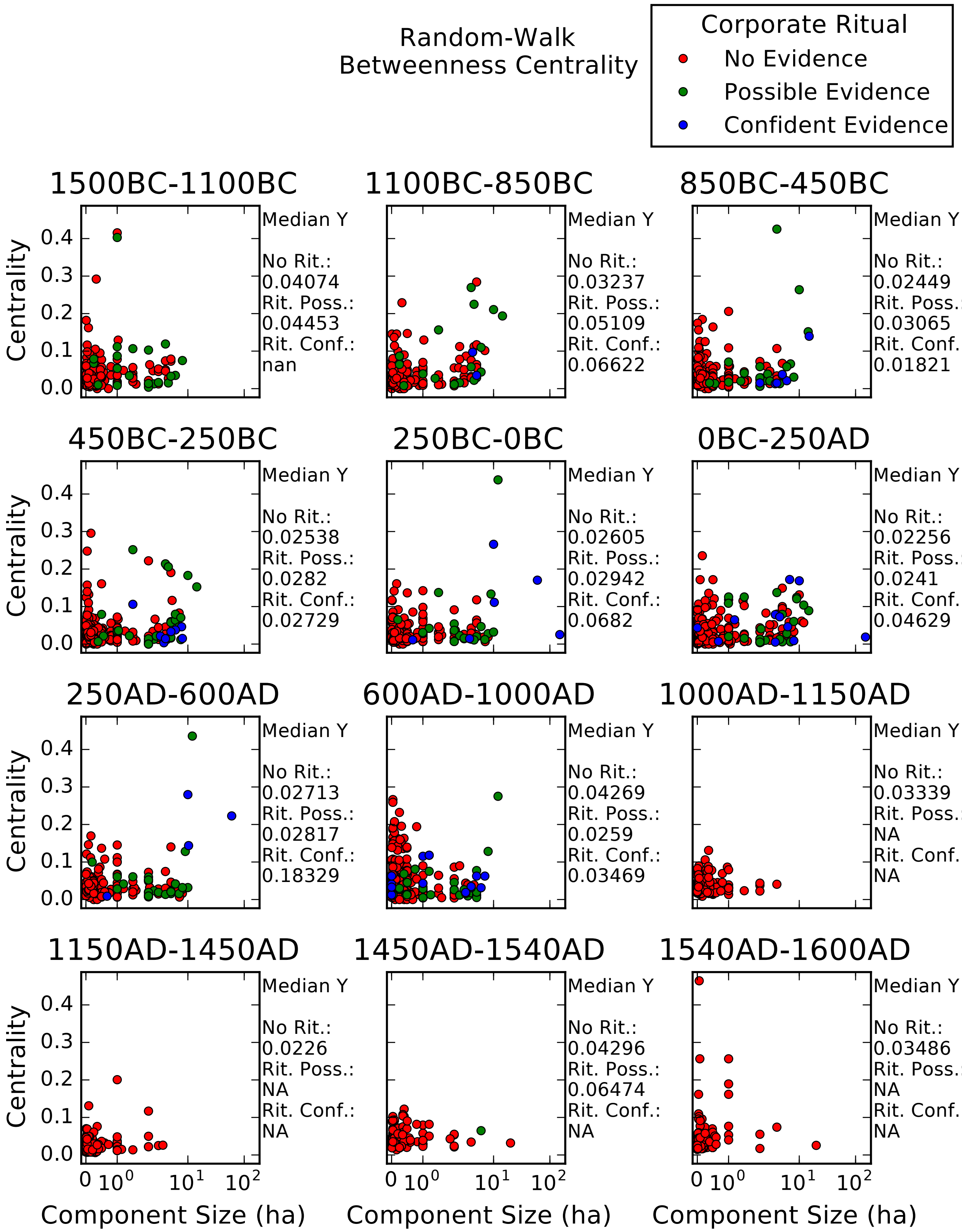


Figure 4.29: Random-Walk Btwn. Cent. by Component Size and Type (See Listing E.10)

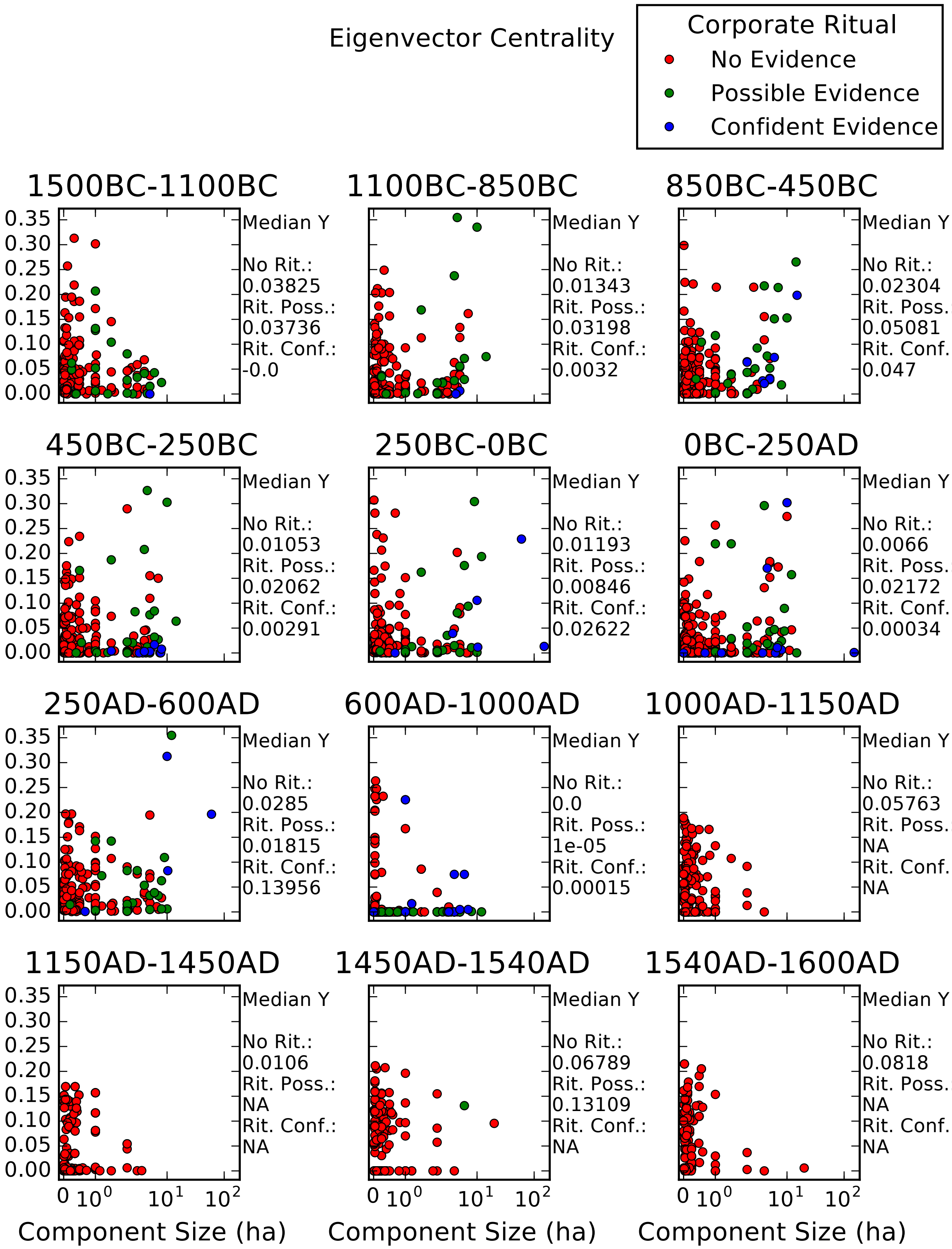


Figure 4.30: Eigenvector Centrality Values by Component Size and Type (See Listing E.10)

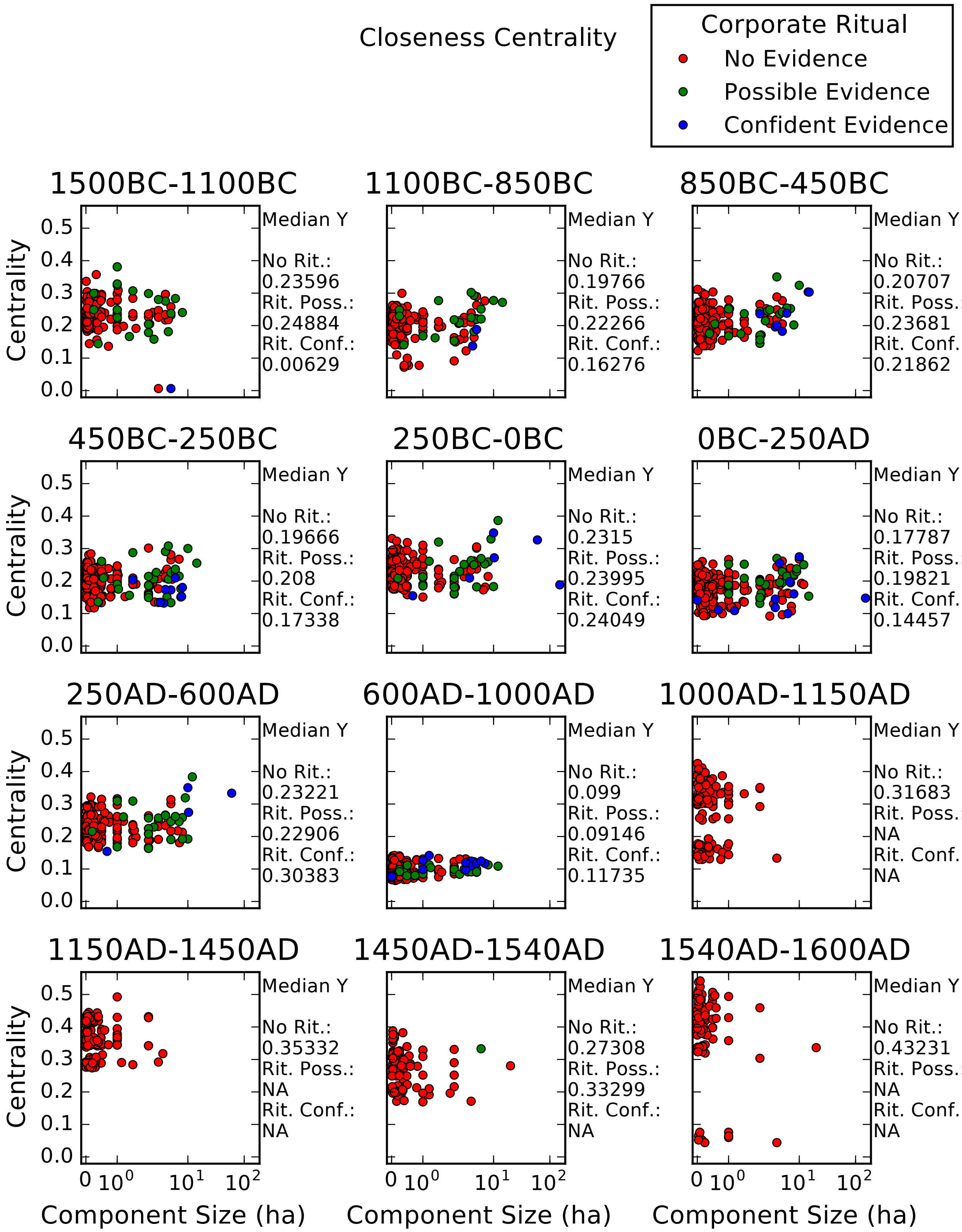


Figure 4.31: Closeness Centrality Values by Component Size and Type (See Listing E.10)

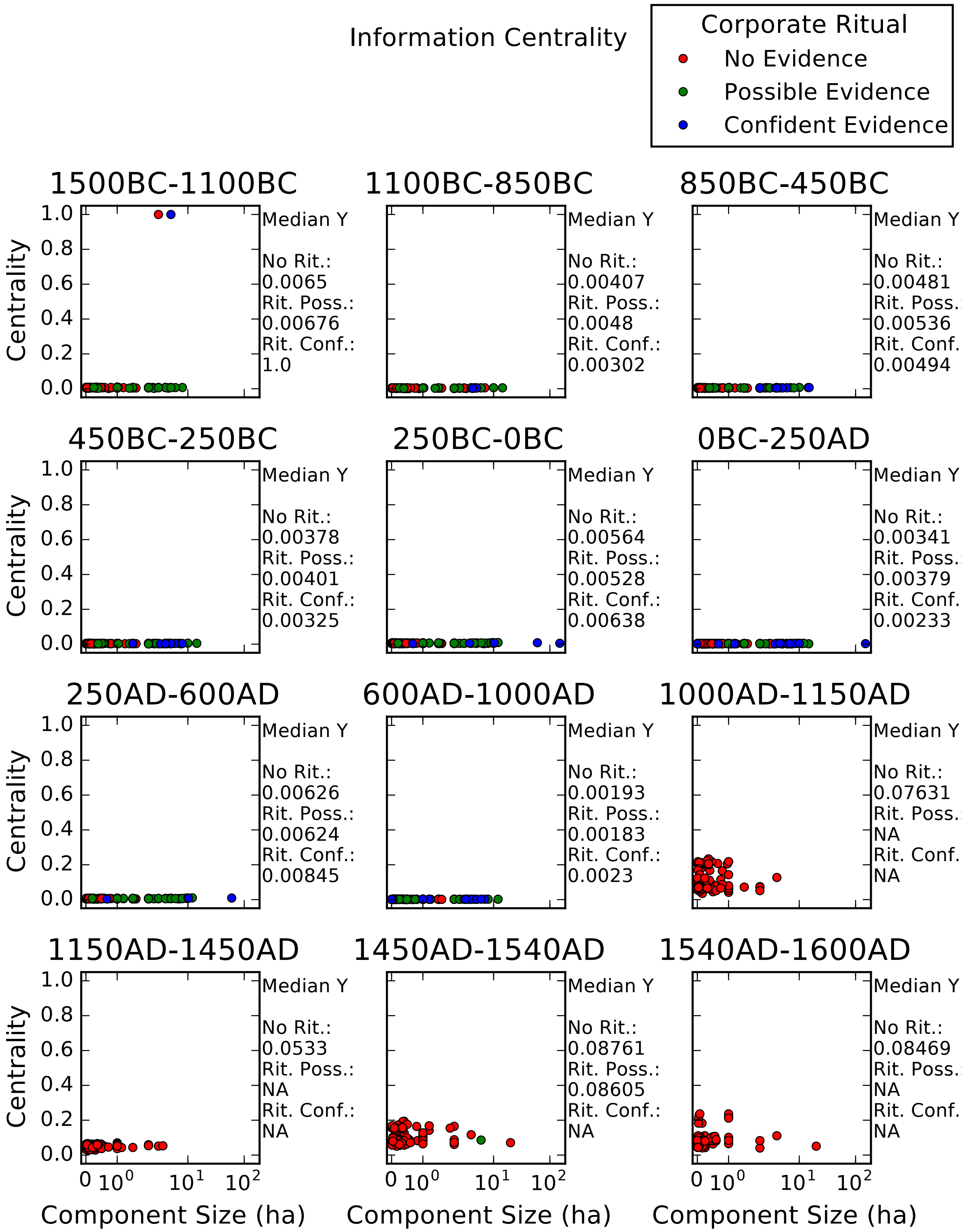


Figure 4.32: Information Centrality Values by Component Size and Type (See Listing E.10)

4.5 Staple and Wealth Finance Conclusions

The most important results of the analyses conducted in this chapter all concern the Late Formative. The staple finance analysis suggested that agricultural intensification and staple finance likely became quite important during the Late Formative. For the most part, and contrary to expectations, the wealth finance analyses did not point to increasing importance of wealth finance during the Late Formative (or any other period, for that matter). However, there was one unexpected, possibly quite important result pointing in the opposite direction. This was the site of Tiwanaku's location exactly upon a dry-period major travel route which would have been open around the time of Tiwanaku's first growth to atypical size. The robusticity of this result will need to be demonstrated with further modeling with wider ranges of parameters, but it may turn out to be a significant result.

Thus, although all of the analyses conducted in this chapter need considerable refinement, a preliminary argument can be made for the increasing importance of *both* staple and wealth finance during the Late Formative. Staple and wealth finance were mixed into complex Late Formative political economies, perhaps even feeding off of each other. For the Titicaca region as a whole, staple finance appears to have been more important during the Late Formative than anticipated by the argument presented in Section 4.2. However, there was substantial inter-regional variation in the relative importance of staple and wealth finance. The Taraco Peninsula, Bandy's (2004b) analysis of which inspired much of this chapter's wealth finance analysis, appears to have been on one extreme of the spectrum. Just slightly before the Late Formative, its politics were heavily oriented to wealth finance. Judging by the dry-period route discussed above, Tiwanaku may have been similar during its earliest major growth. The Juli-Pomata region appears to have been on the opposite end of the Late Formative spectrum, with a political economy more focused on staple finance. The Huancané-Putina region provides an example of a more mixed political economy. For a long time span probably including much of the Formative and Tiwanaku periods, wealth finance was quite important, though this was made more apparent in Section 3.1.3 than in this chapter. At the same time, the catchment analyses in this chapter indicate that staple finance's importance increased throughout the Formative in the Huancané-Putina region.

CHAPTER 5

Conclusion

The vast majority of the Titicaca region's history was characterized by population increase, and this continual increase influenced a series of political changes. As previously illustrated by Bandy (2004a) and further supported in Section 3.3, the early first millennium B.C. saw the advent of new political/religious forms, one consequence of which was an anti-fissioning effect which permitted the growth of larger villages (also see Stanish and Haley 2004). As suggested in Section 4.3.2, many Late Formative peoples in the Titicaca region likely intensified their agricultural production, and a stressor leading to this, or perhaps an unintended consequence of this, would have been the support of the larger Late Formative populations observed in Sections 3.1.2 and 3.1.3. Agricultural intensification reached its peak during the late Tiwanaku period (Janusek and Kolata 2003, 2004; Bandy 2005a), at the same time that the Titicaca region's peak prehistoric population is observed (Section 3.1.2). The erosion of the political foundations of Tiwanaku was in large part the erosion of this intensive agricultural system (e.g., Kolata 2003a: 8–10; Bandy 2005a), leading to a post-Tiwanaku catastrophic population decline to Formative population levels (Section 3.1.2). Following this decline, the Inca state later reversed the trend, largely via mass immigration into the Titicaca region, but nevertheless population did not rise to the Tiwanaku period level (Section 3.1.2).

However, inter-regional variation in demographic trends may have been substantial. If the Huancané-Putina region reflects a broader northern Titicaca pattern (which it might or might not), the northern Titicaca region would have had considerably more stable population sizes (Section 3.1.3). A major exception would be the Pukara Valley during the Late Formative, which drew a massive number of immigrants from other regions (Section 3.1.3). Another dramatic immigration-driven population boom transpired in the Juli-Pomata region during the Inca period (Section 3.1.3).

Different regions had different relationships between population growth and population nucleation, suggesting that population nucleation was not some simple response to demographic pressure (Section 3.1.4). The Tiwanaku Valley (in the Late Formative and Tiwanaku periods) and the Pukara Valley (in the Late Formative period) had extreme population nuclei which suggest very uneven balances of power between urban and rural social segments (Section 3.1.4; also see Bandy (2013)). Later, as recognized since the early days of Titicaca survey archaeology (see Section 2.2), there are very large numbers of Altiplano period sites all across the Titicaca region. This is best understood as a reflection of population dispersal and a great degree of political decentralization (Section 3.1.4).

When the Titicaca region's demographic geography is examined, four major transitions are apparent (Section 3.1.5). The first transition is from demographic expansion to demographic reorganization, or in other words from growth across a landscape to more complicated patterns of growth and decline across a landscape. In some regions this transition occurs around 500 B.C. and in other regions it occurs later, around 1 B.C. These inter-regional variations in timing are not well explained by environmental differences or population pressure: instead, they reflect different political histories. Relatedly and in some contrast to expectations, close proximity to the lake is not a major factor in the location of the most prominent early population nuclei. The second major transition is from the pattern of mixed growth and decline to a pattern of monolithic growth across entire landscapes during the Tiwanaku period. This is a reflection of a change from voting-with-your-feet politics to state-administered landscapes. Still, Tiwanaku's territory is best understood as a network rather than an inkblot, even in the Tiwanaku Valley itself. The third major transition is back to a mosaic of growth and decline, during the Altiplano period's population dispersal. The fourth and final major transition was to re-nucleation during the Inca period, when much of the landscape was abandoned and population concentrated into fewer places. Change from the Inca period to the early Colonial period was heterogeneous: in some cases, the early Colonial period inherited much of the Inca period spatial structure, whereas in other cases dramatic migrations took place. Bandy and Janusek (2005) identified the logic of much of this migration: many people fled from encomiendas to areas governed directly by the Spanish crown.

I do believe that this study has generally avoided the trap of environmental determinism. Certainly, I hope that this study has been grounded in individuals' and groups' creation of history via choices between equally available options for how to relate to one another. Nevertheless, it is as unjustifiable to ignore the relevance of ecological geography to political-demographic geography as it is to imagine that the former rigidly determined the latter. As discussed in Section 4.3.2, Formative peoples settled with a strong orientation to each region's areas of highest subsistence productivity. By the Late Formative, many Titicaca peoples sought out landscapes adaptable to intensive production (Section 4.3.2). Tiwanaku period peoples elaborated upon this collective act (Section 3.1.2), and Altiplano period peoples dramatically rejected the Tiwanaku period system (Sections 3.1.4, 3.2.1, and 3.3).

The political-demographic history summarized thus far has, I hope, provided some insights into how people in the Titicaca region chose to craft relationships with one another, and under what conditions. It is also important, however, to ask some more precise questions about political structure, even if the answer to a precise question often must force historical particularities into rigid boxes. First of all, especially to facilitate comparison to other world regions, we should ask what kind of settlement hierarchies are evident through time in the Titicaca region. Recall that I have argued that most settlement pattern hierarchies in the Titicaca region are indeed reflections of political hierarchies (Section 3.2.1). Thus, the best approximation of Titicaca political hierarchies through time is: two-tier Middle Formative and Altiplano period hierarchies, three-tier Late Formative, Inca, and early Colonial period hierarchies (with another tier outside the region for the latter two), and a four-tier Tiwanaku period hierarchy (Section 3.2.1). If the northern and southern Titicaca regions are considered separately, as is best, each has this same pattern, with one exception: the northern Titicaca region lacks a fourth (upper-most) Tiwanaku period tier (Section 3.2.1).

For this characterization of settlement/political hierarchies to be meaningful, it must be complemented by an examination of the character and spatial scale of political integration, something pursued via rank-size graphs in Section 3.2.1. At the survey scale, all examined regions are politically unintegrated during the period from about 1500 to 800 B.C. This same pattern holds, in effect, for the period from about 800 B.C. to 200 B.C. The Late Formative (200 B.C. to A.D. 600) is very different: many regions are politically integrated at the survey scale, and in the Pukara Valley and the Tiwanaku Valley a single site dominates each settlement system. Such dominance is also evident during the Tiwanaku period in the Tiwanaku Valley and the Katari Valley. The Altiplano period rank-size graphs must be interpreted in a different way because of the key role of hilltop forts in the settlement patterns, but ultimately my conclusion is that Altiplano period societies were segmentary (also see Arkush 2014). Finally, Inca period and early Colonial period societies at the survey scale were more highly integrated than those of any preceding period. This is surprising, given the fact that survey-scale regions were parts of a much larger Inca system, and such a condition in the Tiwanaku period had involved locally unintegrated societies in the peripheral survey-scale regions. This suggests that Inca period local elites were able to use Inca infrastructure and manipulate Inca political economies to their own advantage, creating highly integrated local sub-systems. Comparison of the Titicaca region's entire Formative–Colonial sequence to other Andean and non-Andean regions suggests that Titicaca societies had a high "baseline" (minimum) degree of integration.

A question prompted by this characterization of hierarchy and integration is the nature of the social groups which were vertically and horizontally integrated within these larger political organizations. Based on cluster analysis conducted in Section 3.2.2, I have argued that Titicaca political organizations always used social nesting as their core logic. This is also supported by the considerable number of small sites with evidence for corporate ritual, persisting even during periods of high political centralization and large political organizations (Section 3.3). However, in contrast to Albarracin-Jordan's (2003) argument for a Tiwanaku segmentary state, I have argued that hierarchical differentiation between social groups was key to many political organizations throughout most of the Titicaca region's history.

The final question asked in this study was the relative importance of staple and wealth finance to the many varieties of political organization across time and space in the Titicaca region (Chapter 4). Most fundamentally, this analysis has suggested that staple finance was key to many political groups even during the period for which I most anticipated wealth finance to eclipse its importance (the Late Formative). Nevertheless, wealth finance clearly played a transformative role at particular times and places, such as the Taraco Peninsula during the late Middle Formative (Bandy 2004b). This may have also been the case for Tiwanaku, since the modeling of optimal travel routes in Chapter 4 suggests that a major potential travel route nearly cut through the site of Tiwanaku during periods with lower lake levels, one of which was around the time of Tiwanaku's initial major growth.

While this study has focused on macro-regional political history, there are also two regional-scale arguments which I would like to highlight. First, I have made a tentative suggestion that the antiquity of the Island of the Sun's ritual importance should be reconsidered. It has been previously argued that the Island of the Sun was a place of exceptional, macro-regional religious importance during both the Tiwanaku and Inca periods (Bauer and Stanish 2001; Stanish and Bauer 2004b). I have made an argument that a more modest form of this importance possibly dates back even further to the Middle Formative (Sections 3.1.3, 3.1.4).

Less tentatively, I have argued that the Huancané-Putina region's relationship with Tiwanaku should be reconsidered. Our ability to understand Tiwanaku's relationships with northern Titicaca societies has recently been revolutionized by Chávez Justo's (2014) in-depth ceramic research. Among other advances, her ceramic chronology allows for the identification of non-Tiwanaku-affiliated, Tiwanaku period settlement in the northern Titicaca region. Based on this kind of settlement, I have made an extended argument that *all* Tiwanaku period settlement in the Huancané-Putina region is a reflection of locally-driven, patchwork affiliation, rather than Tiwanaku control (especially in Section 3.1.3, but also see the discussion of rank-size graphs in Section 3.2.1, and the discussion of staple finance in Section 4.3.2).

APPENDIX A

Settlement Pattern Database Part I: Intensive Surveys Dataset

A.1 Intensive Surveys Database

In the scripts presented in Appendix D, the database presented here in Table A.2 is referred to with the file name "titicaca_surveys_r_LAST_SFI_VERSION_NO_SPACES_NO_BLANKS.csv". The file referred to in Appendices D and E as "titicaca_surveys_python_LAST_SFI_VERSION_NO_SPACES_NO_BLANKS.csv" is identical except that it uses "-1" instead of "NA" to indicate "not available".

Table A.1 explains what each column in Table A.2 signifies.

Note that while I have broken some of the headers in Table A.2 across two lines to save space, in reality there are no separators between the two parts.

Table A.1: Database's Variables

Variable	Full name	Description
comp	component	Database's primary key. Phase-specific part of a site. Format is [survey]-[site].[sector]-[phase]
multi_sectors	multiple sectors flag	"1" means there are multiple rows with the same site and phase
masl	meters above sea level	Elevation
eutm19	easting	Easting, UTM zone 19 WGS84
nutm19	northing	Northing, UTM zone 19 WGS84
size_abs	absolute component size	Component spatial size when an absolute figure is available
size_min	minimum component size	Component spatial size minimum when only a range is available
size_max	maximum component size	Component spatial size maximum when only a range is available
chron_conf	chronological confidence	"P" = phase assignment is possible; "C" = phase assignment is confident
sitesize	site size	Total site spatial size. All components combined.
hab	habitation	"1" = component has confident evidence of habitation area. ".5" = it has possible evidence. ".75" = no information available but component likely includes habitation area.
rit	corporate ritual	"1" = component has confident evidence of corporate ritual area. ".5" = it has possible evidence.
bur	burial	"1" = component has confident evidence of human burial. ".5" = it has possible evidence.
agr	agricultural only	"1" = component is SOLELY an agricultural feature. ".5" = component may solely be an agricultural feature.
def	defensive wall	"1" = component has confident evidence of fortification. ".5" = it has possible evidence. A surveyor describing the site as in a defensive location is not sufficient for either "1" or ".5": there must be material evidence.
sherds	sherd count	Number of sherds within the surface collection sample that have been phased to this component

Table A.2: Intensive Surveys Database

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0001.01-b	0	3828	451151	8208644	2.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0001.01-c	0	3828	451151	8208644	4.00	NA	NA	C	NA	1	1	1	0	0	NA
jp-0001.01-d	0	3828	451151	8208644	5.30	NA	NA	C	NA	1	1	0	0	0	NA
jp-0001.01-f	0	3828	451151	8208644	3.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0001.01-g	0	3828	451151	8208644	3.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0002.01-f	0	3886	450903	8207479	20.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0002.01-g	0	3886	450903	8207479	20.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0003.01-e	0	4058	450458	8204539	5.00	NA	NA	C	NA	1	0.5	0	0	1	NA
jp-0003.01-f	0	4058	450458	8204539	1.00	NA	NA	C	NA	1	0	0	0	0.5	NA
jp-0004.01-f	0	3901	468604	8200710	5.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0004.01-g	0	3901	468604	8200710	5.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0008.01-e	0	4100	443611	8207010	0.75	NA	NA	C	NA	1	0	0	0	1	NA
jp-0009.01-f	0	3876	449482	8202393	2.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0009.01-g	0	3876	449482	8202393	2.00	NA	NA	C	NA	1	1	0.5	0	0	NA
jp-0011.01-f	0	3883	450547	8207934	2.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0011.01-g	0	3883	450547	8207934	2.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0012.01-e	0	3859	450505	8208228	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0013.01-f	0	3839	451389	8208218	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0014.01-f	0	3855	451561	8208283	0.08	NA	NA	C	NA	1	0	0	0	0	NA
jp-0017.01-f	0	3892	454660	8211062	1.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0017.01-g	0	3892	454660	8211062	1.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0018.01-f	0	3861	453944	8210961	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0018.01-g	0	3861	453944	8210961	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0019.01-e	0	4056	449976	8208303	0.50	NA	NA	C	NA	1	0	0	0	0.5	NA
jp-0019.01-f	0	4056	449976	8208303	0.50	NA	NA	C	NA	1	0.5	0	0	0.5	NA
jp-0019.01-g	0	4056	449976	8208303	0.50	NA	NA	C	NA	1	0.5	0	0	0.5	NA
jp-0020.01-f	0	3897	451893	8208426	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0020.01-g	0	3897	451893	8208426	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0021.01-f	0	3931	454264	8210706	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0022.01-a	0	4088	453199	8209290	0.33	NA	NA	C	NA	1	0	0	0	0	NA
jp-0022.01-b	0	4088	453199	8209290	0.90	NA	NA	C	NA	1	0.5	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0023.01-e	0	4107	453207	8208856	2.00	NA	NA	C	NA	1	0	0	0	1	NA
jp-0024.01-f	0	4112	453095	8209027	0.50	NA	NA	P	NA	1	0	1	0	0	NA
jp-0025.01-e	0	4021	453624	8209586	0.02	NA	NA	P	NA	1	0	0	0	0	NA
jp-0025.01-f	0	4021	453624	8209586	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0026.01-f	0	4063	453490	8209337	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0026.01-g	0	4063	453490	8209337	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0027.01-f	0	4020	453785	8209500	0.13	NA	NA	C	NA	1	0	0	0	0	NA
jp-0027.01-g	0	4020	453785	8209500	0.13	NA	NA	C	NA	1	0	0	0	0	NA
jp-0028.01-f	0	4015	453535	8209856	4.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0028.01-g	0	4015	453535	8209856	4.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0029.01-e	0	4003	453763	8210152	0.04	NA	NA	P	NA	1	0	0	0	0	NA
jp-0029.01-f	0	4003	453763	8210152	0.04	NA	NA	P	NA	1	0	0	0	0	NA
jp-0029.01-g	0	4003	453763	8210152	0.04	NA	NA	P	NA	1	0	0	0	0	NA
jp-0030.01-f	0	4027	452791	8208273	0.12	NA	NA	P	NA	1	0	0	0	0	NA
jp-0030.01-g	0	4027	452791	8208273	0.12	NA	NA	P	NA	1	0	0	0	0	NA
jp-0031.01-f	0	4000	452501	8208729	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0031.01-g	0	4000	452501	8208729	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0032.01-e	0	4016	452596	8208950	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0032.01-f	0	4016	452596	8208950	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0032.01-g	0	4016	452596	8208950	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0033.01-f	0	4051	452673	8208875	0.02	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0033.01-g	0	4051	452673	8208875	0.02	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0034.01-e	0	4060	452761	8208959	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0034.01-f	0	4060	452761	8208959	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0034.01-g	0	4060	452761	8208959	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0035.01-f	0	4076	452832	8209076	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0035.01-g	0	4076	452832	8209076	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0036.01-f	0	4025	453151	8208278	0.08	NA	NA	C	NA	1	0	0	0	0	NA
jp-0036.01-g	0	4025	453151	8208278	0.08	NA	NA	C	NA	1	0	0	0	0	NA
jp-0037.01-e	0	4060	453457	8208568	0.25	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0037.01-f	0	4060	453457	8208568	0.25	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0038.01-g	0	4002	454035	8208745	0.20	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0039.01-g	0	3956	454499	8209106	0.01	NA	NA	P	NA	0	0	1	0	0	NA
jp-0040.01-f	0	3956	454291	8209344	0.08	NA	NA	C	NA	1	0	0	0	0	NA
jp-0041.01-e	0	3955	454576	8209573	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0041.01-f	0	3955	454576	8209573	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0041.01-g	0	3955	454576	8209573	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0042.01-f	0	3913	454733	8209807	0.09	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0042.01-g	0	3913	454733	8209807	0.09	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0043.01-f	0	3890	454790	8210040	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0043.01-g	0	3890	454790	8210040	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0044.01-f	0	3886	455189	8209364	0.01	NA	NA	P	NA	0	0	1	0	0	NA
jp-0045.01-f	0	3925	452118	8208403	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0045.01-g	0	3925	452118	8208403	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0046.01-f	0	3957	452363	8208330	0.12	NA	NA	P	NA	1	0	0	0	0	NA
jp-0047.01-g	0	3988	452776	8208024	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0048.01-f	0	3915	452005	8208659	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0048.01-g	0	3915	452005	8208659	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0049.01-f	0	3952	452204	8208718	0.28	NA	NA	C	NA	1	0	0	0	0	NA
jp-0049.01-g	0	3952	452204	8208718	0.28	NA	NA	C	NA	1	0	0	0	0	NA
jp-0050.01-f	0	4033	452537	8208605	0.09	NA	NA	P	NA	1	0	0	0	0	NA
jp-0050.01-g	0	4033	452537	8208605	0.09	NA	NA	P	NA	1	0	0	0	0	NA
jp-0051.01-g	0	3924	452175	8208941	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0052.01-e	0	3947	452300	8209128	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0052.01-f	0	3947	452300	8209128	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0052.01-g	0	3947	452300	8209128	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0053.01-g	0	3874	451816	8208681	0.04	NA	NA	C	NA	1	0	1	0	0	NA
jp-0054.01-e	0	3989	452590	8209188	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0054.01-f	0	3989	452590	8209188	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0054.01-g	0	3989	452590	8209188	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0055.01-g	0	3990	452857	8209423	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0056.01-f	0	4069	453168	8209492	0.12	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0056.01-g	0	4069	453168	8209492	0.12	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0057.01-f	0	4024	453244	8209822	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
jp-0057.01-g	0	4024	453244	8209822	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0058.01-e	0	3927	453314	8210157	0.40	NA	NA	P	NA	1	0	0	0	0	NA
jp-0058.01-f	0	3927	453314	8210157	0.40	NA	NA	C	NA	1	0	0	0	0	NA
jp-0058.01-g	0	3927	453314	8210157	0.40	NA	NA	C	NA	1	0	0	0	0	NA
jp-0059.01-f	0	3890	453559	8210534	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0060.01-f	0	4057	453344	8209591	3.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0060.01-g	0	4057	453344	8209591	3.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0061.01-f	0	4007	453459	8210082	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0061.01-g	0	4007	453459	8210082	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0062.01-f	0	3979	454012	8210610	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0062.01-g	0	3979	454012	8210610	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0063.01-f	0	3947	454303	8210857	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0064.01-g	0	3930	452325	8207916	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0065.01-f	0	3967	452475	8208126	0.05	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0065.01-g	0	3967	452475	8208126	0.05	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0066.01-f	0	3910	452163	8208195	0.01	NA	NA	C	NA	0.5	0	1	0	0	NA
jp-0067.01-f	0	3919	452091	8209189	3.00	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0067.01-g	0	3919	452091	8209189	3.00	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0068.01-e	0	3938	452280	8209386	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0068.01-f	0	3938	452280	8209386	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0068.01-g	0	3938	452280	8209386	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0069.01-f	0	3945	452504	8209447	0.05	NA	NA	C	NA	0	0	1	0	0	NA
jp-0070.01-f	0	3948	452789	8209661	0.08	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0070.01-g	0	3948	452789	8209661	0.08	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0071.01-e	0	3905	452815	8209990	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0071.01-g	0	3905	452815	8209990	0.06	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0072.01-e	0	3908	453059	8210062	0.11	NA	NA	C	NA	0	0	1	0	0	NA
jp-0073.01-f	0	3831	451487	8208934	0.56	NA	NA	C	NA	1	0	0	0	0	NA
jp-0073.01-g	0	3831	451487	8208934	0.56	NA	NA	C	NA	1	0	0	0	0	NA
jp-0074.01-e	0	3868	451806	8209305	0.30	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0074.01-f	0	3868	451806	8209305	0.30	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0074.01-g	0	3868	451806	8209305	0.30	NA	NA	C	NA	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
jp-0075.01-f	0	3864	452292	8210030	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0075.01-g	0	3864	452292	8210030	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0076.01-f	0	3891	452592	8210122	0.08	NA	NA	C	NA	1	0	0	0	0	NA
jp-0077.01-f	0	3922	452467	8209822	4.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0077.01-g	0	3922	452467	8209822	4.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0078.01-g	0	3878	452830	8210306	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0079.01-e	0	3970	454112	8209506	0.04	NA	NA	P	NA	1	0	0	0	0	NA
jp-0080.01-g	0	3957	454242	8209763	0.20	NA	NA	C	NA	1	0	0	0	0	NA
jp-0081.01-f	0	3954	454451	8209950	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0081.01-g	0	3954	454451	8209950	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0082.01-e	0	3934	454668	8210165	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0082.01-f	0	3934	454668	8210165	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0082.01-g	0	3934	454668	8210165	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0083.01-f	0	3933	454546	8210442	0.05	NA	NA	C	NA	1	0	0	0	0	NA
jp-0083.01-g	0	3933	454546	8210442	0.05	NA	NA	C	NA	1	0	0	0	0	NA
jp-0084.01-f	0	3907	454795	8210488	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0084.01-g	0	3907	454795	8210488	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0086.01-f	0	3844	454791	8210823	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0086.01-g	0	3844	454791	8210823	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0087.01-f	0	3930	454093	8210337	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0088.01-f	0	3831	455300	8210363	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0088.01-g	0	3831	455300	8210363	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0089.01-g	0	3919	454223	8210465	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0090.01-f	0	3961	453932	8210402	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0090.01-g	0	3961	453932	8210402	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0091.01-f	0	3909	454915	8210373	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0092.01-f	0	3902	454953	8210503	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0092.01-g	0	3902	454953	8210503	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0093.01-e	0	3879	455145	8210620	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0094.01-e	0	3843	455279	8210074	0.04	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0094.01-f	0	3843	455279	8210074	0.04	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0095.01-e	0	3875	455093	8209966	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0095.01-f	0	3875	455093	8209966	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0096.01-d	0	3892	454617	8209857	0.14	NA	NA	C	NA	1	0	0	0	0	NA
jp-0096.01-e	0	3892	454617	8209857	0.14	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0096.01-f	0	3892	454617	8209857	0.14	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0097.01-e	0	3916	454405	8209718	0.09	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0097.01-f	0	3916	454405	8209718	0.09	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0098.01-f	0	3996	453750	8210378	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0098.01-g	0	3996	453750	8210378	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0099.01-f	0	4031	453700	8209269	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0100.01-g	0	4000	454077	8209062	0.25	NA	NA	C	NA	1	0	1	0	0	NA
jp-0101.01-e	0	3888	454950	8209755	0.03	NA	NA	C	NA	0	0	1	0	0	NA
jp-0102.01-e	0	3909	454824	8209798	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0102.01-f	0	3909	454824	8209798	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0103.01-e	0	3879	454942	8209520	2.00	NA	NA	C	NA	1	0	0.5	0	0.5	NA
jp-0103.01-f	0	3879	454942	8209520	2.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0103.01-g	0	3879	454942	8209520	2.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0104.01-e	0	3855	455123	8209747	0.20	NA	NA	C	NA	1	0	0	0	0	NA
jp-0104.01-f	0	3855	455123	8209747	0.20	NA	NA	C	NA	1	0	0	0	0	NA
jp-0104.01-g	0	3855	455123	8209747	0.20	NA	NA	C	NA	1	0	0	0	0	NA
jp-0105.01-f	0	3920	454785	8209578	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0106.01-e	0	3923	455332	8208654	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0107.01-f	0	3886	455507	8209817	6.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0107.01-g	0	3886	455507	8209817	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0108.01-f	0	3936	454436	8208849	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0109.01-e	0	3924	454601	8208963	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0110.01-f	0	3995	453944	8209735	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0111.01-e	0	3977	454120	8209900	0.13	NA	NA	C	NA	1	0	0	0	0	NA
jp-0112.01-f	0	3984	454283	8210184	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0112.01-g	0	3984	454283	8210184	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0113.01-a	0	3851	455678	8210208	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0113.01-b	0	3851	455678	8210208	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0113.01-d	0	3851	455678	8210208	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0113.01-f	0	3851	455678	8210208	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0114.01-f	0	3904	455286	8208337	1.00	NA	NA	C	NA	1	0	1	0	0	NA
jp-0116.01-e	0	3838	456476	8209869	4.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0116.01-f	0	3838	456476	8209869	8.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0116.01-g	0	3838	456476	8209869	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0117.01-f	0	3868	456153	8209497	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0117.01-g	0	3868	456153	8209497	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0118.01-g	0	3861	456033	8209917	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0119.01-f	0	3912	455090	8208897	6.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0119.01-g	0	3912	455090	8208897	6.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0120.01-d	0	3911	455852	8208913	0.80	NA	NA	C	NA	1	0	0	0	0	NA
jp-0120.01-e	0	3911	455852	8208913	0.80	NA	NA	C	NA	1	0	0	0	0	NA
jp-0121.01-d	0	3893	455825	8209589	4.00	NA	NA	C	NA	1	1	0.5	0	0	NA
jp-0121.01-e	0	3893	455825	8209589	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0121.01-f	0	3893	455825	8209589	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0121.01-g	0	3893	455825	8209589	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0122.01-e	0	3848	457050	8209890	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0122.01-f	0	3848	457050	8209890	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0122.01-g	0	3848	457050	8209890	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0123.01-f	0	3879	458008	8210515	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0123.01-g	0	3879	458008	8210515	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0125.01-f	0	3824	458534	8209366	0.08	NA	NA	C	NA	1	0	0	0	0	NA
jp-0125.01-g	0	3824	458534	8209366	0.08	NA	NA	C	NA	1	0	0	0	0	NA
jp-0126.01-e	0	3822	458115	8209110	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0126.01-f	0	3822	458115	8209110	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0127.01-f	0	3905	456724	8209231	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0127.01-g	0	3905	456724	8209231	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0128.01-g	0	3849	457709	8209370	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0129.01-f	0	3846	457999	8209245	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0129.01-g	0	3846	457999	8209245	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0130.01-f	0	3895	457611	8209998	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0132.01-f	0	3823	457690	8209099	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0132.01-g	0	3823	457690	8209099	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0133.01-b	0	3840	456933	8208998	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0133.01-c	0	3840	456933	8208998	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0133.01-d	0	3840	456933	8208998	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0134.01-g	0	3833	456509	8208585	3.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0135.01-f	0	3828	456958	8208586	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0135.01-g	0	3828	456958	8208586	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0136.01-d	0	3898	456890	8209215	0.06	NA	NA	C	NA	0.5	0	0.5	0	0	NA
jp-0136.01-e	0	3898	456890	8209215	0.06	NA	NA	C	NA	0.5	0	0.5	0	0	NA
jp-0136.01-f	0	3898	456890	8209215	0.06	NA	NA	P	NA	0.5	0	0.5	0	0	NA
jp-0136.01-g	0	3898	456890	8209215	0.06	NA	NA	C	NA	0.5	0	0.5	0	0	NA
jp-0137.01-d	0	3822	457181	8208925	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0137.01-f	0	3822	457181	8208925	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0138.01-f	0	3822	457277	8208434	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0138.01-g	0	3822	457277	8208434	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0139.01-f	0	3839	456196	8208361	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0140.01-f	0	3912	455224	8207772	0.06	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0140.01-g	0	3912	455224	8207772	0.06	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0141.01-f	0	3909	455555	8207940	0.07	NA	NA	C	NA	1	0	0	0	0	NA
jp-0141.01-g	0	3909	455555	8207940	0.07	NA	NA	C	NA	1	0	0	0	0	NA
jp-0142.01-f	0	3942	455024	8207916	0.10	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0142.01-g	0	3942	455024	8207916	0.10	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0143.01-e	0	3987	454562	8208427	0.16	NA	NA	C	NA	1	0	1	0	0	NA
jp-0144.01-f	0	3946	454932	8208317	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0145.01-f	0	3910	450364	8208181	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0145.01-g	0	3910	450364	8208181	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0146.01-f	0	3913	450223	8208394	0.16	NA	NA	P	NA	1	0	0	0	0	NA
jp-0146.01-g	0	3913	450223	8208394	0.16	NA	NA	C	NA	1	0	0	0	0	NA
jp-0147.01-d	0	4005	449747	8208406	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0148.01-d	0	3919	449542	8208428	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0148.01-f	0	3919	449542	8208428	0.04	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0148.01-g	0	3919	449542	8208428	0.04	NA	NA	C	NA	0	0	0.5	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
jp-0149.01-e	0	3939	449684	8208061	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0149.01-f	0	3939	449684	8208061	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0150.01-f	0	3924	455152	8208113	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0150.01-g	0	3924	455152	8208113	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0151.01-e	0	3983	449812	8207880	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0151.01-f	0	3983	449812	8207880	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0151.01-g	0	3983	449812	8207880	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0152.01-e	0	3869	450375	8208500	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0152.01-g	0	3869	450375	8208500	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0153.01-f	0	3871	450247	8208564	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0153.01-g	0	3871	450247	8208564	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0154.01-g	0	3869	449556	8208803	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0155.01-e	0	3856	449516	8208896	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0155.01-f	0	3856	449516	8208896	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0156.01-e	0	3860	449272	8208517	0.09	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0156.01-g	0	3860	449272	8208517	0.09	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0157.01-d	0	3850	449211	8208400	0.09	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0157.01-e	0	3850	449211	8208400	0.09	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0157.01-f	0	3850	449211	8208400	0.09	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0158.01-a	0	3834	448924	8207981	0.33	NA	NA	C	NA	1	0	0	0	0	NA
jp-0158.01-b	0	3834	448924	8207981	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0158.01-c	0	3834	448924	8207981	2.00	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0158.01-d	0	3834	448924	8207981	3.50	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0158.01-f	0	3834	448924	8207981	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0159.01-e	0	3828	448928	8208207	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0159.01-f	0	3828	448928	8208207	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0159.01-g	0	3828	448928	8208207	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0160.01-d	0	3846	449135	8208028	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0160.01-e	0	3846	449135	8208028	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0160.01-f	0	3846	449135	8208028	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0160.01-g	0	3846	449135	8208028	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0161.01-g	0	3824	448618	8207410	0.01	NA	NA	P	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
jp-0162.01-f	0	3828	448400	8206857	0.01	NA	NA	P	NA	1	0	1	0	0	NA
jp-0163.01-g	0	3826	449038	8207530	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0164.01-c	0	3833	449020	8207824	0.07	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0164.01-e	0	3833	449020	8207824	0.07	NA	NA	C	NA	0	0	1	0	0	NA
jp-0165.01-f	0	3871	449394	8207935	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0165.01-g	0	3871	449394	8207935	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0166.01-e	0	3852	449678	8207399	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0166.01-f	0	3852	449678	8207399	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0167.01-g	0	4029	453062	8207365	0.06	NA	NA	C	NA	1	0	1	0	0	NA
jp-0168.01-g	0	4055	452226	8206754	0.06	NA	NA	C	NA	1	0	1	0	0	NA
jp-0169.01-g	0	4207	451900	8206517	2.00	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0170.01-g	0	4024	451214	8205865	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0171.01-f	0	3995	451062	8205965	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0171.01-g	0	3995	451062	8205965	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0172.01-f	0	4131	451880	8205835	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0173.01-g	0	4147	452121	8205905	0.05	NA	NA	C	NA	1	0	0	0	0	NA
jp-0174.01-e	0	4130	452451	8205597	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0175.01-f	0	4098	451992	8205322	0.56	NA	NA	C	NA	1	0	0	0	0	NA
jp-0175.01-g	0	4098	451992	8205322	0.56	NA	NA	C	NA	1	0	0	0	0	NA
jp-0176.01-f	0	3934	451043	8206863	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0177.01-e	0	3961	451140	8206749	0.01	NA	NA	P	NA	0	0	1	0	0	NA
jp-0178.01-f	0	3950	451942	8207406	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0178.01-g	0	3950	451942	8207406	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0179.01-b	0	3856	449269	8207944	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0179.01-c	0	3856	449269	8207944	0.02	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0179.01-f	0	3856	449269	8207944	0.02	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0179.01-g	0	3856	449269	8207944	0.02	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0180.01-g	0	4000	452583	8207560	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0181.01-f	0	4127	453140	8206792	0.16	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0181.01-g	0	4127	453140	8206792	0.16	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0182.01-g	0	3906	450874	8206777	0.01	NA	NA	P	NA	0	0	1	0	0	NA
jp-0183.01-f	0	3871	450475	8205954	0.01	NA	NA	C	NA	0	0	1	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0184.01-f	0	4042	450625	8204940	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0185.01-f	0	4056	450235	8205502	4.00	NA	NA	C	NA	1	0	1	0	0	NA
jp-0186.01-e	0	3944	451100	8206605	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0186.01-f	0	3944	451100	8206605	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0187.01-e	0	4066	449081	8205234	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0187.01-g	0	4066	449081	8205234	0.03	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0188.01-e	0	3920	449119	8204126	0.09	NA	NA	P	NA	1	0	0	0	0	NA
jp-0188.01-g	0	3920	449119	8204126	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0189.01-f	0	3974	450727	8204689	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0189.01-g	0	3974	450727	8204689	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0190.01-f	0	4060	452014	8206801	3.00	NA	NA	C	NA	1	0	1	0	0	NA
jp-0191.01-f	0	4123	452105	8206494	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0192.01-e	0	4091	451868	8206704	0.04	NA	NA	P	NA	1	0	0	0	0	NA
jp-0192.01-f	0	4091	451868	8206704	0.04	NA	NA	P	NA	1	0	0	0	0	NA
jp-0193.01-f	0	4028	451394	8206739	0.01	NA	NA	C	NA	0	0.5	1	0	0	NA
jp-0194.01-g	0	4198	452106	8206077	0.02	NA	NA	C	NA	1	0	1	0	0	NA
jp-0195.01-g	0	4250	451746	8206325	0.04	NA	NA	P	NA	1	0	0	0	0.5	NA
jp-0196.01-e	0	4106	452227	8205619	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0196.01-f	0	4106	452227	8205619	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0196.01-g	0	4106	452227	8205619	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0197.01-g	0	4031	451274	8206422	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0198.01-e	0	3966	450870	8205856	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0198.01-f	0	3966	450870	8205856	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0198.01-g	0	3966	450870	8205856	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0199.01-e	0	3993	451218	8205225	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0199.01-f	0	3993	451218	8205225	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0199.01-g	0	3993	451218	8205225	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0200.01-e	0	3968	450567	8205469	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0200.01-f	0	3968	450567	8205469	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0200.01-g	0	3968	450567	8205469	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0201.01-e	0	3836	449865	8206786	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0201.01-f	0	3836	449865	8206786	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
jp-0202.01-g	0	4153	449899	8204380	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0203.01-f	0	3920	448739	8204359	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0203.01-g	0	3920	448739	8204359	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0204.01-f	0	4018	450070	8204046	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0204.01-g	0	4018	450070	8204046	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0205.01-f	0	3925	450741	8204210	2.25	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0205.01-g	0	3925	450741	8204210	2.25	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0206.01-g	0	3963	448731	8205165	0.09	NA	NA	C	NA	1	0	1	0	0	NA
jp-0207.01-f	0	3874	448457	8205394	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0207.01-g	0	3874	448457	8205394	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0208.01-b	0	3826	448110	8206912	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0208.01-c	0	3826	448110	8206912	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0208.01-d	0	3826	448110	8206912	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0208.01-e	0	3826	448110	8206912	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0208.01-f	0	3826	448110	8206912	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0208.01-g	0	3826	448110	8206912	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0209.01-e	0	3824	448525	8208333	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0209.01-f	0	3824	448525	8208333	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0209.01-g	0	3824	448525	8208333	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0210.01-a	0	3828	447556	8206952	0.33	NA	NA	C	NA	1	0	0	0	0	NA
jp-0210.01-b	0	3828	447556	8206952	0.50	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0210.01-c	0	3828	447556	8206952	1.50	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0210.01-d	0	3828	447556	8206952	1.50	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0211.01-g	0	3872	448383	8204454	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0212.01-a	0	3869	448363	8204887	0.33	NA	NA	C	NA	1	0	0	0	0	NA
jp-0212.01-b	0	3869	448363	8204887	4.00	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0212.01-c	0	3869	448363	8204887	10.00	NA	NA	C	NA	1	1	0	0	0	NA
jp-0212.01-d	0	3869	448363	8204887	12.00	NA	NA	C	NA	1	1	0	0	0	NA
jp-0212.01-e	0	3869	448363	8204887	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0212.01-f	0	3869	448363	8204887	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0213.01-e	0	3929	448571	8205659	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0213.01-g	0	3929	448571	8205659	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0214.01-e	0	3894	448581	8206009	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0214.01-g	0	3894	448581	8206009	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0215.01-e	0	3851	448624	8206482	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0215.01-f	0	3851	448624	8206482	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0215.01-g	0	3851	448624	8206482	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0216.01-f	0	3825	447610	8207882	0.01	NA	NA	P	NA	1	0	0	0	0	NA
jp-0216.01-g	0	3825	447610	8207882	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0217.01-g	0	3825	447399	8207624	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0218.01-f	0	3820	448005	8207760	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0219.01-g	0	3827	447635	8207466	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0220.01-b	0	3827	447595	8207187	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0220.01-c	0	3827	447595	8207187	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0220.01-e	0	3827	447595	8207187	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0221.01-e	0	3822	446806	8208049	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0221.01-f	0	3822	446806	8208049	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0221.01-g	0	3822	446806	8208049	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0222.01-e	0	3827	445265	8207323	0.01	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0222.01-f	0	3827	445265	8207323	0.01	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0222.01-g	0	3827	445265	8207323	0.01	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0223.01-e	0	3824	445526	8208550	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0223.01-f	0	3824	445526	8208550	0.01	NA	NA	P	NA	1	0	0	0	0	NA
jp-0223.01-g	0	3824	445526	8208550	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0224.01-e	0	3823	445653	8208191	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0224.01-g	0	3823	445653	8208191	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0225.01-g	0	3842	445171	8205552	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0226.01-e	0	3862	444927	8204590	0.50	NA	NA	C	NA	0.5	0	0	0	0	NA
jp-0227.01-f	0	3828	445241	8207542	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0227.01-g	0	3828	445241	8207542	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0228.01-c	0	3829	446946	8206267	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0228.01-e	0	3829	446946	8206267	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0229.01-e	0	3826	447354	8207394	0.04	NA	NA	P	NA	1	0	0	0	0	NA
jp-0229.01-f	0	3826	447354	8207394	0.04	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0229.01-g	0	3826	447354	8207394	0.04	NA	NA	P	NA	1	0	0	0	0	NA
jp-0230.01-e	0	3860	444482	8205133	0.05	NA	NA	C	NA	0.5	0	1	0	0	NA
jp-0231.01-e	0	3829	447340	8206589	0.01	NA	NA	C	NA	1	0	1	0	0	NA
jp-0232.01-e	0	3831	446924	8206086	0.25	NA	NA	C	NA	0.5	0	0	0	0	NA
jp-0233.01-e	0	3829	447717	8206493	0.50	NA	NA	C	NA	1	0	1	0	0	NA
jp-0234.01-e	0	3831	447057	8205830	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0234.01-f	0	3831	447057	8205830	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0235.01-e	0	3848	446963	8204149	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0235.01-f	0	3848	446963	8204149	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0236.01-c	0	3856	446784	8204002	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0236.01-e	0	3856	446784	8204002	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0236.01-f	0	3856	446784	8204002	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0236.01-g	0	3856	446784	8204002	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0237.01-e	0	3853	446728	8204265	0.01	NA	NA	C	NA	0.5	0	1	0	0	NA
jp-0238.01-e	0	3850	444846	8205305	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0239.01-e	0	3845	445186	8205060	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0240.01-e	0	3831	447468	8205312	0.07	NA	NA	C	NA	1	0	1	0	0	NA
jp-0240.01-f	0	3831	447468	8205312	0.07	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0241.01-e	0	3839	447691	8204779	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0241.01-f	0	3839	447691	8204779	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0241.01-g	0	3839	447691	8204779	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0242.01-e	0	3838	448071	8203954	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0242.01-f	0	3838	448071	8203954	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0242.01-g	0	3838	448071	8203954	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0243.01-e	0	3837	447971	8205237	0.49	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0243.01-g	0	3837	447971	8205237	0.49	NA	NA	C	NA	0.5	0	0.5	0	0	NA
jp-0244.01-e	0	3835	448173	8206039	0.02	NA	NA	C	NA	1	0	1	0	0	NA
jp-0245.01-e	0	3841	447999	8204744	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0245.01-f	0	3841	447999	8204744	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0246.01-e	0	3838	447160	8204895	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0247.01-e	0	3896	451161	8203414	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0248.01-e	0	3861	446007	8204139	0.03	NA	NA	C	NA	1	0	1	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0249.01-f	0	3883	450490	8203448	0.04	NA	NA	C	NA	0	0	1	0	0	NA
jp-0250.01-e	0	3890	450470	8202880	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0250.01-f	0	3890	450470	8202880	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0251.01-e	0	3960	450031	8200899	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0251.01-f	0	3960	450031	8200899	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0252.01-f	0	3845	448077	8203782	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0253.01-e	0	3871	447180	8202367	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0253.01-f	0	3871	447180	8202367	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0254.01-e	0	3908	457274	8204647	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0254.01-f	0	3908	457274	8204647	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0254.01-g	0	3908	457274	8204647	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0255.01-f	0	3877	456637	8206099	0.10	NA	NA	C	NA	1	0	0	0	0	NA
jp-0255.01-g	0	3877	456637	8206099	0.10	NA	NA	C	NA	1	0	0	0	0	NA
jp-0256.01-e	0	3932	455862	8206258	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0256.01-f	0	3932	455862	8206258	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0256.01-g	0	3932	455862	8206258	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0257.01-g	0	3956	455902	8205949	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0258.01-d	0	3851	457906	8205804	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0258.01-e	0	3851	457906	8205804	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0258.01-f	0	3851	457906	8205804	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0259.01-e	0	4011	454753	8206932	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0260.01-f	0	3965	456908	8204073	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0261.01-b	0	3870	457648	8205966	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0261.01-d	0	3870	457648	8205966	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0261.01-e	0	3870	457648	8205966	0.30	NA	NA	P	NA	1	0	0	0	0	NA
jp-0261.01-f	0	3870	457648	8205966	0.30	NA	NA	C	NA	1	0	0	0	0	NA
jp-0262.01-g	0	3862	457663	8205315	0.50	NA	NA	C	NA	0	0	0	0	0	NA
jp-0263.01-e	0	3969	457013	8203810	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0263.01-f	0	3969	457013	8203810	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0264.01-g	0	3879	458467	8205593	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0265.01-e	0	3885	458360	8205414	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0265.01-f	0	3885	458360	8205414	0.06	NA	NA	C	NA	0	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0266.01-e	0	3851	446374	8204469	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0267.01-e	0	3892	449257	8203786	0.01	NA	NA	C	NA	0.5	0	1	0	0	NA
jp-0268.01-e	0	3941	451274	8202502	0.01	NA	NA	P	NA	0	0	1	0	0	NA
jp-0269.01-e	0	3847	448281	8203438	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0270.01-e	0	3907	447987	8201160	0.05	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0270.01-f	0	3907	447987	8201160	0.05	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0270.01-g	0	3907	447987	8201160	0.05	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0271.01-d	0	3889	448483	8200997	0.04	NA	NA	C	NA	1	0	1	0	0	NA
jp-0272.01-e	0	3828	457476	8207406	0.10	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0272.01-f	0	3828	457476	8207406	0.10	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0273.01-f	0	3854	456998	8206644	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0273.01-g	0	3854	456998	8206644	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0274.01-e	0	3845	457736	8206365	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0274.01-f	0	3845	457736	8206365	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0275.01-f	0	3867	457123	8206316	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0276.01-f	0	3873	456968	8206191	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0277.01-g	0	3982	455373	8206257	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0278.01-b	0	3906	456412	8205921	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0278.01-g	0	3906	456412	8205921	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0281.01-f	0	4068	452005	8204698	0.03	NA	NA	C	NA	0	0	1	0	0	NA
jp-0282.01-a	0	4286	452297	8205093	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0282.01-f	0	4286	452297	8205093	0.04	NA	NA	C	NA	1	0.5	1	0	0	NA
jp-0283.01-e	0	4191	452489	8204989	0.03	NA	NA	C	NA	0	0	1	0	0	NA
jp-0284.01-d	0	3878	457889	8205476	1.25	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0284.01-e	0	3878	457889	8205476	1.25	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0284.01-g	0	3878	457889	8205476	0.04	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0285.01-f	0	3904	457765	8204422	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0285.01-g	0	3904	457765	8204422	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0286.01-f	0	3899	457519	8203726	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0286.01-g	0	3899	457519	8203726	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0287.01-e	0	3963	457803	8203615	4.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0287.01-f	0	3963	457803	8203615	4.00	NA	NA	C	NA	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
jp-0287.01-g	0	3963	457803	8203615	4.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0288.01-e	0	3931	457135	8203612	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0288.01-f	0	3931	457135	8203612	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0288.01-g	0	3931	457135	8203612	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0289.01-e	0	4030	456573	8203294	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0289.01-f	0	4030	456573	8203294	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0289.01-g	0	4030	456573	8203294	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0290.01-e	0	3962	455828	8205388	0.75	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0290.01-g	0	3962	455828	8205388	0.75	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0291.01-f	0	4107	455689	8204257	2.50	NA	NA	P	NA	1	0	0	0	0	NA
jp-0291.01-g	0	4107	455689	8204257	2.50	NA	NA	P	NA	1	0	0	0	0	NA
jp-0292.01-g	0	4109	455276	8204823	0.20	NA	NA	C	NA	1	0	0	0	0	NA
jp-0293.01-f	0	3858	458594	8205823	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0293.01-g	0	3858	458594	8205823	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0294.01-e	0	3879	458646	8205430	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0294.01-f	0	3879	458646	8205430	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0294.01-g	0	3879	458646	8205430	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0295.01-f	0	3895	458679	8204262	0.04	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0295.01-g	0	3895	458679	8204262	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0296.01-g	0	3908	457870	8204668	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0297.01-f	0	3991	457816	8203331	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0297.01-g	0	3991	457816	8203331	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0298.01-e	0	4004	458027	8202964	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0298.01-f	0	4004	458027	8202964	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0298.01-g	0	4004	458027	8202964	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0299.01-e	0	4033	458942	8201779	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0299.01-f	0	4033	458942	8201779	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0299.01-g	0	4033	458942	8201779	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0300.01-e	0	4065	458832	8201496	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0300.01-f	0	4065	458832	8201496	4.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0300.01-g	0	4065	458832	8201496	4.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0301.01-e	0	4086	458667	8201297	0.03	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0301.01-f	0	4086	458667	8201297	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0301.01-g	0	4086	458667	8201297	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0302.01-f	0	3893	458263	8205084	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0302.01-g	0	3893	458263	8205084	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0303.01-e	0	3904	458094	8204769	0.04	NA	NA	C	NA	1	0	1	0	0	NA
jp-0304.01-f	0	3972	457601	8203322	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0304.01-g	0	3972	457601	8203322	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0305.01-f	0	3928	457381	8203348	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0305.01-g	0	3928	457381	8203348	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0306.01-e	0	3964	457460	8203128	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0306.01-f	0	3964	457460	8203128	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0307.01-e	0	3992	457626	8202932	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0307.01-f	0	3992	457626	8202932	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0307.01-g	0	3992	457626	8202932	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0308.01-f	0	4031	458266	8202530	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0308.01-g	0	4031	458266	8202530	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0309.01-e	0	4013	458262	8202708	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0310.01-e	0	3994	458422	8202820	0.04	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0310.01-f	0	3994	458422	8202820	0.04	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0311.01-e	0	3978	459209	8202054	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0312.01-e	0	3944	459205	8202318	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0312.01-g	0	3944	459205	8202318	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0313.01-e	0	3889	459113	8203059	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0313.01-f	0	3889	459113	8203059	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0313.01-g	0	3889	459113	8203059	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0314.01-g	0	3962	458801	8202657	0.25	NA	NA	C	NA	1	0	1	0	0	NA
jp-0315.01-f	0	4033	458522	8201681	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0315.01-g	0	4033	458522	8201681	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0316.01-e	0	4026	458413	8202113	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0317.01-f	0	3967	458643	8202426	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0317.01-g	0	3967	458643	8202426	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0318.01-e	0	3889	459284	8203395	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0318.01-f	0	3889	459284	8203395	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0318.01-g	0	3889	459284	8203395	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0319.01-f	0	3915	459067	8202899	0.12	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0319.01-g	0	3915	459067	8202899	0.12	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0320.01-e	0	3933	458967	8202784	0.25	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0320.01-f	0	3933	458967	8202784	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0320.01-g	0	3933	458967	8202784	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0321.01-a	0	3842	459899	8204083	0.33	NA	NA	C	NA	1	0	0	0	0	NA
jp-0321.01-b	0	3842	459899	8204083	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0321.01-c	0	3842	459899	8204083	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0321.01-g	0	3842	459899	8204083	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0322.01-f	0	3846	459806	8204005	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0322.01-g	0	3846	459806	8204005	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0323.01-e	0	3820	459881	8204727	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0323.01-f	0	3820	459881	8204727	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0323.01-g	0	3820	459881	8204727	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0324.01-f	0	3862	459436	8203987	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0324.01-g	0	3862	459436	8203987	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0325.01-e	0	3890	459286	8202984	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0325.01-g	0	3890	459286	8202984	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0326.01-f	0	3881	459769	8203499	0.04	NA	NA	P	NA	1	0	0	0	0	NA
jp-0326.01-g	0	3881	459769	8203499	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0327.01-d	0	3831	459880	8204463	0.18	NA	NA	C	NA	1	0	0	0	0	NA
jp-0327.01-e	0	3831	459880	8204463	0.18	NA	NA	C	NA	1	0	0	0	0	NA
jp-0328.01-g	0	4100	453380	8205250	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0329.01-e	0	4090	453522	8205572	0.25	NA	NA	P	NA	1	0	0	0	0	NA
jp-0329.01-f	0	4090	453522	8205572	0.25	NA	NA	P	NA	1	0	0	0	0	NA
jp-0330.01-f	0	3937	459766	8202271	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0330.01-g	0	3937	459766	8202271	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0331.01-f	0	3931	459559	8201992	0.40	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0331.01-g	0	3931	459559	8201992	0.40	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0332.01-e	0	3825	460169	8204527	0.35	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0332.01-f	0	3825	460169	8204527	0.35	NA	NA	C	NA	1	0	0	0	0	NA
jp-0333.01-b	0	4128	453043	8205406	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0333.01-c	0	4128	453043	8205406	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0333.01-d	0	4128	453043	8205406	2.00	NA	NA	C	NA	1	0	1	0	0	NA
jp-0333.01-e	0	4128	453043	8205406	2.00	NA	NA	C	NA	1	0	1	0	0	NA
jp-0334.01-g	0	4146	454337	8204942	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0335.01-g	0	3863	455911	8208035	0.02	NA	NA	C	NA	1	0	1	0	0	NA
jp-0336.01-d	0	3854	460866	8203679	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0336.01-e	0	3854	460866	8203679	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0336.01-f	0	3854	460866	8203679	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0337.01-e	0	3849	461195	8203382	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0337.01-f	0	3849	461195	8203382	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0337.01-g	0	3849	461195	8203382	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0338.01-f	0	3871	461385	8203084	0.20	NA	NA	C	NA	1	0	0	0	0	NA
jp-0339.01-e	0	3832	461794	8203154	0.01	NA	NA	C	NA	1	0	0	0	0	NA
jp-0340.01-f	0	3860	462875	8202112	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0340.01-g	0	3860	462875	8202112	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0341.01-d	0	3851	462896	8201778	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0341.01-f	0	3851	462896	8201778	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0342.01-a	0	3905	462387	8201137	0.33	NA	NA	C	NA	1	0	0	0	0	NA
jp-0342.01-b	0	3905	462387	8201137	2.75	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0343.01-f	0	3977	462414	8200451	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0344.01-f	0	3904	462849	8201027	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0344.01-g	0	3904	462849	8201027	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0345.01-d	0	3867	463173	8201558	0.20	NA	NA	C	NA	1	0	0	0	0	NA
jp-0345.01-f	0	3867	463173	8201558	0.20	NA	NA	C	NA	1	0	0	0	0	NA
jp-0346.01-e	0	3839	460288	8204282	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0346.01-f	0	3839	460288	8204282	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0346.01-g	0	3839	460288	8204282	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0347.01-b	0	3870	460422	8203844	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0347.01-c	0	3870	460422	8203844	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0347.01-d	0	3870	460422	8203844	1.00	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0347.01-e	0	3870	460422	8203844	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0347.01-f	0	3870	460422	8203844	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0348.01-e	0	3850	461027	8203305	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0348.01-f	0	3850	461027	8203305	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0348.01-g	0	3850	461027	8203305	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0349.01-b	0	3834	461471	8203337	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0349.01-c	0	3834	461471	8203337	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0349.01-d	0	3834	461471	8203337	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0349.01-e	0	3834	461471	8203337	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0350.01-f	0	4077	453831	8205928	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0350.01-g	0	4077	453831	8205928	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0351.01-e	0	4040	454328	8205768	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0351.01-f	0	4040	454328	8205768	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0351.01-g	0	4040	454328	8205768	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0352.01-f	0	4059	454029	8206460	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0352.01-g	0	4059	454029	8206460	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0353.01-f	0	3880	456697	8208004	5.00	NA	NA	P	NA	1	0	0	0	0	NA
jp-0353.01-g	0	3880	456697	8208004	5.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0354.01-g	0	3928	461655	8202720	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0355.01-e	0	3895	461832	8201821	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0355.01-f	0	3895	461832	8201821	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0355.01-g	0	3895	461832	8201821	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0356.01-e	0	3857	462347	8202442	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0356.01-f	0	3857	462347	8202442	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0357.01-f	0	3843	462408	8202736	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0357.01-g	0	3843	462408	8202736	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0358.01-f	0	3857	462654	8202214	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0358.01-g	0	3857	462654	8202214	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0359.01-f	0	3895	463359	8200785	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0360.01-f	0	3951	462839	8200474	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0361.01-e	0	3971	463251	8200203	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0361.01-f	0	3971	463251	8200203	0.04	NA	NA	P	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0362.01-e	0	3892	463527	8200895	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0362.01-f	0	3892	463527	8200895	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0362.01-g	0	3892	463527	8200895	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0363.01-e	0	3875	463877	8200208	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0364.01-e	0	3880	464177	8200434	1.00	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0364.01-f	0	3880	464177	8200434	1.00	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0365.01-b	0	3838	465089	8202406	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0365.01-c	0	3838	465089	8202406	1.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0365.01-d	0	3838	465089	8202406	1.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0365.01-e	0	3838	465089	8202406	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0365.01-f	0	3838	465089	8202406	1.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0365.01-g	0	3838	465089	8202406	1.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0366.01-c	0	3876	465032	8201535	8.00	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0366.01-e	0	3876	465032	8201535	8.00	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0366.01-f	0	3876	465032	8201535	8.00	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0367.01-f	0	3888	465046	8201016	0.02	NA	NA	P	NA	1	0	1	0	0	NA
jp-0368.01-e	0	3878	464248	8199782	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0368.01-f	0	3878	464248	8199782	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0369.01-e	0	3838	465302	8200695	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0370.01-e	0	3842	465524	8201072	0.25	NA	NA	C	NA	0	0	1	0	0	NA
jp-0371.01-c	0	3844	465413	8201527	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0371.01-e	0	3844	465413	8201527	0.02	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0371.01-f	0	3844	465413	8201527	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0372.01-e	0	3840	465440	8201715	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0372.01-f	0	3840	465440	8201715	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0372.01-g	0	3840	465440	8201715	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0373.01-b	0	3885	466302	8200617	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0374.01-g	0	3989	465466	8199324	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0375.01-e	0	3902	466598	8200938	2.00	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0375.01-f	0	3902	466598	8200938	2.00	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0376.01-g	0	3837	465205	8200423	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0377.01-g	0	3836	465409	8200520	0.04	NA	NA	C	NA	1	0	1	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0378.01-f	0	3834	465497	8200728	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0378.01-g	0	3834	465497	8200728	0.02	NA	NA	C	NA	1	0	0	0	0	NA
jp-0379.01-f	0	3834	465483	8202015	3.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0379.01-g	0	3834	465483	8202015	3.00	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0380.01-g	0	3884	465664	8200191	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0381.01-f	0	4001	465233	8199157	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0382.01-e	0	3878	466469	8201023	0.06	NA	NA	P	NA	1	0	0	0	0	NA
jp-0383.01-b	0	3860	465997	8200385	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0383.01-c	0	3860	465997	8200385	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0383.01-d	0	3860	465997	8200385	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0383.01-e	0	3860	465997	8200385	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0383.01-f	0	3860	465997	8200385	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0383.01-g	0	3860	465997	8200385	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0384.01-e	0	3869	464128	8199509	0.50	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0384.01-g	0	3869	464128	8199509	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0385.01-f	0	3892	463799	8199024	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0386.01-f	0	3917	463889	8198666	1.50	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0386.01-g	0	3917	463889	8198666	1.50	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0387.01-f	0	4011	463631	8197903	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0387.01-g	0	4011	463631	8197903	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0388.01-e	0	4133	463136	8197407	1.00	NA	NA	C	NA	1	0	0	0	1	NA
jp-0389.01-f	0	3939	464509	8197881	0.60	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0389.01-g	0	3939	464509	8197881	0.60	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0390.01-e	0	3945	464508	8198385	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0390.01-f	0	3945	464508	8198385	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0390.01-g	0	3945	464508	8198385	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0391.01-e	0	3915	464168	8199321	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0391.01-f	0	3915	464168	8199321	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0392.01-f	0	3925	464089	8199155	0.16	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0392.01-g	0	3925	464089	8199155	0.16	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0393.01-e	0	3951	464020	8197853	0.02	NA	NA	C	NA	1	0	1	0	0	NA
jp-0394.01-f	0	4004	463954	8197347	0.02	NA	NA	C	NA	0	0	1	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0395.01-f	0	3957	464451	8198588	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0395.01-g	0	3957	464451	8198588	0.01	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0396.01-d	0	3904	466244	8199901	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0396.01-e	0	3904	466244	8199901	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0396.01-f	0	3904	466244	8199901	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0396.01-g	0	3904	466244	8199901	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0398.01-g	0	3951	467807	8202723	0.01	NA	NA	P	NA	0	0	1	0	0	NA
jp-0399.01-d	0	4082	467204	8202233	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0399.01-e	0	4082	467204	8202233	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0400.01-e	0	3940	463644	8198698	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0401.01-e	0	3968	463415	8198384	1.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0401.01-g	0	3968	463415	8198384	1.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0402.01-e	0	3950	463531	8198169	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0402.01-f	0	3950	463531	8198169	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0402.01-g	0	3950	463531	8198169	0.03	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0403.01-f	0	4089	466823	8199305	0.48	NA	NA	C	NA	1	0	1	0	0	NA
jp-0404.01-e	0	3919	467948	8201510	0.70	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0404.01-f	0	3919	467948	8201510	0.70	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0404.01-g	0	3919	467948	8201510	0.70	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0405.01-e	0	3920	467898	8201292	0.12	NA	NA	C	NA	1	0	1	0	0	NA
jp-0406.01-f	0	3996	468215	8200466	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0406.01-g	0	3996	468215	8200466	0.12	NA	NA	C	NA	1	0	0	0	0	NA
jp-0407.01-f	0	3835	469105	8198171	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0407.01-g	0	3835	469105	8198171	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0408.01-f	0	3874	468700	8198435	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0408.01-g	0	3874	468700	8198435	0.03	NA	NA	C	NA	1	0	0	0	0	NA
jp-0409.01-e	0	4014	466390	8198557	0.16	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0409.01-g	0	4014	466390	8198557	0.16	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0410.01-e	0	3951	467980	8197800	0.15	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0410.01-f	0	3951	467980	8197800	0.15	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0410.01-g	0	3951	467980	8197800	0.15	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0411.01-d	0	4169	450924	8193799	0.09	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0411.01-f	0	4169	450924	8193799	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0411.01-g	0	4169	450924	8193799	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0412.01-g	0	4081	451410	8192051	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0414.01-g	0	4139	447998	8197062	0.04	NA	NA	C	NA	0	0	1	0	0	NA
jp-0415.01-e	0	4026	467479	8200817	0.30	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0415.01-f	0	4026	467479	8200817	0.30	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0416.01-e	0	4104	467502	8202289	0.49	NA	NA	C	NA	1	0	0.5	0	0.5	NA
jp-0416.01-f	0	4104	467502	8202289	0.49	NA	NA	C	NA	1	0	0.5	0	0.5	NA
jp-0416.01-g	0	4104	467502	8202289	0.49	NA	NA	C	NA	1	0	0.5	0	0.5	NA
jp-0417.01-f	0	3848	468379	8202796	0.35	NA	NA	C	NA	1	0	0	0	0	NA
jp-0418.01-e	0	3844	468369	8201662	0.16	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0418.01-f	0	3844	468369	8201662	0.16	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0419.01-d	0	3965	467656	8201139	0.49	NA	NA	C	NA	1	0	0	0	0	NA
jp-0419.01-f	0	3965	467656	8201139	0.49	NA	NA	C	NA	1	0	0	0	0	NA
jp-0420.01-e	0	3989	468853	8200066	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0420.01-f	0	3989	468853	8200066	0.04	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0421.01-d	0	3899	468432	8198174	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0421.01-f	0	3899	468432	8198174	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0422.01-a	0	3858	469635	8199805	0.33	NA	NA	C	NA	1	0	0	0	0	NA
jp-0422.01-b	0	3858	469635	8199805	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0422.01-c	0	3858	469635	8199805	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0422.01-d	0	3858	469635	8199805	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0422.01-f	0	3858	469635	8199805	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0423.01-e	0	3830	469615	8200121	0.15	NA	NA	P	NA	1	0	0	0	0	NA
jp-0423.01-f	0	3830	469615	8200121	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0423.01-g	0	3830	469615	8200121	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0424.01-e	0	3827	469655	8198624	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0424.01-f	0	3827	469655	8198624	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0424.01-g	0	3827	469655	8198624	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0425.01-e	0	3836	468979	8197699	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0425.01-f	0	3836	468979	8197699	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0425.01-g	0	3836	468979	8197699	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0426.01-e	0	3830	470057	8198435	0.49	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0426.01-g	0	3830	470057	8198435	0.49	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0427.01-f	0	3838	470024	8197403	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0427.01-g	0	3838	470024	8197403	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0428.01-e	0	3839	470224	8197249	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0429.01-e	0	3838	470699	8196783	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0429.01-f	0	3838	470699	8196783	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0429.01-g	0	3838	470699	8196783	0.06	NA	NA	C	NA	1	0	0	0	0	NA
jp-0430.01-f	0	4150	449588	8191174	0.01	NA	NA	C	NA	0	0	1	0	0	NA
jp-0431.01-f	0	4223	451019	8196051	0.03	NA	NA	C	NA	0	0	1	0	0	NA
jp-0432.01-f	0	4239	451105	8197156	0.25	NA	NA	P	NA	1	0	0	0	0	NA
jp-0432.01-g	0	4239	451105	8197156	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0433.01-e	0	4166	447953	8191851	0.28	NA	NA	C	NA	1	0	0	0	0	NA
jp-0433.01-g	0	4166	447953	8191851	0.28	NA	NA	C	NA	1	0	0	0	0	NA
jp-0434.01-g	0	4125	451920	8195184	0.50	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0435.01-e	0	4376	448275	8190860	0.50	NA	NA	C	NA	1	0	0	0	0.5	NA
jp-0435.01-f	0	4376	448275	8190860	0.50	NA	NA	C	NA	0.5	0	0	0	0.5	NA
jp-0435.01-g	0	4376	448275	8190860	0.50	NA	NA	C	NA	0	0.5	1	0	0.5	NA
jp-0436.01-f	0	4225	449803	8197809	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0436.01-g	0	4225	449803	8197809	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0437.01-e	0	3828	444396	8207915	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0437.01-f	0	3828	444396	8207915	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0437.01-g	0	3828	444396	8207915	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0438.01-e	0	3828	444710	8207765	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0438.01-f	0	3828	444710	8207765	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0438.01-g	0	3828	444710	8207765	0.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0439.01-f	0	3827	444820	8207903	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0439.01-g	0	3827	444820	8207903	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0440.01-e	0	3825	444688	8208740	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0440.01-f	0	3825	444688	8208740	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0440.01-g	0	3825	444688	8208740	0.09	NA	NA	C	NA	1	0	0	0	0	NA
jp-0441.01-c	0	3834	443514	8209244	0.01	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0441.01-e	0	3834	443514	8209244	0.01	NA	NA	C	NA	1	0	1	0	0	NA
jp-0442.01-f	0	3824	444095	8210614	0.04	NA	NA	C	NA	1	0	0	0	0	NA
jp-0443.01-e	0	3831	443389	8209781	0.30	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0443.01-f	0	3831	443389	8209781	0.30	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0443.01-g	0	3831	443389	8209781	0.30	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0444.01-d	0	3831	442915	8209982	1.00	NA	NA	C	NA	1	1	0.5	0	0	NA
jp-0444.01-f	0	3831	442915	8209982	1.00	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0445.01-d	0	3826	443194	8210106	5.00	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0445.01-e	0	3826	443194	8210106	4.00	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0445.01-f	0	3826	443194	8210106	4.00	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0446.01-e	0	3883	442342	8210716	2.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0446.01-f	0	3883	442342	8210716	2.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0447.01-e	0	3946	442061	8210706	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0448.01-e	0	3954	441794	8210836	1.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0449.01-f	0	3821	444333	8211978	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0449.01-g	0	3821	444333	8211978	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0450.01-e	0	3825	442719	8211953	0.25	NA	NA	C	NA	1	0	1	0	0	NA
jp-0451.01-b	0	3833	442331	8211511	0.09	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0451.01-c	0	3833	442331	8211511	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0451.01-e	0	3833	442331	8211511	0.09	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0451.01-f	0	3833	442331	8211511	0.09	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0452.01-c	0	3852	441835	8211429	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0452.01-e	0	3852	441835	8211429	1.00	NA	NA	C	NA	1	0	1	0	0	NA
jp-0452.01-f	0	3852	441835	8211429	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0453.01-e	0	3904	441533	8211462	0.25	NA	NA	C	NA	0	0	1	0	0	NA
jp-0454.01-d	0	3854	441399	8212155	0.25	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0454.01-e	0	3854	441399	8212155	0.25	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0454.01-f	0	3854	441399	8212155	0.25	NA	NA	C	NA	1	0.5	0.5	0	0	NA
jp-0454.01-g	0	3854	441399	8212155	0.25	NA	NA	P	NA	1	0.5	0.5	0	0	NA
jp-0455.01-d	0	3845	441753	8211664	4.00	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0455.01-f	0	3845	441753	8211664	1.50	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0456.01-e	0	3840	442360	8212020	0.02	NA	NA	C	NA	1	0	1	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0457.01-a	0	3877	441901	8212350	0.33	NA	NA	C	NA	1	0	0	0	0	NA
jp-0457.01-b	0	3877	441901	8212350	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0457.01-c	0	3877	441901	8212350	4.00	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0457.01-d	0	3877	441901	8212350	5.00	NA	NA	C	NA	1	0.5	0	0	0	NA
jp-0457.01-e	0	3877	441901	8212350	2.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0458.01-g	0	4279	453432	8201752	0.50	NA	NA	C	NA	1	0	0	0	0	NA
jp-0459.01-e	0	3829	441218	8214031	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0459.01-f	0	3829	441218	8214031	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0459.01-g	0	3829	441218	8214031	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0460.01-f	0	4364	454585	8200873	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0461.01-f	0	4146	451821	8200637	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0462.01-g	0	4527	453320	8199406	0.01	NA	NA	C	NA	0	1	0	0	0	NA
jp-0463.01-g	0	4331	454670	8197071	2.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0464.01-f	0	4466	455007	8196242	0.06	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0464.01-g	0	4466	455007	8196242	0.06	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0465.01-g	0	4213	453781	8192436	0.02	NA	NA	C	NA	0	0	1	0	0	NA
jp-0466.01-g	0	4139	453071	8191497	4.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0467.01-e	0	4347	452755	8198266	0.15	NA	NA	P	NA	1	0	0.5	0	0	NA
jp-0469.01-g	0	4184	452086	8196283	0.25	NA	NA	C	NA	1	0	0	0	0	NA
jp-0470.01-e	0	4231	452855	8196614	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0470.01-f	0	4231	452855	8196614	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0470.01-g	0	4231	452855	8196614	0.02	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0471.01-g	0	4499	452164	8198680	0.15	NA	NA	C	NA	1	0	0	0	0	NA
jp-0472.01-f	0	4173	456164	8198797	0.35	NA	NA	C	NA	1	0	0	0	0	NA
jp-0472.01-g	0	4173	456164	8198797	0.35	NA	NA	C	NA	1	0	0	0	0	NA
jp-0473.01-e	0	4423	454063	8198721	0.20	NA	NA	C	NA	1	0	0	0	0	NA
jp-0474.01-f	0	4154	452822	8192821	2.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0474.01-g	0	4154	452822	8192821	2.25	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0477.01-e	0	4175	455745	8199444	1.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0477.01-g	0	4175	455745	8199444	4.00	NA	NA	C	NA	1	0	0.5	0	0	NA
jp-0479.01-g	0	4501	455064	8192968	0.15	NA	NA	P	NA	1	0	0	0	0	NA
jp-0480.01-e	0	3875	446290	8203972	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
jp-0480.01-g	0	3875	446290	8203972	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0481.01-e	0	4571	459587	8196452	0.50	NA	NA	C	NA	1	0.5	0	0	1	NA
jp-0482.01-e	0	3878	446055	8203787	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0482.01-g	0	3878	446055	8203787	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0484.01-e	0	3868	447999	8202416	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0484.01-f	0	3868	447999	8202416	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0484.01-g	0	3868	447999	8202416	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0485.01-e	0	3863	447468	8202942	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0485.01-g	0	3863	447468	8202942	0.01	NA	NA	C	NA	0	0	0.5	0	0	NA
jp-0486.01-e	0	4058	456278	8203281	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0486.01-f	0	4058	456278	8203281	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0486.01-g	0	4058	456278	8203281	0.01	NA	NA	P	NA	0	0	0.5	0	0	NA
jp-0496.01-f	0	3847	450422	8206900	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0496.01-g	0	3847	450422	8206900	1.00	NA	NA	C	NA	1	0	0	0	0	NA
jp-0498.01-f	0	4309	449711	8205011	0.01	NA	NA	C	NA	0	0	0	0	0	NA
jp-0498.01-g	0	4309	449711	8205011	0.01	NA	NA	C	NA	0	0	0	0	0	NA
jp-0499.01-b	0	4270	452138	8205139	0.05	NA	NA	C	NA	1	0	0	0	0	NA
jp-0500.01-b	0	4131	452001	8205025	0.05	NA	NA	C	NA	1	0	0	0	0	NA
jp-0500.01-d	0	4131	452001	8205025	0.05	NA	NA	C	NA	1	0	0	0	0	NA
jp-0500.01-f	0	4131	452001	8205025	0.05	NA	NA	C	NA	1	0	0	0	0	NA
jp-0500.01-g	0	4131	452001	8205025	0.05	NA	NA	C	NA	1	0	0	0	0	NA
tm-0001.01-f	0	3830	533102	8169634	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0002.01-h	0	3830	532902	8170134	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0003.01-f	0	3830	532702	8170034	NA	0.6	0.6	C	0.6	1	0	0	0	0	NA
tm-0004.01-d	0	3830	532602	8169734	NA	0.01	0.99	C	4.4	1	0	0	0	0	NA
tm-0004.01-f	0	3830	532602	8169734	NA	3.41	4.4	C	4.4	1	0	0	0	0	NA
tm-0005.01-f	0	3835	532602	8169334	NA	0.75	0.75	C	0.75	1	0	0	0	0	NA
tm-0006.01-f	0	3835	532502	8169434	NA	0.8	0.8	C	0.8	1	0	0	0	0	NA
tm-0007.01-f	0	3830	532302	8169634	NA	1	1.6	C	1.6	1	0	0	0	0	NA
tm-0007.01-h	0	3830	532302	8169634	NA	0.01	0.99	C	1.6	1	0	0	0	0	NA
tm-0008.01-f	0	3830	532502	8169934	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0008.01-h	0	3830	532502	8169934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0009.01-f	0	3830	532102	8169634	NA	1.2	1.2	C	1.2	1	0	0	0	0	NA
tm-0010.01-f	0	3830	532102	8170234	NA	0.56	0.99	C	1.1	1	0	0	0	0	NA
tm-0010.01-g	0	3830	532102	8170234	NA	0.11	0.98	C	1.1	1	0	0	0	0	NA
tm-0011.01-f	0	3830	532002	8169634	NA	7.01	8	C	8	1	0	0	0	0	NA
tm-0011.01-h	0	3830	532002	8169634	NA	0.01	0.99	C	8	1	0	0	0	0	NA
tm-0012.01-f	0	3830	531902	8169634	NA	1.51	2.5	C	2.5	1	0	0	0	0	NA
tm-0012.01-g	0	3830	531902	8169634	NA	0.01	0.99	C	2.5	1	0	0	0	0	NA
tm-0013.01-f	0	3830	531802	8170134	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0013.01-h	0	3830	531802	8170134	NA	0.21	0.4	C	0.4	1	0	0	0	0	NA
tm-0014.01-f	0	3830	531802	8169534	NA	1.5	1.5	C	1.5	1	0	0	0	0	NA
tm-0015.01-f	0	3830	531802	8169334	NA	0.21	0.4	C	0.4	1	0	0	0	0	NA
tm-0015.01-h	0	3830	531802	8169334	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0016.01-f	0	3830	531802	8169234	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0016.01-h	0	3830	531802	8169234	NA	0.21	0.4	C	0.4	1	0	0	0	0	NA
tm-0017.01-f	0	3830	531702	8169634	NA	0.21	0.4	C	0.4	1	0	0	0	0	NA
tm-0017.01-h	0	3830	531702	8169634	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0018.01-f	0	3830	531602	8169334	NA	0.05	0.05	C	0.05	1	0	0	0	0	NA
tm-0019.01-f	0	3830	531602	8169234	NA	0.8	0.8	C	0.8	1	0	0	0	0	NA
tm-0020.01-e	0	3830	531602	8169034	NA	0.01	0.99	C	1.2	1	0	0	0	0	NA
tm-0020.01-f	0	3830	531602	8169034	NA	1	1.2	C	1.2	1	0	0	0	0	NA
tm-0020.01-h	0	3830	531602	8169034	NA	0.01	0.99	C	1.2	1	0	0	0	0	NA
tm-0021.01-f	0	3830	531302	8169334	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0021.01-h	0	3830	531302	8169334	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0022.01-f	0	3830	531302	8169434	NA	1	2.99	C	3	1	0	0	0	0	NA
tm-0022.01-h	0	3830	531302	8169434	NA	1.51	3	C	3	1	0	0	0	0	NA
tm-0023.01-f	0	3830	531102	8169534	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0023.01-h	0	3830	531102	8169534	NA	1	1.55	C	1.55	1	0	0	0	0	NA
tm-0024.01-d	0	3830	531102	8169334	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0024.01-f	0	3830	531102	8169334	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0024.01-h	0	3830	531102	8169334	NA	0.22	0.65	C	0.65	1	0	0	0	0	NA
tm-0025.01-f	0	3830	531002	8169234	NA	0.31	0.9	C	0.9	1	0	0	0	0	NA
tm-0025.01-g	0	3830	531002	8169234	NA	0.01	0.89	C	0.9	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0025.01-h	0	3830	531002	8169234	NA	0.01	0.89	C	0.9	1	0	0	0	0	NA
tm-0026.01-f	0	3830	531002	8169834	NA	3.26	6.25	C	6.25	1	0	0	0	0	NA
tm-0026.01-h	0	3830	531002	8169834	NA	1	2.99	C	6.25	1	0	0	0	0	NA
tm-0028.01-f	0	3830	531002	8170134	NA	0.5	0.99	C	1	1	0	0	0	0	NA
tm-0028.01-h	0	3830	531002	8170134	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0029.01-f	0	3830	531002	8170034	NA	0.34	0.99	C	1	1	0	0	0	0	NA
tm-0029.01-g	0	3830	531002	8170034	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0029.01-h	0	3830	531002	8170034	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0030.01-f	0	3830	530802	8169834	NA	1.01	1.5	C	1.5	1	0	0	0	0	NA
tm-0030.01-h	0	3830	530802	8169834	NA	1	1.49	C	1.5	1	0	0	0	0	NA
tm-0031.01-f	0	3830	530902	8169534	NA	1.26	2.25	C	2.25	1	0	0	0	0	NA
tm-0031.01-h	0	3830	530902	8169534	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0032.01-f	0	3830	530802	8169334	NA	0.11	0.2	C	0.2	1	0	0	0	0	NA
tm-0032.01-h	0	3830	530802	8169334	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0033.01-f	0	3830	530702	8169734	NA	0.33	0.65	C	0.65	1	0	0	0	0	NA
tm-0033.01-h	0	3830	530702	8169734	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0034.01-f	0	3830	530802	8170134	NA	1	2.99	C	3.05	1	0	0	0	0	NA
tm-0034.01-h	0	3830	530802	8170134	NA	1.53	3	C	3.05	1	0	0	0	0	NA
tm-0035.01-h	0	3825	530902	8170434	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0036.01-f	0	3830	530602	8169734	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0036.01-h	0	3830	530602	8169734	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0037.01-f	0	3830	530502	8169434	NA	0.01	0.99	C	2.5	1	0	0	0	0	NA
tm-0037.01-h	0	3830	530502	8169434	NA	1.51	2.5	C	2.5	1	0	0	0	0	NA
tm-0038.01-f	0	3830	530502	8169634	NA	1	1.15	C	1.15	1	0	0	0	0	NA
tm-0038.01-h	0	3830	530502	8169634	NA	0.01	0.99	C	1.15	1	0	0	0	0	NA
tm-0039.01-h	0	3825	530502	8170334	NA	1	1	C	1	1	0	0	0	0	NA
tm-0040.01-f	0	3830	530402	8169734	NA	1.26	2.25	C	2.25	1	0	0	0	0	NA
tm-0040.01-h	0	3830	530402	8169734	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0041.01-f	0	3830	530102	8169234	NA	1	1.5	C	1.5	1	0	0	0	0	NA
tm-0041.01-h	0	3830	530102	8169234	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0042.01-f	0	3830	530102	8169634	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0042.01-h	0	3830	530102	8169634	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0043.01-f	0	3830	530102	8169734	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0043.01-h	0	3830	530102	8169734	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0045.01-f	0	3830	530302	8170134	NA	1	2.99	C	4	1	0	0	0	0	NA
tm-0045.01-h	0	3830	530302	8170134	NA	3	4	C	4	1	0	0	0	0	NA
tm-0046.01-f	0	3830	529902	8169834	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0046.01-h	0	3830	529902	8169834	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0047.01-f	0	3830	530002	8169634	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0047.01-h	0	3830	530002	8169634	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0048.01-f	0	3830	529902	8169334	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0048.01-h	0	3830	529902	8169334	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0049.01-f	0	3830	530202	8168934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0049.01-h	0	3830	530202	8168934	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0050.01-f	0	3830	529902	8169434	NA	0.38	0.75	C	0.75	1	0	0	0	0	NA
tm-0050.01-h	0	3830	529902	8169434	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0051.01-e	0	3830	529802	8169834	NA	0.01	0.99	C	2.15	1	0	0	0	0	NA
tm-0051.01-f	0	3830	529802	8169834	NA	1	2.15	C	2.15	1	0	0	0	0	NA
tm-0051.01-g	0	3830	529802	8169834	NA	0.01	0.99	C	2.15	1	0	0	0	0	NA
tm-0051.01-h	0	3830	529802	8169834	NA	0.01	0.99	C	2.15	1	0	0	0	0	NA
tm-0052.01-f	0	3830	529902	8170434	NA	0.01	0.99	C	3	1	0	0	0	0	NA
tm-0052.01-h	0	3830	529902	8170434	NA	2.01	3	C	3	1	0	0	0	0	NA
tm-0053.01-e	0	3830	529702	8169434	NA	1	1.54	C	1.55	1	0	0	0	0	NA
tm-0053.01-f	0	3830	529702	8169434	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0053.01-h	0	3830	529702	8169434	NA	1.01	1.55	C	1.55	1	0	0	0	0	NA
tm-0054.01-e	0	3830	529702	8169834	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0054.01-f	0	3830	529702	8169834	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0054.01-h	0	3830	529702	8169834	NA	0.22	0.65	C	0.65	1	0	0	0	0	NA
tm-0055.01-f	0	3830	529602	8169734	NA	0.46	0.9	C	0.9	1	0	0	0	0	NA
tm-0055.01-h	0	3830	529602	8169734	NA	0.01	0.89	C	0.9	1	0	0	0	0	NA
tm-0056.01-f	0	3835	529602	8168834	NA	5.26	6.25	C	6.25	1	0	0	0	0	NA
tm-0056.01-h	0	3835	529602	8168834	NA	0.01	0.99	C	6.25	1	0	0	0	0	NA
tm-0057.01-f	0	3845	529402	8171134	NA	2.01	3	C	3	1	0	0	0	0	NA
tm-0057.01-h	0	3845	529402	8171134	NA	0.01	0.99	C	3	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0058.01-f	0	3845	529402	8171334	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0058.01-h	0	3845	529402	8171334	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0059.01-f	0	3860	529702	8171834	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0059.01-h	0	3860	529702	8171834	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0060.01-f	0	3865	529702	8171934	NA	0.61	0.99	C	1.2	1	0	0	0	0	NA
tm-0060.01-h	0	3865	529702	8171934	NA	0.21	0.98	C	1.2	1	0	0	0	0	NA
tm-0061.01-f	0	3875	529802	8172234	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0061.01-h	0	3875	529802	8172234	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0062.01-f	0	3865	529802	8171834	NA	0.14	0.4	C	0.4	1	0	0	0	0	NA
tm-0062.01-g	0	3865	529802	8171834	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0062.01-h	0	3865	529802	8171834	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0063.01-e	0	3850	529702	8171534	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0063.01-f	0	3850	529702	8171534	NA	0.17	0.5	C	0.5	1	0	0	0	0	NA
tm-0063.01-h	0	3850	529702	8171534	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0064.01-f	0	3840	529702	8171334	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0065.01-f	0	3930	529802	8173334	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0065.01-h	0	3930	529802	8173334	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0066.01-h	0	4025	530202	8173834	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
tm-0067.01-f	0	4100	530402	8174234	NA	0.26	0.5	C	0.5	1	0	0	0	0	NA
tm-0067.01-h	0	4100	530402	8174234	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0068.01-f	0	3925	530002	8173134	NA	0.16	0.3	C	0.3	1	0	0	0	0	NA
tm-0068.01-h	0	3925	530002	8173134	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0069.01-f	0	3920	530002	8173034	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0069.01-h	0	3920	530002	8173034	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0070.01-e	0	3910	529902	8173034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0070.01-f	0	3910	529902	8173034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0070.01-g	0	3910	529902	8173034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0071.01-f	0	3865	530002	8171834	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0071.01-g	0	3865	530002	8171834	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0072.01-d	0	3850	529902	8171634	NA	3	6.24	C	6.25	1	0	0.5	0	0	NA
tm-0072.01-e	0	3850	529902	8171634	NA	3	6.24	C	6.25	1	0	0.5	0	0	NA
tm-0072.01-f	0	3850	529902	8171634	NA	3.01	6.25	C	6.25	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0072.01-g	0	3850	529902	8171634	NA	0.01	0.99	C	6.25	1	0	0.5	0	0	NA
tm-0072.01-h	0	3850	529902	8171634	NA	0.01	0.99	C	6.25	1	0	0.5	0	0	NA
tm-0073.01-f	0	3835	529902	8171134	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0073.01-h	0	3835	529902	8171134	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0074.01-f	0	3875	530302	8172334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0074.01-h	0	3875	530302	8172334	NA	0.26	0.5	C	0.5	1	0	0	0	0	NA
tm-0075.01-h	0	3930	531102	8172934	NA	0.2	0.2	C	0.2	1	0	0	0	0	NA
tm-0076.01-f	0	3940	530902	8173034	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0076.01-h	0	3940	530902	8173034	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0077.01-e	0	3920	530702	8173034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0077.01-f	0	3920	530702	8173034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0077.01-g	0	3920	530702	8173034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0078.01-f	0	3910	530802	8172734	NA	0.35	0.35	C	0.35	1	0	0	0	0	NA
tm-0079.01-a	0	3895	530502	8172634	NA	1.26	2.5	C	2.5	1	1	0	0	0	NA
tm-0079.01-f	0	3895	530502	8172634	NA	0.01	0.99	C	2.5	1	0	0	0	0	NA
tm-0079.01-h	0	3895	530502	8172634	NA	0.01	0.99	C	2.5	1	0	0	0	0	NA
tm-0080.01-f	0	3895	530902	8172534	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0080.01-g	0	3895	530902	8172534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0081.01-f	0	3880	530702	8172234	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0081.01-h	0	3880	530702	8172234	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0082.01-f	0	3880	530502	8172234	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0083.01-f	0	3880	530402	8172234	NA	0.16	0.3	C	0.3	1	0	0	0	0	NA
tm-0083.01-h	0	3880	530402	8172234	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0084.01-f	0	3870	530602	8172034	NA	3	3.75	C	3.75	1	0	0	0	0	NA
tm-0084.01-g	0	3870	530602	8172034	NA	0.01	0.99	C	3.75	1	0	0	0	0	NA
tm-0084.01-h	0	3870	530602	8172034	NA	0.01	0.99	C	3.75	1	0	0	0	0	NA
tm-0085.01-f	0	3860	530602	8171934	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0085.01-g	0	3860	530602	8171934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0085.01-h	0	3860	530602	8171934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0086.01-f	0	3860	530102	8171634	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0086.01-g	0	3860	530102	8171634	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0086.01-h	0	3860	530102	8171634	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0087.01-d	0	3850	530302	8171434	NA	3	3.75	C	3.75	1	0	0	0	0	NA
tm-0087.01-f	0	3850	530302	8171434	NA	0.01	0.99	C	3.75	1	0	0	0	0	NA
tm-0087.01-g	0	3850	530302	8171434	NA	0.01	0.99	C	3.75	1	0	0	0	0	NA
tm-0087.01-h	0	3850	530302	8171434	NA	1	2.99	C	3.75	1	0	0	0	0	NA
tm-0088.01-f	0	3830	530002	8170734	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0088.01-h	0	3830	530002	8170734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0089.01-f	0	3835	530002	8171134	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0089.01-g	0	3835	530002	8171134	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0089.01-h	0	3835	530002	8171134	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0090.01-f	0	3845	530302	8171334	NA	3	3.5	C	3.5	1	0	0	0	0	NA
tm-0090.01-g	0	3845	530302	8171334	NA	0.01	0.99	C	3.5	1	0	0	0	0	NA
tm-0090.01-h	0	3845	530302	8171334	NA	0.01	0.99	C	3.5	1	0	0	0	0	NA
tm-0091.01-f	0	3860	530502	8171734	NA	0.26	0.5	C	0.5	1	0	0	0	0	NA
tm-0091.01-h	0	3860	530502	8171734	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0092.01-f	0	3850	530502	8171434	NA	0.21	0.6	C	0.6	1	0	0	0	0	NA
tm-0092.01-g	0	3850	530502	8171434	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0092.01-h	0	3850	530502	8171434	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0093.01-e	0	3840	530602	8171334	NA	1	2.24	C	2.25	1	0	0	0	0	NA
tm-0093.01-f	0	3840	530602	8171334	NA	1.01	2.25	C	2.25	1	0	0	0	0	NA
tm-0093.01-h	0	3840	530602	8171334	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0094.01-f	0	3850	530602	8171534	NA	0.14	0.4	C	0.4	1	0	0	0	0	NA
tm-0094.01-g	0	3850	530602	8171534	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0094.01-h	0	3850	530602	8171534	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0095.01-d	0	3850	530802	8171434	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0095.01-f	0	3850	530802	8171434	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0095.01-h	0	3850	530802	8171434	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0096.01-f	0	3850	530902	8171534	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0096.01-h	0	3850	530902	8171534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0097.01-a	0	3840	531002	8171434	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0097.01-d	0	3840	531002	8171434	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0097.01-f	0	3840	531002	8171434	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0097.01-g	0	3840	531002	8171434	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0097.01-h	0	3840	531002	8171434	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0098.01-f	0	3835	531102	8171134	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0099.01-d	0	3830	531102	8171034	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0099.01-f	0	3830	531102	8171034	NA	0.12	0.35	C	0.35	1	0	0	0	0	NA
tm-0099.01-h	0	3830	531102	8171034	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0100.01-f	0	3850	531102	8171534	NA	2.02	4	C	4	1	0	0	0	0	NA
tm-0100.01-g	0	3850	531102	8171534	NA	0.01	0.99	C	4	1	0	0	0	0	NA
tm-0100.01-h	0	3850	531102	8171534	NA	0.01	0.99	C	4	1	0	0	0	0	NA
tm-0101.01-b	0	3845	531402	8171434	NA	3	7.19	C	7.2	1	0.5	0	0	0	NA
tm-0101.01-d	0	3845	531402	8171434	NA	3	7.19	C	7.2	1	0.5	0	0	0	NA
tm-0101.01-e	0	3845	531402	8171434	NA	3.01	7.2	C	7.2	1	0.5	1	0	0	NA
tm-0101.01-f	0	3845	531402	8171434	NA	0.01	0.99	C	7.2	1	0.5	0.5	0	0	NA
tm-0103.01-f	0	3825	531702	8170334	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0103.01-h	0	3825	531702	8170334	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0104.01-f	0	3885	530902	8172534	NA	0.18	0.35	C	0.35	1	0	0	0	0	NA
tm-0104.01-h	0	3885	530902	8172534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0105.01-d	0	3910	531102	8172634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0105.01-f	0	3910	531102	8172634	NA	0.08	0.3	C	0.3	1	0	0	0	0	NA
tm-0105.01-g	0	3910	531102	8172634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0105.01-h	0	3910	531102	8172634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0106.01-a	0	3920	531202	8172734	NA	0.01	0.99	C	2.25	1	0.5	0	0	0	NA
tm-0106.01-d	0	3920	531202	8172734	NA	0.01	0.99	C	2.25	1	0.5	0	0	0	NA
tm-0106.01-e	0	3920	531202	8172734	NA	1	2.24	C	2.25	1	0.5	0	0	0	NA
tm-0106.01-f	0	3920	531202	8172734	NA	1.01	2.25	C	2.25	1	0.5	0	0	0	NA
tm-0107.01-f	0	3940	531602	8172834	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0107.01-g	0	3940	531602	8172834	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0107.01-h	0	3940	531602	8172834	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0108.01-f	0	3920	531502	8172734	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0108.01-g	0	3920	531502	8172734	NA	1	1.5	C	1.5	1	0	0	0	0	NA
tm-0108.01-h	0	3920	531502	8172734	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0109.01-f	0	3895	531302	8172434	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0109.01-g	0	3895	531302	8172434	NA	0.26	0.5	C	0.5	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0110.01-a	0	3880	531202	8172334	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0110.01-d	0	3880	531202	8172334	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0110.01-f	0	3880	531202	8172334	NA	0.09	0.35	C	0.35	1	0	0	0	0	NA
tm-0110.01-h	0	3880	531202	8172334	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0111.01-e	0	3870	530902	8172034	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0111.01-f	0	3870	530902	8172034	NA	0.38	0.75	C	0.75	1	0	0	0	0	NA
tm-0112.01-f	0	3865	530802	8171934	NA	1	1.9	C	1.9	1	0	0	0	0	NA
tm-0112.01-h	0	3865	530802	8171934	NA	0.01	1	C	1.9	1	0	0	0	0	NA
tm-0113.01-a	0	3865	531002	8171934	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0113.01-d	0	3865	531002	8171934	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0113.01-e	0	3865	531002	8171934	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0113.01-f	0	3865	531002	8171934	NA	0.1	0.55	C	0.55	1	0	0	0	0	NA
tm-0113.01-g	0	3865	531002	8171934	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0113.01-h	0	3865	531002	8171934	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0114.01-f	0	3855	530902	8171734	NA	1	2	C	2	1	0	0	0	0	NA
tm-0114.01-g	0	3855	530902	8171734	NA	0.01	0.99	C	2	1	0	0	0	0	NA
tm-0114.01-h	0	3855	530902	8171734	NA	0.01	0.99	C	2	1	0	0	0	0	NA
tm-0115.01-a	0	3875	530802	8172134	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0115.01-d	0	3875	530802	8172134	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0115.01-e	0	3875	530802	8172134	NA	1	1.54	C	1.55	1	0	0	0	0	NA
tm-0115.01-f	0	3875	530802	8172134	NA	1.01	1.55	C	1.55	1	0	0	0	0	NA
tm-0115.01-h	0	3875	530802	8172134	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0116.01-f	0	3855	531202	8171734	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0116.01-h	0	3855	531202	8171734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0117.01-f	0	3880	531402	8172234	NA	0.32	0.95	C	0.95	1	0	0	0	0	NA
tm-0117.01-g	0	3880	531402	8172234	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0117.01-h	0	3880	531402	8172234	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0118.01-f	0	3885	531402	8172334	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0118.01-h	0	3885	531402	8172334	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0119.01-f	0	3905	531502	8172634	NA	0.12	0.35	C	0.35	1	0	0	0	0	NA
tm-0119.01-g	0	3905	531502	8172634	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0119.01-h	0	3905	531502	8172634	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0120.01-f	0	3920	531602	8172834	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0120.01-h	0	3920	531602	8172834	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0121.01-f	0	3885	531602	8172334	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0122.01-f	0	3855	531502	8171734	NA	0.45	0.45	C	0.45	1	0	0	0	0	NA
tm-0123.01-f	0	3865	531602	8171834	NA	0.11	0.2	C	0.2	1	0	0	0	0	NA
tm-0123.01-h	0	3865	531602	8171834	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0124.01-e	0	3870	531602	8171934	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0124.01-f	0	3870	531602	8171934	NA	0.12	0.35	C	0.35	1	0	0	0	0	NA
tm-0124.01-h	0	3870	531602	8171934	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0125.01-a	0	3900	531802	8172434	NA	0.01	0.99	C	1.15	1	0.5	0	0	0	NA
tm-0125.01-d	0	3900	531802	8172434	NA	0.01	0.99	C	1.15	1	0.5	0	0	0	NA
tm-0125.01-f	0	3900	531802	8172434	NA	0.01	0.99	C	1.15	1	0.5	0	0	0	NA
tm-0125.01-h	0	3900	531802	8172434	NA	0.01	0.99	C	1.15	1	0.5	0	0	0	NA
tm-0127.01-f	0	3855	531902	8171834	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0127.01-h	0	3855	531902	8171834	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0128.01-f	0	3880	532002	8172234	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0128.01-g	0	3880	532002	8172234	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0128.01-h	0	3880	532002	8172234	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0129.01-e	0	3930	532402	8172634	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0129.01-f	0	3930	532402	8172634	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0129.01-h	0	3930	532402	8172634	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0130.01-f	0	3950	532302	8172734	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0130.01-h	0	3950	532302	8172734	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0131.01-f	0	3985	532702	8172834	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0131.01-g	0	3985	532702	8172834	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0131.01-h	0	3985	532702	8172834	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0132.01-f	0	3880	532202	8172334	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0132.01-g	0	3880	532202	8172334	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0132.01-h	0	3880	532202	8172334	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0133.01-f	0	3870	532502	8172034	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0133.01-g	0	3870	532502	8172034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0133.01-h	0	3870	532502	8172034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0134.01-f	0	3850	532302	8171734	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0134.01-h	0	3850	532302	8171734	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0135.01-f	0	3835	532102	8171434	NA	0.38	0.75	C	0.75	1	0	0	0	0	NA
tm-0135.01-h	0	3835	532102	8171434	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0136.01-f	0	3835	531902	8171234	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0136.01-h	0	3835	531902	8171234	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0137.01-f	0	3830	532002	8170934	NA	0.31	0.6	C	0.6	1	0	0	0	0	NA
tm-0137.01-h	0	3830	532002	8170934	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0138.01-e	0	3825	532102	8170634	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0138.01-f	0	3825	532102	8170634	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0138.01-h	0	3825	532102	8170634	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0139.01-e	0	3835	532302	8171234	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0139.01-f	0	3835	532302	8171234	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0139.01-g	0	3835	532302	8171234	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0139.01-h	0	3835	532302	8171234	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0140.01-f	0	3865	532702	8172034	NA	0.22	0.65	C	0.65	1	0	0	0	0	NA
tm-0140.01-g	0	3865	532702	8172034	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0140.01-h	0	3865	532702	8172034	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0142.01-f	0	4130	533202	8173334	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0142.01-h	0	4130	533202	8173334	NA	0.33	0.65	C	0.65	1	0	0	0	0	NA
tm-0143.01-f	0	3890	533002	8172134	NA	0.11	0.2	C	0.2	1	0	0	0	0	NA
tm-0143.01-h	0	3890	533002	8172134	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0144.01-f	0	3880	532902	8172034	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0144.01-g	0	3880	532902	8172034	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0144.01-h	0	3880	532902	8172034	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0145.01-f	0	3870	532802	8172034	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0145.01-g	0	3870	532802	8172034	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0145.01-h	0	3870	532802	8172034	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0146.01-a	0	3855	532802	8171734	NA	0.01	0.99	C	1.45	1	0	0	0	0	NA
tm-0146.01-d	0	3855	532802	8171734	NA	0.01	0.99	C	1.45	1	0	0	0	0	NA
tm-0146.01-e	0	3855	532802	8171734	NA	1	1.44	C	1.45	1	0	0	0	0	NA
tm-0146.01-f	0	3855	532802	8171734	NA	1.01	1.45	C	1.45	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0146.01-h	0	3855	532802	8171734	NA	0.01	0.99	C	1.45	1	0	0	0	0	NA
tm-0147.01-a	0	3859	532802	8171234	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0147.01-e	0	3859	532802	8171234	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0149.01-d	0	3840	533002	8171434	NA	3	10	C	10	1	0	0	0	0	NA
tm-0149.01-e	0	3840	533002	8171434	NA	3	10	C	10	1	0	0	0	0	NA
tm-0149.01-f	0	3840	533002	8171434	NA	0.01	0.99	C	10	1	0	0	0	0	NA
tm-0149.01-h	0	3840	533002	8171434	NA	0.01	0.99	C	10	1	0	0	0	0	NA
tm-0150.01-f	0	3890	533302	8172034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0150.01-g	0	3890	533302	8172034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0150.01-h	0	3890	533302	8172034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0151.01-f	0	3885	533102	8172134	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0151.01-g	0	3885	533102	8172134	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0151.01-h	0	3885	533102	8172134	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0152.01-e	0	3970	533802	8172534	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0152.01-f	0	3970	533802	8172534	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0152.01-g	0	3970	533802	8172534	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0152.01-h	0	3970	533802	8172534	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0153.01-e	0	3890	534102	8171734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0153.01-f	0	3890	534102	8171734	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0153.01-h	0	3890	534102	8171734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0154.01-a	0	3880	534002	8171534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0154.01-d	0	3880	534002	8171534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0154.01-f	0	3880	534002	8171534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0154.01-h	0	3880	534002	8171534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0155.01-f	0	3840	533602	8171034	NA	0.26	0.5	C	0.5	1	0	0	0	0	NA
tm-0155.01-h	0	3840	533602	8171034	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0156.01-f	0	3895	533602	8171834	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0156.01-h	0	3895	533602	8171834	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0157.01-f	0	3880	533402	8171734	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0157.01-h	0	3880	533402	8171734	NA	0.03	0.05	C	0.05	1	0	0	0	0	NA
tm-0158.01-e	0	3855	534202	8171234	NA	0.01	0.15	C	0.15	1	0	0	0	0	NA
tm-0158.01-f	0	3855	534202	8171234	NA	0.01	0.15	C	0.15	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0158.01-h	0	3855	534202	8171234	NA	0.01	0.15	C	0.15	1	0	0	0	0	NA
tm-0159.01-e	0	3835	534102	8170834	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0159.01-f	0	3835	534102	8170834	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0159.01-h	0	3835	534102	8170834	NA	0.17	0.5	C	0.5	1	0	0	0	0	NA
tm-0160.01-e	0	3845	528602	8171634	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0160.01-f	0	3845	528602	8171634	NA	0.17	0.5	C	0.5	1	0	0	0	0	NA
tm-0160.01-h	0	3845	528602	8171634	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0161.01-f	0	3840	528602	8171534	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0161.01-h	0	3840	528602	8171534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0162.01-e	0	3835	528502	8170834	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0162.01-f	0	3835	528502	8170834	NA	0.19	0.55	C	0.55	1	0	0	0	0	NA
tm-0162.01-h	0	3835	528502	8170834	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0163.01-e	0	3870	529402	8172234	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0163.01-f	0	3870	529402	8172234	NA	0.11	0.2	C	0.2	1	0	0	0	0	NA
tm-0164.01-e	0	3915	529802	8173234	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0164.01-f	0	3915	529802	8173234	NA	0.08	0.3	C	0.3	1	0	0	0	0	NA
tm-0164.01-g	0	3915	529802	8173234	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0164.01-h	0	3915	529802	8173234	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0165.01-f	0	3910	529802	8173334	NA	0.24	0.7	C	0.7	1	0	0	0	0	NA
tm-0165.01-g	0	3910	529802	8173334	NA	0.01	0.69	C	0.7	1	0	0	0	0	NA
tm-0165.01-h	0	3910	529802	8173334	NA	0.01	0.69	C	0.7	1	0	0	0	0	NA
tm-0166.01-e	0	3870	529202	8172334	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0166.01-f	0	3870	529202	8172334	NA	1	1	C	1	1	0	0	0	0	NA
tm-0166.01-h	0	3870	529202	8172334	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0167.01-f	0	3830	528802	8172434	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0167.01-h	0	3830	528802	8172434	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0168.01-f	0	3860	529302	8172034	NA	0.48	0.95	C	0.95	1	0	0	0	0	NA
tm-0168.01-h	0	3860	529302	8172034	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0169.01-f	0	3850	529402	8171634	NA	0.48	0.95	C	0.95	1	0	0	0	0	NA
tm-0169.01-h	0	3850	529402	8171634	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0170.01-f	0	3850	529402	8171534	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0170.01-h	0	3850	529402	8171534	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
tm-0172.01-f	0	3855	529202	8171934	NA	0.27	0.8	C	0.8	1	0	0	0	0	NA
tm-0172.01-g	0	3855	529202	8171934	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0172.01-h	0	3855	529202	8171934	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0173.01-e	0	3845	529402	8171334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0173.01-f	0	3845	529402	8171334	NA	0.17	0.5	C	0.5	1	0	0	0	0	NA
tm-0173.01-h	0	3845	529402	8171334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0174.01-d	0	3845	529402	8170934	NA	0.01	0.99	C	1.15	1	0	0	0	0	NA
tm-0174.01-e	0	3845	529402	8170934	NA	1	1.14	C	1.15	1	0	0	0	0	NA
tm-0174.01-f	0	3845	529402	8170934	NA	0.01	0.99	C	1.15	1	0	0	0	0	NA
tm-0174.01-g	0	3845	529402	8170934	NA	0.01	0.99	C	1.15	1	0	0	0	0	NA
tm-0174.01-h	0	3845	529402	8170934	NA	1.01	1.15	C	1.15	1	0	0	0	0	NA
tm-0175.01-f	0	3825	529402	8169934	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0175.01-h	0	3825	529402	8169934	NA	0.38	0.75	C	0.75	1	0	0	0	0	NA
tm-0176.01-f	0	3830	528802	8169034	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0176.01-h	0	3830	528802	8169034	NA	0.18	0.35	C	0.35	1	0	0	0	0	NA
tm-0177.01-f	0	3835	528502	8168434	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0177.01-h	0	3835	528502	8168434	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0178.01-f	0	3835	528202	8168534	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0179.01-e	0	3825	528202	8169534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0179.01-f	0	3825	528202	8169534	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0179.01-h	0	3825	528202	8169534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0180.01-h	0	3825	528702	8169634	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0181.01-f	0	3835	529302	8171134	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0181.01-h	0	3835	529302	8171134	NA	1.13	2.25	C	2.25	1	0	0	0	0	NA
tm-0182.01-e	0	3850	529002	8171734	NA	3	5.64	C	5.65	1	0	0	0	0	NA
tm-0182.01-f	0	3850	529002	8171734	NA	3.01	5.65	C	5.65	1	0	0	0	0	NA
tm-0182.01-h	0	3850	529002	8171734	NA	0.01	0.99	C	5.65	1	0	0	0	0	NA
tm-0183.01-f	0	3860	529102	8172134	NA	0.31	0.6	C	0.6	1	0	0	0	0	NA
tm-0183.01-h	0	3860	529102	8172134	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0184.01-e	0	3875	528702	8172534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0184.01-f	0	3875	528702	8172534	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0184.01-h	0	3875	528702	8172534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0185.01-f	0	3920	529202	8173634	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0185.01-g	0	3920	529202	8173634	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0185.01-h	0	3920	529202	8173634	NA	0.01	0.6	C	0.6	1	0	0	0	0	NA
tm-0186.01-a	0	3940	529202	8173734	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0186.01-e	0	3940	529202	8173734	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0186.01-f	0	3940	529202	8173734	NA	0.02	0.05	C	0.05	1	0	0	0	0	NA
tm-0186.01-g	0	3940	529202	8173734	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0186.01-h	0	3940	529202	8173734	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0187.01-f	0	3990	528902	8174434	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0187.01-h	0	3990	528902	8174434	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0188.01-a	0	3950	528402	8174034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0188.01-e	0	3950	528402	8174034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0188.01-f	0	3950	528402	8174034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0188.01-g	0	3950	528402	8174034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0188.01-h	0	3950	528402	8174034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0189.01-a	0	3950	528802	8174034	NA	0.01	0.99	C	1.4	1	0	0	0	0	NA
tm-0189.01-g	0	3950	528802	8174034	NA	0.01	0.99	C	1.4	1	0	0	0	0	NA
tm-0189.01-h	0	3950	528802	8174034	NA	0.01	0.99	C	1.4	1	0	0	0	0	NA
tm-0190.01-f	0	3870	528302	8172634	NA	1	2	C	2	1	0	0	0	0	NA
tm-0190.01-g	0	3870	528302	8172634	NA	0.01	0.99	C	2	1	0	0	0	0	NA
tm-0190.01-h	0	3870	528302	8172634	NA	0.01	0.99	C	2	1	0	0	0	0	NA
tm-0191.01-f	0	3865	528202	8172734	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0191.01-h	0	3865	528202	8172734	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0192.01-e	0	3855	528002	8172834	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0192.01-f	0	3855	528002	8172834	NA	0.14	0.4	C	0.4	1	0	0	0	0	NA
tm-0192.01-h	0	3855	528002	8172834	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0193.01-f	0	3880	528002	8173234	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0193.01-h	0	3880	528002	8173234	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0194.01-f	0	3890	528202	8173434	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0194.01-h	0	3890	528202	8173434	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0195.01-a	0	3940	528402	8173934	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0195.01-f	0	3940	528402	8173934	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
tm-0195.01-g	0	3940	528402	8173934	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0195.01-h	0	3940	528402	8173934	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0196.01-f	0	3910	528202	8173634	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0196.01-g	0	3910	528202	8173634	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0196.01-h	0	3910	528202	8173634	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0197.01-a	0	3855	527502	8173034	NA	0.01	0.99	C	1.9	1	0	0	0	0	NA
tm-0197.01-e	0	3855	527502	8173034	NA	0.01	0.99	C	1.9	1	0	0	0	0	NA
tm-0197.01-f	0	3855	527502	8173034	NA	1	1.9	C	1.9	1	0	0	0	0	NA
tm-0197.01-h	0	3855	527502	8173034	NA	0.01	0.99	C	1.9	1	0	0	0	0	NA
tm-0198.01-g	0	3855	527702	8172934	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0198.01-h	0	3855	527702	8172934	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0199.01-e	0	3830	528302	8170034	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0199.01-f	0	3830	528302	8170034	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0199.01-h	0	3830	528302	8170034	NA	0.07	0.2	C	0.2	1	0	0	0	0	NA
tm-0200.01-h	0	3830	528302	8169934	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0201.01-f	0	3830	528402	8170034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0201.01-h	0	3830	528402	8170034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0202.01-f	0	3840	528702	8171434	NA	0.26	0.5	C	0.5	1	0	0	0	0	NA
tm-0202.01-h	0	3840	528702	8171434	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0204.01-e	0	3840	528802	8171434	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0204.01-f	0	3840	528802	8171434	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0204.01-h	0	3840	528802	8171434	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0205.01-h	0	3825	529202	8170134	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0206.01-f	0	3835	534502	8170934	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0206.01-g	0	3835	534502	8170934	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0206.01-h	0	3835	534502	8170934	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0207.01-h	0	3865	534502	8171434	NA	0.65	0.65	C	0.65	1	0	0	0	0	NA
tm-0208.01-e	0	3890	534502	8171734	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0208.01-f	0	3890	534502	8171734	NA	0.19	0.75	C	0.75	1	0	0	0	0	NA
tm-0208.01-g	0	3890	534502	8171734	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0208.01-h	0	3890	534502	8171734	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0209.01-e	0	3925	535002	8172034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0209.01-f	0	3925	535002	8172034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0209.01-g	0	3925	535002	8172034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0209.01-h	0	3925	535002	8172034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0210.01-f	0	3915	535002	8171934	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0210.01-h	0	3915	535002	8171934	NA	0.38	0.75	C	0.75	1	0	0	0	0	NA
tm-0211.01-e	0	3860	534702	8171434	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0211.01-f	0	3860	534702	8171434	NA	0.12	0.35	C	0.35	1	0	0	0	0	NA
tm-0211.01-h	0	3860	534702	8171434	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0212.01-a	0	3850	534602	8171334	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0212.01-e	0	3850	534602	8171334	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0212.01-f	0	3850	534602	8171334	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0212.01-g	0	3850	534602	8171334	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0212.01-h	0	3850	534602	8171334	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0213.01-f	0	3830	534802	8170734	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0213.01-g	0	3830	534802	8170734	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0213.01-h	0	3830	534802	8170734	NA	0.21	0.6	C	0.6	1	0	0	0	0	NA
tm-0214.01-h	0	3830	534502	8170834	NA	0.2	0.2	C	0.2	1	0	0	0	0	NA
tm-0215.01-e	0	3855	535002	8171234	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0215.01-f	0	3855	535002	8171234	NA	0.19	0.75	C	0.75	1	0	0	0	0	NA
tm-0215.01-g	0	3855	535002	8171234	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0215.01-h	0	3855	535002	8171234	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0216.01-e	0	3880	535102	8171534	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0216.01-f	0	3880	535102	8171534	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0216.01-g	0	3880	535102	8171534	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0216.01-h	0	3880	535102	8171534	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0217.01-f	0	3850	535102	8171334	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0217.01-h	0	3850	535102	8171334	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0218.01-f	0	3850	535202	8171334	NA	0.18	0.35	C	0.35	1	0	0	0	0	NA
tm-0218.01-h	0	3850	535202	8171334	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0219.01-f	0	3855	535202	8171434	NA	0.12	0.35	C	0.35	1	0	0	0	0	NA
tm-0219.01-g	0	3855	535202	8171434	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0219.01-h	0	3855	535202	8171434	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0220.01-f	0	3900	535102	8171734	NA	0.19	0.55	C	0.55	1	0	0	0	0	NA
tm-0220.01-g	0	3900	535102	8171734	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0220.01-h	0	3900	535102	8171734	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0221.01-f	0	3880	535502	8171734	NA	0.22	0.65	C	0.65	1	0	0	0	0	NA
tm-0221.01-g	0	3880	535502	8171734	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0221.01-h	0	3880	535502	8171734	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0222.01-e	0	3830	535502	8170534	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0222.01-f	0	3830	535502	8170534	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0222.01-h	0	3830	535502	8170534	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0223.01-h	0	3830	535602	8170534	NA	0.15	0.15	C	0.15	1	0	0	0	0	NA
tm-0224.01-e	0	3830	535702	8170634	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0224.01-f	0	3830	535702	8170634	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0224.01-h	0	3830	535702	8170634	NA	0.07	0.2	C	0.2	1	0	0	0	0	NA
tm-0225.01-e	0	3840	535902	8171234	NA	1	2	C	2	1	0	0	0	0	NA
tm-0225.01-f	0	3840	535902	8171234	NA	1	2	C	2	1	0	0	0	0	NA
tm-0225.01-g	0	3840	535902	8171234	NA	1	2	C	2	1	0	0	0	0	NA
tm-0225.01-h	0	3840	535902	8171234	NA	1	2	C	2	1	0	0	0	0	NA
tm-0226.01-d	0	3850	536002	8171334	NA	1	2.24	C	2.25	1	0	0	0	0	NA
tm-0226.01-e	0	3850	536002	8171334	NA	1	2.24	C	2.25	1	0	0	0	0	NA
tm-0226.01-f	0	3850	536002	8171334	NA	1.01	2.25	C	2.25	1	0	0	0	0	NA
tm-0226.01-g	0	3850	536002	8171334	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0226.01-h	0	3850	536002	8171334	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0227.01-d	0	3900	535902	8171934	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0227.01-e	0	3900	535902	8171934	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0227.01-f	0	3900	535902	8171934	NA	0.14	0.55	C	0.55	1	0	0	0	0	NA
tm-0227.01-h	0	3900	535902	8171934	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0228.01-e	0	3835	536602	8170034	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0228.01-f	0	3835	536602	8170034	NA	0.34	0.99	C	1	1	0	0.5	0	0	NA
tm-0228.01-h	0	3835	536602	8170034	NA	0.01	0.98	C	1	1	0	0.5	0	0	NA
tm-0229.01-b	0	3835	536802	8170134	NA	0.46	1.8	C	1.8	1	0	0	0	0	NA
tm-0229.01-e	0	3835	536802	8170134	NA	0.01	0.99	C	1.8	1	0	0	0	0	NA
tm-0229.01-f	0	3835	536802	8170134	NA	0.01	0.99	C	1.8	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0229.01-h	0	3835	536802	8170134	NA	0.01	0.99	C	1.8	1	0	0	0	0	NA
tm-0230.01-h	0	3830	537002	8169934	NA	0.4	0.4	C	0.4	1	0	0	0	0	NA
tm-0231.01-f	0	3830	536702	8169934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0231.01-g	0	3830	536702	8169934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0231.01-h	0	3830	536702	8169934	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0232.01-b	0	3830	536402	8169834	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0232.01-e	0	3830	536402	8169834	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0232.01-f	0	3830	536402	8169834	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0232.01-h	0	3830	536402	8169834	NA	0.09	0.35	C	0.35	1	0	0	0	0	NA
tm-0233.01-b	0	3830	535902	8170534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0233.01-e	0	3830	535902	8170534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0233.01-f	0	3830	535902	8170534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0233.01-h	0	3830	535902	8170534	NA	0.09	0.35	C	0.35	1	0	0	0	0	NA
tm-0234.01-e	0	3870	536302	8171534	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0234.01-f	0	3870	536302	8171534	NA	0.22	0.65	C	0.65	1	0	0	0	0	NA
tm-0234.01-h	0	3870	536302	8171534	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0235.01-f	0	3900	536402	8169734	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0235.01-h	0	3900	536402	8169734	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0236.01-f	0	3940	537502	8172134	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0236.01-h	0	3940	537502	8172134	NA	0.38	0.75	C	0.75	1	0	0	0	0	NA
tm-0237.01-e	0	3910	537602	8171834	NA	1	2	C	2	1	0	0	0	0	NA
tm-0237.01-h	0	3910	537602	8171834	NA	1	2	C	2	1	0	0	0	0	NA
tm-0238.01-f	0	3875	537502	8171234	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0238.01-h	0	3875	537502	8171234	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0239.01-d	0	3845	537502	8169734	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0239.01-e	0	3845	537502	8169734	NA	1	1.5	C	1.5	1	0	0	0	0	NA
tm-0239.01-f	0	3845	537502	8169734	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0239.01-g	0	3845	537502	8169734	NA	1	1.5	C	1.5	1	0	0	0	0	NA
tm-0239.01-h	0	3845	537502	8169734	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0240.01-e	0	3825	537302	8170334	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0240.01-f	0	3825	537302	8170334	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0240.01-h	0	3825	537302	8170334	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0241.01-f	0	3825	536902	8170134	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0241.01-g	0	3825	536902	8170134	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0241.01-h	0	3825	536902	8170134	NA	0.26	0.75	C	0.75	1	0	0	0	0	NA
tm-0242.01-h	0	3825	536602	8170134	NA	0.65	0.65	C	0.65	1	0	0	0	0	NA
tm-0243.01-d	0	3825	535502	8170334	NA	0.08	0.3	C	0.3	1	0	0	0	0	NA
tm-0243.01-e	0	3825	535502	8170334	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0243.01-g	0	3825	535502	8170334	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0243.01-h	0	3825	535502	8170334	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0244.01-d	0	3825	535702	8170634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0244.01-e	0	3825	535702	8170634	NA	0.07	0.3	C	0.3	1	0	0	0	0	NA
tm-0244.01-f	0	3825	535702	8170634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0244.01-g	0	3825	535702	8170634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0244.01-h	0	3825	535702	8170634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0245.01-e	0	3835	536402	8171034	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0245.01-f	0	3835	536402	8171034	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0245.01-h	0	3835	536402	8171034	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0246.01-e	0	3850	536502	8171234	NA	1	2.19	C	2.2	1	0	0	0	0	NA
tm-0246.01-f	0	3850	536502	8171234	NA	1.01	2.2	C	2.2	1	0	0	0	0	NA
tm-0246.01-h	0	3850	536502	8171234	NA	0.01	0.99	C	2.2	1	0	0	0	0	NA
tm-0247.01-f	0	3890	536602	8171534	NA	5.01	6	C	6	1	0.5	0	0	0	NA
tm-0247.01-h	0	3890	536602	8171534	NA	0.01	0.99	C	6	1	0.5	0	0	0	NA
tm-0248.01-e	0	3890	536802	8171634	NA	0.01	0.44	C	0.45	1	0	0	0	0	NA
tm-0248.01-f	0	3890	536802	8171634	NA	0.16	0.45	C	0.45	1	0	0	0	0	NA
tm-0248.01-h	0	3890	536802	8171634	NA	0.01	0.44	C	0.45	1	0	0	0	0	NA
tm-0249.01-e	0	3870	536702	8171534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0249.01-f	0	3870	536702	8171534	NA	0.07	0.25	C	0.25	1	0	0	0	0	NA
tm-0249.01-g	0	3870	536702	8171534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0249.01-h	0	3870	536702	8171534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0250.01-a	0	3845	536602	8171134	NA	0.01	0.98	C	1.55	1	0	0	0	0	NA
tm-0250.01-f	0	3845	536602	8171134	NA	0.39	0.99	C	1.55	1	0	0	0	0	NA
tm-0250.01-g	0	3845	536602	8171134	NA	0.01	0.98	C	1.55	1	0	0	0	0	NA
tm-0250.01-h	0	3845	536602	8171134	NA	0.01	0.98	C	1.55	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0251.01-a	0	3850	536902	8171034	NA	0.01	0.65	C	0.65	1	0	0	0	0	NA
tm-0251.01-f	0	3850	536902	8171034	NA	0.01	0.65	C	0.65	1	0	0	0	0	NA
tm-0251.01-h	0	3850	536902	8171034	NA	0.01	0.65	C	0.65	1	0	0	0	0	NA
tm-0252.01-e	0	3900	537502	8171634	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0252.01-f	0	3900	537502	8171634	NA	0.07	0.2	C	0.2	1	0	0	0	0	NA
tm-0252.01-h	0	3900	537502	8171634	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0253.01-a	0	3840	537302	8170834	NA	0.01	0.99	C	1.15	1	0	0	0	0	NA
tm-0253.01-d	0	3840	537302	8170834	NA	0.01	0.99	C	1.15	1	0	0	0	0	NA
tm-0253.01-f	0	3840	537302	8170834	NA	0.01	0.99	C	1.15	1	0	0	0	0	NA
tm-0253.01-g	0	3840	537302	8170834	NA	0.01	0.99	C	1.15	1	0	0	0	0	NA
tm-0253.01-h	0	3840	537302	8170834	NA	0.01	0.99	C	1.15	1	0	0	0	0	NA
tm-0254.01-f	0	3835	537102	8170534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0254.01-h	0	3835	537102	8170534	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0255.01-f	0	4200	527602	8161134	NA	7.01	8	C	8	1	0	0.5	0	0	NA
tm-0255.01-h	0	4200	527602	8161134	NA	0.01	0.99	C	8	1	0	0.5	0	0	NA
tm-0256.01-f	0	4150	527402	8162034	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0256.01-h	0	4150	527402	8162034	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0257.01-d	0	3880	527802	8162834	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0257.01-f	0	3880	527802	8162834	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0257.01-g	0	3880	527802	8162834	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0257.01-h	0	3880	527802	8162834	NA	0.04	0.15	C	0.15	1	0	0	0	0	NA
tm-0258.01-e	0	3865	527802	8163034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0258.01-f	0	3865	527802	8163034	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0258.01-h	0	3865	527802	8163034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0259.01-b	0	3860	527702	8163134	NA	0.02	0.05	C	0.05	1	0	0	0	0	NA
tm-0259.01-f	0	3860	527702	8163134	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0259.01-h	0	3860	527702	8163134	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0260.01-f	0	3860	527802	8163234	NA	0.3	0.3	C	0.3	1	0	0	0	0	NA
tm-0261.01-f	0	3855	527802	8163334	NA	1.26	2.25	C	2.25	1	0	0	0	0	NA
tm-0261.01-h	0	3855	527802	8163334	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0262.01-e	0	3855	527702	8163334	NA	1	1.54	C	1.55	1	0	0	0	0	NA
tm-0262.01-f	0	3855	527702	8163334	NA	1.01	1.55	C	1.55	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0262.01-g	0	3855	527702	8163334	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0262.01-h	0	3855	527702	8163334	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0263.01-f	0	3855	527602	8163634	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0263.01-h	0	3855	527602	8163634	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0264.01-e	0	3855	527702	8163534	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0264.01-f	0	3855	527702	8163534	NA	0.21	0.6	C	0.6	1	0	0	0	0	NA
tm-0264.01-h	0	3855	527702	8163534	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0265.01-e	0	3855	527702	8163834	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0265.01-f	0	3855	527702	8163834	NA	0.14	0.4	C	0.4	1	0	0	0	0	NA
tm-0265.01-h	0	3855	527702	8163834	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0266.01-e	0	3855	527802	8163634	NA	1	1.49	C	1.5	1	0	0	0	0	NA
tm-0266.01-f	0	3855	527802	8163634	NA	1.01	1.5	C	1.5	1	0	0	0	0	NA
tm-0266.01-h	0	3855	527802	8163634	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0267.01-f	0	3850	527502	8164634	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0267.01-h	0	3850	527502	8164634	NA	0.03	0.05	C	0.05	1	0	0	0	0	NA
tm-0268.01-f	0	3845	527402	8165734	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0268.01-h	0	3845	527402	8165734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0269.01-f	0	3840	527502	8167134	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0269.01-h	0	3840	527502	8167134	NA	1	1	C	1	1	0	0	0	0	NA
tm-0270.01-h	0	3845	527702	8165734	NA	0.05	0.05	C	0.05	1	0	0	0	0	NA
tm-0271.01-h	0	3850	527902	8165134	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
tm-0272.01-f	0	3855	527802	8164134	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0272.01-g	0	3855	527802	8164134	NA	0.34	0.99	C	1	1	0	0	0	0	NA
tm-0272.01-h	0	3855	527802	8164134	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0273.01-f	0	3870	528002	8163134	NA	0.12	0.35	C	0.35	1	0	0	0	0	NA
tm-0273.01-g	0	3870	528002	8163134	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0273.01-h	0	3870	528002	8163134	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0274.01-e	0	3865	528002	8163334	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0274.01-f	0	3865	528002	8163334	NA	0.19	0.55	C	0.55	1	0	0	0	0	NA
tm-0274.01-h	0	3865	528002	8163334	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0275.01-e	0	3855	528002	8163534	NA	0.28	0.98	C	2.25	1	0	0	0	0	NA
tm-0275.01-f	0	3855	528002	8163534	NA	0.76	0.99	C	2.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0275.01-h	0	3855	528002	8163534	NA	0.28	0.98	C	2.25	1	0	0	0	0	NA
tm-0276.01-f	0	3855	528102	8163734	NA	1.81	2.8	C	2.8	1	0	0	0	0	NA
tm-0276.01-h	0	3855	528102	8163734	NA	0.01	0.99	C	2.8	1	0	0	0	0	NA
tm-0277.01-e	0	3855	528002	8164034	NA	1	1.49	C	1.5	1	0	0	0	0	NA
tm-0277.01-f	0	3855	528002	8164034	NA	1.01	1.5	C	1.5	1	0	0	0	0	NA
tm-0277.01-h	0	3855	528002	8164034	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0278.01-f	0	3850	528102	8165034	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0278.01-g	0	3850	528102	8165034	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0278.01-h	0	3850	528102	8165034	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0279.01-e	0	3850	528202	8165134	NA	0.01	0.98	C	1.25	1	0	0	0	0	NA
tm-0279.01-f	0	3850	528202	8165134	NA	0.42	0.99	C	1.25	1	0	0	0	0	NA
tm-0279.01-h	0	3850	528202	8165134	NA	0.01	0.98	C	1.25	1	0	0	0	0	NA
tm-0280.01-f	0	3845	527702	8167134	NA	1	1.3	C	1.3	1	0	0	0	0	NA
tm-0280.01-h	0	3845	527702	8167134	NA	0.01	0.99	C	1.3	1	0	0	0	0	NA
tm-0281.01-f	0	3840	528002	8167934	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0281.01-h	0	3840	528002	8167934	NA	0.11	0.2	C	0.2	1	0	0	0	0	NA
tm-0282.01-f	0	3855	528302	8164434	NA	0.11	0.2	C	0.2	1	0	0	0	0	NA
tm-0282.01-h	0	3855	528302	8164434	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0283.01-e	0	3865	528202	8163534	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0283.01-f	0	3865	528202	8163534	NA	0.11	0.3	C	0.3	1	0	0	0	0	NA
tm-0283.01-h	0	3865	528202	8163534	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0284.01-f	0	3870	528302	8163434	NA	0.31	0.6	C	0.6	1	0	0	0	0	NA
tm-0284.01-h	0	3870	528302	8163434	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0285.01-f	0	3920	528002	8162334	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0285.01-g	0	3920	528002	8162334	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0285.01-h	0	3920	528002	8162334	NA	0.07	0.2	C	0.2	1	0	0	0	0	NA
tm-0286.01-f	0	3960	528002	8162134	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0286.01-h	0	3960	528002	8162134	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0287.01-f	0	4020	527802	8161634	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0287.01-g	0	4020	527802	8161634	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0287.01-h	0	4020	527802	8161634	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0288.01-f	0	4100	527702	8161434	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0288.01-g	0	4100	527702	8161434	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0288.01-h	0	4100	527702	8161434	NA	0.07	0.2	C	0.2	1	0	0	0	0	NA
tm-0289.01-f	0	4060	527802	8161334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0289.01-h	0	4060	527802	8161334	NA	0.26	0.5	C	0.5	1	0	0	0	0	NA
tm-0290.01-f	0	4215	528002	8160734	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0290.01-g	0	4215	528002	8160734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0290.01-h	0	4215	528002	8160734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0291.01-f	0	4050	528802	8160934	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0291.01-h	0	4050	528802	8160934	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0292.01-f	0	3995	528102	8161634	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0292.01-g	0	3995	528102	8161634	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0292.01-h	0	3995	528102	8161634	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0293.01-f	0	3980	528002	8161734	NA	0.04	0.1	C	0.1	1	0	0	0	0	NA
tm-0293.01-g	0	3980	528002	8161734	NA	0.04	0.1	C	0.1	1	0	0	0	0	NA
tm-0293.01-h	0	3980	528002	8161734	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0294.01-f	0	3955	528102	8162034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0294.01-h	0	3955	528102	8162034	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0295.01-g	0	3950	528102	8162134	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0295.01-h	0	3950	528102	8162134	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0296.01-h	0	3930	528102	8162334	NA	0.95	0.95	C	0.95	1	0	0	0	0	NA
tm-0297.01-f	0	3890	528202	8162834	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0297.01-h	0	3890	528202	8162834	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0298.01-f	0	3875	528202	8163234	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0298.01-h	0	3875	528202	8163234	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0299.01-e	0	3870	528302	8163334	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0299.01-f	0	3870	528302	8163334	NA	1	2.25	C	2.25	1	0	0	0	0	NA
tm-0299.01-h	0	3870	528302	8163334	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0300.01-f	0	3865	528402	8163634	NA	0.11	0.3	C	0.3	1	0	0	0	0	NA
tm-0300.01-g	0	3865	528402	8163634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0300.01-h	0	3865	528402	8163634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0301.01-e	0	3865	528402	8163734	NA	1	2.24	C	2.25	1	0	0	0	0	NA
tm-0301.01-f	0	3865	528402	8163734	NA	1.01	2.25	C	2.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0301.01-g	0	3865	528402	8163734	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0301.01-h	0	3865	528402	8163734	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0302.01-f	0	3860	528502	8164334	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0302.01-h	0	3860	528502	8164334	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0303.01-f	0	3860	528802	8164934	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0303.01-h	0	3860	528802	8164934	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0304.01-f	0	3855	528702	8165034	NA	0.38	0.75	C	0.75	1	0	0	0	0	NA
tm-0304.01-h	0	3855	528702	8165034	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0305.01-b	0	3850	528802	8165934	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0305.01-d	0	3850	528802	8165934	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0305.01-f	0	3850	528802	8165934	NA	0.19	0.75	C	0.75	1	0	0	0	0	NA
tm-0305.01-h	0	3850	528802	8165934	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0306.01-e	0	3850	528802	8166534	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0306.01-f	0	3850	528802	8166534	NA	0.03	0.1	C	0.1	1	0	0	0	0	NA
tm-0306.01-g	0	3850	528802	8166534	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0306.01-h	0	3850	528802	8166534	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0307.01-f	0	3845	528202	8167234	NA	0.26	0.75	C	0.75	1	0	0	0	0	NA
tm-0307.01-g	0	3845	528202	8167234	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0307.01-h	0	3845	528202	8167234	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0308.01-e	0	3845	528202	8167334	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0308.01-f	0	3845	528202	8167334	NA	0.21	0.6	C	0.6	1	0	0	0	0	NA
tm-0308.01-h	0	3845	528202	8167334	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0309.01-a	0	3850	528902	8166534	NA	0.01	0.98	C	1.15	1	0	0	0	0	NA
tm-0309.01-d	0	3850	528902	8166534	NA	0.01	0.98	C	1.15	1	0	0	0	0	NA
tm-0309.01-e	0	3850	528902	8166534	NA	0.01	0.98	C	1.15	1	0	0	0	0	NA
tm-0309.01-f	0	3850	528902	8166534	NA	0.01	0.98	C	1.15	1	0	0	0	0	NA
tm-0309.01-g	0	3850	528902	8166534	NA	0.01	0.98	C	1.15	1	0	0	0	0	NA
tm-0309.01-h	0	3850	528902	8166534	NA	0.2	0.99	C	1.15	1	0	0	0	0	NA
tm-0310.01-f	0	3855	529002	8165934	NA	1	1.54	C	1.55	1	0	0	0	0	NA
tm-0310.01-g	0	3855	529002	8165934	NA	1.01	1.55	C	1.55	1	0	0	0	0	NA
tm-0310.01-h	0	3855	529002	8165934	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0311.01-f	0	3890	528402	8163034	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
tm-0311.01-h	0	3890	528402	8163034	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0312.01-f	0	3895	528502	8162834	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0312.01-g	0	3895	528502	8162834	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0312.01-h	0	3895	528502	8162834	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0313.01-f	0	3910	528602	8162634	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0313.01-h	0	3910	528602	8162634	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0314.01-d	0	3950	528802	8161934	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0314.01-f	0	3950	528802	8161934	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0314.01-h	0	3950	528802	8161934	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0315.01-e	0	3940	528802	8162134	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0315.01-f	0	3940	528802	8162134	NA	0.04	0.15	C	0.15	1	0	0	0	0	NA
tm-0315.01-g	0	3940	528802	8162134	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0315.01-h	0	3940	528802	8162134	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0316.01-e	0	3950	528902	8162034	NA	0.01	0.44	C	0.45	1	0	0	0	0	NA
tm-0316.01-f	0	3950	528902	8162034	NA	0.16	0.45	C	0.45	1	0	0	0	0	NA
tm-0316.01-h	0	3950	528902	8162034	NA	0.01	0.44	C	0.45	1	0	0	0	0	NA
tm-0317.01-f	0	3900	529302	8163034	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0317.01-g	0	3900	529302	8163034	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0317.01-h	0	3900	529302	8163034	NA	0.21	0.6	C	0.6	1	0	0	0	0	NA
tm-0318.01-e	0	3940	529002	8162334	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0318.01-f	0	3940	529002	8162334	NA	0.19	0.75	C	0.75	1	0	0	0	0	NA
tm-0318.01-g	0	3940	529002	8162334	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0318.01-h	0	3940	529002	8162334	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0320.01-f	0	3955	529202	8162134	NA	0.16	0.3	C	0.3	1	0	0	0	0	NA
tm-0320.01-h	0	3955	529202	8162134	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0321.01-f	0	4005	529002	8161334	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0321.01-g	0	4005	529002	8161334	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0321.01-h	0	4005	529002	8161334	NA	0.04	0.1	C	0.1	1	0	0	0	0	NA
tm-0322.01-a	0	4005	529002	8161334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0322.01-d	0	4005	529002	8161334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0322.01-f	0	4005	529002	8161334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0322.01-g	0	4005	529002	8161334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0322.01-h	0	4005	529002	8161334	NA	0.11	0.5	C	0.5	1	0	0	0	0	NA
tm-0323.01-b	0	3865	529102	8164734	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0323.01-f	0	3865	529102	8164734	NA	0.26	0.99	C	1	1	0	0	0	0	NA
tm-0323.01-g	0	3865	529102	8164734	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0323.01-h	0	3865	529102	8164734	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0324.01-f	0	3870	529002	8164034	NA	0.18	0.35	C	0.35	1	0	0	0	0	NA
tm-0324.01-h	0	3870	529002	8164034	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0325.01-d	0	3890	529702	8163534	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0325.01-f	0	3890	529702	8163534	NA	1	1	C	1	1	0	0	0	0	NA
tm-0325.01-h	0	3890	529702	8163534	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0326.01-e	0	3930	529302	8163234	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0326.01-f	0	3930	529302	8163234	NA	0.14	0.4	C	0.4	1	0	0	0	0	NA
tm-0326.01-h	0	3930	529302	8163234	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0327.01-a	0	3890	529702	8163434	NA	0.01	0.99	C	1.9	1	0	0	0	0	NA
tm-0327.01-f	0	3890	529702	8163434	NA	1	1.9	C	1.9	1	0	0	0	0	NA
tm-0327.01-h	0	3890	529702	8163434	NA	0.01	0.99	C	1.9	1	0	0	0	0	NA
tm-0328.01-f	0	3875	529502	8164034	NA	1	1.55	C	1.55	1	0	0	0	0	NA
tm-0328.01-h	0	3875	529502	8164034	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0329.01-f	0	3870	529402	8164834	NA	1.01	1.75	C	1.75	1	0	0	0	0	NA
tm-0329.01-h	0	3870	529402	8164834	NA	1	1.74	C	1.75	1	0	0	0	0	NA
tm-0330.01-f	0	3860	529202	8165234	NA	0.19	0.55	C	0.55	1	0	0	0	0	NA
tm-0330.01-g	0	3860	529202	8165234	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0330.01-h	0	3860	529202	8165234	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0331.01-f	0	3860	529302	8165734	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0331.01-h	0	3860	529302	8165734	NA	1	1.25	C	1.25	1	0	0	0	0	NA
tm-0332.01-b	0	3855	529402	8166034	NA	0.01	2	C	2	1	0.5	0.5	0	0	NA
tm-0332.01-d	0	3855	529402	8166034	NA	0.01	0.99	C	2	1	0.5	0.5	0	0	NA
tm-0332.01-e	0	3855	529402	8166034	NA	1	2	C	2	1	0.5	0.5	0	0	NA
tm-0332.01-f	0	3855	529402	8166034	NA	0.01	0.99	C	2	1	0.5	0.5	0	0	NA
tm-0332.01-h	0	3855	529402	8166034	NA	0.01	0.99	C	2	1	0.5	0.5	0	0	NA
tm-0333.01-f	0	3850	528802	8167334	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0333.01-h	0	3850	528802	8167334	NA	0.03	0.05	C	0.05	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0334.01-h	0	3850	528802	8167434	NA	0.15	0.15	C	0.15	1	0	0	0	0	NA
tm-0335.01-f	0	3870	529702	8165434	NA	1	2.65	C	2.65	1	0	0	0	0	NA
tm-0335.01-g	0	3870	529702	8165434	NA	1	2.65	C	2.65	1	0	0	0	0	NA
tm-0335.01-h	0	3870	529702	8165434	NA	0.01	0.99	C	2.65	1	0	0	0	0	NA
tm-0336.01-h	0	3835	533602	8169134	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0337.01-b	0	3855	533302	8168334	NA	0.01	2.99	C	3	1	0	0	0	0	NA
tm-0337.01-d	0	3855	533302	8168334	NA	3	3	C	3	1	0	0	0	0	NA
tm-0337.01-e	0	3855	533302	8168334	NA	1	2.99	C	3	1	0	0	0	0	NA
tm-0337.01-f	0	3855	533302	8168334	NA	1	2.99	C	3	1	0	0	0	0	NA
tm-0337.01-g	0	3855	533302	8168334	NA	0.01	0.99	C	3	1	0	0	0	0	NA
tm-0337.01-h	0	3855	533302	8168334	NA	0.01	0.99	C	3	1	0	0	0	0	NA
tm-0338.01-e	0	3860	533302	8168134	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0338.01-f	0	3860	533302	8168134	NA	0.14	0.55	C	0.55	1	0	0	0	0	NA
tm-0338.01-g	0	3860	533302	8168134	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0338.01-h	0	3860	533302	8168134	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0339.01-f	0	3860	533002	8167034	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0339.01-g	0	3860	533002	8167034	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0339.01-h	0	3860	533002	8167034	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0340.01-f	0	3885	532602	8166234	NA	0.38	0.75	C	0.75	1	0	0	0	0	NA
tm-0340.01-h	0	3885	532602	8166234	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0341.01-f	0	3885	532502	8165334	NA	0.21	0.4	C	0.4	1	0	0	0	0	NA
tm-0341.01-h	0	3885	532502	8165334	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0342.01-e	0	3885	532502	8164934	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0342.01-f	0	3885	532502	8164934	NA	1	1	C	1	1	0	0	0	0	NA
tm-0342.01-h	0	3885	532502	8164934	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0343.01-d	0	3890	532402	8165434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0343.01-e	0	3890	532402	8165434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0343.01-g	0	3890	532402	8165434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0343.01-h	0	3890	532402	8165434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0344.01-d	0	3865	533102	8168234	NA	0.01	0.99	C	2.8	1	0	0	0	0	NA
tm-0344.01-f	0	3865	533102	8168234	NA	1	2.8	C	2.8	1	0	0	0	0	NA
tm-0344.01-h	0	3865	533102	8168234	NA	0.01	0.99	C	2.8	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0346.01-a	0	3835	533202	8169134	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0346.01-e	0	3835	533202	8169134	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0346.01-f	0	3835	533202	8169134	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0346.01-g	0	3835	533202	8169134	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0346.01-h	0	3835	533202	8169134	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0347.01-e	0	3850	532902	8168634	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0347.01-f	0	3850	532902	8168634	NA	0.14	0.55	C	0.55	1	0	0	0	0	NA
tm-0347.01-g	0	3850	532902	8168634	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0347.01-h	0	3850	532902	8168634	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0348.01-e	0	3850	532602	8167734	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0348.01-f	0	3850	532602	8167734	NA	0.32	0.95	C	0.95	1	0	0	0	0	NA
tm-0348.01-h	0	3850	532602	8167734	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0349.01-e	0	3855	532502	8167134	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0349.01-f	0	3855	532502	8167134	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0349.01-h	0	3855	532502	8167134	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0350.01-f	0	3890	532402	8166134	NA	0.16	0.3	C	0.3	1	0	0	0	0	NA
tm-0350.01-h	0	3890	532402	8166134	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0351.01-f	0	3895	532002	8164734	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0351.01-h	0	3895	532002	8164734	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0352.01-f	0	3855	532302	8167634	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0352.01-h	0	3855	532302	8167634	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0353.01-f	0	3850	532602	8168234	NA	1	1.5	C	1.5	1	0	0	0	0	NA
tm-0353.01-h	0	3850	532602	8168234	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0354.01-e	0	3890	538102	8164534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0354.01-h	0	3890	538102	8164534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0355.01-e	0	3895	538302	8164734	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0355.01-f	0	3895	538302	8164734	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0355.01-g	0	3895	538302	8164734	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0355.01-h	0	3895	538302	8164734	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0356.01-f	0	3880	538402	8165234	NA	0.21	0.4	C	0.4	1	0	0	0	0	NA
tm-0356.01-h	0	3880	538402	8165234	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0357.01-f	0	3900	538602	8165434	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0357.01-h	0	3900	538602	8165434	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0358.01-f	0	3865	539102	8166534	NA	0.22	0.65	C	0.65	1	0	0	0	0	NA
tm-0358.01-g	0	3865	539102	8166534	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0358.01-h	0	3865	539102	8166534	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0359.01-e	0	3875	538402	8165534	NA	0.01	0.99	C	4	1	0	0	0	0	NA
tm-0359.01-f	0	3875	538402	8165534	NA	3	4	C	4	1	0	0	0	0	NA
tm-0359.01-h	0	3875	538402	8165534	NA	0.01	0.99	C	4	1	0	0	0	0	NA
tm-0360.01-e	0	3875	538402	8165434	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0360.01-f	0	3875	538402	8165434	NA	0.26	0.99	C	1	1	0	0	0	0	NA
tm-0360.01-g	0	3875	538402	8165434	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0360.01-h	0	3875	538402	8165434	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0361.01-f	0	3880	538302	8165434	NA	1	1.25	C	1.25	1	0	0	0	0	NA
tm-0361.01-h	0	3880	538302	8165434	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0362.01-f	0	3875	538202	8166134	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0362.01-g	0	3875	538202	8166134	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0362.01-h	0	3875	538202	8166134	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0363.01-f	0	3875	538102	8165634	NA	0.16	0.3	C	0.3	1	0	0	0	0	NA
tm-0363.01-h	0	3875	538102	8165634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0364.01-f	0	3875	538002	8165534	NA	1	1.2	C	1.2	1	0	0	0	0	NA
tm-0364.01-g	0	3875	538002	8165534	NA	0.01	0.99	C	1.2	1	0	0	0	0	NA
tm-0364.01-h	0	3875	538002	8165534	NA	0.01	0.99	C	1.2	1	0	0	0	0	NA
tm-0365.01-e	0	3865	538802	8166634	NA	0.01	0.15	C	0.15	1	0	0	0	0	NA
tm-0365.01-f	0	3865	538802	8166634	NA	0.01	0.15	C	0.15	1	0	0	0	0	NA
tm-0365.01-h	0	3865	538802	8166634	NA	0.01	0.15	C	0.15	1	0	0	0	0	NA
tm-0366.01-h	0	3860	538902	8166934	NA	0.5	0.5	C	0.5	1	0	0	0	0	NA
tm-0367.01-e	0	3860	539002	8167534	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0367.01-f	0	3860	539002	8167534	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0367.01-g	0	3860	539002	8167534	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0367.01-h	0	3860	539002	8167534	NA	1	2.25	C	2.25	1	0	0	0	0	NA
tm-0368.01-e	0	3855	539402	8168134	NA	1	2.25	C	2.25	1	0	0	0	0	NA
tm-0368.01-f	0	3855	539402	8168134	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0368.01-h	0	3855	539402	8168134	NA	1	2.25	C	2.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0369.01-e	0	3850	539402	8168534	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0369.01-f	0	3850	539402	8168534	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0369.01-h	0	3850	539402	8168534	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0370.01-f	0	3860	538702	8166834	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0370.01-h	0	3860	538702	8166834	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0371.01-h	0	3850	539002	8168434	NA	0.5	0.5	C	0.5	1	0	0	0	0	NA
tm-0372.01-f	0	3840	538602	8168434	NA	0.01	0.99	C	1.5	1	0	0	0	0	NA
tm-0372.01-h	0	3840	538602	8168434	NA	1	1.5	C	1.5	1	0	0	0	0	NA
tm-0373.01-e	0	3855	538002	8167134	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0373.01-f	0	3855	538002	8167134	NA	1	1	C	1	1	0	0	0	0	NA
tm-0373.01-h	0	3855	538002	8167134	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0374.01-f	0	3860	538202	8168134	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0374.01-h	0	3860	538202	8168134	NA	0.01	0.98	C	1	1	0	0	0	0	NA
tm-0375.01-a	0	3855	538202	8168334	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0375.01-e	0	3855	538202	8168334	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0375.01-f	0	3855	538202	8168334	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0375.01-g	0	3855	538202	8168334	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0375.01-h	0	3855	538202	8168334	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0376.01-f	0	3830	538402	8169134	NA	0.18	0.35	C	0.35	1	0	0	0	0	NA
tm-0376.01-h	0	3830	538402	8169134	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0377.01-f	0	3880	538002	8167634	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0377.01-h	0	3880	538002	8167634	NA	0.48	0.95	C	0.95	1	0	0	0	0	NA
tm-0378.01-h	0	3855	537702	8167234	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
tm-0379.01-h	0	3860	537402	8167234	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
tm-0380.01-e	0	3860	537602	8167934	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0380.01-f	0	3860	537602	8167934	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0380.01-h	0	3860	537602	8167934	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0381.01-f	0	3860	537902	8168434	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0381.01-h	0	3860	537902	8168434	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0382.01-e	0	3840	538102	8168634	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0382.01-f	0	3840	538102	8168634	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0382.01-h	0	3840	538102	8168634	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0383.01-f	0	3830	537902	8169134	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0383.01-h	0	3830	537902	8169134	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0385.01-a	0	3860	537602	8168434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0385.01-e	0	3860	537602	8168434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0385.01-f	0	3860	537602	8168434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0385.01-h	0	3860	537602	8168434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0387.01-d	0	3835	537202	8169134	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0387.01-e	0	3835	537202	8169134	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0387.01-h	0	3835	537202	8169134	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0388.01-h	0	3835	537102	8169134	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
tm-0389.01-e	0	3840	536802	8168934	NA	0.01	0.15	C	0.15	1	0	0	0	0	NA
tm-0389.01-f	0	3840	536802	8168934	NA	0.01	0.15	C	0.15	1	0	0	0	0	NA
tm-0389.01-h	0	3840	536802	8168934	NA	0.01	0.15	C	0.15	1	0	0	0	0	NA
tm-0390.01-b	0	3845	537102	8168434	NA	0.01	1.24	C	1.25	1	0	0	0	0	NA
tm-0390.01-f	0	3845	537102	8168434	NA	1	1.25	C	1.25	1	0	0	0	0	NA
tm-0390.01-g	0	3845	537102	8168434	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0390.01-h	0	3845	537102	8168434	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0391.01-f	0	3845	537202	8168334	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0391.01-h	0	3845	537202	8168334	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0392.01-e	0	3850	536702	8168234	NA	1	1.89	C	1.9	1	0	0	0	0	NA
tm-0392.01-f	0	3850	536702	8168234	NA	1.01	1.9	C	1.9	1	0	0	0	0	NA
tm-0392.01-g	0	3850	536702	8168234	NA	0.01	0.99	C	1.9	1	0	0	0	0	NA
tm-0392.01-h	0	3850	536702	8168234	NA	0.01	0.99	C	1.9	1	0	0	0	0	NA
tm-0393.01-e	0	3845	536302	8168134	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0393.01-f	0	3845	536302	8168134	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0393.01-h	0	3845	536302	8168134	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0394.01-e	0	3850	535202	8168534	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0394.01-f	0	3850	535202	8168534	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0394.01-h	0	3850	535202	8168534	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0395.01-e	0	3850	535302	8168134	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0395.01-f	0	3850	535302	8168134	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0395.01-h	0	3850	535302	8168134	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0396.01-f	0	3850	535102	8168334	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0396.01-h	0	3850	535102	8168334	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0397.01-h	0	3860	537102	8167134	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
tm-0398.01-e	0	3860	537302	8167034	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0398.01-g	0	3860	537302	8167034	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0398.01-h	0	3860	537302	8167034	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0399.01-e	0	3865	537102	8166634	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0399.01-h	0	3865	537102	8166634	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0400.01-e	0	3865	536702	8166534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0400.01-f	0	3865	536702	8166534	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0400.01-h	0	3865	536702	8166534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0401.01-f	0	3855	536102	8166634	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0401.01-h	0	3855	536102	8166634	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0402.01-e	0	3860	535902	8166034	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0402.01-f	0	3860	535902	8166034	NA	0.27	0.8	C	0.8	1	0	0	0	0	NA
tm-0402.01-h	0	3860	535902	8166034	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0403.01-f	0	3865	536602	8166134	NA	0.01	0.05	C	0.05	1	0	0	0	0	NA
tm-0403.01-g	0	3865	536602	8166134	NA	0.01	0.05	C	0.05	1	0	0	0	0	NA
tm-0403.01-h	0	3865	536602	8166134	NA	0.01	0.05	C	0.05	1	0	0	0	0	NA
tm-0404.01-e	0	3865	537202	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0404.01-f	0	3865	537202	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0404.01-g	0	3865	537202	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0404.01-h	0	3865	537202	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0405.01-h	0	3865	537602	8166334	NA	0.15	0.15	C	0.15	1	0	0	0	0	NA
tm-0406.01-e	0	3865	536602	8165934	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0406.01-f	0	3865	536602	8165934	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0406.01-g	0	3865	536602	8165934	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0406.01-h	0	3865	536602	8165934	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0407.01-f	0	3865	536802	8165934	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0407.01-g	0	3865	536802	8165934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0407.01-h	0	3865	536802	8165934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0408.01-a	0	3865	536902	8165734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0408.01-e	0	3865	536902	8165734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0408.01-f	0	3865	536902	8165734	NA	0.06	0.25	C	0.25	1	0	0	0	0	NA
tm-0408.01-g	0	3865	536902	8165734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0408.01-h	0	3865	536902	8165734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0409.01-e	0	3870	536602	8165434	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0409.01-f	0	3870	536602	8165434	NA	1	1.55	C	1.55	1	0	0	0	0	NA
tm-0409.01-h	0	3870	536602	8165434	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0410.01-d	0	3870	537302	8165534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0410.01-e	0	3870	537302	8165534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0410.01-f	0	3870	537302	8165534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0410.01-g	0	3870	537302	8165534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0410.01-h	0	3870	537302	8165534	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0411.01-d	0	3870	537602	8165434	NA	1	1.25	C	1.25	1	0	0	0	0	NA
tm-0411.01-e	0	3870	537602	8165434	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0411.01-f	0	3870	537602	8165434	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0411.01-g	0	3870	537602	8165434	NA	1	1.25	C	1.25	1	0	0	0	0	NA
tm-0411.01-h	0	3870	537602	8165434	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0412.01-e	0	3870	537102	8165034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0412.01-f	0	3870	537102	8165034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0412.01-g	0	3870	537102	8165034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0412.01-h	0	3870	537102	8165034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0413.01-f	0	3870	537602	8165034	NA	0.01	0.8	C	0.8	1	0	0	0	0	NA
tm-0413.01-g	0	3870	537602	8165034	NA	0.01	0.8	C	0.8	1	0	0	0	0	NA
tm-0413.01-h	0	3870	537602	8165034	NA	0.01	0.8	C	0.8	1	0	0	0	0	NA
tm-0414.01-f	0	3875	536902	8164434	NA	0.27	0.8	C	0.8	1	0	0	0	0	NA
tm-0414.01-g	0	3875	536902	8164434	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0414.01-h	0	3875	536902	8164434	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0415.01-e	0	3880	537802	8164134	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0415.01-f	0	3880	537802	8164134	NA	1	1.25	C	1.25	1	0	0	0	0	NA
tm-0415.01-h	0	3880	537802	8164134	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0417.01-f	0	3910	531802	8165134	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0417.01-h	0	3910	531802	8165134	NA	0.18	0.35	C	0.35	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0418.01-g	0	3905	531702	8164934	NA	1.55	1.55	C	1.55	1	0	0	0	0	NA
tm-0419.01-f	0	3850	532102	8168034	NA	1	1	C	1	1	0	0	0	0	NA
tm-0420.01-e	0	3920	531202	8164934	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0420.01-f	0	3920	531202	8164934	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0420.01-h	0	3920	531202	8164934	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0421.01-e	0	3840	531902	8168534	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0421.01-f	0	3840	531902	8168534	NA	0.17	0.5	C	0.5	1	0	0	0	0	NA
tm-0421.01-h	0	3840	531902	8168534	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0422.01-f	0	3845	531802	8168134	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0422.01-h	0	3845	531802	8168134	NA	0.21	0.4	C	0.4	1	0	0	0	0	NA
tm-0423.01-f	0	3855	531502	8167134	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0423.01-g	0	3855	531502	8167134	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0424.01-e	0	3870	531302	8166534	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0424.01-f	0	3870	531302	8166534	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0424.01-g	0	3870	531302	8166534	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0424.01-h	0	3870	531302	8166534	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0425.01-f	0	3880	531102	8165834	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0425.01-g	0	3880	531102	8165834	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0425.01-h	0	3880	531102	8165834	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0426.01-f	0	3900	531202	8164934	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0426.01-g	0	3900	531202	8164934	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0426.01-h	0	3900	531202	8164934	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0427.01-e	0	3875	530902	8165934	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0427.01-f	0	3875	530902	8165934	NA	1	1.55	C	1.55	1	0	0	0	0	NA
tm-0427.01-g	0	3875	530902	8165934	NA	1	1.55	C	1.55	1	0	0	0	0	NA
tm-0427.01-h	0	3875	530902	8165934	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0428.01-h	0	3840	531602	8168234	NA	0.3	0.3	C	0.3	1	0	0	0	0	NA
tm-0429.01-e	0	3845	529902	8167734	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0429.01-f	0	3845	529902	8167734	NA	0.07	0.2	C	0.2	1	0	0	0	0	NA
tm-0429.01-h	0	3845	529902	8167734	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0430.01-e	0	3850	529902	8167034	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0430.01-f	0	3850	529902	8167034	NA	0.22	0.65	C	0.65	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0430.01-h	0	3850	529902	8167034	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0431.01-e	0	3870	530002	8165334	NA	0.01	0.8	C	0.8	1	0	0	0	0	NA
tm-0431.01-g	0	3870	530002	8165334	NA	0.01	0.8	C	0.8	1	0	0	0	0	NA
tm-0431.01-h	0	3870	530002	8165334	NA	0.01	0.8	C	0.8	1	0	0	0	0	NA
tm-0432.01-a	0	3855	529902	8166134	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0432.01-e	0	3855	529902	8166134	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0432.01-f	0	3855	529902	8166134	NA	0.13	0.6	C	0.6	1	0	0	0	0	NA
tm-0432.01-g	0	3855	529902	8166134	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0432.01-h	0	3855	529902	8166134	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0433.01-h	0	3840	530202	8168034	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0434.01-f	0	3855	530102	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0434.01-g	0	3855	530102	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0434.01-h	0	3855	530102	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0435.01-e	0	3860	530002	8166034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0435.01-f	0	3860	530002	8166034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0435.01-g	0	3860	530002	8166034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0435.01-h	0	3860	530002	8166034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0436.01-a	0	3845	530602	8167834	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0436.01-f	0	3845	530602	8167834	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0436.01-h	0	3845	530602	8167834	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0437.01-e	0	3855	530502	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0437.01-f	0	3855	530502	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0437.01-g	0	3855	530502	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0437.01-h	0	3855	530502	8166434	NA	0.01	0.4	C	0.4	1	0	0	0	0	NA
tm-0438.01-e	0	3890	529902	8163534	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0438.01-f	0	3890	529902	8163534	NA	0.21	0.8	C	0.8	1	0	0	0	0	NA
tm-0438.01-g	0	3890	529902	8163534	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0438.01-h	0	3890	529902	8163534	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0439.01-f	0	3915	530002	8162934	NA	0.17	0.5	C	0.5	1	0	0	0	0	NA
tm-0439.01-g	0	3915	530002	8162934	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0439.01-h	0	3915	530002	8162934	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0440.01-e	0	3905	530102	8163234	NA	0.01	0.99	C	1	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0440.01-f	0	3905	530102	8163234	NA	1	1	C	1	1	0	0	0	0	NA
tm-0440.01-g	0	3905	530102	8163234	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0440.01-h	0	3905	530102	8163234	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0441.01-b	0	3890	530002	8164034	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0441.01-e	0	3890	530002	8164034	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0441.01-f	0	3890	530002	8164034	NA	0.24	0.95	C	0.95	1	0	0	0	0	NA
tm-0441.01-h	0	3890	530002	8164034	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0442.01-f	0	3855	530902	8166834	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0442.01-h	0	3855	530902	8166834	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0443.01-e	0	3940	529302	8162134	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0443.01-f	0	3940	529302	8162134	NA	0.24	0.95	C	0.95	1	0	0	0	0	NA
tm-0443.01-g	0	3940	529302	8162134	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0443.01-h	0	3940	529302	8162134	NA	0.01	0.94	C	0.95	1	0	0	0	0	NA
tm-0444.01-f	0	4025	529602	8160934	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0444.01-g	0	4025	529602	8160934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0444.01-h	0	4025	529602	8160934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0445.01-e	0	3955	530102	8161934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0445.01-f	0	3955	530102	8161934	NA	0.07	0.25	C	0.25	1	0	0	0	0	NA
tm-0445.01-g	0	3955	530102	8161934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0445.01-h	0	3955	530102	8161934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0446.01-f	0	4020	529502	8161034	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0446.01-g	0	4020	529502	8161034	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0446.01-h	0	4020	529502	8161034	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0447.01-e	0	4020	529402	8160934	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0447.01-g	0	4020	529402	8160934	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0447.01-h	0	4020	529402	8160934	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0448.01-e	0	4030	529202	8161234	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0448.01-g	0	4030	529202	8161234	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0448.01-h	0	4030	529202	8161234	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0449.01-e	0	4015	529302	8161334	NA	0.01	0.45	C	0.45	1	0	0	0	0	NA
tm-0449.01-f	0	4015	529302	8161334	NA	0.01	0.45	C	0.45	1	0	0	0	0	NA
tm-0449.01-g	0	4015	529302	8161334	NA	0.01	0.45	C	0.45	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0449.01-h	0	4015	529302	8161334	NA	0.01	0.45	C	0.45	1	0	0	0	0	NA
tm-0450.01-e	0	3920	529602	8162534	NA	0.01	0.89	C	0.9	1	0	0	0	0	NA
tm-0450.01-f	0	3920	529602	8162534	NA	0.23	0.9	C	0.9	1	0	0	0	0	NA
tm-0450.01-g	0	3920	529602	8162534	NA	0.01	0.89	C	0.9	1	0	0	0	0	NA
tm-0450.01-h	0	3920	529602	8162534	NA	0.01	0.89	C	0.9	1	0	0	0	0	NA
tm-0451.01-e	0	3925	529702	8162534	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0451.01-f	0	3925	529702	8162534	NA	0.14	0.4	C	0.4	1	0	0	0	0	NA
tm-0451.01-g	0	3925	529702	8162534	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0452.01-f	0	3950	530002	8162034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0452.01-g	0	3950	530002	8162034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0452.01-h	0	3950	530002	8162034	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0453.01-a	0	3930	529902	8162534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0453.01-e	0	3930	529902	8162534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0453.01-f	0	3930	529902	8162534	NA	0.09	0.35	C	0.35	1	0	0	0	0	NA
tm-0453.01-g	0	3930	529902	8162534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0454.01-d	0	3925	530002	8162634	NA	1.76	3.05	C	3.05	1	0	0	0	0	NA
tm-0454.01-e	0	3925	530002	8162634	NA	3	3.05	C	3.05	1	0	0	0	0	NA
tm-0454.01-f	0	3925	530002	8162634	NA	0.01	0.99	C	3.05	1	0	0	0	0	NA
tm-0455.01-b	0	3925	530102	8162734	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0455.01-e	0	3925	530102	8162734	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0455.01-g	0	3925	530102	8162734	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0455.01-h	0	3925	530102	8162734	NA	0.01	0.75	C	0.75	1	0	0	0	0	NA
tm-0456.01-d	0	3930	530102	8162634	NA	0.01	0.99	C	1	1	0	0.5	0	0	NA
tm-0456.01-e	0	3930	530102	8162634	NA	1	1	C	1	1	0	0.5	0	0	NA
tm-0456.01-g	0	3930	530102	8162634	NA	0.01	0.99	C	1	1	0	0.5	0	0	NA
tm-0456.01-h	0	3930	530102	8162634	NA	0.01	0.99	C	1	1	0	0.5	0	0	NA
tm-0457.01-d	0	3930	530102	8162534	NA	0.01	0.24	C	0.25	1	0	0.5	0	0	NA
tm-0457.01-e	0	3930	530102	8162534	NA	0.01	0.24	C	0.25	1	0	0.5	0	0	NA
tm-0457.01-f	0	3930	530102	8162534	NA	0.09	0.25	C	0.25	1	0	0.5	0	0	NA
tm-0458.01-f	0	3945	530202	8162234	NA	0.31	0.6	C	0.6	1	0	0	0	0	NA
tm-0458.01-h	0	3945	530202	8162234	NA	0.01	0.59	C	0.6	1	0	0	0	0	NA
tm-0459.01-f	0	3960	530202	8161934	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0459.01-h	0	3960	530202	8161934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0460.01-f	0	3975	530202	8161734	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0460.01-g	0	3975	530202	8161734	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0461.01-f	0	3980	530302	8161534	NA	0.01	0.05	C	0.05	1	0	0	0	0	NA
tm-0461.01-g	0	3980	530302	8161534	NA	0.01	0.05	C	0.05	1	0	0	0	0	NA
tm-0462.01-f	0	3980	530402	8161734	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0462.01-g	0	3980	530402	8161734	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0462.01-h	0	3980	530402	8161734	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0463.01-e	0	3950	530402	8162034	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0463.01-f	0	3950	530402	8162034	NA	1	1	C	1	1	0	0	0	0	NA
tm-0463.01-g	0	3950	530402	8162034	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0463.01-h	0	3950	530402	8162034	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0464.01-f	0	3910	530302	8163334	NA	1	1.25	C	1.25	1	0	0	0	0	NA
tm-0464.01-g	0	3910	530302	8163334	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0464.01-h	0	3910	530302	8163334	NA	0.01	0.99	C	1.25	1	0	0	0	0	NA
tm-0465.01-f	0	3890	530402	8164234	NA	1	1	C	1	1	0	0	0	0	NA
tm-0465.01-g	0	3890	530402	8164234	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0465.01-h	0	3890	530402	8164234	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0466.01-f	0	3890	530502	8164434	NA	0.35	0.35	C	0.35	1	0	0	0	0	NA
tm-0467.01-f	0	3910	530302	8163334	NA	0.03	0.05	C	0.05	1	0	0	0	0	NA
tm-0467.01-h	0	3910	530302	8163334	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0468.01-a	0	3930	530402	8163034	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0468.01-e	0	3930	530402	8163034	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0468.01-f	0	3930	530402	8163034	NA	0.09	0.4	C	0.4	1	0	0	0	0	NA
tm-0468.01-g	0	3930	530402	8163034	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0468.01-h	0	3930	530402	8163034	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0469.01-h	0	3950	530202	8163234	NA	0.5	0.5	C	0.5	1	0	0	0	0	NA
tm-0470.01-f	0	3945	530502	8162134	NA	1	2.25	C	2.25	1	0	0	0	0	NA
tm-0470.01-g	0	3945	530502	8162134	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0470.01-h	0	3945	530502	8162134	NA	0.01	0.99	C	2.25	1	0	0	0	0	NA
tm-0471.01-f	0	3950	530602	8162034	NA	1	1	C	1	1	0	0	0	0	NA
tm-0471.01-g	0	3950	530602	8162034	NA	0.01	0.99	C	1	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0471.01-h	0	3950	530602	8162034	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0472.01-e	0	3980	530502	8161034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0472.01-f	0	3980	530502	8161034	NA	0.07	0.25	C	0.25	1	0	0	0	0	NA
tm-0472.01-g	0	3980	530502	8161034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0472.01-h	0	3980	530502	8161034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0473.01-f	0	3965	530902	8161534	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0473.01-g	0	3965	530902	8161534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0473.01-h	0	3965	530902	8161534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0474.01-e	0	3975	530902	8161034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0474.01-f	0	3975	530902	8161034	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0474.01-h	0	3975	530902	8161034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0475.01-e	0	3955	531702	8161534	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0475.01-f	0	3955	531702	8161534	NA	0.33	0.65	C	0.65	1	0	0	0	0	NA
tm-0476.01-f	0	3985	530902	8162634	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0476.01-g	0	3985	530902	8162634	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0476.01-h	0	3985	530902	8162634	NA	0.01	0.3	C	0.3	1	0	0	0	0	NA
tm-0477.01-e	0	3930	530502	8163034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0477.01-f	0	3930	530502	8163034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0477.01-g	0	3930	530502	8163034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0477.01-h	0	3930	530502	8163034	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0478.01-f	0	3915	530502	8163234	NA	0.65	0.65	C	0.65	1	0	0	0	0	NA
tm-0479.01-e	0	3925	530702	8163134	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0479.01-f	0	3925	530702	8163134	NA	0.19	0.55	C	0.55	1	0	0	0	0	NA
tm-0479.01-h	0	3925	530702	8163134	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0480.01-e	0	3920	530902	8163234	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0480.01-f	0	3920	530902	8163234	NA	0.26	0.75	C	0.75	1	0	0	0	0	NA
tm-0480.01-h	0	3920	530902	8163234	NA	0.01	0.74	C	0.75	1	0	0	0	0	NA
tm-0481.01-f	0	4260	532002	8160234	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0481.01-h	0	4260	532002	8160234	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0482.01-f	0	4260	532302	8160234	NA	0.05	0.05	C	0.05	1	0	0	0	0	NA
tm-0483.01-f	0	3965	531002	8162334	NA	0.51	0.99	C	1	1	0	0	0	0	NA
tm-0483.01-h	0	3965	531002	8162334	NA	0.01	0.98	C	1	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0484.01-f	0	3960	531502	8162334	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0484.01-g	0	3960	531502	8162334	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0484.01-h	0	3960	531502	8162334	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0485.01-e	0	3930	531002	8163034	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0485.01-f	0	3930	531002	8163034	NA	0.27	0.8	C	0.8	1	0	0	0	0	NA
tm-0485.01-h	0	3930	531002	8163034	NA	0.01	0.79	C	0.8	1	0	0	0	0	NA
tm-0486.01-f	0	3925	531302	8163234	NA	0.19	0.55	C	0.55	1	0	0	0	0	NA
tm-0486.01-g	0	3925	531302	8163234	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0486.01-h	0	3925	531302	8163234	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0487.01-a	0	3940	531102	8162734	NA	0.01	0.05	C	0.05	0.5	0	0.5	0	0	NA
tm-0487.01-h	0	3940	531102	8162734	NA	0.01	0.05	C	0.05	0.5	0	0.5	0	0	NA
tm-0488.01-f	0	3935	531402	8162834	NA	0.26	0.5	C	0.5	1	0	0	0	0	NA
tm-0488.01-g	0	3935	531402	8162834	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0489.01-e	0	3930	531402	8163134	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0489.01-f	0	3930	531402	8163134	NA	1	1	C	1	1	0	0	0	0	NA
tm-0489.01-h	0	3930	531402	8163134	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0490.01-e	0	3895	531002	8164434	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0490.01-f	0	3895	531002	8164434	NA	0.22	0.65	C	0.65	1	0	0	0	0	NA
tm-0490.01-h	0	3895	531002	8164434	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0491.01-f	0	3900	531302	8164334	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0491.01-h	0	3900	531302	8164334	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0492.01-f	0	3905	531802	8164334	NA	1	1	C	1	1	0	0	0	0	NA
tm-0492.01-h	0	3905	531802	8164334	NA	0.01	0.99	C	1	1	0	0	0	0	NA
tm-0493.01-e	0	3955	531802	8162534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0493.01-f	0	3955	531802	8162534	NA	0.12	0.35	C	0.35	1	0	0	0	0	NA
tm-0493.01-h	0	3955	531802	8162534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0494.01-f	0	3990	531602	8161334	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0494.01-g	0	3990	531602	8161334	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0494.01-h	0	3990	531602	8161334	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0495.01-f	0	3975	531702	8161534	NA	0.33	0.65	C	0.65	1	0	0	0	0	NA
tm-0495.01-h	0	3975	531702	8161534	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0496.01-f	0	3925	532102	8164634	NA	0.65	0.65	C	0.65	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0497.01-f	0	3980	532202	8162434	NA	0.16	0.45	C	0.45	1	0	0	0	0	NA
tm-0497.01-g	0	3980	532202	8162434	NA	0.01	0.44	C	0.45	1	0	0	0	0	NA
tm-0497.01-h	0	3980	532202	8162434	NA	0.01	0.44	C	0.45	1	0	0	0	0	NA
tm-0498.01-e	0	3955	532102	8161834	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0498.01-f	0	3955	532102	8161834	NA	0.18	0.35	C	0.35	1	0	0	0	0	NA
tm-0499.01-f	0	3940	532202	8162434	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0499.01-h	0	3940	532202	8162434	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0500.01-f	0	3935	532402	8162434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0500.01-g	0	3935	532402	8162434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0500.01-h	0	3935	532402	8162434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0501.01-f	0	3960	532402	8161834	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0501.01-g	0	3960	532402	8161834	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0501.01-h	0	3960	532402	8161834	NA	0.01	0.1	C	0.1	1	0	0	0	0	NA
tm-0502.01-f	0	3960	532502	8161934	NA	0.18	0.35	C	0.35	1	0	0	0	0	NA
tm-0502.01-g	0	3960	532502	8161934	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0503.01-e	0	3900	532402	8164334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0503.01-f	0	3900	532402	8164334	NA	0.17	0.5	C	0.5	1	0	0	0	0	NA
tm-0503.01-h	0	3900	532402	8164334	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0504.01-f	0	3885	532602	8164734	NA	0.36	0.7	C	0.7	1	0	0	0	0	NA
tm-0504.01-h	0	3885	532602	8164734	NA	0.01	0.69	C	0.7	1	0	0	0	0	NA
tm-0505.01-e	0	3895	532502	8164434	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0505.01-f	0	3895	532502	8164434	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0507.01-f	0	3950	532902	8162034	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0507.01-g	0	3950	532902	8162034	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0507.01-h	0	3950	532902	8162034	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0508.01-h	0	3985	533302	8161634	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0509.01-f	0	3890	532702	8164434	NA	0.33	0.65	C	0.65	1	0	0	0	0	NA
tm-0509.01-h	0	3890	532702	8164434	NA	0.01	0.64	C	0.65	1	0	0	0	0	NA
tm-0510.01-f	0	3885	532802	8164634	NA	0.35	0.35	C	0.35	1	0	0	0	0	NA
tm-0511.01-f	0	3875	533202	8164634	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0511.01-h	0	3875	533202	8164634	NA	0.16	0.3	C	0.3	1	0	0	0	0	NA
tm-0512.01-e	0	3965	533402	8162034	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0512.01-f	0	3965	533402	8162034	NA	0.12	0.35	C	0.35	1	0	0	0	0	NA
tm-0512.01-h	0	3965	533402	8162034	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0513.01-f	0	3980	533602	8161734	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0513.01-h	0	3980	533602	8161734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0514.01-e	0	3965	533602	8161934	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0514.01-f	0	3965	533602	8161934	NA	0.16	0.3	C	0.3	1	0	0	0	0	NA
tm-0515.01-e	0	3875	533602	8164434	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0515.01-f	0	3875	533602	8164434	NA	0.07	0.2	C	0.2	1	0	0	0	0	NA
tm-0515.01-h	0	3875	533602	8164434	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0516.01-a	0	3845	533802	8168234	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0516.01-e	0	3845	533802	8168234	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0516.01-f	0	3845	533802	8168234	NA	0.01	0.55	C	0.55	1	0	0	0	0	NA
tm-0517.01-f	0	3915	533602	8163034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0517.01-h	0	3915	533602	8163034	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0518.01-f	0	3875	533902	8164834	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
tm-0519.01-e	0	3875	533002	8165034	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0519.01-f	0	3875	533002	8165034	NA	0.03	0.05	C	0.05	1	0	0	0	0	NA
tm-0520.01-d	0	3860	533902	8167134	NA	0.01	0.8	C	0.8	1	0.5	0	0	0	NA
tm-0520.01-f	0	3860	533902	8167134	NA	0.01	0.8	C	0.8	1	0.5	0	0	0	NA
tm-0520.01-g	0	3860	533902	8167134	NA	0.01	0.8	C	0.8	1	0.5	0	0	0	NA
tm-0520.01-h	0	3860	533902	8167134	NA	0.01	0.8	C	0.8	1	0.5	0	0	0	NA
tm-0521.01-e	0	3870	533702	8165334	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0521.01-f	0	3870	533702	8165334	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0522.01-f	0	3870	533902	8165734	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0522.01-h	0	3870	533902	8165734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0523.01-d	0	3870	534102	8165234	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0523.01-e	0	3870	534102	8165234	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0523.01-f	0	3870	534102	8165234	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0523.01-g	0	3870	534102	8165234	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0523.01-h	0	3870	534102	8165234	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0524.01-b	0	3850	534102	8168134	NA	0.01	0.65	C	0.65	1	0	0	0	0	NA
tm-0524.01-e	0	3850	534102	8168134	NA	0.01	0.65	C	0.65	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0524.01-f	0	3850	534102	8168134	NA	0.01	0.65	C	0.65	1	0	0	0	0	NA
tm-0524.01-g	0	3850	534102	8168134	NA	0.01	0.65	C	0.65	1	0	0	0	0	NA
tm-0525.01-b	0	3845	534302	8168434	NA	0.01	0.8	C	0.8	1	0	0	0	0	NA
tm-0525.01-d	0	3845	534302	8168434	NA	0.01	0.8	C	0.8	1	0	0	0	0	NA
tm-0525.01-e	0	3845	534302	8168434	NA	0.01	0.8	C	0.8	1	0	0	0	0	NA
tm-0526.01-f	0	3855	534402	8167334	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0526.01-h	0	3855	534402	8167334	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0528.01-d	0	3865	534702	8166134	NA	0.01	0.99	C	1	1	0.5	0	0	0	NA
tm-0528.01-e	0	3865	534702	8166134	NA	1	1	C	1	1	0.5	0	0	0	NA
tm-0528.01-f	0	3865	534702	8166134	NA	0.01	0.99	C	1	1	0.5	0	0	0	NA
tm-0528.01-g	0	3865	534702	8166134	NA	0.01	0.99	C	1	1	0.5	0	0	0	NA
tm-0529.01-h	0	3925	533802	8162634	NA	0.35	0.35	C	0.35	1	0	0	0	0	NA
tm-0530.01-f	0	3980	534502	8161634	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0530.01-h	0	3980	534502	8161634	NA	0.03	0.05	C	0.05	1	0	0	0	0	NA
tm-0531.01-e	0	3975	534802	8161834	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0531.01-f	0	3975	534802	8161834	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0531.01-h	0	3975	534802	8161834	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0532.01-f	0	3940	534202	8162034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0532.01-g	0	3940	534202	8162034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0532.01-h	0	3940	534202	8162034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0533.01-e	0	3950	534202	8161934	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0533.01-f	0	3950	534202	8161934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0534.01-e	0	3955	533902	8162034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0534.01-f	0	3955	533902	8162034	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0534.01-h	0	3955	533902	8162034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0535.01-h	0	3910	533902	8162934	NA	0.05	0.05	C	0.05	1	0	0	0	0	NA
tm-0536.01-d	0	3890	533902	8163834	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0536.01-e	0	3890	533902	8163834	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0536.01-f	0	3890	533902	8163834	NA	0.04	0.1	C	0.1	1	0	0	0	0	NA
tm-0537.01-e	0	3875	534202	8164834	NA	0.01	0.99	C	2	1	0	0	0	0	NA
tm-0537.01-f	0	3875	534202	8164834	NA	1	2	C	2	1	0	0	0	0	NA
tm-0537.01-g	0	3875	534202	8164834	NA	0.01	0.99	C	2	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0538.01-e	0	3890	534102	8164534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0538.01-f	0	3890	534102	8164534	NA	0.09	0.35	C	0.35	1	0	0	0	0	NA
tm-0538.01-g	0	3890	534102	8164534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0538.01-h	0	3890	534102	8164534	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0539.01-e	0	3875	534602	8164734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0539.01-f	0	3875	534602	8164734	NA	0.04	0.15	C	0.15	1	0	0	0	0	NA
tm-0539.01-g	0	3875	534602	8164734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0539.01-h	0	3875	534602	8164734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0540.01-e	0	3880	534602	8164634	NA	0.01	0.99	C	1.2	1	0	0	0	0	NA
tm-0540.01-f	0	3880	534602	8164634	NA	1	1.2	C	1.2	1	0	0	0	0	NA
tm-0541.01-e	0	3950	534502	8164034	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0541.01-f	0	3950	534502	8164034	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0542.01-e	0	3925	534502	8163734	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0542.01-f	0	3925	534502	8163734	NA	0.07	0.2	C	0.2	1	0	0	0	0	NA
tm-0542.01-g	0	3925	534502	8163734	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0543.01-e	0	3910	534602	8164134	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0543.01-f	0	3910	534602	8164134	NA	0.02	0.05	C	0.05	1	0	0	0	0	NA
tm-0543.01-h	0	3910	534602	8164134	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0544.01-f	0	3900	534802	8163134	NA	0.01	0.04	C	0.05	1	0	0	0	0	NA
tm-0544.01-h	0	3900	534802	8163134	NA	0.03	0.05	C	0.05	1	0	0	0	0	NA
tm-0545.01-f	0	4240	536302	8161334	NA	0.03	0.03	C	0.03	1	0	0	0	0	NA
tm-0546.01-h	0	4040	535002	8161634	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
tm-0547.01-f	0	4050	535602	8161734	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0548.01-f	0	4085	536302	8161834	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0548.01-h	0	4085	536302	8161834	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0549.01-f	0	4035	536302	8162134	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0549.01-h	0	4035	536302	8162134	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0550.01-h	0	3950	535902	8162334	NA	0.15	0.15	C	0.15	1	0	0	0	0	NA
tm-0551.01-e	0	3920	535602	8162434	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0551.01-f	0	3920	535602	8162434	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0551.01-h	0	3920	535602	8162434	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0552.01-e	0	3920	535702	8162534	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0552.01-f	0	3920	535702	8162534	NA	0.11	0.3	C	0.3	1	0	0	0	0	NA
tm-0552.01-h	0	3920	535702	8162534	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0553.01-f	0	3950	536502	8162534	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0553.01-h	0	3950	536502	8162534	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0554.01-f	0	3910	536302	8162934	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0554.01-h	0	3910	536302	8162934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0555.01-f	0	3920	535002	8162834	NA	0.18	0.35	C	0.35	1	0	0	0	0	NA
tm-0555.01-h	0	3920	535002	8162834	NA	0.01	0.34	C	0.35	1	0	0	0	0	NA
tm-0556.01-e	0	3900	535102	8163034	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0556.01-f	0	3900	535102	8163034	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0556.01-h	0	3900	535102	8163034	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0557.01-e	0	3900	535302	8163034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0557.01-f	0	3900	535302	8163034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0557.01-g	0	3900	535302	8163034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0557.01-h	0	3900	535302	8163034	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0558.01-d	0	3910	535602	8163034	NA	3	4.5	C	4.5	1	0.5	0.5	0	0	NA
tm-0558.01-e	0	3910	535602	8163034	NA	3	4.5	C	4.5	1	0.5	1	0	0	NA
tm-0558.01-f	0	3910	535602	8163034	NA	0.01	0.99	C	4.5	1	0	0	0	0	NA
tm-0558.01-g	0	3910	535602	8163034	NA	0.01	0.99	C	4.5	1	0	0	0	0	NA
tm-0558.01-h	0	3910	535602	8163034	NA	0.01	0.99	C	4.5	1	0	0	0	0	NA
tm-0559.01-f	0	3910	536302	8162934	NA	0.14	0.4	C	0.4	1	0	0	0	0	NA
tm-0559.01-g	0	3910	536302	8162934	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0559.01-h	0	3910	536302	8162934	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0560.01-e	0	3855	534802	8167234	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0560.01-f	0	3855	534802	8167234	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0561.01-d	0	3865	534802	8166034	NA	0.01	0.1	C	0.1	1	0.5	0	0	0	NA
tm-0561.01-e	0	3865	534802	8166034	NA	0.01	0.1	P	0.1	1	0.5	0	0	0	NA
tm-0562.01-e	0	3865	534802	8165934	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0562.01-f	0	3865	534802	8165934	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0562.01-h	0	3865	534802	8165934	NA	0.01	0.35	C	0.35	1	0	0	0	0	NA
tm-0563.01-f	0	3870	535502	8165034	NA	0.19	0.55	C	0.55	1	0	0	0	0	NA
tm-0563.01-g	0	3870	535502	8165034	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0563.01-h	0	3870	535502	8165034	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0564.01-g	0	3870	535502	8165134	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0564.01-h	0	3870	535502	8165134	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0565.01-f	0	3870	535602	8165434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0565.01-g	0	3870	535602	8165434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0565.01-h	0	3870	535602	8165434	NA	0.01	0.25	C	0.25	1	0	0	0	0	NA
tm-0566.01-f	0	3870	535802	8165134	NA	0.01	0.29	C	0.3	1	0	0	0	0	NA
tm-0566.01-g	0	3870	535802	8165134	NA	0.16	0.3	C	0.3	1	0	0	0	0	NA
tm-0567.01-f	0	4020	537502	8160434	NA	0.01	0.49	C	0.5	1	0	0	0	0	NA
tm-0567.01-h	0	4020	537502	8160434	NA	0.26	0.5	C	0.5	1	0	0	0	0	NA
tm-0568.01-f	0	4140	536702	8161134	NA	0.06	0.1	C	0.1	1	0	0	0	0	NA
tm-0568.01-h	0	4140	536702	8161134	NA	0.01	0.09	C	0.1	1	0	0	0	0	NA
tm-0569.01-f	0	4080	536902	8161334	NA	0.13	0.25	C	0.25	1	0	0	0	0	NA
tm-0569.01-h	0	4080	536902	8161334	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0570.01-f	0	4080	537002	8161434	NA	0.28	0.55	C	0.55	1	0	0	0	0	NA
tm-0570.01-h	0	4080	537002	8161434	NA	0.01	0.54	C	0.55	1	0	0	0	0	NA
tm-0571.01-e	0	4165	536902	8161534	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0571.01-f	0	4165	536902	8161534	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0571.01-g	0	4165	536902	8161534	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0571.01-h	0	4165	536902	8161534	NA	0.01	0.5	C	0.5	1	0	0	0	0	NA
tm-0572.01-h	0	4160	537202	8161734	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
tm-0573.01-e	0	4035	537202	8161934	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0573.01-f	0	4035	537202	8161934	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0573.01-g	0	4035	537202	8161934	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0573.01-h	0	4035	537202	8161934	NA	0.01	0.2	C	0.2	1	0	0	0	0	NA
tm-0574.01-f	0	3900	537102	8162934	NA	0.01	0.19	C	0.2	1	0	0	0	0	NA
tm-0574.01-g	0	3900	537102	8162934	NA	0.11	0.2	C	0.2	1	0	0	0	0	NA
tm-0575.01-e	0	3900	537102	8162834	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0575.01-f	0	3900	537102	8162834	NA	0.21	0.4	C	0.4	1	0	0	0	0	NA
tm-0576.01-f	0	3940	537902	8161734	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0576.01-g	0	3940	537902	8161734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0576.01-h	0	3940	537902	8161734	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tm-0577.01-d	0	3910	537902	8162634	NA	3	3	C	3	1	0	0	0	0	NA
tm-0577.01-e	0	3910	537902	8162634	NA	3	3	C	3	1	0	0	0	0	NA
tm-0577.01-h	0	3910	537902	8162634	NA	0.01	0.99	C	3	1	0	0	0	0	NA
tm-0578.01-f	0	3890	538102	8163834	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0579.01-e	0	3885	538002	8164034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0579.01-f	0	3885	538002	8164034	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0579.01-h	0	3885	538002	8164034	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0580.01-f	0	3885	537302	8163734	NA	0.35	0.35	C	0.35	1	0	0	0	0	NA
tm-0581.01-h	0	3890	537302	8163534	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
tm-0582.01-f	0	3900	537302	8162934	NA	0.09	0.25	C	0.25	1	0	0	0	0	NA
tm-0582.01-g	0	3900	537302	8162934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0582.01-h	0	3900	537302	8162934	NA	0.01	0.24	C	0.25	1	0	0	0	0	NA
tm-0583.01-e	0	3875	535802	8164734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0583.01-f	0	3875	535802	8164734	NA	0.06	0.15	C	0.15	1	0	0	0	0	NA
tm-0583.01-h	0	3875	535802	8164734	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0584.01-e	0	3890	536002	8163734	NA	0.01	0.44	C	0.45	1	0	0	0	0	NA
tm-0584.01-f	0	3890	536002	8163734	NA	0.16	0.45	C	0.45	1	0	0	0	0	NA
tm-0584.01-h	0	3890	536002	8163734	NA	0.01	0.44	C	0.45	1	0	0	0	0	NA
tm-0585.01-f	0	3875	535602	8164634	NA	0.01	0.99	C	1.55	1	0	0	0	0	NA
tm-0585.01-g	0	3875	535602	8164634	NA	1	1.55	C	1.55	1	0	0	0	0	NA
tm-0586.01-f	0	3855	534802	8164334	NA	0.21	0.4	C	0.4	1	0	0	0	0	NA
tm-0586.01-g	0	3855	534802	8164334	NA	0.01	0.39	C	0.4	1	0	0	0	0	NA
tm-0587.01-d	0	3880	534802	8164634	NA	0.01	0.14	C	0.15	1	0	0	0	0	NA
tm-0587.01-f	0	3880	534802	8164634	NA	0.08	0.15	C	0.15	1	0	0	0	0	NA
tm-0600.01-b	0	3861	534954	8169363	NA	37	37	C	400	1	1	1	0	0	NA
tm-0600.01-c	0	3861	534954	8169363	NA	100	100	C	400	1	1	0	0	0	NA
tm-0600.01-d	0	3861	534954	8169363	NA	400	400	C	400	1	1	1	0	0	NA
tm-0600.01-e	0	3861	534954	8169363	NA	400	400	C	400	1	1	1	0	0	NA
tm-0600.01-f	0	3861	534954	8169363	NA	20	20	C	400	1	0	0	0	0	NA
tm-0600.01-g	0	3861	534954	8169363	NA	170	170	C	400	1	1	1	0	0	NA
tm-0600.01-h	0	3861	534954	8169363	NA	68	68	C	400	1	1	0	0	0	NA
kt-0001.01-f	0	3828	541030	8183418	NA	0.001	0.22	C	0.22	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0001.01-g	0	3828	541030	8183418	NA	0.001	0.22	C	0.22	1	0	0	0	0	NA
kt-0002.01-e	0	3827	539526	8181054	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0002.01-f	0	3827	539526	8181054	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0003.01-b	0	3826	540415	8182549	NA	0.001	3	C	6.22	1	0	0	0	0	NA
kt-0003.01-c	0	3826	540415	8182549	NA	0.001	1	C	6.22	1	0	0	0	0	NA
kt-0003.01-d	0	3826	540415	8182549	NA	1	6.22	C	6.22	1	0	0	0	0	NA
kt-0003.01-f	0	3826	540415	8182549	NA	0.001	6.22	C	6.22	1	0	0	0	0	NA
kt-0004.01-g	0	3828	540588	8183194	NA	0.09	0.09	C	0.09	1	0	0	0	0	NA
kt-0005.01-g	0	3829	540212	8182952	NA	0.12	0.12	C	0.12	1	0	0	0	0	NA
kt-0006.01-c	0	3828	539837	8182192	NA	0.001	0.24	C	0.24	1	0	0	0	0	NA
kt-0006.01-g	0	3828	539837	8182192	NA	0.001	0.24	C	0.24	1	0	0	0	0	NA
kt-0007.01-g	0	3823	539533	8181941	NA	0.5	0.5	C	0.5	1	0	0	0	0	NA
kt-0008.01-g	0	3824	539479	8182394	NA	0.04	0.04	C	0.04	1	0	0	0	0	NA
kt-0009.01-g	0	3822	539416	8182345	NA	0.008	0.008	C	0.008	1	0	0	0	0	NA
kt-0010.01-g	0	3824	539421	8181938	NA	0.02	0.02	C	0.02	1	0	0	0	0	NA
kt-0011.01-e	0	3827	539196	8181441	NA	0.001	0.006	C	0.006	1	0	0	0	0	NA
kt-0011.01-f	0	3827	539196	8181441	NA	0.001	0.006	C	0.006	1	0	0	0	0	NA
kt-0012.01-c	0	3850	537851	8181626	NA	0.001	1	C	48.4	1	0	0	0	0	NA
kt-0012.01-d	0	3850	537851	8181626	NA	7	15	C	48.4	1	0	0	0	0	NA
kt-0012.01-e	0	3850	537851	8181626	NA	7	48.4	C	48.4	1	0	0	0	0	NA
kt-0012.01-f	0	3850	537851	8181626	NA	0.001	48.4	C	48.4	1	0	0	0	0	NA
kt-0013.01-d	0	3826	539146	8182545	NA	0.3	0.3	C	0.3	1	0	0	0	0	NA
kt-0014.01-e	0	3826	539361	8182895	NA	0.001	0.23	C	0.23	1	0	0	0	0	NA
kt-0014.01-f	0	3826	539361	8182895	NA	0.001	0.23	C	0.23	1	0	0	0	0	NA
kt-0015.01-g	0	3828	539916	8183662	NA	0.54	0.54	C	0.54	1	0	0	0	0	NA
kt-0016.01-d	0	3827	539546	8183536	NA	0.2	0.2	C	0.2	1	0	0	0	0	NA
kt-0017.01-d	0	3826	539112	8182776	NA	0.04	0.04	C	0.04	1	0	0	0	0	NA
kt-0018.01-f	0	3829	538538	8181611	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0018.01-g	0	3829	538538	8181611	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0019.01-d	0	3827	539405	8183683	NA	0.02	0.02	C	0.02	1	0	0	0	0	NA
kt-0020.01-c	0	3829	538560	8183139	NA	0.04	0.04	C	0.04	1	0	0	0	0	NA
kt-0021.01-b	0	3825	538706	8183474	NA	0.001	0.47	C	0.47	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0021.01-c	0	3825	538706	8183474	NA	0.001	0.47	C	0.47	1	0	0	0	0	NA
kt-0021.01-d	0	3825	538706	8183474	NA	0.001	0.47	C	0.47	1	0	0	0	0	NA
kt-0021.01-e	0	3825	538706	8183474	NA	0.001	0.47	C	0.47	1	0	0	0	0	NA
kt-0021.01-f	0	3825	538706	8183474	NA	0.001	0.47	C	0.47	1	0	0	0	0	NA
kt-0021.01-g	0	3825	538706	8183474	NA	0.001	0.47	C	0.47	1	0	0	0	0	NA
kt-0022.01-g	0	3826	539093	8183900	NA	0.18	0.18	C	0.18	1	0	0	0	0	NA
kt-0023.01-e	0	3826	539130	8184280	NA	0.001	1.3	C	1.3	1	0	0	0	0	NA
kt-0023.01-f	0	3826	539130	8184280	NA	0.001	1.3	C	1.3	1	0	0	0	0	NA
kt-0023.01-g	0	3826	539130	8184280	NA	0.001	1.3	C	1.3	1	0	0	0	0	NA
kt-0024.01-d	0	3828	538950	8184188	NA	0.005	0.005	C	0.005	1	0	0	0	0	NA
kt-0025.01-g	0	3827	538981	8184082	NA	0.24	0.24	C	0.24	1	0	0	0	0	NA
kt-0026.01-f	0	3824	538515	8183542	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0026.01-g	0	3824	538515	8183542	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0027.01-g	0	3827	538412	8183449	NA	0.24	0.24	C	0.24	1	0	0	0	0	NA
kt-0028.01-d	0	3826	538191	8183470	NA	1	2.1	C	2.1	1	0	0	0	0	NA
kt-0028.01-f	0	3826	538191	8183470	NA	0.001	2.1	C	2.1	1	0	0	0	0	NA
kt-0029.01-d	0	3827	538300	8183726	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0029.01-f	0	3827	538300	8183726	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0030.01-d	0	3829	538019	8182155	NA	0.001	1	C	2.6	1	0	0	0	0	NA
kt-0030.01-e	0	3829	538019	8182155	NA	0.001	2.6	C	2.6	1	0	0	0	0	NA
kt-0030.01-f	0	3829	538019	8182155	NA	0.001	2.6	C	2.6	1	0	0	0	0	NA
kt-0030.01-g	0	3829	538019	8182155	NA	0.001	2.6	C	2.6	1	0	0	0	0	NA
kt-0031.01-f	0	3827	538091	8181886	NA	0.001	0.05	P	0.05	1	0	0	0	0	NA
kt-0031.01-g	0	3827	538091	8181886	NA	0.001	0.05	C	0.05	1	0	0	0	0	NA
kt-0032.01-b	0	3853	536218	8181813	NA	0.001	19.5	C	23.6	1	0	0	0	0	NA
kt-0032.01-c	1	3853	536218	8181813	NA	14	15	C	23.6	1	1	0	0	0	NA
kt-0032.01-d	1	3853	536218	8181813	NA	0.001	1	C	23.6	1	0	0	0	0	NA
kt-0032.01-e	1	3853	536218	8181813	NA	14	19.5	C	23.6	1	0	0	0	0	NA
kt-0032.01-f	1	3853	536218	8181813	NA	0.001	19.5	C	23.6	1	0	0	0	0	NA
kt-0032.01-g	0	3853	536218	8181813	NA	0.001	19.5	C	23.6	1	0	0	0	0	NA
kt-0032.02-c	1	3828	536447	8182512	NA	0.001	1	C	23.6	1	0	0	0	0	NA
kt-0032.02-d	1	3828	536447	8182512	NA	1	3.6	C	23.6	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0032.02-e	1	3828	536447	8182512	NA	0.001	3.6	C	23.6	1	0	0	0	0	NA
kt-0032.02-f	1	3828	536447	8182512	NA	0.001	3.6	C	23.6	1	0	0	0	0	NA
kt-0032.03-d	1	3826	536648	8182566	NA	0.5	0.5	C	23.6	1	0	0	0	0	NA
kt-0033.01-d	0	3827	537263	8183963	NA	3.06	3.06	C	3.06	1	0	0	0	0	NA
kt-0034.01-d	0	3824	537171	8184232	NA	1	1.2	C	1.2	1	0	0	0	0	NA
kt-0034.01-e	0	3824	537171	8184232	NA	0.001	1.2	P	1.2	1	0	0	0	0	NA
kt-0034.01-f	0	3824	537171	8184232	NA	0.001	1.2	P	1.2	1	0	0	0	0	NA
kt-0035.01-d	0	3826	537238	8184558	NA	0.001	1	C	5.78	1	0	0	0	0	NA
kt-0035.01-e	0	3826	537238	8184558	NA	0.001	5.78	P	5.78	1	0	0	0	0	NA
kt-0035.01-f	0	3826	537238	8184558	NA	0.001	5.78	P	5.78	1	0	0	0	0	NA
kt-0036.01-d	0	3828	536905	8184560	NA	1	1.6	C	1.6	1	0	0	0	0	NA
kt-0036.01-e	0	3828	536905	8184560	NA	0.001	1.6	P	1.6	1	0	0	0	0	NA
kt-0036.01-f	0	3828	536905	8184560	NA	0.001	1.6	P	1.6	1	0	0	0	0	NA
kt-0037.01-d	1	3826	536693	8184303	NA	0.075	0.075	C	0.115	1	0	0	0	0	NA
kt-0037.02-d	1	3829	536926	8184241	NA	0.04	0.04	C	0.115	1	0	0	0	0	NA
kt-0038.01-d	0	3826	537006	8183915	NA	0.001	0.08	C	0.08	1	0	0	0	0	NA
kt-0038.01-f	0	3826	537006	8183915	NA	0.001	0.08	C	0.08	1	0	0	0	0	NA
kt-0038.01-g	0	3826	537006	8183915	NA	0.001	0.08	C	0.08	1	0	0	0	0	NA
kt-0039.01-f	1	3826	536642	8182563	NA	0.001	0.06	C	0.62	1	0	0	0	0	NA
kt-0039.01-g	0	3826	536642	8182563	NA	0.001	0.06	C	0.62	1	0	0	0	0	NA
kt-0039.02-e	0	3826	536643	8182418	NA	0.001	0.56	C	0.62	1	0	0	0	0	NA
kt-0039.02-f	1	3826	536643	8182418	NA	0.001	0.56	C	0.62	1	0	0	0	0	NA
kt-0040.01-d	0	3824	536662	8183352	NA	1.8	1.8	C	1.8	1	0	0	0	0	NA
kt-0041.01-d	0	3825	536734	8185713	NA	0.63	0.63	C	0.63	1	0	0	0	0	NA
kt-0042.01-d	0	3831	536555	8184584	NA	0.2	0.2	C	0.2	1	0	0	0	0	NA
kt-0043.01-d	0	3831	536506	8184346	NA	0.08	0.08	C	0.08	1	0	0	0	0	NA
kt-0044.01-d	0	3827	536455	8183005	NA	1	1	C	1	1	0	0	0	0	NA
kt-0045.01-c	0	3826	536475	8182740	NA	0.001	0.36	C	0.36	1	0	0	0	0	NA
kt-0045.01-d	0	3826	536475	8182740	NA	0.001	0.36	C	0.36	1	0	0	0	0	NA
kt-0045.01-e	0	3826	536475	8182740	NA	0.001	0.36	C	0.36	1	0	0	0	0	NA
kt-0045.01-f	0	3826	536475	8182740	NA	0.001	0.36	C	0.36	1	0	0	0	0	NA
kt-0046.01-g	0	3827	536280	8185802	NA	0.04	0.04	C	0.04	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0047.01-d	0	3832	536118	8184516	NA	0.26	0.26	C	0.26	1	0	0	0	0	NA
kt-0048.01-b	0	3849	536107	8181080	NA	0.001	3.1	C	3.1	1	0	0	0	0	NA
kt-0048.01-c	0	3849	536107	8181080	NA	3.1	3.1	C	3.1	1	0	0	0	0	NA
kt-0048.01-d	0	3849	536107	8181080	NA	1	3.1	C	3.1	1	0	0	0	0	NA
kt-0048.01-e	0	3849	536107	8181080	NA	0.001	3.1	C	3.1	1	0	0	0	0	NA
kt-0048.01-f	0	3849	536107	8181080	NA	0.001	3.1	C	3.1	1	0	0	0	0	NA
kt-0049.01-d	0	3828	535717	8183801	NA	0.001	1	C	1.2	1	0	0	0	0	NA
kt-0049.01-e	0	3828	535717	8183801	NA	0.001	1.2	C	1.2	1	0	0	0	0	NA
kt-0049.01-g	0	3828	535717	8183801	NA	0.001	1.2	C	1.2	1	0	0	0	0	NA
kt-0050.01-d	0	3826	535454	8184124	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0050.01-f	0	3826	535454	8184124	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0050.01-g	0	3826	535454	8184124	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0051.01-f	0	3825	535739	8184355	NA	0.001	0.17	C	0.17	1	0	0	0	0	NA
kt-0051.01-g	0	3825	535739	8184355	NA	0.001	0.17	C	0.17	1	0	0	0	0	NA
kt-0052.01-d	0	3826	535218	8183655	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0052.01-g	0	3826	535218	8183655	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0053.01-a	0	3859	535395	8181529	NA	0.001	1.25	C	1.25	1	0	0	0	0	NA
kt-0053.01-e	0	3859	535395	8181529	NA	0.001	1.25	C	1.25	1	0	0	0	0	NA
kt-0054.01-e	0	3845	535542	8181557	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0054.01-f	0	3845	535542	8181557	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0054.01-g	0	3845	535542	8181557	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0055.01-d	0	3826	537814	8182295	NA	0.05	0.05	C	0.05	1	0	0	0	0	NA
kt-0056.01-f	0	3873	537566	8179950	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0056.01-g	0	3873	537566	8179950	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0057.01-f	0	3855	537507	8180608	NA	0.001	0.12	C	0.12	1	0	0	0	0	NA
kt-0057.01-g	0	3855	537507	8180608	NA	0.001	0.12	C	0.12	1	0	0	0	0	NA
kt-0058.01-e	1	3851	537508	8180849	NA	0.001	0.3	C	0.54	1	0	0	0	0	NA
kt-0058.01-f	1	3851	537508	8180849	NA	0.001	0.3	C	0.54	1	0	0	0	0	NA
kt-0058.01-g	1	3851	537508	8180849	NA	0.001	0.3	C	0.54	1	0	0	0	0	NA
kt-0058.02-e	1	3847	537543	8180936	NA	0.001	0.24	C	0.54	1	0	0	0	0	NA
kt-0058.02-f	1	3847	537543	8180936	NA	0.001	0.24	C	0.54	1	0	0	0	0	NA
kt-0058.02-g	1	3847	537543	8180936	NA	0.001	0.24	C	0.54	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0059.01-f	0	3849	537345	8181390	NA	0.001	5.75	C	5.75	1	0	0	0	0	NA
kt-0059.01-g	0	3849	537345	8181390	NA	0.001	5.75	C	5.75	1	0	0	0	0	NA
kt-0060.01-f	0	3864	537358	8180933	NA	0.001	0.063	C	0.063	1	0	0	0	0	NA
kt-0060.01-g	0	3864	537358	8180933	NA	0.001	0.063	C	0.063	1	0	0	0	0	NA
kt-0061.01-c	0	3868	537400	8180421	NA	0.001	0.015	P	0.015	1	0	0	0	0	NA
kt-0061.01-d	0	3868	537400	8180421	NA	0.001	0.015	C	0.015	1	0	0	0	0	NA
kt-0061.01-e	0	3868	537400	8180421	NA	0.001	0.015	C	0.015	1	0	0	0	0	NA
kt-0061.01-f	0	3868	537400	8180421	NA	0.001	0.015	C	0.015	1	0	0	0	0	NA
kt-0062.01-d	0	3864	536906	8181420	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0062.01-f	0	3864	536906	8181420	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0062.01-g	0	3864	536906	8181420	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0063.01-d	0	3875	536922	8181024	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0063.01-f	0	3875	536922	8181024	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0063.01-g	0	3875	536922	8181024	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0064.01-d	0	3825	537205	8182405	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0064.01-g	0	3825	537205	8182405	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0065.01-b	0	3826	537926	8184980	NA	1	2.35	C	2.35	1	1	1	0	0	NA
kt-0065.01-c	0	3826	537926	8184980	NA	1	2.35	C	2.35	1	0	1	0	0	NA
kt-0065.01-d	0	3826	537926	8184980	NA	0.001	1	C	2.35	1	0	1	0	0	NA
kt-0065.01-e	0	3826	537926	8184980	NA	0.001	2.35	C	2.35	1	0	0	0	0	NA
kt-0065.01-g	0	3826	537926	8184980	NA	0.001	2.35	C	2.35	1	0	0	0	0	NA
kt-0066.01-e	0	3823	537899	8183532	NA	0.001	1.5	C	1.5	1	0	0	0	0	NA
kt-0066.01-f	0	3823	537899	8183532	NA	0.001	1.5	C	1.5	1	0	0	0	0	NA
kt-0066.01-g	0	3823	537899	8183532	NA	0.001	1.5	C	1.5	1	0	0	0	0	NA
kt-0067.01-d	0	3823	538230	8184088	NA	15	15	C	15	1	0	0	0	0	NA
kt-0067.01-f	0	3823	538230	8184088	NA	0.001	15	C	15	1	0	0	0	0	NA
kt-0068.01-d	0	3826	538077	8183161	NA	0.001	0.24	C	0.24	1	0	0	0	0	NA
kt-0068.01-f	0	3826	538077	8183161	NA	0.001	0.24	C	0.24	1	0	0	0	0	NA
kt-0069.01-b	0	3826	539154	8185387	NA	0.001	0.36	C	0.36	1	0	0	0	0	NA
kt-0069.01-c	0	3826	539154	8185387	NA	0.001	0.36	C	0.36	1	0	0	0	0	NA
kt-0069.01-d	0	3826	539154	8185387	NA	0.001	0.36	C	0.36	1	0	0	0	0	NA
kt-0070.01-b	0	3827	538736	8185130	NA	0.001	0.74	C	0.74	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0070.01-c	0	3827	538736	8185130	NA	0.001	0.74	C	0.74	1	0	1	0	0	NA
kt-0070.01-d	0	3827	538736	8185130	NA	0.001	0.74	C	0.74	1	0	1	0	0	NA
kt-0070.01-f	0	3827	538736	8185130	NA	0.001	0.74	C	0.74	1	0	0	0	0	NA
kt-0070.01-g	0	3827	538736	8185130	NA	0.001	0.74	C	0.74	1	0	0	0	0	NA
kt-0071.01-b	0	3828	539143	8185156	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0071.01-c	0	3828	539143	8185156	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0071.01-d	0	3828	539143	8185156	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0071.01-f	0	3828	539143	8185156	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0071.01-g	0	3828	539143	8185156	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0072.01-f	0	3826	538933	8185027	NA	0.001	0.18	C	0.18	1	0	0	0	0	NA
kt-0072.01-g	0	3826	538933	8185027	NA	0.001	0.18	C	0.18	1	0	0	0	0	NA
kt-0073.01-d	0	3828	539933	8185684	NA	0.001	0.046	C	0.046	1	0	0	0	0	NA
kt-0073.01-f	0	3828	539933	8185684	NA	0.001	0.046	C	0.046	1	0	0	0	0	NA
kt-0073.01-g	0	3828	539933	8185684	NA	0.001	0.046	C	0.046	1	0	0	0	0	NA
kt-0074.01-d	0	3823	535542	8185523	NA	0.56	0.56	C	0.56	1	0	0	0	0	NA
kt-0075.01-d	0	3812	535257	8185368	NA	0.001	0.15	P	0.15	1	0	0	0	0	NA
kt-0076.01-d	0	3825	534982	8185956	NA	0.001	0.09	P	0.09	1	0	0	0	0	NA
kt-0076.01-g	0	3825	534982	8185956	NA	0.001	0.09	C	0.09	1	0	0	0	0	NA
kt-0077.01-d	0	3826	534985	8183858	NA	0.001	0.12	P	0.12	1	0	0	0	0	NA
kt-0077.01-g	0	3826	534985	8183858	NA	0.001	0.12	C	0.12	1	0	0	0	0	NA
kt-0078.01-d	0	3828	534912	8183216	NA	0.064	0.064	C	0.064	1	0	0	0	0	NA
kt-0079.01-d	0	3830	535012	8182627	NA	0.4	0.4	C	0.4	1	0	0	0	0	NA
kt-0080.01-c	0	3852	536044	8180340	NA	0.001	0.14	P	0.14	1	0	0	0	0	NA
kt-0080.01-e	0	3852	536044	8180340	NA	0.001	0.14	C	0.14	1	0	0	0	0	NA
kt-0080.01-f	0	3852	536044	8180340	NA	0.001	0.14	C	0.14	1	0	0	0	0	NA
kt-0080.01-g	0	3852	536044	8180340	NA	0.001	0.14	C	0.14	1	0	0	0	0	NA
kt-0081.01-c	0	3863	535870	8180256	NA	1.12	1.12	C	1.12	1	0	0	0	0	NA
kt-0081.01-e	0	3863	535870	8180256	NA	0.001	1.12	C	1.12	1	0	0	0	0	NA
kt-0081.01-f	0	3863	535870	8180256	NA	0.001	1.12	C	1.12	1	0	0	0	0	NA
kt-0081.01-g	0	3863	535870	8180256	NA	0.001	1.12	C	1.12	1	0	0	0	0	NA
kt-0082.01-f	0	3895	535601	8179715	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0082.01-g	0	3895	535601	8179715	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0083.01-c	0	3880	535451	8179577	NA	0.5	0.5	C	0.5	1	0	0	0	0	NA
kt-0083.01-d	0	3880	535451	8179577	NA	0.001	0.5	C	0.5	1	0	0	0	0	NA
kt-0083.01-f	0	3880	535451	8179577	NA	0.001	0.5	C	0.5	1	0	0	0	0	NA
kt-0083.01-g	0	3880	535451	8179577	NA	0.001	0.5	C	0.5	1	0	0	0	0	NA
kt-0084.01-f	0	3879	535104	8179183	NA	0.001	0.09	C	0.09	1	0	0	0	0	NA
kt-0084.01-g	0	3879	535104	8179183	NA	0.001	0.09	C	0.09	1	0	0	0	0	NA
kt-0085.01-f	0	3861	535330	8179928	NA	0.001	0.06	C	0.06	1	0	0	0	0	NA
kt-0085.01-g	0	3861	535330	8179928	NA	0.001	0.06	C	0.06	1	0	0	0	0	NA
kt-0086.01-f	0	3860	535476	8180099	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0086.01-g	0	3860	535476	8180099	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0087.01-f	0	3846	535795	8180773	NA	0.001	0.15	C	0.15	1	0	0	0	0	NA
kt-0087.01-g	0	3846	535795	8180773	NA	0.001	0.15	C	0.15	1	0	0	0	0	NA
kt-0088.01-f	0	3845	535800	8180917	NA	0.001	0.18	C	0.18	1	0	0	0	0	NA
kt-0088.01-g	0	3845	535800	8180917	NA	0.001	0.18	C	0.18	1	0	0	0	0	NA
kt-0089.01-e	0	3843	535791	8181195	NA	0.001	0.088	C	0.088	1	0	0	0	0	NA
kt-0089.01-f	0	3843	535791	8181195	NA	0.001	0.088	C	0.088	1	0	0	0	0	NA
kt-0089.01-g	0	3843	535791	8181195	NA	0.001	0.088	C	0.088	1	0	0	0	0	NA
kt-0090.01-d	0	3827	534900	8182799	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0090.01-f	0	3827	534900	8182799	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0090.01-g	0	3827	534900	8182799	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0091.01-d	0	3829	534844	8182908	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
kt-0092.01-d	0	3828	534830	8183013	NA	0.012	0.012	C	0.012	1	0	0	0	0	NA
kt-0093.01-d	0	3826	534677	8184845	NA	0.001	0.04	C	0.04	1	0	0	0	0	NA
kt-0093.01-g	0	3826	534677	8184845	NA	0.001	0.04	C	0.04	1	0	0	0	0	NA
kt-0094.01-d	0	3827	534461	8184927	NA	0.1	0.1	C	0.1	1	0	0	0	0	NA
kt-0095.01-g	0	3824	534870	8184472	NA	0.08	0.08	C	0.08	1	0	0	0	0	NA
kt-0096.01-b	0	3829	534429	8182632	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0096.01-c	0	3829	534429	8182632	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0096.01-d	0	3829	534429	8182632	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0096.01-e	0	3829	534429	8182632	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0096.01-f	0	3829	534429	8182632	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0096.01-g	0	3829	534429	8182632	NA	0.001	1	C	1	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0097.01-d	0	3827	534649	8182820	NA	0.001	0.075	C	0.075	1	0	0	0	0	NA
kt-0097.01-f	0	3827	534649	8182820	NA	0.001	0.075	C	0.075	1	0	0	0	0	NA
kt-0098.01-d	0	3827	534589	8183434	NA	1	1.8	C	1.8	1	0	0	0	0	NA
kt-0098.01-f	0	3827	534589	8183434	NA	0.001	1.8	C	1.8	1	0	0	0	0	NA
kt-0098.01-g	0	3827	534589	8183434	NA	0.001	1.8	C	1.8	1	0	0	0	0	NA
kt-0099.01-d	0	3827	534757	8184599	NA	1	1.2	C	1.2	1	0	0	0	0	NA
kt-0099.01-f	0	3827	534757	8184599	NA	0.001	1.2	C	1.2	1	0	0	0	0	NA
kt-0100.01-d	0	3825	534468	8183537	NA	0.12	0.12	C	0.12	1	0	0	0	0	NA
kt-0101.01-c	0	3829	540140	8182267	NA	0.001	0.75	P	0.75	1	0	0	0	0	NA
kt-0101.01-d	0	3829	540140	8182267	NA	0.001	0.75	C	0.75	1	0	0	0	0	NA
kt-0101.01-g	0	3829	540140	8182267	NA	0.001	0.75	C	0.75	1	0	0	0	0	NA
kt-0102.01-d	0	3828	541725	8181775	NA	0.28	0.28	C	0.28	1	0	0	0	0	NA
kt-0103.01-d	0	3824	541101	8182904	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0103.01-e	0	3824	541101	8182904	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0103.01-g	0	3824	541101	8182904	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0104.01-b	0	3828	541343	8182765	NA	0.001	1	C	2.5	1	0	0	0	0	NA
kt-0104.01-c	0	3828	541343	8182765	NA	0.001	1	C	2.5	1	0	1	0	0	NA
kt-0104.01-d	0	3828	541343	8182765	NA	0.001	1	C	2.5	1	0	0	0	0	NA
kt-0104.01-e	0	3828	541343	8182765	NA	0.001	1	C	2.5	1	0	0	0	0	NA
kt-0104.01-g	0	3828	541343	8182765	NA	0.001	1	C	2.5	1	0	0	0	0	NA
kt-0105.01-d	0	3826	542195	8182902	NA	1.9	1.9	C	1.9	1	0	0	0	0	NA
kt-0106.01-d	0	3829	541685	8183220	NA	0.03	0.03	C	0.03	1	0	0	0	0	NA
kt-0107.01-d	0	3827	542441	8181246	NA	0.4	0.4	C	0.4	1	0	0	0	0	NA
kt-0108.01-d	0	3827	541446	8181824	NA	0.008	0.008	C	0.008	1	0	0	0	0	NA
kt-0109.01-d	0	3830	542692	8182937	NA	0.2	0.2	C	0.2	1	0	0	0	0	NA
kt-0110.01-c	0	3845	526248	8182357	NA	0.001	0.42	C	0.42	1	0	0	0	0	NA
kt-0110.01-e	0	3845	526248	8182357	NA	0.001	0.42	C	0.42	1	0	0	0	0	NA
kt-0111.01-c	0	3841	526615	8182342	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0111.01-d	0	3841	526615	8182342	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0112.01-e	0	3896	529254	8179493	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0112.01-f	0	3896	529254	8179493	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0113.01-d	0	3911	529456	8178804	NA	0.001	0.21	C	0.21	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0113.01-g	0	3911	529456	8178804	NA	0.001	0.21	C	0.21	1	0	0	0	0	NA
kt-0114.01-b	0	3854	527552	8181933	NA	0.001	3	C	11.8	1	0	0	0	0	NA
kt-0114.01-c	0	3854	527552	8181933	NA	6	6	C	11.8	1	0	0	0	0	NA
kt-0114.01-d	0	3854	527552	8181933	NA	1	7	C	11.8	1	0	0	0	0	NA
kt-0114.01-e	0	3854	527552	8181933	NA	6	11.8	C	11.8	1	0	0	0	0	NA
kt-0114.01-f	0	3854	527552	8181933	NA	0.001	11.8	C	11.8	1	0	0	0	0	NA
kt-0114.01-g	0	3854	527552	8181933	NA	0.001	11.8	C	11.8	1	0	0	0	0	NA
kt-0115.01-c	0	3840	528280	8182086	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0115.01-d	0	3840	528280	8182086	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0115.01-e	0	3840	528280	8182086	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0115.01-g	0	3840	528280	8182086	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0116.01-c	0	3844	528549	8181976	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0116.01-d	0	3844	528549	8181976	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0116.01-f	0	3844	528549	8181976	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0117.01-d	0	3833	528885	8182451	NA	0.001	0.35	C	0.35	1	0	0	0	0	NA
kt-0117.01-e	0	3833	528885	8182451	NA	0.001	0.35	C	0.35	1	0	0	0	0	NA
kt-0118.01-c	0	3846	528916	8182004	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0118.01-d	0	3846	528916	8182004	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0119.01-c	0	3859	529126	8181780	NA	0.001	1	C	1.5	1	0	0	0	0	NA
kt-0119.01-d	0	3859	529126	8181780	NA	1	1.5	C	1.5	1	0	0	0	0	NA
kt-0119.01-e	0	3859	529126	8181780	NA	0.001	1.5	C	1.5	1	0	0	0	0	NA
kt-0119.01-f	0	3859	529126	8181780	NA	0.001	1.5	C	1.5	1	0	0	0	0	NA
kt-0120.01-d	0	3865	529956	8181161	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0120.01-f	0	3865	529956	8181161	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0120.01-g	0	3865	529956	8181161	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0121.01-b	0	3829	529556	8182616	NA	0.001	12.3	C	12.3	1	0	0	0	0	NA
kt-0121.01-c	0	3829	529556	8182616	NA	7	12.3	C	12.3	1	0	0	0	0	NA
kt-0121.01-d	0	3829	529556	8182616	NA	0.001	1	C	12.3	1	0	0	0	0	NA
kt-0122.01-c	0	3842	529753	8182094	NA	0.2	0.2	C	0.2	1	0	0	0	0	NA
kt-0123.01-b	0	3867	529976	8181904	NA	0.001	10	C	10	1	0	0	0	0	NA
kt-0123.01-c	0	3867	529976	8181904	NA	7	10	C	10	1	0	0	0	0	NA
kt-0123.01-d	0	3867	529976	8181904	NA	1	7	C	10	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0123.01-e	0	3867	529976	8181904	NA	0.001	10	C	10	1	0	0	0	0	NA
kt-0123.01-f	0	3867	529976	8181904	NA	0.001	10	C	10	1	0	0	0	0	NA
kt-0124.01-a	0	3846	530246	8182201	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0124.01-c	0	3846	530246	8182201	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0124.01-d	0	3846	530246	8182201	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0124.01-e	0	3846	530246	8182201	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0125.01-b	0	3837	530602	8182633	NA	20	20	C	120	1	0	0	0	0	NA
kt-0125.01-c	0	3837	530602	8182633	NA	120	120	C	120	1	1	1	0	0	NA
kt-0125.01-d	0	3837	530602	8182633	NA	7	15	C	120	1	0	1	0	0	NA
kt-0125.01-e	0	3837	530602	8182633	NA	0.001	120	C	120	1	0	0	0	0	NA
kt-0125.01-f	0	3837	530602	8182633	NA	0.001	120	C	120	1	0	0	0	0	NA
kt-0126.01-c	0	3824	530995	8183295	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0126.01-d	0	3824	530995	8183295	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0126.01-e	0	3824	530995	8183295	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0126.01-f	0	3824	530995	8183295	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0127.01-a	0	3837	531474	8181874	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0127.01-c	0	3837	531474	8181874	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0127.01-d	0	3837	531474	8181874	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0127.01-e	0	3837	531474	8181874	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0128.01-c	0	3830	531279	8182143	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0128.01-d	0	3830	531279	8182143	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0128.01-e	0	3830	531279	8182143	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0129.01-g	0	3826	531239	8183984	NA	0.16	0.16	C	0.16	1	0	0	0	0	NA
kt-0130.01-d	0	3827	531773	8183064	NA	1	1.1	C	1.100	1	0	0	0	0	NA
kt-0130.01-e	0	3827	531773	8183064	NA	0.001	1.1	C	1.100	1	0	0	0	0	NA
kt-0131.01-e	0	3829	531864	8182718	NA	0.001	1.1	C	1.100	1	0	0	0	0	NA
kt-0131.01-f	0	3829	531864	8182718	NA	0.001	1.1	C	1.100	1	0	0	0	0	NA
kt-0131.01-g	0	3829	531864	8182718	NA	0.001	1.1	C	1.100	1	0	0	0	0	NA
kt-0132.01-b	0	3832	532421	8182658	NA	3	16.2	C	16.2	1	0	0	0	0	NA
kt-0132.01-c	0	3832	532421	8182658	NA	8	8	C	16.2	1	1	0	0	0	NA
kt-0132.01-d	0	3832	532421	8182658	NA	1	7	C	16.2	1	0	0	0	0	NA
kt-0132.01-e	0	3832	532421	8182658	NA	8	16.2	C	16.2	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0132.01-f	0	3832	532421	8182658	NA	0.001	16.2	C	16.2	1	0	0	0	0	NA
kt-0132.01-g	0	3832	532421	8182658	NA	0.001	16.2	C	16.2	1	0	0	0	0	NA
kt-0133.01-d	0	3846	532427	8182085	NA	0.001	1.2	C	1.2	1	0	0	0	0	NA
kt-0133.01-e	0	3846	532427	8182085	NA	0.001	1.2	C	1.2	1	0	0	0	0	NA
kt-0133.01-f	0	3846	532427	8182085	NA	0.001	1.2	C	1.2	1	0	0	0	0	NA
kt-0134.01-d	0	3858	532797	8181422	NA	0.001	0.09	C	0.09	1	0	0	0	0	NA
kt-0134.01-f	0	3858	532797	8181422	NA	0.001	0.09	C	0.09	1	0	0	0	0	NA
kt-0135.01-c	0	3843	532982	8182160	NA	0.001	1.4	C	1.4	1	0	0	0	0	NA
kt-0135.01-d	0	3843	532982	8182160	NA	0.001	1.4	C	1.4	1	0	0	0	0	NA
kt-0136.01-c	0	3834	533408	8182236	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0136.01-d	0	3834	533408	8182236	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0137.01-b	0	3833	533870	8182427	NA	3	5	C	5	1	0	0	0	0	NA
kt-0137.01-c	0	3833	533870	8182427	NA	5	5	C	5	1	0	0	0	0	NA
kt-0137.01-d	0	3833	533870	8182427	NA	0.001	1	C	5	1	0	0	0	0	NA
kt-0137.01-e	0	3833	533870	8182427	NA	0.001	5	C	5	1	0	0	0	0	NA
kt-0138.01-f	0	3826	541944	8182156	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0138.01-g	0	3826	541944	8182156	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0139.01-d	0	3831	542059	8183245	NA	0.02	0.02	C	0.02	1	0	0	0	0	NA
kt-0140.01-c	0	3829	541537	8182888	NA	0.001	0.045	C	0.045	1	0	0	0	0	NA
kt-0140.01-d	0	3829	541537	8182888	NA	0.001	0.045	C	0.045	1	0	0	0	0	NA
kt-0141.01-d	0	3828	542074	8182925	NA	0.02	0.02	C	0.02	1	0	0	0	0	NA
kt-0143.01-d	0	3827	541448	8181818	NA	0.009	0.009	C	0.009	1	0	0	0	0	NA
kt-0144.01-f	0	3827	542546	8181768	NA	0.001	0.5	C	0.5	1	0	0	0	0	NA
kt-0144.01-g	0	3827	542546	8181768	NA	0.001	0.5	C	0.5	1	0	0	0	0	NA
kt-0145.01-d	0	3826	542099	8181509	NA	0.032	0.032	C	0.032	1	0	0	0	0	NA
kt-0146.01-f	0	3829	540957	8179686	NA	0.001	2	C	2	1	0	0	0	0	NA
kt-0146.01-g	0	3829	540957	8179686	NA	0.001	2	C	2	1	0	0	0	0	NA
kt-0147.01-d	0	3827	541783	8180467	NA	0.4	0.4	C	0.4	1	0	0	0	0	NA
kt-0148.01-d	0	3829	542480	8181267	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0148.01-f	0	3829	542480	8181267	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0148.01-g	0	3829	542480	8181267	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0149.01-d	0	3828	542660	8181164	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0149.01-f	0	3828	542660	8181164	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0149.01-g	0	3828	542660	8181164	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0150.01-d	0	3827	542875	8181028	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0150.01-f	0	3827	542875	8181028	NA	0.001	0.6	P	0.6	1	0	0	0	0	NA
kt-0150.01-g	0	3827	542875	8181028	NA	0.001	0.6	C	0.6	1	0	0	0	0	NA
kt-0151.01-d	0	3829	541676	8180156	NA	0.45	0.45	C	0.45	1	0	0	0	0	NA
kt-0152.01-a	0	3843	541136	8179101	NA	6	6	C	7.5	1	1	0	0	0	NA
kt-0152.01-b	0	3843	541136	8179101	NA	3	3	C	7.5	1	0	1	0	0	NA
kt-0152.01-c	0	3843	541136	8179101	NA	7.5	7.5	C	7.5	1	1	1	0	0	NA
kt-0152.01-d	0	3843	541136	8179101	NA	0.001	7.5	C	7.5	1	0	0	0	0	NA
kt-0152.01-e	0	3843	541136	8179101	NA	0.001	7.5	C	7.5	1	0	0	0	0	NA
kt-0152.01-f	0	3843	541136	8179101	NA	0.001	7.5	C	7.5	1	0	0	0	0	NA
kt-0152.01-g	0	3843	541136	8179101	NA	0.001	7.5	C	7.5	1	0	0	0	0	NA
kt-0153.01-f	0	3830	541500	8179146	NA	0.001	0.36	C	0.36	1	0	0	0	0	NA
kt-0153.01-g	0	3830	541500	8179146	NA	0.001	0.36	C	0.36	1	0	0	0	0	NA
kt-0154.01-d	0	3829	541437	8179281	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0154.01-f	0	3829	541437	8179281	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0154.01-g	0	3829	541437	8179281	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0155.01-f	0	3830	541499	8179159	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0155.01-g	0	3830	541499	8179159	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0156.01-f	0	3827	542457	8180463	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0156.01-g	0	3827	542457	8180463	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0157.01-f	0	3827	542332	8180187	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0157.01-g	0	3827	542332	8180187	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0158.01-f	0	3829	541625	8179126	NA	0.001	0.3	C	0.3	1	0	0	0	0	NA
kt-0158.01-g	0	3829	541625	8179126	NA	0.001	0.3	C	0.3	1	0	0	0	0	NA
kt-0159.01-c	0	3839	540099	8179828	NA	0.001	1	C	2.4	1	0	0	0	0	NA
kt-0159.01-d	0	3839	540099	8179828	NA	1	2.4	C	2.4	1	0	0	0	0	NA
kt-0159.01-e	0	3839	540099	8179828	NA	1	2.4	C	2.4	1	0	0	0	0	NA
kt-0159.01-f	0	3839	540099	8179828	NA	0.001	2.4	C	2.4	1	0	0	0	0	NA
kt-0159.01-g	0	3839	540099	8179828	NA	0.001	2.4	C	2.4	1	0	0	0	0	NA
kt-0160.01-a	0	3944	539675	8179149	NA	0.001	3	C	3	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0160.01-b	0	3944	539675	8179149	NA	0.001	3	C	3	1	0	0	0	0	NA
kt-0160.01-c	0	3944	539675	8179149	NA	1	3	C	3	1	0	0	0	0	NA
kt-0160.01-d	0	3944	539675	8179149	NA	0.001	1	C	3	1	0	0	0	0	NA
kt-0160.01-f	0	3944	539675	8179149	NA	0.001	3	C	3	1	0	0	0	0	NA
kt-0160.01-g	0	3944	539675	8179149	NA	0.001	3	C	3	1	0	0	0	0	NA
kt-0161.01-d	0	3927	539588	8179886	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0161.01-g	0	3927	539588	8179886	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0162.01-g	0	3827	542394	8179686	NA	0.06	0.06	C	0.06	1	0	0	0	0	NA
kt-0163.01-d	0	3826	542971	8180990	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0163.01-f	0	3826	542971	8180990	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0164.01-e	0	3830	543884	8181831	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0164.01-f	0	3830	543884	8181831	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0164.01-g	0	3830	543884	8181831	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0165.01-d	0	3831	542928	8180351	NA	0.001	0.22	C	0.22	1	0	0	0	0	NA
kt-0165.01-f	0	3831	542928	8180351	NA	0.001	0.22	C	0.22	1	0	0	0	0	NA
kt-0165.01-g	0	3831	542928	8180351	NA	0.001	0.22	C	0.22	1	0	0	0	0	NA
kt-0166.01-e	0	3829	542086	8179116	NA	0.001	0.09	C	0.09	1	0	0	0	0	NA
kt-0166.01-f	0	3829	542086	8179116	NA	0.001	0.09	C	0.09	1	0	0	0	0	NA
kt-0167.01-d	0	3832	542469	8178577	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0167.01-e	0	3832	542469	8178577	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0167.01-f	0	3832	542469	8178577	NA	0.001	0.4	C	0.4	1	0	0	0	0	NA
kt-0168.01-e	0	3830	543711	8179741	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0168.01-f	0	3830	543711	8179741	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0168.01-g	0	3830	543711	8179741	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0169.01-d	0	3828	542357	8179496	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0169.01-f	0	3828	542357	8179496	NA	0.001	0.25	P	0.25	1	0	0	0	0	NA
kt-0170.01-d	0	3834	542702	8178327	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0170.01-e	0	3834	542702	8178327	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0170.01-g	0	3834	542702	8178327	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0171.01-d	0	3831	542935	8178533	NA	0.001	0.12	C	0.12	1	0	0	0	0	NA
kt-0171.01-e	0	3831	542935	8178533	NA	0.001	0.12	C	0.12	1	0	0	0	0	NA
kt-0171.01-f	0	3831	542935	8178533	NA	0.001	0.12	C	0.12	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0171.01-g	0	3831	542935	8178533	NA	0.001	0.12	C	0.12	1	0	0	0	0	NA
kt-0172.01-d	0	3848	542433	8177907	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0172.01-e	0	3848	542433	8177907	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0173.01-d	0	3846	542263	8178012	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0173.01-e	0	3846	542263	8178012	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0174.01-d	0	3856	542082	8178141	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
kt-0175.01-d	0	3853	541900	8178392	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
kt-0176.01-d	0	3860	541861	8178228	NA	0.001	0.09	C	0.09	1	0	0	0	0	NA
kt-0176.01-f	0	3860	541861	8178228	NA	0.001	0.09	P	0.09	1	0	0	0	0	NA
kt-0177.01-d	0	3866	542253	8177727	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0177.01-e	0	3866	542253	8177727	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0178.01-d	0	3866	542293	8177517	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0178.01-e	0	3866	542293	8177517	NA	0.001	0.64	C	0.64	1	0	0	0	0	NA
kt-0179.01-d	0	3860	542292	8177633	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0179.01-e	0	3860	542292	8177633	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0180.01-b	0	3836	543015	8177918	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0180.01-c	0	3836	543015	8177918	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0180.01-d	0	3836	543015	8177918	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0180.01-e	0	3836	543015	8177918	NA	0.001	0.9	C	0.9	1	0	0	0	0	NA
kt-0181.01-d	0	3833	543131	8177933	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0181.01-e	0	3833	543131	8177933	NA	0.001	0.16	C	0.16	1	0	0	0	0	NA
kt-0182.01-d	0	3846	542667	8177650	NA	0.12	0.12	C	0.12	1	0	0	0	0	NA
kt-0183.01-c	0	3849	542549	8177540	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0183.01-d	0	3849	542549	8177540	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0184.01-f	0	3870	542625	8177091	NA	0.25	0.25	C	0.25	1	0	0	0	0	NA
kt-0185.01-d	0	3839	542957	8177600	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0185.01-f	0	3839	542957	8177600	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0186.01-b	0	3851	544243	8178295	NA	0.001	14.2	C	14.2	1	0	0	0	0	NA
kt-0186.01-c	0	3851	544243	8178295	NA	8	8	C	14.2	1	0	0	0	0	NA
kt-0186.01-d	0	3851	544243	8178295	NA	7	14.2	C	14.2	1	0	0	0	0	NA
kt-0186.01-e	0	3851	544243	8178295	NA	8	14.2	C	14.2	1	0	0	0	0	NA
kt-0187.01-d	0	3846	544715	8177978	NA	0.001	1	C	1	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0187.01-e	0	3846	544715	8177978	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0188.01-d	0	3840	544878	8178022	NA	0.001	0.65	C	0.65	1	0	0	0	0	NA
kt-0188.01-e	0	3840	544878	8178022	NA	0.001	0.65	C	0.65	1	0	0	0	0	NA
kt-0189.01-d	0	3836	545001	8178054	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0189.01-e	0	3836	545001	8178054	NA	0.001	0.25	C	0.25	1	0	0	0	0	NA
kt-0190.01-d	0	3833	545098	8177875	NA	0.001	1	C	1.5	1	0	0	0	0	NA
kt-0190.01-e	0	3833	545098	8177875	NA	1.5	1.5	C	1.5	1	0	0	0	0	NA
kt-0191.01-c	0	3838	544896	8177837	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0191.01-d	0	3838	544896	8177837	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0191.01-e	0	3838	544896	8177837	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0192.01-d	0	3836	544846	8177707	NA	0.001	0.72	C	0.72	1	0	0	0	0	NA
kt-0192.01-e	0	3836	544846	8177707	NA	0.001	0.72	P	0.72	1	0	0	0	0	NA
kt-0193.01-d	0	3845	544837	8177657	NA	0.16	0.16	C	0.16	1	0	0	0	0	NA
kt-0195.01-c	0	3914	544191	8177869	NA	0.14	0.14	C	0.14	1	1	0	0	0	NA
kt-0196.01-a	0	3885	543960	8178000	NA	0.001	0.85	C	0.85	1	0	0	0	0	NA
kt-0196.01-d	0	3885	543960	8178000	NA	0.001	0.85	C	0.85	1	0	0	0	0	NA
kt-0196.01-e	0	3885	543960	8178000	NA	0.001	0.85	C	0.85	1	0	0	0	0	NA
kt-0196.01-f	0	3885	543960	8178000	NA	0.001	0.85	C	0.85	1	0	0	0	0	NA
kt-0196.01-g	0	3885	543960	8178000	NA	0.001	0.85	C	0.85	1	0	0	0	0	NA
kt-0197.01-c	0	3862	544794	8177471	NA	0.001	0.5	P	0.5	1	0	0	0	0	NA
kt-0197.01-d	0	3862	544794	8177471	NA	0.001	0.5	C	0.5	1	0	0	0	0	NA
kt-0197.01-e	0	3862	544794	8177471	NA	0.001	0.5	C	0.5	1	0	0	0	0	NA
kt-0198.01-d	0	3834	545025	8177289	NA	1	2	C	2	1	0	0	0	0	NA
kt-0198.01-e	0	3834	545025	8177289	NA	0.001	2	C	2	1	0	0	0	0	NA
kt-0198.01-f	0	3834	545025	8177289	NA	0.001	2	C	2	1	0	0	0	0	NA
kt-0198.01-g	0	3834	545025	8177289	NA	0.001	2	C	2	1	0	0	0	0	NA
kt-0199.01-d	0	3837	544966	8177007	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0199.01-e	0	3837	544966	8177007	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0199.01-f	0	3837	544966	8177007	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0199.01-g	0	3837	544966	8177007	NA	0.001	0.8	C	0.8	1	0	0	0	0	NA
kt-0200.01-d	0	3837	544849	8176804	NA	0.001	0.65	C	0.65	1	0	0	0	0	NA
kt-0200.01-e	0	3837	544849	8176804	NA	0.001	0.65	C	0.65	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
kt-0201.01-d	0	3848	544620	8176776	NA	0.16	0.16	C	0.16	1	0	0	0	0	NA
kt-0202.01-d	0	3841	544502	8176598	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0202.01-e	0	3841	544502	8176598	NA	0.001	1	C	1	1	0	0	0	0	NA
kt-0203.01-d	0	3843	544300	8176791	NA	0.001	0.96	C	0.96	1	0	0	0	0	NA
kt-0203.01-f	0	3843	544300	8176791	NA	0.001	0.96	C	0.96	1	0	0	0	0	NA
kt-0203.01-g	0	3843	544300	8176791	NA	0.001	0.96	C	0.96	1	0	0	0	0	NA
kt-0204.01-e	0	3846	544219	8176886	NA	0.09	0.09	C	0.09	1	0	0	0	0	NA
kt-0205.01-e	0	3845	544098	8177283	NA	0.09	0.09	C	0.09	1	0	0	0	0	NA
kt-0206.01-c	0	3837	543792	8177917	NA	0.001	0.54	C	0.54	1	0	0	0	0	NA
kt-0206.01-f	0	3837	543792	8177917	NA	0.001	0.54	C	0.54	1	0	0	0	0	NA
kt-0206.01-g	0	3837	543792	8177917	NA	0.001	0.54	C	0.54	1	0	0	0	0	NA
kt-0207.01-c	0	3840	543893	8177727	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0207.01-f	0	3840	543893	8177727	NA	0.001	0.2	C	0.2	1	0	0	0	0	NA
kt-0208.01-a	0	3875	543739	8175651	NA	3.5	4	C	4	1	0	0	0	0	NA
kt-0208.01-b	0	3875	543739	8175651	NA	3	4	C	4	1	0	0	0	0	NA
kt-0208.01-c	0	3875	543739	8175651	NA	3.5	3.5	C	4	1	1	0	0	0	NA
kt-0208.01-d	0	3875	543739	8175651	NA	1	4	C	4	1	0	0	0	0	NA
kt-0208.01-e	0	3875	543739	8175651	NA	0.001	4	C	4	1	0	0	0	0	NA
kt-0209.01-d	0	3851	543380	8176391	NA	0.01	0.01	C	0.01	1	0	0	0	0	NA
kt-0210.01-d	0	3861	543085	8176674	NA	0.001	0.15	C	0.15	1	0	0	0	0	NA
kt-0210.01-e	0	3861	543085	8176674	NA	0.001	0.15	C	0.15	1	0	0	0	0	NA
kt-0210.01-f	0	3861	543085	8176674	NA	0.001	0.15	C	0.15	1	0	0	0	0	NA
kt-0211.01-d	0	3863	543020	8176696	NA	0.001	0.15	C	0.15	1	0	0	0	0	NA
kt-0211.01-e	0	3863	543020	8176696	NA	0.001	0.15	C	0.15	1	0	0	0	0	NA
kt-0211.01-f	0	3863	543020	8176696	NA	0.001	0.15	C	0.15	1	0	0	0	0	NA
kt-0212.01-d	0	4000	539446	8175940	NA	15	15	C	15	1	0	0	0	1	NA
pk-0001.01-b	0	3875	353209	8337057	5	NA	NA	C	NA	1	1	0	0	0	NA
pk-0001.01-c	0	3875	353209	8337057	150	NA	NA	C	NA	1	1	1	0	0	NA
pk-0003.01-b	0	3900	351154	8339410	3.75	NA	NA	C	NA	1	1	0	0	0	NA
pk-0003.01-c	0	3900	351154	8339410	3.75	NA	NA	C	NA	1	1	0	0	0	NA
pk-0004.01-a	0	3875	352615	8338433	1.39	NA	NA	P	NA	1	0.5	0	0	0	NA
pk-0004.01-b	0	3875	352615	8338433	1.39	NA	NA	P	NA	1	0.5	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
pk-0004.01-d	0	3875	352615	8338433	1.39	NA	NA	C	NA	1	0	0	0	0	NA
pk-0005.01-a	0	3875	352591	8339019	0.39	NA	NA	P	NA	1	0.5	0	0	0	NA
pk-0005.01-b	0	3875	352591	8339019	0.39	NA	NA	P	NA	1	0.5	0	0	0	NA
pk-0005.01-d	0	3875	352591	8339019	0.39	NA	NA	C	NA	1	0	0	0	0	NA
pk-0006.01-a	0	3875	351935	8338912	0.35	NA	NA	P	NA	1	0	0	0	0	NA
pk-0006.01-b	0	3875	351935	8338912	0.35	NA	NA	P	NA	1	0	0	0	0	NA
pk-0006.01-c	0	3875	351935	8338912	0.35	NA	NA	P	NA	1	0	0	0	0	NA
pk-0006.01-d	0	3875	351935	8338912	0.35	NA	NA	C	NA	1	0	0	0	0	NA
pk-0007.01-a	0	3875	351723	8338792	0.11	NA	NA	P	NA	1	0	0	0	0	NA
pk-0007.01-b	0	3875	351723	8338792	0.11	NA	NA	P	NA	1	0	0	0	0	NA
pk-0007.01-c	0	3875	351723	8338792	0.11	NA	NA	P	NA	1	0	0	0	0	NA
pk-0007.01-d	0	3875	351723	8338792	0.11	NA	NA	C	NA	1	0	0	0	0	NA
pk-0009.01-a	0	3850	352721	8340794	0.04	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0009.01-b	0	3850	352721	8340794	0.04	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0009.01-c	0	3850	352721	8340794	0.04	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0009.01-d	0	3850	352721	8340794	0.04	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0010.01-d	0	3875	352603	8343540	1	NA	NA	C	NA	1	0	0	0	0	NA
pk-0011.01-e	0	3875	352423	8341479	0.49	NA	NA	C	NA	1	0	0	0	0	NA
pk-0012.01-a	0	3875	353299	8341857	4.5	NA	NA	C	NA	1	0.5	0.5	0	0	NA
pk-0013.01-b	0	3875	354429	8340020	6	NA	NA	C	NA	1	1	1	0	0	NA
pk-0014.01-d	0	3900	351621	8337940	0.36	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0014.01-e	0	3900	351621	8337940	0.36	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0015.01-d	0	3900	351584	8338199	0.02	NA	NA	C	NA	0	0	1	0	0	NA
pk-0016.01-d	0	3900	351764	8338059	0.23	NA	NA	C	NA	1	0	0	0	0	NA
pk-0016.01-e	0	3900	351764	8338059	0.23	NA	NA	C	NA	1	0	0	0	0	NA
pk-0017.01-d	0	3900	351737	8338360	0.17	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0018.01-d	0	3900	351480	8338246	0.08	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0019.01-d	1	3900	350849	8337703	0.01	NA	NA	C	NA	0.5	0	0.5	0	0	NA
pk-0019.02-d	1	3900	350931	8337849	0.02	NA	NA	C	NA	0.5	0	0.5	0	0	NA
pk-0019.03-d	1	3900	350947	8337830	0.03	NA	NA	C	NA	0.5	0	0.5	0	0	NA
pk-0019.03-d	1	3900	350947	8337830	0.04	NA	NA	C	NA	0.5	0	0.5	0	0	NA
pk-0020.01-d	0	3900	351105	8338896	0.06	NA	NA	C	NA	0	0	1	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
pk-0021.01-a	0	3900	353383	8337999	0.46	NA	NA	P	NA	1	0	0	0	0	NA
pk-0021.01-b	0	3900	353383	8337999	0.46	NA	NA	P	NA	1	0	0	0	0	NA
pk-0021.01-c	0	3900	353383	8337999	0.46	NA	NA	P	NA	1	0	0	0	0	NA
pk-0021.01-d	0	3900	353383	8337999	0.46	NA	NA	C	NA	1	0	0	0	0	NA
pk-0022.01-d	0	3900	353462	8338030	0.02	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0023.01-d	0	3900	353453	8338383	0.24	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0024.01-a	0	3900	353283	8337999	0.01	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0024.01-b	0	3900	353283	8337999	0.01	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0024.01-c	0	3900	353283	8337999	0.01	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0025.01-a	0	3850	354653	8338597	0.48	NA	NA	P	NA	1	0	0	0	0	NA
pk-0025.01-b	0	3850	354653	8338597	0.48	NA	NA	P	NA	1	0	0	0	0	NA
pk-0026.01-b	0	3850	354759	8338332	2.61	NA	NA	C	NA	1	0	0	0	0	NA
pk-0026.01-d	1	3850	354759	8338332	0.06	NA	NA	C	NA	0	0	1	0	0	NA
pk-0026.01-d	1	3850	354759	8338332	0.14	NA	NA	C	NA	0	0	1	0	0	NA
pk-0027.01-d	0	3850	354825	8337929	1.3	NA	NA	C	NA	1	0	0	0	0	NA
pk-0027.02-a	0	3850	354825	8338231	1.03	NA	NA	P	NA	1	0	0	0	0	NA
pk-0027.02-b	0	3850	354825	8338231	1.03	NA	NA	P	NA	1	0	0	0	0	NA
pk-0031.01-a	0	3850	354708	8338331	0.25	NA	NA	P	NA	1	0	0	0	0	NA
pk-0031.01-b	0	3850	354708	8338331	0.25	NA	NA	P	NA	1	0	0	0	0	NA
pk-0031.01-c	0	3850	354708	8338331	0.25	NA	NA	P	NA	1	0	0	0	0	NA
pk-0031.01-d	0	3850	354708	8338331	0.54	NA	NA	C	NA	1	0	0	0	0	NA
pk-0032.01-d	0	3900	351980	8337679	0.06	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0033.01-a	0	3850	354384	8337659	0.11	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0033.01-b	0	3850	354384	8337659	0.11	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0033.01-c	0	3850	354384	8337659	0.11	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0033.01-d	0	3850	354384	8337659	0.11	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0034.01-d	0	3850	354404	8337891	0.09	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0035.01-d	0	3900	352586	8335485	0.02	NA	NA	C	NA	1	0	0	0	0	NA
pk-0036.01-d	0	3950	352354	8335444	6.74	NA	NA	C	NA	1	0	0	0	0	NA
pk-0036.01-e	0	3950	352354	8335444	6.74	NA	NA	C	NA	1	0	0	0	0	NA
pk-0037.01-d	0	3850	353513	8335068	0.1	NA	NA	C	NA	1	0	0	0	0	NA
pk-0038.01-d	0	3875	352858	8335167	0.07	NA	NA	C	NA	0.75	0	0	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
pk-0039.01-d	0	3875	352642	8335091	0.36	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0040.01-d	0	3875	352683	8335047	0.12	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0041.01-d	0	3875	352879	8335306	0.65	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0042.01-d	0	3875	352545	8335372	0.04	NA	NA	C	NA	1	0	0	0	0	NA
pk-0043.01-d	0	3875	352604	8335393	0.4	NA	NA	C	NA	1	0	0	0	0	NA
pk-0043.01-e	0	3875	352604	8335393	0.4	NA	NA	C	NA	1	0	0	0	0	NA
pk-0044.01-d	0	3875	352661	8335366	0.12	NA	NA	C	NA	1	0	0	0	0	NA
pk-0044.01-e	0	3875	352661	8335366	0.12	NA	NA	C	NA	1	0	0	0	0	NA
pk-0045.01-d	0	3875	352942	8335377	0.18	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0045.01-e	0	3875	352942	8335377	0.18	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0046.01-d	0	3875	353049	8335411	0.26	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0046.01-e	0	3875	353049	8335411	0.26	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0047.01-a	0	3875	353018	8335561	0.06	NA	NA	P	NA	1	0	0	0	0	NA
pk-0047.01-b	0	3875	353018	8335561	0.06	NA	NA	P	NA	1	0	0	0	0	NA
pk-0047.01-c	0	3875	353018	8335561	0.06	NA	NA	P	NA	1	0	0	0	0	NA
pk-0047.01-d	0	3875	353018	8335561	0.06	NA	NA	C	NA	1	0	0	0	0	NA
pk-0048.01-a	0	3875	352940	8335566	0.05	NA	NA	P	NA	1	0	0	0	0	NA
pk-0048.01-b	0	3875	352940	8335566	0.05	NA	NA	P	NA	1	0	0	0	0	NA
pk-0048.01-c	0	3875	352940	8335566	0.05	NA	NA	P	NA	1	0	0	0	0	NA
pk-0048.01-d	0	3875	352940	8335566	0.05	NA	NA	C	NA	1	0	0	0	0	NA
pk-0049.01-a	0	3875	352915	8335658	0.11	NA	NA	P	NA	1	0	0	0	0	NA
pk-0049.01-b	0	3875	352915	8335658	0.11	NA	NA	P	NA	1	0	0	0	0	NA
pk-0049.01-c	0	3875	352915	8335658	0.11	NA	NA	P	NA	1	0	0	0	0	NA
pk-0049.01-d	0	3875	352915	8335658	0.11	NA	NA	C	NA	1	0	0	0	0	NA
pk-0050.01-a	0	3875	352971	8335709	0.06	NA	NA	P	NA	1	0	0	0	0	NA
pk-0050.01-b	0	3875	352971	8335709	0.06	NA	NA	P	NA	1	0	0	0	0	NA
pk-0050.01-c	0	3875	352971	8335709	0.06	NA	NA	P	NA	1	0	0	0	0	NA
pk-0050.01-e	0	3875	352971	8335709	0.06	NA	NA	C	NA	1	0	0	0	0	NA
pk-0052.01-a	0	3880	353045	8335717	0.32	NA	NA	P	NA	1	0	0	0	0	NA
pk-0052.01-b	0	3880	353045	8335717	0.32	NA	NA	P	NA	1	0	0	0	0	NA
pk-0052.01-c	0	3880	353045	8335717	0.32	NA	NA	P	NA	1	0	0	0	0	NA
pk-0052.01-d	0	3880	353045	8335717	0.32	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
pk-0052.01-e	0	3880	353045	8335717	0.32	NA	NA	C	NA	1	0	0	0	0	NA
pk-0054.01-d	0	3875	353316	8335792	0.02	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0054.01-e	0	3875	353316	8335792	0.02	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0055.01-c	0	3875	353281	8335839	0.07	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0055.01-d	0	3875	353281	8335839	0.07	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0055.01-e	0	3875	353281	8335839	0.07	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0056.01-d	0	3875	353099	8335781	0.04	NA	NA	C	NA	1	0	0	0	0	NA
pk-0056.01-e	0	3875	353099	8335781	0.04	NA	NA	C	NA	1	0	0	0	0	NA
pk-0057.01-e	0	3875	352964	8335768	1.87	NA	NA	C	NA	1	0	0	0	0	NA
pk-0058.01-d	0	3875	352876	8335752	0.11	NA	NA	C	NA	1	0	0	0	0	NA
pk-0059.01-c	0	3875	353322	8336400	0.16	NA	NA	C	NA	1	0	0	0	0	NA
pk-0059.01-d	0	3875	353322	8336400	0.16	NA	NA	C	NA	1	0	0	0	0	NA
pk-0059.01-e	0	3875	353322	8336400	0.16	NA	NA	C	NA	1	0	0	0	0	NA
pk-0060.01-d	0	3875	353626	8336500	0.42	NA	NA	C	NA	1	0	0	0	0	NA
pk-0060.01-e	0	3875	353626	8336500	0.42	NA	NA	C	NA	1	0	0	0	0	NA
pk-0061.01-d	0	3875	354315	8336630	0.02	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0062.01-e	0	3875	353481	8336328	0.64	NA	NA	C	NA	1	0	0	0	0	NA
pk-0063.01-d	0	3875	353459	8336241	0.88	NA	NA	C	NA	1	0	0	0	0	NA
pk-0063.01-e	0	3875	353459	8336241	0.88	NA	NA	C	NA	1	0	0	0	0	NA
pk-0064.01-d	0	3875	353910	8336354	0.57	NA	NA	C	NA	1	0	0	0	0	NA
pk-0064.01-e	0	3875	353910	8336354	0.57	NA	NA	C	NA	1	0	0	0	0	NA
pk-0065.01-d	0	3875	354079	8336356	0.36	NA	NA	C	NA	1	0	0	0	0	NA
pk-0065.01-e	0	3875	354079	8336356	0.36	NA	NA	C	NA	1	0	0	0	0	NA
pk-0066.01-d	0	3875	353691	8336181	0.003	NA	NA	C	NA	0	0	1	0	0	NA
pk-0067.01-a	0	3875	353297	8336138	0.05	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0067.01-b	0	3875	353297	8336138	0.05	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0067.01-c	0	3875	353297	8336138	0.05	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0067.01-d	0	3875	353297	8336138	0.05	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0068.01-a	0	3875	353672	8336035	0.03	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0068.01-b	0	3875	353672	8336035	0.03	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0068.01-c	0	3875	353672	8336035	0.03	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0068.01-d	0	3875	353672	8336035	0.03	NA	NA	C	NA	0.75	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
pk-0068.01-e	0	3875	353672	8336035	0.03	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0069.01-d	0	3875	354759	8337215	0.04	NA	NA	C	NA	1	0	0	0	0	NA
pk-0070.01-d	0	3875	354824	8337198	0.01	NA	NA	C	NA	0	0	1	0	0	NA
pk-0071.01-e	0	3875	353554	8335281	0.06	NA	NA	C	NA	1	0	0	0	0	NA
pk-0072.01-d	0	3875	353605	8335235	0.25	NA	NA	C	NA	1	0	0	0	0	NA
pk-0072.01-e	0	3875	353605	8335235	0.25	NA	NA	C	NA	1	0	0	0	0	NA
pk-0073.01-d	0	3875	353649	8335284	0.2	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0073.01-e	0	3875	353649	8335284	0.2	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0074.01-a	0	3875	353651	8335187	0.03	NA	NA	P	NA	1	0	0	0	0	NA
pk-0074.01-b	0	3875	353651	8335187	0.03	NA	NA	P	NA	1	0	0	0	0	NA
pk-0074.01-c	0	3875	353651	8335187	0.03	NA	NA	P	NA	1	0	0	0	0	NA
pk-0074.01-d	0	3875	353651	8335187	0.03	NA	NA	C	NA	1	0	0	0	0	NA
pk-0074.01-e	0	3875	353651	8335187	0.03	NA	NA	C	NA	1	0	0	0	0	NA
pk-0075.01-d	0	3875	354154	8334242	0.06	NA	NA	C	NA	1	0	0	0	0	NA
pk-0075.01-e	0	3875	354154	8334242	0.06	NA	NA	C	NA	1	0	0	0	0	NA
pk-0076.01-d	0	3875	354226	8334106	0.01	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0076.01-e	0	3875	354226	8334106	0.01	NA	NA	P	NA	0.75	0	0	0	0	NA
pk-0077.01-c	0	3875	354822	8336318	0.68	NA	NA	C	NA	1	0	0	0	0	NA
pk-0077.01-d	0	3875	354822	8336318	0.68	NA	NA	C	NA	1	0	0	0	0	NA
pk-0078.01-a	0	3875	354833	8336200	0.04	NA	NA	P	NA	1	0	0	0	0	NA
pk-0078.01-b	0	3875	354833	8336200	0.04	NA	NA	P	NA	1	0	0	0	0	NA
pk-0078.01-c	0	3875	354833	8336200	0.04	NA	NA	P	NA	1	0	0	0	0	NA
pk-0078.01-d	0	3875	354833	8336200	0.04	NA	NA	C	NA	1	0	0	0	0	NA
pk-0078.01-e	0	3875	354833	8336200	0.04	NA	NA	C	NA	1	0	0	0	0	NA
pk-0079.01-d	0	3875	354891	8335817	0.1	NA	NA	C	NA	0	0	1	0	0	NA
pk-0080.01-a	0	3875	353653	8334726	0.15	NA	NA	P	NA	1	0	0	0	0	NA
pk-0080.01-b	0	3875	353653	8334726	0.15	NA	NA	P	NA	1	0	0	0	0	NA
pk-0080.01-c	0	3875	353653	8334726	0.15	NA	NA	P	NA	1	0	0	0	0	NA
pk-0080.01-d	0	3875	353653	8334726	0.15	NA	NA	C	NA	1	0	0	0	0	NA
pk-0080.01-e	0	3875	353653	8334726	0.15	NA	NA	C	NA	1	0	0	0	0	NA
pk-0081.01-d	0	3875	353655	8334630	0.08	NA	NA	C	NA	1	0	0	0	0	NA
pk-0081.01-e	0	3875	353655	8334630	0.08	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
pk-0082.01-d	0	3875	353228	8334451	0.04	NA	NA	C	NA	1	0	0	0	0	NA
pk-0083.01-d	0	3875	353244	8334501	0.04	NA	NA	C	NA	1	0	0	0	0	NA
pk-0084.01-d	0	3875	352650	8334451	0.01	NA	NA	C	NA	0.75	0	0	0	0	NA
pk-0085.01-d	0	3875	352307	8334415	0.07	NA	NA	C	NA	0	0	0	1	0	NA
pk-0086.01-d	0	3875	353887	8334263	0.05	NA	NA	C	NA	1	0	0	0	0	NA
pk-0087.01-d	0	3875	353829	8334043	0.25	NA	NA	C	NA	1	0	0	0	0	NA
pk-0088.01-d	0	3875	354029	8333886	0.02	NA	NA	C	NA	1	0	0	0	0	NA
pk-0088.01-e	0	3875	354029	8333886	0.02	NA	NA	C	NA	1	0	0	0	0	NA
pk-0089.01-d	0	3875	352114	8334351	0.16	NA	NA	C	NA	0	0	0	0	1	NA
pk-0090.01-d	0	3875	351903	8333903	0.003	NA	NA	C	NA	0	0	0	1	0	NA
pk-0090.01-e	0	3875	351903	8333903	0.003	NA	NA	C	NA	0	0	0	1	0	NA
pk-0091.01-d	0	3875	351903	8334536	0.01	NA	NA	C	NA	1	0	0	0	0	NA
pk-0092.01-d	0	3920	353269	8333471	0.39	NA	NA	C	NA	1	0	0	0	0	NA
pk-0092.01-e	0	3920	353269	8333471	0.39	NA	NA	C	NA	1	0	0	0	0	NA
pk-0094.01-d	0	3910	354503	8332966	0.16	NA	NA	C	NA	1	0	0	0	0	NA
pk-0095.01-d	0	3910	354461	8332945	0.01	NA	NA	C	NA	0	0	0	0	1	NA
pk-0095.01-e	0	3910	354461	8332945	0.01	NA	NA	C	NA	0	0	0	0	1	NA
pk-0096.01-e	0	3950	354090	8332461	0.03	NA	NA	C	NA	1	0	0	0	0	NA
pk-0097.01-d	0	3950	353979	8332527	0.06	NA	NA	C	NA	1	0	0	0	0	NA
pk-0098.01-d	0	3925	353209	8333114	0.52	NA	NA	C	NA	1	0	0	0	0	NA
pk-0099.01-e	0	3925	353087	8332778	0.02	NA	NA	C	NA	1	0	0	0	0	NA
pk-0100.01-d	0	3975	349317	8345639	0.11	NA	NA	C	NA	1	0	0	0	0	NA
pk-0100.01-e	0	3975	349317	8345639	0.11	NA	NA	C	NA	1	0	0	0	0	NA
pk-0101.01-a	0	3875	349281	8345718	0.01	NA	NA	P	NA	1	0	0	0	0	NA
pk-0101.01-b	0	3875	349281	8345718	0.01	NA	NA	P	NA	1	0	0	0	0	NA
pk-0101.01-c	0	3875	349281	8345718	0.01	NA	NA	P	NA	1	0	0	0	0	NA
pk-0101.01-d	0	3875	349281	8345718	0.01	NA	NA	C	NA	1	0	0	0	0	NA
pk-0101.01-e	0	3875	349281	8345718	0.01	NA	NA	C	NA	1	0	0	0	0	NA
pk-0102.01-d	0	3875	349609	8344958	0.07	NA	NA	C	NA	1	0	0	0	0	NA
pk-0103.01-d	0	3875	349610	8344885	0.1	NA	NA	C	NA	1	0	0	0	0	NA
pk-0103.01-e	0	3875	349610	8344885	0.1	NA	NA	C	NA	1	0	0	0	0	NA
pk-0104.01-a	0	3875	350531	8344759	0.01	NA	NA	P	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
pk-0104.01-b	0	3875	350531	8344759	0.01	NA	NA	P	NA	1	0	0	0	0	NA
pk-0104.01-c	0	3875	350531	8344759	0.01	NA	NA	P	NA	1	0	0	0	0	NA
pk-0105.01-a	0	3875	350984	8344008	4.5	NA	NA	C	NA	1	0	0	0	0	NA
pk-0105.01-b	0	3875	350984	8344008	4.5	NA	NA	C	NA	1	0.5	0	0	0	NA
pk-0105.01-c	0	3875	350984	8344008	4.5	NA	NA	P	NA	1	0.5	0	0	0	NA
pk-0105.01-d	0	3875	350984	8344008	0.04	NA	NA	C	NA	1	0	0	0	0	NA
pk-0105.01-e	1	3875	350984	8344008	0.02	NA	NA	C	NA	1	0	0	0	0	NA
pk-0105.01-e	1	3875	350984	8344008	0.01	NA	NA	C	NA	0	0	1	0	0	NA
pk-0106.01-a	0	3875	351207	8344031	0.13	NA	NA	P	NA	1	0	0	0	0	NA
pk-0106.01-b	0	3875	351207	8344031	0.13	NA	NA	P	NA	1	0	0	0	0	NA
pk-0106.01-c	0	3875	351207	8344031	0.13	NA	NA	P	NA	1	0	0	0	0	NA
pk-0106.01-d	0	3875	351207	8344031	0.13	NA	NA	C	NA	1	0	0	0	0	NA
pk-0107.01-a	0	3875	351174	8343814	0.8	NA	NA	P	NA	1	0	0	0	0	NA
pk-0107.01-b	0	3875	351174	8343814	0.8	NA	NA	P	NA	1	0	0	0	0	NA
pk-0107.01-c	0	3875	351174	8343814	0.8	NA	NA	P	NA	1	0	0	0	0	NA
pk-0108.01-d	0	3875	349129	8337441	0.01	NA	NA	C	NA	0	0	1	0	0	NA
pk-0109.01-d	0	3900	349224	8337638	0.003	NA	NA	C	NA	0	0	1	0	0	NA
pk-0110.01-a	0	3875	350723	8342462	0.36	NA	NA	P	NA	1	0	0	0	0	NA
pk-0110.01-b	0	3875	350723	8342462	0.36	NA	NA	P	NA	1	0	0	0	0	NA
pk-0110.01-c	0	3875	350723	8342462	0.36	NA	NA	P	NA	1	0	0	0	0	NA
pk-0110.01-d	0	3875	350723	8342462	0.36	NA	NA	C	NA	1	0	0	0	0	NA
pk-0111.01-a	0	3875	350614	8342402	0.18	NA	NA	P	NA	1	0	0	0	0	NA
pk-0111.01-b	0	3875	350614	8342402	0.18	NA	NA	P	NA	1	0	0	0	0	NA
pk-0112.01-a	0	3875	350672	8342350	1.62	NA	NA	P	NA	1	0	0	0	0	NA
pk-0112.01-b	0	3875	350672	8342350	1.62	NA	NA	P	NA	1	0	0	0	0	NA
pk-0113.01-a	0	3875	350642	8342516	0.27	NA	NA	P	NA	1	0	0	0	0	NA
pk-0113.01-b	0	3875	350642	8342516	0.27	NA	NA	P	NA	1	0	0	0	0	NA
pk-0113.01-d	0	3875	350642	8342516	0.27	NA	NA	C	NA	1	0	0	0	0	NA
pk-0113.01-e	0	3875	350642	8342516	0.27	NA	NA	C	NA	1	0	0	0	0	NA
pk-0114.01-a	0	3875	350606	8342519	0.02	NA	NA	P	NA	1	0	0	0	0	NA
pk-0114.01-b	0	3875	350606	8342519	0.02	NA	NA	P	NA	1	0	0	0	0	NA
pk-0116.01-b	0	3875	352824	8340884	0.83	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
pk-0116.01-c	0	3875	352824	8340884	0.83	NA	NA	C	NA	1	0	0	0	0	NA
pk-0116.01-d	0	3875	352824	8340884	0.83	NA	NA	C	NA	1	0	0	0	0	NA
pk-0117.01-d	0	3875	348237	8347431	0.08	NA	NA	C	NA	0	0	1	0	0	NA
pk-0118.01-d	0	3875	348249	8347379	0.01	NA	NA	C	NA	1	0	1	0	0	NA
pk-0119.01-d	0	3875	348324	8347018	0.02	NA	NA	C	NA	0	0	1	0	0	NA
pk-0120.01-d	0	3900	346799	8346427	0.64	NA	NA	C	NA	1	0	0	0	0	NA
pk-0120.01-e	0	3900	346799	8346427	0.64	NA	NA	C	NA	1	0	0	0	0	NA
pk-0122.01-e	0	4000	357653	8331082	0.28	NA	NA	C	NA	0	0	0	1	0	NA
pk-0124.01-d	0	3900	357860	8331319	0.66	NA	NA	C	NA	1	0	0	0	0	NA
pk-0125.01-d	1	3925	357003	8331960	3.75	NA	NA	C	NA	0	0	0	1	0	NA
pk-0125.01-d	1	3925	357003	8331960	0.01	NA	NA	C	NA	0	0	1	0	0	NA
pk-0125.01-e	0	3925	357003	8331960	3.75	NA	NA	C	NA	0	0	0	1	0	NA
pk-0126.01-d	0	3925	356518	8331790	4.5	NA	NA	C	NA	0	0	0	1	0	NA
pk-0127.01-a	0	3875	355739	8331562	0.01	NA	NA	P	NA	1	0	0	0	0	NA
pk-0127.01-b	0	3875	355739	8331562	0.01	NA	NA	P	NA	1	0	0	0	0	NA
pk-0127.01-c	0	3875	355739	8331562	0.01	NA	NA	P	NA	1	0	0	0	0	NA
pk-0127.01-d	0	3875	355739	8331562	0.01	NA	NA	C	NA	1	0	0	0	0	NA
pk-0128.01-d	0	3900	355631	8331265	0.21	NA	NA	C	NA	0	0	1	0	0	NA
pk-0129.01-d	0	3900	355641	8331494	0.03	NA	NA	C	NA	0	0	1	0	0	NA
pk-0130.01-d	0	3900	355659	8331562	0.14	NA	NA	C	NA	0	0	1	0	0	NA
pk-0131.01-d	0	3900	356709	8332081	0.003	NA	NA	C	NA	0	0	1	0	0	NA
pk-0132.01-d	0	4000	352065	8336679	0.16	NA	NA	C	NA	0	0	0	1	0	NA
pk-0132.01-e	0	4000	352065	8336679	0.16	NA	NA	C	NA	0	0	0	1	0	NA
pk-0133.01-d	0	3900	352483	8335269	0.75	NA	NA	C	NA	1	0	0	0	0	NA
pk-0134.01-d	0	4050	352344	8335608	0.8	NA	NA	C	NA	1	0	0	0	1	NA
pk-0135.01-d	0	4000	352206	8336141	0.5	NA	NA	C	NA	1	0	0	0	0	NA
pk-0135.01-e	0	4000	352206	8336141	0.5	NA	NA	C	NA	1	0	0	0	0	NA
pk-0136.01-c	0	3900	352207	8336401	0.3	NA	NA	C	NA	1	0	0	0	0	NA
pk-0136.01-d	0	3900	352207	8336401	1.2	NA	NA	C	NA	1	0	0	0	0	NA
pk-0136.01-e	0	3900	352207	8336401	1.2	NA	NA	C	NA	1	0	0	0	0	NA
pk-0137.01-a	0	3875	355699	8331771	0.3	NA	NA	P	NA	1	0	0	0	0	NA
pk-0137.01-b	0	3875	355699	8331771	0.3	NA	NA	P	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
pk-0137.01-c	0	3875	355699	8331771	0.3	NA	NA	P	NA	1	0	0	0	0	NA
pk-0137.01-d	0	3875	355699	8331771	0.3	NA	NA	C	NA	1	0	0	0	0	NA
pk-0137.01-e	0	3875	355699	8331771	0.3	NA	NA	C	NA	1	0	0	0	0	NA
pk-0138.01-d	0	3875	355731	8331854	0.17	NA	NA	C	NA	0	0	1	0	0	NA
pk-0138.01-e	0	3875	355731	8331854	0.17	NA	NA	C	NA	0	0	1	0	0	NA
pk-0139.01-d	0	3875	355872	8331834	0.003	NA	NA	C	NA	0	0	1	0	0	NA
pk-0140.01-d	0	3875	356174	8331861	0.13	NA	NA	C	NA	0	0	1	0	0	NA
pk-0141.01-d	0	4320	352239	8335972	0.9	NA	NA	C	NA	1	0	0	0	1	NA
pk-0142.01-d	0	4410	351348	8335987	10.5	NA	NA	C	NA	1	0	1	0	1	NA
pk-0143.01-d	0	3950	352324	8335791	1.5	NA	NA	C	NA	1	0	0	0	0	NA
is-0001.01-c	0	3826	480495	8231438	0.6	NA	NA	C	0.6	1	0.5	0.5	0	0	NA
is-0001.01-d	0	3826	480495	8231438	0.6	NA	NA	C	0.6	1	0.5	0.5	0	0	NA
is-0001.01-f	0	3826	480495	8231438	0.6	NA	NA	C	0.6	1	0	0.5	0	0	NA
is-0002.01-c	0	3827	480628	8231550	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0002.01-d	0	3827	480628	8231550	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0002.01-e	0	3827	480628	8231550	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0002.01-f	0	3827	480628	8231550	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0002.01-g	0	3827	480628	8231550	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0003.01-c	0	3854	480711	8232063	0.28	NA	NA	C	0.28	1	0	0.5	0	0	NA
is-0003.01-d	0	3854	480711	8232063	0.28	NA	NA	C	0.28	1	0	0.5	0	0	NA
is-0003.01-f	0	3854	480711	8232063	0.28	NA	NA	C	0.28	1	0	0.5	0	0	NA
is-0003.01-g	0	3854	480711	8232063	0.28	NA	NA	C	0.28	1	0.5	0.5	0	0	NA
is-0004.01-c	0	3841	480765	8232128	0.04	NA	NA	C	0.04	0	0	0.5	0	0	NA
is-0004.01-f	0	3841	480765	8232128	0.04	NA	NA	C	0.04	0	0	0.5	0	0	NA
is-0005.01-c	0	3856	480892	8231782	0.09	NA	NA	C	0.09	1	0	0.5	0	0	NA
is-0006.01-c	0	3847	481078	8232007	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0006.01-d	0	3847	481078	8232007	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0006.01-e	0	3847	481078	8232007	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0007.01-d	0	3838	481307	8231907	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
is-0008.01-g	0	3824	481238	8231413	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0009.01-f	0	3837	481883	8231578	0.02	NA	NA	C	0.02	1	0	0	0	0	NA
is-0009.01-g	0	3837	481883	8231578	0.02	NA	NA	C	0.02	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
is-0010.01-c	0	3841	481743	8231669	0.15	NA	NA	C	0.15	1	0	0.5	0	0	NA
is-0010.01-g	0	3841	481743	8231669	0.15	NA	NA	C	0.15	1	0	0.5	0	0	NA
is-0011.01-f	0	3836	481469	8231797	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0011.01-g	0	3836	481469	8231797	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0012.01-c	0	3839	481576	8231821	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0012.01-d	0	3839	481576	8231821	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0012.01-f	0	3839	481576	8231821	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0012.01-g	0	3839	481576	8231821	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0013.01-g	0	3877	479526	8231835	5	NA	NA	C	5	1	1	1	0	0	NA
is-0014.01-c	0	3880	479616	8232160	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0014.01-d	0	3880	479616	8232160	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0014.01-g	0	3880	479616	8232160	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0016.01-c	0	3863	479641	8232498	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
is-0016.01-f	0	3863	479641	8232498	0.2	NA	NA	P	0.2	1	0	0	0	0	NA
is-0018.01-g	0	3937	478934	8231845	0.12	NA	NA	C	0.12	1	0	0	0	0	NA
is-0019.01-d	0	3916	478820	8231935	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0019.01-g	0	3916	478820	8231935	0.5	NA	NA	C	0.5	0	1	0	0	0	NA
is-0020.01-g	0	3908	478823	8232047	0.35	NA	NA	C	0.35	0.5	0.5	0	0	0	NA
is-0021.01-g	0	3909	478647	8232062	0.5	NA	NA	C	0.5	1	1	0	0	0	NA
is-0022.01-c	0	3863	478519	8231875	1	NA	NA	C	4.2	1	0	0	0	0	NA
is-0022.01-d	0	3863	478519	8231875	3	NA	NA	C	4.2	1	0.5	0	0	0	NA
is-0022.01-e	0	3863	478519	8231875	4.2	NA	NA	C	4.2	1	1	1	0	0	NA
is-0023.01-g	0	3905	478538	8232080	0.28	NA	NA	C	0.28	0	1	0	0	0	NA
is-0024.01-c	0	3884	478635	8232214	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
is-0024.01-g	0	3884	478635	8232214	0.06	NA	NA	C	0.06	0.5	0.5	0	0	0	NA
is-0025.01-g	0	3883	478345	8232112	0.4	NA	NA	C	0.4	1	1	0	0	0	NA
is-0026.01-g	0	3872	478369	8231952	0.08	NA	NA	C	0.08	1	0	0	0	0	NA
is-0027.01-c	0	3880	478262	8232453	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
is-0027.01-e	0	3880	478262	8232453	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
is-0028.01-c	0	3887	477953	8232341	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
is-0028.01-e	0	3887	477953	8232341	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
is-0028.01-f	0	3887	477953	8232341	1.5	NA	NA	C	1.5	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
is-0029.01-c	0	3932	477707	8232374	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0030.01-c	0	3880	477478	8232593	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0030.01-d	0	3880	477478	8232593	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0030.01-g	0	3880	477478	8232593	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0031.01-f	0	3833	475390	8234650	0.15	NA	NA	C	0.15	0.5	0.5	0	0	0	NA
is-0031.01-g	0	3833	475390	8234650	0.15	NA	NA	C	0.15	0.5	0.5	0	0	0	NA
is-0032.01-g	0	3830	476755	8235819	1.25	NA	NA	C	1.25	0.5	0.5	1	0	0	NA
is-0033.01-g	0	3887	479940	8231502	1.5	NA	NA	C	1.5	1	0.5	0	0	0	NA
is-0034.01-c	0	3842	476532	8231495	0.04	NA	NA	P	0.04	0	0.5	0.5	0	0	NA
is-0035.01-c	0	3840	479571	8233573	0.25	NA	NA	C	0.25	1	0	0.5	0	0	NA
is-0035.01-g	0	3840	479571	8233573	0.25	NA	NA	C	0.25	1	0	0.5	0	0	NA
is-0036.01-c	0	3889	477343	8232461	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0036.01-e	0	3889	477343	8232461	1	NA	NA	C	1	1	0	0.5	0	0	NA
is-0037.01-c	0	3884	477575	8232192	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
is-0037.01-f	0	3884	477575	8232192	0.15	NA	NA	P	0.15	1	0	0	0	0	NA
is-0037.01-g	0	3884	477575	8232192	0.15	NA	NA	P	0.15	1	0	0	0	0	NA
is-0038.01-g	0	3851	477448	8232072	0.04	NA	NA	C	0.04	0	0	0.5	0	0	NA
is-0039.01-e	0	3833	477769	8232092	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0040.01-c	0	3835	478152	8232167	0.24	NA	NA	C	0.24	1	0	0	0	0	NA
is-0040.01-d	0	3835	478152	8232167	0.24	NA	NA	C	0.24	1	0	0	0	0	NA
is-0041.01-g	0	3826	477886	8232100	0.37	NA	NA	P	0.37	0	0	0	1	0	NA
is-0042.01-c	0	3865	478685	8231836	0.1	NA	NA	C	0.1	1	0	0	0	0	NA
is-0043.01-c	0	3897	478817	8231686	0.15	NA	NA	C	0.15	1	0	0.5	0	0	NA
is-0043.01-d	0	3897	478817	8231686	0.15	NA	NA	C	0.15	1	0	0.5	0	0	NA
is-0043.01-e	0	3897	478817	8231686	0.15	NA	NA	C	0.15	1	0	0.5	0	0	NA
is-0045.01-e	0	3875	478990	8231239	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0046.01-g	0	3934	480098	8230960	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0047.01-g	0	3826	480430	8231211	1	NA	NA	C	1	1	0	0	0	0	NA
is-0048.01-g	0	3965	480157	8230661	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0051.01-g	0	3835	479710	8229915	2	NA	NA	C	2	0.5	0	0.5	0	0	NA
is-0052.01-g	0	3984	480128	8230304	0.01	NA	NA	C	0.01	0	0.5	1	0	0	NA
is-0053.01-c	0	3880	479816	8232350	0.53	NA	NA	C	0.53	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
is-0054.01-g	0	3822	479779	8232043	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0056.01-c	0	3843	479795	8229815	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0057.01-c	0	3831	479769	8229677	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
is-0057.01-f	0	3831	479769	8229677	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
is-0059.01-d	0	3911	479822	8229075	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
is-0061.01-f	0	4020	480257	8230127	0.15	NA	NA	P	0.15	0	0	0.5	0	0	NA
is-0061.01-g	0	4020	480257	8230127	0.15	NA	NA	P	0.15	0	0	0.5	0	0	NA
is-0062.01-g	0	3988	480158	8230167	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0063.01-c	0	3992	480276	8229956	0.09	NA	NA	C	0.09	1	0	0.5	0	0	NA
is-0063.01-e	0	3992	480276	8229956	0.09	NA	NA	C	0.09	1	0	0.5	0	0	NA
is-0063.01-g	0	3992	480276	8229956	0.09	NA	NA	C	0.09	1	0	0.5	0	0	NA
is-0064.01-g	0	3978	480505	8230122	1	NA	NA	C	1	1	0	1	0	0	NA
is-0065.01-g	0	3896	480929	8230354	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
is-0067.01-c	0	3865	482114	8229708	1	NA	NA	C	1	1	0	0	0	0	NA
is-0068.01-c	0	3889	482215	8229871	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0069.01-f	0	3925	482412	8229985	0.12	NA	NA	C	0.12	1	0	0	0	0	NA
is-0071.01-d	0	3929	482370	8229860	0.16	NA	NA	P	0.16	0.5	0.5	0.5	0	0	NA
is-0072.01-c	0	3989	482580	8229792	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0072.01-d	0	3989	482580	8229792	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0072.01-f	0	3989	482580	8229792	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0073.01-e	0	3902	482893	8230254	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
is-0074.01-f	0	3968	482674	8229985	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
is-0075.01-b	0	3985	482669	8229682	1.5	NA	NA	C	1.5	1	0	0.5	0	0	NA
is-0075.01-c	0	3985	482669	8229682	1.5	NA	NA	C	1.5	1	0	0.5	0	0	NA
is-0075.01-d	0	3985	482669	8229682	1.5	NA	NA	C	1.5	1	0.5	0.5	0	0	NA
is-0075.01-e	0	3985	482669	8229682	1.5	NA	NA	C	1.5	1	0.5	0.5	0	0	NA
is-0075.01-f	0	3985	482669	8229682	1.5	NA	NA	C	1.5	1	0	0.5	0	0	NA
is-0076.01-b	0	3994	482553	8229679	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0076.01-c	0	3994	482553	8229679	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0077.01-d	0	3956	482451	8229579	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0077.01-e	0	3956	482451	8229579	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0077.01-f	0	3956	482451	8229579	0.75	NA	NA	C	0.75	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
is-0078.01-g	0	3862	483080	8230069	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0079.01-c	0	3939	482836	8229650	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
is-0080.01-c	0	3897	482313	8229346	1.44	NA	NA	C	1.44	1	0	0.5	0	0	NA
is-0080.01-d	0	3897	482313	8229346	1.44	NA	NA	C	1.44	1	0	0.5	0	0	NA
is-0082.01-g	0	4002	480675	8229574	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0083.01-f	0	4025	480592	8229426	0.15	NA	NA	P	0.15	1	0	0	0	0	NA
is-0083.01-g	0	4025	480592	8229426	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
is-0084.01-g	0	3963	480832	8229884	0.25	NA	NA	C	0.25	1	0	0.5	0	0	NA
is-0085.01-g	0	3892	481057	8229912	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0086.01-b	0	3888	481048	8230222	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0087.01-g	0	3857	481264	8229879	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0092.01-a	0	3887	482362	8229081	0.25	NA	NA	C	4	1	0	0.5	0	0	NA
is-0092.01-b	0	3887	482362	8229081	0.25	NA	NA	C	4	1	0	0.5	0	0	NA
is-0092.01-c	0	3887	482362	8229081	3	NA	NA	C	4	1	0.5	0.5	0	0	NA
is-0092.01-d	0	3887	482362	8229081	4	NA	NA	C	4	1	1	0.5	0	0	NA
is-0092.01-e	0	3887	482362	8229081	2	NA	NA	C	4	1	0	0.5	0	0	NA
is-0092.01-f	0	3887	482362	8229081	0.5	NA	NA	C	4	1	0	0.5	0	0	NA
is-0092.01-g	0	3887	482362	8229081	0.5	NA	NA	C	4	1	0	0.5	0	0	NA
is-0093.01-a	0	3835	482651	8229169	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0093.01-b	0	3835	482651	8229169	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0093.01-c	0	3835	482651	8229169	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0093.01-d	0	3835	482651	8229169	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0094.01-g	0	3928	482311	8228742	0.37	NA	NA	C	0.37	1	0	0	0	0	NA
is-0096.01-b	0	3863	482057	8229442	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0096.01-c	0	3863	482057	8229442	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0096.01-e	0	3863	482057	8229442	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0096.01-g	0	3863	482057	8229442	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0098.01-d	0	4027	481853	8228848	0.01	NA	NA	P	0.01	0	0.5	0	0	0	NA
is-0098.01-e	0	4027	481853	8228848	0.01	NA	NA	P	0.01	0	0.5	0	0	0	NA
is-0100.01-g	0	3863	483374	8228743	0.5	NA	NA	C	0.5	1	0.5	1	0	0	NA
is-0101.01-d	0	3967	483859	8228674	0.15	NA	NA	P	0.15	1	0	0	0	0	NA
is-0103.01-g	0	4036	483585	8227953	0.01	NA	NA	P	0.01	0	0	0	1	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
is-0105.01-c	0	4047	483328	8227832	2	NA	NA	C	3.75	1	0	0.5	0	0.5	NA
is-0105.01-d	0	4047	483328	8227832	3	NA	NA	C	3.75	1	0	0.5	0	0.5	NA
is-0105.01-e	0	4047	483328	8227832	3.75	NA	NA	C	3.75	1	0	0.5	0	0.5	NA
is-0105.01-f	0	4047	483328	8227832	3.75	NA	NA	C	3.75	1	0	0.5	0	0.5	NA
is-0105.01-g	0	4047	483328	8227832	2	NA	NA	C	3.75	1	0	0.5	0	0.5	NA
is-0106.01-c	0	3912	483140	8228543	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
is-0106.01-e	0	3912	483140	8228543	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
is-0106.01-f	0	3912	483140	8228543	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
is-0106.01-g	0	3912	483140	8228543	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
is-0107.01-g	0	3897	482964	8228639	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0108.01-g	0	3988	483045	8228324	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
is-0109.01-c	0	3915	482955	8227501	3	NA	NA	C	3	1	0	0.5	0	0	NA
is-0109.01-e	0	3915	482955	8227501	3	NA	NA	C	3	1	0	0.5	0	0	NA
is-0109.01-f	0	3915	482955	8227501	3	NA	NA	C	3	1	0	0.5	0	0	NA
is-0109.01-g	0	3915	482955	8227501	3	NA	NA	C	3	1	0	0	0	0	NA
is-0110.01-g	0	3886	482875	8228531	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
is-0111.01-g	0	3852	482671	8228462	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
is-0112.01-g	0	3901	482442	8228777	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
is-0114.01-g	0	3939	482594	8228089	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
is-0115.01-c	0	3899	483131	8227301	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0115.01-d	0	3899	483131	8227301	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0115.01-f	0	3899	483131	8227301	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0117.01-g	0	3847	482832	8227210	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
is-0118.01-g	0	3853	482430	8227353	0.08	NA	NA	C	0.08	1	0	0	0	0	NA
is-0119.01-d	0	3832	481799	8227787	0.08	NA	NA	C	0.08	1	0	0	0	0	NA
is-0120.01-c	0	3980	481058	8229178	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0121.01-e	0	4006	481316	8228838	0.04	NA	NA	C	0.04	0.5	0.5	0	0	0	NA
is-0122.01-g	0	3928	481687	8228152	0.09	NA	NA	C	0.09	0.5	0.5	0	0	0	NA
is-0123.01-e	0	3873	480777	8228529	2	NA	NA	P	2	1	0	0	0	0	NA
is-0123.01-g	0	3873	480777	8228529	2	NA	NA	C	2	1	0	0	0	0	NA
is-0124.01-e	0	3936	480397	8228816	1	NA	NA	C	1	1	0	0	0	0	NA
is-0124.01-f	0	3936	480397	8228816	1	NA	NA	C	1	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
is-0124.01-g	0	3936	480397	8228816	1	NA	NA	C	1	1	0	0	0	0	NA
is-0125.01-g	0	3829	481337	8227984	0.5	NA	NA	P	0.5	1	0	0	0	0	NA
is-0127.01-g	0	3978	482100	8228097	0.01	NA	NA	C	0.01	0	1	0	0	0	NA
is-0129.01-g	0	3837	481101	8228213	0.29	NA	NA	C	0.29	0	1	0	0	0	NA
is-0130.01-g	0	3851	480974	8228372	0.05	NA	NA	C	0.05	1	0	0	0	0	NA
is-0131.01-g	0	3890	480971	8228595	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0133.01-g	0	3903	484219	8227535	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0134.01-c	0	3847	484383	8227525	0.03	NA	NA	P	0.03	1	0	0	0	0	NA
is-0134.01-d	0	3847	484383	8227525	0.03	NA	NA	P	0.03	1	0	0	0	0	NA
is-0135.01-g	0	3829	484454	8227528	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0136.01-d	0	3870	484393	8227652	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0136.01-g	0	3870	484393	8227652	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
is-0137.01-e	0	3922	484308	8227808	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0139.01-c	0	3922	484373	8227859	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
is-0139.01-d	0	3922	484373	8227859	0.06	NA	NA	P	0.06	1	0	0	0	0	NA
is-0139.01-e	0	3922	484373	8227859	0.06	NA	NA	P	0.06	1	0	0	0	0	NA
is-0140.01-c	0	3939	484261	8227944	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0140.01-d	0	3939	484261	8227944	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0140.01-e	0	3939	484261	8227944	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0142.01-a	0	3976	484062	8228352	0.25	NA	NA	C	4	1	0	0	0	0	NA
is-0142.01-b	0	3976	484062	8228352	0.25	NA	NA	C	4	1	0	0	0	0	NA
is-0142.01-c	0	3976	484062	8228352	2	NA	NA	C	4	1	0.5	0	0	0	NA
is-0142.01-d	0	3976	484062	8228352	3	NA	NA	C	4	1	0.5	0	0	0	NA
is-0142.01-e	0	3976	484062	8228352	4	NA	NA	C	4	1	0.5	1	0	0	NA
is-0143.01-e	0	3883	484272	8228495	0.03	NA	NA	C	0.03	1	0	0	0	0	NA
is-0145.01-c	0	4068	483690	8227834	0.5	NA	NA	C	0.5	1	0	0.5	0	0	NA
is-0145.01-d	0	4068	483690	8227834	0.5	NA	NA	P	0.5	1	0	0.5	0	0	NA
is-0145.01-e	0	4068	483690	8227834	0.5	NA	NA	C	0.5	1	0	0.5	0	0	NA
is-0145.01-f	0	4068	483690	8227834	0.5	NA	NA	C	0.5	1	0	0.5	0	0	NA
is-0146.01-g	0	4068	483754	8227698	0.25	NA	NA	C	0.25	1	0	1	0	0	NA
is-0147.01-g	0	4067	483554	8227642	0.09	NA	NA	C	0.09	0	0	1	0	0	NA
is-0150.01-g	0	3906	484437	8227206	0.15	NA	NA	C	0.15	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
is-0151.01-g	0	3877	484507	8227190	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0152.01-g	0	3857	484529	8227008	1	NA	NA	P	1	1	0	0	0	0	NA
is-0153.01-g	0	3895	484527	8226546	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0154.01-g	0	3881	484619	8226449	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
is-0157.01-g	0	3929	484563	8226332	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
is-0158.01-g	0	3911	484406	8225816	0.1	NA	NA	C	0.1	1	0	1	0	0	NA
is-0159.01-g	0	3882	484453	8225913	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
is-0160.01-d	0	3877	484633	8225434	0.09	NA	NA	C	0.09	1	0	1	0	0	NA
is-0163.01-g	0	3815	484846	8225321	0.28	NA	NA	C	0.28	1	0	0	0	0	NA
is-0164.01-g	0	3840	484647	8225621	1	NA	NA	C	1	0.5	0.5	0	0	0	NA
is-0165.01-g	0	3874	484476	8226728	0.01	NA	NA	C	0.01	0	1	0	0	0	NA
is-0166.01-c	0	3815	484638	8226004	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0167.01-g	0	3975	483460	8227380	0.05	NA	NA	P	0.05	1	0	0	0	0	NA
is-0168.01-g	0	3919	483355	8227152	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
is-0169.01-b	0	3873	483895	8226433	0.08	NA	NA	C	0.08	1	0	0	0	0	NA
is-0170.01-g	0	3908	483811	8226587	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
is-0172.01-b	0	3912	484328	8225930	0.02	NA	NA	C	0.02	1	0	0	0	0	NA
is-0173.01-g	0	3922	484271	8226036	0.04	NA	NA	P	0.04	1	0	0	0	0	NA
is-0174.01-c	0	3915	484284	8225952	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
is-0175.01-e	0	3886	483140	8227148	0.25	NA	NA	P	0.25	0.5	0	0.5	0	0	NA
is-0176.01-g	0	3937	483182	8227226	0.04	NA	NA	P	0.04	1	0	0	0	0	NA
is-0178.01-b	0	3834	483734	8226306	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
is-0180.01-g	0	3935	477779	8232441	0.25	NA	NA	C	0.25	0	1	0	0	0	NA
is-0200.01-c	0	3863	492496	8226693	0.6	NA	NA	C	1.5	1	0	0.5	0	0	NA
is-0200.01-d	0	3863	492496	8226693	0.6	NA	NA	C	1.5	1	1	0.5	0	0	NA
is-0200.01-e	0	3863	492496	8226693	0.6	NA	NA	C	1.5	1	1	0.5	0	0	NA
is-0200.01-f	0	3863	492496	8226693	0.25	NA	NA	C	1.5	1	0	0.5	0	0	NA
is-0200.01-g	0	3863	492496	8226693	1.5	NA	NA	C	1.5	1	1	0.5	0	0	NA
is-0201.01-c	0	3886	491580	8227275	0.39	NA	NA	C	0.39	1	0	0.5	0	0	NA
is-0201.01-d	0	3886	491580	8227275	0.39	NA	NA	C	0.39	1	0	0.5	0	0	NA
is-0201.01-e	0	3886	491580	8227275	0.39	NA	NA	C	0.39	1	0	0.5	0	0	NA
is-0201.01-f	0	3886	491580	8227275	0.25	NA	NA	C	0.39	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
is-0201.01-g	0	3886	491580	8227275	0.39	NA	NA	C	0.39	1	0	0.5	0	0	NA
is-0202.01-g	0	3922	492314	8226643	0.01	NA	NA	C	0.01	0	0	1	0	0	NA
qt-2001.01-c	0	4600	396457	8145698	NA	NA	NA	C	0.25	1	0	0	0	0	2
qt-2001.01-e	0	4600	396457	8145698	NA	NA	NA	C	0.25	1	0	0	0	0	2
qt-2002.01-c	0	3992	422781	8149249	NA	NA	NA	C	0.25	1	0	0	0	0	13
qt-2002.01-d	0	3992	422781	8149249	NA	NA	NA	C	0.25	1	0	0	0	0	9
qt-2003.01-c	0	4008	418807	8147679	NA	NA	NA	C	0.04	1	0	0	0	0	6
qt-2003.01-d	0	4008	418807	8147679	NA	NA	NA	C	0.04	1	0	0	0	0	3
qt-2006.01-c	0	3986	423743	8148846	NA	NA	NA	C	0.02	1	0	0	0	0	1
qt-2006.01-d	0	3986	423743	8148846	NA	NA	NA	C	0.02	1	0	0	0	0	2
qt-2007.01-a	0	4041	417048	8148396	NA	NA	NA	C	0.15	1	0	0	0	0	28
qt-2007.01-b	0	4041	417048	8148396	NA	NA	NA	C	0.15	1	0	0	0	0	7
qt-2007.01-c	0	4041	417048	8148396	NA	NA	NA	C	0.15	1	0	0	0	0	14
qt-2007.01-d	0	4041	417048	8148396	NA	NA	NA	C	0.15	1	0	0	0	0	15
qt-2008.01-a	0	4094	411781	8147689	NA	NA	NA	C	0.48	1	0	0	0	0	1
qt-2008.01-e	0	4094	411781	8147689	NA	NA	NA	C	0.48	1	0	0	0	0	9
qt-2009.01-a	0	4117	410912	8147598	NA	NA	NA	C	1	1	0	0	0	0	1
qt-2009.01-c	0	4117	410912	8147598	NA	NA	NA	C	1	1	0	0	0	0	1
qt-2009.01-d	0	4117	410912	8147598	NA	NA	NA	C	1	1	0	0	0	0	1
qt-2009.01-e	0	4117	410912	8147598	NA	NA	NA	C	1	1	0	0	0	0	2
qt-2010.01-a	0	4159	407864	8146367	NA	NA	NA	C	2	1	0	0.5	0	0	9
qt-2010.01-b	0	4159	407864	8146367	NA	NA	NA	C	2	1	0	0.5	0	0	4
qt-2010.01-c	0	4159	407864	8146367	NA	NA	NA	C	2	1	0	0.5	0	0	33
qt-2010.01-d	0	4159	407864	8146367	NA	NA	NA	C	2	1	0	0.5	0	0	38
qt-2010.01-e	0	4159	407864	8146367	NA	NA	NA	C	2	1	0	0.5	0	0	11
qt-2011.01-c	0	4283	405799	8146588	NA	NA	NA	C	0.04	0.5	0	0	0	0	14
qt-2011.01-d	0	4283	405799	8146588	NA	NA	NA	C	0.04	0.5	0	0	0	0	2
qt-2011.01-e	0	4283	405799	8146588	NA	NA	NA	C	0.04	0.5	0	0	0	0	7
qt-2012.01-d	0	4289	405668	8146652	NA	NA	NA	C	0.01	1	0	0	0	0	1
qt-2012.01-e	0	4289	405668	8146652	NA	NA	NA	C	0.01	1	0	0	0	0	5
qt-2013.01-a	0	4279	405514	8146996	NA	NA	NA	C	0.06	1	0	0	0	0	4
qt-2013.01-c	0	4279	405514	8146996	NA	NA	NA	C	0.06	1	0	0	0	0	4

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2013.01-d	0	4279	405514	8146996	NA	NA	NA	C	0.06	1	0	0	0	0	7
qt-2013.01-e	0	4279	405514	8146996	NA	NA	NA	C	0.06	1	0	0	0	0	2
qt-2014.01-a	0	4241	405133	8146619	NA	NA	NA	C	0.09	1	0	0	0	0	28
qt-2014.01-c	0	4241	405133	8146619	NA	NA	NA	C	0.09	1	0	0	0	0	3
qt-2014.01-d	0	4241	405133	8146619	NA	NA	NA	C	0.09	1	0	0	0	0	1
qt-2015.01-a	0	4250	404948	8146533	NA	NA	NA	C	0.5	1	0	0	0	0	2
qt-2015.01-c	0	4250	404948	8146533	NA	NA	NA	C	0.5	1	0	0	0	0	4
qt-2015.01-d	0	4250	404948	8146533	NA	NA	NA	C	0.5	1	0	0	0	0	1
qt-2015.01-e	0	4250	404948	8146533	NA	NA	NA	C	0.5	1	0	0	0	0	3
qt-2016.01-a	0	4286	403404	8146508	NA	NA	NA	C	0.25	1	0	0	0	0	2
qt-2016.01-c	0	4286	403404	8146508	NA	NA	NA	C	0.25	1	0	0	0	0	17
qt-2016.01-d	0	4286	403404	8146508	NA	NA	NA	C	0.25	1	0	0	0	0	3
qt-2016.01-e	0	4286	403404	8146508	NA	NA	NA	C	0.25	1	0	0	0	0	3
qt-2017.01-c	0	4308	402585	8146816	NA	NA	NA	C	0.25	1	0	0	0	0	9
qt-2017.01-e	0	4308	402585	8146816	NA	NA	NA	C	0.25	1	0	0	0	0	4
qt-2018.01-a	0	4339	401821	8146790	NA	NA	NA	C	0.16	1	0	0	0	0	2
qt-2018.01-c	0	4339	401821	8146790	NA	NA	NA	C	0.16	1	0	0	0	0	15
qt-2018.01-d	0	4339	401821	8146790	NA	NA	NA	C	0.16	1	0	0	0	0	3
qt-2018.01-e	0	4339	401821	8146790	NA	NA	NA	C	0.16	1	0	0	0	0	3
qt-2019.01-b	0	4361	401540	8146764	NA	NA	NA	C	1	1	0	0.5	0	0	2
qt-2019.01-c	0	4361	401540	8146764	NA	NA	NA	C	1	1	0	0.5	0	0	1
qt-2019.01-d	0	4361	401540	8146764	NA	NA	NA	C	1	1	0	0.5	0	0	4
qt-2019.01-e	0	4361	401540	8146764	NA	NA	NA	C	1	1	0	0.5	0	0	8
qt-2020.01-a	0	4431	399411	8146219	NA	NA	NA	C	4	1	0	0.5	0	0	3
qt-2020.01-b	0	4431	399411	8146219	NA	NA	NA	C	4	1	0	0.5	0	0	3
qt-2020.01-c	0	4431	399411	8146219	NA	NA	NA	C	4	1	0	0.5	0	0	18
qt-2020.01-d	0	4431	399411	8146219	NA	NA	NA	C	4	1	0	0.5	0	0	89
qt-2020.01-e	0	4431	399411	8146219	NA	NA	NA	C	4	1	0	0.5	0	0	4
qt-2021.01-a	0	4466	398581	8146005	NA	NA	NA	C	0.16	1	0	0	0	0	16
qt-2021.01-b	0	4466	398581	8146005	NA	NA	NA	C	0.16	1	0	0	0	0	2
qt-2021.01-c	0	4466	398581	8146005	NA	NA	NA	C	0.16	1	0	0	0	0	5
qt-2021.01-d	0	4466	398581	8146005	NA	NA	NA	C	0.16	1	0	0	0	0	4

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2021.01-e	0	4466	398581	8146005	NA	NA	NA	C	0.16	1	0	0	0	0	2
qt-2022.01-a	0	4507	398290	8145984	NA	NA	NA	C	0.25	1	0	0.5	0	0	1
qt-2022.01-c	0	4507	398290	8145984	NA	NA	NA	C	0.25	1	0	0.5	0	0	24
qt-2022.01-d	0	4507	398290	8145984	NA	NA	NA	C	0.25	1	0	0.5	0	0	24
qt-2022.01-e	0	4507	398290	8145984	NA	NA	NA	C	0.25	1	0	0.5	0	0	3
qt-2023.01-a	0	4574	397489	8145869	NA	NA	NA	C	0.09	1	0	0	0	0	2
qt-2023.01-e	0	4574	397489	8145869	NA	NA	NA	C	0.09	1	0	0	0	0	15
qt-2024.01-a	0	4606	396884	8145773	NA	NA	NA	C	0.25	1	0	0	0	0	9
qt-2024.01-d	0	4606	396884	8145773	NA	NA	NA	C	0.25	1	0	0	0	0	2
qt-2025.01-c	0	4621	396310	8145647	NA	NA	NA	C	0.6	1	0	0	0	0	5
qt-2025.01-d	0	4621	396310	8145647	NA	NA	NA	C	0.6	1	0	0	0	0	18
qt-2028.01-a	0	3977	425340	8149129	NA	NA	NA	C	0.04	1	0	0	0	0	7
qt-2028.01-c	0	3977	425340	8149129	NA	NA	NA	C	0.04	1	0	0	0	0	1
qt-2028.01-d	0	3977	425340	8149129	NA	NA	NA	C	0.04	1	0	0	0	0	5
qt-2029.01-b	0	3988	426323	8149617	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	2
qt-2029.01-c	0	3988	426323	8149617	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	3
qt-2029.01-d	0	3988	426323	8149617	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	6
qt-2029.01-e	0	3988	426323	8149617	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	3
qt-2030.01-c	0	3976	426172	8149524	NA	NA	NA	C	0.04	1	0	0	0	0	4
qt-2031.01-c	0	4254	406321	8145831	NA	NA	NA	C	0.03	1	0	0	0	0	2
qt-2031.01-d	0	4254	406321	8145831	NA	NA	NA	C	0.03	1	0	0	0	0	2
qt-2032.01-a	0	3986	423352	8148414	NA	NA	NA	C	0.25	0.5	0	0.5	0	0	1
qt-2032.01-d	0	3986	423352	8148414	NA	NA	NA	C	0.25	0.5	0	0.5	0	0	12
qt-2033.01-a	0	4184	406827	8146607	NA	NA	NA	C	0.1	1	0	0	0	0	3
qt-2033.01-c	0	4184	406827	8146607	NA	NA	NA	C	0.1	1	0	0	0	0	5
qt-2033.01-d	0	4184	406827	8146607	NA	NA	NA	C	0.1	1	0	0	0	0	17
qt-2034.01-a	0	4208	406139	8146928	NA	NA	NA	C	0.12	1	0	0.5	0	0	1
qt-2034.01-c	0	4208	406139	8146928	NA	NA	NA	C	0.12	1	0	0.5	0	0	2
qt-2034.01-d	0	4208	406139	8146928	NA	NA	NA	C	0.12	1	0	0.5	0	0	10
qt-2034.01-e	0	4208	406139	8146928	NA	NA	NA	C	0.12	1	0	0.5	0	0	1
qt-2036.01-d	0	4200	405845	8147052	NA	NA	NA	C	0.3	0.5	0	1	0	0	11
qt-2037.01-c	0	4225	406155	8146805	NA	NA	NA	C	0.25	1	0	0	0	0	2

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
qt-2038.01-a	0	4221	406358	8146612	NA	NA	NA	C	1.5	1	0	0.5	0	0	8
qt-2038.01-c	0	4221	406358	8146612	NA	NA	NA	C	1.5	1	0	0.5	0	0	7
qt-2038.01-d	0	4221	406358	8146612	NA	NA	NA	C	1.5	1	0	0.5	0	0	18
qt-2039.01-a	0	4215	406439	8146110	NA	NA	NA	C	0.08	0.5	0	0.5	0	0	3
qt-2039.01-c	0	4215	406439	8146110	NA	NA	NA	C	0.08	0.5	0	0.5	0	0	10
qt-2039.01-d	0	4215	406439	8146110	NA	NA	NA	C	0.08	0.5	0	0.5	0	0	3
qt-2039.01-e	0	4215	406439	8146110	NA	NA	NA	C	0.08	0.5	0	0.5	0	0	4
qt-2040.01-a	0	4280	406019	8145472	NA	NA	NA	C	0.04	1	0	0	0	0	21
qt-2040.01-c	0	4280	406019	8145472	NA	NA	NA	C	0.04	1	0	0	0	0	1
qt-2040.01-d	0	4280	406019	8145472	NA	NA	NA	C	0.04	1	0	0	0	0	2
qt-2041.01-a	0	4252	406243	8145988	NA	NA	NA	C	0.5	1	0	0	0	0	1
qt-2041.01-c	0	4252	406243	8145988	NA	NA	NA	C	0.5	1	0	0	0	0	9
qt-2041.01-d	0	4252	406243	8145988	NA	NA	NA	C	0.5	1	0	0	0	0	9
qt-2041.01-e	0	4252	406243	8145988	NA	NA	NA	C	0.5	1	0	0	0	0	12
qt-2042.01-a	0	4248	407194	8145817	NA	NA	NA	C	0.005	1	0	0.5	0	0	9
qt-2042.01-c	0	4248	407194	8145817	NA	NA	NA	C	0.005	1	0	0.5	0	0	2
qt-2042.01-d	0	4248	407194	8145817	NA	NA	NA	C	0.005	1	0	0.5	0	0	1
qt-2045.01-c	0	4314	405434	8146611	NA	NA	NA	C	0.3	1	0.5	0	0	0	11
qt-2046.01-c	0	4301	405548	8146430	NA	NA	NA	C	0.64	1	0	1	0	0	4
qt-2047.01-a	0	4284	405825	8146112	NA	NA	NA	C	0.04	1	0	0	0	0	1
qt-2047.01-c	0	4284	405825	8146112	NA	NA	NA	C	0.04	1	0	0	0	0	17
qt-2047.01-d	0	4284	405825	8146112	NA	NA	NA	C	0.04	1	0	0	0	0	16
qt-2047.01-e	0	4284	405825	8146112	NA	NA	NA	C	0.04	1	0	0	0	0	1
qt-2048.01-a	0	4269	405796	8146792	NA	NA	NA	C	0.04	1	0	0	0	0	3
qt-2048.01-d	0	4269	405796	8146792	NA	NA	NA	C	0.04	1	0	0	0	0	3
qt-2049.01-c	0	4263	405738	8146909	NA	NA	NA	C	0.18	0	0	0	0.5	0	1
qt-2049.01-d	0	4263	405738	8146909	NA	NA	NA	C	0.18	0	0	0	0.5	0	6
qt-2050.01-a	0	4292	405347	8147026	NA	NA	NA	C	0.25	1	0	0	0	0	4
qt-2050.01-d	0	4292	405347	8147026	NA	NA	NA	C	0.25	1	0	0	0	0	1
qt-2052.01-a	0	4263	405241	8146965	NA	NA	NA	C	0.5	1	0	0	0	0	5
qt-2052.01-b	0	4263	405241	8146965	NA	NA	NA	C	0.5	1	0	0	0	0	2
qt-2052.01-c	0	4263	405241	8146965	NA	NA	NA	C	0.5	1	0	0	0	0	17

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2052.01-d	0	4263	405241	8146965	NA	NA	NA	C	0.5	1	0	0	0	0	36
qt-2052.01-e	0	4263	405241	8146965	NA	NA	NA	C	0.5	1	0	0	0	0	1
qt-2053.01-d	0	4304	416285	8147120	NA	NA	NA	C	12.3	1	0	1	0	1	10
qt-2055.01-a	0	4285	404320	8146172	NA	NA	NA	C	0.5	1	0	0	0	0	6
qt-2055.01-b	0	4285	404320	8146172	NA	NA	NA	C	0.5	1	0	0	0	0	1
qt-2055.01-c	0	4285	404320	8146172	NA	NA	NA	C	0.5	1	0	0	0	0	2
qt-2055.01-d	0	4285	404320	8146172	NA	NA	NA	C	0.5	1	0	0	0	0	4
qt-2056.01-c	0	4366	401705	8146622	NA	NA	NA	C	0.03	0	0	0.5	0	0	1
qt-2056.01-d	0	4366	401705	8146622	NA	NA	NA	C	0.03	0	0	0.5	0	0	6
qt-2057.01-c	0	4389	400206	8147105	NA	NA	NA	C	0.1	1	0	0	0	0	1
qt-2058.01-a	0	4409	399851	8146802	NA	NA	NA	C	0.04	1	0	0	0	0	3
qt-2058.01-d	0	4409	399851	8146802	NA	NA	NA	C	0.04	1	0	0	0	0	1
qt-2059.01-a	0	4420	400275	8146585	NA	NA	NA	C	0.1	0.5	0	0.5	0	0	1
qt-2060.01-a	0	4450	400425	8146996	NA	NA	NA	C	0.4	0.5	0	0.5	0	0	7
qt-2060.01-c	0	4450	400425	8146996	NA	NA	NA	C	0.4	0.5	0	0.5	0	0	2
qt-2060.01-d	0	4450	400425	8146996	NA	NA	NA	C	0.4	0.5	0	0.5	0	0	7
qt-2061.01-a	0	4502	398599	8145781	NA	NA	NA	C	0.6	1	0	0	0	0	3
qt-2061.01-c	0	4502	398599	8145781	NA	NA	NA	C	0.6	1	0	0	0	0	3
qt-2061.01-d	0	4502	398599	8145781	NA	NA	NA	C	0.6	1	0	0	0	0	6
qt-2062.01-a	0	4485	398392	8145729	NA	NA	NA	C	0.25	1	0	0	0	0	2
qt-2062.01-c	0	4485	398392	8145729	NA	NA	NA	C	0.25	1	0	0	0	0	7
qt-2062.01-d	0	4485	398392	8145729	NA	NA	NA	C	0.25	1	0	0	0	0	2
qt-2062.01-e	0	4485	398392	8145729	NA	NA	NA	C	0.25	1	0	0	0	0	1
qt-2063.01-a	0	4476	398412	8145877	NA	NA	NA	C	0.06	1	0	0	0	0	8
qt-2063.01-c	0	4476	398412	8145877	NA	NA	NA	C	0.06	1	0	0	0	0	3
qt-2063.01-d	0	4476	398412	8145877	NA	NA	NA	C	0.06	1	0	0	0	0	10
qt-2063.01-e	0	4476	398412	8145877	NA	NA	NA	C	0.06	1	0	0	0	0	6
qt-2065.01-a	0	4138	408708	8146753	NA	NA	NA	C	0.3	1	0	0	0	0	2
qt-2065.01-c	0	4138	408708	8146753	NA	NA	NA	C	0.3	1	0	0	0	0	11
qt-2065.01-d	0	4138	408708	8146753	NA	NA	NA	C	0.3	1	0	0	0	0	22
qt-2065.01-e	0	4138	408708	8146753	NA	NA	NA	C	0.3	1	0	0	0	0	2
qt-2066.01-a	0	4161	409168	8146421	NA	NA	NA	C	0.01	1	0	0	0	0	1

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2066.01-c	0	4161	409168	8146421	NA	NA	NA	C	0.01	1	0	0	0	0	5
qt-2066.01-d	0	4161	409168	8146421	NA	NA	NA	C	0.01	1	0	0	0	0	3
qt-2067.01-d	0	4145	410507	8147195	NA	NA	NA	C	0.004	1	0	0	0	0	1
qt-2067.01-e	0	4145	410507	8147195	NA	NA	NA	C	0.004	1	0	0	0	0	1
qt-2068.01-d	0	4136	411177	8147156	NA	NA	NA	C	0.01	1	0	0	0	0	6
qt-2069.01-d	0	4136	411482	8147168	NA	NA	NA	C	0.01	1	0	0	0	0	3
qt-2071.01-a	0	4154	408376	8146634	NA	NA	NA	C	0.01	1	0	0	0	0	1
qt-2071.01-c	0	4154	408376	8146634	NA	NA	NA	C	0.01	1	0	0	0	0	2
qt-2071.01-d	0	4154	408376	8146634	NA	NA	NA	C	0.01	1	0	0	0	0	7
qt-2071.01-e	0	4154	408376	8146634	NA	NA	NA	C	0.01	1	0	0	0	0	1
qt-2072.01-c	0	4102	414147	8149020	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	7
qt-2072.01-d	0	4102	414147	8149020	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	5
qt-2072.01-e	0	4102	414147	8149020	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	1
qt-2074.01-a	0	4086	414538	8148720	NA	NA	NA	C	0.002	0.5	0	0.5	0	0	2
qt-2074.01-d	0	4086	414538	8148720	NA	NA	NA	C	0.002	0.5	0	0.5	0	0	8
qt-2075.01-a	0	4065	414879	8147912	NA	NA	NA	C	0.03	1	0	0	0	0	10
qt-2075.01-b	0	4065	414879	8147912	NA	NA	NA	C	0.03	1	0	0	0	0	1
qt-2076.01-a	0	4050	414586	8147829	NA	NA	NA	C	1	1	0	0	0	0	4
qt-2076.01-c	0	4050	414586	8147829	NA	NA	NA	C	1	1	0	0	0	0	9
qt-2076.01-d	0	4050	414586	8147829	NA	NA	NA	C	1	1	0	0	0	0	14
qt-2077.01-e	0	4035	417220	8147912	NA	NA	NA	C	0.01	1	0	0	0	0	3
qt-2078.01-a	0	4069	414651	8148745	NA	NA	NA	C	0.14	1	0	0	0	0	1
qt-2078.01-c	0	4069	414651	8148745	NA	NA	NA	C	0.14	1	0	0	0	0	3
qt-2078.01-d	0	4069	414651	8148745	NA	NA	NA	C	0.14	1	0	0	0	0	2
qt-2079.01-a	0	4074	416613	8148479	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	6
qt-2079.01-c	0	4074	416613	8148479	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	1
qt-2079.01-d	0	4074	416613	8148479	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	7
qt-2080.01-a	0	4066	417358	8148658	NA	NA	NA	C	0.4	1	0	0	0	0	4
qt-2080.01-c	0	4066	417358	8148658	NA	NA	NA	C	0.4	1	0	0	0	0	26
qt-2080.01-d	0	4066	417358	8148658	NA	NA	NA	C	0.4	1	0	0	0	0	56
qt-2080.01-e	0	4066	417358	8148658	NA	NA	NA	C	0.4	1	0	0	0	0	3
qt-2081.01-a	0	4062	417962	8147940	NA	NA	NA	C	0.005	0.5	0	0.5	0	0	1

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2081.01-e	0	4062	417962	8147940	NA	NA	NA	C	0.005	0.5	0	0.5	0	0	7
qt-2082.01-a	0	4034	418194	8147847	NA	NA	NA	C	0.5	0.5	0	0.5	0	0	8
qt-2082.01-c	0	4034	418194	8147847	NA	NA	NA	C	0.5	0.5	0	0.5	0	0	30
qt-2082.01-d	0	4034	418194	8147847	NA	NA	NA	C	0.5	0.5	0	0.5	0	0	5
qt-2083.01-a	0	4029	419333	8147724	NA	NA	NA	C	0.04	0.5	0	0.5	0	0	2
qt-2083.01-c	0	4029	419333	8147724	NA	NA	NA	C	0.04	0.5	0	0.5	0	0	2
qt-2083.01-d	0	4029	419333	8147724	NA	NA	NA	C	0.04	0.5	0	0.5	0	0	6
qt-2084.01-a	0	4009	419962	8147510	NA	NA	NA	C	0.4	0.5	0	0.5	0	0	9
qt-2084.01-b	0	4009	419962	8147510	NA	NA	NA	C	0.4	0.5	0	0.5	0	0	17
qt-2084.01-c	0	4009	419962	8147510	NA	NA	NA	C	0.4	0.5	0	0.5	0	0	40
qt-2084.01-d	0	4009	419962	8147510	NA	NA	NA	C	0.4	0.5	0	0.5	0	0	2
qt-2085.01-a	0	4026	420648	8148117	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	2
qt-2085.01-b	0	4026	420648	8148117	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	1
qt-2085.01-c	0	4026	420648	8148117	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	10
qt-2086.01-a	0	4026	420833	8147968	NA	NA	NA	C	0.1	0.5	0	0.5	0	0	1
qt-2086.01-c	0	4026	420833	8147968	NA	NA	NA	C	0.1	0.5	0	0.5	0	0	1
qt-2087.01-c	0	3993	421078	8147841	NA	NA	NA	C	0.04	1	0	0	0	0	8
qt-2089.01-a	0	3989	422962	8147443	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	3
qt-2089.01-c	0	3989	422962	8147443	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	1
qt-2089.01-d	0	3989	422962	8147443	NA	NA	NA	C	0.01	0.5	0	0.5	0	0	4
qt-2090.01-b	0	4035	417518	8147873	NA	NA	NA	C	0.3	1	0	0	0	0	1
qt-2090.01-c	0	4035	417518	8147873	NA	NA	NA	C	0.3	1	0	0	0	0	2
qt-2090.01-d	0	4035	417518	8147873	NA	NA	NA	C	0.3	1	0	0	0	0	2
qt-2090.01-e	0	4035	417518	8147873	NA	NA	NA	C	0.3	1	0	0	0	0	1
qt-2092.01-a	0	4028	417373	8147503	NA	NA	NA	C	0.1	1	0	0.5	0	0	6
qt-2092.01-c	0	4028	417373	8147503	NA	NA	NA	C	0.1	1	0	0.5	0	0	5
qt-2092.01-d	0	4028	417373	8147503	NA	NA	NA	C	0.1	1	0	0.5	0	0	16
qt-2092.01-e	0	4028	417373	8147503	NA	NA	NA	C	0.1	1	0	0.5	0	0	3
qt-2093.01-c	0	4022	418264	8147444	NA	NA	NA	C	0.16	1	0	0	0	0	1
qt-2093.01-d	0	4022	418264	8147444	NA	NA	NA	C	0.16	1	0	0	0	0	3
qt-2093.01-e	0	4022	418264	8147444	NA	NA	NA	C	0.16	1	0	0	0	0	4
qt-2094.01-a	0	4641	392899	8143854	NA	NA	NA	C	0.04	1	0	0	0	0	7

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2095.01-a	0	4608	390850	8142750	NA	NA	NA	C	2	1	0	0	0	0.5	26
qt-2095.01-c	0	4608	390850	8142750	NA	NA	NA	C	2	1	0	0	0	0.5	17
qt-2095.01-d	0	4608	390850	8142750	NA	NA	NA	C	2	1	0	0	0	0.5	7
qt-2096.01-a	0	4622	391133	8142498	NA	NA	NA	C	0.25	1	0	0	0	0	10
qt-2096.01-c	0	4622	391133	8142498	NA	NA	NA	C	0.25	1	0	0	0	0	13
qt-2096.01-d	0	4622	391133	8142498	NA	NA	NA	C	0.25	1	0	0	0	0	4
qt-2097.01-a	0	4620	390100	8142508	NA	NA	NA	C	0.25	1	0	0	0	0	12
qt-2097.01-c	0	4620	390100	8142508	NA	NA	NA	C	0.25	1	0	0	0	0	5
qt-2097.01-d	0	4620	390100	8142508	NA	NA	NA	C	0.25	1	0	0	0	0	9
qt-2098.01-a	0	4603	390321	8142050	NA	NA	NA	C	0.04	0.5	0	0.5	0	0	15
qt-2098.01-d	0	4603	390321	8142050	NA	NA	NA	C	0.04	0.5	0	0.5	0	0	2
qt-2099.01-a	0	4637	390359	8141866	NA	NA	NA	C	0.25	1	0	0	0	0	6
qt-2099.01-c	0	4637	390359	8141866	NA	NA	NA	C	0.25	1	0	0	0	0	3
qt-2099.01-d	0	4637	390359	8141866	NA	NA	NA	C	0.25	1	0	0	0	0	34
qt-2100.01-a	0	4589	388690	8141221	NA	NA	NA	C	0.12	1	0	0	0	0	1
qt-2100.01-c	0	4589	388690	8141221	NA	NA	NA	C	0.12	1	0	0	0	0	8
qt-2100.01-d	0	4589	388690	8141221	NA	NA	NA	C	0.12	1	0	0	0	0	2
qt-2101.01-d	0	4603	389328	8141610	NA	NA	NA	C	0.16	1	0	0	0	0	9
qt-2102.01-a	0	4595	389152	8141594	NA	NA	NA	C	0.15	1	0	0	0	0	4
qt-2102.01-c	0	4595	389152	8141594	NA	NA	NA	C	0.15	1	0	0	0	0	2
qt-2103.01-a	0	4591	388455	8140552	NA	NA	NA	C	3	1	0	0.5	0	0	3
qt-2103.01-c	0	4591	388455	8140552	NA	NA	NA	C	3	1	0	0.5	0	0	5
qt-2103.01-d	0	4591	388455	8140552	NA	NA	NA	C	3	1	0	0.5	0	0	94
qt-2104.01-c	0	4589	384794	8137998	NA	NA	NA	C	0.01	0.5	0	0	0	0	6
qt-2104.01-d	0	4589	384794	8137998	NA	NA	NA	C	0.01	0.5	0	0	0	0	8
qt-2106.01-a	0	4572	383630	8137349	NA	NA	NA	C	0.25	1	0	0	0	0	1
qt-2106.01-d	0	4572	383630	8137349	NA	NA	NA	C	0.25	1	0	0	0	0	20
qt-2107.01-a	0	4569	383796	8137195	NA	NA	NA	C	0.2	1	0	0	0	0	11
qt-2107.01-b	0	4569	383796	8137195	NA	NA	NA	C	0.2	1	0	0	0	0	2
qt-2107.01-d	0	4569	383796	8137195	NA	NA	NA	C	0.2	1	0	0	0	0	15
qt-2108.01-a	0	4576	383216	8137196	NA	NA	NA	C	1.6	1	0	0	0	0	29
qt-2108.01-b	0	4576	383216	8137196	NA	NA	NA	C	1.6	1	0	0	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2108.01-c	0	4576	383216	8137196	NA	NA	NA	C	1.6	1	0	0	0	0	9
qt-2108.01-d	0	4576	383216	8137196	NA	NA	NA	C	1.6	1	0	0	0	0	72
qt-2109.01-c	0	4570	382603	8137185	NA	NA	NA	C	0.16	1	0	0	0	0	8
qt-2109.01-d	0	4570	382603	8137185	NA	NA	NA	C	0.16	1	0	0	0	0	7
qt-2110.01-d	0	4576	383516	8137616	NA	NA	NA	C	0.5	1	0	0	0	0	8
qt-2111.01-d	0	4573	382543	8136824	NA	NA	NA	C	0.25	1	0	0	0	0	6
qt-2112.01-d	0	4570	382382	8136644	NA	NA	NA	C	0.25	1	0	0	0	0	35
qt-2113.01-d	0	4585	382387	8135909	NA	NA	NA	C	0.02	1	0	0	0	0	7
qt-2114.01-c	0	4585	387694	8140973	NA	NA	NA	C	5	1	0	0	0	0	6
qt-2114.01-d	0	4585	387694	8140973	NA	NA	NA	C	5	1	0	0	0	0	1
qt-2117.01-a	0	4613	375594	8133150	NA	NA	NA	C	1.5	1	0	0	0	0	20
qt-2117.01-b	0	4613	375594	8133150	NA	NA	NA	C	1.5	1	0	0	0	0	10
qt-2117.01-c	0	4613	375594	8133150	NA	NA	NA	C	1.5	1	0	0	0	0	14
qt-2117.01-d	0	4613	375594	8133150	NA	NA	NA	C	1.5	1	0	0	0	0	26
qt-2118.01-a	0	4609	375213	8133319	NA	NA	NA	C	1.5	1	0	0	0	0	20
qt-2118.01-b	0	4609	375213	8133319	NA	NA	NA	C	1.5	1	0	0	0	0	2
qt-2118.01-c	0	4609	375213	8133319	NA	NA	NA	C	1.5	1	0	0.5	0	0	20
qt-2118.01-d	0	4609	375213	8133319	NA	NA	NA	C	1.5	1	0	0.5	0	0	31
qt-2118.01-e	0	4609	375213	8133319	NA	NA	NA	C	1.5	1	0	0	0	0	2
qt-2119.01-a	0	4622	373964	8133136	NA	NA	NA	C	1	1	0	0.5	0	0	5
qt-2119.01-c	0	4622	373964	8133136	NA	NA	NA	C	1	1	0	0.5	0	0	18
qt-2119.01-d	0	4622	373964	8133136	NA	NA	NA	C	1	1	0	0.5	0	0	12
qt-2120.01-c	0	4638	372985	8132770	NA	NA	NA	C	0.1	1	0	0.5	0	0	17
qt-2120.01-e	0	4638	372985	8132770	NA	NA	NA	C	0.1	1	0	0.5	0	0	9
qt-2121.01-a	0	4629	372556	8132177	NA	NA	NA	C	0.09	1	0	0	0	0	4
qt-2121.01-b	0	4629	372556	8132177	NA	NA	NA	C	0.09	1	0	0	0	0	1
qt-2121.01-c	0	4629	372556	8132177	NA	NA	NA	C	0.09	1	0	0	0	0	4
qt-2121.01-d	0	4629	372556	8132177	NA	NA	NA	C	0.09	1	0	0	0	0	6
qt-2122.01-c	0	4618	372130	8132123	NA	NA	NA	C	0.06	1	0	0	0	0	6
qt-2123.01-a	0	4606	371348	8131536	NA	NA	NA	C	2.5	1	0.5	0.5	0	0	18
qt-2123.01-b	0	4606	371348	8131536	NA	NA	NA	C	2.5	1	0.5	0.5	0	0	2
qt-2123.01-c	0	4606	371348	8131536	NA	NA	NA	C	2.5	1	0.5	0.5	0	0	25

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size __abs	size __min	size __max	chron __conf	site size	hab	rit	bur	agr	def	sherds
qt-2123.01-d	0	4606	371348	8131536	NA	NA	NA	C	2.5	1	0.5	0.5	0	0	23
qt-2124.01-a	0	4603	369541	8130000	NA	NA	NA	C	0.4	1	0	0	0	0	4
qt-2124.01-c	0	4603	369541	8130000	NA	NA	NA	C	0.4	1	0	0	0	0	8
qt-2125.01-a	0	4598	380084	8134437	NA	NA	NA	C	0.09	1	0	0	0	0	7
qt-2125.01-c	0	4598	380084	8134437	NA	NA	NA	C	0.09	1	0	0	0	0	42
qt-2125.01-e	0	4598	380084	8134437	NA	NA	NA	C	0.09	1	0	0	0	0	3
qt-2126.01-a	0	4624	376032	8133253	NA	NA	NA	C	0.09	1	0	0	0	0	4
qt-2126.01-c	0	4624	376032	8133253	NA	NA	NA	C	0.09	1	0	0	0	0	9
qt-2126.01-d	0	4624	376032	8133253	NA	NA	NA	C	0.09	1	0	0	0	0	23
qt-2126.01-e	0	4624	376032	8133253	NA	NA	NA	C	0.09	1	0	0	0	0	14
qt-2128.01-a	0	4601	379799	8134419	NA	NA	NA	C	1.5	1	0	0	0	0	7
qt-2128.01-c	0	4601	379799	8134419	NA	NA	NA	C	1.5	1	0	0	0	0	14
qt-2129.01-a	0	3978	429104	8149851	NA	NA	NA	C	0.09	1	0	0	0	0	21
qt-2129.01-b	0	3978	429104	8149851	NA	NA	NA	C	0.09	1	0	0	0	0	1
qt-2129.01-d	0	3978	429104	8149851	NA	NA	NA	C	0.09	1	0	0	0	0	6
qt-2130.01-a	0	3977	428765	8149664	NA	NA	NA	C	0.01	1	0	0	0	0	7
qt-2130.01-c	0	3977	428765	8149664	NA	NA	NA	C	0.01	1	0	0	0	0	3
qt-2130.01-d	0	3977	428765	8149664	NA	NA	NA	C	0.01	1	0	0	0	0	3
qt-2131.01-a	0	3973	428583	8149561	NA	NA	NA	C	0.01	1	0	0	0	0	3
qt-2131.01-c	0	3973	428583	8149561	NA	NA	NA	C	0.01	1	0	0	0	0	2
qt-2131.01-d	0	3973	428583	8149561	NA	NA	NA	C	0.01	1	0	0	0	0	8
qt-2131.01-e	0	3973	428583	8149561	NA	NA	NA	C	0.01	1	0	0	0	0	7
qt-2132.01-a	0	4020	428542	8148936	NA	NA	NA	C	1	1	0	0.5	0	0	12
qt-2132.01-c	0	4020	428542	8148936	NA	NA	NA	C	1	1	0	0.5	0	0	1
qt-2132.01-d	0	4020	428542	8148936	NA	NA	NA	C	1	1	0	0.5	0	0	15
qt-2133.01-a	0	3990	428170	8149138	NA	NA	NA	C	0.09	1	0	0	0	0	25
qt-2133.01-b	0	3990	428170	8149138	NA	NA	NA	C	0.09	1	0	1	0	0	2
qt-2133.01-d	0	3990	428170	8149138	NA	NA	NA	C	0.09	1	0	0	0	0	2
qt-2133.01-e	0	3990	428170	8149138	NA	NA	NA	C	0.09	1	0	0	0	0	1
qt-2134.01-a	0	4010	432480	8148520	NA	NA	NA	C	0.01	1	0	0	0	0	5
qt-2134.01-c	0	4010	432480	8148520	NA	NA	NA	C	0.01	1	0	0	0	0	4
qt-2134.01-d	0	4010	432480	8148520	NA	NA	NA	C	0.01	1	0	0	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2135.01-a	0	4027	432098	8148150	NA	NA	NA	C	0.36	1	0	0	0	0	11
qt-2135.01-b	0	4027	432098	8148150	NA	NA	NA	C	0.36	1	0	0	0	0	4
qt-2135.01-c	0	4027	432098	8148150	NA	NA	NA	C	0.36	1	0	0	0	0	17
qt-2135.01-d	0	4027	432098	8148150	NA	NA	NA	C	0.36	1	0	0	0	0	23
qt-2136.01-a	0	4027	433112	8148249	NA	NA	NA	C	0.25	1	0	0	0	0	1
qt-2136.01-c	0	4027	433112	8148249	NA	NA	NA	C	0.25	1	0	0	0	0	3
qt-2136.01-d	0	4027	433112	8148249	NA	NA	NA	C	0.25	1	0	0	0	0	33
qt-2137.01-a	0	4026	434065	8149608	NA	NA	NA	C	0.16	1	0	0	0	0	2
qt-2137.01-c	0	4026	434065	8149608	NA	NA	NA	C	0.16	1	0	0	0	0	4
qt-2137.01-e	0	4026	434065	8149608	NA	NA	NA	C	0.16	1	0	0	0	0	5
qt-2138.01-a	0	3970	427014	8151443	NA	NA	NA	C	0.5	1	0	0	0	0	21
qt-2138.01-b	0	3970	427014	8151443	NA	NA	NA	C	0.5	1	0	0	0	0	4
qt-2138.01-c	0	3970	427014	8151443	NA	NA	NA	C	0.5	1	0	0	0	0	18
qt-2138.01-d	0	3970	427014	8151443	NA	NA	NA	C	0.5	1	0	0	0	0	10
qt-2139.01-a	0	3973	426065	8150985	NA	NA	NA	C	1	1	0	0	0	0	1
qt-2139.01-c	0	3973	426065	8150985	NA	NA	NA	C	1	1	0	0	0	0	3
qt-2141.01-c	0	4062	428192	8147058	NA	NA	NA	C	0.04	0.5	0	0	0	0	2
qt-2141.01-d	0	4062	428192	8147058	NA	NA	NA	C	0.04	0.5	0	0	0	0	1
qt-2142.01-d	0	3985	424844	8145260	NA	NA	NA	C	1	1	0	0	0	0	21
qt-2144.01-a	0	4254	412500	8133361	NA	NA	NA	C	0.09	1	0	0	0	0	4
qt-2144.01-c	0	4254	412500	8133361	NA	NA	NA	C	0.09	1	0	0	0	0	8
qt-2144.01-d	0	4254	412500	8133361	NA	NA	NA	C	0.09	1	0	0	0	0	15
qt-2145.01-a	0	4276	412404	8132229	NA	NA	NA	C	1	1	0	0	0	0	26
qt-2145.01-c	0	4276	412404	8132229	NA	NA	NA	C	1	1	0	0	0	0	29
qt-2145.01-d	0	4276	412404	8132229	NA	NA	NA	C	1	1	0	0	0	0	41
qt-2145.01-e	0	4276	412404	8132229	NA	NA	NA	C	1	1	0	0	0	0	3
qt-2146.01-c	0	4278	411346	8132027	NA	NA	NA	C	0.5	1	0	0	0	0	15
qt-2146.01-d	0	4278	411346	8132027	NA	NA	NA	C	0.5	1	0	0	0	0	72
qt-2146.01-e	0	4278	411346	8132027	NA	NA	NA	C	0.5	1	0	0	0	0	8
qt-2147.01-c	0	4267	412006	8132708	NA	NA	NA	C	0.5	1	0	0	0	0	3
qt-2147.01-d	0	4267	412006	8132708	NA	NA	NA	C	0.5	1	0	0	0	0	14
qt-2148.01-c	0	4134	412951	8135859	NA	NA	NA	C	0.09	1	0	0	0	0	3

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2148.01-d	0	4134	412951	8135859	NA	NA	NA	C	0.09	1	0	0	0	0	11
qt-2149.01-a	0	4145	412825	8135727	NA	NA	NA	C	0.02	1	0	0	0	0	5
qt-2149.01-c	0	4145	412825	8135727	NA	NA	NA	C	0.02	1	0	0	0	0	2
qt-2149.01-d	0	4145	412825	8135727	NA	NA	NA	C	0.02	1	0	0	0	0	35
qt-2150.01-c	0	4157	412800	8135321	NA	NA	NA	C	0.005	1	0	0	0	0	4
qt-2151.01-a	0	4346	408085	8131837	NA	NA	NA	C	0.08	1	0	0.5	0	0	1
qt-2151.01-c	0	4346	408085	8131837	NA	NA	NA	C	0.08	1	0	0.5	0	0	6
qt-2151.01-d	0	4346	408085	8131837	NA	NA	NA	C	0.08	1	0	0.5	0	0	15
qt-2153.01-b	0	4554	398572	8131969	NA	NA	NA	C	0.25	1	0	0.5	0	0	2
qt-2153.01-c	0	4554	398572	8131969	NA	NA	NA	C	0.25	1	0	0.5	0	0	10
qt-2153.01-d	0	4554	398572	8131969	NA	NA	NA	C	0.25	1	0	0.5	0	0	41
qt-2153.01-e	0	4554	398572	8131969	NA	NA	NA	C	0.25	1	0	0.5	0	0	3
qt-2154.01-a	0	4482	355997	8127324	NA	NA	NA	C	0.86	1	0	0	0	0	8
qt-2154.01-b	0	4482	355997	8127324	NA	NA	NA	C	0.86	1	0	0	0	0	2
qt-2154.01-c	0	4482	355997	8127324	NA	NA	NA	C	0.86	1	0	0	0	0	4
qt-2154.01-d	0	4482	355997	8127324	NA	NA	NA	C	0.86	1	0	0	0	0	9
qt-2154.01-e	0	4482	355997	8127324	NA	NA	NA	C	0.86	1	0	0	0	0	1
qt-2155.01-a	0	4493	354939	8127908	NA	NA	NA	C	0.72	1	0	0	0	0	1
qt-2155.01-b	0	4493	354939	8127908	NA	NA	NA	C	0.72	1	0	0	0	0	1
qt-2155.01-c	0	4493	354939	8127908	NA	NA	NA	C	0.72	1	0	0	0	0	3
qt-2155.01-d	0	4493	354939	8127908	NA	NA	NA	C	0.72	1	0	0	0	0	29
qt-2155.01-e	0	4493	354939	8127908	NA	NA	NA	C	0.72	1	0	0	0	0	5
qt-2156.01-c	0	4665	345676	8124713	NA	NA	NA	C	0.005	0.5	0	0	0	0	6
qt-2156.01-d	0	4665	345676	8124713	NA	NA	NA	C	0.005	0.5	0	0	0	0	2
qt-2157.01-c	0	4650	363003	8129243	NA	NA	NA	C	0.4	1	0	0	0	0	1
qt-2157.01-d	0	4650	363003	8129243	NA	NA	NA	C	0.4	1	0	0	0	0	2
qt-2158.01-e	0	4651	345942	8124803	NA	NA	NA	C	0.285	1	0	0	0	0	1
qt-2159.01-e	0	4634	346290	8124795	NA	NA	NA	C	0.04	1	0	0	0	0	1
qt-2160.01-c	0	4596	346969	8124853	NA	NA	NA	C	0.16	1	0	0	0	0	10
qt-2160.01-d	0	4596	346969	8124853	NA	NA	NA	C	0.16	1	0	0	0	0	4
qt-2160.01-e	0	4596	346969	8124853	NA	NA	NA	C	0.16	1	0	0	0	0	2
qt-2161.01-c	0	4636	346337	8124819	NA	NA	NA	C	0.08	1	0	0	0	0	3

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2161.01-e	0	4636	346337	8124819	NA	NA	NA	C	0.08	1	0	0	0	0	1
qt-2162.01-c	0	4584	347010	8125002	NA	NA	NA	C	0.06	1	0	0	0	0	1
qt-2162.01-d	0	4584	347010	8125002	NA	NA	NA	C	0.06	1	0	0	0	0	3
qt-2163.01-e	0	4592	347705	8124853	NA	NA	NA	C	0.08	1	0	0	0	0	1
qt-2164.01-d	0	4583	348685	8125001	NA	NA	NA	C	0.12	1	0	0	0	0	1
qt-2164.01-e	0	4583	348685	8125001	NA	NA	NA	C	0.12	1	0	0	0	0	1
qt-2165.01-d	0	4470	350523	8125471	NA	NA	NA	C	0.64	1	0	0	0	0	5
qt-2165.01-e	0	4470	350523	8125471	NA	NA	NA	C	0.64	1	0	0	0	0	2
qt-2166.01-a	0	4477	350760	8125539	NA	NA	NA	C	0.45	1	0	0	0	0	6
qt-2166.01-b	0	4477	350760	8125539	NA	NA	NA	C	0.45	1	0	0	0	0	4
qt-2166.01-c	0	4477	350760	8125539	NA	NA	NA	C	0.45	1	0	0	0	0	6
qt-2166.01-d	0	4477	350760	8125539	NA	NA	NA	C	0.45	1	0	0	0	0	49
qt-2167.01-c	0	4506	353534	8127447	NA	NA	NA	C	0.01	1	0	0	0	0	6
qt-2167.01-d	0	4506	353534	8127447	NA	NA	NA	C	0.01	1	0	0	0	0	2
qt-2168.01-a	0	4510	352427	8126651	NA	NA	NA	C	0.05	1	0	0	0	0	4
qt-2168.01-c	0	4510	352427	8126651	NA	NA	NA	C	0.05	1	0	0	0	0	4
qt-2169.01-d	0	4489	354531	8127835	NA	NA	NA	C	0.18	1	0	0	0	0	5
qt-2169.01-e	0	4489	354531	8127835	NA	NA	NA	C	0.18	1	0	0	0	0	1
qt-2170.01-a	0	4487	355829	8127370	NA	NA	NA	C	1.08	1	0	0	0	0	20
qt-2170.01-c	0	4487	355829	8127370	NA	NA	NA	C	1.08	1	0	0	0	0	9
qt-2172.01-c	0	4475	355284	8128114	NA	NA	NA	C	0.12	1	0	0	0	0	3
qt-2172.01-d	0	4475	355284	8128114	NA	NA	NA	C	0.12	1	0	0	0	0	4
qt-2173.01-c	0	4823	366258	8129596	NA	NA	NA	C	0.14	0.5	0	0	0	0	7
qt-2173.01-d	0	4823	366258	8129596	NA	NA	NA	C	0.14	0.5	0	0	0	0	1
qt-2174.01-b	0	4638	371864	8131157	NA	NA	NA	C	0.25	1	0	0	0	0	7
qt-2174.01-c	0	4638	371864	8131157	NA	NA	NA	C	0.25	1	0	0	0	0	14
qt-2174.01-d	0	4638	371864	8131157	NA	NA	NA	C	0.25	1	0	0	0	0	15
qt-2175.01-d	0	4472	355232	8127933	NA	NA	NA	C	0.45	1	0	0	0	0	2
qt-2176.01-c	0	4470	355354	8127797	NA	NA	NA	C	0.68	1	0	0	0	0	1
qt-2177.01-c	0	4611	367789	8129750	NA	NA	NA	C	0.96	1	0	0	0	0	3
qt-2177.01-d	0	4611	367789	8129750	NA	NA	NA	C	0.96	1	0	0	0	0	8
qt-2180.01-d	0	4580	368531	8137070	NA	NA	NA	C	0.3	1	0	0	0	0	3

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
qt-2181.01-a	0	4580	384964	8137990	NA	NA	NA	C	0.06	1	0	0	0	0	10
qt-2181.01-b	0	4580	384964	8137990	NA	NA	NA	C	0.06	1	0	0	0	0	1
qt-2181.01-c	0	4580	384964	8137990	NA	NA	NA	C	0.06	1	0	0	0	0	9
qt-2181.01-d	0	4580	384964	8137990	NA	NA	NA	C	0.06	1	0	0	0	0	6
qt-2182.01-a	0	4588	367467	8137549	NA	NA	NA	C	0.03	1	0	0	0	0	3
qt-2182.01-c	0	4588	367467	8137549	NA	NA	NA	C	0.03	1	0	0	0	0	2
qt-2182.01-d	0	4588	367467	8137549	NA	NA	NA	C	0.03	1	0	0	0	0	1
tr-0001.01-a	1	3825	518239	8183272	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0001.02-a	1	3825	518064	8183172	2	NA	NA	C	NA	1	0	1	0	0	2058
tr-0001.03-b	0	3825	518164	8183147	4.25	NA	NA	C	NA	1	1	1	0	0	2058
tr-0001.04-c	0	3825	518089	8183172	7.75	NA	NA	C	NA	1	1	1	0	0	2058
tr-0001.05-d	0	3825	518114	8183247	6.25	NA	NA	C	NA	1	1	0	0	0	28
tr-0001.05-e	0	3825	518114	8183247	5.75	NA	NA	C	NA	1	1	1	0	0	25
tr-0001.05-f	0	3825	518114	8183247	9	NA	NA	C	NA	1	1	1	0	0	4
tr-0001.06-g	0	3825	518264	8183097	0.25	NA	NA	C	NA	1	0	0	0	0	7
tr-0001.07-h	0	3825	517964	8183047	0.25	NA	NA	C	NA	1	0	0	0	0	3
tr-0001.08-i	1	3825	517989	8183322	0.75	NA	NA	C	NA	1	0	0	0	0	0
tr-0001.09-i	1	3825	518314	8183047	1	NA	NA	C	NA	1	0	0	0	0	0
tr-0001.10-i	1	3825	518139	8182946	1.25	NA	NA	C	NA	1	0	0	0	0	6
tr-0002.01-a	0	3870	506313	8180230	3	NA	NA	C	NA	1	0	0	0	0	1691
tr-0002.01-c	0	3870	506313	8180230	4.25	NA	NA	C	NA	1	0	0	0	0	1691
tr-0003.01-a	0	3825	516464	8183308	3.5	NA	NA	C	NA	1	0	0	0	0	1898
tr-0003.02-b	0	3825	516464	8183333	2.5	NA	NA	C	NA	1	0	0	0	0	1898
tr-0003.03-c	0	3825	516464	8183283	4.25	NA	NA	C	NA	1	0.5	0	0	0	1898
tr-0003.03-d	0	3825	516464	8183283	3	NA	NA	C	NA	1	0	0	0	0	136
tr-0003.03-e	0	3825	516464	8183283	0.25	NA	NA	C	NA	1	0	0	0	0	1
tr-0003.04-f	0	3825	516524	8183233	0.5	NA	NA	C	NA	1	0	0	0	0	4
tr-0003.05-h	0	3825	516464	8183208	0.25	NA	NA	C	NA	1	0	0	0	0	3
tr-0003.06-i	1	3825	516414	8183408	0.25	NA	NA	C	NA	1	0	0	0	0	0
tr-0003.07-i	1	3825	516524	8183308	0.5	NA	NA	C	NA	1	0	0	0	0	6
tr-0004.01-b	0	3825	519509	8183312	3.25	NA	NA	C	NA	1	0	0	0	0	560
tr-0004.01-c	0	3825	519509	8183312	5	NA	NA	C	NA	1	0.5	0	0	0	560

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
tr-0004.02-d	0	3825	519509	8183287	7.25	NA	NA	C	NA	1	0	0	0	0	1435
tr-0004.02-e	0	3825	519509	8183287	6.25	NA	NA	C	NA	1	0	0	0	0	100
tr-0004.02-f	0	3825	519509	8183287	7.5	NA	NA	C	NA	1	0.5	0.5	0	0	596
tr-0004.03-g	0	3825	519484	8183262	1	NA	NA	C	NA	1	0	0	0	0	17
tr-0004.04-i	1	3825	519384	8183312	0.25	NA	NA	C	NA	1	0	0	0	0	12
tr-0004.05-i	1	3825	519584	8183262	0.25	NA	NA	C	NA	1	0	0	0	0	0
tr-0005.01-h	0	3865	518158	8181514	1.52	NA	NA	C	NA	1	0	0	0	0	NA
tr-0006.01-i	0	3810	516930	8183512	0.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0008.01-b	0	3820	515648	8183424	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0008.01-d	0	3820	515648	8183424	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0008.01-i	0	3820	515648	8183424	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0009.01-g	0	3815	515726	8183510	0.31	NA	NA	C	NA	1	0	0	0	0	NA
tr-0009.01-i	0	3815	515726	8183510	0.31	NA	NA	C	NA	1	0	0	0	0	NA
tr-0011.01-h	0	3815	515825	8183567	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0011.01-i	0	3815	515825	8183567	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0012.01-i	0	3820	515816	8183349	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0014.01-i	0	3820	516201	8183312	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0015.01-g	0	3820	516006	8183317	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0016.01-f	0	3820	516178	8183400	0.74	NA	NA	C	NA	1	0	0	0	0	NA
tr-0016.01-i	0	3820	516178	8183400	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0017.01-f	0	3815	516193	8183503	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0017.01-i	0	3815	516193	8183503	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0018.01-i	0	3820	516400	8183386	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0019.01-c	0	3815	516658	8183291	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0019.01-g	0	3815	516658	8183291	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0019.01-i	0	3815	516658	8183291	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0020.01-h	0	3850	516690	8182635	0.01	NA	NA	C	NA	1	0	0	0	0	NA
tr-0021.01-h	0	3850	516730	8182478	0.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0023.01-g	0	3900	516443	8181971	0.11	NA	NA	C	NA	1	0	0	0	0	NA
tr-0024.01-i	0	3890	516394	8182414	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0025.01-h	0	3880	516180	8182418	0.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0025.01-i	0	3880	516180	8182418	0.09	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0026.01-i	0	3840	516438	8182969	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0027.01-h	0	3850	516097	8182648	1.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0028.01-d	0	3840	516288	8182910	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0028.01-e	0	3840	516288	8182910	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0028.01-i	0	3840	516288	8182910	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0030.01-i	0	3880	515957	8182232	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0031.01-h	0	3870	515828	8182645	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0032.01-i	0	3835	510116	8179370	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0033.01-i	0	3835	509980	8179304	0.65	NA	NA	C	NA	1	0	0	0	0	NA
tr-0034.01-f	0	3835	509940	8179193	0.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0034.01-i	0	3835	509940	8179193	0.78	NA	NA	C	NA	1	0	0	0	0	NA
tr-0035.01-i	0	3830	510030	8179198	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0037.01-h	0	3820	510149	8178955	0.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0038.01-g	0	3830	510233	8179337	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0038.01-h	0	3830	510233	8179337	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0039.01-i	0	3830	510349	8179275	0.08	NA	NA	C	NA	1	0	0	0	0	NA
tr-0040.01-i	0	3835	510286	8179446	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0041.01-i	0	3845	509958	8179558	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0042.01-i	0	3900	510183	8180190	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0043.01-i	0	3855	510350	8180001	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0044.01-i	0	3825	510525	8179715	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0045.01-i	0	3845	510445	8180010	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0048.01-i	0	3820	510509	8179359	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0049.01-i	0	3815	510790	8179462	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0050.01-g	0	3815	511010	8179426	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0050.01-i	0	3815	511010	8179426	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0051.01-i	0	3830	511058	8179922	0.34	NA	NA	C	NA	1	0	0	0	0	NA
tr-0052.01-g	0	3830	511233	8179984	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0052.01-h	0	3830	511233	8179984	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0052.01-i	0	3830	511233	8179984	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0054.01-h	0	3840	511246	8180001	0.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0055.01-h	0	3830	511348	8180063	0.6	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0055.01-i	0	3830	511348	8180063	0.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0056.01-i	0	3840	511312	8180098	0.18	NA	NA	C	NA	1	0	0	0	0	NA
tr-0057.01-h	0	3830	511323	8180064	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0057.01-i	0	3830	511323	8180064	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0058.01-i	0	3815	511322	8179485	0.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0060.01-g	0	3820	511718	8179941	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0060.01-h	0	3820	511718	8179941	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0060.01-i	0	3820	511718	8179941	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0061.01-h	0	3825	511536	8180135	0.7	NA	NA	C	NA	1	0	0	0	0	NA
tr-0062.01-i	0	3845	511519	8180261	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0063.01-i	0	3840	511447	8180423	0.08	NA	NA	C	NA	1	0	0	0	0	NA
tr-0064.01-i	0	3840	511917	8180178	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0065.01-i	0	3835	511802	8180077	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0067.01-f	0	3825	512026	8180128	0.49	NA	NA	C	NA	1	0	0	0	0	NA
tr-0067.01-h	0	3825	512026	8180128	0.49	NA	NA	C	NA	1	0	0	0	0	NA
tr-0067.01-i	0	3825	512026	8180128	0.49	NA	NA	C	NA	1	0	0	0	0	NA
tr-0068.01-g	0	3825	512250	8179966	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0069.01-g	0	3820	512297	8179809	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0069.01-h	0	3820	512297	8179809	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0070.01-g	0	3815	512155	8179727	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0071.01-i	0	3815	512126	8179596	0.08	NA	NA	C	NA	1	0	0	0	0	NA
tr-0072.01-i	0	3810	512361	8179410	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0073.01-i	0	3815	512198	8179594	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0074.01-i	0	3820	512367	8179576	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0077.01-i	0	3835	512403	8180134	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0078.01-i	0	3835	512516	8180072	0.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0079.01-h	0	3840	512369	8180234	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0081.01-i	0	3850	512496	8180413	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0082.01-i	0	3845	512628	8180375	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0083.01-i	0	3840	512487	8180313	0.08	NA	NA	C	NA	1	0	0	0	0	NA
tr-0084.01-i	0	3820	512810	8179565	0.33	NA	NA	C	NA	1	0	0	0	0	NA
tr-0085.01-f	0	3825	512786	8180594	0.8	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
tr-0086.01-h	0	3845	512683	8180428	0.41	NA	NA	C	NA	1	0	0	0	0	NA
tr-0086.01-i	0	3845	512683	8180428	0.41	NA	NA	C	NA	1	0	0	0	0	NA
tr-0087.01-i	0	3840	512855	8180471	0.14	NA	NA	C	NA	1	0	0	0	0	NA
tr-0088.01-i	0	3855	512859	8180564	0.54	NA	NA	C	NA	1	0	0	0	0	NA
tr-0089.01-i	0	3860	512701	8180564	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0090.01-h	0	3845	513086	8180391	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0090.01-i	0	3845	513086	8180391	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0091.01-g	0	3835	513020	8180247	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0091.01-i	0	3835	513020	8180247	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0092.01-g	0	3835	513120	8180179	0.33	NA	NA	C	NA	1	0	0	0	0	NA
tr-0092.01-h	0	3835	513120	8180179	0.33	NA	NA	C	NA	1	0	0	0	0	NA
tr-0093.01-g	0	3830	512944	8180087	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0093.01-i	0	3830	512944	8180087	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0095.01-i	0	3820	513084	8179513	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0096.01-i	0	3825	513090	8179623	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0097.01-h	0	3835	513305	8180050	2.08	NA	NA	C	NA	1	0	0	0	0	NA
tr-0097.01-i	0	3835	513305	8180050	1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0098.01-i	0	3835	513255	8180198	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0099.01-g	0	3835	513272	8180195	0.26	NA	NA	C	NA	1	0	0	0	0	NA
tr-0099.01-h	0	3835	513272	8180195	0.26	NA	NA	C	NA	1	0	0	0	0	NA
tr-0099.01-i	0	3835	513272	8180195	0.26	NA	NA	C	NA	1	0	0	0	0	NA
tr-0100.01-i	0	3845	513292	8180333	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0101.01-h	0	3850	513350	8180394	0.27	NA	NA	C	NA	1	0	0	0	0	NA
tr-0102.01-i	0	3855	513288	8180405	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0103.01-i	0	3845	513576	8180311	0.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0105.01-i	0	3840	513484	8180151	1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0106.01-h	0	3840	513568	8180113	0.44	NA	NA	C	NA	1	0	0	0	0	NA
tr-0106.01-i	0	3840	513568	8180113	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0107.01-g	0	3815	513630	8179259	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0107.01-h	0	3815	513630	8179259	1.7	NA	NA	C	NA	1	0	0	0	0	NA
tr-0107.01-i	0	3815	513630	8179259	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0108.01-i	0	3815	513719	8179283	0.66	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0109.01-h	0	3850	513815	8180414	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0109.01-i	0	3850	513815	8180414	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0110.01-i	0	3855	513829	8180440	0.39	NA	NA	C	NA	1	0	0	0	0	NA
tr-0111.01-h	0	3860	513923	8180609	0.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0113.01-i	0	3845	514126	8180333	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0114.01-i	0	3840	513968	8180213	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0115.01-i	0	3835	514075	8180006	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0116.01-i	0	3835	513898	8180077	1.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0117.01-f	0	3825	513962	8179663	0.44	NA	NA	C	NA	1	0	0	0	0	NA
tr-0118.01-f	0	3830	514192	8179817	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0118.01-i	0	3830	514192	8179817	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0119.01-h	0	3850	514388	8180349	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0120.01-i	0	3850	514579	8180230	0.18	NA	NA	C	NA	1	0	0	0	0	NA
tr-0121.01-i	0	3855	514717	8180359	0.08	NA	NA	C	NA	1	0	0	0	0	NA
tr-0122.01-c	0	3830	509859	8182476	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0122.01-d	0	3830	509859	8182476	1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0122.01-e	0	3830	509859	8182476	1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0122.01-f	0	3830	509859	8182476	1.54	NA	NA	C	NA	1	0	0	0	0	NA
tr-0122.01-g	0	3830	509859	8182476	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0122.01-i	0	3830	509859	8182476	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0123.01-c	0	3815	509961	8182667	0.25	NA	NA	C	NA	1	0	0	0	0	32
tr-0123.02-d	0	3815	509911	8182667	1.25	NA	NA	C	NA	1	0	0	0	0	94
tr-0123.03-f	0	3815	509836	8182742	7.5	NA	NA	C	NA	1	0	0	0	0	53
tr-0123.07-g	1	3815	508811	8182764	0.25	NA	NA	C	NA	1	0	0	0	0	0
tr-0123.08-g	1	3815	509836	8182764	0.5	NA	NA	C	NA	1	0	0	0	0	6
tr-0123.04-h	1	3815	509911	8182842	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0123.06-h	1	3815	508886	8182817	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0123.09-h	1	3815	508811	8182717	0.25	NA	NA	C	NA	1	0	0	0	0	0
tr-0123.10-h	1	3815	509886	8182692	0.75	NA	NA	C	NA	1	0	0	0	0	13
tr-0123.05-i	1	3815	509961	8182842	0.5	NA	NA	C	NA	1	0	0	0	0	4
tr-0123.11-i	1	3815	509936	8181715	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0124.01-i	0	3810	509973	8182842	0.3	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0125.01-d	0	3825	510090	8182642	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0125.01-e	0	3825	510090	8182642	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0125.01-g	0	3825	510090	8182642	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0126.01-e	0	3820	510035	8182683	0.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0126.01-i	0	3820	510035	8182683	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0127.01-c	0	3825	510087	8182583	0.05	NA	NA	C	NA	1	0	0	0	0	NA
tr-0127.01-d	0	3825	510087	8182583	0.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0127.01-f	0	3825	510087	8182583	0.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0127.02-g	0	3825	510102	8182583	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0128.01-e	0	3825	510033	8182514	1.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0128.01-g	0	3825	510033	8182514	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0128.01-h	0	3825	510033	8182514	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0128.01-i	0	3825	510033	8182514	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0129.01-c	0	3840	509899	8182146	0.78	NA	NA	C	NA	1	0	0	0	0	NA
tr-0129.01-d	0	3840	509899	8182146	0.78	NA	NA	C	NA	1	0	0	0	0	NA
tr-0129.01-e	0	3840	509899	8182146	0.78	NA	NA	C	NA	1	0	0	0	0	NA
tr-0130.01-a	0	3860	509892	8182036	1	NA	NA	C	NA	1	0	0	0	0	2950
tr-0130.02-b	1	3860	509892	8182061	3	NA	NA	C	NA	1	0	0	0	0	2950
tr-0130.03-b	1	3860	510067	8182133	0.75	NA	NA	C	NA	1	0	0	0	0	0
tr-0130.04-c	0	3860	509942	8182061	7.5	NA	NA	C	NA	1	0.5	0	0	0	2950
tr-0130.04-d	0	3860	509942	8182061	7.25	NA	NA	C	NA	1	0	0	0	0	1105
tr-0130.05-e	0	3860	509842	8182008	0.5	NA	NA	C	NA	1	0	0	0	0	21
tr-0130.04-f	0	3860	509942	8182061	3.75	NA	NA	C	NA	1	0	0	0	0	114
tr-0130.02-i	1	3860	509892	8182061	1.25	NA	NA	C	NA	1	0	0	0	0	13
tr-0130.06-i	1	3860	510067	8182111	0.75	NA	NA	C	NA	1	0	0	0	0	0
tr-0131.01-i	0	3840	510040	8182290	0.75	NA	NA	C	NA	1	0	0	0	0	NA
tr-0132.01-f	0	3830	510240	8182633	0.84	NA	NA	C	NA	1	0	0	0	0	NA
tr-0133.01-d	0	3825	510224	8182765	1.08	NA	NA	C	NA	1	0	0	0	0	NA
tr-0133.01-f	0	3825	510224	8182765	0.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0133.01-g	0	3825	510224	8182765	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0134.01-f	0	3820	510261	8182808	0.64	NA	NA	C	NA	1	0	0	0	0	NA
tr-0134.01-g	0	3820	510261	8182808	0.09	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0134.01-h	0	3820	510261	8182808	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0135.01-i	0	3815	510388	8183116	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0136.01-e	0	3825	510445	8182740	2.08	NA	NA	C	NA	1	0	0	0	0	NA
tr-0136.01-g	0	3825	510445	8182740	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0137.01-e	0	3825	510552	8182758	0.99	NA	NA	C	NA	1	0	0	0	0	NA
tr-0137.01-f	0	3825	510552	8182758	0.99	NA	NA	C	NA	1	0	0	0	0	NA
tr-0137.01-g	0	3825	510552	8182758	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0137.01-i	0	3825	510552	8182758	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0138.01-i	0	3880	510350	8181500	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0139.01-f	0	3875	510471	8181698	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0140.01-f	0	3875	510531	8181720	0.18	NA	NA	C	NA	1	0	0	0	0	NA
tr-0140.01-i	0	3875	510531	8181720	0.18	NA	NA	C	NA	1	0	0	0	0	NA
tr-0141.01-d	0	3870	510389	8181912	0.1	NA	NA	C	NA	1	0	1	0	0	NA
tr-0141.01-e	0	3870	510389	8181912	0.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0141.01-i	0	3870	510389	8181912	0.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0142.01-d	0	3870	510577	8181912	1.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0142.01-e	0	3870	510577	8181912	1.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0142.01-f	0	3870	510577	8181912	1.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0142.01-g	0	3870	510577	8181912	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0143.01-d	0	3870	510670	8181866	1.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0143.01-e	0	3870	510670	8181866	1.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0144.01-d	0	3860	510390	8182008	0.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0144.01-e	0	3860	510390	8182008	0.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0144.01-f	0	3860	510390	8182008	0.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0145.01-d	0	3860	510629	8182011	1.46	NA	NA	C	NA	1	0	0	0	0	NA
tr-0145.01-e	0	3860	510629	8182011	1.46	NA	NA	C	NA	1	0	0	0	0	NA
tr-0145.01-i	0	3860	510629	8182011	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0146.01-e	0	3860	510439	8182046	1.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0146.02-i	1	3860	510479	8182046	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0146.03-i	1	3860	510439	8182026	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0147.01-f	0	3830	510632	8182633	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0147.01-i	0	3830	510632	8182633	0.28	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0148.01-f	0	3820	510636	8182830	0.39	NA	NA	C	NA	1	0	0	0	0	NA
tr-0149.01-f	0	3820	510552	8182889	3.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0149.02-g	0	3820	510532	8182919	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0150.01-i	0	3815	510549	8183109	2.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0151.01-i	0	3815	510525	8183231	1.41	NA	NA	C	NA	1	0	0	0	0	NA
tr-0152.01-i	0	3815	510629	8183278	0.67	NA	NA	C	NA	1	0	0	0	0	NA
tr-0153.01-g	0	3820	510746	8182927	3.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0154.01-i	0	3830	510745	8182551	0.77	NA	NA	C	NA	1	0	0	0	0	NA
tr-0155.01-i	0	3855	510906	8181161	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0157.01-i	0	3835	511152	8182268	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0158.01-i	0	3840	511273	8182282	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0160.01-e	0	3840	511323	8181580	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0160.02-f	0	3840	511293	8181600	4.25	NA	NA	C	NA	1	0	1	0	0	NA
tr-0161.01-i	0	3840	511429	8181632	0.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0162.01-h	0	3860	511481	8182156	0.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0163.01-h	0	3860	511503	8182306	1.43	NA	NA	C	NA	1	0	0	0	0	NA
tr-0164.01-i	0	3840	511355	8182799	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0165.01-g	0	3830	511347	8182979	0.72	NA	NA	C	NA	1	0	0	0	0	NA
tr-0166.01-g	0	3820	511274	8183239	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0166.01-i	0	3820	511274	8183239	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0167.01-d	0	3820	511371	8183243	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0168.01-f	0	3830	511525	8183188	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0168.01-g	0	3830	511525	8183188	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0169.01-e	0	3840	511475	8183024	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0169.01-i	0	3840	511475	8183024	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0171.01-i	0	3875	511780	8182461	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0173.01-i	0	3875	511944	8182469	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0174.01-i	0	3860	511765	8182802	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0175.01-i	0	3865	511865	8182781	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0176.01-i	0	3860	511908	8182917	0.54	NA	NA	C	NA	1	0	0	0	0	NA
tr-0177.01-c	0	3815	511710	8183610	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0177.02-d	0	3815	511720	8183576	0.5	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0177.02-i	0	3815	511720	8183576	1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0178.01-i	0	3820	511888	8183495	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0179.01-i	0	3840	512042	8183070	2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0180.01-d	0	3840	511930	8183088	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0180.01-g	0	3840	511930	8183088	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0180.01-i	0	3840	511930	8183088	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0181.01-i	0	3870	512102	8182373	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0182.01-d	0	3880	512398	8182361	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0183.01-h	0	3870	512504	8182412	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0184.01-e	0	3870	512306	8182403	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0184.01-h	0	3870	512306	8182403	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0185.01-i	0	3860	512200	8182771	1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0186.01-i	0	3815	512264	8183659	0.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0187.01-e	0	3820	512443	8183352	1.08	NA	NA	C	NA	1	0	0	0	0	NA
tr-0187.02-g	0	3820	512443	8183377	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0187.02-h	0	3820	512443	8183377	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0188.01-i	0	3835	512369	8183120	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0189.01-i	0	3835	512666	8183065	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0190.01-e	0	3820	512609	8183404	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0190.01-h	0	3820	512609	8183404	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0190.01-i	0	3820	512609	8183404	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0191.01-i	0	3820	512673	8183464	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0194.01-i	0	3835	512883	8183068	0.64	NA	NA	C	NA	1	0	0	0	0	NA
tr-0195.01-i	0	3840	512982	8183013	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0196.01-i	0	3835	512910	8183106	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0197.01-i	0	3820	513024	8183407	0.72	NA	NA	C	NA	1	0	0	0	0	NA
tr-0198.01-i	0	3815	513087	8183624	0.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0199.01-d	0	3825	513091	8183358	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0199.01-e	0	3825	513091	8183358	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0199.01-f	0	3825	513091	8183358	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0199.01-i	0	3825	513091	8183358	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0200.01-i	0	3855	512572	8181793	0.2	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0201.01-i	0	3860	512870	8181848	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0202.01-i	0	3850	513045	8182540	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0203.01-c	0	3870	510017	8181897	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0203.01-d	0	3870	510017	8181897	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0204.01-h	0	3820	506073	8179033	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0205.01-g	0	3820	506059	8179133	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0205.01-h	0	3820	506059	8179133	1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0205.02-i	0	3820	506075	8179103	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0207.01-i	0	3840	506109	8179375	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0208.01-h	0	3840	506315	8179368	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0209.01-i	0	3840	506212	8179452	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0210.01-e	0	3845	506222	8179544	0.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0210.01-h	0	3845	506222	8179544	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0211.01-i	0	3845	506419	8179631	0.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0212.01-h	0	3820	506512	8179151	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0213.01-d	0	3815	507608	8179176	0.75	NA	NA	C	NA	1	0	0	0	0	37
tr-0213.02-e	0	3815	507633	8179201	1	NA	NA	C	NA	1	0	0	0	0	6
tr-0213.03-f	0	3815	507633	8179226	2.25	NA	NA	C	NA	1	0	0	0	0	60
tr-0213.04-i	0	3815	507658	8179221	2.5	NA	NA	C	NA	1	0	0	0	0	2
tr-0214.01-f	0	3815	507715	8178960	0.18	NA	NA	C	NA	1	0	0	0	0	NA
tr-0214.01-i	0	3815	507715	8178960	0.18	NA	NA	C	NA	1	0	0	0	0	NA
tr-0216.01-i	0	3825	508369	8179412	1.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0217.01-e	0	3815	508211	8178993	1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0217.01-f	0	3815	508211	8178993	3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0218.01-d	0	3840	509012	8179268	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0219.01-g	0	3830	508908	8179150	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0219.01-i	0	3830	508908	8179150	0.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0220.01-g	0	3830	509060	8179092	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0220.01-i	0	3830	509060	8179092	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0221.01-i	0	3830	509626	8178959	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0223.01-i	0	3840	509564	8179208	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0224.01-i	0	3840	509852	8179425	0.09	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0225.01-a	0	3900	509481	8179978	0.5	NA	NA	C	NA	1	0	0	0	0	2021
tr-0225.01-b	0	3900	509481	8179978	0.5	NA	NA	C	NA	1	0	0	0	0	2021
tr-0225.01-c	0	3900	509481	8179978	1.5	NA	NA	C	NA	1	1	1	0	0	2021
tr-0225.01-d	0	3900	509481	8179978	0.5	NA	NA	C	NA	1	0	0	0	0	21
tr-0226.01-i	0	3875	509893	8180690	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0227.01-i	0	3875	509897	8180629	0.72	NA	NA	C	NA	1	0	0	0	0	NA
tr-0229.01-h	0	3875	509575	8180868	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0231.01-i	0	3885	509291	8179922	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0232.01-b	0	3860	509136	8179633	2.5	NA	NA	C	NA	1	0	0	0	0	1460
tr-0232.02-c	0	3860	509111	8179683	5.25	NA	NA	C	NA	1	0	0	0	0	1460
tr-0232.01-d	0	3860	509136	8179633	14.75	NA	NA	C	NA	1	0.5	1	0	0	6004
tr-0232.03-e	0	3860	509036	8179733	1.5	NA	NA	C	NA	1	0	0	0	0	13
tr-0232.04-f	0	3860	509186	8179683	5.25	NA	NA	C	NA	1	0	1	0	0	206
tr-0232.05-g	0	3860	509136	8179733	0.25	NA	NA	C	NA	1	0	0	0	0	1
tr-0232.05-h	0	3860	509136	8179733	0.25	NA	NA	C	NA	1	0	0	0	0	3
tr-0232.06-i	1	3860	509011	8179758	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0232.07-i	1	3860	509236	8179483	1	NA	NA	C	NA	1	0	0	0	0	10
tr-0233.01-i	0	3860	508882	8179867	0.26	NA	NA	C	NA	1	0	0	0	0	NA
tr-0235.01-i	0	3835	508405	8179708	0.42	NA	NA	C	NA	1	0	0	0	0	NA
tr-0236.01-a	0	3840	508329	8179997	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0236.01-i	0	3840	508329	8179997	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0237.01-i	0	3840	508313	8180140	0.75	NA	NA	C	NA	1	0	0	0	0	NA
tr-0238.01-i	0	3850	508175	8181007	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0239.01-f	0	3850	508049	8180900	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0239.01-h	0	3850	508049	8180900	1.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0239.01-i	0	3850	508049	8180900	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0240.01-i	0	3855	507949	8181334	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0241.01-h	0	3845	507909	8180920	0.64	NA	NA	C	NA	1	0	0	0	0	NA
tr-0241.01-i	0	3845	507909	8180920	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0242.01-i	0	3840	507709	8180780	0.85	NA	NA	C	NA	1	0	0	0	0	NA
tr-0243.01-h	0	3870	507602	8181545	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0244.01-i	0	3820	507394	8179923	0.25	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0245.01-i	0	3840	507010	8180191	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0246.01-i	0	3845	506740	8179986	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0247.01-h	0	3855	506667	8180182	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0247.01-i	0	3855	506667	8180182	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0248.01-e	0	3820	505683	8180543	0.88	NA	NA	C	NA	1	0	0	0	0	NA
tr-0248.01-f	0	3820	505683	8180543	0.88	NA	NA	C	NA	1	0	0	0	0	NA
tr-0249.01-h	0	3830	506030	8180801	0.41	NA	NA	C	NA	1	0	0	0	0	NA
tr-0249.01-i	0	3830	506030	8180801	0.41	NA	NA	C	NA	1	0	0	0	0	NA
tr-0251.01-h	0	3860	505593	8179153	0.14	NA	NA	C	NA	1	0	0	0	0	NA
tr-0252.01-i	0	3835	505132	8179127	0.13	NA	NA	C	NA	1	0	0	0	0	NA
tr-0253.01-i	0	3835	505319	8179465	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0255.01-i	0	3830	505432	8179769	0.07	NA	NA	C	NA	1	0	0	0	0	NA
tr-0256.01-i	0	3830	505302	8179629	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0257.01-i	0	3835	505508	8179909	0.37	NA	NA	C	NA	1	0	0	0	0	NA
tr-0258.01-i	0	3845	505975	8180075	0.03	NA	NA	C	NA	1	0	0	0	0	NA
tr-0259.01-i	0	3850	505947	8180003	0.14	NA	NA	C	NA	1	0	0	0	0	NA
tr-0260.01-i	0	3835	505743	8180176	0.33	NA	NA	C	NA	1	0	0	0	0	NA
tr-0261.01-i	0	3830	505681	8180294	0.44	NA	NA	C	NA	1	0	0	0	0	NA
tr-0262.01-i	0	3830	505568	8180207	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0263.01-i	0	3815	505380	8180292	0.72	NA	NA	C	NA	1	0	0	0	0	NA
tr-0264.01-i	0	3835	505826	8180360	0.39	NA	NA	C	NA	1	0	0	0	0	NA
tr-0265.01-i	0	3815	505781	8180728	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0266.01-i	0	3815	505702	8180929	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0268.01-a	0	3845	506404	8180994	1.25	NA	NA	C	NA	1	0	0	0	0	2748
tr-0268.02-c	0	3845	506429	8180969	5	NA	NA	C	NA	1	0.5	0	0	0	2748
tr-0268.03-h	0	3845	506379	8180919	0.25	NA	NA	C	NA	1	0	0	0	0	5
tr-0268.04-i	0	3845	506454	8180994	1.25	NA	NA	C	NA	1	0	0	0	0	12
tr-0269.01-i	0	3830	506137	8181077	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0270.01-i	0	3825	505975	8181097	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0271.01-b	0	3820	505905	8181423	5	NA	NA	C	NA	1	0	0	0	0	372
tr-0271.02-d	0	3820	505855	8181423	6.75	NA	NA	C	NA	1	1	0	0	0	1645
tr-0271.02-e	0	3820	505855	8181423	6.5	NA	NA	C	NA	1	1	1	0	0	195

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0271.02-f	0	3820	505855	8181423	7.5	NA	NA	C	NA	1	1	1	0	0	507
tr-0271.03-h	0	3820	505905	8181523	1.25	NA	NA	C	NA	1	0	0	0	0	18
tr-0271.04-i	1	3820	505955	8181573	7	NA	NA	C	NA	1	0	0	0	0	85
tr-0271.05-i	1	3820	505705	8181398	1.25	NA	NA	C	NA	1	0	0	0	0	0
tr-0272.01-b	0	3815	505911	8182447	1	NA	NA	C	NA	1	0	0	0	0	98
tr-0272.02-d	0	3815	505811	8182572	11	NA	NA	C	NA	1	0	1	0	0	4108
tr-0272.02-e	0	3815	505811	8182572	13.75	NA	NA	C	NA	1	0	0	0	0	307
tr-0272.02-f	0	3815	505811	8182572	14	NA	NA	C	NA	1	0	1	0	0	151
tr-0272.03-g	1	3815	505686	8182697	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0272.04-g	1	3815	505686	8182547	1	NA	NA	C	NA	1	0	0	0	0	25
tr-0272.05-g	1	3815	505911	8182597	0.75	NA	NA	C	NA	1	0	0	0	0	0
tr-0272.06-h	0	3815	505941	8182497	1	NA	NA	C	NA	1	0	0	0	0	17
tr-0272.07-i	1	3815	505611	8182472	0.5	NA	NA	C	NA	1	0	0	0	0	16
tr-0272.08-i	1	3815	505886	8182547	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0272.09-i	1	3815	505911	8182322	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0273.01-i	0	3835	506636	8181578	0.47	NA	NA	C	NA	1	0	0	0	0	NA
tr-0275.01-d	0	3820	506408	8182519	0.46	NA	NA	C	NA	1	0	0	0	0	NA
tr-0275.01-f	0	3820	506408	8182519	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0275.01-h	0	3820	506408	8182519	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0275.01-i	0	3820	506408	8182519	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0276.01-d	0	3815	506377	8182783	2.89	NA	NA	C	NA	1	0	0	0	0	NA
tr-0276.01-e	0	3815	506377	8182783	2.89	NA	NA	C	NA	1	0	0	0	0	NA
tr-0276.02-f	0	3815	506417	8182823	2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0277.01-d	0	3815	506219	8182742	0.95	NA	NA	C	NA	1	0	0	0	0	NA
tr-0277.01-f	0	3815	506219	8182742	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0278.01-d	0	3820	506217	8182450	0.38	NA	NA	C	NA	1	0	0	0	0	NA
tr-0278.01-e	0	3820	506217	8182450	0.38	NA	NA	C	NA	1	0	0	0	0	NA
tr-0278.01-i	0	3820	506217	8182450	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0279.01-i	0	3830	506302	8181470	0.39	NA	NA	C	NA	1	0	0	0	0	NA
tr-0281.01-i	0	3815	505942	8181933	0.59	NA	NA	C	NA	1	0	0	0	0	NA
tr-0282.01-e	0	3815	505967	8181836	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0282.01-i	0	3815	505967	8181836	1.17	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0284.01-i	0	3815	523301	8183363	1.19	NA	NA	C	NA	1	0	0	0	0	NA
tr-0285.01-h	0	3815	523178	8183357	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0286.01-h	0	3820	523238	8183028	0.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0286.01-i	0	3820	523238	8183028	0.86	NA	NA	C	NA	1	0	0	0	0	NA
tr-0287.01-i	0	3980	523347	8180046	0.26	NA	NA	C	NA	1	0	0	0	0	NA
tr-0289.01-h	0	3850	523446	8182527	0.43	NA	NA	C	NA	1	0	0	0	0	NA
tr-0289.01-i	0	3850	523446	8182527	0.43	NA	NA	C	NA	1	0	0	0	0	NA
tr-0290.01-i	0	3835	523537	8182727	0.18	NA	NA	C	NA	1	0	0	0	0	NA
tr-0291.01-c	0	3820	523471	8182965	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0291.02-d	0	3820	523491	8182955	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0291.02-g	0	3820	523491	8182955	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0291.02-i	0	3820	523491	8182955	0.44	NA	NA	C	NA	1	0	0	0	0	NA
tr-0292.01-h	0	3815	523483	8183172	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0292.01-i	0	3815	523483	8183172	0.34	NA	NA	C	NA	1	0	0	0	0	NA
tr-0293.01-g	0	3810	523487	8183497	0.14	NA	NA	C	NA	1	0	0	0	0	NA
tr-0293.01-i	0	3810	523487	8183497	0.14	NA	NA	C	NA	1	0	0	0	0	NA
tr-0294.01-i	0	3810	523514	8183730	0.11	NA	NA	C	NA	1	0	0	0	0	NA
tr-0295.01-i	0	3815	523803	8183291	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0297.01-i	0	3820	523718	8182966	0.14	NA	NA	C	NA	1	0	0	0	0	NA
tr-0298.01-i	0	3820	523789	8182893	0.14	NA	NA	C	NA	1	0	0	0	0	NA
tr-0299.01-i	0	3825	523653	8182873	0.64	NA	NA	C	NA	1	0	0	0	0	NA
tr-0301.01-b	0	3890	524019	8182129	0.25	NA	NA	C	NA	1	0	0	0	0	335
tr-0301.01-c	0	3890	524019	8182129	0.25	NA	NA	C	NA	1	0	0	0	0	335
tr-0302.01-i	0	3910	523888	8180704	0.65	NA	NA	C	NA	1	0	0	0	0	NA
tr-0303.01-b	0	3895	524244	8180529	1.75	NA	NA	C	NA	1	0	0	0	0	508
tr-0303.01-c	0	3895	524244	8180529	2.25	NA	NA	C	NA	1	0.5	0	0	0	508
tr-0303.01-d	0	3895	524244	8180529	2.25	NA	NA	C	NA	1	0	0	0	0	234
tr-0303.02-e	0	3895	524294	8180454	0.25	NA	NA	C	NA	1	0	0	0	0	1
tr-0303.03-g	1	3895	524244	8180604	0.75	NA	NA	C	NA	1	0	0	0	0	15
tr-0303.04-g	1	3895	524269	8180479	0.75	NA	NA	C	NA	1	0	0	0	0	0
tr-0303.05-h	0	3895	524269	8180529	1.25	NA	NA	C	NA	1	0	0	0	0	12
tr-0303.06-i	0	3895	524220	8180504	0.5	NA	NA	C	NA	1	0	0	0	0	4

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0304.01-i	0	3920	524518	8179414	0.14	NA	NA	C	NA	1	0	0	0	0	NA
tr-0305.01-c	0	3885	524087	8182164	0.3	NA	NA	C	NA	1	0	0	0	0	23
tr-0305.01-d	0	3885	524087	8182164	0.3	NA	NA	C	NA	1	0	0	0	0	5
tr-0307.01-e	0	3820	524119	8182833	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0307.01-f	0	3820	524119	8182833	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0307.01-i	0	3820	524119	8182833	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0308.01-i	0	3815	523997	8182972	0.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0309.01-g	0	3815	524010	8183201	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0309.01-i	0	3815	524010	8183201	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0311.01-h	0	3815	524113	8183205	0.22	NA	NA	C	NA	1	0	0	0	0	NA
tr-0311.01-i	0	3815	524113	8183205	0.22	NA	NA	C	NA	1	0	0	0	0	NA
tr-0312.01-i	0	3810	523986	8183342	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0313.01-i	0	3810	524099	8183444	0.23	NA	NA	C	NA	1	0	0	0	0	NA
tr-0315.01-e	0	3810	524323	8183293	0.13	NA	NA	C	NA	1	0	0	0	0	NA
tr-0315.01-i	0	3810	524323	8183293	0.13	NA	NA	C	NA	1	0	0	0	0	NA
tr-0316.01-h	0	3815	523883	8182989	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0316.01-i	0	3815	523883	8182989	0.63	NA	NA	C	NA	1	0	0	0	0	NA
tr-0317.01-i	0	3910	524478	8179687	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0318.01-d	0	3810	524680	8189920	0.33	NA	NA	C	NA	1	0	0	0	0	NA
tr-0318.01-e	0	3810	524680	8189920	0.33	NA	NA	C	NA	1	0	0	0	0	NA
tr-0318.01-f	0	3810	524680	8189920	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0318.01-g	0	3810	524680	8189920	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0318.01-i	0	3810	524680	8189920	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0319.01-d	0	3810	524895	8189773	3.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0319.01-e	0	3810	524895	8189773	3.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0319.01-f	0	3810	524895	8189773	3.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0319.02-g	0	3810	524845	8189773	0.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0319.03-i	0	3810	524865	8189813	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0320.01-c	0	3810	524370	8190031	3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0320.01-e	0	3810	524370	8190031	1.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0320.01-f	0	3810	524370	8190031	3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0320.01-h	0	3810	524370	8190031	1.5	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0321.01-i	0	3850	507130	8181624	0.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0322.01-d	0	3845	507116	8182126	3.5	NA	NA	C	NA	1	0.5	0	0	0	NA
tr-0322.01-e	0	3845	507116	8182126	4.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0322.01-f	0	3845	507116	8182126	11.73	NA	NA	C	NA	1	0	0	0	0	NA
tr-0322.01-g	0	3845	507116	8182126	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0322.02-h	0	3845	507116	8182186	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0322.03-i	1	3845	507062	8182083	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0322.04-i	1	3845	507167	8182126	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0323.01-g	0	3845	507098	8181939	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0323.01-h	0	3845	507098	8181939	0.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0324.01-d	0	3815	506561	8182903	0.52	NA	NA	C	NA	1	0	0	0	0	NA
tr-0324.01-f	0	3815	506561	8182903	0.52	NA	NA	C	NA	1	0	0	0	0	NA
tr-0325.01-d	0	3815	506753	8183073	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0325.01-e	0	3815	506753	8183073	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0325.01-g	0	3815	506753	8183073	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0325.01-i	0	3815	506753	8183073	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0327.01-i	0	3850	507579	8181873	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0328.01-i	0	3830	507327	8182682	0.38	NA	NA	C	NA	1	0	0	0	0	NA
tr-0329.01-i	0	3835	507538	8182458	0.58	NA	NA	C	NA	1	0	0	0	0	NA
tr-0330.01-i	0	3850	507822	8181857	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0331.01-i	0	3815	507637	8183034	1.44	NA	NA	C	NA	1	0	0	0	0	NA
tr-0332.01-i	0	3815	507624	8183109	0.37	NA	NA	C	NA	1	0	0	0	0	NA
tr-0333.01-h	0	3815	507545	8183178	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0333.01-i	0	3815	507545	8183178	0.61	NA	NA	C	NA	1	0	0	0	0	NA
tr-0334.01-d	0	3815	507713	8183480	1.05	NA	NA	C	NA	1	0	0	0	0	NA
tr-0334.02-g	0	3815	507648	8183480	0.72	NA	NA	C	NA	1	0	0	0	0	NA
tr-0334.01-i	0	3815	507713	8183480	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0335.01-d	0	3815	507682	8183167	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0335.01-i	0	3815	507682	8183167	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0336.01-i	0	3820	507789	8182760	0.91	NA	NA	C	NA	1	0	0	0	0	NA
tr-0337.01-e	0	3815	507871	8183384	1.68	NA	NA	C	NA	1	0	0	0	0	NA
tr-0337.01-g	0	3815	507871	8183384	1.68	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0337.01-h	0	3815	507871	8183384	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0337.01-i	0	3815	507871	8183384	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0338.01-g	0	3815	507914	8183504	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0339.01-i	0	3815	508155	8182964	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0340.01-i	0	3825	508570	8182277	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0341.01-b	0	3815	508500	8182904	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0341.02-d	0	3815	508512	8182879	1.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0341.02-f	0	3815	508512	8182879	1.5	NA	NA	C	NA	1	0	0	0	0	NA
tr-0341.03-g	0	3815	508500	8182879	0.64	NA	NA	C	NA	1	0	0	0	0	NA
tr-0341.04-i	0	3815	508400	8182879	0.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0342.01-i	0	3815	508757	8182594	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0344.01-i	0	3815	509173	8182567	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0345.01-h	0	3815	509339	8182884	4.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0345.02-i	0	3815	509289	8182884	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0346.01-i	0	3835	509527	8182176	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0347.01-i	0	3825	509478	8182319	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0348.01-i	0	3815	509383	8182560	0.27	NA	NA	C	NA	1	0	0	0	0	NA
tr-0349.01-f	0	3820	509563	8182494	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0349.01-h	0	3820	509563	8182494	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0350.01-f	0	3825	509573	8182353	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0350.01-i	0	3825	509573	8182353	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0351.01-i	0	3855	509666	8181848	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0352.01-c	0	3900	509980	8181221	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0352.01-i	0	3900	509980	8181221	0.45	NA	NA	C	NA	1	0	0	0	0	NA
tr-0353.01-f	0	3810	509682	8183112	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0353.01-g	0	3810	509682	8183112	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0353.01-h	0	3810	509682	8183112	0.47	NA	NA	C	NA	1	0	0	0	0	NA
tr-0354.01-g	0	3810	524569	8183157	0.46	NA	NA	C	NA	1	0	0	0	0	NA
tr-0354.01-h	0	3810	524569	8183157	0.99	NA	NA	C	NA	1	0	0	0	0	NA
tr-0355.01-h	0	3810	524770	8183291	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0356.01-i	0	3815	524904	8182992	0.54	NA	NA	C	NA	1	0	0	0	0	NA
tr-0357.01-i	0	3810	524903	8183360	0.56	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0358.01-i	0	3810	525008	8183299	0.46	NA	NA	C	NA	1	0	0	0	0	NA
tr-0359.01-h	0	3810	525104	8183221	0.13	NA	NA	C	NA	1	0	0	0	0	NA
tr-0360.01-g	0	3900	524586	8180277	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0361.01-i	0	3830	524740	8182508	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0362.01-i	0	3980	525074	8179986	0.23	NA	NA	C	NA	1	0	0	0	0	NA
tr-0363.01-h	0	3825	525041	8182548	2.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0363.02-i	0	3825	525001	8182503	0.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0364.01-f	0	3880	526018	8179576	0.42	NA	NA	C	NA	1	0	0	0	0	NA
tr-0365.01-f	0	3910	525931	8179391	3.23	NA	NA	C	NA	1	0.5	0	0	0	NA
tr-0366.01-b	0	3895	525844	8179819	0.54	NA	NA	C	NA	1	0	0	0	0	NA
tr-0366.01-c	0	3895	525844	8179819	0.54	NA	NA	C	NA	1	0	0	0	0	NA
tr-0366.01-d	0	3895	525844	8179819	0.54	NA	NA	C	NA	1	0	0	0	0	NA
tr-0366.01-e	0	3895	525844	8179819	0.54	NA	NA	C	NA	1	0	0	0	0	NA
tr-0367.01-b	0	3895	525860	8179923	0.88	NA	NA	C	NA	1	0	0	0	0	NA
tr-0367.02-g	0	3895	525860	8179943	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0367.02-i	0	3895	525860	8179943	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0368.01-b	0	3835	525379	8182458	0.49	NA	NA	C	NA	1	0	0	0	0	NA
tr-0368.02-c	0	3835	525359	8182463	2.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0368.02-d	0	3835	525359	8182463	2.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0368.02-e	0	3835	525359	8182463	2.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0368.03-f	0	3835	525359	8182478	3.56	NA	NA	C	NA	1	1	0	0	0	NA
tr-0368.04-g	0	3835	525329	8182478	0.88	NA	NA	C	NA	1	0	0.5	0	0	NA
tr-0368.04-h	0	3835	525329	8182478	0.88	NA	NA	C	NA	1	0	0.5	0	0	NA
tr-0369.01-h	0	3835	525574	8182459	2.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0369.02-i	0	3835	525614	8182459	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0371.01-h	0	3810	525751	8183202	0.64	NA	NA	C	NA	1	0	0	0	0	NA
tr-0371.01-i	0	3810	525751	8183202	3.99	NA	NA	C	NA	1	0	0	0	0	NA
tr-0372.01-e	0	3810	525668	8183487	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0372.01-h	0	3810	525668	8183487	0.49	NA	NA	C	NA	1	0	0	0	0	NA
tr-0372.01-i	0	3810	525668	8183487	0.49	NA	NA	C	NA	1	0	0	0	0	NA
tr-0376.01-i	0	3815	525039	8182683	0.11	NA	NA	C	NA	1	0	0	0	0	NA
tr-0377.01-i	0	3860	516794	8180952	0.06	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0378.01-i	0	3905	516784	8180367	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0379.01-h	0	3850	515607	8181831	3.52	NA	NA	C	NA	1	0	0	0	0	NA
tr-0379.02-i	0	3850	515607	8181741	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0380.01-i	0	3830	515352	8182105	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0381.01-i	0	3855	515138	8181816	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0382.01-i	0	3825	515127	8182015	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0383.01-h	0	3850	514723	8182167	1.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0383.01-i	0	3850	514723	8182167	0.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0385.01-f	0	3840	514570	8182566	0.33	NA	NA	C	NA	1	0	0	0	0	NA
tr-0385.02-h	0	3840	514570	8182541	0.65	NA	NA	C	NA	1	0	0	0	0	NA
tr-0385.02-i	0	3840	514570	8182541	0.65	NA	NA	C	NA	1	0	0	0	0	NA
tr-0386.01-h	0	3860	514548	8182355	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0387.01-h	0	3855	514576	8182206	0.82	NA	NA	C	NA	1	0	0	0	0	NA
tr-0388.01-i	0	3865	514857	8181390	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0389.01-h	0	3845	514370	8182380	1.6	NA	NA	C	NA	1	0	0	0	0	NA
tr-0390.01-h	0	3855	514188	8182082	0.62	NA	NA	C	NA	1	0	0	0	0	NA
tr-0391.01-h	0	3850	514018	8182066	1.81	NA	NA	C	NA	1	0	0	0	0	NA
tr-0391.01-i	0	3850	514018	8182066	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0392.01-h	0	3845	514026	8182271	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0392.01-i	0	3845	514026	8182271	0.4	NA	NA	C	NA	1	0	0	0	0	NA
tr-0393.01-h	0	3845	514037	8182381	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0394.01-a	0	3865	513677	8182587	2.25	NA	NA	C	NA	1	0	0	0	0	4069
tr-0394.02-b	0	3865	513782	8182612	4.5	NA	NA	C	NA	1	0	0	0	0	4069
tr-0394.03-c	0	3865	513732	8182612	7.5	NA	NA	C	NA	1	0.5	0	0	0	4069
tr-0394.04-d	0	3865	513757	8182637	5	NA	NA	C	NA	1	0	0	0	0	625
tr-0394.03-e	0	3865	513732	8182612	4.5	NA	NA	C	NA	1	0	0	0	0	106
tr-0394.05-f	0	3865	513707	8182637	1.75	NA	NA	C	NA	1	0	0	0	0	12
tr-0394.06-g	0	3865	513782	8182662	0.5	NA	NA	C	NA	1	0	0	0	0	4
tr-0394.07-h	0	3865	513732	8182587	6.5	NA	NA	C	NA	1	0	0	0	0	249
tr-0394.08-i	0	3865	513757	8182512	1	NA	NA	C	NA	1	0	0	0	0	17
tr-0395.01-i	0	3860	513967	8181011	0.09	NA	NA	C	NA	1	0	0	0	0	NA
tr-0396.01-h	0	3880	513622	8181351	0.51	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0396.01-i	0	3880	513622	8181351	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0397.01-i	0	3855	513670	8181453	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0398.01-h	0	3880	513532	8181490	0.49	NA	NA	C	NA	1	0	0	0	0	NA
tr-0399.01-h	0	3880	513522	8181289	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0400.01-f	0	3835	515474	8183118	0.31	NA	NA	C	NA	1	0	0	0	0	NA
tr-0401.01-f	0	3825	515254	8183377	0.33	NA	NA	C	NA	1	0	0	0	0	NA
tr-0401.01-i	0	3825	515254	8183377	0.33	NA	NA	C	NA	1	0	0	0	0	NA
tr-0402.01-f	0	3815	515249	8183452	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0402.01-i	0	3815	515249	8183452	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0403.01-f	0	3810	515172	8183570	0.23	NA	NA	C	NA	1	0	0	0	0	NA
tr-0403.02-i	0	3810	515225	8183570	0.47	NA	NA	C	NA	1	0	0	0	0	NA
tr-0404.01-h	0	3810	515127	8183491	0.76	NA	NA	C	NA	1	0	0	0	0	NA
tr-0404.01-i	0	3810	515127	8183491	0.76	NA	NA	C	NA	1	0	0	0	0	NA
tr-0405.01-f	0	3825	515184	8182865	0.64	NA	NA	C	NA	1	0	0	0	0	NA
tr-0405.01-h	0	3825	515184	8182865	0.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0406.01-f	0	3815	515132	8182685	1.57	NA	NA	C	NA	1	0	0	0	0	NA
tr-0406.02-i	0	3815	515132	8182725	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0407.01-b	0	3810	514914	8183389	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0407.01-d	0	3810	514914	8183389	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0407.01-e	0	3810	514914	8183389	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0407.01-f	0	3810	514914	8183389	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0407.01-g	0	3810	514914	8183389	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0407.01-h	0	3810	514914	8183389	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0408.01-h	0	3810	514830	8183619	0.23	NA	NA	C	NA	1	0	0	0	0	NA
tr-0408.01-i	0	3810	514830	8183619	0.23	NA	NA	C	NA	1	0	0	0	0	NA
tr-0409.01-i	0	3815	514872	8183164	0.56	NA	NA	C	NA	1	0	0	0	0	NA
tr-0410.01-h	0	3810	514733	8183104	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0410.01-i	0	3810	514733	8183104	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0411.01-i	0	3810	514708	8183249	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0413.01-i	0	3815	514275	8183039	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0414.01-f	0	3810	512936	8183593	0.53	NA	NA	C	NA	1	0	0	0	0	NA
tr-0414.01-g	0	3810	512936	8183593	0.53	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0414.01-h	0	3810	512936	8183593	0.53	NA	NA	C	NA	1	0	0	0	0	NA
tr-0414.01-i	0	3810	512936	8183593	0.53	NA	NA	C	NA	1	0	0	0	0	NA
tr-0415.01-f	0	3825	513980	8183344	6.2	NA	NA	C	NA	1	1	0	0	0	NA
tr-0416.01-g	0	3815	513703	8183705	0.26	NA	NA	C	NA	1	0	0	0	0	NA
tr-0416.02-i	0	3815	513760	8183705	0.52	NA	NA	C	NA	1	0	0	0	0	NA
tr-0417.01-f	0	3815	513752	8183605	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0417.01-g	0	3815	513752	8183605	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0417.01-i	0	3815	513752	8183605	0.21	NA	NA	C	NA	1	0	0	0	0	NA
tr-0418.01-i	0	3820	513244	8183439	0.47	NA	NA	C	NA	1	0	0	0	0	NA
tr-0419.01-f	0	3825	513160	8183389	0.53	NA	NA	C	NA	1	0	0	0	0	NA
tr-0420.01-b	0	3840	513175	8183138	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0420.01-c	0	3840	513175	8183138	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0420.01-d	0	3840	513175	8183138	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0420.01-h	0	3840	513175	8183138	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0421.01-b	0	3830	520868	8182641	0.5	NA	NA	C	NA	1	0	0	0	0	151
tr-0421.02-c	1	3830	520943	8182966	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0421.03-c	1	3830	520818	8182666	1.25	NA	NA	C	NA	1	0	0	0	0	151
tr-0421.02-d	1	3830	520943	8182966	0.5	NA	NA	C	NA	1	0	0	0	0	0
tr-0421.04-d	1	3830	520818	8182691	3.75	NA	NA	C	NA	1	1	0	0	0	268
tr-0421.05-e	0	3830	520888	8182816	4.5	NA	NA	C	NA	1	0.5	0	0	0	187
tr-0421.06-f	0	3830	520868	8182791	3.5	NA	NA	C	NA	1	0	0	0	0	134
tr-0421.07-g	1	3830	520843	8182841	0.75	NA	NA	C	NA	1	0	0	0	0	9
tr-0421.08-g	1	3830	520818	8182618	0.25	NA	NA	C	NA	1	0	0	0	0	0
tr-0421.06-h	0	3830	520868	8182791	5.5	NA	NA	C	NA	1	0	0	0	0	663
tr-0421.09-i	0	3830	520918	8182766	0.25	NA	NA	C	NA	1	0	0	0	0	7
tr-0423.01-i	0	3810	521193	8183786	0.23	NA	NA	C	NA	1	0	0	0	0	NA
tr-0424.01-i	0	3810	521050	8183712	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0426.01-g	0	3815	521712	8183175	0.38	NA	NA	C	NA	1	0	0	0	0	NA
tr-0427.01-g	0	3825	521667	8182954	0.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0427.01-h	0	3825	521667	8182954	0.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0427.01-i	0	3825	521667	8182954	0.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0428.01-g	0	3820	521768	8183101	0.24	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
tr-0429.01-h	0	3815	522083	8183382	0.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0429.01-i	0	3815	522083	8183382	0.32	NA	NA	C	NA	1	0	0	0	0	NA
tr-0430.01-b	0	3825	522296	8183074	2	NA	NA	C	NA	1	0	0	0	0	1567
tr-0430.02-c	0	3825	522346	8183074	3.25	NA	NA	C	NA	1	1	1	0	0	1567
tr-0430.02-d	0	3825	522346	8183074	3.5	NA	NA	C	NA	1	0	0	0	0	239
tr-0430.03-e	0	3825	522396	8183099	2.5	NA	NA	C	NA	1	0	0	0	0	51
tr-0430.04-f	0	3825	522371	8183124	1.75	NA	NA	C	NA	1	0	0	0	0	32
tr-0430.05-g	0	3825	522321	8183049	1	NA	NA	C	NA	1	0	0	0	0	8
tr-0430.03-h	0	3825	522396	8183099	2.25	NA	NA	C	NA	1	0	0	0	0	305
tr-0431.01-i	0	3920	521460	8181340	0.07	NA	NA	C	NA	1	0	0	0	0	NA
tr-0432.01-g	0	3810	522517	8183437	0.06	NA	NA	C	NA	1	0	0	0	0	NA
tr-0432.01-h	0	3810	522517	8183437	0.06	NA	NA	C	NA	1	0	0	0	0	NA
tr-0432.01-i	0	3810	522517	8183437	0.06	NA	NA	C	NA	1	0	0	0	0	NA
tr-0433.01-i	0	3810	522466	8183500	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0435.01-h	0	3815	522685	8183302	0.19	NA	NA	C	NA	1	0	0	0	0	NA
tr-0436.01-c	0	3820	522605	8182982	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0436.01-d	0	3820	522605	8182982	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0436.01-g	0	3820	522605	8182982	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0437.01-g	0	3830	521644	8182866	0.68	NA	NA	C	NA	1	0	0	0	0	NA
tr-0438.01-h	0	3835	521754	8182751	1.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0438.02-i	0	3835	521754	8182698	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0439.01-b	0	3850	522219	8182368	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0439.01-h	0	3850	522219	8182368	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0440.01-i	0	3830	522117	8182832	0.23	NA	NA	C	NA	1	0	0	0	0	NA
tr-0441.01-g	0	3825	522906	8183025	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0441.01-i	0	3825	522906	8183025	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0443.01-h	0	3820	520490	8183406	0.69	NA	NA	C	NA	1	0	0	0	0	NA
tr-0443.01-i	0	3820	520490	8183406	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0445.01-b	0	3825	519877	8183263	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0445.01-g	0	3825	519877	8183263	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0445.01-i	0	3825	519877	8183263	0.16	NA	NA	C	NA	1	0	0	0	0	NA
tr-0446.01-i	0	3815	519887	8183372	0.11	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0447.01-i	0	3825	520505	8183154	0.19	NA	NA	C	NA	1	0	0	0	0	NA
tr-0448.01-h	0	3835	520576	8182769	0.83	NA	NA	C	NA	1	0	0	0	0	NA
tr-0448.01-i	0	3835	520576	8182769	0.25	NA	NA	C	NA	1	0	0	0	0	NA
tr-0449.01-i	0	3810	519716	8183619	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0451.01-g	0	3810	519515	8183784	1.14	NA	NA	C	NA	1	0	0	0	0	NA
tr-0451.02-i	0	3810	519455	8183784	0.55	NA	NA	C	NA	1	0	0	0	0	NA
tr-0453.01-h	0	3810	519403	8183838	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0453.01-i	0	3810	519403	8183838	0.28	NA	NA	C	NA	1	0	0	0	0	NA
tr-0454.01-i	0	3840	519655	8182907	0.24	NA	NA	C	NA	1	0	0	0	0	NA
tr-0455.01-g	0	4000	519707	8179754	3.23	NA	NA	C	NA	1	0.5	0	0	1	NA
tr-0456.01-i	0	3810	519136	8183501	0.31	NA	NA	C	NA	1	0	0	0	0	NA
tr-0458.01-h	0	3810	518882	8183762	0.57	NA	NA	C	NA	1	0	0	0	0	NA
tr-0458.01-i	0	3810	518882	8183762	0.57	NA	NA	C	NA	1	0	0	0	0	NA
tr-0459.01-i	0	3850	519164	8182852	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0460.01-h	0	3840	518833	8182968	0.88	NA	NA	C	NA	1	0	0	0	0	NA
tr-0460.02-i	0	3840	518863	8182968	0.36	NA	NA	C	NA	1	0	0	0	0	NA
tr-0461.01-h	0	3815	518693	8183337	0.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0461.01-i	0	3815	518693	8183337	0.8	NA	NA	C	NA	1	0	0	0	0	NA
tr-0464.01-d	0	3985	518854	8180056	1.19	NA	NA	C	NA	0	1	0	0	0	NA
tr-0464.01-e	0	3985	518854	8180056	1.19	NA	NA	C	NA	0	1	0	0	0	NA
tr-0464.02-f	0	3985	518924	8180056	0.55	NA	NA	C	NA	0	1	0	0	0	NA
tr-0465.01-h	0	3810	517450	8183441	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0465.01-i	0	3810	517450	8183441	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0466.01-h	0	3810	517341	8183568	0.15	NA	NA	C	NA	1	0	0	0	0	NA
tr-0467.01-h	0	3810	517336	8183685	0.37	NA	NA	C	NA	1	0	0	0	0	NA
tr-0467.01-i	0	3810	517336	8183685	0.2	NA	NA	C	NA	1	0	0	0	0	NA
tr-0468.01-g	0	3810	516945	8183637	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0468.01-h	0	3810	516945	8183637	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0468.01-i	0	3810	516945	8183637	0.3	NA	NA	C	NA	1	0	0	0	0	NA
tr-0469.01-g	0	3820	516906	8183175	0.31	NA	NA	C	NA	1	0	0	0	0	NA
tr-0470.01-c	0	3820	516811	8183169	0.35	NA	NA	C	NA	1	0	0	0	0	NA
tr-0470.01-i	0	3820	516811	8183169	0.35	NA	NA	C	NA	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tr-0471.01-h	0	3850	517984	8182144	0.12	NA	NA	C	NA	1	0	0	0	0	NA
tr-0472.01-i	0	3910	517310	8181056	0.04	NA	NA	C	NA	1	0	0	0	0	NA
tr-0473.01-i	0	3835	517527	8182929	0.39	NA	NA	C	NA	1	0	0	0	0	NA
tr-0474.01-i	0	3840	517162	8182903	0.17	NA	NA	C	NA	1	0	0	0	0	NA
tr-0475.01-h	0	3860	516941	8180937	0.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0475.01-i	0	3860	516941	8180937	0.1	NA	NA	C	NA	1	0	0	0	0	NA
tr-0476.01-c	0	3830	516767	8183044	1.04	NA	NA	C	NA	1	0.5	0	0	0	NA
tr-0476.01-f	0	3830	516767	8183044	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0476.01-g	0	3830	516767	8183044	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tr-0476.01-h	0	3830	516767	8183044	0.48	NA	NA	C	NA	1	0	0	0	0	NA
tl-0001.01-h	0	3945	516902	8163134	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0002.01-h	0	3990	517002	8162934	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0003.01-h	0	4000	517002	8162734	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0004.01-h	0	3840	517902	8163834	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0005.01-h	0	4260	518502	8162034	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0006.01-h	0	4200	517802	8161434	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0007.01-d	0	3818	518502	8164734	2	NA	NA	C	2	1	0	0	0	0	NA
tl-0007.01-e	0	3818	518502	8164734	2	NA	NA	C	2	1	0	0	0	0	NA
tl-0007.01-f	0	3818	518502	8164734	0.25	NA	NA	C	2	1	0	0	0	0	NA
tl-0007.01-g	0	3818	518502	8164734	0.25	NA	NA	C	2	1	0	0	0	0	NA
tl-0008.01-d	0	3820	519902	8164134	1	NA	NA	C	1	1	1	0	0	0	NA
tl-0008.01-e	0	3820	519902	8164134	1	NA	NA	C	1	1	1	0	0	0	NA
tl-0008.01-g	0	3820	519902	8164134	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0009.01-h	0	4020	519902	8162934	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0010.01-h	0	4080	520202	8162734	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0011.01-d	0	3825	520902	8165034	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0011.01-e	0	3825	520902	8165034	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0011.01-f	0	3825	520902	8165034	0.25	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0011.01-g	0	3825	520902	8165034	0.25	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0012.01-e	0	3830	521702	8165434	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0012.01-f	0	3830	521702	8165434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0012.01-g	0	3830	521702	8165434	0.04	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0013.01-f	0	3900	523202	8164034	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0014.01-e	0	3880	523002	8162434	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0014.01-f	0	3880	523002	8162434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0014.01-h	0	3880	523002	8162434	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0015.01-d	0	3840	522602	8166434	1.2	NA	NA	C	1.2	1	1	0	0	0	NA
tl-0015.01-e	0	3840	522602	8166434	1.2	NA	NA	C	1.2	1	1	0	0	0	NA
tl-0015.01-f	0	3840	522602	8166434	0.25	NA	NA	C	1.2	1	0	0	0	0	NA
tl-0016.01-e	0	3840	522402	8166434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0017.01-f	0	3835	523802	8167434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0018.01-f	0	3845	523802	8166334	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0020.01-f	0	3930	525202	8162834	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0021.01-f	0	3825	524702	8167834	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0022.01-f	0	3935	526002	8166034	2	NA	NA	C	2	1	0.5	0	0	0	NA
tl-0022.01-g	0	3935	526002	8166034	2	NA	NA	C	2	1	0.5	0	0	0	NA
tl-0023.01-f	0	4100	525902	8163234	2.5	NA	NA	C	2.5	1	0.5	1	0	1	3350
tl-0024.01-g	0	3900	527002	8163334	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0024.01-h	0	3900	527002	8163334	0.01	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0025.01-f	0	3816	517202	8165334	0.25	NA	NA	C	6	1	0	0	0	0	NA
tl-0025.01-g	0	3816	517202	8165334	6	NA	NA	C	6	1	0.5	0	0	0	NA
tl-0026.01-g	0	3816	517402	8165234	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0027.01-d	0	3830	520502	8166634	1	NA	NA	C	1.5	1	1	0	0	0	NA
tl-0027.01-e	0	3830	520502	8166634	1.5	NA	NA	C	1.5	1	1	0	0	0	NA
tl-0027.01-f	0	3830	520502	8166634	0.04	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0027.01-h	0	3830	520502	8166634	0.04	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0029.01-a	0	3830	522702	8168434	0.25	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0029.01-c	0	3830	522702	8168434	0.01	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0029.01-d	0	3830	522702	8168434	0.25	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0029.01-e	0	3830	522702	8168434	0.25	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0029.01-f	0	3830	522702	8168434	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0029.01-g	0	3830	522702	8168434	0.25	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0030.01-c	0	3830	526102	8172534	0.01	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0030.01-d	0	3830	526102	8172534	0.8	NA	NA	C	0.8	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0030.01-e	0	3830	526102	8172534	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0030.01-f	0	3830	526102	8172534	0.25	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0030.01-g	0	3830	526102	8172534	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0030.01-h	0	3830	526102	8172534	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0031.01-e	0	3835	526202	8172734	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0032.01-f	0	3900	526402	8175734	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0032.01-g	0	3900	526402	8175734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0033.01-a	0	3980	527002	8177034	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0033.01-d	0	3980	527002	8177034	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0033.01-f	0	3980	527002	8177034	0.25	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0033.01-g	0	3980	527002	8177034	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0034.01-c	0	3885	526102	8175734	0.01	NA	NA	C	3.2	1	0	0	0	0	NA
tl-0034.01-d	0	3885	526102	8175734	3.2	NA	NA	C	3.2	1	1	0.5	0	0	NA
tl-0034.01-e	0	3885	526102	8175734	3.2	NA	NA	C	3.2	1	1	0	0	0	NA
tl-0034.01-f	0	3885	526102	8175734	0.25	NA	NA	C	3.2	1	0	0	0	0	NA
tl-0035.01-d	0	3835	517802	8178533	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0035.01-e	0	3835	517802	8178533	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0036.01-d	0	3850	519202	8178233	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0036.01-e	0	3850	519202	8178233	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0037.01-d	0	3830	521702	8177134	3.1	NA	NA	C	3.1	1	1	0	0	0	NA
tl-0037.01-e	0	3830	521702	8177134	3.1	NA	NA	C	3.1	1	1	0	0	0	NA
tl-0037.01-f	0	3830	521702	8177134	0.25	NA	NA	C	3.1	1	0	0	0	0	NA
tl-0037.01-g	0	3830	521702	8177134	0.25	NA	NA	C	3.1	1	0	0	0	0	NA
tl-0038.01-e	0	3885	523402	8178333	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0038.01-f	0	3885	523402	8178333	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0038.01-g	0	3885	523402	8178333	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0040.01-f	0	3818	523102	8170934	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0041.01-f	0	3825	524202	8173634	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0042.01-f	0	3825	524602	8172434	0.03	NA	NA	C	0.03	1	0	0	0	0	NA
tl-0043.01-f	0	3820	524802	8171834	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0044.01-f	0	3835	525402	8174634	0.02	NA	NA	C	0.02	1	0	0	0	0	NA
tl-0045.01-d	0	3830	525002	8173734	0.03	NA	NA	C	0.03	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0045.01-e	0	3830	525002	8173734	0.03	NA	NA	C	0.03	1	0	0	0	0	NA
tl-0045.01-f	0	3830	525002	8173734	0.03	NA	NA	C	0.03	1	0	0	0	0	NA
tl-0046.01-f	0	3825	524902	8173334	0.02	NA	NA	C	0.02	1	0	0	0	0	NA
tl-0047.01-f	0	3825	524802	8173234	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
tl-0048.01-f	0	3825	525602	8171834	0.24	NA	NA	C	0.24	1	0	0	0	0	NA
tl-0049.01-f	0	3830	525602	8172934	0.02	NA	NA	C	0.02	1	0	0	0	0	NA
tl-0049.01-g	0	3830	525602	8172934	0.02	NA	NA	C	0.02	1	0	0	0	0	NA
tl-0050.01-c	0	3905	524902	8177733	0.02	NA	NA	C	0.09	0.5	0	0.5	0	0	NA
tl-0050.01-d	0	3905	524902	8177733	0.09	NA	NA	C	0.09	0.5	0	0.5	0	0	NA
tl-0050.01-e	0	3905	524902	8177733	0.09	NA	NA	C	0.09	0.5	0	0.5	0	0	NA
tl-0050.01-g	0	3905	524902	8177733	0.02	NA	NA	C	0.09	0.5	0	0.5	0	0	NA
tl-0051.01-h	0	4200	518102	8162234	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0052.01-d	0	3820	517402	8164234	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0052.01-f	0	3820	517402	8164234	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0053.01-d	0	3880	516702	8163734	0.02	NA	NA	C	0.7	1	0	0	0	0	NA
tl-0053.01-g	0	3880	516702	8163734	0.7	NA	NA	C	0.7	1	0	0	0	0	NA
tl-0053.01-h	0	3880	516702	8163734	0.02	NA	NA	C	0.7	1	0	0	0	0	NA
tl-0054.01-h	0	3900	517002	8163434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0055.01-c	0	3860	517202	8164534	0.01	NA	NA	C	7	1	0	0	0	0	NA
tl-0055.01-d	0	3860	517202	8164534	5	NA	NA	C	7	1	1	1	0	0	NA
tl-0055.01-e	0	3860	517202	8164534	7	NA	NA	C	7	1	1	1	0	0	NA
tl-0055.01-f	0	3860	517202	8164534	0.5	NA	NA	C	7	1	0	0	0	0	NA
tl-0055.01-g	0	3860	517202	8164534	0.25	NA	NA	C	7	1	0	0	0	0	NA
tl-0056.01-f	0	3815	517602	8164534	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0056.01-g	0	3815	517602	8164534	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0057.01-f	0	3815	517702	8164534	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0059.01-f	0	3820	517602	8164134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0059.01-g	0	3820	517602	8164134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0060.01-e	0	3820	517802	8164134	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0060.01-f	0	3820	517802	8164134	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0060.01-g	0	3820	517802	8164134	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0061.01-f	0	3825	518602	8164334	0.09	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0061.01-g	0	3825	518602	8164334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0062.01-e	0	3900	519302	8163434	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0062.01-f	0	3900	519302	8163434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0062.01-g	0	3900	519302	8163434	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0063.01-f	0	3835	519402	8164134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0063.01-g	0	3835	519402	8164134	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0063.01-h	0	3835	519402	8164134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0064.01-f	0	3830	519402	8164234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0065.01-f	0	3840	521402	8162534	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0065.01-g	0	3840	521402	8162534	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0066.01-f	0	3855	520202	8163934	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0066.01-g	0	3855	520202	8163934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0067.01-e	0	3855	520902	8164134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0067.01-f	0	3855	520902	8164134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0067.01-h	0	3855	520902	8164134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0068.01-d	0	3845	520702	8164534	4	NA	NA	C	6	1	1	0	0	0	NA
tl-0068.01-e	0	3845	520702	8164534	6	NA	NA	C	6	1	1	0	0	0	NA
tl-0068.01-f	0	3845	520702	8164534	0.25	NA	NA	C	6	1	0	0	0	0	NA
tl-0068.01-g	0	3845	520702	8164534	0.04	NA	NA	C	6	1	0	0	0	0	NA
tl-0068.01-h	0	3845	520702	8164534	0.04	NA	NA	C	6	1	0	0	0	0	NA
tl-0069.01-f	0	3870	521602	8163834	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0069.01-g	0	3870	521602	8163834	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0071.01-d	0	4000	522302	8162934	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0071.01-e	0	4000	522302	8162934	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0071.01-f	0	4000	522302	8162934	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0071.01-g	0	4000	522302	8162934	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0071.01-h	0	4000	522302	8162934	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0072.01-f	0	3970	523902	8162334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0073.01-d	0	3970	523702	8162534	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0073.01-e	0	3970	523702	8162534	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0074.01-f	0	3960	523302	8162534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0074.01-g	0	3960	523302	8162534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0074.01-h	0	3960	523302	8162534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0075.01-e	0	3900	523002	8163434	1	NA	NA	C	4	1	0	0	0	0	NA
tl-0075.01-g	0	3900	523002	8163434	4	NA	NA	C	4	1	0	0	0	0	NA
tl-0076.01-f	0	3930	522202	8163434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0076.01-g	0	3930	522202	8163434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0077.01-f	0	3940	522202	8163134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0077.01-g	0	3940	522202	8163134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0077.01-h	0	3940	522202	8163134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0078.01-e	0	3860	521502	8164834	0.25	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0078.01-f	0	3860	521502	8164834	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0078.01-g	0	3860	521502	8164834	0.09	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0079.01-f	0	3960	523602	8162434	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0079.01-g	0	3960	523602	8162434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0079.01-h	0	3960	523602	8162434	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0080.01-f	0	4020	524802	8162134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0080.01-g	0	4020	524802	8162134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0081.01-f	0	4060	524202	8162334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0081.01-g	0	4060	524202	8162334	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0082.01-g	0	3920	523402	8162934	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0082.01-h	0	3920	523402	8162934	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0083.01-f	0	3850	522102	8166034	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0083.01-g	0	3850	522102	8166034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0084.01-f	0	3940	525102	8162734	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0084.01-g	0	3940	525102	8162734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0084.01-h	0	3940	525102	8162734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0085.01-f	0	3915	524602	8163234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0085.01-g	0	3915	524602	8163234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0085.01-h	0	3915	524602	8163234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0086.01-f	0	3915	524402	8163334	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0086.01-g	0	3915	524402	8163334	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0086.01-h	0	3915	524402	8163334	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0087.01-d	0	3850	522702	8166234	3.2	NA	NA	C	3.2	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0087.01-e	0	3850	522702	8166234	3.2	NA	NA	C	3.2	1	0	0	0	0	NA
tl-0087.01-g	0	3850	522702	8166234	0.5	NA	NA	C	3.2	1	0	0	0	0	NA
tl-0087.01-h	0	3850	522702	8166234	0.09	NA	NA	C	3.2	1	0	0	0	0	NA
tl-0088.01-e	0	3925	523502	8163934	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0088.01-g	0	3925	523502	8163934	0.09	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0088.01-h	0	3925	523502	8163934	0.09	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0089.01-f	0	3880	523302	8164234	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0089.01-g	0	3880	523302	8164234	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0089.01-h	0	3880	523302	8164234	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0090.01-a	0	3840	522602	8166834	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0090.01-b	0	3840	522602	8166834	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0090.01-d	0	3840	522602	8166834	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0090.01-e	0	3840	522602	8166834	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0090.01-f	0	3840	522602	8166834	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0091.01-e	0	3835	523302	8166834	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0091.01-f	0	3835	523302	8166834	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0091.01-g	0	3835	523302	8166834	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0091.01-h	0	3835	523302	8166834	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0092.01-f	0	3850	523202	8165834	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0092.01-g	0	3850	523202	8165834	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0093.01-f	0	3870	523902	8164434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0094.01-a	0	3860	525002	8163534	2	NA	NA	C	2	1	0.5	0	0	0	NA
tl-0094.01-g	0	3860	525002	8163534	0.25	NA	NA	C	2	1	0	0	0	0	NA
tl-0095.01-d	0	3825	524802	8167634	3.2	NA	NA	C	3.2	1	1	0	0	0	NA
tl-0095.01-e	0	3825	524802	8167634	3.2	NA	NA	C	3.2	1	1	0	0	0	NA
tl-0095.01-f	0	3825	524802	8167634	0.5	NA	NA	C	3.2	1	0	0	0	0	NA
tl-0095.01-g	0	3825	524802	8167634	0.5	NA	NA	C	3.2	1	0	0	0	0	NA
tl-0096.01-f	0	3825	524502	8167834	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0096.01-g	0	3825	524502	8167834	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0097.01-f	0	3825	524002	8167734	2	NA	NA	C	2	1	0	0	0	0	NA
tl-0097.01-g	0	3825	524002	8167734	2	NA	NA	C	2	1	0	0	0	0	NA
tl-0098.01-f	0	3840	524002	8166734	1	NA	NA	C	1	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0098.01-g	0	3840	524002	8166734	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0099.01-f	0	3840	524902	8167034	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0100.01-f	0	3840	524002	8166534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0100.01-g	0	3840	524002	8166534	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0101.01-a	0	3870	524802	8164534	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0101.01-f	0	3870	524802	8164534	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0102.01-f	0	4000	525302	8163434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0103.01-f	0	4000	525602	8163234	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0104.01-d	0	3860	525102	8164534	1	NA	NA	C	2.5	1	0	0	0	0	NA
tl-0104.01-e	0	3860	525102	8164534	2.5	NA	NA	C	2.5	1	0	0	0	0	NA
tl-0104.01-f	0	3860	525102	8164534	2	NA	NA	C	2.5	1	0	0	0	0	NA
tl-0104.01-g	0	3860	525102	8164534	1	NA	NA	C	2.5	1	0	0	0	0	NA
tl-0105.01-f	0	4020	525502	8163534	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0106.01-f	0	3980	526202	8163734	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0107.01-f	0	3920	526602	8164434	0.09	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0107.01-g	0	3920	526602	8164434	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0108.01-d	0	3845	525002	8166334	0.25	NA	NA	C	4	1	0	0	0	0	NA
tl-0108.01-e	0	3845	525002	8166334	1	NA	NA	C	4	1	0	0	0	0	NA
tl-0108.01-f	0	3845	525002	8166334	4	NA	NA	C	4	1	0	0	0	0	NA
tl-0108.01-g	0	3845	525002	8166334	0.25	NA	NA	C	4	1	0	0	0	0	NA
tl-0109.01-d	0	3840	526202	8165634	3.5	NA	NA	C	4.5	1	0	0	0	0	NA
tl-0109.01-e	0	3840	526202	8165634	4.5	NA	NA	C	4.5	1	0	0	0	0	NA
tl-0109.01-f	0	3840	526202	8165634	0.09	NA	NA	C	4.5	1	0	0.5	0	0	NA
tl-0109.01-g	0	3840	526202	8165634	0.09	NA	NA	C	4.5	1	0	0.5	0	0	NA
tl-0110.01-f	0	3815	517402	8166234	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0111.01-e	0	3815	517702	8167334	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0111.01-f	0	3815	517702	8167334	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0111.01-g	0	3815	517702	8167334	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0112.01-f	0	3815	518802	8168834	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0112.01-h	0	3815	518802	8168834	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0113.01-f	0	3815	518702	8172134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0113.01-g	0	3815	518702	8172134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0114.01-g	0	3818	519502	8172034	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0114.01-h	0	3818	519502	8172034	0.25	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0115.01-f	0	3818	520602	8162734	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0115.01-g	0	3818	520602	8162734	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0115.01-h	0	3818	520602	8162734	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0116.01-e	0	3818	519002	8165934	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0116.01-f	0	3818	519002	8165934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0116.01-g	0	3818	519002	8165934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0116.01-h	0	3818	519002	8165934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0117.01-f	0	3830	522102	8168534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0117.01-g	0	3830	522102	8168534	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0117.01-h	0	3830	522102	8168534	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0118.01-f	0	3830	523402	8167634	0.09	NA	NA	C	3.5	1	0	0	0	0	NA
tl-0118.01-g	0	3830	523402	8167634	3.5	NA	NA	C	3.5	1	0	0	0	0	NA
tl-0119.01-e	0	3818	524902	8168134	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0119.01-f	0	3818	524902	8168134	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0119.01-g	0	3818	524902	8168134	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0119.01-h	0	3818	524902	8168134	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0120.01-f	0	3818	524502	8171034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0120.01-h	0	3818	524502	8171034	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0121.01-g	0	3818	524702	8171034	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0121.01-h	0	3818	524702	8171034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0122.01-g	0	3818	524802	8170834	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0122.01-h	0	3818	524802	8170834	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0123.01-d	0	3818	525002	8171034	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0123.01-e	0	3818	525002	8171034	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0123.01-f	0	3818	525002	8171034	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0124.01-d	0	3818	525302	8171034	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0124.01-g	0	3818	525302	8171034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0124.01-h	0	3818	525302	8171034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0125.01-g	0	3825	525802	8170934	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0125.01-h	0	3825	525802	8170934	0.15	NA	NA	C	0.15	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0126.01-g	0	3825	527002	8170834	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0126.01-h	0	3825	527002	8170834	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0127.01-g	0	3825	527202	8170934	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0127.01-h	0	3825	527202	8170934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0128.01-f	0	3855	528302	8172334	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0128.01-g	0	3855	528302	8172334	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0128.01-h	0	3855	528302	8172334	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0129.01-f	0	3850	528102	8172134	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0129.01-g	0	3850	528102	8172134	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0130.01-f	0	3840	527902	8171834	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0131.01-f	0	3835	528202	8171434	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0131.01-g	0	3835	528202	8171434	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0131.01-h	0	3835	528202	8171434	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0132.01-f	0	3830	528202	8171134	0.09	NA	NA	C	2.5	1	0	0	0	0	NA
tl-0132.01-g	0	3830	528202	8171134	2.5	NA	NA	C	2.5	1	0	0	0	0	NA
tl-0133.01-d	0	3830	528302	8170934	4	NA	NA	C	4	1	1	0	0	0	NA
tl-0133.01-e	0	3830	528302	8170934	4	NA	NA	C	4	1	1	0	0	0	NA
tl-0133.01-f	0	3830	528302	8170934	0.25	NA	NA	C	4	1	0	0	0	0	NA
tl-0133.01-g	0	3830	528302	8170934	0.25	NA	NA	C	4	1	0	0	0	0	NA
tl-0133.01-h	0	3830	528302	8170934	0.25	NA	NA	C	4	1	0	0	0	0	NA
tl-0134.01-a	0	3840	527602	8172134	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0134.01-f	0	3840	527602	8172134	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0134.01-g	0	3840	527602	8172134	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0134.01-h	0	3840	527602	8172134	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0135.01-f	0	3855	528002	8172634	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
tl-0135.01-g	0	3855	528002	8172634	0.09	NA	NA	C	0.35	1	0	0	0	0	NA
tl-0135.01-h	0	3855	528002	8172634	0.09	NA	NA	C	0.35	1	0	0	0	0	NA
tl-0136.01-f	0	3835	526502	8172834	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0136.01-g	0	3835	526502	8172834	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0136.01-h	0	3835	526502	8172834	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0137.01-f	0	3825	525502	8171834	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0138.01-f	0	3830	526102	8171734	0.09	NA	NA	C	0.4	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0138.01-g	0	3830	526102	8171734	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0138.01-h	0	3830	526102	8171734	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0139.01-g	0	3835	525802	8172234	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0139.01-h	0	3835	525802	8172234	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0140.01-g	0	3835	525702	8172234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0140.01-h	0	3835	525702	8172234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0141.01-f	0	3835	525702	8172334	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0141.01-g	0	3835	525702	8172334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0141.01-h	0	3835	525702	8172334	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0142.01-f	0	3835	525602	8172434	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0142.01-h	0	3835	525602	8172434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0143.01-g	0	3850	528002	8176134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0143.01-h	0	3850	528002	8176134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0144.01-f	0	3870	527702	8177533	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0144.01-h	0	3870	527702	8177533	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0145.01-f	0	3920	526402	8175934	0.5	NA	NA	C	1	1	0	0	0	0	NA
tl-0145.01-g	0	3920	526402	8175934	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0146.01-e	0	3880	526302	8175434	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0146.01-f	0	3880	526302	8175434	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0146.01-g	0	3880	526302	8175434	0.5	NA	NA	C	1	1	0	0	0	0	NA
tl-0146.01-h	0	3880	526302	8175434	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0147.01-e	0	3835	525502	8173634	0.04	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0147.01-g	0	3835	525502	8173634	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0147.01-h	0	3835	525502	8173634	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0148.01-g	0	3835	525302	8173734	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0148.01-h	0	3835	525302	8173734	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0149.01-f	0	3830	525402	8172734	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0149.01-h	0	3830	525402	8172734	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0150.01-c	0	3813	514202	8178733	0.01	NA	NA	C	4	1	0	0	0	0	NA
tl-0150.01-d	0	3813	514202	8178733	3.2	NA	NA	C	4	1	1	0	0	0	83
tl-0150.01-e	0	3813	514202	8178733	4	NA	NA	C	4	1	1	1	0	0	754
tl-0151.01-f	0	3820	514602	8179533	0.25	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0151.01-h	0	3820	514602	8179533	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0152.01-f	0	3820	515102	8179433	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0152.01-h	0	3820	515102	8179433	0.25	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0153.01-e	0	3840	516202	8179533	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0153.01-f	0	3840	516202	8179533	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0153.01-g	0	3840	516202	8179533	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0153.01-h	0	3840	516202	8179533	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0154.01-f	0	3825	518202	8178033	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0154.01-h	0	3825	518202	8178033	0.09	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0155.01-b	0	3840	517902	8178433	0.15	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0155.01-c	0	3840	517902	8178433	0.01	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0155.01-e	0	3840	517902	8178433	0.04	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0155.01-f	0	3840	517902	8178433	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0155.01-g	0	3840	517902	8178433	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0155.01-h	0	3840	517902	8178433	0.04	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0156.01-a	0	3830	517602	8178433	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0156.01-b	0	3830	517602	8178433	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0156.01-c	0	3830	517602	8178433	0.01	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0156.01-e	0	3830	517602	8178433	0.09	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0156.01-f	0	3830	517602	8178433	0.25	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0157.01-e	0	3830	517602	8178533	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0157.01-h	0	3830	517602	8178533	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0158.01-a	0	3825	517302	8178633	0.04	NA	NA	C	7	1	0	0	0	0	NA
tl-0158.01-d	0	3825	517302	8178633	4	NA	NA	C	7	1	1	0	0	0	NA
tl-0158.01-e	0	3825	517302	8178633	7	NA	NA	C	7	1	1	0	0	0	NA
tl-0158.01-f	0	3825	517302	8178633	0.09	NA	NA	C	7	1	0	0	0	0	NA
tl-0158.01-g	0	3825	517302	8178633	0.04	NA	NA	C	7	1	0	0	0	0	NA
tl-0159.01-f	0	3835	518002	8178533	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0159.01-g	0	3835	518002	8178533	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0160.01-g	0	3865	518402	8179033	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0160.01-h	0	3865	518402	8179033	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0162.01-h	0	3870	518702	8179033	0.25	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0163.01-f	0	3835	518802	8177833	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0163.01-h	0	3835	518802	8177833	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0164.01-a	0	3820	519102	8177334	0.04	NA	NA	C	5	1	0	0	0	0	NA
tl-0164.01-e	0	3820	519102	8177334	0.04	NA	NA	C	5	1	0	0	0	0	NA
tl-0164.01-f	0	3820	519102	8177334	0.09	NA	NA	C	5	1	0	0	0	0	NA
tl-0164.01-g	0	3820	519102	8177334	5	NA	NA	C	5	1	0.5	0	0	0	NA
tl-0164.01-h	0	3820	519102	8177334	0.09	NA	NA	C	5	1	0	0	0	0	NA
tl-0165.01-g	0	3830	519702	8177534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0165.01-h	0	3830	519702	8177534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0166.01-f	0	3835	519502	8177833	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0166.01-g	0	3835	519502	8177833	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0166.01-h	0	3835	519502	8177833	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0167.01-f	0	3865	520602	8178633	0.04	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0167.01-g	0	3865	520602	8178633	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0167.01-h	0	3865	520602	8178633	0.15	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0168.01-f	0	3850	519802	8178133	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0168.01-h	0	3850	519802	8178133	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0169.01-f	0	3840	520702	8177933	0.09	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0169.01-h	0	3840	520702	8177933	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0170.01-g	0	3840	521002	8177833	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0170.01-h	0	3840	521002	8177833	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0171.01-f	0	3840	520302	8177733	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0171.01-g	0	3840	520302	8177733	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0171.01-h	0	3840	520302	8177733	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0172.01-f	0	3840	521402	8177234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0172.01-g	0	3840	521402	8177234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0172.01-h	0	3840	521402	8177234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0173.01-d	0	3860	523802	8177434	1.2	NA	NA	C	1.2	1	0	0.5	0	0	NA
tl-0173.01-e	0	3860	523802	8177434	1.2	NA	NA	C	1.2	1	0	0.5	0	0	NA
tl-0174.01-a	0	3890	523902	8178333	0.4	NA	NA	C	0.5	1	0.5	0	0	0	3189
tl-0175.01-f	0	3870	523902	8177933	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0175.01-g	0	3870	523902	8177933	0.04	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0175.01-h	0	3870	523902	8177933	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0176.01-f	0	3865	523302	8177933	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0176.01-h	0	3865	523302	8177933	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0177.01-e	0	3865	522602	8177833	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0177.01-f	0	3865	522602	8177833	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0178.01-e	0	3860	522202	8177833	2.2	NA	NA	C	2.2	1	0	0	0	0	NA
tl-0179.01-a	0	4000	525002	8178933	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0180.01-g	0	3900	524202	8178033	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0180.01-h	0	3900	524202	8178033	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0181.01-f	0	3875	524302	8177833	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0181.01-g	0	3875	524302	8177833	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0181.01-h	0	3875	524302	8177833	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0182.01-a	0	3845	524402	8176434	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0182.01-f	0	3845	524402	8176434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0182.01-g	0	3845	524402	8176434	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0182.01-h	0	3845	524402	8176434	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0183.01-e	0	3845	525102	8175634	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0183.01-f	0	3845	525102	8175634	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0183.01-g	0	3845	525102	8175634	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0183.01-h	0	3845	525102	8175634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0184.01-f	0	4000	526302	8177034	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0184.01-g	0	4000	526302	8177034	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0184.01-h	0	4000	526302	8177034	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0185.01-f	0	3975	526202	8177633	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0186.01-d	0	3860	525602	8175534	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0186.01-e	0	3860	525602	8175534	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0186.01-f	0	3860	525602	8175534	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0186.01-g	0	3860	525602	8175534	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0186.01-h	0	3860	525602	8175534	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0187.01-c	0	3845	525102	8175434	0.01	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0187.01-e	0	3845	525102	8175434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0187.01-f	0	3845	525102	8175434	0.09	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0188.01-h	0	3840	524202	8176134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0189.01-h	0	3845	524802	8175734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0190.01-f	0	3835	524702	8174234	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0190.01-g	0	3835	524702	8174234	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0190.01-h	0	3835	524702	8174234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0191.01-f	0	3825	524202	8173534	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0191.01-h	0	3825	524202	8173534	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0192.01-f	0	3820	523902	8173534	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0193.01-f	0	3825	524102	8173734	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0193.01-h	0	3825	524102	8173734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0194.01-h	0	3818	522002	8174734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0195.01-f	0	3835	522702	8176434	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0195.01-g	0	3835	522702	8176434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0195.01-h	0	3835	522702	8176434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0196.01-e	0	3835	523102	8175434	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0196.01-f	0	3835	523102	8175434	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0196.01-g	0	3835	523102	8175434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0196.01-h	0	3835	523102	8175434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0197.01-f	0	3840	523402	8175634	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0198.01-f	0	3825	524502	8173034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0198.01-h	0	3825	524502	8173034	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0199.01-f	0	3825	524302	8172634	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0199.01-h	0	3825	524302	8172634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0200.01-f	0	3820	524102	8172634	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0201.01-f	0	3825	524202	8172834	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0201.01-h	0	3825	524202	8172834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0202.01-f	0	3820	524202	8173134	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0202.01-h	0	3820	524202	8173134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0203.01-f	0	3818	522902	8172934	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0204.01-g	0	3880	526202	8175634	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0205.01-a	0	4005	527102	8176434	0.15	NA	NA	C	0.15	1	0	0.5	0	0	NA
tl-0205.01-f	0	4005	527102	8176434	0.15	NA	NA	C	0.15	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0206.01-f	0	4000	527102	8176234	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0206.01-g	0	4000	527102	8176234	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0207.01-f	0	4020	525802	8163634	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0208.01-f	0	3835	515802	8179833	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0208.01-h	0	3835	515802	8179833	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0209.01-h	0	3825	515502	8179633	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0210.01-f	0	3830	515802	8179633	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0210.01-g	0	3830	515802	8179633	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0210.01-h	0	3830	515802	8179633	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0211.01-f	0	3825	515402	8179733	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0211.01-h	0	3825	515402	8179733	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0212.01-f	0	3825	515302	8179833	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0212.01-g	0	3825	515302	8179833	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0212.01-h	0	3825	515302	8179833	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0213.01-f	0	3820	515302	8179733	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0213.01-g	0	3820	515302	8179733	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0213.01-h	0	3820	515302	8179733	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0214.01-f	0	3820	515202	8179633	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0215.01-a	0	3820	515302	8179433	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0215.01-f	0	3820	515302	8179433	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0215.01-h	0	3820	515302	8179433	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0216.01-f	0	3815	515502	8179133	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0216.01-g	0	3815	515502	8179133	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0217.01-f	0	3815	515302	8179233	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0217.01-h	0	3815	515302	8179233	0.09	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0218.01-f	0	3815	515102	8179233	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0219.01-e	0	3820	515002	8179633	1	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0219.01-f	0	3820	515002	8179633	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0219.01-g	0	3820	515002	8179633	0.09	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0219.01-h	0	3820	515002	8179633	0.09	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0220.01-f	0	3840	514902	8180233	0.04	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0220.01-g	0	3840	514902	8180233	0.04	NA	NA	C	0.5	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0220.01-h	0	3840	514902	8180233	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0221.01-f	0	3825	514902	8179933	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0221.01-g	0	3825	514902	8179933	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0221.01-h	0	3825	514902	8179933	0.5	NA	NA	C	1	1	0	0	0	0	NA
tl-0222.01-f	0	3820	514702	8179833	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0222.01-g	0	3820	514702	8179833	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0222.01-h	0	3820	514702	8179833	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0223.01-e	0	3815	514502	8179433	0.04	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0223.01-f	0	3815	514502	8179433	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0223.01-h	0	3815	514502	8179433	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0224.01-d	0	3820	515102	8179733	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0224.01-f	0	3820	515102	8179733	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0224.01-g	0	3820	515102	8179733	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0224.01-h	0	3820	515102	8179733	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0225.01-h	0	3830	515102	8180033	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0226.01-f	0	3835	516002	8179633	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0226.01-g	0	3835	516002	8179633	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0226.01-h	0	3835	516002	8179633	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0227.01-f	0	3850	516202	8179933	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0227.01-h	0	3850	516202	8179933	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0228.01-f	0	3845	516202	8179633	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0228.01-h	0	3845	516202	8179633	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0229.01-h	0	3835	516102	8179433	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0230.01-d	0	3835	516202	8179333	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0230.01-e	0	3835	516202	8179333	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0230.01-f	0	3835	516202	8179333	0.5	NA	NA	C	1	1	0	0	0	0	NA
tl-0230.01-g	0	3835	516202	8179333	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0230.01-h	0	3835	516202	8179333	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0231.01-f	0	3830	516102	8179233	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0231.01-h	0	3830	516102	8179233	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0232.01-f	0	3820	516002	8178733	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0232.01-h	0	3820	516002	8178733	0.09	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0233.01-d	0	3830	516102	8179033	0.09	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0233.01-e	0	3830	516102	8179033	0.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0233.01-f	0	3830	516102	8179033	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0233.01-g	0	3830	516102	8179033	0.04	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0234.01-f	0	3830	516302	8179033	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0234.01-h	0	3830	516302	8179033	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0235.01-e	0	3845	516402	8179433	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0235.01-f	0	3845	516402	8179433	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0235.01-h	0	3845	516402	8179433	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0236.01-f	0	3835	516302	8179333	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0236.01-g	0	3835	516302	8179333	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0236.01-h	0	3835	516302	8179333	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0237.01-g	0	3850	516502	8179633	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0237.01-h	0	3850	516502	8179633	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0238.01-g	0	3835	516502	8179233	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0238.01-h	0	3835	516502	8179233	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0239.01-h	0	3815	516402	8178533	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0240.01-e	0	3825	516402	8178833	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0240.01-f	0	3825	516402	8178833	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0241.01-f	0	3830	516702	8178933	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0241.01-g	0	3830	516702	8178933	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0241.01-h	0	3830	516702	8178933	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0242.01-f	0	3830	516602	8179033	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0242.01-h	0	3830	516602	8179033	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0243.01-f	0	3845	516802	8179333	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0243.01-h	0	3845	516802	8179333	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0244.01-f	0	3840	516902	8179233	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0244.01-g	0	3840	516902	8179233	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0244.01-h	0	3840	516902	8179233	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0245.01-f	0	3835	516902	8179133	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0245.01-h	0	3835	516902	8179133	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0246.01-f	0	3835	517102	8178933	0.25	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0246.01-h	0	3835	517102	8178933	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0247.01-f	0	3835	516802	8179033	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0247.01-g	0	3835	516802	8179033	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0247.01-h	0	3835	516802	8179033	0.2	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0248.01-e	0	3830	517102	8178733	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0248.01-f	0	3830	517102	8178733	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0248.01-g	0	3830	517102	8178733	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0249.01-e	0	3835	517202	8178933	0.25	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0249.01-f	0	3835	517202	8178933	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0249.01-h	0	3835	517202	8178933	0.25	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0250.01-f	0	3875	517302	8179533	0.25	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0250.01-g	0	3875	517302	8179533	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0250.01-h	0	3875	517302	8179533	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0251.01-g	0	3875	517402	8179533	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0251.01-h	0	3875	517402	8179533	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0252.01-f	0	3835	517902	8178633	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0252.01-h	0	3835	517902	8178633	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0253.01-f	0	3855	518002	8179033	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0253.01-h	0	3855	518002	8179033	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0254.01-g	0	3920	518202	8179833	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0255.01-f	0	3845	518402	8178433	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0255.01-h	0	3845	518402	8178433	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0256.01-f	0	3855	518502	8178533	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0256.01-h	0	3855	518502	8178533	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0257.01-f	0	3870	518702	8178733	0.5	NA	NA	C	1	1	0	0	0	0	NA
tl-0257.01-g	0	3870	518702	8178733	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0257.01-h	0	3870	518702	8178733	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0258.01-g	0	3870	518502	8178933	0.5	NA	NA	C	1	1	0	0	0	0	NA
tl-0258.01-h	0	3870	518502	8178933	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0259.01-f	0	3975	519102	8179833	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0259.01-g	0	3975	519102	8179833	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0259.01-h	0	3975	519102	8179833	0.09	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0260.01-f	0	3950	519402	8179633	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0261.01-f	0	3955	519502	8179633	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0261.01-h	0	3955	519502	8179633	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0262.01-f	0	3870	519402	8178633	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0262.01-h	0	3870	519402	8178633	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0263.01-f	0	3860	519302	8178433	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0263.01-h	0	3860	519302	8178433	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0264.01-e	0	3860	518702	8178633	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0264.01-f	0	3860	518702	8178633	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0264.01-g	0	3860	518702	8178633	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0264.01-h	0	3860	518702	8178633	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0265.01-e	0	3855	518802	8178533	2	NA	NA	C	2	1	0	0	0	0	NA
tl-0265.01-f	0	3855	518802	8178533	1.5	NA	NA	C	2	1	0	0	0	0	NA
tl-0265.01-g	0	3855	518802	8178533	0.25	NA	NA	C	2	1	0	0	0	0	NA
tl-0265.01-h	0	3855	518802	8178533	1.5	NA	NA	C	2	1	0	0	0	0	NA
tl-0266.01-d	0	3850	519202	8178133	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0266.01-e	0	3850	519202	8178133	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0266.01-f	0	3850	519202	8178133	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0266.01-g	0	3850	519202	8178133	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0266.01-h	0	3850	519202	8178133	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0267.01-f	0	3835	518502	8178033	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0267.01-h	0	3835	518502	8178033	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0268.01-f	0	3830	518502	8177833	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0269.01-f	0	3825	518802	8177633	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0269.01-g	0	3825	518802	8177633	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0270.01-d	0	3820	518802	8177334	0.09	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0270.01-e	0	3820	518802	8177334	0.09	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0270.01-f	0	3820	518802	8177334	0.5	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0270.01-g	0	3820	518802	8177334	0.5	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0270.01-h	0	3820	518802	8177334	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0271.01-f	0	3818	519202	8177134	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0271.01-g	0	3818	519202	8177134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0271.01-h	0	3818	519202	8177134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0272.01-f	0	3825	519302	8177334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0272.01-g	0	3825	519302	8177334	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0273.01-f	0	3830	519202	8177434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0273.01-g	0	3830	519202	8177434	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0273.01-h	0	3830	519202	8177434	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0274.01-f	0	3835	519302	8177633	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0274.01-g	0	3835	519302	8177633	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0274.01-h	0	3835	519302	8177633	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0275.01-e	0	3830	519302	8177833	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0275.01-f	0	3830	519302	8177833	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0275.01-h	0	3830	519302	8177833	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0276.01-f	0	3845	519602	8178033	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0277.01-f	0	3845	519402	8178033	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0277.01-h	0	3845	519402	8178033	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0278.01-f	0	3845	519302	8178133	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0278.01-h	0	3845	519302	8178133	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0279.01-f	0	3855	519602	8178333	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0279.01-h	0	3855	519602	8178333	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0280.01-f	0	3865	519502	8178433	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0280.01-h	0	3865	519502	8178433	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0281.01-f	0	3965	519802	8179533	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0282.01-f	0	4000	519802	8179733	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0282.01-h	0	4000	519802	8179733	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0283.01-f	0	3950	519602	8179533	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0283.01-g	0	3950	519602	8179533	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0284.01-f	0	4000	519602	8179733	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0284.01-g	0	4000	519602	8179733	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0284.01-h	0	4000	519602	8179733	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0285.01-f	0	3975	520002	8179733	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0286.01-f	0	3870	520602	8178833	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0286.01-h	0	3870	520602	8178833	0.09	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0287.01-e	0	3855	520702	8178133	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0287.01-f	0	3855	520702	8178133	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0287.01-h	0	3855	520702	8178133	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0288.01-f	0	3855	520502	8178133	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0288.01-g	0	3855	520502	8178133	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0289.01-f	0	3845	520502	8177933	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0289.01-g	0	3845	520502	8177933	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0289.01-h	0	3845	520502	8177933	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0290.01-e	0	3840	520502	8177833	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0290.01-f	0	3840	520502	8177833	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0290.01-h	0	3840	520502	8177833	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0291.01-f	0	3835	520502	8177434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0291.01-g	0	3835	520502	8177434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0291.01-h	0	3835	520502	8177434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0292.01-f	0	3830	520302	8176934	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0292.01-h	0	3830	520302	8176934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0293.01-e	0	3815	520002	8176334	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0293.01-f	0	3815	520002	8176334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0293.01-g	0	3815	520002	8176334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0294.01-f	0	3820	519902	8177034	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0294.01-g	0	3820	519902	8177034	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0294.01-h	0	3820	519902	8177034	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0295.01-f	0	3835	520902	8177534	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0295.01-h	0	3835	520902	8177534	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0296.01-f	0	3830	520802	8177334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0296.01-g	0	3830	520802	8177334	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0296.01-h	0	3830	520802	8177334	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0297.01-f	0	3840	520802	8177434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0298.01-f	0	3840	520802	8177733	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0299.01-f	0	3850	520902	8178133	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0299.01-h	0	3850	520902	8178133	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0300.01-f	0	3855	520802	8178233	0.6	NA	NA	C	0.6	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0300.01-h	0	3855	520802	8178233	0.04	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0301.01-f	0	3855	521002	8178233	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0301.01-g	0	3855	521002	8178233	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0301.01-h	0	3855	521002	8178233	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0302.01-f	0	3860	520902	8178433	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0302.01-h	0	3860	520902	8178433	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0303.01-e	0	3865	520802	8178533	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0303.01-f	0	3865	520802	8178533	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0303.01-g	0	3865	520802	8178533	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0303.01-h	0	3865	520802	8178533	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0304.01-f	0	3875	521202	8178633	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0304.01-g	0	3875	521202	8178633	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0304.01-h	0	3875	521202	8178633	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0305.01-f	0	3865	521202	8178333	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0305.01-h	0	3865	521202	8178333	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0306.01-f	0	3860	521302	8178333	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0306.01-g	0	3860	521302	8178333	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0306.01-h	0	3860	521302	8178333	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0307.01-e	0	3840	521202	8177733	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0307.01-f	0	3840	521202	8177733	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0307.01-h	0	3840	521202	8177733	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0308.01-f	0	3840	521002	8177534	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0308.01-h	0	3840	521002	8177534	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0309.01-e	0	3835	521202	8177434	0.04	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0309.01-f	0	3835	521202	8177434	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0309.01-h	0	3835	521202	8177434	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0310.01-f	0	3835	521002	8177334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0310.01-h	0	3835	521002	8177334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0311.01-f	0	3835	521102	8177234	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0311.01-h	0	3835	521102	8177234	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0312.01-f	0	3830	521102	8176734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0312.01-g	0	3830	521102	8176734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0312.01-h	0	3830	521102	8176734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0313.01-f	0	3830	520902	8177134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0313.01-h	0	3830	520902	8177134	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0314.01-d	0	3830	521102	8176534	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0314.01-e	0	3830	521102	8176534	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0314.01-f	0	3830	521102	8176534	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0315.01-d	0	3830	521202	8176534	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0315.01-e	0	3830	521202	8176534	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0315.01-f	0	3830	521202	8176534	0.01	NA	NA	C	0.01	1	0	0	0	0	NA
tl-0316.01-d	0	3830	521302	8176634	0.03	NA	NA	C	0.03	1	0	0	0	0	NA
tl-0316.01-e	0	3830	521302	8176634	0.03	NA	NA	C	0.03	1	0	0	0	0	NA
tl-0316.01-f	0	3830	521302	8176634	0.03	NA	NA	C	0.03	1	0	0	0	0	NA
tl-0317.01-f	0	3835	521502	8176934	0.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0317.01-g	0	3835	521502	8176934	1.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0317.01-h	0	3835	521502	8176934	0.5	NA	NA	C	1.5	1	0	0	0	0	NA
tl-0318.01-f	0	3840	521402	8177633	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0318.01-h	0	3840	521402	8177633	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0319.01-f	0	3840	521602	8177633	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0319.01-h	0	3840	521602	8177633	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0320.01-f	0	3845	521402	8177733	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0321.01-f	0	3855	521702	8177833	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0321.01-h	0	3855	521702	8177833	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0322.01-f	0	3870	521502	8178233	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0322.01-h	0	3870	521502	8178233	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0323.01-e	0	3875	521502	8178433	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0323.01-f	0	3875	521502	8178433	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0323.01-g	0	3875	521502	8178433	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0323.01-h	0	3875	521502	8178433	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0324.01-f	0	3880	521902	8178433	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0324.01-h	0	3880	521902	8178433	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0325.01-f	0	3865	522002	8178133	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0325.01-h	0	3865	522002	8178133	1	NA	NA	C	1	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0326.01-f	0	3870	521902	8178233	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0326.01-h	0	3870	521902	8178233	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0327.01-e	0	3860	521802	8178033	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0327.01-f	0	3860	521802	8178033	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0327.01-h	0	3860	521802	8178033	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0328.01-f	0	3860	521902	8178033	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0328.01-h	0	3860	521902	8178033	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0329.01-f	0	3845	521802	8177633	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0330.01-e	0	3845	522002	8177234	1	NA	NA	C	2	1	0	0	0	0	NA
tl-0330.01-f	0	3845	522002	8177234	1	NA	NA	C	2	1	0	0	0	0	NA
tl-0330.01-g	0	3845	522002	8177234	1	NA	NA	C	2	1	0	0	0	0	NA
tl-0330.01-h	0	3845	522002	8177234	1	NA	NA	C	2	1	0	0	0	0	NA
tl-0331.01-f	0	3845	521702	8177434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0332.01-f	0	3845	521602	8177534	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0332.01-h	0	3845	521602	8177534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0333.01-a	0	3835	521802	8176934	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0333.01-e	0	3835	521802	8176934	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0333.01-f	0	3835	521802	8176934	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0333.01-g	0	3835	521802	8176934	0.09	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0334.01-f	0	3830	521702	8176634	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0334.01-g	0	3830	521702	8176634	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0334.01-h	0	3830	521702	8176634	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0335.01-f	0	3835	522002	8170734	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0335.01-g	0	3835	522002	8170734	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0335.01-h	0	3835	522002	8170734	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0336.01-e	0	3825	521902	8170734	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0336.01-f	0	3825	521902	8170734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0336.01-g	0	3825	521902	8170734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0336.01-h	0	3825	521902	8170734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0337.01-e	0	3840	522002	8171034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0337.01-f	0	3840	522002	8171034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0337.01-g	0	3840	522002	8171034	0.04	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0337.01-h	0	3840	522002	8171034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0338.01-f	0	3845	522102	8171134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0338.01-h	0	3845	522102	8171134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0339.01-f	0	3845	522302	8171534	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0339.01-g	0	3845	522302	8171534	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0339.01-h	0	3845	522302	8171534	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0340.01-f	0	3845	522002	8177633	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
tl-0340.01-g	0	3845	522002	8177633	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
tl-0340.01-h	0	3845	522002	8177633	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
tl-0341.01-e	0	3850	522302	8177633	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0341.01-f	0	3850	522302	8177633	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0342.01-e	0	3855	522302	8177733	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0342.01-f	0	3855	522302	8177733	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0342.01-g	0	3855	522302	8177733	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0342.01-h	0	3855	522302	8177733	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0343.01-f	0	3870	522902	8178033	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0343.01-g	0	3870	522902	8178033	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0343.01-h	0	3870	522902	8178033	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0344.01-f	0	3870	522802	8178033	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0344.01-h	0	3870	522802	8178033	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0345.01-f	0	3865	522802	8177833	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0345.01-h	0	3865	522802	8177833	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0346.01-f	0	3855	522702	8177633	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0346.01-g	0	3855	522702	8177633	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0346.01-h	0	3855	522702	8177633	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0347.01-e	0	3850	522702	8171434	0.25	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0347.01-f	0	3850	522702	8171434	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0347.01-h	0	3850	522702	8171434	0.25	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0348.01-g	0	3855	522902	8177633	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0348.01-h	0	3855	522902	8177633	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0349.01-f	0	3835	522502	8176634	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0349.01-g	0	3835	522502	8176634	0.09	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0349.01-h	0	3835	522502	8176634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0350.01-h	0	3835	522402	8176434	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0351.01-f	0	3830	522402	8176134	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0351.01-h	0	3830	522402	8176134	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0352.01-f	0	3835	522902	8177134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0352.01-g	0	3835	522902	8177134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0352.01-h	0	3835	522902	8177134	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0353.01-e	0	3855	523002	8177533	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0353.01-f	0	3855	523002	8177533	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0353.01-g	0	3855	523002	8177533	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0353.01-h	0	3855	523002	8177533	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0354.01-f	0	3865	523102	8177833	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0355.01-f	0	3875	523402	8178133	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0355.01-h	0	3875	523402	8178133	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0356.01-f	0	3870	523002	8177933	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0357.01-f	0	3870	523202	8178033	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0357.01-h	0	3870	523202	8178033	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0358.01-f	0	3885	523602	8178433	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0358.01-g	0	3885	523602	8178433	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0358.01-h	0	3885	523602	8178433	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0359.01-f	0	3870	523602	8178033	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0359.01-g	0	3870	523602	8178033	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0359.01-h	0	3870	523602	8178033	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0360.01-f	0	3875	523502	8178133	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
tl-0360.01-h	0	3875	523502	8178133	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
tl-0361.01-f	0	3865	523502	8177733	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0361.01-h	0	3865	523502	8177733	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0362.01-f	0	3865	523302	8177234	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0363.01-f	0	3865	523702	8177733	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0363.01-g	0	3865	523702	8177733	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0363.01-h	0	3865	523702	8177733	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0364.01-f	0	3860	523502	8177533	0.25	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0365.01-f	0	3855	523402	8177334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0365.01-h	0	3855	523402	8177334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0366.01-a	0	3845	526002	8174534	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0366.01-f	0	3845	526002	8174534	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0366.01-h	0	3845	526002	8174534	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0367.01-e	0	3850	526002	8174734	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0367.01-f	0	3850	526002	8174734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0368.01-f	0	3855	526302	8174734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0368.01-h	0	3855	526302	8174734	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0369.01-f	0	3880	526402	8175134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0369.01-h	0	3880	526402	8175134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0370.01-f	0	3875	526502	8174734	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0370.01-h	0	3875	526502	8174734	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0371.01-f	0	3875	526602	8174934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0372.01-a	0	3890	526502	8175234	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0372.01-e	0	3890	526502	8175234	0.25	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0372.01-f	0	3890	526502	8175234	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0372.01-g	0	3890	526502	8175234	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0372.01-h	0	3890	526502	8175234	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0373.01-e	0	3875	526402	8175334	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0373.01-f	0	3875	526402	8175334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0373.01-g	0	3875	526402	8175334	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0373.01-h	0	3875	526402	8175334	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0374.01-f	0	3845	525802	8174734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0374.01-g	0	3845	525802	8174734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0374.01-h	0	3845	525802	8174734	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0375.01-e	0	3940	526802	8175634	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0375.01-f	0	3940	526802	8175634	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0375.01-g	0	3940	526802	8175634	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0375.01-h	0	3940	526802	8175634	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0376.01-f	0	3950	527002	8175934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0376.01-g	0	3950	527002	8175934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
tl-0376.01-h	0	3950	527002	8175934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0377.01-a	0	4000	527702	8175434	0.16	NA	NA	C	0.16	1	0	0	0	0	NA
tl-0377.01-g	0	4000	527702	8175434	0.04	NA	NA	C	0.16	1	0	0	0	0	NA
tl-0377.01-h	0	4000	527702	8175434	0.04	NA	NA	C	0.16	1	0	0	0	0	NA
tl-0378.01-g	0	3970	527402	8175234	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0378.01-h	0	3970	527402	8175234	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0379.01-f	0	3850	526202	8174234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0379.01-g	0	3850	526202	8174234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0379.01-h	0	3850	526202	8174234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0380.01-e	0	3925	526602	8175534	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0380.01-f	0	3925	526602	8175534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0380.01-g	0	3925	526602	8175534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0380.01-h	0	3925	526602	8175534	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0381.01-f	0	3925	526702	8175834	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0381.01-g	0	3925	526702	8175834	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0381.01-h	0	3925	526702	8175834	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0382.01-a	0	3960	526802	8176134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0382.01-e	0	3960	526802	8176134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0382.01-f	0	3960	526802	8176134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0382.01-g	0	3960	526802	8176134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0382.01-h	0	3960	526802	8176134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0383.01-f	0	3980	527502	8175234	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0383.01-g	0	3980	527502	8175234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0383.01-h	0	3980	527502	8175234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0384.01-f	0	3890	526902	8174634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0384.01-g	0	3890	526902	8174634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0384.01-h	0	3890	526902	8174634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0385.01-f	0	3835	525902	8173734	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0385.01-g	0	3835	525902	8173734	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0385.01-h	0	3835	525902	8173734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0386.01-f	0	3835	526502	8173334	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0386.01-h	0	3835	526502	8173334	0.04	NA	NA	C	0.4	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0387.01-f	0	3835	526302	8173734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0387.01-h	0	3835	526302	8173734	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0388.01-e	0	3835	526202	8173634	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0388.01-f	0	3835	526202	8173634	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0388.01-g	0	3835	526202	8173634	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0388.01-h	0	3835	526202	8173634	0.09	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0389.01-e	0	3840	526502	8173534	0.09	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0389.01-f	0	3840	526502	8173534	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0389.01-g	0	3840	526502	8173534	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0389.01-h	0	3840	526502	8173534	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0390.01-f	0	3970	528202	8175034	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0390.01-g	0	3970	528202	8175034	0.04	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0390.01-h	0	3970	528202	8175034	0.04	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0391.01-g	0	3940	527802	8174734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0391.01-h	0	3940	527802	8174734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0392.01-f	0	3900	527602	8173734	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0392.01-g	0	3900	527602	8173734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0392.01-h	0	3900	527602	8173734	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0393.01-a	0	3860	527202	8173434	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0393.01-f	0	3860	527202	8173434	0.8	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0393.01-g	0	3860	527202	8173434	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0393.01-h	0	3860	527202	8173434	0.04	NA	NA	C	0.8	1	0	0	0	0	NA
tl-0394.01-f	0	3860	527102	8173634	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0394.01-g	0	3860	527102	8173634	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0394.01-h	0	3860	527102	8173634	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0395.01-f	0	3880	527302	8173934	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
tl-0396.01-f	0	3870	527202	8173534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0396.01-g	0	3870	527202	8173534	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0396.01-h	0	3870	527202	8173534	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0397.01-f	0	3840	527002	8172934	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0397.01-g	0	3840	527002	8172934	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0397.01-h	0	3840	527002	8172934	0.04	NA	NA	C	0.4	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0398.01-f	0	3835	527002	8172634	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0398.01-g	0	3835	527002	8172634	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0398.01-h	0	3835	527002	8172634	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0399.01-f	0	3845	527002	8173134	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0399.01-g	0	3845	527002	8173134	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0400.01-f	0	3840	526902	8173234	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0400.01-g	0	3840	526902	8173234	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0401.01-f	0	3840	526902	8173034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0401.01-g	0	3840	526902	8173034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0402.01-f	0	3835	526802	8172934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0402.01-g	0	3835	526802	8172934	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0402.01-h	0	3835	526802	8172934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0403.01-f	0	3845	527202	8172834	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
tl-0403.01-g	0	3845	527202	8172834	0.04	NA	NA	C	0.35	1	0	0	0	0	NA
tl-0403.01-h	0	3845	527202	8172834	0.04	NA	NA	C	0.35	1	0	0	0	0	NA
tl-0404.01-f	0	3818	517402	8164734	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0404.01-g	0	3818	517402	8164734	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0404.01-h	0	3818	517402	8164734	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0405.01-f	0	3818	517602	8164334	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0406.01-e	0	3825	517502	8164334	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0406.01-f	0	3825	517502	8164334	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0406.01-g	0	3825	517502	8164334	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0406.01-h	0	3825	517502	8164334	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0407.01-f	0	3845	517402	8164034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0407.01-g	0	3845	517402	8164034	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0407.01-h	0	3845	517402	8164034	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0408.01-f	0	3825	517702	8164034	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0408.01-g	0	3825	517702	8164034	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0408.01-h	0	3825	517702	8164034	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0409.01-f	0	3818	517802	8164334	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0409.01-g	0	3818	517802	8164334	0.09	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0409.01-h	0	3818	517802	8164334	0.09	NA	NA	C	0.2	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0410.01-f	0	3818	517902	8164634	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0410.01-g	0	3818	517902	8164634	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0410.01-h	0	3818	517902	8164634	0.04	NA	NA	C	1	1	0	0	0	0	NA
tl-0411.01-e	0	3818	517802	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0411.01-f	0	3818	517802	8164434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0411.01-g	0	3818	517802	8164434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0411.01-h	0	3818	517802	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0412.01-f	0	3818	517602	8164234	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0412.01-g	0	3818	517602	8164234	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0412.01-h	0	3818	517602	8164234	0.04	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0413.01-f	0	3818	518402	8164634	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
tl-0413.01-h	0	3818	518402	8164634	0.04	NA	NA	C	0.04	1	0	0	0	0	NA
tl-0414.01-f	0	3818	518502	8164434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0414.01-g	0	3818	518502	8164434	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0414.01-h	0	3818	518502	8164434	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0415.01-f	0	3825	518502	8164234	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0415.01-g	0	3825	518502	8164234	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0415.01-h	0	3825	518502	8164234	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0416.01-f	0	3840	518502	8163934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0416.01-g	0	3840	518502	8163934	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0417.01-f	0	3830	518702	8164334	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0417.01-g	0	3830	518702	8164334	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0417.01-h	0	3830	518702	8164334	0.04	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0418.01-f	0	3818	518602	8164634	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0418.01-g	0	3818	518602	8164634	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0418.01-h	0	3818	518602	8164634	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0419.01-a	0	3825	519102	8164434	0.04	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0419.01-f	0	3825	519102	8164434	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0419.01-g	0	3825	519102	8164434	0.5	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0419.01-h	0	3825	519102	8164434	0.04	NA	NA	C	0.5	1	0	0	0	0	NA
tl-0420.01-f	0	3845	519102	8163934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0420.01-g	0	3845	519102	8163934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0421.01-e	0	3840	519102	8164134	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0421.01-f	0	3840	519102	8164134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0421.01-g	0	3840	519102	8164134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0421.01-h	0	3840	519102	8164134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0422.01-e	0	3830	519002	8164234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0422.01-f	0	3830	519002	8164234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0422.01-g	0	3830	519002	8164234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0422.01-h	0	3830	519002	8164234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0423.01-f	0	3850	519102	8163734	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0423.01-g	0	3850	519102	8163734	0.5	NA	NA	C	1	1	0	0	0	0	NA
tl-0423.01-h	0	3850	519102	8163734	0.5	NA	NA	C	1	1	0	0	0	0	NA
tl-0424.01-f	0	3860	519302	8163634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0424.01-g	0	3860	519302	8163634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0424.01-h	0	3860	519302	8163634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0425.01-d	0	3830	519802	8164634	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0425.01-e	0	3830	519802	8164634	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0425.01-f	0	3830	519802	8164634	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0425.01-g	0	3830	519802	8164634	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0425.01-h	0	3830	519802	8164634	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0426.01-d	0	3835	519702	8164134	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0426.01-e	0	3835	519702	8164134	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0426.01-f	0	3835	519702	8164134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0426.01-g	0	3835	519702	8164134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0426.01-h	0	3835	519702	8164134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0427.01-d	0	3830	519602	8164434	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0427.01-e	0	3830	519602	8164434	0.09	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0427.01-f	0	3830	519602	8164434	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0427.01-g	0	3830	519602	8164434	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0427.01-h	0	3830	519602	8164434	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0428.01-d	0	3835	519702	8164234	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0428.01-e	0	3835	519702	8164234	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0428.01-f	0	3835	519702	8164234	0.09	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0428.01-g	0	3835	519702	8164234	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0428.01-h	0	3835	519702	8164234	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0429.01-e	0	3865	521502	8164334	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0429.01-f	0	3865	521502	8164334	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0429.01-h	0	3865	521502	8164334	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0430.01-f	0	3870	521602	8164234	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0430.01-g	0	3870	521602	8164234	0.09	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0430.01-h	0	3870	521602	8164234	0.09	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0431.01-f	0	4000	521702	8162534	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0431.01-g	0	4000	521702	8162534	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0431.01-h	0	4000	521702	8162534	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0432.01-a	0	3900	521802	8163434	0.25	NA	NA	C	1	1	0	0	0	0	NA
tl-0432.01-e	0	3900	521802	8163434	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0432.01-f	0	3900	521802	8163434	1	NA	NA	C	1	1	0	0	0	0	NA
tl-0432.01-g	0	3900	521802	8163434	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0432.01-h	0	3900	521802	8163434	0.09	NA	NA	C	1	1	0	0	0	0	NA
tl-0433.01-f	0	3940	521502	8162834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0433.01-g	0	3940	521502	8162834	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0433.01-h	0	3940	521502	8162834	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0434.01-f	0	3960	521702	8162734	0.12	NA	NA	C	0.12	1	0	0	0	0	NA
tl-0434.01-h	0	3960	521702	8162734	0.04	NA	NA	C	0.12	1	0	0	0	0	NA
tl-0435.01-f	0	4000	521602	8162634	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0435.01-g	0	4000	521602	8162634	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0435.01-h	0	4000	521602	8162634	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0436.01-a	0	4100	522102	8162134	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0436.01-f	0	4100	522102	8162134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0436.01-g	0	4100	522102	8162134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0436.01-h	0	4100	522102	8162134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0437.01-e	0	3940	522302	8163234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0437.01-f	0	3940	522302	8163234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0437.01-g	0	3940	522302	8163234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0437.01-h	0	3940	522302	8163234	0.04	NA	NA	C	0.25	1	0	0	0	0	NA

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
tl-0438.01-f	0	3920	522402	8163334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0438.01-g	0	3920	522402	8163334	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0438.01-h	0	3920	522402	8163334	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0439.01-e	0	3915	522402	8163434	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0439.01-f	0	3915	522402	8163434	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0439.01-g	0	3915	522402	8163434	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0439.01-h	0	3915	522402	8163434	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0440.01-f	0	3900	522702	8163334	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0440.01-g	0	3900	522702	8163334	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0440.01-h	0	3900	522702	8163334	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0441.01-e	0	3905	522602	8163434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0441.01-f	0	3905	522602	8163434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0441.01-g	0	3905	522602	8163434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0441.01-h	0	3905	522602	8163434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0442.01-e	0	3900	522802	8163534	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0442.01-f	0	3900	522802	8163534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0442.01-g	0	3900	522802	8163534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0442.01-h	0	3900	522802	8163534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0443.01-f	0	3895	522702	8163634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0443.01-g	0	3895	522702	8163634	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0443.01-h	0	3895	522702	8163634	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0444.01-e	0	3895	522502	8163934	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0444.01-f	0	3895	522502	8163934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0444.01-g	0	3895	522502	8163934	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0444.01-h	0	3895	522502	8163934	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0445.01-e	0	3880	522502	8164134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0445.01-f	0	3880	522502	8164134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0445.01-g	0	3880	522502	8164134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0445.01-h	0	3880	522502	8164134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0446.01-e	0	3890	522302	8164034	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0446.01-f	0	3890	522302	8164034	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0446.01-g	0	3890	522302	8164034	0.04	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0446.01-h	0	3890	522302	8164034	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0447.01-f	0	3880	522202	8164134	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0447.01-g	0	3880	522202	8164134	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0448.01-e	0	3875	522102	8164234	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0448.01-f	0	3875	522102	8164234	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0448.01-g	0	3875	522102	8164234	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0448.01-h	0	3875	522102	8164234	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0449.01-f	0	3870	522002	8164334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0449.01-h	0	3870	522002	8164334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0450.01-a	0	3850	521202	8164734	0.04	NA	NA	C	0.75	1	0	0	0	0	NA
tl-0450.01-d	0	3850	521202	8164734	0.04	NA	NA	C	0.75	1	0	0	0	0	NA
tl-0450.01-e	0	3850	521202	8164734	0.04	NA	NA	C	0.75	1	0	0	0	0	NA
tl-0450.01-f	0	3850	521202	8164734	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
tl-0450.01-g	0	3850	521202	8164734	0.25	NA	NA	C	0.75	1	0	0	0	0	NA
tl-0450.01-h	0	3850	521202	8164734	0.04	NA	NA	C	0.75	1	0	0	0	0	NA
tl-0451.01-f	0	3855	521302	8164534	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0451.01-h	0	3855	521302	8164534	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0452.01-e	0	3865	521802	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0452.01-f	0	3865	521802	8164434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0452.01-h	0	3865	521802	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0453.01-f	0	3860	521702	8164534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0453.01-g	0	3860	521702	8164534	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0453.01-h	0	3860	521702	8164534	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0454.01-f	0	3860	521302	8164334	0.75	NA	NA	C	0.75	1	0	0	0	0	NA
tl-0454.01-g	0	3860	521302	8164334	0.25	NA	NA	C	0.75	1	0	0	0	0	NA
tl-0454.01-h	0	3860	521302	8164334	0.25	NA	NA	C	0.75	1	0	0	0	0	NA
tl-0455.01-f	0	3825	519002	8164834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0455.01-g	0	3825	519002	8164834	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0455.01-h	0	3825	519002	8164834	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0456.01-e	0	3830	519102	8164634	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0456.01-f	0	3830	519102	8164634	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0456.01-g	0	3830	519102	8164634	0.09	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0456.01-h	0	3830	519102	8164634	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0457.01-f	0	3830	519302	8164534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0457.01-g	0	3830	519302	8164534	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0457.01-h	0	3830	519302	8164534	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0458.01-f	0	3835	519302	8164434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0458.01-g	0	3835	519302	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0458.01-h	0	3835	519302	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0459.01-e	0	3850	519902	8163834	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0459.01-f	0	3850	519902	8163834	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0459.01-g	0	3850	519902	8163834	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0459.01-h	0	3850	519902	8163834	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0460.01-a	0	3850	520002	8163934	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0460.01-f	0	3850	520002	8163934	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0460.01-g	0	3850	520002	8163934	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0460.01-h	0	3850	520002	8163934	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0461.01-a	0	3855	519902	8163734	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0461.01-e	0	3855	519902	8163734	0.09	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0461.01-f	0	3855	519902	8163734	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0461.01-g	0	3855	519902	8163734	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0461.01-h	0	3855	519902	8163734	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0462.01-a	0	3855	519702	8163734	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0462.01-e	0	3855	519702	8163734	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0462.01-f	0	3855	519702	8163734	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0462.01-g	0	3855	519702	8163734	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0462.01-h	0	3855	519702	8163734	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0463.01-f	0	3865	520002	8163634	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0463.01-g	0	3865	520002	8163634	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0463.01-h	0	3865	520002	8163634	0.06	NA	NA	C	0.06	1	0	0	0	0	NA
tl-0464.01-a	0	3880	520102	8163534	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0464.01-d	0	3880	520102	8163534	0.25	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0464.01-e	0	3880	520102	8163534	0.25	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0464.01-f	0	3880	520102	8163534	0.25	NA	NA	C	0.6	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0464.01-g	0	3880	520102	8163534	0.25	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0464.01-h	0	3880	520102	8163534	0.25	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0465.01-f	0	3900	520102	8163434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0465.01-g	0	3900	520102	8163434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0465.01-h	0	3900	520102	8163434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0466.01-f	0	3930	520502	8163234	0.09	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0466.01-g	0	3930	520502	8163234	0.09	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0466.01-h	0	3930	520502	8163234	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0467.01-a	0	3870	520502	8163934	0.6	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0467.01-d	0	3870	520502	8163934	0.04	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0467.01-e	0	3870	520502	8163934	0.3	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0467.01-f	0	3870	520502	8163934	0.3	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0467.01-g	0	3870	520502	8163934	0.04	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0467.01-h	0	3870	520502	8163934	0.04	NA	NA	C	0.6	1	0	0	0	0	NA
tl-0468.01-a	0	3865	520502	8164034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0468.01-f	0	3865	520502	8164034	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0468.01-g	0	3865	520502	8164034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0468.01-h	0	3865	520502	8164034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0469.01-e	0	3850	520502	8164334	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0469.01-f	0	3850	520502	8164334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0469.01-g	0	3850	520502	8164334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0469.01-h	0	3850	520502	8164334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0470.01-f	0	3860	517102	8164234	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0470.01-g	0	3860	517102	8164234	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0470.01-h	0	3860	517102	8164234	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0471.01-f	0	3865	517002	8164134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0471.01-g	0	3865	517002	8164134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0471.01-h	0	3865	517002	8164134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0472.01-e	0	3870	517102	8163834	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0472.01-f	0	3870	517102	8163834	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0472.01-g	0	3870	517102	8163834	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0472.01-h	0	3870	517102	8163834	0.04	NA	NA	C	0.3	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0473.01-f	0	3880	516902	8163834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0473.01-g	0	3880	516902	8163834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0473.01-h	0	3880	516902	8163834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0474.01-a	0	3870	516802	8163934	0.04	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0474.01-f	0	3870	516802	8163934	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0474.01-g	0	3870	516802	8163934	0.04	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0474.01-h	0	3870	516802	8163934	0.04	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0475.01-f	0	3818	517102	8164734	0.09	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0475.01-g	0	3818	517102	8164734	0.2	NA	NA	C	0.2	1	0	0	0	0	NA
tl-0476.01-f	0	3860	516902	8164234	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0477.01-f	0	3850	516702	8164334	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0477.01-g	0	3850	516702	8164334	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0477.01-h	0	3850	516702	8164334	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0478.01-f	0	3850	516902	8164434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0478.01-g	0	3850	516902	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0478.01-h	0	3850	516902	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0479.01-f	0	3830	516702	8164434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0479.01-g	0	3830	516702	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0479.01-h	0	3830	516702	8164434	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0480.01-a	0	3835	525202	8166134	0.09	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0480.01-e	0	3835	525202	8166134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0480.01-f	0	3835	525202	8166134	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0480.01-g	0	3835	525202	8166134	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0481.01-f	0	3825	525502	8166634	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0481.01-g	0	3825	525502	8166634	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0481.01-h	0	3825	525502	8166634	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0482.01-f	0	3835	525102	8165834	0.3	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0482.01-h	0	3835	525102	8165834	0.04	NA	NA	C	0.3	1	0	0	0	0	NA
tl-0483.01-f	0	3830	525402	8166134	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0484.01-f	0	3840	524402	8166234	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0485.01-e	0	3845	524602	8166234	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0485.01-f	0	3845	524602	8166234	0.15	NA	NA	C	0.15	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0485.01-g	0	3845	524602	8166234	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0485.01-h	0	3845	524602	8166234	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0486.01-d	0	3850	524302	8165834	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0486.01-f	0	3850	524302	8165834	0.4	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0486.01-h	0	3850	524302	8165834	0.04	NA	NA	C	0.4	1	0	0	0	0	NA
tl-0487.01-c	0	3840	524902	8165734	0.04	NA	NA	C	3.2	1	0	0	0	0	NA
tl-0487.01-d	0	3840	524902	8165734	3.2	NA	NA	C	3.2	1	1	0	0	0	NA
tl-0487.01-e	0	3840	524902	8165734	3.2	NA	NA	C	3.2	1	1	0	0	0	NA
tl-0487.01-f	0	3840	524902	8165734	0.09	NA	NA	C	3.2	1	0	0	0	0	NA
tl-0488.01-e	0	3835	525002	8165534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0488.01-f	0	3835	525002	8165534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0489.01-e	0	3850	524402	8165334	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0489.01-f	0	3850	524402	8165334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0490.01-f	0	3850	524202	8165334	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0490.01-g	0	3850	524202	8165334	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0491.01-f	0	3855	524402	8165034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0491.01-g	0	3855	524402	8165034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0492.01-f	0	3860	524502	8164434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0492.01-g	0	3860	524502	8164434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0492.01-h	0	3860	524502	8164434	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0493.01-f	0	3860	524102	8164434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0494.01-f	0	3855	524202	8164634	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0494.01-g	0	3855	524202	8164634	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0495.01-f	0	3880	523902	8164334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0495.01-g	0	3880	523902	8164334	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0495.01-h	0	3880	523902	8164334	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0496.01-f	0	3860	524002	8164634	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0496.01-g	0	3860	524002	8164634	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0497.01-f	0	3860	524102	8164834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0497.01-g	0	3860	524102	8164834	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0498.01-f	0	3860	524002	8165134	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0499.01-e	0	3865	524002	8164834	0.04	NA	NA	C	0.09	1	0	0	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
tl-0499.01-f	0	3865	524002	8164834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0500.01-f	0	3880	523802	8164334	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0500.01-g	0	3880	523802	8164334	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0500.01-h	0	3880	523802	8164334	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0501.01-f	0	3865	523802	8164634	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0501.01-g	0	3865	523802	8164634	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0502.01-f	0	3870	523602	8164434	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0503.01-f	0	3875	523402	8164434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0503.01-g	0	3875	523402	8164434	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0504.01-f	0	3870	523302	8164534	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0504.01-h	0	3870	523302	8164534	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0505.01-f	0	3865	523602	8164834	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0505.01-h	0	3865	523602	8164834	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0506.01-f	0	3870	523402	8164534	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0506.01-g	0	3870	523402	8164534	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0506.01-h	0	3870	523402	8164534	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0507.01-f	0	3875	523502	8164434	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0508.01-f	0	3865	523402	8164734	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0508.01-h	0	3865	523402	8164734	0.04	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0509.01-f	0	3850	523502	8165834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0509.01-g	0	3850	523502	8165834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0509.01-h	0	3850	523502	8165834	0.09	NA	NA	C	0.09	1	0	0	0	0	NA
tl-0510.01-e	0	3850	523602	8166034	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0510.01-f	0	3850	523602	8166034	0.15	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0510.01-h	0	3850	523602	8166034	0.04	NA	NA	C	0.15	1	0	0	0	0	NA
tl-0511.01-e	0	3850	523402	8166034	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0511.01-f	0	3850	523402	8166034	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0512.01-f	0	3835	525102	8166934	0.25	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0512.01-g	0	3835	525102	8166934	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
tl-0512.01-h	0	3835	525102	8166934	0.04	NA	NA	C	0.25	1	0	0	0	0	NA
hp-0003.01-a	0	3822	415829	8320681	8.00	NA	NA	C	10.00	1	0.5	0.5	0	0	11
hp-0003.01-b	0	3822	415829	8320681	8.00	NA	NA	C	10.00	1	0.5	0.5	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0003.01-c	0	3822	415829	8320681	10.00	NA	NA	C	10.00	1	0.5	0.5	0	0	4
hp-0003.01-d	0	3822	415829	8320681	8.00	NA	NA	C	10.00	1	0.5	0.5	0	0	5
hp-0003.01-i	0	3822	415829	8320681	2.00	NA	NA	C	10.00	1	0	0.5	0	0	5
hp-0003.01-j	0	3822	415829	8320681	2.00	NA	NA	C	10.00	1	0	0.5	0	0	4
hp-0003.01-k	0	3822	415829	8320681	2.00	NA	NA	C	10.00	1	0	0.5	0	0	12
hp-0003.01-l	0	3822	415829	8320681	2.00	NA	NA	C	10.00	1	0	0.5	0	0	7
hp-0003.01-m	0	3822	415829	8320681	2.00	NA	NA	C	10.00	1	0	0.5	0	0	4
hp-0004.01-c	0	3847	418303	8319131	2.00	NA	NA	C	10.00	1	0	0	0	0	2
hp-0004.01-i	0	3847	418303	8319131	2.00	NA	NA	C	10.00	1	0	0	0	0	5
hp-0004.01-j	0	3847	418303	8319131	2.00	NA	NA	C	10.00	1	0	0	0	0	2
hp-0004.01-k	0	3847	418303	8319131	10.00	NA	NA	C	10.00	1	0	0	0	0	10
hp-0004.01-l	0	3847	418303	8319131	10.00	NA	NA	C	10.00	1	0	0	0	0	12
hp-0004.01-m	0	3847	418303	8319131	10.00	NA	NA	C	10.00	1	0	0	0	0	6
hp-0006.01-h	0	3846	411186	8323812	1.00	NA	NA	C	2.00	1	0	0.5	0	0	2
hp-0006.01-i	0	3846	411186	8323812	1.00	NA	NA	C	2.00	1	0	0.5	0	0	19
hp-0006.01-j	0	3846	411186	8323812	1.00	NA	NA	C	2.00	1	0	0.5	0	0	9
hp-0006.01-k	0	3846	411186	8323812	2.00	NA	NA	C	2.00	1	0	0.5	0	0	44
hp-0006.01-l	0	3846	411186	8323812	2.00	NA	NA	C	2.00	1	0	0.5	0	0	18
hp-0006.01-m	0	3846	411186	8323812	2.00	NA	NA	C	2.00	1	0	0.5	0	0	2
hp-0007.01-h	0	3841	410894	8322413	0.28	NA	NA	C	0.28	1	0	0.5	0	0	1
hp-0007.01-i	0	3841	410894	8322413	0.28	NA	NA	C	0.28	1	0	0.5	0	0	11
hp-0007.01-j	0	3841	410894	8322413	0.28	NA	NA	C	0.28	1	0	0.5	0	0	2
hp-0007.01-k	0	3841	410894	8322413	0.28	NA	NA	C	0.28	1	0	0.5	0	0	2
hp-0007.01-l	0	3841	410894	8322413	0.28	NA	NA	C	0.28	1	0	0.5	0	0	3
hp-0007.01-m	0	3841	410894	8322413	0.28	NA	NA	C	0.28	1	0	0.5	0	0	2
hp-0008.01-h	0	3942	412127	8327744	10.00	NA	NA	C	10.00	1	0	0.5	0	0.5	9
hp-0008.01-i	0	3942	412127	8327744	10.00	NA	NA	C	10.00	1	0	0.5	0	0.5	35
hp-0008.01-j	0	3942	412127	8327744	5.00	NA	NA	C	10.00	1	0	0.5	0	0.5	10
hp-0008.01-k	0	3942	412127	8327744	1.00	NA	NA	C	10.00	1	0	0.5	0	0.5	23
hp-0008.01-l	0	3942	412127	8327744	1.00	NA	NA	C	10.00	1	0	0.5	0	0.5	7
hp-0008.01-m	0	3942	412127	8327744	1.00	NA	NA	C	10.00	1	0	0.5	0	0.5	3
hp-0009.01-i	0	3990	413569	8332378	0.50	NA	NA	C	0.50	1	0	0	0	0	3

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0009.01-k	0	3990	413569	8332378	0.50	NA	NA	C	0.50	1	0	0	0	0	1
hp-0010.01-i	0	3842	414184	8334684	1.00	NA	NA	C	1.00	1	0	0.5	0	0	12
hp-0010.01-j	0	3842	414184	8334684	1.00	NA	NA	C	1.00	1	0	0.5	0	0	2
hp-0010.01-k	0	3842	414184	8334684	1.00	NA	NA	C	1.00	1	0	0.5	0	0	22
hp-0010.01-l	0	3842	414184	8334684	1.00	NA	NA	C	1.00	1	0	0.5	0	0	27
hp-0010.01-m	0	3842	414184	8334684	1.00	NA	NA	C	1.00	1	0	0.5	0	0	47
hp-0011.01-h	0	3859	408864	8342598	0.16	NA	NA	C	0.16	1	0	0	0	0	1
hp-0011.01-i	0	3859	408864	8342598	0.16	NA	NA	C	0.16	1	0	0	0	0	15
hp-0011.01-k	0	3859	408864	8342598	0.10	NA	NA	C	0.16	1	0	0	0	0	9
hp-0012.01-i	0	3846	408293	8347639	0.25	NA	NA	C	0.25	1	0	0	0	0	13
hp-0013.01-i	0	3852	408806	8346916	0.25	NA	NA	C	0.25	1	0	0	0	0	14
hp-0014.01-a	0	3851	408987	8343685	5.00	NA	NA	C	8.00	1	1	0.5	0	0	4
hp-0014.01-b	0	3851	408987	8343685	8.00	NA	NA	C	8.00	1	1	0.5	0	0	14
hp-0014.01-c	0	3851	408987	8343685	8.00	NA	NA	C	8.00	1	1	0.5	0	0	27
hp-0014.01-d	0	3851	408987	8343685	5.00	NA	NA	C	8.00	1	0	0.5	0	0	3
hp-0014.01-e	0	3851	408987	8343685	5.00	NA	NA	C	8.00	1	0	0.5	0	0	1
hp-0014.01-i	0	3851	408987	8343685	1.00	NA	NA	C	8.00	1	0	0.5	0	0	13
hp-0014.01-j	0	3851	408987	8343685	1.00	NA	NA	C	8.00	1	0	0.5	0	0	4
hp-0014.01-k	0	3851	408987	8343685	1.00	NA	NA	C	8.00	1	0	0.5	0	0	6
hp-0014.01-l	0	3851	408987	8343685	5.00	NA	NA	C	8.00	1	0	0.5	0	0	2
hp-0015.01-h	0	3952	414743	8333753	1.00	NA	NA	C	1.30	1	0	0.5	0	0	3
hp-0015.01-i	0	3952	414743	8333753	1.00	NA	NA	C	1.30	1	0	0.5	0	0	30
hp-0015.01-j	0	3952	414743	8333753	1.00	NA	NA	C	1.30	1	0	0.5	0	0	10
hp-0015.01-k	0	3952	414743	8333753	1.30	NA	NA	C	1.30	1	0	0.5	0	0	90
hp-0015.01-l	0	3952	414743	8333753	1.30	NA	NA	C	1.30	1	0	0.5	0	0	11
hp-0016.01-i	0	3839	413034	8334424	1.00	NA	NA	C	1.00	1	0	0.5	0	0	21
hp-0016.01-j	0	3839	413034	8334424	1.00	NA	NA	C	1.00	1	0	0.5	0	0	2
hp-0016.01-k	0	3839	413034	8334424	1.00	NA	NA	C	1.00	1	0	0.5	0	0	17
hp-0016.01-m	0	3839	413034	8334424	0.50	NA	NA	C	1.00	1	0	0.5	0	0	3
hp-0017.01-i	0	3831	412488	8332215	0.25	NA	NA	C	1.00	1	0	0	0	0	8
hp-0017.01-k	0	3831	412488	8332215	0.25	NA	NA	C	1.00	1	0	0	0	0	2
hp-0017.01-m	0	3831	412488	8332215	1.00	NA	NA	C	1.00	1	0	0	0	0	5

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0019.01-i	0	3853	413126	8325307	3.00	NA	NA	C	3.00	1	0	0.5	0	0	17
hp-0019.01-j	0	3853	413126	8325307	3.00	NA	NA	C	3.00	1	0	0.5	0	0	3
hp-0019.01-k	0	3853	413126	8325307	1.00	NA	NA	C	3.00	1	0	0.5	0	0	7
hp-0019.01-l	0	3853	413126	8325307	1.00	NA	NA	C	3.00	1	0	0.5	0	0	4
hp-0020.01-i	0	3837	413698	8323917	0.75	NA	NA	C	0.75	1	0	0	0	0	6
hp-0020.01-j	0	3837	413698	8323917	0.75	NA	NA	C	0.75	1	0	0	0	0	4
hp-0021.01-h	0	3849	412933	8325807	0.04	NA	NA	C	0.04	0	0	0.5	0	0	2
hp-0021.01-i	0	3849	412933	8325807	0.04	NA	NA	C	0.04	0	0	0.5	0	0	9
hp-0021.01-j	0	3849	412933	8325807	0.04	NA	NA	C	0.04	0	0	0.5	0	0	4
hp-0021.01-k	0	3849	412933	8325807	0.04	NA	NA	C	0.04	0	0	0.5	0	0	5
hp-0022.01-i	0	3856	411756	8326637	0.07	NA	NA	C	0.07	1	0	0	0	0	17
hp-0024.01-i	0	3911	411555	8322324	0.01	NA	NA	C	0.01	0	0	0	0	0	19
hp-0024.01-j	0	3911	411555	8322324	0.01	NA	NA	C	0.01	0	0	0	0	0	3
hp-0024.01-k	0	3911	411555	8322324	0.01	NA	NA	C	0.01	0	0	0	0	0	6
hp-0024.01-l	0	3911	411555	8322324	0.01	NA	NA	C	0.01	0	0	0	0	0	1
hp-0025.01-h	0	3833	410808	8322566	0.01	NA	NA	C	0.01	0	0.5	0	0	0	1
hp-0025.01-i	0	3833	410808	8322566	0.01	NA	NA	C	0.01	0	0.5	0	0	0	4
hp-0025.01-j	0	3833	410808	8322566	0.01	NA	NA	C	0.01	0	0.5	0	0	0	1
hp-0025.01-k	0	3833	410808	8322566	0.01	NA	NA	C	0.01	0	0.5	0	0	0	2
hp-0030.01-a	0	3864	407304	8350881	4.00	NA	NA	C	7.00	1	0.5	0.5	0	0	12
hp-0030.01-b	0	3864	407304	8350881	7.00	NA	NA	C	7.00	1	0.5	0.5	0	0	8
hp-0030.01-c	0	3864	407304	8350881	7.00	NA	NA	C	7.00	1	0.5	0.5	0	0	23
hp-0030.01-d	0	3864	407304	8350881	5.00	NA	NA	C	7.00	1	0.5	0.5	0	0	3
hp-0030.01-e	0	3864	407304	8350881	5.00	NA	NA	C	7.00	1	0.5	0.5	0	0	2
hp-0030.01-i	0	3864	407304	8350881	1.00	NA	NA	C	7.00	1	0	0.5	0	0	5
hp-0030.01-k	0	3864	407304	8350881	1.00	NA	NA	C	7.00	1	0	0.5	0	0	2
hp-0031.01-h	0	3862	407154	8352431	0.06	NA	NA	C	0.06	0.5	0.5	0	0	0	2
hp-0031.01-i	0	3862	407154	8352431	0.06	NA	NA	C	0.06	0.5	0.5	0	0	0	14
hp-0031.01-j	0	3862	407154	8352431	0.06	NA	NA	C	0.06	0.5	0.5	0	0	0	2
hp-0033.01-h	0	3867	409432	8350559	3.00	NA	NA	C	3.00	1	0	0.5	0	0	13
hp-0033.01-i	0	3867	409432	8350559	3.00	NA	NA	C	3.00	1	0	0.5	0	0	24
hp-0033.01-k	0	3867	409432	8350559	2.00	NA	NA	C	3.00	1	0	0.5	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0035.01-h	0	3873	413421	8352563	0.36	NA	NA	C	0.36	1	0	0	0	0	6
hp-0035.01-i	0	3873	413421	8352563	0.36	NA	NA	C	0.36	1	0	0	0	0	18
hp-0036.01-h	0	3861	411244	8351950	0.07	NA	NA	C	0.07	1	0	0	0	0	11
hp-0036.01-i	0	3861	411244	8351950	0.07	NA	NA	C	0.07	1	0	0	0	0	48
hp-0038.01-h	0	3875	416217	8354383	0.35	NA	NA	C	0.35	0	0	0.5	0	0	7
hp-0038.01-i	0	3875	416217	8354383	0.35	NA	NA	C	0.35	0	0	0.5	0	0	34
hp-0038.01-j	0	3875	416217	8354383	0.35	NA	NA	C	0.35	0	0	0.5	0	0	2
hp-0038.01-k	0	3875	416217	8354383	0.35	NA	NA	C	0.35	0	0	0.5	0	0	2
hp-0039.01-i	0	3900	417515	8355418	1.00	NA	NA	C	1.00	1	0	0	0	0	6
hp-0040.01-i	0	3992	418141	8353434	1.00	NA	NA	C	1.00	1	0	0	0	0	5
hp-0041.01-h	0	3925	418762	8352627	0.63	NA	NA	C	0.63	1	0	0	0	0	1
hp-0041.01-i	0	3925	418762	8352627	0.63	NA	NA	C	0.63	1	0	0	0	0	3
hp-0042.01-g	0	3914	420993	8353625	0.75	NA	NA	C	0.75	1	0	0	0	0	4
hp-0042.01-h	0	3914	420993	8353625	0.75	NA	NA	C	0.75	1	0	0	0	0	8
hp-0042.01-i	0	3914	420993	8353625	0.75	NA	NA	C	0.75	1	0	0	0	0	26
hp-0042.01-j	0	3914	420993	8353625	0.75	NA	NA	C	0.75	1	0	0	0	0	2
hp-0042.01-k	0	3914	420993	8353625	0.75	NA	NA	C	0.75	1	0	0	0	0	3
hp-0042.01-m	0	3914	420993	8353625	0.50	NA	NA	C	0.75	1	0	0	0	0	2
hp-0044.01-h	0	4115	421830	8351485	2.28	NA	NA	C	2.28	1	0	0.5	0	0.5	1
hp-0044.01-i	0	4115	421830	8351485	2.28	NA	NA	C	2.28	1	0	0.5	0	0.5	6
hp-0044.01-j	0	4115	421830	8351485	2.28	NA	NA	C	2.28	1	0	0.5	0	0.5	1
hp-0044.01-k	0	4115	421830	8351485	2.28	NA	NA	C	2.28	1	0	0.5	0	0.5	2
hp-0045.01-i	0	4143	408025	8344398	0.20	NA	NA	C	0.20	1	0	0	0	0	9
hp-0045.01-j	0	4143	408025	8344398	0.20	NA	NA	C	0.20	1	0	0	0	0	2
hp-0046.01-h	0	3889	408070	8343648	0.3	NA	NA	C	0.3	0	0	0	0	0	3
hp-0046.01-i	0	3889	408070	8343648	0.3	NA	NA	C	0.3	0	0	0	0	0	5
hp-0048.01-i	0	4003	406603	8342746	0.09	NA	NA	C	0.09	0	0	0.5	0	0	6
hp-0049.01-h	0	3869	408570	8343716	0.25	NA	NA	C	0.25	1	0	0.5	0	0	2
hp-0049.01-i	0	3869	408570	8343716	0.25	NA	NA	C	0.25	1	0	0.5	0	0	24
hp-0049.01-j	0	3869	408570	8343716	0.25	NA	NA	C	0.25	1	0	0.5	0	0	8
hp-0049.01-k	0	3869	408570	8343716	0.25	NA	NA	C	0.25	1	0	0.5	0	0	2
hp-0049.01-l	0	3869	408570	8343716	0.25	NA	NA	C	0.25	1	0	0.5	0	0	5

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0050.01-i	0	3866	408885	8343908	0.35	NA	NA	C	0.35	1	0	0	0	0	27
hp-0050.01-k	0	3866	408885	8343908	0.35	NA	NA	C	0.35	1	0	0	0	0	2
hp-0051.01-i	0	3955	409990	8344295	0.10	NA	NA	C	0.10	1	0	0	0	0	15
hp-0052.01-h	0	3905	409679	8344277	0.15	NA	NA	C	0.15	1	0	0	0	0	2
hp-0052.01-i	0	3905	409679	8344277	0.15	NA	NA	C	0.15	1	0	0	0	0	32
hp-0052.01-m	0	3905	409679	8344277	0.15	NA	NA	C	0.15	1	0	0	0	0	2
hp-0053.01-h	0	3851	409738	8343589	1.00	NA	NA	C	1.00	1	0	0	0	0	5
hp-0053.01-i	0	3851	409738	8343589	1.00	NA	NA	C	1.00	1	0	0	0	0	33
hp-0053.01-j	0	3851	409738	8343589	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0054.01-i	0	3925	410180	8342951	0.02	NA	NA	C	0.02	0	0	1	0	0	15
hp-0055.01-i	0	3886	410364	8342672	1	NA	NA	C	1	1	0	0	0	0.5	7
hp-0055.01-j	0	3886	410364	8342672	1	NA	NA	C	1	1	0	0	0	0.5	2
hp-0055.01-k	0	3886	410364	8342672	1	NA	NA	C	1	1	0	0	0	0.5	1
hp-0056.01-i	0	3871	410177	8342581	0.09	NA	NA	C	0.09	1	0	0	0	0	16
hp-0058.01-c	0	3847	409911	8342544	3.00	NA	NA	C	3.00	1	0	0	0	0	2
hp-0058.01-j	0	3847	409911	8342544	0.50	NA	NA	C	3.00	1	0	0	0	0	2
hp-0059.01-i	0	3852	409559	8342653	0.01	NA	NA	C	0.01	0	0	0	0	0	7
hp-0059.01-j	0	3852	409559	8342653	0.01	NA	NA	C	0.01	0	0	0	0	0	2
hp-0059.01-k	0	3852	409559	8342653	0.01	NA	NA	C	0.01	0	0	0	0	0	3
hp-0060.01-h	0	3880	408800	8344751	0.37	NA	NA	C	0.37	1	0	0	0	0	2
hp-0060.01-i	0	3880	408800	8344751	0.37	NA	NA	C	0.37	1	0	0	0	0	33
hp-0060.01-j	0	3880	408800	8344751	0.37	NA	NA	C	0.37	1	0	0	0	0	2
hp-0061.01-h	0	3898	408434	8344926	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0061.01-i	0	3898	408434	8344926	0.06	NA	NA	C	0.06	1	0	0	0	0	9
hp-0062.01-i	0	3927	407519	8345676	0.10	NA	NA	C	0.10	1	0	0	0	0	16
hp-0065.01-c	0	3893	407849	8346931	12	NA	NA	C	12	0	0	0	0	0.5	5
hp-0065.01-i	0	3893	407849	8346931	12	NA	NA	C	12	0	0	0	0	0.5	16
hp-0065.01-j	0	3893	407849	8346931	12	NA	NA	C	12	0	0	0	0	0.5	1
hp-0066.01-h	0	3879	407929	8346626	0.01	NA	NA	C	0.01	0	0	0.5	0	0	1
hp-0066.01-i	0	3879	407929	8346626	0.01	NA	NA	C	0.01	0	0	0.5	0	0	31
hp-0066.01-j	0	3879	407929	8346626	0.01	NA	NA	C	0.01	0	0	0.5	0	0	2
hp-0067.01-i	0	3879	409795	8345797	0.50	NA	NA	C	0.50	1	0	0	0	0	23

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0068.01-a	0	3964	410154	8346141	3.00	NA	NA	C	3.00	1	0	0.5	0	0.5	2
hp-0068.01-b	0	3964	410154	8346141	3.00	NA	NA	C	3.00	1	0	0.5	0	0.5	2
hp-0068.01-c	0	3964	410154	8346141	3.00	NA	NA	C	3.00	1	0	0.5	0	0.5	24
hp-0068.01-i	0	3964	410154	8346141	3.00	NA	NA	C	3.00	1	0	0.5	0	0.5	10
hp-0068.01-l	0	3964	410154	8346141	0.50	NA	NA	C	3.00	1	0	0.5	0	0.5	3
hp-0068.01-m	0	3964	410154	8346141	0.50	NA	NA	C	3.00	1	0	0.5	0	0.5	2
hp-0069.01-i	0	3900	410004	8346441	0.25	NA	NA	C	0.25	1	0	0	0	0	13
hp-0070.01-i	0	3916	411554	8344036	1.12	NA	NA	C	1.12	1	0	0	0	0.5	6
hp-0070.01-j	0	3916	411554	8344036	1.12	NA	NA	C	1.12	1	0	0	0	0.5	2
hp-0070.01-k	0	3916	411554	8344036	1.12	NA	NA	C	1.12	1	0	0	0	0.5	2
hp-0071.01-i	0	3861	409222	8346814	0.25	NA	NA	C	0.25	1	0	0	0	0	40
hp-0072.01-b	0	3883	409246	8347061	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0072.01-i	0	3883	409246	8347061	0.05	NA	NA	C	1.00	1	0	0	0	0	9
hp-0073.01-b	0	3884	409386	8346814	0.25	NA	NA	C	0.25	1	0	0	0	0	4
hp-0073.01-h	0	3884	409386	8346814	0.25	NA	NA	C	0.25	1	0	0	0	0	2
hp-0073.01-i	0	3884	409386	8346814	0.25	NA	NA	C	0.25	1	0	0	0	0	33
hp-0073.01-j	0	3884	409386	8346814	0.25	NA	NA	C	0.25	1	0	0	0	0	2
hp-0073.01-k	0	3884	409386	8346814	0.25	NA	NA	C	0.25	1	0	0	0	0	2
hp-0074.01-i	0	4000	410004	8347331	0.49	NA	NA	C	0.49	1	0	0	0	0	22
hp-0075.01-c	0	3866	409074	8347355	0.50	NA	NA	C	1.00	1	0	0	0	0	2
hp-0075.01-i	0	3866	409074	8347355	1.00	NA	NA	C	1.00	1	0	0	0	0	42
hp-0075.01-j	0	3866	409074	8347355	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0076.01-h	0	3908	408789	8347835	0.50	NA	NA	C	0.50	1	0	0	0	0	NA
hp-0076.01-i	0	3908	408789	8347835	0.50	NA	NA	C	0.50	1	0	0	0	0	NA
hp-0077.01-a	0	3945	408444	8348475	0.25	NA	NA	C	0.25	1	0	0	0	0.5	2
hp-0077.01-b	0	3945	408444	8348475	0.25	NA	NA	C	0.25	1	0	0	0	0.5	4
hp-0077.01-c	0	3945	408444	8348475	0.25	NA	NA	C	0.25	1	0	0	0	0.5	30
hp-0077.01-i	0	3945	408444	8348475	0.20	NA	NA	C	0.25	1	0	0	0	0.5	10
hp-0078.01-b	0	3888	408004	8348531	0.02	NA	NA	C	0.02	1	0	0	0	0	7
hp-0078.01-c	0	3888	408004	8348531	0.02	NA	NA	C	0.02	1	0	0	0	0	8
hp-0078.01-d	0	3888	408004	8348531	0.02	NA	NA	C	0.02	1	0	0	0	0	2
hp-0079.01-a	0	3958	407534	8349131	0.35	NA	NA	C	0.35	1	0	0	0	0.5	6

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0079.01-b	0	3958	407534	8349131	0.35	NA	NA	C	0.35	1	0	0	0	0.5	8
hp-0079.01-c	0	3958	407534	8349131	0.35	NA	NA	C	0.35	1	0	0	0	0.5	7
hp-0079.01-i	0	3958	407534	8349131	0.20	NA	NA	C	0.35	1	0	0	0	0.5	2
hp-0081.01-a	0	4063	407118	8349728	2.00	NA	NA	C	2.00	1	0	0.5	0	0.5	4
hp-0081.01-b	0	4063	407118	8349728	2.00	NA	NA	C	2.00	1	0	0.5	0	0.5	11
hp-0081.01-c	0	4063	407118	8349728	2.00	NA	NA	C	2.00	1	0	0.5	0	0.5	37
hp-0094.01-a	0	3915	405539	8347931	2.00	NA	NA	C	4.00	1	0.5	0	0	0	11
hp-0094.01-b	0	3915	405539	8347931	3.00	NA	NA	C	4.00	1	0.5	0	0	0	12
hp-0094.01-c	0	3915	405539	8347931	4.00	NA	NA	C	4.00	1	0.5	0	0	0	37
hp-0094.01-d	0	3915	405539	8347931	3.00	NA	NA	C	4.00	1	0.5	0	0	0	2
hp-0094.01-i	0	3915	405539	8347931	1.00	NA	NA	C	4.00	1	0	0	0	0	31
hp-0094.01-j	0	3915	405539	8347931	1.00	NA	NA	C	4.00	1	0	0	0	0	2
hp-0094.01-k	0	3915	405539	8347931	1.00	NA	NA	C	4.00	1	0	0	0	0	6
hp-0095.01-a	0	3883	405179	8347900	2.00	NA	NA	C	2.00	1	0.5	0	0	0	2
hp-0095.01-b	0	3883	405179	8347900	2.00	NA	NA	C	2.00	1	0.5	0	0	0	3
hp-0095.01-c	0	3883	405179	8347900	2.00	NA	NA	C	2.00	1	0.5	0	0	0	10
hp-0095.01-i	0	3883	405179	8347900	1.00	NA	NA	C	2.00	1	0	0	0	0	3
hp-0096.01-i	0	3883	405179	8347900	0.35	NA	NA	C	0.35	1	0	0	0	0	2
hp-0096.01-j	0	3883	405179	8347900	0.35	NA	NA	C	0.35	1	0	0	0	0	1
hp-0096.01-l	0	3883	405179	8347900	0.25	NA	NA	C	0.35	1	0	0	0	0	1
hp-0096.01-m	0	3883	405179	8347900	0.25	NA	NA	C	0.35	1	0	0	0	0	1
hp-0098.01-h	0	3848	406429	8348556	0.09	NA	NA	C	0.09	0.5	0	0.5	0	0	2
hp-0098.01-i	0	3848	406429	8348556	0.09	NA	NA	C	0.09	0.5	0	0.5	0	0	17
hp-0098.01-k	0	3848	406429	8348556	0.09	NA	NA	C	0.09	0.5	0	0.5	0	0	1
hp-0099.01-b	0	3848	406304	8348381	0.16	NA	NA	C	0.16	1	0	0	0	0	1
hp-0100.01-h	0	3871	404893	8348313	0.09	NA	NA	C	0.09	0	0	0.5	0	0	8
hp-0100.01-i	0	3871	404893	8348313	0.09	NA	NA	C	0.09	0	0	0.5	0	0	22
hp-0103.01-c	0	3856	404743	8349708	0.10	NA	NA	C	0.10	1	0	0	0	0	1
hp-0103.01-i	0	3856	404743	8349708	0.10	NA	NA	C	0.10	1	0	0	0	0	4
hp-0103.01-k	0	3856	404743	8349708	0.10	NA	NA	C	0.10	1	0	0	0	0	4
hp-0108.01-i	0	4027	402111	8353391	0.04	NA	NA	C	0.04	1	0	0	0	0	11
hp-0109.01-k	0	3900	402799	8353181	0.04	NA	NA	C	0.04	1	0	0.5	0	0	1

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0109.01-m	0	3900	402799	8353181	0.04	NA	NA	C	0.04	1	0	0.5	0	0	2
hp-0111.01-i	0	3992	408204	8350381	0.04	NA	NA	C	0.04	0.5	0	0.5	0	0	5
hp-0111.01-l	0	3992	408204	8350381	0.04	NA	NA	C	0.04	0.5	0	0.5	0	0	1
hp-0112.01-h	0	3923	408034	8350931	0.10	NA	NA	C	0.10	1	0	0.5	0	0	7
hp-0112.01-i	0	3923	408034	8350931	0.10	NA	NA	C	0.10	1	0	0.5	0	0	19
hp-0113.01-i	0	3868	409379	8351361	0.09	NA	NA	C	0.09	1	0	0	0	0	4
hp-0115.01-i	0	4136	405187	8342998	0.25	NA	NA	C	0.25	1	0	0.5	0	0	4
hp-0118.01-a	0	4239	404939	8342731	0.01	NA	NA	C	0.01	1	0.5	0.5	0	0	2
hp-0118.01-c	0	4239	404939	8342731	0.01	NA	NA	C	0.01	1	0.5	0.5	0	0	6
hp-0118.01-i	0	4239	404939	8342731	0.01	NA	NA	C	0.01	1	0.5	0.5	0	0	4
hp-0119.01-a	0	3870	414173	8341378	0.50	NA	NA	C	4.00	1	0	0.5	0	0	2
hp-0119.01-b	0	3870	414173	8341378	0.50	NA	NA	C	4.00	1	0	0.5	0	0	5
hp-0119.01-c	0	3870	414173	8341378	0.50	NA	NA	C	4.00	1	0	0.5	0	0	8
hp-0119.01-i	0	3870	414173	8341378	2.00	NA	NA	C	4.00	1	0	0.5	0	0	39
hp-0119.01-j	0	3870	414173	8341378	2.00	NA	NA	C	4.00	1	0	0.5	0	0	14
hp-0119.01-k	0	3870	414173	8341378	2.00	NA	NA	C	4.00	1	0	0.5	0	0	12
hp-0120.01-i	0	3869	414206	8340575	0.12	NA	NA	C	0.12	0.5	0	0.5	0	0	21
hp-0120.01-k	0	3869	414206	8340575	0.12	NA	NA	C	0.12	0.5	0	0.5	0	0	4
hp-0122.01-i	0	3855	413652	8341225	0.35	NA	NA	C	0.35	0	0	0.5	0	0	18
hp-0122.01-j	0	3855	413652	8341225	0.35	NA	NA	C	0.35	0	0	0.5	0	0	2
hp-0125.01-j	0	4110	413371	8341974	0.80	NA	NA	C	0.80	1	0	0	0	0	NA
hp-0125.01-k	0	4110	413371	8341974	0.80	NA	NA	C	0.80	1	0	0	0	0	NA
hp-0125.01-l	0	4110	413371	8341974	0.80	NA	NA	C	0.80	1	0	0	0	0	NA
hp-0126.01-c	0	3865	409190	8342489	0.25	NA	NA	C	0.25	1	0	0	0	0	3
hp-0126.01-f	0	3865	409190	8342489	0.25	NA	NA	C	0.25	1	0	0	0	0	1
hp-0126.01-g	0	3865	409190	8342489	0.25	NA	NA	C	0.25	1	0	0	0	0	2
hp-0126.01-h	0	3865	409190	8342489	0.25	NA	NA	C	0.25	1	0	0	0	0	34
hp-0126.01-i	0	3865	409190	8342489	0.25	NA	NA	C	0.25	1	0	0	0	0	165
hp-0126.01-j	0	3865	409190	8342489	0.25	NA	NA	C	0.25	1	0	0	0	0	25
hp-0126.01-k	0	3865	409190	8342489	0.25	NA	NA	C	0.25	1	0	0	0	0	48
hp-0126.01-l	0	3865	409190	8342489	0.25	NA	NA	C	0.25	1	0	0	0	0	2
hp-0127.01-c	0	3853	409057	8342574	0.25	NA	NA	C	0.70	1	0	0	0	0	6

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0127.01-h	0	3853	409057	8342574	0.50	NA	NA	C	0.70	1	0	0	0	0	11
hp-0127.01-i	0	3853	409057	8342574	0.50	NA	NA	C	0.70	1	0	0	0	0	107
hp-0127.01-j	0	3853	409057	8342574	0.50	NA	NA	C	0.70	1	0	0	0	0	26
hp-0127.01-k	0	3853	409057	8342574	0.70	NA	NA	C	0.70	1	0	0	0	0	17
hp-0127.01-l	0	3853	409057	8342574	0.70	NA	NA	C	0.70	1	0	0	0	0	3
hp-0130.01-b	0	3869	408593	8342729	0.25	NA	NA	C	2.00	1	0.5	0	0	0	NA
hp-0130.01-c	0	3869	408593	8342729	0.25	NA	NA	C	2.00	1	0.5	0	0	0	NA
hp-0130.01-i	0	3869	408593	8342729	2.00	NA	NA	C	2.00	1	0	0	0	0	NA
hp-0130.01-j	0	3869	408593	8342729	2.00	NA	NA	C	2.00	1	0	0	0	0	NA
hp-0130.01-k	0	3869	408593	8342729	2.00	NA	NA	C	2.00	1	0	0	0	0	NA
hp-0130.01-l	0	3869	408593	8342729	1.00	NA	NA	C	2.00	1	0	0	0	0	NA
hp-0130.01-m	0	3869	408593	8342729	1.00	NA	NA	C	2.00	1	0	0	0	0	NA
hp-0131.01-i	0	3910	409662	8341249	1.50	NA	NA	C	1.50	1	0	0	0	0	NA
hp-0131.01-j	0	3910	409662	8341249	1.50	NA	NA	C	1.50	1	0	0	0	0	NA
hp-0132.01-b	0	3853	410110	8341692	1.20	NA	NA	C	1.20	1	0	0	0	0	NA
hp-0132.01-c	0	3853	410110	8341692	1.20	NA	NA	C	1.20	1	0	0	0	0	NA
hp-0133.01-j	0	3872	409342	8342131	0.72	NA	NA	C	0.72	1	0	0	0	0	NA
hp-0134.01-l	0	3894	409136	8341293	0.35	NA	NA	C	0.35	1	0	0	0	0	NA
hp-0135.01-i	0	3853	409403	8342613	0.70	NA	NA	C	0.70	1	0	0	0	0	NA
hp-0135.01-j	0	3853	409403	8342613	0.70	NA	NA	C	0.70	1	0	0	0	0	NA
hp-0135.01-k	0	3853	409403	8342613	0.70	NA	NA	C	0.70	1	0	0	0	0	NA
hp-0135.01-l	0	3853	409403	8342613	0.25	NA	NA	C	0.70	1	0	0	0	0	NA
hp-0136.01-b	0	3881	409285	8341586	1.00	NA	NA	C	1.00	1	0.5	0	0	0	NA
hp-0136.01-c	0	3881	409285	8341586	1.00	NA	NA	C	1.00	1	0.5	0	0	0	NA
hp-0136.01-d	0	3881	409285	8341586	1.00	NA	NA	C	1.00	1	0.5	0	0	0	NA
hp-0137.01-i	0	3923	410322	8342804	1.50	NA	NA	C	1.50	1	0	0	0	0	NA
hp-0137.01-j	0	3923	410322	8342804	1.50	NA	NA	C	1.50	1	0	0	0	0	NA
hp-0137.01-k	0	3923	410322	8342804	1.50	NA	NA	C	1.50	1	0	0	0	0	NA
hp-0137.01-l	0	3923	410322	8342804	1.50	NA	NA	C	1.50	1	0	0	0	0	NA
hp-0138.01-i	0	3874	409561	8341491	0.25	NA	NA	C	0.25	1	0	0	0	0	61
hp-0138.01-j	0	3874	409561	8341491	0.25	NA	NA	C	0.25	1	0	0	0	0	5
hp-0139.01-h	0	4006	408048	8342475	0.20	NA	NA	C	0.20	1	0	0	0	0	1

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0139.01-i	0	4006	408048	8342475	0.20	NA	NA	C	0.20	1	0	0	0	0	8
hp-0139.01-m	0	4006	408048	8342475	0.20	NA	NA	C	0.20	1	0	0	0	0	1
hp-0140.01-i	0	4408	407288	8341198	0.25	NA	NA	C	0.25	0	0.5	0	0	0	4
hp-0140.01-j	0	4408	407288	8341198	0.25	NA	NA	C	0.25	0	0.5	0	0	0	8
hp-0154.01-a	0	3893	410660	8340687	3.00	NA	NA	C	5.00	1	0	0.5	0	0	3
hp-0154.01-b	0	3893	410660	8340687	4.00	NA	NA	C	5.00	1	0	0.5	0	0	2
hp-0154.01-c	0	3893	410660	8340687	4.50	NA	NA	C	5.00	1	0	0.5	0	0	16
hp-0154.01-h	0	3893	410660	8340687	2.00	NA	NA	C	5.00	1	0	0.5	0	0	3
hp-0154.01-i	0	3893	410660	8340687	2.00	NA	NA	C	5.00	1	0	0.5	0	0	43
hp-0154.01-j	0	3893	410660	8340687	2.00	NA	NA	C	5.00	1	0	0.5	0	0	10
hp-0155.01-i	0	3865	411909	8340509	0.01	NA	NA	C	0.01	0	0	1	0	0	NA
hp-0156.01-b	0	3871	410904	8340373	0.56	NA	NA	C	0.56	1	0.5	0	0	0	4
hp-0156.01-i	0	3871	410904	8340373	0.56	NA	NA	C	0.56	1	0	0	0	0	22
hp-0156.01-j	0	3871	410904	8340373	0.56	NA	NA	C	0.56	1	0	0	0	0	14
hp-0156.01-k	0	3871	410904	8340373	0.56	NA	NA	C	0.56	1	0	0	0	0	5
hp-0157.01-e	0	3908	411264	8339537	0.50	NA	NA	C	2.00	1	0	0	0	0	2
hp-0157.01-h	0	3908	411264	8339537	0.75	NA	NA	C	2.00	1	0	0	0	0	9
hp-0157.01-i	0	3908	411264	8339537	1.00	NA	NA	C	2.00	1	0	0	0	0	92
hp-0157.01-j	0	3908	411264	8339537	2.00	NA	NA	C	2.00	1	0	0	0	0	17
hp-0157.01-k	0	3908	411264	8339537	2.00	NA	NA	C	2.00	1	0	0	0	0	4
hp-0157.01-m	0	3908	411264	8339537	1.00	NA	NA	C	2.00	1	0	0	0	0	2
hp-0158.01-i	0	3879	412789	8338332	0.50	NA	NA	C	0.50	1	0	0.5	0	0	19
hp-0158.01-j	0	3879	412789	8338332	0.50	NA	NA	C	0.50	1	0	0.5	0	0	3
hp-0159.01-a	0	3864	413031	8337734	0.25	NA	NA	C	0.25	1	0.5	0.5	0	0	3
hp-0159.01-i	0	3864	413031	8337734	0.25	NA	NA	C	0.25	1	0	0.5	0	0	33
hp-0159.01-j	0	3864	413031	8337734	0.25	NA	NA	C	0.25	1	0	0.5	0	0	8
hp-0159.01-k	0	3864	413031	8337734	0.25	NA	NA	C	0.25	1	0	0.5	0	0	2
hp-0160.01-b	0	3876	411834	8339990	0.06	NA	NA	C	0.06	0.5	0	0.5	0	0	3
hp-0160.01-h	0	3876	411834	8339990	0.06	NA	NA	C	0.06	0	0	0.5	0	0	22
hp-0160.01-i	0	3876	411834	8339990	0.06	NA	NA	C	0.06	0	0	0.5	0	0	207
hp-0160.01-j	0	3876	411834	8339990	0.06	NA	NA	C	0.06	0	0	0.5	0	0	18
hp-0160.01-k	0	3876	411834	8339990	0.06	NA	NA	C	0.06	0	0	0.5	0	0	14

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0160.01-l	0	3876	411834	8339990	0.06	NA	NA	C	0.06	0	0	0.5	0	0	6
hp-0161.01-h	0	3860	410853	8341064	1.00	NA	NA	C	1.00	1	0	0	0	0	9
hp-0161.01-i	0	3860	410853	8341064	1.00	NA	NA	C	1.00	1	0	0	0	0	83
hp-0161.01-k	0	3860	410853	8341064	1.00	NA	NA	C	1.00	1	0	0	0	0	13
hp-0162.01-i	0	3836	411863	8341319	0.14	NA	NA	C	0.14	1	0	0	0	0	51
hp-0162.01-j	0	3836	411863	8341319	0.14	NA	NA	C	0.14	1	0	0	0	0	9
hp-0163.01-b	0	3859	411189	8342206	0.50	NA	NA	C	0.50	1	0	0.5	0	0	3
hp-0163.01-c	0	3859	411189	8342206	0.50	NA	NA	C	0.50	1	0	0.5	0	0	2
hp-0163.01-h	0	3859	411189	8342206	0.50	NA	NA	C	0.50	1	0	0.5	0	0	2
hp-0163.01-i	0	3859	411189	8342206	0.50	NA	NA	C	0.50	1	0	0.5	0	0	45
hp-0163.01-j	0	3859	411189	8342206	0.50	NA	NA	C	0.50	1	0	0.5	0	0	3
hp-0166.01-a	0	3872	413564	8338005	0.01	NA	NA	C	0.01	0	0	0	1	0	1
hp-0166.01-b	0	3872	413564	8338005	0.01	NA	NA	C	0.01	0	0	0	1	0	2
hp-0166.01-c	0	3872	413564	8338005	0.01	NA	NA	C	0.01	0	0	0	1	0	1
hp-0166.01-i	0	3872	413564	8338005	0.01	NA	NA	C	0.01	0	0	0	1	0	43
hp-0166.01-j	0	3872	413564	8338005	0.01	NA	NA	C	0.01	0	0	0	1	0	23
hp-0166.01-k	0	3872	413564	8338005	0.01	NA	NA	C	0.01	0	0	0	1	0	3
hp-0167.01-d	0	3862	413077	8336896	1.20	NA	NA	C	1.20	1	0	0.5	0	0	1
hp-0167.01-h	0	3862	413077	8336896	1.00	NA	NA	C	1.20	1	0	0.5	0	0	1
hp-0167.01-i	0	3862	413077	8336896	1.00	NA	NA	C	1.20	1	0	0.5	0	0	1
hp-0168.01-i	0	4100	411457	8338737	0.01	NA	NA	C	0.01	1	0	0	0	0	4
hp-0168.01-j	0	4100	411457	8338737	0.01	NA	NA	C	0.01	1	0	0	0	0	6
hp-0169.01-h	0	4013	412148	8338203	1.00	NA	NA	C	2.00	1	0	0	0	0	9
hp-0169.01-i	0	4013	412148	8338203	1.00	NA	NA	C	2.00	1	0	0	0	0	26
hp-0169.01-j	0	4013	412148	8338203	2.00	NA	NA	C	2.00	1	0	0	0	0	4
hp-0169.01-k	0	4013	412148	8338203	2.00	NA	NA	C	2.00	1	0	0	0	0	2
hp-0169.01-m	0	4013	412148	8338203	1.00	NA	NA	C	2.00	1	0	0	0	0	2
hp-0172.01-b	0	3923	414078	8334372	4.00	NA	NA	C	4.00	1	1	0	0	0	1
hp-0172.01-h	0	3923	414078	8334372	2.00	NA	NA	C	4.00	1	0	0	0	0	2
hp-0172.01-i	0	3923	414078	8334372	2.00	NA	NA	C	4.00	1	0	0	0	0	23
hp-0172.01-j	0	3923	414078	8334372	1.00	NA	NA	C	4.00	1	0	0	0	0	8
hp-0172.01-k	0	3923	414078	8334372	1.00	NA	NA	C	4.00	1	0	0	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0173.01-a	0	3838	414274	8334638	0.04	NA	NA	C	0.04	1	0	0	0	0	2
hp-0173.01-b	0	3838	414274	8334638	0.04	NA	NA	C	0.04	1	0	0	0	0	4
hp-0173.01-c	0	3838	414274	8334638	0.04	NA	NA	C	0.04	1	0	0	0	0	16
hp-0173.01-h	0	3838	414274	8334638	0.04	NA	NA	C	0.04	1	0	0	0	0	3
hp-0173.01-i	0	3838	414274	8334638	0.04	NA	NA	C	0.04	1	0	0	0	0	9
hp-0173.01-j	0	3838	414274	8334638	0.04	NA	NA	C	0.04	1	0	0	0	0	6
hp-0173.01-k	0	3838	414274	8334638	0.04	NA	NA	C	0.04	1	0	0	0	0	18
hp-0173.01-l	0	3838	414274	8334638	0.04	NA	NA	C	0.04	1	0	0	0	0	23
hp-0173.01-m	0	3838	414274	8334638	0.04	NA	NA	C	0.04	1	0	0	0	0	13
hp-0174.01-c	0	3907	413604	8333421	1.00	NA	NA	C	1.50	1	0	0.5	0	0	12
hp-0174.01-d	0	3907	413604	8333421	1.00	NA	NA	C	1.50	1	0	0.5	0	0	3
hp-0174.01-h	0	3907	413604	8333421	1.50	NA	NA	C	1.50	1	0	0.5	0	0	6
hp-0174.01-i	0	3907	413604	8333421	1.50	NA	NA	C	1.50	1	0	0.5	0	0	47
hp-0174.01-j	0	3907	413604	8333421	1.50	NA	NA	C	1.50	1	0	0.5	0	0	9
hp-0175.01-i	0	3904	418860	8352157	0.16	NA	NA	C	0.16	1	0	0	0	0	20
hp-0175.01-j	0	3904	418860	8352157	0.16	NA	NA	C	0.16	1	0	0	0	0	8
hp-0176.01-h	0	3832	412959	8333831	0.15	NA	NA	C	0.15	0	0	0.5	0	0	4
hp-0176.01-i	0	3832	412959	8333831	0.15	NA	NA	C	0.15	0	0	0.5	0	0	22
hp-0176.01-j	0	3832	412959	8333831	0.15	NA	NA	C	0.15	0	0	0.5	0	0	13
hp-0176.01-k	0	3832	412959	8333831	0.15	NA	NA	C	0.15	0	0	0.5	0	0	2
hp-0176.01-l	0	3832	412959	8333831	0.15	NA	NA	C	0.15	0	0	0.5	0	0	5
hp-0176.01-m	0	3832	412959	8333831	0.15	NA	NA	C	0.15	0	0	0.5	0	0	2
hp-0200.01-b	0	3831	416224	8317747	1.00	NA	NA	C	1.00	1	0	0	0	0	2
hp-0200.01-h	0	3831	416224	8317747	1.00	NA	NA	C	1.00	1	0	0	0	0	4
hp-0200.01-i	0	3831	416224	8317747	1.00	NA	NA	C	1.00	1	0	0	0	0	15
hp-0201.01-a	0	3829	416111	8317637	1.00	NA	NA	C	1.00	1	0	0	0	0	2
hp-0201.01-b	0	3829	416111	8317637	1.00	NA	NA	C	1.00	1	0	0	0	0	2
hp-0201.01-h	0	3829	416111	8317637	1.00	NA	NA	C	1.00	1	0	0	0	0	5
hp-0201.01-i	0	3829	416111	8317637	1.00	NA	NA	C	1.00	1	0	0	0	0	18
hp-0201.01-j	0	3829	416111	8317637	1.00	NA	NA	C	1.00	1	0	0	0	0	16
hp-0202.01-h	0	3831	416163	8317960	1.00	NA	NA	C	1.00	1	0	0	0	0	7
hp-0202.01-i	0	3831	416163	8317960	1.00	NA	NA	C	1.00	1	0	0	0	0	24

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0202.01-j	0	3831	416163	8317960	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0202.01-k	0	3831	416163	8317960	1.00	NA	NA	C	1.00	1	0	0	0	0	7
hp-0202.01-l	0	3831	416163	8317960	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0202.01-m	0	3831	416163	8317960	1.00	NA	NA	C	1.00	1	0	0	0	0	2
hp-0203.01-i	0	3829	416402	8317855	0.28	NA	NA	C	0.28	1	0	0	0	0	11
hp-0204.01-a	0	3849	414950	8317035	0.21	NA	NA	C	0.21	1	0	0	0	0	17
hp-0204.01-b	0	3849	414950	8317035	0.21	NA	NA	C	0.21	1	0	0	0	0	17
hp-0204.01-c	0	3849	414950	8317035	0.21	NA	NA	C	0.21	1	0	0	0	0	15
hp-0204.01-d	0	3849	414950	8317035	0.21	NA	NA	C	0.21	1	0	0	0	0	4
hp-0204.01-i	0	3849	414950	8317035	0.21	NA	NA	C	0.21	1	0	0	0	0	10
hp-0205.01-a	0	3825	414642	8317160	3.00	NA	NA	C	3.00	1	0.5	0.5	0	0	147
hp-0205.01-b	0	3825	414642	8317160	3.00	NA	NA	C	3.00	1	0.5	0.5	0	0	56
hp-0205.01-c	0	3825	414642	8317160	3.00	NA	NA	C	3.00	1	0.5	0.5	0	0	68
hp-0205.01-d	0	3825	414642	8317160	2.00	NA	NA	C	3.00	1	0.5	0.5	0	0	14
hp-0205.01-e	0	3825	414642	8317160	2.00	NA	NA	C	3.00	1	0.5	0.5	0	0	2
hp-0205.01-f	0	3825	414642	8317160	3.00	NA	NA	C	3.00	1	0.5	0.5	0	0	8
hp-0205.01-g	0	3825	414642	8317160	3.00	NA	NA	C	3.00	1	0.5	0.5	0	0	6
hp-0205.01-h	0	3825	414642	8317160	1.00	NA	NA	C	3.00	1	0.5	0.5	0	0	3
hp-0205.01-i	0	3825	414642	8317160	1.00	NA	NA	C	3.00	1	0.5	0.5	0	0	7
hp-0205.01-j	0	3825	414642	8317160	1.00	NA	NA	C	3.00	1	0.5	0.5	0	0	4
hp-0206.01-g	0	3827	415926	8317231	0.14	NA	NA	C	0.14	1	0	0	0	0	2
hp-0206.01-h	0	3827	415926	8317231	0.14	NA	NA	C	0.14	1	0	0	0	0	2
hp-0206.01-i	0	3827	415926	8317231	0.14	NA	NA	C	0.14	1	0	0	0	0	21
hp-0206.01-j	0	3827	415926	8317231	0.14	NA	NA	C	0.14	1	0	0	0	0	5
hp-0207.01-d	0	3847	415253	8316801	0.15	NA	NA	C	0.15	1	0	0	0	0	2
hp-0207.01-i	0	3847	415253	8316801	0.15	NA	NA	C	0.15	1	0	0	0	0	8
hp-0207.01-j	0	3847	415253	8316801	0.15	NA	NA	C	0.15	1	0	0	0	0	9
hp-0207.01-k	0	3847	415253	8316801	0.15	NA	NA	C	0.15	1	0	0	0	0	2
hp-0207.01-m	0	3847	415253	8316801	0.15	NA	NA	C	0.15	1	0	0	0	0	4
hp-0208.01-c	0	3843	415529	8316742	1.20	NA	NA	C	1.20	1	0	0	0	0	2
hp-0208.01-h	0	3843	415529	8316742	1.00	NA	NA	C	1.20	1	0	0	0	0	2
hp-0208.01-i	0	3843	415529	8316742	1.00	NA	NA	C	1.20	1	0	0	0	0	11

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0208.01-j	0	3843	415529	8316742	1.00	NA	NA	C	1.20	1	0	0	0	0	3
hp-0208.01-k	0	3843	415529	8316742	0.50	NA	NA	C	1.20	1	0	0	0	0	2
hp-0208.01-l	0	3843	415529	8316742	0.50	NA	NA	C	1.20	1	0	0	0	0	3
hp-0208.01-m	0	3843	415529	8316742	0.50	NA	NA	C	1.20	1	0	0	0	0	7
hp-0209.01-a	0	3828	415824	8316811	0.04	NA	NA	C	0.04	1	0	0	0	0	12
hp-0209.01-b	0	3828	415824	8316811	0.04	NA	NA	C	0.04	1	0	0	0	0	4
hp-0209.01-c	0	3828	415824	8316811	0.04	NA	NA	C	0.04	1	0	0	0	0	5
hp-0209.01-i	0	3828	415824	8316811	0.04	NA	NA	C	0.04	0.5	0	0.5	0	0	6
hp-0209.01-j	0	3828	415824	8316811	0.04	NA	NA	C	0.04	0.5	0	0.5	0	0	5
hp-0210.01-b	0	3827	416059	8317052	0.08	NA	NA	C	0.08	0.5	0	0.5	0	0	1
hp-0210.01-h	0	3827	416059	8317052	0.08	NA	NA	C	0.08	0	0	0.5	0	0	1
hp-0210.01-i	0	3827	416059	8317052	0.08	NA	NA	C	0.08	0	0	0.5	0	0	8
hp-0210.01-j	0	3827	416059	8317052	0.08	NA	NA	C	0.08	0	0	0.5	0	0	5
hp-0211.01-i	0	3824	416523	8317584	0.32	NA	NA	C	0.32	1	0	0	0	0	16
hp-0211.01-j	0	3824	416523	8317584	0.32	NA	NA	C	0.32	1	0	0	0	0	4
hp-0211.01-l	0	3824	416523	8317584	0.10	NA	NA	C	0.32	1	0	0	0	0	9
hp-0212.01-a	0	3818	417206	8318797	0.36	NA	NA	C	0.36	0.5	0	0.5	0	0	1
hp-0212.01-h	0	3818	417206	8318797	0.36	NA	NA	C	0.36	0	0	0.5	0	0	1
hp-0212.01-i	0	3818	417206	8318797	0.36	NA	NA	C	0.36	0	0	0.5	0	0	17
hp-0212.01-j	0	3818	417206	8318797	0.36	NA	NA	C	0.36	0	0	0.5	0	0	3
hp-0212.01-k	0	3818	417206	8318797	0.36	NA	NA	C	0.36	0	0	0.5	0	0	3
hp-0214.01-a	0	3823	416613	8317241	0.45	NA	NA	C	0.45	1	0	0	0	0	3
hp-0214.01-c	0	3823	416613	8317241	0.45	NA	NA	C	0.45	1	0	0	0	0	2
hp-0214.01-h	0	3823	416613	8317241	0.30	NA	NA	C	0.45	1	0	0	0	0	4
hp-0214.01-i	0	3823	416613	8317241	0.30	NA	NA	C	0.45	1	0	0	0	0	23
hp-0214.01-j	0	3823	416613	8317241	0.30	NA	NA	C	0.45	1	0	0	0	0	9
hp-0214.01-k	0	3823	416613	8317241	0.45	NA	NA	C	0.45	1	0	0	0	0	4
hp-0214.01-l	0	3823	416613	8317241	0.45	NA	NA	C	0.45	1	0	0	0	0	4
hp-0214.01-m	0	3823	416613	8317241	0.45	NA	NA	C	0.45	1	0	0	0	0	3
hp-0215.01-h	0	3822	416697	8317087	0.70	NA	NA	C	0.70	1	0	0	0	0	4
hp-0215.01-i	0	3822	416697	8317087	0.70	NA	NA	C	0.70	1	0	0	0	0	19
hp-0215.01-j	0	3822	416697	8317087	0.70	NA	NA	C	0.70	1	0	0	0	0	10

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0216.01-c	0	3823	416849	8317084	1.00	NA	NA	C	1.00	1	0	0	0	0	2
hp-0216.01-e	0	3823	416849	8317084	1.00	NA	NA	C	1.00	1	0	0	0	0	2
hp-0216.01-g	0	3823	416849	8317084	1.00	NA	NA	C	1.00	1	0	0	0	0	6
hp-0216.01-i	0	3823	416849	8317084	0.50	NA	NA	C	1.00	1	0	0	0	0	9
hp-0216.01-j	0	3823	416849	8317084	0.50	NA	NA	C	1.00	1	0	0	0	0	15
hp-0216.01-k	0	3823	416849	8317084	0.20	NA	NA	C	1.00	1	0	0	0	0	6
hp-0216.01-l	0	3823	416849	8317084	0.20	NA	NA	C	1.00	1	0	0	0	0	2
hp-0216.01-m	0	3823	416849	8317084	0.20	NA	NA	C	1.00	1	0	0	0	0	6
hp-0217.01-b	0	3823	417298	8316977	0.25	NA	NA	C	0.50	1	0	0	0	0	2
hp-0217.01-i	0	3823	417298	8316977	0.50	NA	NA	C	0.50	1	0	0	0	0	9
hp-0217.01-j	0	3823	417298	8316977	0.50	NA	NA	C	0.50	1	0	0	0	0	2
hp-0217.01-k	0	3823	417298	8316977	0.20	NA	NA	C	0.50	1	0	0	0	0	4
hp-0218.01-h	0	3824	418105	8315393	0.25	NA	NA	C	0.25	1	0	0	0	0	3
hp-0218.01-i	0	3824	418105	8315393	0.25	NA	NA	C	0.25	1	0	0	0	0	14
hp-0218.01-k	0	3824	418105	8315393	0.25	NA	NA	C	0.25	1	0	0	0	0	2
hp-0219.01-a	0	3833	418617	8314495	5.00	NA	NA	C	5.00	1	0	0.5	0	0.5	10
hp-0219.01-b	0	3833	418617	8314495	5.00	NA	NA	C	5.00	1	0	0.5	0	0.5	18
hp-0219.01-c	0	3833	418617	8314495	5.00	NA	NA	C	5.00	1	0	0.5	0	0.5	12
hp-0219.01-d	0	3833	418617	8314495	3.00	NA	NA	C	5.00	1	0	0.5	0	0.5	4
hp-0219.01-g	0	3833	418617	8314495	2.00	NA	NA	C	5.00	1	0	0.5	0	0.5	5
hp-0219.01-h	0	3833	418617	8314495	5.00	NA	NA	C	5.00	1	0	0.5	0	0.5	12
hp-0219.01-i	0	3833	418617	8314495	5.00	NA	NA	C	5.00	1	0	0.5	0	0.5	28
hp-0219.01-j	0	3833	418617	8314495	5.00	NA	NA	C	5.00	1	0	0.5	0	0.5	21
hp-0219.01-k	0	3833	418617	8314495	1.00	NA	NA	C	5.00	1	0	0.5	0	0.5	13
hp-0219.01-l	0	3833	418617	8314495	1.00	NA	NA	C	5.00	1	0	0.5	0	0.5	10
hp-0219.01-m	0	3833	418617	8314495	1.00	NA	NA	C	5.00	1	0	0.5	0	0.5	3
hp-0222.01-a	0	3917	419975	8314214	4.00	NA	NA	C	4.00	1	0	0.5	0	0.5	2
hp-0222.01-h	0	3917	419975	8314214	1.00	NA	NA	C	4.00	1	0	0.5	0	0.5	6
hp-0222.01-i	0	3917	419975	8314214	1.00	NA	NA	C	4.00	1	0	0.5	0	0.5	20
hp-0222.01-j	0	3917	419975	8314214	1.00	NA	NA	C	4.00	1	0	0.5	0	0.5	10
hp-0222.01-k	0	3917	419975	8314214	1.00	NA	NA	C	4.00	1	0	0.5	0	0.5	33
hp-0223.01-i	0	3824	419407	8314684	0.4	NA	NA	C	0.4	0	0	0.5	0	0	6

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0223.01-j	0	3824	419407	8314684	0.4	NA	NA	C	0.4	0	0	0.5	0	0	4
hp-0223.01-k	0	3824	419407	8314684	0.4	NA	NA	C	0.4	0	0	0.5	0	0	6
hp-0224.01-g	0	3833	419206	8314637	0.12	NA	NA	C	0.12	0.5	0	0.5	0	0	1
hp-0224.01-h	0	3833	419206	8314637	0.12	NA	NA	C	0.12	0	0	0.5	0	0	6
hp-0224.01-i	0	3833	419206	8314637	0.12	NA	NA	C	0.12	0	0	0.5	0	0	19
hp-0224.01-j	0	3833	419206	8314637	0.12	NA	NA	C	0.12	0	0	0.5	0	0	13
hp-0224.01-k	0	3833	419206	8314637	0.12	NA	NA	C	0.12	0	0	0.5	0	0	3
hp-0225.01-i	0	3962	415164	8316465	0.04	NA	NA	C	0.04	0.5	0.5	0	0	0	14
hp-0225.01-k	0	3962	415164	8316465	0.04	NA	NA	C	0.04	0.5	0.5	0	0	0	2
hp-0226.01-h	0	4039	415335	8316267	3.00	NA	NA	C	3.00	1	0	0.5	0	0.5	5
hp-0226.01-i	0	4039	415335	8316267	3.00	NA	NA	C	3.00	1	0	0.5	0	0.5	17
hp-0226.01-j	0	4039	415335	8316267	2.00	NA	NA	C	3.00	1	0	0.5	0	0.5	7
hp-0227.01-h	0	4086	415737	8316047	2.50	NA	NA	C	2.50	1	0	0.5	0	0.5	5
hp-0227.01-i	0	4086	415737	8316047	2.50	NA	NA	C	2.50	1	0	0.5	0	0.5	24
hp-0227.01-j	0	4086	415737	8316047	2.50	NA	NA	C	2.50	1	0	0.5	0	0.5	8
hp-0227.01-k	0	4086	415737	8316047	0.50	NA	NA	C	2.50	1	0	0.5	0	0.5	3
hp-0228.01-i	0	4060	416131	8315867	0.12	NA	NA	C	0.12	1	0	0	0	0	6
hp-0228.01-j	0	4060	416131	8315867	0.12	NA	NA	C	0.12	1	0	0	0	0	13
hp-0229.01-i	0	4009	416849	8315632	0.5	NA	NA	C	0.5	0	0.5	0	0	0	1
hp-0229.01-j	0	4009	416849	8315632	0.5	NA	NA	C	0.5	0	0.5	0	0	0	4
hp-0229.01-m	0	4009	416849	8315632	0.5	NA	NA	C	0.5	0	0.5	0	0	0	1
hp-0230.01-i	0	4017	417276	8315397	0.56	NA	NA	C	0.56	1	0	0	0	0	7
hp-0230.01-j	0	4017	417276	8315397	0.56	NA	NA	C	0.56	1	0	0	0	0	3
hp-0231.01-a	0	3822	416438	8316917	0.20	NA	NA	C	0.20	1	0	0	0	0	4
hp-0231.01-b	0	3822	416438	8316917	0.20	NA	NA	C	0.20	1	0	0	0	0	5
hp-0231.01-h	0	3822	416438	8316917	0.20	NA	NA	C	0.20	1	0	0	0	0	4
hp-0231.01-i	0	3822	416438	8316917	0.20	NA	NA	C	0.20	1	0	0	0	0	10
hp-0231.01-j	0	3822	416438	8316917	0.20	NA	NA	C	0.20	1	0	0	0	0	4
hp-0232.01-h	0	3825	416142	8316933	0.06	NA	NA	C	0.06	1	0	0	0	0	9
hp-0232.01-i	0	3825	416142	8316933	0.06	NA	NA	C	0.06	1	0	0	0	0	14
hp-0232.01-j	0	3825	416142	8316933	0.06	NA	NA	C	0.06	1	0	0	0	0	3
hp-0233.01-h	0	3861	415986	8316428	0.20	NA	NA	C	0.20	1	0	0.5	0	0	4

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
hp-0233.01-i	0	3861	415986	8316428	0.20	NA	NA	C	0.20	1	0	0.5	0	0	3
hp-0233.01-j	0	3861	415986	8316428	0.20	NA	NA	C	0.20	1	0	0.5	0	0	3
hp-0234.01-h	0	3850	416956	8316099	0.28	NA	NA	C	0.28	1	0	0	0	0	2
hp-0234.01-i	0	3850	416956	8316099	0.28	NA	NA	C	0.28	1	0	0	0	0	10
hp-0234.01-j	0	3850	416956	8316099	0.28	NA	NA	C	0.28	1	0	0	0	0	5
hp-0234.01-k	0	3850	416956	8316099	0.28	NA	NA	C	0.28	1	0	0	0	0	6
hp-0234.01-l	0	3850	416956	8316099	0.28	NA	NA	C	0.28	1	0	0	0	0	6
hp-0234.01-m	0	3850	416956	8316099	0.01	NA	NA	C	0.28	1	0	0	0	0	8
hp-0235.01-a	0	3825	416655	8316506	0.16	NA	NA	C	0.16	0.5	0	0.5	0	0	NA
hp-0235.01-g	0	3825	416655	8316506	0.16	NA	NA	C	0.16	0	0	0.5	0	0	1
hp-0235.01-h	0	3825	416655	8316506	0.16	NA	NA	C	0.16	0	0	0.5	0	0	3
hp-0235.01-i	0	3825	416655	8316506	0.16	NA	NA	C	0.16	0	0	0.5	0	0	24
hp-0235.01-j	0	3825	416655	8316506	0.16	NA	NA	C	0.16	0	0	0.5	0	0	3
hp-0235.01-m	0	3825	416655	8316506	0.16	NA	NA	C	0.16	0	0	0.5	0	0	1
hp-0236.01-i	0	3827	416500	8316579	0.16	NA	NA	C	0.16	1	0	0	0	0	11
hp-0237.01-i	0	3836	417878	8315484	0.12	NA	NA	C	0.12	1	0	0	0	0	9
hp-0237.01-j	0	3836	417878	8315484	0.12	NA	NA	C	0.12	1	0	0	0	0	2
hp-0237.01-k	0	3836	417878	8315484	0.12	NA	NA	C	0.12	1	0	0	0	0	3
hp-0238.01-i	0	3841	418062	8315275	0.1	NA	NA	C	0.1	0	0	0.5	0	0	7
hp-0238.01-l	0	3841	418062	8315275	0.1	NA	NA	C	0.1	0	0	0.5	0	0	1
hp-0239.01-h	0	3830	418172	8315116	0.18	NA	NA	C	0.18	1	0	0	0	0	2
hp-0239.01-i	0	3830	418172	8315116	0.18	NA	NA	C	0.18	1	0	0	0	0	11
hp-0239.01-j	0	3830	418172	8315116	0.18	NA	NA	C	0.18	1	0	0	0	0	9
hp-0239.01-k	0	3830	418172	8315116	0.10	NA	NA	C	0.18	1	0	0	0	0	3
hp-0239.01-l	0	3830	418172	8315116	0.10	NA	NA	C	0.18	1	0	0	0	0	3
hp-0239.01-m	0	3830	418172	8315116	0.05	NA	NA	C	0.18	1	0	0	0	0	13
hp-0240.01-l	0	3903	419540	8315780	1.20	NA	NA	C	1.20	1	0	0.5	0	0	NA
hp-0241.01-b	0	3965	419591	8315992	0.24	NA	NA	C	0.24	1	0	0	0	0	3
hp-0241.01-h	0	3965	419591	8315992	0.24	NA	NA	C	0.24	1	0	0	0	0	2
hp-0241.01-i	0	3965	419591	8315992	0.24	NA	NA	C	0.24	1	0	0	0	0	7
hp-0241.01-j	0	3965	419591	8315992	0.24	NA	NA	C	0.24	1	0	0	0	0	2
hp-0241.01-k	0	3965	419591	8315992	0.24	NA	NA	C	0.24	1	0	0	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0241.01-l	0	3965	419591	8315992	0.24	NA	NA	C	0.24	1	0	0	0	0	2
hp-0241.01-m	0	3965	419591	8315992	0.24	NA	NA	C	0.24	1	0	0	0	0	4
hp-0243.01-i	0	4109	419810	8316364	4.50	NA	NA	C	4.50	1	0	1	0	0	8
hp-0244.01-i	0	4100	420268	8316156	0.25	NA	NA	C	0.25	1	0	1	0	0	NA
hp-0246.01-a	0	3829	421390	8315114	0.56	NA	NA	C	0.56	1	0	0	0	0	17
hp-0246.01-b	0	3829	421390	8315114	0.56	NA	NA	C	0.56	1	0	0	0	0	10
hp-0246.01-c	0	3829	421390	8315114	0.56	NA	NA	C	0.56	1	0	0	0	0	5
hp-0246.01-d	0	3829	421390	8315114	0.56	NA	NA	C	0.56	1	0	0	0	0	2
hp-0246.01-f	0	3829	421390	8315114	0.56	NA	NA	C	0.56	1	0	0	0	0	2
hp-0246.01-g	0	3829	421390	8315114	0.56	NA	NA	C	0.56	1	0	0	0	0	8
hp-0246.01-h	0	3829	421390	8315114	0.56	NA	NA	C	0.56	1	0	0	0	0	2
hp-0246.01-i	0	3829	421390	8315114	0.56	NA	NA	C	0.56	1	0	0	0	0	18
hp-0246.01-j	0	3829	421390	8315114	0.56	NA	NA	C	0.56	1	0	0	0	0	11
hp-0246.01-k	0	3829	421390	8315114	0.20	NA	NA	C	0.56	1	0	0	0	0	6
hp-0246.01-l	0	3829	421390	8315114	0.20	NA	NA	C	0.56	1	0	0	0	0	9
hp-0246.01-m	0	3829	421390	8315114	0.20	NA	NA	C	0.56	1	0	0	0	0	2
hp-0247.01-a	0	3825	421425	8314728	0.16	NA	NA	C	0.16	0	0	0	0	0	3
hp-0247.01-b	0	3825	421425	8314728	0.16	NA	NA	C	0.16	0	0	0	0	0	10
hp-0247.01-c	0	3825	421425	8314728	0.16	NA	NA	C	0.16	0	0	0	0	0	7
hp-0248.01-a	0	3818	421503	8314342	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	14
hp-0248.01-b	0	3818	421503	8314342	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	13
hp-0248.01-c	0	3818	421503	8314342	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	3
hp-0248.01-d	0	3818	421503	8314342	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	2
hp-0248.01-f	0	3818	421503	8314342	1.00	NA	NA	C	2.00	1	0.5	0.5	0	0	3
hp-0248.01-g	0	3818	421503	8314342	1.00	NA	NA	C	2.00	1	0.5	0.5	0	0	2
hp-0248.01-h	0	3818	421503	8314342	0.50	NA	NA	C	2.00	1	0.5	0.5	0	0	6
hp-0248.01-i	0	3818	421503	8314342	0.50	NA	NA	C	2.00	1	0.5	0.5	0	0	7
hp-0248.01-j	0	3818	421503	8314342	0.50	NA	NA	C	2.00	1	0.5	0.5	0	0	6
hp-0249.01-i	0	3818	421273	8314880	1.00	NA	NA	C	1.00	1	0	0	0	0	4
hp-0249.01-j	0	3818	421273	8314880	1.00	NA	NA	C	1.00	1	0	0	0	0	6
hp-0249.01-k	0	3818	421273	8314880	1.00	NA	NA	C	1.00	1	0	0	0	0	5
hp-0249.01-l	0	3818	421273	8314880	1.00	NA	NA	C	1.00	1	0	0	0	0	9

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0251.01-g	0	3816	419908	8313447	0.16	NA	NA	C	0.16	1	0	0	0	0	1
hp-0251.01-h	0	3816	419908	8313447	0.16	NA	NA	C	0.16	1	0	0	0	0	2
hp-0251.01-i	0	3816	419908	8313447	0.16	NA	NA	C	0.16	1	0	0	0	0	10
hp-0251.01-j	0	3816	419908	8313447	0.16	NA	NA	C	0.16	1	0	0	0	0	8
hp-0251.01-k	0	3816	419908	8313447	0.16	NA	NA	C	0.16	1	0	0	0	0	6
hp-0251.01-l	0	3816	419908	8313447	0.16	NA	NA	C	0.16	1	0	0	0	0	12
hp-0251.01-m	0	3816	419908	8313447	0.16	NA	NA	C	0.16	1	0	0	0	0	9
hp-0252.01-i	0	3816	419790	8313822	0.64	NA	NA	C	0.64	1	0	0.5	0	0	3
hp-0252.01-j	0	3816	419790	8313822	0.64	NA	NA	C	0.64	1	0	0.5	0	0	6
hp-0252.01-k	0	3816	419790	8313822	0.64	NA	NA	C	0.64	1	0	0.5	0	0	9
hp-0253.01-h	0	3817	419326	8313925	0.2	NA	NA	C	0.2	0	0	0.5	0	0	8
hp-0253.01-i	0	3817	419326	8313925	0.2	NA	NA	C	0.2	0	0	0.5	0	0	12
hp-0254.01-h	0	3822	419194	8313922	0.04	NA	NA	C	1.00	1	0	0	0	0	1
hp-0254.01-i	0	3822	419194	8313922	0.04	NA	NA	C	1.00	1	0	0	0	0	5
hp-0254.01-j	0	3822	419194	8313922	0.04	NA	NA	C	1.00	1	0	0	0	0	2
hp-0254.01-m	0	3822	419194	8313922	1.00	NA	NA	C	1.00	1	0	0	0	0	1
hp-0255.01-b	0	3828	419153	8314026	0.06	NA	NA	C	0.06	1	0	0.5	0	0	2
hp-0255.01-c	0	3828	419153	8314026	0.06	NA	NA	C	0.06	1	0	0.5	0	0	4
hp-0255.01-f	0	3828	419153	8314026	0.06	NA	NA	C	0.06	1	0	0.5	0	0	17
hp-0255.01-g	0	3828	419153	8314026	0.06	NA	NA	C	0.06	1	0	0.5	0	0	14
hp-0255.01-h	0	3828	419153	8314026	0.06	NA	NA	C	0.06	1	0	0.5	0	0	4
hp-0255.01-j	0	3828	419153	8314026	0.06	NA	NA	C	0.06	1	0	0.5	0	0	6
hp-0256.01-f	0	3828	419120	8314035	0.16	NA	NA	C	0.16	0	0	0.5	0	0	2
hp-0256.01-h	0	3828	419120	8314035	0.16	NA	NA	C	0.16	0	0	0.5	0	0	1
hp-0256.01-i	0	3828	419120	8314035	0.16	NA	NA	C	0.16	0	0	0.5	0	0	5
hp-0256.01-k	0	3828	419120	8314035	0.16	NA	NA	C	0.16	0	0	0.5	0	0	2
hp-0257.01-c	0	3826	419113	8313976	0.75	NA	NA	C	0.75	0.5	0	0.5	0	0	2
hp-0257.01-h	0	3826	419113	8313976	0.75	NA	NA	C	0.75	0	0	0.5	0	0	1
hp-0257.01-i	0	3826	419113	8313976	0.75	NA	NA	C	0.75	0	0	0.5	0	0	11
hp-0257.01-j	0	3826	419113	8313976	0.75	NA	NA	C	0.75	0	0	0.5	0	0	7
hp-0258.01-h	0	3820	419091	8313863	0.02	NA	NA	C	0.02	0	0	0.5	0	0	2
hp-0258.01-i	0	3820	419091	8313863	0.02	NA	NA	C	0.02	0	0	0.5	0	0	1

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0258.01-j	0	3820	419091	8313863	0.02	NA	NA	C	0.02	0	0	0.5	0	0	4
hp-0259.01-h	0	3820	419057	8313862	0.01	NA	NA	C	0.01	0	0	0.5	0	0	3
hp-0259.01-i	0	3820	419057	8313862	0.01	NA	NA	C	0.01	0	0	0.5	0	0	11
hp-0259.01-j	0	3820	419057	8313862	0.01	NA	NA	C	0.01	0	0	0.5	0	0	4
hp-0260.01-h	0	3819	419111	8313792	0.04	NA	NA	C	0.04	0	0	0.5	0	0	3
hp-0260.01-i	0	3819	419111	8313792	0.04	NA	NA	C	0.04	0	0	0.5	0	0	5
hp-0261.01-f	0	3829	418935	8313769	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0261.01-i	0	3829	418935	8313769	1.00	NA	NA	C	1.00	1	0	0	0	0	7
hp-0261.01-k	0	3829	418935	8313769	1.00	NA	NA	C	1.00	1	0	0	0	0	4
hp-0262.01-f	0	3845	418882	8313656	1	NA	NA	C	1	0	0	0.5	0	0	1
hp-0262.01-h	0	3845	418882	8313656	1	NA	NA	C	1	0	0	0.5	0	0	1
hp-0262.01-i	0	3845	418882	8313656	1	NA	NA	C	1	0	0	0.5	0	0	4
hp-0262.01-k	0	3845	418882	8313656	1	NA	NA	C	1	0	0	0.5	0	0	3
hp-0262.01-l	0	3845	418882	8313656	1	NA	NA	C	1	0	0	0.5	0	0	6
hp-0263.01-i	0	3859	418850	8313569	0.9	NA	NA	C	0.9	0	0	0.5	0	0	16
hp-0263.01-j	0	3859	418850	8313569	0.9	NA	NA	C	0.9	0	0	0.5	0	0	9
hp-0263.01-k	0	3859	418850	8313569	0.9	NA	NA	C	0.9	0	0	0.5	0	0	5
hp-0263.01-l	0	3859	418850	8313569	0.9	NA	NA	C	0.9	0	0	0.5	0	0	4
hp-0265.01-h	0	4098	419560	8316613	0.32	NA	NA	C	0.32	1	0	0.5	0	0	3
hp-0265.01-i	0	4098	419560	8316613	0.32	NA	NA	C	0.32	1	0	0.5	0	0	13
hp-0265.01-j	0	4098	419560	8316613	0.32	NA	NA	C	0.32	1	0	0.5	0	0	9
hp-0266.01-h	0	4028	418298	8317829	0.16	NA	NA	C	0.16	1	0	0	0	0	3
hp-0266.01-i	0	4028	418298	8317829	0.16	NA	NA	C	0.16	1	0	0	0	0	6
hp-0267.01-i	0	4031	418211	8317884	0.02	NA	NA	C	0.02	1	0	0.5	0	0	10
hp-0267.01-j	0	4031	418211	8317884	0.02	NA	NA	C	0.02	1	0	0.5	0	0	1
hp-0268.01-i	0	4026	418143	8317960	0.30	NA	NA	C	0.30	1	0	1	0	0	6
hp-0269.01-a	0	3935	417744	8318699	1.20	NA	NA	C	1.20	1	0	0	0	0	9
hp-0269.01-b	0	3935	417744	8318699	1.20	NA	NA	C	1.20	1	0	0	0	0	5
hp-0269.01-k	0	3935	417744	8318699	1.00	NA	NA	C	1.20	1	0	0	0	0	5
hp-0270.01-h	0	3831	418182	8316457	0.80	NA	NA	C	0.80	1	0	0	0	0	2
hp-0270.01-i	0	3831	418182	8316457	0.80	NA	NA	C	0.80	1	0	0	0	0	12
hp-0270.01-j	0	3831	418182	8316457	0.80	NA	NA	C	0.80	1	0	0	0	0	5

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0270.01-k	0	3831	418182	8316457	0.80	NA	NA	C	0.80	1	0	0	0	0	3
hp-0270.01-m	0	3831	418182	8316457	0.25	NA	NA	C	0.80	1	0	0	0	0	6
hp-0271.01-b	0	3824	418383	8316293	0.05	NA	NA	C	0.05	1	0	0	0	0	12
hp-0273.01-h	0	3876	416529	8319689	2.00	NA	NA	C	2.00	1	0	0.5	0	0	1
hp-0273.01-i	0	3876	416529	8319689	2.00	NA	NA	C	2.00	1	0	0.5	0	0	3
hp-0273.01-j	0	3876	416529	8319689	2.00	NA	NA	C	2.00	1	0	0.5	0	0	1
hp-0273.01-k	0	3876	416529	8319689	2.00	NA	NA	C	2.00	1	0	0.5	0	0	1
hp-0274.01-i	0	3921	416878	8319539	2.00	NA	NA	C	2.00	1	0	0	0	0	9
hp-0274.01-j	0	3921	416878	8319539	2.00	NA	NA	C	2.00	1	0	0	0	0	3
hp-0275.01-i	0	3832	416248	8320366	0.04	NA	NA	C	0.04	1	0	0	0	0	1
hp-0275.01-j	0	3832	416248	8320366	0.04	NA	NA	C	0.04	1	0	0	0	0	1
hp-0275.01-k	0	3832	416248	8320366	0.04	NA	NA	C	0.04	1	0	0	0	0	2
hp-0275.01-l	0	3832	416248	8320366	0.04	NA	NA	C	0.04	1	0	0	0	0	1
hp-0275.01-m	0	3832	416248	8320366	0.04	NA	NA	C	0.04	1	0	0	0	0	1
hp-0276.01-a	0	3826	415450	8320467	5.00	NA	NA	C	5.00	1	0.5	0	0	0	30
hp-0276.01-b	0	3826	415450	8320467	5.00	NA	NA	C	5.00	1	0.5	0	0	0	20
hp-0276.01-c	0	3826	415450	8320467	5.00	NA	NA	C	5.00	1	0.5	0	0	0	17
hp-0276.01-d	0	3826	415450	8320467	5.00	NA	NA	C	5.00	1	0.5	0	0	0	10
hp-0278.01-h	0	3826	418359	8313763	4.00	NA	NA	C	4.00	1	0	0	0	0	3
hp-0278.01-i	0	3826	418359	8313763	4.00	NA	NA	C	4.00	1	0	0	0	0	7
hp-0278.01-j	0	3826	418359	8313763	4.00	NA	NA	C	4.00	1	0	0	0	0	5
hp-0278.01-l	0	3826	418359	8313763	4.00	NA	NA	C	4.00	1	0	0	0	0	5
hp-0278.01-m	0	3826	418359	8313763	4.00	NA	NA	C	4.00	1	0	0	0	0	9
hp-0279.01-h	0	3913	419376	8312217	3.00	NA	NA	C	3.00	1	0	0	0	0.5	3
hp-0279.01-i	0	3913	419376	8312217	3.00	NA	NA	C	3.00	1	0	0	0	0.5	4
hp-0279.01-j	0	3913	419376	8312217	3.00	NA	NA	C	3.00	1	0	0	0	0.5	2
hp-0279.01-k	0	3913	419376	8312217	1.00	NA	NA	C	3.00	1	0	0	0	0.5	1
hp-0280.01-a	0	3877	419488	8310607	7.00	NA	NA	C	7.00	1	0	0.5	0	0	41
hp-0280.01-b	0	3877	419488	8310607	7.00	NA	NA	C	7.00	1	0	0.5	0	0	37
hp-0280.01-c	0	3877	419488	8310607	7.00	NA	NA	C	7.00	1	0	0.5	0	0	30
hp-0280.01-d	0	3877	419488	8310607	7.00	NA	NA	C	7.00	1	0	0.5	0	0	3
hp-0280.01-f	0	3877	419488	8310607	4.00	NA	NA	C	7.00	1	0	0.5	0	0	16

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
hp-0280.01-g	0	3877	419488	8310607	4.00	NA	NA	C	7.00	1	0	0.5	0	0	8
hp-0280.01-h	0	3877	419488	8310607	0.50	NA	NA	C	7.00	1	0	0.5	0	0	2
hp-0280.01-j	0	3877	419488	8310607	0.50	NA	NA	C	7.00	1	0	0.5	0	0	3
hp-0280.01-m	0	3877	419488	8310607	0.50	NA	NA	C	7.00	1	0	0.5	0	0	2
hp-0281.01-a	0	3858	418261	8312680	5.00	NA	NA	C	5.00	1	0	0.5	0	0	25
hp-0281.01-b	0	3858	418261	8312680	5.00	NA	NA	C	5.00	1	0	0.5	0	0	15
hp-0281.01-c	0	3858	418261	8312680	5.00	NA	NA	C	5.00	1	0	0.5	0	0	7
hp-0281.01-e	0	3858	418261	8312680	4.00	NA	NA	C	5.00	1	0	0.5	0	0	2
hp-0281.01-i	0	3858	418261	8312680	1.00	NA	NA	C	5.00	1	0	0.5	0	0	5
hp-0281.01-j	0	3858	418261	8312680	1.00	NA	NA	C	5.00	1	0	0.5	0	0	3
hp-0281.01-k	0	3858	418261	8312680	1.00	NA	NA	C	5.00	1	0	0.5	0	0	3
hp-0281.01-l	0	3858	418261	8312680	1.00	NA	NA	C	5.00	1	0	0.5	0	0	15
hp-0281.01-m	0	3858	418261	8312680	1.00	NA	NA	C	5.00	1	0	0.5	0	0	4
hp-0283.01-f	0	3824	417164	8320272	0.16	NA	NA	C	0.16	1	0	0	0	0	1
hp-0283.01-i	0	3824	417164	8320272	0.16	NA	NA	C	0.16	1	0	0	0	0	3
hp-0283.01-j	0	3824	417164	8320272	0.16	NA	NA	C	0.16	1	0	0	0	0	1
hp-0285.01-b	0	3823	416728	8321150	0.09	NA	NA	C	0.09	1	0	0	0	0	4
hp-0285.01-i	0	3823	416728	8321150	0.09	NA	NA	C	0.09	1	0	0	0	0	7
hp-0285.01-j	0	3823	416728	8321150	0.09	NA	NA	C	0.09	1	0	0	0	0	6
hp-0285.01-k	0	3823	416728	8321150	0.09	NA	NA	C	0.09	1	0	0	0	0	7
hp-0285.01-l	0	3823	416728	8321150	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0285.01-m	0	3823	416728	8321150	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0286.01-a	0	3845	417380	8320893	0.03	NA	NA	C	0.03	0.5	0	0.5	0	0	1
hp-0286.01-b	0	3845	417380	8320893	0.03	NA	NA	C	0.03	0.5	0	0.5	0	0	3
hp-0286.01-c	0	3845	417380	8320893	0.03	NA	NA	C	0.03	0.5	0	0.5	0	0	1
hp-0286.01-h	0	3845	417380	8320893	0.03	NA	NA	C	0.03	0	0	0.5	0	0	4
hp-0286.01-i	0	3845	417380	8320893	0.03	NA	NA	C	0.03	0	0	0.5	0	0	29
hp-0286.01-j	0	3845	417380	8320893	0.03	NA	NA	C	0.03	0	0	0.5	0	0	2
hp-0287.01-h	0	3834	417453	8320646	0.04	NA	NA	C	0.04	0	0	0.5	0	0	7
hp-0287.01-i	0	3834	417453	8320646	0.04	NA	NA	C	0.04	0	0	0.5	0	0	14
hp-0287.01-j	0	3834	417453	8320646	0.04	NA	NA	C	0.04	0	0	0.5	0	0	3
hp-0287.01-k	0	3834	417453	8320646	0.04	NA	NA	C	0.04	0	0	0.5	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0288.01-h	0	3836	418032	8320131	0.12	NA	NA	C	0.12	1	0	0	0	0	3
hp-0288.01-i	0	3836	418032	8320131	0.12	NA	NA	C	0.12	1	0	0	0	0	14
hp-0288.01-j	0	3836	418032	8320131	0.12	NA	NA	C	0.12	1	0	0	0	0	4
hp-0288.01-k	0	3836	418032	8320131	0.12	NA	NA	C	0.12	1	0	0	0	0	2
hp-0289.01-h	0	3827	416832	8319046	0.09	NA	NA	C	0.09	1	0	0	0	0	5
hp-0289.01-i	0	3827	416832	8319046	0.09	NA	NA	C	0.09	1	0	0	0	0	10
hp-0289.01-j	0	3827	416832	8319046	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0291.01-c	0	3824	416606	8319090	0.20	NA	NA	C	0.20	1	0.5	0.5	0	0	4
hp-0291.01-h	0	3824	416606	8319090	0.20	NA	NA	C	0.20	1	0	0.5	0	0	6
hp-0291.01-i	0	3824	416606	8319090	0.20	NA	NA	C	0.20	1	0	0.5	0	0	55
hp-0291.01-j	0	3824	416606	8319090	0.20	NA	NA	C	0.20	1	0	0.5	0	0	7
hp-0291.01-k	0	3824	416606	8319090	0.20	NA	NA	C	0.20	1	0	0.5	0	0	3
hp-0291.01-m	0	3824	416606	8319090	0.20	NA	NA	C	0.20	1	0	0.5	0	0	2
hp-0292.01-h	0	3822	416370	8319227	0.01	NA	NA	C	0.01	0	0	0.5	0	0	1
hp-0292.01-i	0	3822	416370	8319227	0.01	NA	NA	C	0.01	0	0	0.5	0	0	3
hp-0292.01-j	0	3822	416370	8319227	0.01	NA	NA	C	0.01	0	0	0.5	0	0	3
hp-0293.01-h	0	3828	415589	8322134	0.09	NA	NA	C	0.09	1	0	0	0	0	1
hp-0293.01-i	0	3828	415589	8322134	0.09	NA	NA	C	0.09	1	0	0	0	0	10
hp-0293.01-j	0	3828	415589	8322134	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0294.01-h	0	3826	415770	8322165	0.06	NA	NA	C	0.06	0	0	0	0	0	5
hp-0294.01-i	0	3826	415770	8322165	0.06	NA	NA	C	0.06	0	0	0	0	0	5
hp-0294.01-j	0	3826	415770	8322165	0.06	NA	NA	C	0.06	0	0	0	0	0	1
hp-0294.01-l	0	3826	415770	8322165	0.06	NA	NA	C	0.06	0	0	0	0	0	1
hp-0295.01-h	0	3831	415340	8322619	0.04	NA	NA	C	0.04	1	0	0	0	0	2
hp-0295.01-i	0	3831	415340	8322619	0.04	NA	NA	C	0.04	1	0	0	0	0	6
hp-0295.01-j	0	3831	415340	8322619	0.04	NA	NA	C	0.04	1	0	0	0	0	1
hp-0295.01-k	0	3831	415340	8322619	0.04	NA	NA	C	0.04	1	0	0	0	0	2
hp-0296.01-h	0	3831	415580	8322905	0.12	NA	NA	C	0.12	0.5	0	0.5	0	0	5
hp-0296.01-i	0	3831	415580	8322905	0.12	NA	NA	C	0.12	0.5	0	0.5	0	0	13
hp-0296.01-j	0	3831	415580	8322905	0.12	NA	NA	C	0.12	0.5	0	0.5	0	0	3
hp-0296.01-k	0	3831	415580	8322905	0.12	NA	NA	C	0.12	0.5	0	0.5	0	0	2
hp-0297.01-f	0	3832	415437	8322954	0.64	NA	NA	C	0.64	1	0	0	0	0	1

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0297.01-h	0	3832	415437	8322954	0.64	NA	NA	C	0.64	1	0	0	0	0	6
hp-0297.01-i	0	3832	415437	8322954	0.64	NA	NA	C	0.64	1	0	0	0	0	43
hp-0297.01-j	0	3832	415437	8322954	0.64	NA	NA	C	0.64	1	0	0	0	0	8
hp-0297.01-k	0	3832	415437	8322954	0.64	NA	NA	C	0.64	1	0	0	0	0	2
hp-0297.01-l	0	3832	415437	8322954	0.64	NA	NA	C	0.64	1	0	0	0	0	9
hp-0298.01-f	0	3873	415345	8323724	1.20	NA	NA	C	1.20	1	0	0.5	0	0.5	3
hp-0298.01-h	0	3873	415345	8323724	1.00	NA	NA	C	1.20	1	0	0.5	0	0.5	7
hp-0298.01-i	0	3873	415345	8323724	1.00	NA	NA	C	1.20	1	0	0.5	0	0.5	29
hp-0298.01-j	0	3873	415345	8323724	1.00	NA	NA	C	1.20	1	0	0.5	0	0.5	3
hp-0300.01-h	0	3881	415546	8323362	0.60	NA	NA	C	0.60	1	0	0.5	0	0	24
hp-0300.01-i	0	3881	415546	8323362	0.60	NA	NA	C	0.60	1	0	0.5	0	0	40
hp-0300.01-j	0	3881	415546	8323362	0.60	NA	NA	C	0.60	1	0	0.5	0	0	7
hp-0300.01-k	0	3881	415546	8323362	0.60	NA	NA	C	0.60	1	0	0.5	0	0	7
hp-0300.01-m	0	3881	415546	8323362	0.60	NA	NA	C	0.60	1	0	0.5	0	0	2
hp-0302.01-h	0	3823	416717	8319392	0.09	NA	NA	C	0.09	1	0	0	0	0	7
hp-0302.01-i	0	3823	416717	8319392	0.09	NA	NA	C	0.09	1	0	0	0	0	8
hp-0302.01-j	0	3823	416717	8319392	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0302.01-k	0	3823	416717	8319392	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0303.01-h	0	3826	416894	8319286	0.06	NA	NA	C	0.06	0	0	0.5	0	0	1
hp-0303.01-i	0	3826	416894	8319286	0.06	NA	NA	C	0.06	0	0	0.5	0	0	7
hp-0303.01-j	0	3826	416894	8319286	0.06	NA	NA	C	0.06	0	0	0.5	0	0	11
hp-0303.01-k	0	3826	416894	8319286	0.06	NA	NA	C	0.06	0	0	0.5	0	0	2
hp-0303.01-l	0	3826	416894	8319286	0.06	NA	NA	C	0.06	0	0	0.5	0	0	2
hp-0304.01-a	0	3973	416856	8321601	2.10	NA	NA	C	2.10	1	0	0.5	0	0	19
hp-0304.01-b	0	3973	416856	8321601	2.10	NA	NA	C	2.10	1	0	0.5	0	0	18
hp-0304.01-c	0	3973	416856	8321601	2.10	NA	NA	C	2.10	1	0	0.5	0	0	8
hp-0304.01-d	0	3973	416856	8321601	2.10	NA	NA	C	2.10	1	0	0.5	0	0	3
hp-0304.01-i	0	3973	416856	8321601	1.00	NA	NA	C	2.10	1	0	0.5	0	0	2
hp-0304.01-j	0	3973	416856	8321601	1.00	NA	NA	C	2.10	1	0	0.5	0	0	5
hp-0305.01-i	0	3882	416781	8322237	0.02	NA	NA	C	0.02	0	0	0.5	0	0	5
hp-0305.01-k	0	3882	416781	8322237	0.02	NA	NA	C	0.02	0	0	0.5	0	0	1
hp-0306.01-b	0	3946	416990	8322562	2.00	NA	NA	C	2.00	1	0.5	0	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0306.01-c	0	3946	416990	8322562	2.00	NA	NA	C	2.00	1	0.5	0	0	0	6
hp-0306.01-i	0	3946	416990	8322562	2.00	NA	NA	C	2.00	1	0.5	0	0	0	6
hp-0306.01-j	0	3946	416990	8322562	2.00	NA	NA	C	2.00	1	0.5	0	0	0	4
hp-0306.01-m	0	3946	416990	8322562	0.20	NA	NA	C	2.00	1	0.5	0	0	0	5
hp-0308.01-h	0	3833	415951	8323799	0.04	NA	NA	C	0.04	1	0	0	0	0	4
hp-0308.01-i	0	3833	415951	8323799	0.04	NA	NA	C	0.04	1	0	0	0	0	11
hp-0309.01-a	0	3829	415844	8324061	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0309.01-b	0	3829	415844	8324061	0.06	NA	NA	C	0.06	1	0	0	0	0	13
hp-0309.01-d	0	3829	415844	8324061	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0309.01-f	0	3829	415844	8324061	0.06	NA	NA	C	0.06	1	0	0	0	0	4
hp-0309.01-i	0	3829	415844	8324061	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0309.01-j	0	3829	415844	8324061	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0310.01-a	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	17
hp-0310.01-b	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	20
hp-0310.01-c	0	3834	415424	8323932	3.00	NA	NA	C	3.00	1	0	0	0	0	11
hp-0310.01-d	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	13
hp-0310.01-e	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	2
hp-0310.01-f	0	3834	415424	8323932	3.00	NA	NA	C	3.00	1	0	0	0	0	17
hp-0310.01-g	0	3834	415424	8323932	3.00	NA	NA	C	3.00	1	0	0	0	0	11
hp-0310.01-h	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	6
hp-0310.01-i	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	13
hp-0310.01-j	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	10
hp-0310.01-k	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	4
hp-0310.01-l	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	23
hp-0310.01-m	0	3834	415424	8323932	2.00	NA	NA	C	3.00	1	0	0	0	0	13
hp-0312.01-i	0	3942	417391	8321810	0.06	NA	NA	C	0.06	1	0	0	0	0	10
hp-0312.01-j	0	3942	417391	8321810	0.06	NA	NA	C	0.06	1	0	0	0	0	12
hp-0312.01-k	0	3942	417391	8321810	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0312.01-m	0	3942	417391	8321810	0.06	NA	NA	C	0.06	1	0	0	0	0	3
hp-0313.01-a	0	3948	417246	8321772	0.36	NA	NA	C	0.36	1	0	0	0	0	4
hp-0313.01-h	0	3948	417246	8321772	0.36	NA	NA	C	0.36	1	0	0	0	0	4
hp-0313.01-j	0	3948	417246	8321772	0.36	NA	NA	C	0.36	1	0	0	0	0	8

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0313.01-k	0	3948	417246	8321772	0.36	NA	NA	C	0.36	1	0	0	0	0	4
hp-0313.01-l	0	3948	417246	8321772	0.36	NA	NA	C	0.36	1	0	0	0	0	8
hp-0314.01-j	0	3839	416121	8323996	0.04	NA	NA	C	0.04	1	0	0	0	0	6
hp-0314.01-m	0	3839	416121	8323996	0.04	NA	NA	C	0.04	1	0	0	0	0	3
hp-0315.01-a	0	3872	414835	8326256	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0315.01-f	0	3872	414835	8326256	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0315.01-g	0	3872	414835	8326256	1.00	NA	NA	C	1.00	1	0	0	0	0	15
hp-0315.01-h	0	3872	414835	8326256	1.00	NA	NA	C	1.00	1	0	0	0	0	9
hp-0315.01-i	0	3872	414835	8326256	1.00	NA	NA	C	1.00	1	0	0	0	0	20
hp-0315.01-j	0	3872	414835	8326256	1.00	NA	NA	C	1.00	1	0	0	0	0	19
hp-0315.01-k	0	3872	414835	8326256	0.20	NA	NA	C	1.00	1	0	0	0	0	5
hp-0315.01-l	0	3872	414835	8326256	0.20	NA	NA	C	1.00	1	0	0	0	0	2
hp-0315.01-m	0	3872	414835	8326256	0.20	NA	NA	C	1.00	1	0	0	0	0	2
hp-0316.01-a	0	3910	414694	8326229	1.00	NA	NA	C	1.00	1	0.5	0	0	0	22
hp-0316.01-b	0	3910	414694	8326229	1.00	NA	NA	C	1.00	1	0.5	0	0	0	9
hp-0316.01-c	0	3910	414694	8326229	1.00	NA	NA	C	1.00	1	0.5	0	0	0	12
hp-0316.01-d	0	3910	414694	8326229	1.00	NA	NA	C	1.00	1	0.5	0	0	0	5
hp-0316.01-j	0	3910	414694	8326229	0.02	NA	NA	C	1.00	1	0	1	0	0	2
hp-0317.01-b	0	3829	414748	8325033	0.50	NA	NA	C	0.50	1	0	0	0	0	2
hp-0317.01-h	0	3829	414748	8325033	0.50	NA	NA	C	0.50	1	0	0	0	0	2
hp-0317.01-i	0	3829	414748	8325033	0.50	NA	NA	C	0.50	1	0	0	0	0	7
hp-0317.01-j	0	3829	414748	8325033	0.50	NA	NA	C	0.50	1	0	0	0	0	8
hp-0317.01-k	0	3829	414748	8325033	0.50	NA	NA	C	0.50	1	0	0	0	0	4
hp-0318.01-b	0	3838	414840	8325282	0.40	NA	NA	C	0.40	1	0	0.5	0	0	4
hp-0318.01-c	0	3838	414840	8325282	0.40	NA	NA	C	0.40	1	0	0.5	0	0	2
hp-0318.01-h	0	3838	414840	8325282	0.20	NA	NA	C	0.40	1	0	0.5	0	0	4
hp-0318.01-i	0	3838	414840	8325282	0.20	NA	NA	C	0.40	1	0	0.5	0	0	28
hp-0318.01-j	0	3838	414840	8325282	0.40	NA	NA	C	0.40	1	0	0.5	0	0	10
hp-0319.01-h	0	3837	414788	8325465	0.48	NA	NA	C	0.48	1	0	0.5	0	0	3
hp-0319.01-i	0	3837	414788	8325465	0.48	NA	NA	C	0.48	1	0	0.5	0	0	10
hp-0319.01-j	0	3837	414788	8325465	0.48	NA	NA	C	0.48	1	0	0.5	0	0	3
hp-0319.01-m	0	3837	414788	8325465	0.48	NA	NA	C	0.48	1	0	0.5	0	0	3

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0320.01-h	0	3844	414608	8325563	1.00	NA	NA	C	1.00	1	0	0.5	0	0	5
hp-0320.01-i	0	3844	414608	8325563	1.00	NA	NA	C	1.00	1	0	0.5	0	0	11
hp-0320.01-j	0	3844	414608	8325563	1.00	NA	NA	C	1.00	1	0	0.5	0	0	10
hp-0320.01-k	0	3844	414608	8325563	1.00	NA	NA	C	1.00	1	0	0.5	0	0	2
hp-0320.01-l	0	3844	414608	8325563	1.00	NA	NA	C	1.00	1	0	0.5	0	0	2
hp-0321.01-h	0	3847	414643	8325624	0.64	NA	NA	C	0.64	1	0	0.5	0	0	10
hp-0321.01-i	0	3847	414643	8325624	0.64	NA	NA	C	0.64	1	0	0.5	0	0	32
hp-0321.01-j	0	3847	414643	8325624	0.64	NA	NA	C	0.64	1	0	0.5	0	0	14
hp-0321.01-k	0	3847	414643	8325624	0.64	NA	NA	C	0.64	1	0	0.5	0	0	2
hp-0322.01-a	0	3844	414983	8325541	2.00	NA	NA	C	2.00	1	0	0	0	0	2
hp-0322.01-b	0	3844	414983	8325541	2.00	NA	NA	C	2.00	1	0	0	0	0	3
hp-0322.01-c	0	3844	414983	8325541	2.00	NA	NA	C	2.00	1	0	0	0	0	3
hp-0322.01-h	0	3844	414983	8325541	1.00	NA	NA	C	2.00	1	0	0	0	0	8
hp-0322.01-i	0	3844	414983	8325541	1.00	NA	NA	C	2.00	1	0	0	0	0	14
hp-0322.01-j	0	3844	414983	8325541	1.00	NA	NA	C	2.00	1	0	0	0	0	7
hp-0322.01-k	0	3844	414983	8325541	1.00	NA	NA	C	2.00	1	0	0	0	0	3
hp-0323.01-h	0	3843	414926	8325726	0.01	NA	NA	C	0.01	0	0	0.5	0	0	7
hp-0323.01-i	0	3843	414926	8325726	0.01	NA	NA	C	0.01	0	0	0.5	0	0	16
hp-0323.01-j	0	3843	414926	8325726	0.01	NA	NA	C	0.01	0	0	0.5	0	0	2
hp-0324.01-h	0	3848	414406	8325732	1.00	NA	NA	C	2.00	1	0	0.5	0	0	10
hp-0324.01-i	0	3848	414406	8325732	2.00	NA	NA	C	2.00	1	0	0.5	0	0	22
hp-0324.01-j	0	3848	414406	8325732	2.00	NA	NA	C	2.00	1	0	0.5	0	0	12
hp-0324.01-k	0	3848	414406	8325732	2.00	NA	NA	C	2.00	1	0	0.5	0	0	7
hp-0325.01-h	0	3834	414356	8325494	2.00	NA	NA	C	2.00	1	0	0.5	0	0	8
hp-0325.01-i	0	3834	414356	8325494	2.00	NA	NA	C	2.00	1	0	0.5	0	0	36
hp-0325.01-j	0	3834	414356	8325494	1.00	NA	NA	C	2.00	1	0	0.5	0	0	16
hp-0325.01-k	0	3834	414356	8325494	1.00	NA	NA	C	2.00	1	0	0.5	0	0	9
hp-0327.01-h	0	4085	418843	8320887	2.00	NA	NA	C	2.50	1	0.5	0	0	0	1
hp-0327.01-i	0	4085	418843	8320887	2.00	NA	NA	C	2.50	1	0.5	0	0	0	4
hp-0328.01-h	0	3861	417590	8320923	0.64	NA	NA	C	0.64	1	0	0	0	0	3
hp-0328.01-i	0	3861	417590	8320923	0.64	NA	NA	C	0.64	1	0	0	0	0	7
hp-0328.01-j	0	3861	417590	8320923	0.64	NA	NA	C	0.64	1	0	0	0	0	12

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0328.01-k	0	3861	417590	8320923	0.64	NA	NA	C	0.64	1	0	0	0	0	3
hp-0328.01-m	0	3861	417590	8320923	0.64	NA	NA	C	0.64	1	0	0	0	0	2
hp-0329.01-i	0	3911	418693	8320061	1.00	NA	NA	C	1.00	1	0	0	0	0	17
hp-0329.01-j	0	3911	418693	8320061	1.00	NA	NA	C	1.00	1	0	0	0	0	6
hp-0329.01-k	0	3911	418693	8320061	1.00	NA	NA	C	1.00	1	0	0	0	0	4
hp-0329.01-m	0	3911	418693	8320061	1.00	NA	NA	C	1.00	1	0	0	0	0	2
hp-0331.01-h	0	3852	415058	8325869	0.04	NA	NA	C	0.04	0	0	0.5	0	0	4
hp-0331.01-i	0	3852	415058	8325869	0.04	NA	NA	C	0.04	0	0	0.5	0	0	28
hp-0331.01-j	0	3852	415058	8325869	0.04	NA	NA	C	0.04	0	0	0.5	0	0	10
hp-0331.01-k	0	3852	415058	8325869	0.04	NA	NA	C	0.04	0	0	0.5	0	0	NA
hp-0332.01-a	0	3848	415171	8325632	0.4	NA	NA	C	0.4	0.5	0	0.5	0	0	1
hp-0332.01-h	0	3848	415171	8325632	0.4	NA	NA	C	0.4	0	0	0.5	0	0	9
hp-0332.01-i	0	3848	415171	8325632	0.4	NA	NA	C	0.4	0	0	0.5	0	0	30
hp-0332.01-j	0	3848	415171	8325632	0.4	NA	NA	C	0.4	0	0	0.5	0	0	7
hp-0332.01-k	0	3848	415171	8325632	0.4	NA	NA	C	0.4	0	0	0.5	0	0	3
hp-0333.01-h	0	3846	415163	8325246	0.18	NA	NA	C	0.18	1	0	0	0	0	6
hp-0333.01-i	0	3846	415163	8325246	0.18	NA	NA	C	0.18	1	0	0	0	0	16
hp-0333.01-j	0	3846	415163	8325246	0.18	NA	NA	C	0.18	1	0	0	0	0	6
hp-0333.01-k	0	3846	415163	8325246	0.18	NA	NA	C	0.18	1	0	0	0	0	2
hp-0334.01-h	0	3830	415159	8325044	0.06	NA	NA	C	0.06	0	0	0.5	0	0	5
hp-0334.01-i	0	3830	415159	8325044	0.06	NA	NA	C	0.06	0	0	0.5	0	0	9
hp-0334.01-j	0	3830	415159	8325044	0.06	NA	NA	C	0.06	0	0	0.5	0	0	3
hp-0335.01-h	0	3849	415437	8325430	0.09	NA	NA	C	0.09	0	0	0.5	0	0	2
hp-0335.01-i	0	3849	415437	8325430	0.09	NA	NA	C	0.09	0	0	0.5	0	0	15
hp-0336.01-c	0	3851	415205	8326364	0.4	NA	NA	C	0.4	0.5	0	0.5	0	0	NA
hp-0336.01-h	0	3851	415205	8326364	0.4	NA	NA	C	0.4	0	0	0.5	0	0	5
hp-0336.01-i	0	3851	415205	8326364	0.4	NA	NA	C	0.4	0	0	0.5	0	0	35
hp-0336.01-j	0	3851	415205	8326364	0.4	NA	NA	C	0.4	0	0	0.5	0	0	3
hp-0336.01-k	0	3851	415205	8326364	0.4	NA	NA	C	0.4	0	0	0.5	0	0	2
hp-0337.01-h	0	3851	415198	8326452	2.00	NA	NA	C	2.00	1	0	0.5	0	0	10
hp-0337.01-i	0	3851	415198	8326452	2.00	NA	NA	C	2.00	1	0	0.5	0	0	84
hp-0337.01-j	0	3851	415198	8326452	2.00	NA	NA	C	2.00	1	0	0.5	0	0	24

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0337.01-k	0	3851	415198	8326452	0.22	NA	NA	C	2.00	1	0	0.5	0	0	13
hp-0338.01-c	0	3852	415132	8326791	0.09	NA	NA	C	0.09	0.5	0	0.5	0	0	1
hp-0338.01-f	0	3852	415132	8326791	0.09	NA	NA	C	0.09	0	0	0.5	0	0	1
hp-0338.01-h	0	3852	415132	8326791	0.09	NA	NA	C	0.09	0	0	0.5	0	0	2
hp-0338.01-i	0	3852	415132	8326791	0.09	NA	NA	C	0.09	0	0	0.5	0	0	8
hp-0338.01-j	0	3852	415132	8326791	0.09	NA	NA	C	0.09	0	0	0.5	0	0	2
hp-0339.01-h	0	3847	414944	8326663	0.4	NA	NA	C	0.4	0	0	0.5	0	0	9
hp-0339.01-i	0	3847	414944	8326663	0.4	NA	NA	C	0.4	0	0	0.5	0	0	14
hp-0339.01-j	0	3847	414944	8326663	0.4	NA	NA	C	0.4	0	0	0.5	0	0	12
hp-0340.01-f	0	3854	414943	8326506	1.00	NA	NA	C	1.00	1	0	0.5	0	0	2
hp-0340.01-h	0	3854	414943	8326506	1.00	NA	NA	C	1.00	1	0	0.5	0	0	7
hp-0340.01-i	0	3854	414943	8326506	1.00	NA	NA	C	1.00	1	0	0.5	0	0	14
hp-0340.01-j	0	3854	414943	8326506	1.00	NA	NA	C	1.00	1	0	0.5	0	0	14
hp-0340.01-k	0	3854	414943	8326506	1.00	NA	NA	C	1.00	1	0	0.5	0	0	2
hp-0341.01-f	0	3890	420090	8319183	0.09	NA	NA	C	0.09	1	0	0	0	0	1
hp-0341.01-h	0	3890	420090	8319183	0.09	NA	NA	C	0.09	1	0	0	0	0	1
hp-0341.01-i	0	3890	420090	8319183	0.09	NA	NA	C	0.09	1	0	0	0	0	13
hp-0341.01-j	0	3890	420090	8319183	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0341.01-k	0	3890	420090	8319183	0.09	NA	NA	C	0.09	1	0	0	0	0	9
hp-0341.01-l	0	3890	420090	8319183	0.09	NA	NA	C	0.09	1	0	0	0	0	6
hp-0341.01-m	0	3890	420090	8319183	0.09	NA	NA	C	0.09	1	0	0	0	0	7
hp-0342.01-c	0	3879	419702	8319223	0.09	NA	NA	C	0.09	0.5	0	0.5	0	0	2
hp-0342.01-i	0	3879	419702	8319223	0.09	NA	NA	C	0.09	0	0	0.5	0	0	8
hp-0342.01-j	0	3879	419702	8319223	0.09	NA	NA	C	0.09	0	0	0.5	0	0	3
hp-0342.01-k	0	3879	419702	8319223	0.09	NA	NA	C	0.09	0	0	0.5	0	0	4
hp-0342.01-l	0	3879	419702	8319223	0.09	NA	NA	C	0.09	0	0	0.5	0	0	10
hp-0342.01-m	0	3879	419702	8319223	0.09	NA	NA	C	0.09	0	0	0.5	0	0	2
hp-0343.01-g	0	3840	414883	8326737	0.25	NA	NA	C	0.25	1	0	0.5	0	0	1
hp-0343.01-h	0	3840	414883	8326737	0.25	NA	NA	C	0.25	1	0	0.5	0	0	15
hp-0343.01-i	0	3840	414883	8326737	0.25	NA	NA	C	0.25	1	0	0.5	0	0	51
hp-0343.01-j	0	3840	414883	8326737	0.25	NA	NA	C	0.25	1	0	0.5	0	0	17
hp-0343.01-k	0	3840	414883	8326737	0.25	NA	NA	C	0.25	1	0	0.5	0	0	7

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0344.01-c	0	3849	414745	8326852	1	NA	NA	C	1	0.5	0	0.5	0	0	NA
hp-0344.01-e	0	3849	414745	8326852	1	NA	NA	C	1	0.5	0	0.5	0	0	1
hp-0344.01-g	0	3849	414745	8326852	1	NA	NA	C	1	0.5	0	0.5	0	0	1
hp-0344.01-h	0	3849	414745	8326852	1	NA	NA	C	1	0.5	0	0.5	0	0	58
hp-0344.01-i	0	3849	414745	8326852	1	NA	NA	C	1	0.5	0	0.5	0	0	162
hp-0344.01-j	0	3849	414745	8326852	1	NA	NA	C	1	0.5	0	0.5	0	0	73
hp-0344.01-k	0	3849	414745	8326852	1	NA	NA	C	1	0.5	0	0.5	0	0	53
hp-0345.01-h	0	3849	414693	8326677	0.25	NA	NA	C	0.25	0.5	0	0.5	0	0	5
hp-0345.01-i	0	3849	414693	8326677	0.25	NA	NA	C	0.25	0.5	0	0.5	0	0	10
hp-0345.01-j	0	3849	414693	8326677	0.25	NA	NA	C	0.25	0.5	0	0.5	0	0	4
hp-0346.01-h	0	3847	414583	8326770	0.09	NA	NA	C	0.09	0	0	0.5	0	0	6
hp-0346.01-i	0	3847	414583	8326770	0.09	NA	NA	C	0.09	0	0	0.5	0	0	15
hp-0346.01-j	0	3847	414583	8326770	0.09	NA	NA	C	0.09	0	0	0.5	0	0	5
hp-0347.01-h	0	3864	414497	8326676	0.14	NA	NA	C	0.14	0	0	0.5	0	0	1
hp-0347.01-i	0	3864	414497	8326676	0.14	NA	NA	C	0.14	0	0	0.5	0	0	5
hp-0347.01-j	0	3864	414497	8326676	0.14	NA	NA	C	0.14	0	0	0.5	0	0	6
hp-0348.01-h	0	3843	414265	8326229	1.50	NA	NA	C	1.50	1	0	0.5	0	0	30
hp-0348.01-i	0	3843	414265	8326229	1.50	NA	NA	C	1.50	1	0	0.5	0	0	73
hp-0348.01-j	0	3843	414265	8326229	1.50	NA	NA	C	1.50	1	0	0.5	0	0	43
hp-0348.01-k	0	3843	414265	8326229	1.50	NA	NA	C	1.50	1	0	0.5	0	0	18
hp-0348.01-l	0	3843	414265	8326229	1.50	NA	NA	C	1.50	1	0	0.5	0	0	2
hp-0348.01-m	0	3843	414265	8326229	1.50	NA	NA	C	1.50	1	0	0.5	0	0	2
hp-0349.01-h	0	3838	414138	8326164	0.30	NA	NA	C	0.32	1	0	0.5	0	0	7
hp-0349.01-i	0	3838	414138	8326164	0.32	NA	NA	C	0.32	1	0	0.5	0	0	10
hp-0349.01-j	0	3838	414138	8326164	0.32	NA	NA	C	0.32	1	0	0.5	0	0	2
hp-0349.01-k	0	3838	414138	8326164	0.32	NA	NA	C	0.32	1	0	0.5	0	0	2
hp-0350.01-h	0	3834	414149	8326018	0.04	NA	NA	C	0.04	0	0	0.5	0	0	6
hp-0350.01-i	0	3834	414149	8326018	0.04	NA	NA	C	0.04	0	0	0.5	0	0	12
hp-0350.01-j	0	3834	414149	8326018	0.04	NA	NA	C	0.04	0	0	0.5	0	0	4
hp-0350.01-k	0	3834	414149	8326018	0.04	NA	NA	C	0.04	0	0	0.5	0	0	2
hp-0351.01-i	0	3850	414338	8326021	0.30	NA	NA	C	0.30	1	0	0.5	0	0	2
hp-0351.01-j	0	3850	414338	8326021	0.30	NA	NA	C	0.30	1	0	0.5	0	0	1

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0351.01-k	0	3850	414338	8326021	0.30	NA	NA	C	0.30	1	0	0.5	0	0	1
hp-0352.01-i	0	3827	414108	8329649	0.01	NA	NA	C	0.01	0	0	1	0	0	3
hp-0353.01-h	0	3860	414156	8331230	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0353.01-i	0	3860	414156	8331230	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0353.01-k	0	3860	414156	8331230	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0353.01-l	0	3860	414156	8331230	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0353.01-m	0	3860	414156	8331230	0.09	NA	NA	C	0.09	1	0	0	0	0	1
hp-0354.01-i	0	3846	414217	8330537	0.05	NA	NA	C	0.05	1	0	0	0	0	4
hp-0354.01-k	0	3846	414217	8330537	0.05	NA	NA	C	0.05	1	0	0	0	0	1
hp-0355.01-h	0	3862	414302	8330165	0.01	NA	NA	C	0.01	0	0	0.5	0	0	1
hp-0355.01-i	0	3862	414302	8330165	0.01	NA	NA	C	0.01	0	0	0.5	0	0	9
hp-0355.01-j	0	3862	414302	8330165	0.01	NA	NA	C	0.01	0	0	0.5	0	0	4
hp-0355.01-k	0	3862	414302	8330165	0.01	NA	NA	C	0.01	0	0	0.5	0	0	18
hp-0355.01-l	0	3862	414302	8330165	0.01	NA	NA	C	0.01	0	0	0.5	0	0	12
hp-0355.01-m	0	3862	414302	8330165	0.01	NA	NA	C	0.01	0	0	0.5	0	0	6
hp-0357.01-i	0	3841	414974	8327362	0.09	NA	NA	C	0.09	1	0	0	0	0	6
hp-0357.01-k	0	3841	414974	8327362	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0358.01-i	0	3833	415024	8327230	0.09	NA	NA	C	0.09	1	0	0	0	0	4
hp-0358.01-k	0	3833	415024	8327230	0.09	NA	NA	C	0.09	1	0	0	0	0	4
hp-0358.01-l	0	3833	415024	8327230	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0359.01-i	0	3832	414946	8326991	0.02	NA	NA	C	0.02	1	0	0	0	0	4
hp-0360.01-i	0	3953	416284	8327292	0.01	NA	NA	C	0.01	0	0	1	0	0	7
hp-0361.01-h	0	4121	415708	8328259	3.00	NA	NA	C	3.00	1	0	0	0	0.5	NA
hp-0361.01-i	0	4121	415708	8328259	3.00	NA	NA	C	3.00	1	0	0	0	0.5	NA
hp-0362.01-i	0	4138	415720	8328395	0.01	NA	NA	C	0.01	0	0	0.5	0	0	15
hp-0362.01-j	0	4138	415720	8328395	0.01	NA	NA	C	0.01	0	0	0.5	0	0	2
hp-0365.01-i	0	3829	416222	8326442	0.04	NA	NA	C	0.04	0	0	0	0	0	5
hp-0366.01-i	0	3831	416115	8326567	0.06	NA	NA	C	0.06	0	0	0	0	0	3
hp-0369.01-h	0	3837	415745	8327118	0.05	NA	NA	C	0.05	0	0	0.5	0	0	1
hp-0369.01-i	0	3837	415745	8327118	0.05	NA	NA	C	0.05	0	0	0.5	0	0	13
hp-0370.01-i	0	3836	415579	8327147	0.18	NA	NA	C	0.18	1	0	0	0	0	12
hp-0374.01-h	0	3849	415751	8326478	0.48	NA	NA	C	0.48	0	0	0.5	0	0	3

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0374.01-i	0	3849	415751	8326478	0.48	NA	NA	C	0.48	0	0	0.5	0	0	13
hp-0374.01-j	0	3849	415751	8326478	0.48	NA	NA	C	0.48	0	0	0.5	0	0	2
hp-0374.01-k	0	3849	415751	8326478	0.48	NA	NA	C	0.48	0	0	0.5	0	0	16
hp-0375.01-i	0	3842	415976	8326473	0.04	NA	NA	C	0.04	0	0	1	0	0	8
hp-0376.01-i	0	3840	416003	8326359	0.12	NA	NA	C	0.12	1	0	1	0	0	7
hp-0377.01-h	0	3898	415820	8325873	0.36	NA	NA	C	0.36	1	0	0	0	0	1
hp-0377.01-i	0	3898	415820	8325873	0.36	NA	NA	C	0.36	1	0	0	0	0	5
hp-0377.01-k	0	3898	415820	8325873	0.36	NA	NA	C	0.36	1	0	0	0	0	4
hp-0377.01-l	0	3898	415820	8325873	0.36	NA	NA	C	0.36	1	0	0	0	0	1
hp-0378.01-i	0	3872	416085	8326051	0.09	NA	NA	C	0.09	1	0	0	0	0	12
hp-0378.01-j	0	3872	416085	8326051	0.09	NA	NA	C	0.09	1	0	0	0	0	5
hp-0378.01-k	0	3872	416085	8326051	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0378.01-l	0	3872	416085	8326051	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0378.01-m	0	3872	416085	8326051	0.09	NA	NA	C	0.09	1	0	0	0	0	5
hp-0379.01-i	0	3853	416181	8326145	0.42	NA	NA	C	0.42	0	0	1	0	0	7
hp-0380.01-c	0	3839	416351	8326034	0.09	NA	NA	C	0.09	1	0	0	0	0	1
hp-0381.01-a	0	3844	416684	8326324	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	56
hp-0381.01-b	0	3844	416684	8326324	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	44
hp-0381.01-c	0	3844	416684	8326324	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	70
hp-0381.01-d	0	3844	416684	8326324	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	16
hp-0381.01-e	0	3844	416684	8326324	1.00	NA	NA	C	2.00	1	0.5	0.5	0	0	3
hp-0381.01-f	0	3844	416684	8326324	1.00	NA	NA	C	2.00	1	0.5	0.5	0	0	4
hp-0381.01-h	0	3844	416684	8326324	1.00	NA	NA	C	2.00	1	0	0.5	0	0	2
hp-0381.01-i	0	3844	416684	8326324	1.00	NA	NA	C	2.00	1	0	0.5	0	0	8
hp-0381.01-j	0	3844	416684	8326324	1.00	NA	NA	C	2.00	1	0	0.5	0	0	7
hp-0381.01-k	0	3844	416684	8326324	0.50	NA	NA	C	2.00	1	0	0.5	0	0	2
hp-0381.01-m	0	3844	416684	8326324	1.00	NA	NA	C	2.00	1	0	0.5	0	0	15
hp-0382.01-a	0	3839	416675	8326240	2.00	NA	NA	C	2.00	1	0	0.5	0	0	10
hp-0382.01-b	0	3839	416675	8326240	2.00	NA	NA	C	2.00	1	0	0.5	0	0	11
hp-0382.01-c	0	3839	416675	8326240	2.00	NA	NA	C	2.00	1	0	0.5	0	0	56
hp-0382.01-d	0	3839	416675	8326240	2.00	NA	NA	C	2.00	1	0	0.5	0	0	3
hp-0383.01-h	0	3852	416677	8326525	0.08	NA	NA	C	0.08	0	0	0.5	0	0	3

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0383.01-i	0	3852	416677	8326525	0.08	NA	NA	C	0.08	0	0	0.5	0	0	1
hp-0383.01-m	0	3852	416677	8326525	0.08	NA	NA	C	0.08	0	0	0.5	0	0	2
hp-0384.01-i	0	3840	413614	8331946	0.49	NA	NA	C	0.49	1	0	0	0	0	25
hp-0384.01-j	0	3840	413614	8331946	0.49	NA	NA	C	0.49	1	0	0	0	0	2
hp-0384.01-k	0	3840	413614	8331946	0.49	NA	NA	C	0.49	1	0	0	0	0	3
hp-0384.01-l	0	3840	413614	8331946	0.49	NA	NA	C	0.49	1	0	0	0	0	3
hp-0384.01-m	0	3840	413614	8331946	0.49	NA	NA	C	0.49	1	0	0	0	0	9
hp-0387.01-i	0	3877	413372	8333040	0.09	NA	NA	C	0.09	1	0	0	0	0	20
hp-0387.01-l	0	3877	413372	8333040	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0388.01-h	0	3845	413442	8333410	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0388.01-i	0	3845	413442	8333410	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0388.01-k	0	3845	413442	8333410	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0388.01-m	0	3845	413442	8333410	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0390.01-b	0	3907	413630	8333438	0.50	NA	NA	C	0.50	1	0	0.5	0	0	4
hp-0390.01-c	0	3907	413630	8333438	0.50	NA	NA	C	0.50	1	0	0.5	0	0	8
hp-0390.01-h	0	3907	413630	8333438	0.50	NA	NA	C	0.50	1	0	0.5	0	0	5
hp-0390.01-i	0	3907	413630	8333438	0.50	NA	NA	C	0.50	1	0	0.5	0	0	47
hp-0390.01-j	0	3907	413630	8333438	0.50	NA	NA	C	0.50	1	0	0.5	0	0	7
hp-0390.01-k	0	3907	413630	8333438	0.50	NA	NA	C	0.50	1	0	0.5	0	0	33
hp-0390.01-l	0	3907	413630	8333438	0.50	NA	NA	C	0.50	1	0	0.5	0	0	3
hp-0392.01-h	0	3833	413011	8333770	0.09	NA	NA	C	0.09	1	0	0	0	0	1
hp-0392.01-i	0	3833	413011	8333770	0.09	NA	NA	C	0.09	1	0	0	0	0	4
hp-0392.01-k	0	3833	413011	8333770	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0392.01-l	0	3833	413011	8333770	0.09	NA	NA	C	0.09	1	0	0	0	0	1
hp-0393.01-h	0	3834	412893	8333857	0.01	NA	NA	C	0.01	0	0	0.5	0	0	6
hp-0393.01-i	0	3834	412893	8333857	0.01	NA	NA	C	0.01	0	0	0.5	0	0	18
hp-0393.01-j	0	3834	412893	8333857	0.01	NA	NA	C	0.01	0	0	0.5	0	0	3
hp-0393.01-k	0	3834	412893	8333857	0.01	NA	NA	C	0.01	0	0	0.5	0	0	10
hp-0394.01-i	0	3838	412808	8333824	0.01	NA	NA	C	0.01	0	0	0.5	0	0	10
hp-0394.01-k	0	3838	412808	8333824	0.01	NA	NA	C	0.01	0	0	0.5	0	0	4
hp-0395.01-i	0	3837	412652	8333553	0.01	NA	NA	C	0.01	0	0	0	0	0	7
hp-0395.01-k	0	3837	412652	8333553	0.01	NA	NA	C	0.01	0	0	0	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0395.01-l	0	3837	412652	8333553	0.01	NA	NA	C	0.01	0	0	0	0	0	2
hp-0396.01-h	0	3835	412526	8333291	0.20	NA	NA	C	0.20	1	0	0	0	0	4
hp-0396.01-i	0	3835	412526	8333291	0.20	NA	NA	C	0.20	1	0	0	0	0	10
hp-0396.01-k	0	3835	412526	8333291	0.20	NA	NA	C	0.20	1	0	0	0	0	4
hp-0396.01-m	0	3835	412526	8333291	0.20	NA	NA	C	0.20	1	0	0	0	0	24
hp-0397.01-h	0	3833	412342	8332956	0.7	NA	NA	C	0.7	0	0	0.5	0	0	4
hp-0397.01-i	0	3833	412342	8332956	0.7	NA	NA	C	0.7	0	0	0.5	0	0	37
hp-0397.01-j	0	3833	412342	8332956	0.7	NA	NA	C	0.7	0	0	0.5	0	0	9
hp-0397.01-k	0	3833	412342	8332956	0.7	NA	NA	C	0.7	0	0	0.5	0	0	19
hp-0398.01-h	0	3831	414224	8318863	1.80	NA	NA	C	1.80	1	0	0	0	0	12
hp-0398.01-i	0	3831	414224	8318863	1.80	NA	NA	C	1.80	1	0	0	0	0	23
hp-0398.01-j	0	3831	414224	8318863	1.80	NA	NA	C	1.80	1	0	0	0	0	15
hp-0398.01-k	0	3831	414224	8318863	1.80	NA	NA	C	1.80	1	0	0	0	0	13
hp-0399.01-h	0	3829	414069	8319356	1.00	NA	NA	C	1.00	1	0	0	0	0	2
hp-0399.01-i	0	3829	414069	8319356	1.00	NA	NA	C	1.00	1	0	0	0	0	6
hp-0399.01-k	0	3829	414069	8319356	1.00	NA	NA	C	1.00	1	0	0	0	0	7
hp-0400.01-h	0	3831	413931	8319665	0.25	NA	NA	C	0.25	1	0	0	0	0	4
hp-0400.01-i	0	3831	413931	8319665	0.25	NA	NA	C	0.25	1	0	0	0	0	13
hp-0400.01-j	0	3831	413931	8319665	0.25	NA	NA	C	0.25	1	0	0	0	0	7
hp-0400.01-k	0	3831	413931	8319665	0.25	NA	NA	C	0.25	1	0	0	0	0	15
hp-0400.01-l	0	3831	413931	8319665	0.25	NA	NA	C	0.25	1	0	0	0	0	2
hp-0402.01-i	0	3835	413412	8323155	0.04	NA	NA	C	0.04	1	0	0	0	0	2
hp-0402.01-k	0	3835	413412	8323155	0.04	NA	NA	C	0.04	1	0	0	0	0	2
hp-0402.01-l	0	3835	413412	8323155	0.04	NA	NA	C	0.04	1	0	0	0	0	1
hp-0402.01-m	0	3835	413412	8323155	0.04	NA	NA	C	0.04	1	0	0	0	0	3
hp-0403.01-i	0	3838	413973	8321509	0.09	NA	NA	C	0.09	1	0	0	0	0	13
hp-0403.01-j	0	3838	413973	8321509	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0403.01-m	0	3838	413973	8321509	0.09	NA	NA	C	0.09	1	0	0	0	0	8
hp-0404.01-b	0	3827	414145	8319455	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0404.01-h	0	3827	414145	8319455	1.00	NA	NA	C	1.00	1	0	0	0	0	17
hp-0404.01-i	0	3827	414145	8319455	1.00	NA	NA	C	1.00	1	0	0	0	0	32
hp-0404.01-j	0	3827	414145	8319455	1.00	NA	NA	C	1.00	1	0	0	0	0	4

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0404.01-k	0	3827	414145	8319455	1.00	NA	NA	C	1.00	1	0	0	0	0	16
hp-0405.01-h	0	3824	414678	8319018	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0405.01-i	0	3824	414678	8319018	0.06	NA	NA	C	0.06	1	0	0	0	0	5
hp-0405.01-j	0	3824	414678	8319018	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0405.01-k	0	3824	414678	8319018	0.06	NA	NA	C	0.06	1	0	0	0	0	3
hp-0405.01-m	0	3824	414678	8319018	0.06	NA	NA	C	0.06	1	0	0	0	0	1
hp-0406.01-a	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	158
hp-0406.01-b	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	76
hp-0406.01-c	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	100
hp-0406.01-d	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	35
hp-0406.01-f	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0.5	0.5	0	0	3
hp-0406.01-h	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0	0.5	0	0	5
hp-0406.01-i	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0	0.5	0	0	22
hp-0406.01-j	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0	0.5	0	0	12
hp-0406.01-k	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0	0.5	0	0	5
hp-0406.01-m	0	3826	415334	8321189	2.00	NA	NA	C	2.00	1	0	0.5	0	0	4
hp-0407.01-i	0	3826	414966	8320954	0.12	NA	NA	C	0.12	1	0	0	0	0	9
hp-0407.01-j	0	3826	414966	8320954	0.12	NA	NA	C	0.12	1	0	0	0	0	2
hp-0407.01-k	0	3826	414966	8320954	0.12	NA	NA	C	0.12	1	0	0	0	0	2
hp-0407.01-l	0	3826	414966	8320954	0.12	NA	NA	C	0.12	1	0	0	0	0	4
hp-0407.01-m	0	3826	414966	8320954	0.12	NA	NA	C	0.12	1	0	0	0	0	13
hp-0408.01-e	0	3828	414512	8320412	0.12	NA	NA	C	0.12	0	0	0.5	0	0	1
hp-0408.01-h	0	3828	414512	8320412	0.12	NA	NA	C	0.12	0	0	0.5	0	0	3
hp-0408.01-i	0	3828	414512	8320412	0.12	NA	NA	C	0.12	0	0	0.5	0	0	12
hp-0408.01-j	0	3828	414512	8320412	0.12	NA	NA	C	0.12	0	0	0.5	0	0	2
hp-0408.01-k	0	3828	414512	8320412	0.12	NA	NA	C	0.12	0	0	0.5	0	0	2
hp-0408.01-m	0	3828	414512	8320412	0.12	NA	NA	C	0.12	0	0	0.5	0	0	3
hp-0409.01-h	0	3832	414240	8322665	0.70	NA	NA	C	0.70	1	0	0	0	0	3
hp-0409.01-j	0	3832	414240	8322665	0.70	NA	NA	C	0.70	1	0	0	0	0	4
hp-0409.01-k	0	3832	414240	8322665	0.70	NA	NA	C	0.70	1	0	0	0	0	6
hp-0409.01-m	0	3832	414240	8322665	0.70	NA	NA	C	0.70	1	0	0	0	0	15
hp-0410.01-h	0	3837	414099	8322869	0.48	NA	NA	C	0.48	0	0	0.5	0	0	15

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0410.01-i	0	3837	414099	8322869	0.48	NA	NA	C	0.48	0	0	0.5	0	0	37
hp-0410.01-j	0	3837	414099	8322869	0.48	NA	NA	C	0.48	0	0	0.5	0	0	8
hp-0410.01-k	0	3837	414099	8322869	0.48	NA	NA	C	0.48	0	0	0.5	0	0	9
hp-0410.01-m	0	3837	414099	8322869	0.48	NA	NA	C	0.48	0	0	0.5	0	0	12
hp-0411.01-h	0	3851	413601	8324626	0.12	NA	NA	C	0.12	1	0	0.5	0	0	2
hp-0411.01-i	0	3851	413601	8324626	0.12	NA	NA	C	0.12	1	0	0.5	0	0	13
hp-0411.01-j	0	3851	413601	8324626	0.12	NA	NA	C	0.12	1	0	0.5	0	0	2
hp-0411.01-m	0	3851	413601	8324626	0.12	NA	NA	C	0.12	1	0	0.5	0	0	4
hp-0412.01-a	0	3894	413262	8325383	0.25	NA	NA	C	0.25	1	0	0	0	0.5	10
hp-0412.01-b	0	3894	413262	8325383	0.25	NA	NA	C	0.25	1	0	0	0	0.5	9
hp-0412.01-c	0	3894	413262	8325383	0.25	NA	NA	C	0.25	1	0	0	0	0.5	2
hp-0412.01-f	0	3894	413262	8325383	0.25	NA	NA	C	0.25	1	0.5	0	0	0.5	3
hp-0412.01-g	0	3894	413262	8325383	0.25	NA	NA	C	0.25	1	0.5	0	0	0.5	4
hp-0412.01-h	0	3894	413262	8325383	0.25	NA	NA	C	0.25	1	0	0.5	0	0.5	4
hp-0412.01-i	0	3894	413262	8325383	0.25	NA	NA	C	0.25	1	0	0.5	0	0.5	26
hp-0412.01-j	0	3894	413262	8325383	0.25	NA	NA	C	0.25	1	0	0.5	0	0.5	8
hp-0413.01-h	0	3865	413254	8325766	0.04	NA	NA	C	0.04	0	0	0.5	0	0	2
hp-0413.01-i	0	3865	413254	8325766	0.04	NA	NA	C	0.04	0	0	0.5	0	0	9
hp-0413.01-j	0	3865	413254	8325766	0.04	NA	NA	C	0.04	0	0	0.5	0	0	2
hp-0413.01-k	0	3865	413254	8325766	0.04	NA	NA	C	0.04	0	0	0.5	0	0	1
hp-0414.01-a	0	3837	413574	8325378	3.00	NA	NA	C	3.00	1	0	0.5	0	0	15
hp-0414.01-b	0	3837	413574	8325378	3.00	NA	NA	C	3.00	1	0	0.5	0	0	14
hp-0414.01-c	0	3837	413574	8325378	3.00	NA	NA	C	3.00	1	0	0.5	0	0	48
hp-0414.01-h	0	3837	413574	8325378	3.00	NA	NA	C	3.00	1	0	0.5	0	0	2
hp-0414.01-i	0	3837	413574	8325378	3.00	NA	NA	C	3.00	1	0	0.5	0	0	13
hp-0414.01-j	0	3837	413574	8325378	3.00	NA	NA	C	3.00	1	0	0.5	0	0	2
hp-0414.01-k	0	3837	413574	8325378	1.00	NA	NA	C	3.00	1	0	0.5	0	0	4
hp-0414.01-l	0	3837	413574	8325378	1.00	NA	NA	C	3.00	1	0	0.5	0	0	5
hp-0414.01-m	0	3837	413574	8325378	1.00	NA	NA	C	3.00	1	0	0.5	0	0	8
hp-0415.01-i	0	3842	413895	8318714	0.09	NA	NA	C	0.09	1	0	0	0	0	6
hp-0415.01-k	0	3842	413895	8318714	0.09	NA	NA	C	0.09	1	0	0	0	0	7
hp-0415.01-l	0	3842	413895	8318714	0.09	NA	NA	C	0.09	1	0	0	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0415.01-m	0	3842	413895	8318714	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0416.01-a	0	3841	413692	8319097	1.00	NA	NA	C	1.00	1	0	0	0	0	1
hp-0416.01-c	0	3841	413692	8319097	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0416.01-g	0	3841	413692	8319097	1.00	NA	NA	C	1.00	1	0	0	0	0	6
hp-0416.01-h	0	3841	413692	8319097	0.30	NA	NA	C	1.00	1	0	0.5	0	0	5
hp-0416.01-i	0	3841	413692	8319097	0.30	NA	NA	C	1.00	1	0	0.5	0	0	22
hp-0416.01-j	0	3841	413692	8319097	0.30	NA	NA	C	1.00	1	0	0.5	0	0	5
hp-0416.01-k	0	3841	413692	8319097	0.30	NA	NA	C	1.00	1	0	0.5	0	0	11
hp-0417.01-a	0	3841	413662	8319147	1.00	NA	NA	C	1.00	1	0	0	0	0	14
hp-0417.01-b	0	3841	413662	8319147	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0417.01-h	0	3841	413662	8319147	0.40	NA	NA	C	1.00	1	0	0.5	0	0	6
hp-0417.01-i	0	3841	413662	8319147	0.40	NA	NA	C	1.00	1	0	0.5	0	0	20
hp-0417.01-j	0	3841	413662	8319147	0.40	NA	NA	C	1.00	1	0	0.5	0	0	7
hp-0417.01-k	0	3841	413662	8319147	0.40	NA	NA	C	1.00	1	0	0.5	0	0	21
hp-0418.01-a	0	3832	413741	8319496	0.32	NA	NA	C	0.32	1	0	0.5	0	0	5
hp-0418.01-h	0	3832	413741	8319496	0.32	NA	NA	C	0.32	0.5	0	0.5	0	0	11
hp-0418.01-i	0	3832	413741	8319496	0.32	NA	NA	C	0.32	0.5	0	0.5	0	0	43
hp-0418.01-j	0	3832	413741	8319496	0.32	NA	NA	C	0.32	0.5	0	0.5	0	0	9
hp-0418.01-k	0	3832	413741	8319496	0.32	NA	NA	C	0.32	0.5	0	0.5	0	0	20
hp-0418.01-l	0	3832	413741	8319496	0.32	NA	NA	C	0.32	0.5	0	0.5	0	0	2
hp-0419.01-i	0	3835	412669	8324103	0.49	NA	NA	C	0.49	1	0	0	0	0	3
hp-0419.01-k	0	3835	412669	8324103	0.49	NA	NA	C	0.49	1	0	0	0	0	3
hp-0419.01-l	0	3835	412669	8324103	0.49	NA	NA	C	0.49	1	0	0	0	0	5
hp-0419.01-m	0	3835	412669	8324103	0.49	NA	NA	C	0.49	1	0	0	0	0	4
hp-0420.01-i	0	3849	412342	8322847	0.01	NA	NA	C	0.01	1	0	0	0	0	9
hp-0420.01-l	0	3849	412342	8322847	0.01	NA	NA	C	0.01	1	0	0	0	0	2
hp-0421.01-i	0	3847	412465	8322702	0.01	NA	NA	C	0.01	0	0	1	0	0	5
hp-0422.01-h	0	3846	412737	8322438	0.14	NA	NA	C	0.14	1	0	0	0	0	7
hp-0422.01-i	0	3846	412737	8322438	0.14	NA	NA	C	0.14	1	0	0	0	0	35
hp-0422.01-j	0	3846	412737	8322438	0.14	NA	NA	C	0.14	1	0	0	0	0	7
hp-0422.01-k	0	3846	412737	8322438	0.14	NA	NA	C	0.14	1	0	0	0	0	11
hp-0422.01-l	0	3846	412737	8322438	0.14	NA	NA	C	0.14	1	0	0	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0423.01-i	0	3840	412567	8321735	0.40	NA	NA	C	0.40	1	0	0	0	0	17
hp-0423.01-k	0	3840	412567	8321735	0.40	NA	NA	C	0.40	1	0	0	0	0	8
hp-0424.01-b	0	3827	413091	8319829	0.50	NA	NA	C	0.50	1	0	0.5	0	0	2
hp-0424.01-h	0	3827	413091	8319829	0.50	NA	NA	C	0.50	1	0	0.5	0	0	2
hp-0424.01-i	0	3827	413091	8319829	0.50	NA	NA	C	0.50	1	0	0.5	0	0	11
hp-0424.01-j	0	3827	413091	8319829	0.50	NA	NA	C	0.50	1	0	0.5	0	0	4
hp-0424.01-k	0	3827	413091	8319829	0.50	NA	NA	C	0.50	1	0	0.5	0	0	7
hp-0424.01-m	0	3827	413091	8319829	0.50	NA	NA	C	0.50	1	0	0.5	0	0	3
hp-0425.01-h	0	3835	413216	8319795	0.16	NA	NA	C	0.16	1	0	0	0	0	9
hp-0425.01-i	0	3835	413216	8319795	0.16	NA	NA	C	0.16	1	0	0	0	0	34
hp-0425.01-j	0	3835	413216	8319795	0.16	NA	NA	C	0.16	1	0	0	0	0	14
hp-0425.01-k	0	3835	413216	8319795	0.16	NA	NA	C	0.16	1	0	0	0	0	13
hp-0426.01-i	0	3831	413153	8319673	0.20	NA	NA	C	0.20	1	0	0	0	0	7
hp-0426.01-j	0	3831	413153	8319673	0.20	NA	NA	C	0.20	1	0	0	0	0	2
hp-0426.01-k	0	3831	413153	8319673	0.20	NA	NA	C	0.20	1	0	0	0	0	14
hp-0426.01-l	0	3831	413153	8319673	0.20	NA	NA	C	0.20	1	0	0	0	0	4
hp-0427.01-a	0	3836	413542	8319162	0.50	NA	NA	C	0.50	1	0	0	0	0	9
hp-0427.01-b	0	3836	413542	8319162	0.50	NA	NA	C	0.50	1	0	0	0	0	5
hp-0427.01-g	0	3836	413542	8319162	0.50	NA	NA	C	0.50	1	0	0	0	0	2
hp-0427.01-h	0	3836	413542	8319162	0.50	NA	NA	C	0.50	1	0	0	0	0	4
hp-0427.01-i	0	3836	413542	8319162	0.50	NA	NA	C	0.50	1	0	0	0	0	19
hp-0427.01-j	0	3836	413542	8319162	0.50	NA	NA	C	0.50	1	0	0	0	0	9
hp-0427.01-k	0	3836	413542	8319162	0.20	NA	NA	C	0.50	1	0	0	0	0	20
hp-0427.01-l	0	3836	413542	8319162	0.20	NA	NA	C	0.50	1	0	0	0	0	33
hp-0427.01-m	0	3836	413542	8319162	0.20	NA	NA	C	0.50	1	0	0	0	0	9
hp-0428.01-a	0	3837	413653	8318950	0.40	NA	NA	C	0.40	1	0	0	0	0	15
hp-0428.01-b	0	3837	413653	8318950	0.40	NA	NA	C	0.40	1	0	0	0	0	5
hp-0428.01-d	0	3837	413653	8318950	0.40	NA	NA	C	0.40	1	0	0	0	0	3
hp-0428.01-g	0	3837	413653	8318950	0.40	NA	NA	C	0.40	1	0	0	0	0	4
hp-0428.01-i	0	3837	413653	8318950	0.40	NA	NA	C	0.40	1	0	0	0	0	8
hp-0428.01-k	0	3837	413653	8318950	0.40	NA	NA	C	0.40	1	0	0	0	0	6
hp-0429.01-i	0	3825	413865	8318583	0.49	NA	NA	C	0.49	1	0	0.5	0	0	15

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0429.01-j	0	3825	413865	8318583	0.49	NA	NA	C	0.49	1	0	0.5	0	0	6
hp-0429.01-l	0	3825	413865	8318583	0.49	NA	NA	C	0.49	1	0	0.5	0	0	9
hp-0430.01-a	0	3848	411748	8323740	0.16	NA	NA	C	0.16	1	0	0.5	0	0	1
hp-0431.01-h	0	3876	411432	8323656	2.00	NA	NA	C	3.00	1	0.5	0.5	0	0	6
hp-0431.01-i	0	3876	411432	8323656	2.00	NA	NA	C	3.00	1	0.5	0.5	0	0	25
hp-0431.01-j	0	3876	411432	8323656	2.00	NA	NA	C	3.00	1	0.5	0.5	0	0	11
hp-0431.01-k	0	3876	411432	8323656	3.00	NA	NA	C	3.00	1	0.5	0.5	0	0	7
hp-0431.01-m	0	3876	411432	8323656	3.00	NA	NA	C	3.00	1	0.5	0.5	0	0	4
hp-0432.01-a	0	3917	411602	8323400	6.00	NA	NA	C	6.00	1	0.5	0.5	0	0.5	7
hp-0432.01-b	0	3917	411602	8323400	6.00	NA	NA	C	6.00	1	0.5	0.5	0	0.5	10
hp-0432.01-c	0	3917	411602	8323400	6.00	NA	NA	C	6.00	1	0.5	0.5	0	0.5	2
hp-0432.01-d	0	3917	411602	8323400	6.00	NA	NA	C	6.00	1	0.5	0.5	0	0.5	2
hp-0432.01-h	0	3917	411602	8323400	4.00	NA	NA	C	6.00	1	0.5	0.5	0	0.5	20
hp-0432.01-i	0	3917	411602	8323400	4.00	NA	NA	C	6.00	1	0.5	0.5	0	0.5	116
hp-0432.01-j	0	3917	411602	8323400	4.00	NA	NA	C	6.00	1	0.5	0.5	0	0.5	32
hp-0432.01-k	0	3917	411602	8323400	1.00	NA	NA	C	6.00	1	0.5	0.5	0	0.5	43
hp-0432.01-m	0	3917	411602	8323400	1.00	NA	NA	C	6.00	1	0.5	0.5	0	0.5	2
hp-0433.01-a	0	3973	411936	8322475	4.00	NA	NA	C	4.00	1	0	0.5	0	0	9
hp-0433.01-b	0	3973	411936	8322475	4.00	NA	NA	C	4.00	1	0	0.5	0	0	3
hp-0433.01-c	0	3973	411936	8322475	4.00	NA	NA	C	4.00	1	0	0.5	0	0	3
hp-0433.01-i	0	3973	411936	8322475	0.50	NA	NA	C	4.00	1	0	0.5	0	0	2
hp-0433.01-k	0	3973	411936	8322475	0.50	NA	NA	C	4.00	1	0	0.5	0	0	2
hp-0434.01-i	0	3860	411183	8324376	0.12	NA	NA	C	0.12	1	0	0	0	0	6
hp-0434.01-k	0	3860	411183	8324376	0.12	NA	NA	C	0.12	1	0	0	0	0	2
hp-0434.01-l	0	3860	411183	8324376	0.12	NA	NA	C	0.12	1	0	0	0	0	1
hp-0434.01-m	0	3860	411183	8324376	0.12	NA	NA	C	0.12	1	0	0	0	0	2
hp-0435.01-h	0	3852	411155	8324212	0.16	NA	NA	C	0.16	1	0	0	0	0	7
hp-0435.01-i	0	3852	411155	8324212	0.16	NA	NA	C	0.16	1	0	0	0	0	5
hp-0435.01-k	0	3852	411155	8324212	0.16	NA	NA	C	0.16	1	0	0	0	0	3
hp-0435.01-l	0	3852	411155	8324212	0.16	NA	NA	C	0.16	1	0	0	0	0	6
hp-0436.01-a	0	3850	413428	8325040	2.40	NA	NA	C	2.40	1	0	0.5	0	0	7
hp-0436.01-b	0	3850	413428	8325040	2.40	NA	NA	C	2.40	1	0	0.5	0	0	3

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0436.01-f	0	3850	413428	8325040	2.00	NA	NA	C	2.40	1	0	0.5	0	0	9
hp-0436.01-g	0	3850	413428	8325040	2.00	NA	NA	C	2.40	1	0	0.5	0	0	9
hp-0436.01-h	0	3850	413428	8325040	1.00	NA	NA	C	2.40	1	0	0.5	0	0	9
hp-0436.01-i	0	3850	413428	8325040	1.00	NA	NA	C	2.40	1	0	0.5	0	0	38
hp-0436.01-j	0	3850	413428	8325040	1.00	NA	NA	C	2.40	1	0	0.5	0	0	7
hp-0436.01-k	0	3850	413428	8325040	2.00	NA	NA	C	2.40	1	0	0.5	0	0	15
hp-0436.01-l	0	3850	413428	8325040	2.00	NA	NA	C	2.40	1	0	0.5	0	0	7
hp-0437.01-a	0	3849	412940	8325898	0.5	NA	NA	C	0.5	0.5	0	0.5	0	0	1
hp-0437.01-b	0	3849	412940	8325898	0.5	NA	NA	C	0.5	0.5	0	0.5	0	0	2
hp-0437.01-c	0	3849	412940	8325898	0.5	NA	NA	C	0.5	0.5	0	0.5	0	0	3
hp-0437.01-h	0	3849	412940	8325898	0.5	NA	NA	C	0.5	0.5	0	0.5	0	0	12
hp-0437.01-i	0	3849	412940	8325898	0.5	NA	NA	C	0.5	0.5	0	0.5	0	0	29
hp-0437.01-j	0	3849	412940	8325898	0.5	NA	NA	C	0.5	0.5	0	0.5	0	0	23
hp-0437.01-k	0	3849	412940	8325898	0.5	NA	NA	C	0.5	0.5	0	0.5	0	0	7
hp-0437.01-l	0	3849	412940	8325898	0.5	NA	NA	C	0.5	0.5	0	0.5	0	0	2
hp-0438.01-a	0	3852	412801	8325580	0.28	NA	NA	C	0.28	0.5	0	0.5	0	0	1
hp-0438.01-g	0	3852	412801	8325580	0.28	NA	NA	C	0.28	0.5	0	0.5	0	0	1
hp-0438.01-h	0	3852	412801	8325580	0.28	NA	NA	C	0.28	0.5	0	0.5	0	0	7
hp-0438.01-i	0	3852	412801	8325580	0.28	NA	NA	C	0.28	0.5	0	0.5	0	0	12
hp-0438.01-m	0	3852	412801	8325580	0.28	NA	NA	C	0.28	0.5	0	0.5	0	0	2
hp-0439.01-g	0	3853	412968	8325452	0.18	NA	NA	C	0.18	1	0	0.5	0	0	2
hp-0439.01-h	0	3853	412968	8325452	0.18	NA	NA	C	0.18	1	0	0.5	0	0	7
hp-0439.01-i	0	3853	412968	8325452	0.18	NA	NA	C	0.18	1	0	0.5	0	0	7
hp-0439.01-j	0	3853	412968	8325452	0.18	NA	NA	C	0.18	1	0	0.5	0	0	5
hp-0440.01-h	0	3850	412964	8325249	0.75	NA	NA	C	0.75	0	0	0.5	0	0	1
hp-0440.01-i	0	3850	412964	8325249	0.75	NA	NA	C	0.75	0	0	0.5	0	0	10
hp-0440.01-j	0	3850	412964	8325249	0.75	NA	NA	C	0.75	0	0	0.5	0	0	2
hp-0440.01-k	0	3850	412964	8325249	0.75	NA	NA	C	0.75	0	0	0.5	0	0	3
hp-0441.01-h	0	3846	413215	8324859	0.04	NA	NA	C	0.04	0	0	0.5	0	0	2
hp-0441.01-i	0	3846	413215	8324859	0.04	NA	NA	C	0.04	0	0	0.5	0	0	3
hp-0441.01-j	0	3846	413215	8324859	0.04	NA	NA	C	0.04	0	0	0.5	0	0	2
hp-0441.01-k	0	3846	413215	8324859	0.04	NA	NA	C	0.04	0	0	0.5	0	0	1

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0442.01-h	0	3850	413110	8324889	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0442.01-i	0	3850	413110	8324889	0.09	NA	NA	C	0.09	1	0	0	0	0	7
hp-0442.01-j	0	3850	413110	8324889	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0443.01-h	0	3844	412746	8324714	0.40	NA	NA	C	0.40	1	0	0	0	0	3
hp-0443.01-i	0	3844	412746	8324714	0.40	NA	NA	C	0.40	1	0	0	0	0	47
hp-0443.01-j	0	3844	412746	8324714	0.40	NA	NA	C	0.40	1	0	0	0	0	12
hp-0443.01-k	0	3844	412746	8324714	0.40	NA	NA	C	0.40	1	0	0	0	0	5
hp-0445.01-h	0	3843	412904	8326425	1.00	NA	NA	C	1.00	1	0	0.5	0	0	9
hp-0445.01-i	0	3843	412904	8326425	1.00	NA	NA	C	1.00	1	0	0.5	0	0	19
hp-0445.01-j	0	3843	412904	8326425	1.00	NA	NA	C	1.00	1	0	0.5	0	0	8
hp-0445.01-k	0	3843	412904	8326425	1.00	NA	NA	C	1.00	1	0	0.5	0	0	7
hp-0445.01-m	0	3843	412904	8326425	1.00	NA	NA	C	1.00	1	0	0.5	0	0	3
hp-0446.01-b	0	3824	413872	8326672	0.16	NA	NA	C	0.16	1	0	0	0	0	3
hp-0446.01-h	0	3824	413872	8326672	0.16	NA	NA	C	0.16	1	0	0	0	0	2
hp-0446.01-i	0	3824	413872	8326672	0.16	NA	NA	C	0.16	1	0	0	0	0	5
hp-0446.01-m	0	3824	413872	8326672	0.16	NA	NA	C	0.16	1	0	0	0	0	2
hp-0447.01-h	0	3844	412864	8330803	0.32	NA	NA	C	0.32	1	0	0	0	0	1
hp-0447.01-i	0	3844	412864	8330803	0.32	NA	NA	C	0.32	1	0	0	0	0	3
hp-0447.01-j	0	3844	412864	8330803	0.32	NA	NA	C	0.32	1	0	0	0	0	1
hp-0448.01-h	0	3835	412601	8331167	0.09	NA	NA	C	0.09	0	0	0.5	0	0	2
hp-0448.01-i	0	3835	412601	8331167	0.09	NA	NA	C	0.09	0	0	0.5	0	0	3
hp-0448.01-j	0	3835	412601	8331167	0.09	NA	NA	C	0.09	0	0	0.5	0	0	2
hp-0449.01-i	0	3841	412228	8331608	0.24	NA	NA	C	0.24	1	0	0	0	0	2
hp-0450.01-h	0	3847	412882	8327064	0.06	NA	NA	C	0.06	1	0	0	0	0	1
hp-0450.01-i	0	3847	412882	8327064	0.06	NA	NA	C	0.06	1	0	0	0	0	3
hp-0450.01-j	0	3847	412882	8327064	0.06	NA	NA	C	0.06	1	0	0	0	0	5
hp-0450.01-k	0	3847	412882	8327064	0.06	NA	NA	C	0.06	1	0	0	0	0	1
hp-0451.01-a	0	4025	411383	8327151	0.25	NA	NA	C	0.25	0	0.5	0	0	0	1
hp-0451.01-h	0	4025	411383	8327151	0.25	NA	NA	C	0.25	0	0.5	0	0	0	1
hp-0451.01-i	0	4025	411383	8327151	0.25	NA	NA	C	0.25	0	0.5	0	0	0	3
hp-0451.01-j	0	4025	411383	8327151	0.25	NA	NA	C	0.25	0	0.5	0	0	0	4
hp-0452.01-i	0	4048	411284	8327435	0.49	NA	NA	C	0.49	1	0	0.5	0	0	NA

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0452.01-j	0	4048	411284	8327435	0.49	NA	NA	C	0.49	1	0	0.5	0	0	NA
hp-0453.01-i	0	4078	410898	8328108	0.60	NA	NA	C	0.60	1	0	0.5	0	0	NA
hp-0453.01-j	0	4078	410898	8328108	0.60	NA	NA	C	0.60	1	0	0.5	0	0	NA
hp-0454.01-k	0	4008	410918	8328464	1.20	NA	NA	C	1.20	1	0	0	0	0	1
hp-0455.01-c	0	4076	410824	8328838	0.36	NA	NA	C	0.36	1	0	0	0	0	1
hp-0455.01-d	0	4076	410824	8328838	0.36	NA	NA	C	0.36	1	0	0	0	0	1
hp-0455.01-i	0	4076	410824	8328838	0.20	NA	NA	C	0.36	1	0	0	0	0	3
hp-0455.01-j	0	4076	410824	8328838	0.20	NA	NA	C	0.36	1	0	0	0	0	1
hp-0456.01-d	0	4117	410548	8329019	0.60	NA	NA	C	0.60	1	0	0	0	0	NA
hp-0457.01-i	0	4257	410212	8329552	0.35	NA	NA	C	0.35	1	0	0	0	0.5	9
hp-0457.01-j	0	4257	410212	8329552	0.35	NA	NA	C	0.35	1	0	0	0	0.5	2
hp-0457.01-k	0	4257	410212	8329552	0.35	NA	NA	C	0.35	1	0	0	0	0.5	5
hp-0457.01-l	0	4257	410212	8329552	0.35	NA	NA	C	0.35	1	0	0	0	0.5	NA
hp-0459.01-h	0	3860	411495	8329021	0.16	NA	NA	C	0.16	1	0	0.5	0	0	4
hp-0459.01-i	0	3860	411495	8329021	0.16	NA	NA	C	0.16	1	0	0.5	0	0	18
hp-0460.01-h	0	3862	411438	8328920	0.20	NA	NA	C	0.20	1	0	0	0	0	2
hp-0460.01-i	0	3862	411438	8328920	0.20	NA	NA	C	0.20	1	0	0	0	0	3
hp-0460.01-j	0	3862	411438	8328920	0.20	NA	NA	C	0.20	1	0	0	0	0	13
hp-0460.01-k	0	3862	411438	8328920	0.20	NA	NA	C	0.20	1	0	0	0	0	3
hp-0460.01-l	0	3862	411438	8328920	0.20	NA	NA	C	0.20	1	0	0	0	0	3
hp-0460.01-m	0	3862	411438	8328920	0.20	NA	NA	C	0.20	1	0	0	0	0	29
hp-0461.01-h	0	3901	411670	8328502	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0461.01-i	0	3901	411670	8328502	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0461.01-j	0	3901	411670	8328502	0.09	NA	NA	C	0.09	1	0	0	0	0	5
hp-0461.01-k	0	3901	411670	8328502	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0461.01-l	0	3901	411670	8328502	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0461.01-m	0	3901	411670	8328502	0.09	NA	NA	C	0.09	1	0	0	0	0	5
hp-0462.01-h	0	3857	411653	8329441	0.01	NA	NA	C	0.01	0	0	0.5	0	0	4
hp-0462.01-i	0	3857	411653	8329441	0.01	NA	NA	C	0.01	0	0	0.5	0	0	5
hp-0464.01-b	0	3871	411254	8330233	0.50	NA	NA	C	0.50	1	0	0	0	0	2
hp-0464.01-h	0	3871	411254	8330233	0.50	NA	NA	C	0.50	1	0	0	0	0	6
hp-0464.01-i	0	3871	411254	8330233	0.50	NA	NA	C	0.50	1	0	0	0	0	12

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
hp-0464.01-j	0	3871	411254	8330233	0.50	NA	NA	C	0.50	1	0	0	0	0	8
hp-0464.01-k	0	3871	411254	8330233	0.50	NA	NA	C	0.50	1	0	0	0	0	6
hp-0464.01-l	0	3871	411254	8330233	0.50	NA	NA	C	0.50	1	0	0	0	0	18
hp-0465.01-h	0	3856	412107	8328988	0.50	NA	NA	C	0.50	1	0	0	0	0	7
hp-0465.01-i	0	3856	412107	8328988	0.50	NA	NA	C	0.50	1	0	0	0	0	30
hp-0465.01-k	0	3856	412107	8328988	0.50	NA	NA	C	0.50	1	0	0	0	0	4
hp-0465.01-m	0	3856	412107	8328988	0.10	NA	NA	C	0.50	1	0	0	0	0	2
hp-0466.01-f	0	3857	412185	8328722	0.16	NA	NA	C	0.16	1	0	0.5	0	0	NA
hp-0466.01-h	0	3857	412185	8328722	0.16	NA	NA	C	0.16	1	0	0.5	0	0	1
hp-0466.01-i	0	3857	412185	8328722	0.16	NA	NA	C	0.16	1	0	0.5	0	0	2
hp-0466.01-j	0	3857	412185	8328722	0.16	NA	NA	C	0.16	1	0	0.5	0	0	2
hp-0467.01-h	0	3856	412282	8328458	0.40	NA	NA	C	0.40	1	0	0	0	0	5
hp-0467.01-i	0	3856	412282	8328458	0.40	NA	NA	C	0.40	1	0	0	0	0	19
hp-0467.01-k	0	3856	412282	8328458	0.40	NA	NA	C	0.40	1	0	0	0	0	2
hp-0468.01-a	0	3910	411993	8328531	1.00	NA	NA	C	1.00	1	0	0	0	0	10
hp-0468.01-b	0	3910	411993	8328531	1.00	NA	NA	C	1.00	1	0	0	0	0	10
hp-0468.01-c	0	3910	411993	8328531	1.00	NA	NA	C	1.00	1	0	0	0	0	11
hp-0468.01-i	0	3910	411993	8328531	0.25	NA	NA	C	1.00	1	0	0	0	0	2
hp-0468.01-j	0	3910	411993	8328531	0.25	NA	NA	C	1.00	1	0	0	0	0	4
hp-0469.01-h	0	3853	412377	8328376	0.04	NA	NA	C	0.04	0	0	0.5	0	0	1
hp-0469.01-i	0	3853	412377	8328376	0.04	NA	NA	C	0.04	0	0	0.5	0	0	6
hp-0469.01-k	0	3853	412377	8328376	0.04	NA	NA	C	0.04	0	0	0.5	0	0	5
hp-0471.01-h	0	3861	412363	8327961	0.49	NA	NA	C	0.49	0	0	0.5	0	0	1
hp-0471.01-i	0	3861	412363	8327961	0.49	NA	NA	C	0.49	0	0	0.5	0	0	11
hp-0471.01-j	0	3861	412363	8327961	0.49	NA	NA	C	0.49	0	0	0.5	0	0	6
hp-0471.01-k	0	3861	412363	8327961	0.49	NA	NA	C	0.49	0	0	0.5	0	0	5
hp-0472.01-h	0	3862	412506	8327539	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0472.01-i	0	3862	412506	8327539	1.00	NA	NA	C	1.00	1	0	0	0	0	17
hp-0472.01-j	0	3862	412506	8327539	1.00	NA	NA	C	1.00	1	0	0	0	0	9
hp-0472.01-k	0	3862	412506	8327539	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0472.01-l	0	3862	412506	8327539	1.00	NA	NA	C	1.00	1	0	0	0	0	3
hp-0472.01-m	0	3862	412506	8327539	1.00	NA	NA	C	1.00	1	0	0	0	0	4

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0473.01-i	0	3858	412612	8327300	0.2	NA	NA	C	0.2	0	0	0.5	0	0	6
hp-0473.01-j	0	3858	412612	8327300	0.2	NA	NA	C	0.2	0	0	0.5	0	0	5
hp-0473.01-k	0	3858	412612	8327300	0.2	NA	NA	C	0.2	0	0	0.5	0	0	7
hp-0474.01-i	0	3880	411971	8326862	0.09	NA	NA	C	0.09	1	0	0	0	0	1
hp-0474.01-j	0	3880	411971	8326862	0.09	NA	NA	C	0.09	1	0	0	0	0	3
hp-0474.01-k	0	3880	411971	8326862	0.09	NA	NA	C	0.09	1	0	0	0	0	2
hp-0474.01-l	0	3880	411971	8326862	0.01	NA	NA	C	0.09	1	0	0	0	0	1
hp-0474.01-m	0	3880	411971	8326862	0.01	NA	NA	C	0.09	1	0	0	0	0	5
hp-0475.01-h	0	3884	411807	8327217	0.16	NA	NA	C	0.16	1	0	0	0	0	2
hp-0475.01-i	0	3884	411807	8327217	0.16	NA	NA	C	0.16	1	0	0	0	0	4
hp-0475.01-j	0	3884	411807	8327217	0.16	NA	NA	C	0.16	1	0	0	0	0	6
hp-0475.01-k	0	3884	411807	8327217	0.16	NA	NA	C	0.16	1	0	0	0	0	3
hp-0475.01-m	0	3884	411807	8327217	0.01	NA	NA	C	0.16	1	0	0	0	0	13
hp-0476.01-i	0	3864	411731	8327306	0.05	NA	NA	C	0.05	0	0	0.5	0	0	2
hp-0476.01-j	0	3864	411731	8327306	0.05	NA	NA	C	0.05	0	0	0.5	0	0	2
hp-0477.01-j	0	3858	412557	8327271	0.04	NA	NA	C	0.04	0	0	0	0	0	1
hp-0477.01-m	0	3858	412557	8327271	0.04	NA	NA	C	0.04	0	0	0	0	0	1
hp-0478.01-h	0	3851	412243	8327278	0.01	NA	NA	C	0.01	0	0	0.5	0	0	1
hp-0478.01-i	0	3851	412243	8327278	0.01	NA	NA	C	0.01	0	0	0.5	0	0	12
hp-0478.01-j	0	3851	412243	8327278	0.01	NA	NA	C	0.01	0	0	0.5	0	0	3
hp-0479.01-i	0	3851	412389	8327118	0.02	NA	NA	C	0.02	1	0	0	0	0	5
hp-0480.01-i	0	3841	411346	8331280	0.40	NA	NA	C	0.40	1	0	0	0	0	4
hp-0480.01-j	0	3841	411346	8331280	0.40	NA	NA	C	0.40	1	0	0	0	0	1
hp-0481.01-i	0	3847	411897	8331219	0.20	NA	NA	C	0.20	1	0	0	0	0	7
hp-0481.01-k	0	3847	411897	8331219	0.20	NA	NA	C	0.20	1	0	0	0	0	6
hp-0482.01-i	0	3835	411040	8332122	0.06	NA	NA	C	0.06	1	0	0	0	0	4
hp-0482.01-k	0	3835	411040	8332122	0.06	NA	NA	C	0.06	1	0	0	0	0	1
hp-0482.01-l	0	3835	411040	8332122	0.06	NA	NA	C	0.06	1	0	0	0	0	1
hp-0489.01-i	0	3837	411374	8332221	0.24	NA	NA	C	0.24	1	0	0	0	0	4
hp-0489.01-j	0	3837	411374	8332221	0.24	NA	NA	C	0.24	1	0	0	0	0	1
hp-0489.01-k	0	3837	411374	8332221	0.24	NA	NA	C	0.24	1	0	0	0	0	2
hp-0494.01-h	0	3835	411910	8332074	0.24	NA	NA	C	0.24	1	0	0	0	0	2

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0494.01-i	0	3835	411910	8332074	0.24	NA	NA	C	0.24	1	0	0	0	0	1
hp-0495.01-b	0	3849	411366	8332650	0.36	NA	NA	C	0.36	1	0	0	0	0	2
hp-0495.01-i	0	3849	411366	8332650	0.25	NA	NA	C	0.36	1	0	0	0	0	9
hp-0495.01-k	0	3849	411366	8332650	0.25	NA	NA	C	0.36	1	0	0	0	0	4
hp-0496.01-i	0	3861	411219	8332804	0.64	NA	NA	C	0.64	1	0	0	0	0	4
hp-0496.01-k	0	3861	411219	8332804	0.64	NA	NA	C	0.64	1	0	0	0	0	3
hp-0496.01-l	0	3861	411219	8332804	0.64	NA	NA	C	0.64	1	0	0	0	0	11
hp-0496.01-m	0	3861	411219	8332804	0.64	NA	NA	C	0.64	1	0	0	0	0	2
hp-0497.01-b	0	3857	411056	8332965	0.30	NA	NA	C	0.30	1	0	0	0	0	1
hp-0497.01-h	0	3857	411056	8332965	0.30	NA	NA	C	0.30	1	0	0	0	0	1
hp-0497.01-i	0	3857	411056	8332965	0.30	NA	NA	C	0.30	1	0	0	0	0	6
hp-0497.01-j	0	3857	411056	8332965	0.30	NA	NA	C	0.30	1	0	0	0	0	1
hp-0497.01-m	0	3857	411056	8332965	0.30	NA	NA	C	0.30	1	0	0	0	0	2
hp-0498.01-h	0	3851	410830	8333033	0.64	NA	NA	C	0.64	1	0	0.5	0	0	2
hp-0498.01-i	0	3851	410830	8333033	0.64	NA	NA	C	0.64	1	0	0.5	0	0	6
hp-0498.01-k	0	3851	410830	8333033	0.64	NA	NA	C	0.64	1	0	0.5	0	0	4
hp-0498.01-m	0	3851	410830	8333033	0.64	NA	NA	C	0.64	1	0	0.5	0	0	2
hp-0499.01-b	0	3871	410854	8333326	0.04	NA	NA	C	0.04	0.5	0	0.5	0	0	2
hp-0499.01-h	0	3871	410854	8333326	0.04	NA	NA	C	0.04	0	0	0.5	0	0	2
hp-0499.01-i	0	3871	410854	8333326	0.04	NA	NA	C	0.04	0	0	0.5	0	0	10
hp-0499.01-j	0	3871	410854	8333326	0.04	NA	NA	C	0.04	0	0	0.5	0	0	5
hp-0499.01-k	0	3871	410854	8333326	0.04	NA	NA	C	0.04	0	0	0.5	0	0	6
hp-0499.01-m	0	3871	410854	8333326	0.04	NA	NA	C	0.04	0	0	0.5	0	0	2
hp-0500.01-h	0	3937	410989	8333568	0.36	NA	NA	C	0.36	1	0	0.5	0	0	6
hp-0500.01-i	0	3937	410989	8333568	0.36	NA	NA	C	0.36	1	0	0.5	0	0	13
hp-0500.01-j	0	3937	410989	8333568	0.36	NA	NA	C	0.36	1	0	0.5	0	0	10
hp-0501.01-h	0	3960	412299	8333969	0.64	NA	NA	C	0.64	1	0	0	0	0	NA
hp-0501.01-i	0	3960	412299	8333969	0.64	NA	NA	C	0.64	1	0	0	0	0	5
hp-0502.01-i	0	3860	412193	8333233	0.20	NA	NA	C	0.20	1	0	0	0	0	11
hp-0502.01-k	0	3860	412193	8333233	0.20	NA	NA	C	0.20	1	0	0	0	0	3
hp-0503.01-h	0	3845	412206	8333019	0.04	NA	NA	C	0.04	0	0	0.5	0	0	3
hp-0503.01-i	0	3845	412206	8333019	0.04	NA	NA	C	0.04	0	0	0.5	0	0	24

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0503.01-j	0	3845	412206	8333019	0.04	NA	NA	C	0.04	0	0	0.5	0	0	6
hp-0503.01-k	0	3845	412206	8333019	0.04	NA	NA	C	0.04	0	0	0.5	0	0	6
hp-0504.01-h	0	3853	412079	8332911	0.01	NA	NA	C	0.01	0	0	0.5	0	0	3
hp-0504.01-i	0	3853	412079	8332911	0.01	NA	NA	C	0.01	0	0	0.5	0	0	24
hp-0504.01-j	0	3853	412079	8332911	0.01	NA	NA	C	0.01	0	0	0.5	0	0	5
hp-0504.01-k	0	3853	412079	8332911	0.01	NA	NA	C	0.01	0	0	0.5	0	0	10
hp-0504.01-l	0	3853	412079	8332911	0.01	NA	NA	C	0.01	0	0	0.5	0	0	7
hp-0505.01-c	0	3840	411979	8332576	0.24	NA	NA	C	0.24	0.5	0	0.5	0	0	1
hp-0505.01-i	0	3840	411979	8332576	0.24	NA	NA	C	0.24	0	0	0.5	0	0	8
hp-0505.01-l	0	3840	411979	8332576	0.24	NA	NA	C	0.24	0	0	0.5	0	0	2
hp-0506.01-a	0	3882	411719	8332807	1.00	NA	NA	C	1.00	1	0	0.5	0	0	17
hp-0506.01-b	0	3882	411719	8332807	1.00	NA	NA	C	1.00	1	0	0.5	0	0	63
hp-0506.01-c	0	3882	411719	8332807	1.00	NA	NA	C	1.00	1	0	0.5	0	0	81
hp-0506.01-d	0	3882	411719	8332807	1.00	NA	NA	C	1.00	1	0	0.5	0	0	29
hp-0506.01-e	0	3882	411719	8332807	1.00	NA	NA	C	1.00	1	0	0.5	0	0	6
hp-0506.01-f	0	3882	411719	8332807	1.00	NA	NA	C	1.00	1	0	0.5	0	0	9
hp-0506.01-g	0	3882	411719	8332807	1.00	NA	NA	C	1.00	1	0	0.5	0	0	3
hp-0506.01-h	0	3882	411719	8332807	0.25	NA	NA	C	1.00	1	0	0.5	0	0	5
hp-0506.01-i	0	3882	411719	8332807	0.25	NA	NA	C	1.00	1	0	0.5	0	0	50
hp-0506.01-j	0	3882	411719	8332807	0.25	NA	NA	C	1.00	1	0	0.5	0	0	8
hp-0506.01-k	0	3882	411719	8332807	0.25	NA	NA	C	1.00	1	0	0.5	0	0	22
hp-0506.01-l	0	3882	411719	8332807	0.25	NA	NA	C	1.00	1	0	0.5	0	0	7
hp-0506.01-m	0	3882	411719	8332807	0.25	NA	NA	C	1.00	1	0	0.5	0	0	5
hp-0507.01-a	0	3879	411652	8333026	0.80	NA	NA	C	0.80	1	0	0.5	0	0	16
hp-0507.01-b	0	3879	411652	8333026	0.80	NA	NA	C	0.80	1	0	0.5	0	0	17
hp-0507.01-c	0	3879	411652	8333026	0.80	NA	NA	C	0.80	1	0	0.5	0	0	24
hp-0507.01-d	0	3879	411652	8333026	0.80	NA	NA	C	0.80	1	0	0.5	0	0	32
hp-0507.01-e	0	3879	411652	8333026	0.80	NA	NA	C	0.80	1	0	0.5	0	0	12
hp-0507.01-h	0	3879	411652	8333026	0.80	NA	NA	C	0.80	1	0	0.5	0	0	3
hp-0507.01-i	0	3879	411652	8333026	0.80	NA	NA	C	0.80	1	0	0.5	0	0	19
hp-0507.01-k	0	3879	411652	8333026	0.10	NA	NA	C	0.80	1	0	0.5	0	0	20
hp-0507.01-l	0	3879	411652	8333026	0.10	NA	NA	C	0.80	1	0	0.5	0	0	2

Table A.2 continued

comp	multi_sectors	masl	eutm19	nutm19	size_abs	size_min	size_max	chron_conf	site size	hab	rit	bur	agr	def	sherds
hp-0508.01-b	0	3881	411602	8332914	0.24	NA	NA	C	0.24	1	0	0.5	0	0	5
hp-0508.01-c	0	3881	411602	8332914	0.24	NA	NA	C	0.24	1	0	0.5	0	0	9
hp-0508.01-i	0	3881	411602	8332914	0.24	NA	NA	C	0.24	1	0	0.5	0	0	16
hp-0508.01-j	0	3881	411602	8332914	0.24	NA	NA	C	0.24	1	0	0.5	0	0	3
hp-0508.01-k	0	3881	411602	8332914	0.24	NA	NA	C	0.24	1	0	0.5	0	0	12
hp-0509.01-i	0	3945	414135	8313377	0.32	NA	NA	C	0.32	1	0	0	0	0	1
hp-0509.01-j	0	3945	414135	8313377	0.32	NA	NA	C	0.32	1	0	0	0	0	2
hp-0510.01-b	0	3931	413478	8311361	0.25	NA	NA	C	0.25	1	0	0	0	0	4
hp-0511.01-a	0	3964	414653	8310931	1.00	NA	NA	C	1.00	1	0	0	0	0	2
hp-0511.01-b	0	3964	414653	8310931	1.00	NA	NA	C	1.00	1	0	0	0	0	8
hp-0511.01-i	0	3964	414653	8310931	0.50	NA	NA	C	1.00	0	0	0.5	0	0	6
hp-0511.01-j	0	3964	414653	8310931	0.50	NA	NA	C	1.00	0	0	0.5	0	0	6
hp-0511.01-m	0	3964	414653	8310931	0.10	NA	NA	C	1.00	0	0	0.5	0	0	3
hp-0512.01-a	0	3912	415216	8309608	1.00	NA	NA	C	1.00	1	0.5	0	0	0	2
hp-0512.01-b	0	3912	415216	8309608	1.00	NA	NA	C	1.00	1	0.5	0	0	0	10
hp-0512.01-c	0	3912	415216	8309608	1.00	NA	NA	C	1.00	1	0.5	0	0	0	5
hp-0512.01-d	0	3912	415216	8309608	1.00	NA	NA	C	1.00	1	0.5	0	0	0	2
hp-0512.01-h	0	3912	415216	8309608	0.50	NA	NA	C	1.00	1	0	0	0	0	2
hp-0512.01-i	0	3912	415216	8309608	0.50	NA	NA	C	1.00	1	0	0	0	0	8
hp-0512.01-j	0	3912	415216	8309608	0.50	NA	NA	C	1.00	1	0	0	0	0	2
hp-0512.01-k	0	3912	415216	8309608	0.50	NA	NA	C	1.00	1	0	0	0	0	2
hp-0512.01-m	0	3912	415216	8309608	0.10	NA	NA	C	1.00	1	0	0	0	0	2
hp-0513.01-h	0	4077	415937	8309427	0.36	NA	NA	C	0.36	1	0	0	0	0	2
hp-0513.01-i	0	4077	415937	8309427	0.36	NA	NA	C	0.36	1	0	0	0	0	12
hp-0513.01-j	0	4077	415937	8309427	0.36	NA	NA	C	0.36	1	0	0	0	0	2
hp-0513.01-k	0	4077	415937	8309427	0.36	NA	NA	C	0.36	1	0	0	0	0	2
hp-0513.01-l	0	4077	415937	8309427	0.36	NA	NA	C	0.36	1	0	0	0	0	2
hp-0513.01-m	0	4077	415937	8309427	0.36	NA	NA	C	0.36	1	0	0	0	0	2
hp-0514.01-h	0	4078	416080	8309542	1	NA	NA	C	1	0	0	0.5	0	0	2
hp-0514.01-i	0	4078	416080	8309542	1	NA	NA	C	1	0	0	0.5	0	0	1
hp-0515.01-i	0	4104	416195	8309912	1.00	NA	NA	C	1.00	1	0.5	1	0	1	1
hp-0517.01-i	0	3993	414411	8312668	1.05	NA	NA	C	1.05	1	0	0	0	0	20

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0517.01-j	0	3993	414411	8312668	1.05	NA	NA	C	1.05	1	0	0	0	0	6
hp-0517.01-k	0	3993	414411	8312668	1.05	NA	NA	C	1.05	1	0	0	0	0	2
hp-0518.01-i	0	3988	414615	8312741	0.25	NA	NA	C	0.25	0	0	1	0	0	5
hp-0519.01-i	0	4038	414712	8312386	1.36	NA	NA	C	1.36	1	0	0	0	1	NA
hp-0520.01-i	0	4004	415106	8312169	0.30	NA	NA	C	0.30	1	0	0	0	0	3
hp-0520.01-j	0	4004	415106	8312169	0.30	NA	NA	C	0.30	1	0	0	0	0	1
hp-0520.01-k	0	4004	415106	8312169	0.30	NA	NA	C	0.30	1	0	0	0	0	1
hp-0521.01-a	0	3999	415784	8313318	1.50	NA	NA	C	1.50	1	0.5	0	0	0	41
hp-0521.01-b	0	3999	415784	8313318	1.50	NA	NA	C	1.50	1	0.5	0	0	0	19
hp-0521.01-c	0	3999	415784	8313318	1.50	NA	NA	C	1.50	1	0.5	0	0	0	10
hp-0521.01-d	0	3999	415784	8313318	1.00	NA	NA	C	1.50	1	0.5	0	0	0	3
hp-0521.01-f	0	3999	415784	8313318	1.00	NA	NA	C	1.50	1	0.5	0	0	0	4
hp-0521.01-i	0	3999	415784	8313318	1.00	NA	NA	C	1.50	1	0	0	0	0	3
hp-0521.01-j	0	3999	415784	8313318	1.00	NA	NA	C	1.50	1	0	0	0	0	3
hp-0521.01-k	0	3999	415784	8313318	1.00	NA	NA	C	1.50	1	0	0	0	0	2
hp-0521.01-m	0	3999	415784	8313318	1.00	NA	NA	C	1.50	1	0	0	0	0	3
hp-0522.01-h	0	3887	415166	8313636	0.01	NA	NA	C	0.01	0	0	0.5	0	0	4
hp-0522.01-i	0	3887	415166	8313636	0.01	NA	NA	C	0.01	0	0	0.5	0	0	12
hp-0522.01-j	0	3887	415166	8313636	0.01	NA	NA	C	0.01	0	0	0.5	0	0	2
hp-0522.01-k	0	3887	415166	8313636	0.01	NA	NA	C	0.01	0	0	0.5	0	0	1
hp-0522.01-m	0	3887	415166	8313636	0.01	NA	NA	C	0.01	0	0	0.5	0	0	2
hp-0524.01-a	0	3870	415516	8314437	0.06	NA	NA	C	0.06	1	0	0	0	0	1
hp-0524.01-h	0	3870	415516	8314437	0.06	NA	NA	C	0.06	1	0	0	0	0	1
hp-0524.01-i	0	3870	415516	8314437	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0524.01-k	0	3870	415516	8314437	0.06	NA	NA	C	0.06	1	0	0	0	0	2
hp-0525.01-i	0	3880	415466	8314637	0.01	NA	NA	C	0.01	0	0	1	0	0	4
hp-0526.01-i	0	3909	414993	8315753	0.16	NA	NA	C	0.16	0	0	1	0	0	1
hp-0527.01-h	0	3944	415146	8315893	0.96	NA	NA	C	0.96	1	0	0.5	0	0	2
hp-0527.01-i	0	3944	415146	8315893	0.96	NA	NA	C	0.96	1	0	0.5	0	0	6
hp-0529.01-h	0	4041	416702	8314081	0.8	NA	NA	C	0.8	1	0	0.5	0	0.5	8
hp-0529.01-i	0	4041	416702	8314081	0.8	NA	NA	C	0.8	1	0	0.5	0	0.5	55
hp-0529.01-j	0	4041	416702	8314081	0.8	NA	NA	C	0.8	1	0	0.5	0	0.5	11

Table A.2 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
hp-0529.01-k	0	4041	416702	8314081	0.8	NA	NA	C	0.8	1	0	0.5	0	0.5	10
hp-0530.01-h	0	4049	415843	8314705	1.50	NA	NA	C	1.50	1	0	0.5	0	0	1
hp-0530.01-i	0	4049	415843	8314705	1.50	NA	NA	C	1.50	1	0	0.5	0	0	4
hp-0530.01-j	0	4049	415843	8314705	1.50	NA	NA	C	1.50	1	0	0.5	0	0	1
hp-0531.01-a	0	3998	415493	8315143	1.50	NA	NA	C	1.50	1	0	0	0	0	NA
hp-0531.01-b	0	3998	415493	8315143	1.50	NA	NA	C	1.50	1	0	0	0	0	NA
hp-0531.01-h	0	3998	415493	8315143	0.25	NA	NA	C	1.50	1	0	0.5	0	0	1
hp-0531.01-i	0	3998	415493	8315143	0.25	NA	NA	C	1.50	1	0	0.5	0	0	4
hp-0532.01-a	0	3940	415139	8315415	1.00	NA	NA	C	1.50	1	0.5	0	0	0	3
hp-0532.01-b	0	3940	415139	8315415	1.00	NA	NA	C	1.50	1	0.5	0	0	0	2
hp-0532.01-i	0	3940	415139	8315415	0.25	NA	NA	C	1.50	1	0	0.5	0	0	3
hp-0532.01-j	0	3940	415139	8315415	0.25	NA	NA	C	1.50	1	0	0.5	0	0	2
hp-0533.01-i	0	3838	414878	8315445	0.35	NA	NA	C	0.35	0	0	0.5	0	0	4
hp-0533.01-l	0	3838	414878	8315445	0.35	NA	NA	C	0.35	0	0	0.5	0	0	4
hp-0536.01-a	0	3833	414905	8309689	1.00	NA	NA	C	1.00	1	0.5	0.5	0	0	16
hp-0536.01-b	0	3833	414905	8309689	1.00	NA	NA	C	1.00	1	0.5	0.5	0	0	15
hp-0536.01-c	0	3833	414905	8309689	1.00	NA	NA	C	1.00	1	0.5	0.5	0	0	6
hp-0536.01-d	0	3833	414905	8309689	1.00	NA	NA	C	1.00	1	0.5	0.5	0	0	3
hp-0536.01-i	0	3833	414905	8309689	0.25	NA	NA	C	1.00	1	0.5	0.5	0	0	2
hp-0536.01-l	0	3833	414905	8309689	0.10	NA	NA	C	1.00	1	0.5	0.5	0	0	3
hp-0537.01-a	0	3818	414339	8317294	1.00	NA	NA	C	1.00	1	0	0.5	0	0	53
hp-0537.01-b	0	3818	414339	8317294	1.00	NA	NA	C	1.00	1	0	0.5	0	0	22
hp-0537.01-c	0	3818	414339	8317294	1.00	NA	NA	C	1.00	1	0	0.5	0	0	33
hp-0537.01-d	0	3818	414339	8317294	1.00	NA	NA	C	1.00	1	0	0.5	0	0	23
hp-0537.01-f	0	3818	414339	8317294	1.00	NA	NA	C	1.00	1	0	0.5	0	0	2
hp-0538.01-i	0	3818	411844	8315557	0.16	NA	NA	C	0.16	0	0	0.5	0	0	2
hp-0538.01-j	0	3818	411844	8315557	0.16	NA	NA	C	0.16	0	0	0.5	0	0	NA

A.2 Intensive Surveys Sources

A.2.1 Pukara Valley

UTM Coordinates and Elevations: Cohen (2010: Table A.1)

- PSAD56 to WGS84, using ArcGIS transformation "PSAD_1956_To_WGS_1984_8" (see Tripcevich 2007: 379)
- When elevation unspecified, Google Earth used

Component Sizes: Cohen (2010: Table A.2)

- Also for sites 11, 66, 89, and 118: respective site descriptions in Cohen (2010: Section A.2)
- Also for sites 131 and 139: Cohen (2010: Table A.1)
- Also for site 90: Cohen (2010: 376,406–407)
- Also for site 109: Cohen (2010: 383,409)
- For the Formative phases: A) when Cohen (2010: Table A.2) assigns a "general Formative period" component to a site, and no finer-grained Formative component, I have assigned "possible" components for all Formative sub-phases, B) when Cohen (2010: Table A.2) assigns "Early-Middle Formative" and "general Formative period" components to a site, but not "Early Formative" or "Middle Formative" components, I have assigned "possible" components for the Early Formative and Middle Formative (in these cases I treat "Late Formative" components separately), and C) when Cohen (2010: Table A.2) assigns "Early Formative" and/or "Middle Formative" and/or "Late Formative" components to a site, I have assigned "confident" components for this fine-grained phase or phases, and nothing for the other fine-grained phases.
- When Cohen (2010: Table A.2) assigns a "Sillustani" component to a site, but neither a "Late Intermediate period" nor a "Late Horizon period/Inka" component, I have assigned "possible" Late Intermediate and Late Horizon components. At

other sites with “Sillustani” components, I have ignored the “Sillustani” components and used each site’s “Late Intermediate period” and “Late Horizon period/Inka” component sizes.

Component Types: site descriptions in Cohen (2010: Section A.2)

- Also for site 1: Stanish (2003: 115); Klarich (2005: 57–58)
- Also for site 3: Stanish (2003: 112–114); Rowe (1958: 258)
- Also for site 13: Cohen (2010: Chapters 5–6)

Note that:

- Sites 29 and 145 omitted (these seem to be unused site numbers)
- Sites 8, 28, 30, 51, 53, 115, 121, 123, and 144 omitted (these sites are undated)
- Site 93 omitted (this site can’t be sized)

A.2.2 Huancané-Putina

UTM Coordinates and Elevations: Primarily Stanish and Plourde (2000: Field form copies), but occasionally Stanish and Plourde (2000: Table) or Stanish (n.d.d)

- PSAD56 to WGS84, using ArcGIS transformation “PSAD_1956_To_WGS_1984_8” (see Tripcevich 2007: 379)
- Occasionally, instead ArcGIS transformation “SAD_1969_To_WGS_1984_11”
- Elevations derived from SRTM data (CGIAR and Tripcevich), using ArcGIS

Component Sizes: Stanish (n.d.c) for habitation sites; in press version of Stanish et al. (2014: Table 3.2) for cemetery-only sites; rarely, Chávez Justo and Stanish (n.d.a); rarely, Stanish (n.d.b); rarely, site descriptions in an in press version of Stanish et al. (2014: Chapter 3); rarely, Chávez Justo and Stanish (n.d.b); rarely, Stanish and Plourde (2000)

- All cemetery-only components' sizes set to site size; likewise for sites 31, 46, 55, 59, 65, 140, 229, 247, 263, 267, 294, 357, 358, 374, 395, 405, 451, 477, 524, and 529
- Site sizes unknown for sites 24, 25, and 166; they are minor sites (Stanish et al. 2014: 188,206), so component sizes set to .01 hectare
- Site/component sizes for sites 168 and 253 estimated

Site Sizes: in press version of Stanish et al. (2014: Tables 3.1,3.2); rarely, Stanish (n.d.c); rarely, Stanish (n.d.b); rarely, site descriptions in an in press version of Stanish et al. (2014: Chapter 3); rarely, Stanish and Plourde (2000)

Component Types: in press version of Stanish et al. (2014: Tables 3.1, 3.2, 3.3, Chapter 3 site descriptions); rarely, Stanish and Plourde (2000); for site 14, Plourde (2006: 468–470,481–482)

Ceramic Counts: Chávez Justo and Stanish (n.d.b)

Note that:

- Sites 32, 34, 37, 43, 57, 63, 64, 80, 82–93, 97, 101, 102, 104–107, 110, 114, 116, 117, 121, 123, 128, 164, 165, 213, 220, 221, 242, 245, 250, 264, 272, 277, 282, 284, 290, 299, 301, 307, 311, 326, 330, 356, 363, 364, 367, 368, 371–373, 386, 389, 391, 401, 444, 458, 463, 470, 483–488, 490–492, 516, 523, 528, 534, and 535 excluded. Most of these are either Archaic-only sites or lack diagnostic sherds.
- Sites 18 and 406 combined. Sites 174 and 385 combined. Sites 449 and 493 combined.

A.2.3 Juli-Pomata

UTM Coordinates and Elevations: Stanish et al. (1997: Figures 107–124), georeferenced in ArcGIS using SRTM data (CGIAR and Tripcevich) and Landsat 8 imagery

- Elevations derived from SRTM data (CGIAR and Tripcevich), using ArcGIS.

- Coordinates for sites 218, 323, 332, 348, and 456 estimated based on Stanish et al. (1997: Figures 36,39) and the map block listings, elevation listings, and descriptions in Stanish et al. (1999). Elevations for these sites are from Stanish et al. (1999).

Component Sizes: Stanish et al. (1997: Tables 1,2,7); rarely, Stanish et al. (1999)

- When component size is derived from Stanish et al. (1997: Table 7), all components are set to the site size.
- For the Early Formative, phasing is determined using Stanish et al. (1997: 40). All Early Formative component sizes are set to a single estimate based on Stanish et al. (1997: 51), unless their site size is smaller.
- For cemetery-only sites, a site size estimate is created by assuming an area of 25 square meters per tomb, and multiplying this figure by the number of tombs listed in Stanish et al. (1999). The 25 square meters per tomb figure is based on sites with both areas and numbers of tombs listed in Stanish et al. (1999). The same size is used for all components. Occasionally a specific number of tombs is not provided, and in these cases I have made a rough guess. Note that the maps (Stanish et al. 1997: Figures 107–124) do not portray the actual size of cemetery sites (see Stanish et al. 1997: 160), so they can't be used to derive cemetery site sizes.
- Site 208's Upper Formative component size changed, due to what appears to be a typo.

Component Types: Stanish et al. (1997: Tables 1,2,7); Stanish et al. (1999); for site 1, also Stanish and Steadman (1994: 14–17) and Stanish et al. (1997: 77); for site 2, also Hyslop (1976: 399); for site 3, also Frye (1997: 135,138,140) and Stanish et al. (1997: 117); for site 9, also Hyslop (1976: 377) and Stanish et al. (1997: 72); for site 22, also Stanish et al. (1997: 10–11,40); for site 113, also Hyslop (1976: 281–282) and Stanish et al. (1997: 10–11,40); for site 121, also Hyslop (1976: 281–282); for site 137, also

Hyslop (1976: 373); for site 158, also Stanish et al. (1997: 10–11,40); for site 210, also Stanish et al. (1997: 10–11,40); for site 212, also Stanish (2003: 118,148–149,181,197) and Stanish et al. (1997: 10–11,40,73–74); for site 282, also Stanish et al. (1997: 10–11,40,79); for site 321, also Stanish et al. (1997: 10–11,40); for site 342, also Stanish et al. (1997: 10–11,40,76); for site 422, also Stanish et al. (1997: 10–11,40), for site 444, also Hyslop (1976: 352); for site 457, also Stanish et al. (1997: 10–11,40,61–63); for site 481, also Frye (1997: 134) and Stanish et al. (1997: 117)

Note that:

- Sites 10, 85, 124, 131, 279, 280, 397, 413, 468, 475, 476, 478, 483, 495, and 497 omitted. Most of these sites are Archaic-only sites or lack diagnostic ceramics.

A.2.4 Island of the Sun

UTM Coordinates and Elevations: Stanish and Bauer (2004c: 24), georeferenced in ArcGIS using Landsat 8 imagery

- For sites 31, 32, 34, and 35, Stanish and Bauer (2004a); Instituto Geográfico Militar (n.d.); Landsat 8
- For sites 152 and 159, Bauer and Stanish (2001: 86)
- For Iñak Uyu (assigned to site number 200 in this database) and Uila Peki (assigned to site number 201 in this database), Bauer et al. (2004a: 140) georeferenced in ArcGIS using Landsat 8 imagery
- For unnamed cemetery site on the Island of the Moon (assigned to site number 202 in this database), Bauer and Stanish (2001: 125). Location is very approximate.
- Elevations derived from SRTM data (CGIAR and Tripcevich), using ArcGIS

Component Sizes: Stanish and Bauer (2004c: Table 2.1)

- For site 21, also Stanish and Bauer (2004a: 181); Bauer et al. (2004b: 45)
- For site 23, also Bauer et al. (2004b: 64)

- For site 25, also Bauer et al. (2004b: 52)
- For site 34, also Stanish and Bauer (2004a: 188)
- For site 35, Stanish and Bauer (2004a) for phasing; sizes unknown and set to equivalent of one household
- For site 92's and site 142's Early Formative and Archaic components, Stanish and Bauer (2004a) for phasing; sizes unknown and set to equivalent of one household
- For sites 112, 174, and 175, also Stanish and Bauer (2004a)
- For Iñak Uyu, Bauer et al. (2004a: 140–141,162–168,171); sizes are my estimates; in contrast to my usual procedure, I have used excavation data to estimate component sizes, for the pre-Inca components
- For Uila Peki, Bauer and Stanish (2001: 125) for phasing; sizes are my estimates based on Bauer and Stanish (2001: 125–126,129)
- For unnamed cemetery site on the Island of the Moon (assigned to site number 202 in this database), Bauer and Stanish (2001: 125) for phasing; size unknown and set to .01 hectare

Site Sizes: Stanish and Bauer (2004a)

- For site 21, also Bauer et al. (2004b: 45)
- For site 23, Stanish and Bauer (2004c: Table 2.1); Bauer et al. (2004b: 64)
- For site 25, Stanish and Bauer (2004c: Table 2.1); Bauer et al. (2004b: 52)
- For site 34, also Stanish and Bauer (2004c: Table 2.1)
- For site 35, see component sizes sources
- For site 129, Stanish and Bauer (2004c: Table 2.1)
- For Iñak Uyu, Uila Peki, and unnamed cemetery site on the Island of the Moon, see component sizes sources

Component Types: Stanish and Bauer (2004a)

- For site 13, also Bauer et al. (2004b: 74,77,81)
- For site 21, also Bauer et al. (2004b: 50–51); Bauer and Stanish (2001: 153)
- For site 22, also Seddon (2004: 99,115–117,122–126); Stanish and Bauer (2004c: 35); Bauer and Stanish (2001: 146)
- For site 25, also Bauer et al. (2004b: 63); Bauer and Stanish (2001: 153)
- For site 92, also Stanish and Bauer (2004c: 29); Bauer and Stanish (2001: 135–136,149,270)
- For site 93, also Stanish et al. (2002)
- For site 109, also Seddon (2004: 137)
- For site 142, also Stanish and Bauer (2004c: 35,37)
- For site 180, also Seddon and Bauer (2004: 90)
- For Iñak Uyu, Bauer et al. (2004a: 164–169,171–172)
- For Uila Peki and unnamed cemetery site on the Island of the Moon, Bauer and Stanish (2001: 125)

Note that:

- Sites 15, 17, 44, 49, 50, 55, 58, 60, 66, 70, 81, 88–91, 95, 97, 99, 102, 104, 113, 116, 126, 128, 132, 138, 141, 144, 148, 149, 155, 156, 161, 162, 171, 177, and 179 excluded (modern, unknown phasing, or skipped number)

A.2.5 Taraco Peninsula

UTM Coordinates and Elevations: Bandy (2001: Appendix A)

- PSAD56 to WGS84, using ArcGIS transformation "PSAD_1956_To_WGS_1984_8" (see Tripcevich 2007: 379)

Component Sizes: Bandy (2001: Appendix A)

Component Types: Bandy (2001: Appendix A)

- For site 1, also Bandy (2001: 97–99,119,174–176,180); Blom and Bandy (1999: 118); Hastorf (1999b: 4); Hastorf (2003: 314–317,321,324)
- For site 3, also Bandy (2001: 94,119)
- For site 4, also Bandy (2001: 99–100,122)
- For site 130, also Bandy (2001: 122,133–134)
- For site 141, also Bandy (2001: 166)
- For site 160, also Bandy (2001: 213)
- For site 225, also Bandy (2001: 122); Bandy and Hastorf (2004: 9–10); Bandy and Hastorf (2007: 5–6,8); Cohen and Roddick (2007: 43,47–49,62,64)
- For site 232, also Bandy and Hastorf (2007: 6–8); Paz and Fernández Murillo (2007: 31–32); Bruno and Leighton (2007: 35,38,40); Bandy (2007: 139–141)
- For site 268, also Bandy (2001: 123,135)
- For site 271, also Bandy (2001: 180–182,214–215); Bandy (2007: 142–143); Bandy and Hastorf (2006: 9); Bruno et al. (2006: 50–52,55–57)
- For site 272, also Fernández Murillo et al. (2005: 27,43–47)
- For site 303, also Bandy (2001: 102)
- For site 322, also Bandy (2001: 178)
- For site 368, also Bandy (2001: 217)
- For site 394, also Bandy (2001: 96–97,124)
- For site 415, also Bandy (2001: 218–219)
- For site 421, also Bandy (2001: 179,183)
- For site 430, also Beck (2004: 335–336)
- For site 455, also Bandy (2001: 233–235)
- For site 476, also Bandy (2001: 135)

Ceramic Counts: Bandy (2001: Appendix B)

- When one phase has multiple sectors at a site, I have assigned the sum of all ceramic counts to the largest sector
- I have summed all sherd counts of the different Chiripa ceramic types, and entered this sum for the sherd count for all three of the Chiripa phases. In other words, I have entered the same sherd count, obtained using coarse-grained phasing, for all three fine-grained phases. This is because the three Chiripa phases are not defined by Bandy (2001) at the sherd/type level but rather at the assemblage level, through frequency profiles.

Note that:

- I have excluded sites with only "Phase unknown" or "Unknown, definitely prehispanic" components

A.2.6 Katari Valley

UTM Coordinates and Elevations: Janusek and Kolata (2003: Appendix 6.1)

- PSAD56 to WGS84, using ArcGIS transformation "PSAD_1956_To_WGS_1984_8" (see Tripcevich 2007: 379)
- Elevations derived from SRTM data (CGIAR and Tripcevich), using ArcGIS

Component Sizes: Janusek and Kolata (2003: Appendix 6.1)

- For site 160, also Janusek and Kolata (2003: Figure 6.3)
- For sites 3, 32, 48, 114, 123, 132, 137, 160, and 208, also Janusek and Kolata (2003: Figure 6.4)
- For sites 3, 12, 32, 65, 104, 119, 121, 123, 159, and 160, also Janusek and Kolata (2003: Figure 6.5)
- For sites 3, 12, 28, 30, 32, 35, 48, 65, 98, 99, 114, 119, 121, 123, 125, 130, 132, 137, 152, 159, 160, 186, 190, and 208, also Janusek and Kolata (2003: Figure 6.6)

- For sites 12, 32, 65, 104, 114, 132, 159, 186, and 208, also Janusek and Kolata (2003: Appendix 6.1's bold font) (Janusek and Kolata (2003: 171) define this in the following way: "Time periods shown in bold indicate probable phase of most intensive-extensive occupation." Thus, for components shown in bold font, I have set their minimum size to be no lower than any other of the site's components' minimum sizes. Also, all of a site's components' maximums must be no higher than the bold font component's maximum.)
- For sites 32, 48, 81, 83, 114, 132, 137, 186, and 208, also Janusek and Kolata (2003: 148)
- For sites 12 and 67, also Janusek and Kolata (2003: 154)
- For site 125, also Janusek and Kolata (2003: 146,154)
- For site 152, also Janusek and Kolata (2003: 136,139,148)

Site Sizes: Janusek and Kolata (2003: Appendix 6.1)

Component Types: Janusek and Kolata (2003: 133)

- For sites 32, 132, 195, and 208, also Janusek and Kolata (2003: 148)
- For site 65, also Janusek and Kolata (2003: 140,150,156)
- For site 70, also Janusek and Kolata (2003: 151,156)
- For site 104, also Janusek and Kolata (2003: 153)
- For site 125, also Janusek and Kolata (2003: 146–147,156)
- For site 152, also Janusek and Kolata (2003: 136,139,148,150)
- For site 212, also Janusek and Kolata (2003: 155)

A.2.7 Lower Tiwanaku Valley

UTM Coordinates and Elevations: Albarracin-Jordan (1992: Appendix 2)

- PSAD56 to WGS84, using ArcGIS transformation "PSAD_1956_To_WGS_1984_8" (see Tripcevich 2007: 379)

Component Sizes: Albarracin-Jordan (1992: Appendix 2)

- For site 29, also Albarracin-Jordan (1996a: 90,103,122,131,137), for Formative fine-graining
- For sites 30, 34, 55, 150, 155, 156, and 187, Tiwanaku III size unknown so set to .01 (at other sites, the three Tiwanaku III components with size information are very small); Albarracin-Jordan (1996a: 131–137) for Formative fine-graining
- For sites 33, 94, 101, 134, 158, 164, 174, 182, 205, 215, 333, 366, 372, 377, 382, 393, 419, 432, 436, 450, 460, 461, 462, 464, 467, 468, 474, and 480, also Albarracin-Jordan (1996a: 90,103,122), for Formative fine-graining
- For site 50, also Albarracin-Jordan (1996a: 131), for Formative fine-graining
- For site 90, also Albarracin-Jordan (1996a: 90,98,122), for Formative fine-graining (Chiripa and Tiwanaku I components set to same size)
- For site 155, also Albarracin-Jordan (1996a: 87,90,122), for Formative fine-graining
- For site 156, also Albarracin-Jordan (1996a: 87,90,98,122,136–137), for Formative fine-graining (Chiripa and Tiwanaku I components set to same size)
- For site 179, also Albarracin-Jordan and Mathews (1990: Map 2), for Formative fine-graining
- For site 487, also Albarracin-Jordan (1996a: 131,137), for Formative fine-graining

Site Sizes: Albarracin-Jordan and Mathews (1990: Appendix 1)

- For site 332, also Albarracin-Jordan (1992: Appendix 2)

Component Types: Albarracin-Jordan (1992: 76–77)

- For site 8, also Albarracin-Jordan (1992: 181)
- For site 15, also Albarracin-Jordan (1992: 174)
- For site 22, also Albarracin-Jordan (1992: 279)
- For site 23, also Albarracin-Jordan (1992: 279–281,300,304)

- For site 25, also Albarracin-Jordan (1992: 319)
- For sites 27 and 29, also Albarracin-Jordan (1992: 174)
- For site 34, also Albarracin-Jordan (1992: 166–168); Albarracin-Jordan and Mathews (1990: 96)
- For site 37, also Albarracin-Jordan (1992: 168–170)
- For site 50, also Albarracin-Jordan and Mathews (1990: 96)
- For site 55, also Albarracin-Jordan (1992: 181–184,213–217)
- For site 68, also Albarracin-Jordan (1992: 172)
- For site 94, also Albarracin-Jordan (1992: 94,115); Albarracin-Jordan and Mathews (1990: 69)
- For site 95, also Albarracin-Jordan (1992: 175)
- For site 109, also Albarracin-Jordan (1992: 229)
- For site 133, also Albarracin-Jordan (1992: 175)
- For site 150, also Albarracin-Jordan (1992: 180,230,262)
- For site 158, also Albarracin-Jordan (1992: 170)
- For site 164, also Albarracin-Jordan (1992: 321)
- For site 173, also Albarracin-Jordan and Mathews (1990: 95)
- For site 174, also Albarracin-Jordan (1992: 91,115,122,138–139,141)
- For site 205, also Albarracin-Jordan (1992: 92)
- For site 487, also Albarracin-Jordan (1992: 178)

Ceramic Counts: Albarracin-Jordan (1992: 360–363)

- If Albarracin-Jordan didn't assign a particular phase to a site (see the component size data), then I have excluded the ceramic count for that phase (in these cases, there are only small numbers of sherds).
- I excluded "Eroded," "N-ID.," and "N-DIAG." counts.

Note that:

- I have excluded sites which have only a “Not Determined” (phase) component, and sites which have no phase codes listed

A.2.8 Middle Tiwanaku Valley

UTM Coordinates and Elevations: Mathews (1992: Appendix A) (coordinates’ format is: easting ten-thousands place, easting thousands place, easting hundreds place, northing ten-thousands place, northing thousands place, northing hundreds place)

- For site 156, Albarracin-Jordan and Mathews (1990: 232)
- For site of Tiwanaku (this database assigns it to site 600), Albarracin-Jordan and Mathews (1990: Maps), georeferenced in ArcGIS using Landsat 8 imagery
- PSAD56 to WGS84, using ArcGIS transformation “PSAD_1956_To_WGS_1984_8” (see Tripcevich 2007: 379)

Component Sizes: Mathews (1992: Appendix A); Albarracin-Jordan and Mathews (1990: Maps).

- When Mathews (1992: Appendix A) lists a period in bold font, I have assumed that the corresponding component’s minimum size = (site size / site’s number of components).
- The site sizes in Mathews (1992: Appendix A) serve as component size maxima.
- Albarracin-Jordan and Mathews (1990: Maps) display each component as within one of three ranges: 0.01–.9 hectare, 1–2.9 hectares, or 3–10 hectares. I have used these ranges to define component size minima and maxima. Besides using the ranges’ endpoints themselves as component size minima and maxima, the ranges can be used to make other deductions. The minimum size of a site’s largest component must be raised high enough so that (largest component’s minimum + other components’ maxima) = site size. If there are only two components and

the larger component's maximum is below the site size, the smaller component's minimum must be raised high enough so that (largest component's maximum + smaller component's minimum) = site size.

- For Formative fine-graining, Mathews (2003: 114–116)
- For site 101's Tiwanaku IV component size, Mathews (1992: 149)
- For site of Tiwanaku (this database assigns it to site 600), Bandy (2013: 84) and Couture and Sampeck (2003: 259) regarding the lack of a Middle Formative component
- For site of Tiwanaku's Late Formative 1 component, Bandy (2013: 84); also see Janusek (2004a: Figure 4.6), which maps an area equivalent to about 25 hectares
- For site of Tiwanaku's Late Formative 2 component, Bandy (2013: 84); Bandy (2001: 196–197); Janusek (2004a: 115,117); Janusek (2008: 154)
- For site of Tiwanaku's Tiwanaku period component, my database's figure of 400 hectares is close to Bandy's (2013: 84) figure of 385 hectares, rather than the figure of 600 hectares which can be found in much of the major literature on Tiwanaku (Janusek and Blom 2006: 239–240; Janusek 2004a: 128; Janusek 2004b: 155; Kolata 2003a: 15; Kolata 2003c: 200). I have done this for three reasons: 1) Bandy's other work is the foundation for all population estimates in this study, 2) the population estimate derived from the 400 hectares figure using Bandy's method is about 26,000, which is already higher than the population estimates given in tandem with the 600 hectares figure by Janusek (10,000–20,000) and Kolata (15,000–20,000), and 3) there are large monumental areas at Tiwanaku, probably sparsely populated and variously estimated as 90/80 hectares (Janusek 2004a: 130; Bandy 2013: 80) to 30/20 hectares (Parsons 1968: 245; Browman 1978: 328). See an important discussion of this and related issues in Janusek and Blom (2006: 240) and Janusek (2004a: 128), where they estimate that 25% of the site is nonresidential (monumental features, water features, cemeteries, etc.) and that 20% of the site would be unoccupied residential areas at any given time (thus,

together 45% of the site would be non-inhabited at any time). Also note that Janusek and Blom (2006: 250) argue for substantial variation in population size between different parts of any year, related to ritual events, perhaps from 9,000 people in low seasons to 30,000 in high seasons. For other perspectives on the size and population of the site of Tiwanaku, most of which provide size estimates in the 400–600 hectares range, also see Janusek (2008: 154), Janusek (2004a: 115), Janusek (1999: 112), Bandy (2001: 222), Ponce Sanginés (1969: 22,29), Ponce Sanginés (1972: 62,79), Ponce Sanginés (1991: 8,15), Kolata (1983: 258), Kolata (1986: 760), Kolata and Ponce Sanginés (1992: 332), Albarracin-Jordan and Mathews (1990: 33,132), Parsons (1968), Browman (1978), and Stanish (2003: 172).

- For site of Tiwanaku's Early Pacajes component, Janusek (2004a: 259). Also see Janusek (2008: 294), for a roughly equivalent figure.
- For site of Tiwanaku's Inca period component, Yaeger and López Bejarano (2004: 341–342)
- For site of Tiwanaku's Late Pacajes component, Cook (1975: 58) (I reversed the population estimation method to derive a spatial area from a population figure). Also see Yaeger and Vranich (2013: 145).

Site Sizes: Mathews (1992: Appendix A)

Component Types: Mathews (1992: 35–37,263)

- For site 72, also Albarracin-Jordan and Mathews (1990: 99)
- For site 79, also Mathews (1992: 69–70,255–256); Albarracin-Jordan and Mathews (1990: 64)
- For site 101, also Mathews (1992: 257,264–267)
- For sites 106 and 125, also Albarracin-Jordan and Mathews (1990: 64)
- For site 228, also Mathews (1992: 267–269)
- For site 247, also Albarracin-Jordan and Mathews (1990: 144)

- For site 255, also Albarracin-Jordan and Mathews (1990: 145)
- For site 332, also Mathews (1992: 259)
- For sites 456 and 457, also Albarracin-Jordan and Mathews (1990: 111)
- For site 487, also Albarracin-Jordan and Mathews (1990: 70–71)
- For sites 520 and 528, also Mathews (1992: 145)
- For site 558, also Mathews (1992: 164–167,170,270–273)
- For site 561, also Mathews (1992: 145); Albarracin-Jordan and Mathews (1990: 114)
- For site of Tiwanaku's Late Formative 1 and 2 components, Janusek (2004a: 101–103,106–111); Janusek (2008: 110–111); Yaeger and Vranich (2013: 140–141); Couture and Sampeck (2003: 230–231,259)
- For site of Tiwanaku's Tiwanaku IV and V components, Kolata (2003c: 190–191,193); Janusek (2003a: 294); Janusek (2008: 110,113–125,152–153); Blom (2005); Couture (2003: 222–223); Couture and Sampeck (2003: 226,233,238–243,252–255,261–262); Blom et al. (2003); Yaeger and Vranich (2013); Verano (2013); Koons (2013)
- For site of Tiwanaku's Early Pacajes component, Kolata (2003a: 10); Kolata (2003c: 189); Janusek (2008: 294–295)
- For site of Tiwanaku's Inca period component, Yaeger and López Bejarano (2004); Yaeger and Vranich (2013: 136); Janusek (2008: 295); Kolata (2003c: 190)
- For site of Tiwanaku's Late Pacajes component, Cobo (1653[1990]: xix,102–105)

Note that:

- I have excluded sites which have no phases or no size listed in Mathews (1992: Appendix A)

A.2.9 Qawra Thaki

UTM Coordinates and Elevations: de la Vega Machicao (2009: Anexo B)

- For site 2165, de la Vega Machicao (2009: Mapa L-04)

Site Sizes: de la Vega Machicao (2009: Anexo B)

- For site 2053, de la Vega Machicao (2009: Anexo A) (Anexo B's site size of 25 ha is probably too big in comparison to other surveys' sizing methods; I compared the site description to SRTM data to restrict the site size to the area above 4250 masl, which is slightly below the site's lowest encircling wall)
- For site 2114, I have reduced the size by half because this is a very extensive but very low-density scatter
- For site 2123, based on de la Vega Machicao's (2009: Anexo A) description, I have reduced the size by half, as this does not seem to be primarily habitation area

Component Types: de la Vega Machicao (2009: Anexo A)

- For sites 2123 and 2127, also de la Vega Machicao (2009: 26)

Ceramic Counts: de la Vega Machicao (2009: Anexo B)

Note that:

- I have phased the sites using the ceramic sample counts. Sometimes, a site's form in de la Vega Machicao (2009: Anexo A) indicates the presence of phases that are absent in the site's ceramic sample. I have excluded such components, as they are likely minor.
- I have excluded sites without ceramics

APPENDIX B

Settlement Pattern Database Part II: Inter-Survey Dataset

B.1 Inter-Survey Database

In the scripts presented in Appendix D, the database presented here in Table B.1 is referred to with the file name "Gaps_r_UNFINISHED_10JAN16_NO_BLANKS_NO_SPACES.csv". The file referred to in Appendices D and E as "Gaps_python_UNFINISHED_10JAN16_NO_BLANKS_NO_SPACES.csv" is identical except that it uses "-1" instead of "NA" to indicate "not available".

Table A.1 explains what each column in Table B.1 signifies. Note that while I have broken some of the headers in Table B.1 across two lines to save space, in reality there are no separators between the two parts.

For each site, only components of major regional importance are included in this inter-survey database. When components are excluded, it is noted in Section B.2.

Some of the component and site sizes for inter-survey sites are reported as ranges in the literature, but for these I have nevertheless entered a specific size (typically the midpoint) in the "size_abs" field rather using the "size_min" and "size_max" fields. Some of the inter-survey sites do have sherd count data available, but I haven't included this data here.

Table B.1: Inter-Survey Database

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
gp-0001.01-a	0	3914	328560	8352803	1	NA	NA	C	2	1	0	0	0	0	NA

Table B.1 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
gp-0001.01-b	0	3914	328560	8352803	2	NA	NA	C	2	1	1	0	0	0	NA
gp-0001.01-c	0	3914	328560	8352803	1	NA	NA	C	2	1	0	0	0	0	NA
gp-0002.01-b	0	3839	376985	8294041	5	NA	NA	C	5	1	0	0.5	0	0	NA
gp-0002.01-c	0	3839	376985	8294041	5	NA	NA	C	5	1	0	0.5	0	0	NA
gp-0002.01-d	0	3839	376985	8294041	5	NA	NA	C	5	1	0.5	0.5	0	0	NA
gp-0003.01-a	0	3879	387529	8259099	1	NA	NA	C	40	1	0	0	0	0	NA
gp-0003.01-b	0	3879	387529	8259099	4	NA	NA	C	40	1	0.5	0	0	0	NA
gp-0003.01-c	0	3879	387529	8259099	12	NA	NA	C	40	1	0.5	0	0	0	NA
gp-0003.01-d	0	3879	387529	8259099	12	NA	NA	C	40	1	0.5	0	0	0	NA
gp-0003.01-f	0	3879	387529	8259099	25	NA	NA	C	40	1	0	0	0	0	NA
gp-0004.01-b	0	3825	393223	8250299	4.5	NA	NA	C	18.9	1	0.5	0	0	0	NA
gp-0004.01-c	0	3825	393223	8250299	4.5	NA	NA	C	18.9	1	1	0	0	0	NA
gp-0004.01-d	0	3825	393223	8250299	18.9	NA	NA	C	18.9	1	1	1	0	0	NA
gp-0005.01-b	0	3865	475000	8201800	6	NA	NA	C	9	1	0.5	0	0	0	NA
gp-0005.01-c	0	3865	475000	8201800	9	NA	NA	C	9	1	0.5	0	0	0	NA
gp-0006.01-a	0	3865	512900	8220200	0.5	NA	NA	C	6	1	0.5	0.5	0	0	NA
gp-0006.01-b	0	3865	512900	8220200	6	NA	NA	C	6	1	0.5	0.5	0	0	NA
gp-0006.01-c	0	3865	512900	8220200	6	NA	NA	C	6	1	0.5	1	0	0	NA
gp-0007.01-d	0	3915	521900	8228300	15	NA	NA	C	18	1	1	0.5	0	0	NA
gp-0008.01-b	0	3905	482535	8269384	4	NA	NA	C	4	1	1	1	0	0	NA
gp-0008.01-c	0	3905	482535	8269384	4	NA	NA	C	4	1	0.5	0.5	0	0	NA
gp-0009.01-a	0	3828	394897	8308749	1	NA	NA	C	60	1	0.5	0	0	0	NA
gp-0009.01-b	0	3828	394897	8308749	15	NA	NA	C	60	1	1	1	0	0	NA
gp-0009.01-c	0	3828	394897	8308749	60	NA	NA	C	60	1	1	1	0	0	NA
gp-0009.01-f	0	3828	394897	8308749	7.5	NA	NA	C	60	1	1	0	0	0	NA
gp-0010.01-c	0	3843	397267	8271512	10	NA	NA	C	12	1	0	0.5	0	0	NA
gp-0011.01-b	0	3940	400294	8243126	10	NA	NA	C	10	1	0.5	0.5	0	0	NA
gp-0011.01-c	0	3940	400294	8243126	10	NA	NA	C	10	1	1	0.5	0	0	NA
gp-0012.01-b	0	3885	381538	8355191	14.4	NA	NA	C	14.4	1	0.5	0	0	0	NA
gp-0012.01-c	0	3885	381538	8355191	9	NA	NA	C	14.4	1	0.5	0	0	0	NA
gp-0013.01-b	0	3865	486565	8201850	5	NA	NA	C	5	1	0.5	0.5	0	0	NA
gp-0013.01-c	0	3865	486565	8201850	5	NA	NA	C	5	1	0.5	0.5	0	0	NA

Table B.1 continued

comp	multi_ sectors	masl	eutm19	nutm19	size _abs	size _min	size _max	chron _conf	site size	hab	rit	bur	agr	def	sherds
gp-0013.01-d	0	3865	486565	8201850	5	NA	NA	C	5	1	0.5	0.5	0	0	NA
gp-0013.01-f	0	3865	486565	8201850	5	NA	NA	C	5	1	0.5	0.5	0	0	NA
gp-0014.01-b	0	3844	496841	8192752	3	NA	NA	C	12	1	0.5	0	0	0	NA
gp-0014.01-c	0	3844	496841	8192752	12	NA	NA	C	12	1	0.5	0	0	0	NA
gp-0014.01-d	0	3844	496841	8192752	12	NA	NA	C	12	1	0.5	0	0	0	NA
gp-0015.01-c	0	3825	498194	8159954	1.2	NA	NA	C	1.2	0.5	0.5	0.5	0	0	NA
gp-0015.01-d	0	3825	498194	8159954	1.2	NA	NA	C	1.2	0.5	0.5	0.5	0	0	NA
gp-0016.01-c	0	3845	534975	8192125	4	NA	NA	C	30	1	0.5	0	0	0	NA
gp-0016.01-d	0	3845	534975	8192125	30	NA	NA	C	30	1	1	0	0	0	NA
gp-0017.01-c	0	3885	534900	8141725	10.3	NA	NA	C	19.1	1	1	1	0	0	NA
gp-0018.01-b	0	3940	524823	8134566	5	NA	NA	C	16.75	1	0.5	0.5	0	0	NA
gp-0018.01-c	0	3940	524823	8134566	5	NA	NA	C	16.75	1	0.5	0.5	0	0	NA
gp-0018.01-d	0	3940	524823	8134566	16.75	NA	NA	C	16.75	1	0.5	1	0	0	NA
gp-0018.01-f	0	3940	524823	8134566	16.75	NA	NA	C	16.75	1	0.5	0.5	0	0	NA
gp-0019.01-c	0	3853	492250	8181650	8	NA	NA	C	8	1	0.5	0	0	0	NA
gp-0019.01-d	0	3853	492250	8181650	8	NA	NA	C	8	1	0.5	0	0	0	NA
gp-0020.01-c	0	3975	392068	8245060	5	NA	NA	C	17.5	1	0	0	0	0	NA
gp-0020.01-d	0	3975	392068	8245060	17.5	NA	NA	C	17.5	1	0	0	0	0	NA
gp-0021.01-f	0	3844	377415	8265165	65	NA	NA	C	65	1	1	1	0	0	NA

B.2 Inter-Survey Sources

GP1 (Balsaspata/Pueblo Libre and Qaqachupa)

UTM Coordinates and Elevation: Tantaleán (2010: 438); Google Earth DEM; also see Tantaleán (2005: Figures 1–2) and Tantaleán (2012: Figures 3.1,3.3)

Component Sizes:

- While Balsaspata and Qaqachupa are typically discussed separately, they are essentially just on opposite riverbanks (see Tantaleán 2012: Figure 3.1), so I have combined their sizes here.

- Regarding the existence of an Early Formative component, Tantaleán (2012: 71); also see Burger et al. (2000: 299). The Early Formative size is unknown and I therefore set it to half of the Middle Formative size.
- The main component at Balsaspata is the Qaluyu component (Tantaleán 2012: 72–73). This is also true at Qaqachupa (Tantaleán 2010: 420; Burger et al. 2000: 299). Therefore I have set the Middle Formative component size to the total site size. Balsaspata is 1 hectare (Tantaleán 2010: 418; also see Tantaleán 2012: 50–51). Qaqachupa is 1 hectare (Tantaleán 2010: 420).
- The Late Formative size is unknown and I therefore set it to half of the Middle Formative size. I based this guess on Tantaleán's (2012: 73) statement that the Late Formative component at Balsaspata is minor, and similar statements regarding Qaqachupa (Tantaleán 2010: 420; Burger et al. 2000: 299).
- Also see Stanish (2003: 5,115) regarding the regional importance of Balsaspata during the Middle Formative. Note that post-Formative occupations have been identified but are not included in this database because they are of less regional importance.

Component Types: Tantaleán (2012: 72)

GP2 (Maravillas)

UTM Coordinates and Elevation: Tantaleán (2010: 439); Google Earth DEM

Component Sizes: Stanish et al. (2005a: 303–304)

- I have set all component sizes to the site size
- See Stanish (2003: 5–6,144–145,183,189) regarding the regional importance of Maravillas during the Middle Formative, Late Formative, and Tiwanaku periods. Note that Maravillas also has Altiplano period and Inca period occupations, but that I have not included them in this database because they are of less regional importance.

Component Types: Stanish et al. (2005a: 303–304); Stanish (2003: 144,189)

GP3 (Paucarcolla and Paucarcolla-Santa Barbara)

UTM Coordinates and Elevation: Tantaleán (2010: 441); Google Earth DEM

Component Sizes:

- There is an Early Formative component (Johnson 2012: 78), but its size is unknown. I have assumed that it is quite small, since this is the general pattern for the Early Formative (e.g., Stanish 2003: 106,108; Lémuz Aguirre 2012: 290).
- For the Middle Formative, Stanish (2003: 119). Also see Stanish et al. (2005a: 305). But see Johnson (2012: 81,Figure 4.3) regarding a larger estimate.
- For the Late Formative, Stanish (2003: 149). But see Johnson (2012: 81,Figure 4.3) for a larger estimate.
- For the Tiwanaku period, Stanish (2003: 189). But see Johnson (2012: Figure 4.7) for a larger estimate.
- For the Inca period, Stanish (2003: 240,242). Also see Stanish et al. (2005a: 304–305). While Paucarcolla and Paucarcolla-Santa Barbara are treated separately by Stanish et al. (2005a: 304–305) and both have an Inca component listed, Johnson (2012: 85) notes that the Inca occupation heavily focused on the area near the road rather than the hill, or in other words on Paucarcolla rather than Paucarcolla-Santa Barbara. I therefore have set this component size to 25 rather than 40 hectares. Also see Johnson (2012: Figure 4.10), which suggests an even smaller size.
- See Stanish (2003: 5–6,9,183) regarding the regional importance of Paucarcolla during the Middle Formative, Late Formative, and Tiwanaku periods. Note that while an Altiplano component exists at Paucarcolla-Santa Barbara, I have not included it in this database because it is minor (Johnson 2012: 85, but also see Figure 4.8).

Site Size: Stanish et al. (2005a: 304–305)

Component Types: Stanish et al. (2005a: 305); Johnson (2012: 81–85); but see Stanish (2003: 120)

GP4 (Huajje and Isla Esteves)

UTM Coordinates and Elevation: Schultze (2008: 469)

Component Sizes:

- For the Middle Formative and Late Formative, Schultze (2008: 469). Also see Stanish et al. (2005a: 302). The Middle Formative and Late Formative component sizes are unknown, so I have set them to the site size of Huajje (this is likely an overestimate for the Middle Formative), but I have excluded Isla Esteves because it is a Tiwanaku site (Schultze 2008: 127,149–150,472). Regarding the regional importance of Huajje during the Middle Formative, see Stanish (2003: 5,120), but also note that subsequent work by Schultze shifts the emphasis to the Late Formative (Schultze et al. 2009: 17280–17281). Regarding the regional importance of Huajje during the Late Formative, see Stanish (2003: 6); Schultze et al. (2009: 17280–17281); Stanish et al. (2005a: 302).
- For the Tiwanaku period, Schultze (2008: 469,472). This figure is the sum of the site sizes of Huajje and Isla Esteves. Regarding the regional importance of Huajje/Isla Esteves during the Tiwanaku period, see Stanish (2003: 183,187); Stanish et al. (2005a: 302).
- Note that there are Altiplano and Inca occupations at Huajje, but that they are not included in this database because they are of less regional importance.

Component Types: Stanish (2003: 120,187,290); Schultze et al. (2009: 17280–17281); Stanish et al. (2005a: 302); Schultze (2008: 126–127,131–135,148–150,445–448,469,472–473); Núñez Mendiguri and Paredes E. (1978: 761). Although Schultze (2008: 130,169,173–174,445) discusses Isla Esteves as a defensive location, it seems that there isn't evidence of defensive walls.

GP5 (Ckackachipata)

UTM Coordinates and Elevation: Stanish et al. (1997: Figure 57), in comparison to Google Earth imagery; Google Earth DEM

Component Sizes:

- For the Middle Formative, Stanish et al. (1997: 83,90)
- For the Late Formative, Stanish et al. (1997: 83)
- Regarding Ckackachipata's regional importance during the Middle Formative, see Stanish (2003: 5,118–119); Stanish et al. (1997: 83,90). Regarding Ckackachipata's regional importance during the Late Formative, see Stanish (2003: 6,151); Stanish et al. (1997: 83). There is also an Inca component and a possible Tiwanaku component, but these are not included in this database because they are of less regional importance (Stanish et al. 1997: 90). There is also an adjacent Altiplano site, Pucara Chatuma, that is not included in this database because, while significant, it is less important than other pucaras in the southwestern Titicaca region (Stanish 2003: 210–214).

Site Size: Stanish et al. (1997: 90)

Component Types: Stanish et al. (1997: 90)

GP6 (Turinipata-uyo/SH74)

UTM Coordinates and Elevation: Lémuz Aguirre (2012: Figure 8.29); Google Earth DEM

Component Sizes:

- For the Early Formative, Lémuz Aguirre (2012: 128,290). This source does not give this size specifically for this component; I have used .5 hectare because all components from this phase in this survey are under .5 hectare.
- For the Middle Formative, Lémuz Aguirre (2012: 128). This figure is for the "parte nuclear," and there is a larger figure of 20 hectares for the "maxima

dispersion del material ceramico en superficie"; Lémuz Aguirre uses the smaller number in the figures/tables, and I follow his use.

- For the Late Formative, Lémuz Aguirre (2012: 128)
- Regarding the Formative period in this region, Stanish (2003: 5–6,155,281) discusses Chigani Alto instead, but Turinipata-uyo seems more important. Sites SH48 and SH15 are also important, and should be incorporated into this database in the future. Note that Turinipata-uyo also has post-Formative occupations, but that I haven't included them in this database because they are minor (Lémuz Aguirre 2012: 128).

Site Size: Lémuz Aguirre (2012: 128). This is my estimate.

Component Types: Lémuz Aguirre (2012: 36,128,147)

GP7 (El Calvario/SH85)

UTM Coordinates and Elevation: Lémuz Aguirre (2012: Figure 8.67), georeferenced in ArcGIS using Landsat 8 imagery; Google Earth DEM

Component Sizes: Lémuz Aguirre (2012: 287,289,305–306). This figure is a minimum for the "ocupacion nuclear," whereas the "ocupacion total" is nearly 34 hectares; it is the smaller number that Lémuz Aguirre uses in the figures/tables and discussion, and I follow his use.

Site Size: Lémuz Aguirre (2012: 119)

Component Types: Lémuz Aguirre (2012: 119,288,305–306)

GP8 (Titimani)

UTM Coordinates and Elevation: Portugal Ortíz (1998: 42), transformed using ArcGIS's "PSAD_1956_To_WGS_1984_8" transformation (I assumed PSAD56 was the datum for Portugal Ortíz's coordinates; this may be incorrect). Note that Portugal Ortíz's latitude and longitude should be switched. For the elevation, Google Earth DEM.

Component Sizes:

- Although the dating of the site is somewhat unclear, there seems to be substantial evidence of Chiripa-era occupation (Portugal Ortíz 1998: 42–56; Hastorf 2005: 74–75; Janusek 2004b: 134; Stanish 2003: 154,279). Therefore, I have set the Middle Formative component size to the total site size. The site size is 4 hectares (Stanish 2003: 154).
- There appears to be a Late Formative component (Hastorf 2003: 314; Hastorf 2005: 84,86). This dating seems less clear than the Middle Formative dating; however, given the difficulties of the southern Late Formative ceramic chronology, particularly at the time of Portugal Ortíz's studies, I have assigned a Late Formative component to Titimani. The Late Formative component size is unknown, so I have used the total site size (Stanish 2003: 154). Regarding the dating and component size of Late Formative Titimani, also see Stanish (2003: 149) and Cohen (2010: 80).
- Regarding the regional importance of Titimani during the Middle Formative, see Stanish (2003: 5,154,279). Regarding the regional importance of Titimani during the Late Formative, see Stanish (2003: 6,154).

Component Types:

- For the Middle Formative, Portugal Ortíz (1998: 42–57,62); Hastorf (2005: 74–75); Janusek (2004b: 134); Stanish (2003: 154,279). The dating of the site is somewhat unclear, but the bulk of the evidence seems to suggest affinity with Chiripa, so I have used the sunken court as evidence for coding a "1" for Middle Formative corporate ritual.
- For the Late Formative, Portugal Ortíz (1998: 42–57); Hastorf (2003: 314); Hastorf (2005: 84,86); Stanish (2003: 154)

GP9 (Taraco)

UTM Coordinates and Elevation: Stanish (n.d.a); Google Earth DEM

Component Sizes:

- Regarding the presence of an Early Formative component, Levine (2015). The Early Formative component size is unknown, so I have assumed that it is quite small since this is the general Early Formative pattern (e.g., Stanish 2003: 106,108; Lémuz Aguirre 2012: 290).
- Regarding the presence of a Middle Formative component, Stanish (n.d.a), regarding sites 714, 715, 725, 1041, and 1042. I believe that an intensive surface re-survey using Chávez Justo's (2014) newer ceramic typology would be necessary to clearly distinguish the Middle Formative component from the Late Formative component, so the 15 hectare figure I have used in this database for the Middle Formative component size is my very provisional guess. I make this figure large compared to other Middle Formative sites because Plourde and Stanish (2006: 248–252) are confident that Taraco's Qaluyu component is significantly larger than that of the site of Qaluyu itself, which they estimate is 7–10 hectares (Plourde and Stanish 2006: 247). However, I do not here follow Plourde and Stanish's (2006: 252) suggestion that it is possible that Taraco's Qaluyu component is 50 or more hectares; since this would be truly massive compared to other Middle Formative sites in both the northern and southern Titicaca region, I believe an intensive re-survey with Chávez Justo's new ceramic typology will be necessary before this possibility can be advocated.
- For the Late Formative, Stanish (n.d.a). I have combined sites 714, 715, 725, 1041, and 1042 (see notes below on the site size). I have used the site sizes as the Late Formative component sizes; the Late Formative component sizes are likely similar to the site sizes. Also see Stanish and Levine (2011: 13903,13906); their figure (100 hectares) is larger than this database's because it includes more distant sectors of the complex.
- For the Inca period, Stanish (2003: 240,243) (this figure is a range from 5 to 10 ha, so I have used the midpoint). Also see Stanish (n.d.a).

- Regarding the regional importance of Taraco during the Middle Formative, see Plourde and Stanish (2006: 248–252). Regarding the regional importance of Taraco during the Late Formative, see Stanish and Levine (2011). Regarding the regional importance of Taraco during the Inca period, see Stanish (2003: 240,243); Levine (2013: 221–224). There are also Huaña/Tiwanaku and Altiplano components at Taraco, but they are not included in this database because they seem to be of less regional importance (e.g., it is the Formative and the Inca/Colonial components that are prominent at the key San Taraco sector (Levine 2013: 220–224). However, see Chávez Justo (2008: 74) and Stanish (2009: endnote 3), regarding Area H; there may be a major Huaña occupation, but the evidence seems too unclear at this point to include it in this database).
- The neighboring site of Saman is also notable (e.g., Stanish 2003: 6,155,243), but the Arapa-Taraco survey (Stanish n.d.a) indicates that it is small compared to Taraco, and therefore I haven't included it in this database.

Site Size: Stanish (n.d.a). I have combined the sizes of sites 714, 715, 725, 1041, and 1042 (which roughly correspond to areas H, G, A, D, and I, respectively). The degree of contiguity between these areas is probably less than for other areas defined as sites in this database, but a more relaxed notion of "site" seems necessary to express Taraco's size. Also see Stanish and Levine (2011: 13903,13906); their figure (100 hectares) is larger than this database's because it includes more distant sectors of the complex.

Component Types:

- For the Early Formative, Levine (2015)
- For the Middle Formative, Levine (2012: 153); Levine (2013: 218–224); Levine (2015)
- For the Late Formative, Levine (2012: 153,202); Levine (2013: 218–224); de la Vega Machicao (2005: 17–20, but see 21); Drayer-Verhagen (2012: 163)

- For the Inca period, Levine (2013: 221–224)

GP10 (Wanina)

UTM Coordinates and Elevation: Tantaleán (2010: 440); Google Earth DEM

Component Sizes:

- Stanish et al. (2005a: 312–315). The site size figure is 12 hectares. The Late Formative component size is unknown but seems to be the major component. Therefore, I have set the Late Formative component size to just slightly under the site size. This is an estimate.
- Regarding Wanina's regional importance during the Late Formative, see Stanish (2003: 6); Stanish et al. (2005a: 312). There are also Middle Formative, possible Huaña, and Inca occupations (Stanish et al. 2005a: 315) as well as limited evidence of Tiwanaku occupation (compare Tantaleán (2010: 440) to Stanish et al. (2005a: 312,315)), but these occupations are not included in this database because they seem to be of less regional importance.

Component Types: Stanish et al. (2005a: 312); Stanish (2003: 145)

GP11 (Incatunuhuiri)

UTM Coordinates and Elevation: Tantaleán (2010: 441); Google Earth DEM

Component Sizes:

- For the Middle Formative, Janusek (2004b: 134)
- For the Late Formative, Stanish (2003: 149)
- Regarding the regional importance of Incatunuhuiri during the Middle Formative, see Hastorf (2005: 66,72–73); Hastorf (2008: 549); Bandy (2001: 140–149). Regarding the regional importance of Incatunuhuiri during the Late Formative, see Stanish (2003: 6,149); Hastorf (2005: 90); Bandy (2001: 198–199). Note that while some scholars have suggested a significant Tiwanaku occupation (e.g., Hyslop 1976: 73,86,252), the Tiwanaku occupation in reality

seems to be minor (Stanish et al. 2005b: 109; Stanish 2003: 158). Also note that while an Altiplano component exists (Hyslop 1976: 252), I have not included it in this database because it seems to be of less regional importance (e.g., Schultze 2008: 125).

Site Size: The Formative components are the major components (e.g., Schultze 2008: 125), so I have set the site size to their size. Note that Hyslop (1976: 73,252) discusses the possibility of a much larger size, 80 hectares.

Component Types: Kidder (1943: 13–14); Janusek (2004b: 134); Hyslop (1976: 252–253)

GP12 (Cancha-cancha Asiruni (QT-20 and QT-19) and Tintiri (QT-18))

UTM Coordinates and Elevation: Tantaleán (2010: 442); Google Earth DEM

Component Sizes:

- Precisely distinguishing the Middle Formative component from the Late Formative component would require further study (Tantaleán et al. 2012: 176,179), but Stanish et al. (2005a: 295–297) suggest that the site was a major site during both periods, and Stanish (2003: 112) seems to suggest a component size of 12 or more hectares for the Middle Formative. Therefore, I set the Middle Formative component size to the combined site sizes for all three sites (see notes on site size), since they all contain Qaluyu components (Tantaleán 2010: 285–323,442). I set the Late Formative component size to the combined site sizes for QT-19 and QT-20, since they contain Pukara components whereas QT-18 does not (Tantaleán 2010: 285–323,442).
- Regarding the regional importance of Cancha-cancha Asiruni during the Middle Formative, see Chávez and Mohr Chávez (1970: 25–31); Plourde and Stanish (2006: 252). Regarding the regional importance of Cancha-cancha Asiruni during the Late Formative, see Stanish (2003: 6,144); Chávez and Mohr Chávez (1970: 25–31). Note that later components are also present

(Stanish et al. 2005a: 297), but that I have not included them in this database because they seem to be of less regional importance (Tantaleán 2010: 285–323; Tantaleán et al. 2012: 186). Also note that a nearby Formative site called QT-06 or Pancañe is also notable (Tantaleán 2010: 195–214) and should be incorporated into this database in the future.

Site Size: Stanish et al. (2005a: 297) provide a figure of 12+ hectares for what they refer to as Canchacancha-Asiruni. Tantaleán (2010: 442), in contrast, provides a figure of 8 hectares for what he refers to as Canchacancha-Asiruni. This difference may or may not be explained if Stanish et al. lumped what Tantaleán refers to as QT-18, QT-19, and QT-20. Regardless, since QT-18 is less than 1.5 km. from the other sites, I lump the three sites together, which results in a figure of 14.4 hectares (Tantaleán 2010: 442).

Component Types: Stanish (2003: 112); Stanish et al. (2005a: 295–297); Tantaleán (2010: 285–323)

GP13 (Imicate)

UTM Coordinates and Elevation: Stanish et al. (1997: Figure 57), georeferenced in ArcGIS using Landsat 8 imagery. After deriving coordinates from this georeferenced map, I shifted the coordinates .75 km. to the north, based on my comparison of site descriptions (Stanish et al. 1997: 92; Hyslop 1976: 384) to Google Earth. For the elevation, Google Earth DEM.

Component Sizes:

- Middle Formative component size is unknown, but Stanish (2003: 119) describes it as a major site during the Middle Formative. I have therefore set the Middle Formative component size to the site size.
- Late Formative component size is unknown, but Stanish (2003: 6,149,152) describes it as a major site during the Late Formative. I have therefore set the Late Formative component size to the site size.

- Tiwanaku period component size is unknown, but Stanish et al. (2005b: 111) describe it as a major site during the Tiwanaku period (also see Stanish et al. (1997: 92), regarding the exceptional quality of the Tiwanaku ceramics, and Hyslop (1976: 80)). I have therefore set the Tiwanaku component size to the site size.
- Inca period component size is unknown, but Stanish et al. (1997: 92) describe it as having exceptional Inca ceramics and one of the few non-local Inca sherds in their research area, so it therefore seems probable that it was a major Inca period site (also see Hyslop 1976: 80). I have therefore set the Inca component size to the site size.
- Note that the site has an Altiplano period component (Stanish et al. 1997: 92), but that I have not included it in this database because it seems to be of less regional importance.

Site Size: Stanish et al. (1997: 92)

Component Types: Stanish et al. (1997: 92); Hyslop (1976: 85–86,384–385)

GP14 (Kanamarca)

UTM Coordinates and Elevation: Stanish et al. (1997: Figure 58), georeferenced in ArcGIS using Landsat 8 imagery. After deriving coordinates from this georeferenced map, I shifted the coordinates .5 km. to the northwest, based on my comparison of the site description (Stanish et al. 1997: 92) to Google Earth. For the elevation, Google Earth DEM.

Component Sizes:

- For the Middle Formative, Stanish (2003: 119)
- For the Late Formative, Bandy (2001: 196). Stanish (2003: 149), in contrast, suggests a Late Formative component size of 5–10 hectares for the Southern Ccapia polity, which he locates at either Kanamarca or Amaizama China. However, Stanish et al. (1997: 94) describe how their time at Kanamarca was severely restricted, so I have used Bandy's larger figure.

- For the Tiwanaku period, Stanish (2003: 180) suggests a component size of 7–10 hectares. However, I have increased the Tiwanaku component size to 12 hectares because of: A) my increase of the Late Formative component size, following Bandy (see notes on the Late Formative component size), beyond what Stanish et al. (1997: 92) described as a 7–10 hectare site size, and B) the fact that Stanish (2003: 180) describes the Tiwanaku occupation as the major occupation.
- Regarding the regional importance of Kanamarca during the Middle Formative, see Stanish et al. (1997: 113). Regarding the regional importance of Kanamarca during the Late Formative, see Stanish (2003: 6,151–152); Stanish et al. (1997: 114); Hastorf (2003: 314). Note that an Inca period occupation exists (Stanish et al. 1997: 92), but that I have not included it in this database because it seems to be of less regional importance.

Site Size: Bandy (2001: 196). This is actually Bandy's figure for the Late Formative 1 component size, but it exceeds Stanish et al.'s (1997: 92) site size estimate, and I therefore use it for the site size. See notes on the Late Formative and Tiwanaku component sizes.

Component Types: Stanish et al. (1997: 83,92–94); Stanish (2003: 119,180)

GP15 (Simillake)

UTM Coordinates and Elevation: Posnansky (1937: 106–107), in comparison to Google Earth imagery

Component Sizes: Smith et al. (2014: 113). Also see the notes on the site size. Regarding the regional importance of Simillake during the Late Formative, see Stanish (2003: 6); Janusek (2015: 140). Regarding the regional importance of Simillake during the Tiwanaku period, see Stanish (2003: 92,180); Hyslop (1976: 79); Browman (1981: 416).

Site Size: Smith et al. (2014: 113). Defining the size is complicated by the fact that this is an island site with a size that dramatically changes even seasonally

(Posnansky 1937: 106, and also visible on satellite imagery), let alone in the long-term. Smith et al.'s figure seems to be equivalent to the island's size during a typical contemporary wet season.

Component Types: Posnansky (1937: 108–111); Stanish (2003: 180). The corporate architecture at Simillake is commonly attributed to the Late Formative (Janusek 2015: 140; Marsh 2011: 114) or Tiwanaku period (Stanish 2003: 180; Stanish et al. 2005b: 112; Hyslop 1976: 79; Browman 1981: 416; Goldstein 1993: 26–27), but the dating of this architecture seems presently too imprecise to distinguish between the Late Formative and the Tiwanaku period. Therefore, I have coded both periods as only possibly having corporate architecture. Also note that the sculpture sometimes attributed to Simillake seems to come from a different site (see Posnansky 1937: Figure 109's caption, and page 112).

GP16 (Pajchiri)

UTM Coordinates and Elevation: Janusek and Kolata (2003: Figure 6.5), georeferenced in ArcGIS using Landsat 8 imagery. For the elevation, Google Earth DEM.

Component Sizes:

- For the Late Formative, Stanish (2003: 149)
- For the Tiwanaku period, Bermann (1994: 174–175). Bermann's figure is the site size; the Tiwanaku component is the primary component, so I have set the Tiwanaku component size to the site size. I have chosen a more conservative estimate of the site's size, since it appears that systematic work has not been conducted at Pajchiri (e.g., Janusek and Kolata 2003: 133). Much larger estimates do exist, including Kolata's (1993: 207–209) estimate of nearly 350 hectares, Janusek and Kolata's (2003: Figure 6.5) estimate of over 100 hectares, Mathews's (1992: 130) estimate of over 100 hectares, and Stanish's (1992: 77) estimate of nearly 200 hectares. However, also see Bandy (2005a: 291), who suggests that the occupation may have been primarily seasonal, and

Janusek (2008: 213), who refers to the Tiwanaku component as "moderately sized."

- Regarding the regional importance of Pajchiri during the Late Formative, see Stanish (2003: 6,155,197); Janusek (2008: 73,213). Regarding the regional importance of Pajchiri during the Tiwanaku period, see Stanish (2003: 183). Regarding the possibility of an important Middle Formative component (not included in this database, due to lack of in-depth work at Pajchiri), see Stanish (2003: 2–3,129–130); Plourde and Stanish (2006: 244). It is possible that there are important Altiplano and Inca components at Pajchiri (see Bennett 1936: 464; Janusek and Kolata 2003: 155; Stanish 2003: 230,262), but I have not included them in this database because of insufficient description in the literature.

Site Size: Bermann (1994: 174–175). Also see the notes on the Tiwanaku period component size.

Component Types: Bennett (1936: 456–467); Bermann (1994: 174–175); Kolata (1993: 207–209); Stanish (2003: 290); Janusek (2008: 213). There are several undated tombs at this site (Bennett 1936: 464–466), but they seem more likely to be post-Tiwanaku, so I have not coded burials as possible for these components. There is some mention of fortifications at Pajchiri (Bennett 1936: 457; Bermann 1994: 175; Janusek and Kolata 2003: 155), but the descriptions of the evidence are insufficient for assigning a "confident" or "possible" code for defensive walls in this database.

GP17 (Khonkho Wankane and Putuni)

UTM Coordinates and Elevation: Lémuz Aguirre (2011: Figure 8), georeferenced in ArcGIS using Landsat 8 imagery (coordinates for site JM-60; also see JM-49, i.e., Putuni). For the elevation, Google Earth DEM.

Component Sizes:

- Smith et al. (2014: 113); Janusek (2015: 129). Smith et al. (2014) provide a figure of 7 hectares for the Late Formative component of Khonkho Wankane, which seems to be equivalent to the Wankane Platform and therefore seems to exclude the Putuni Platform, probably either considering it minor (see Smith 2013: 33) or treating it as a separate site. Janusek (2015) provides a figure of 3.3 hectares for the Putuni Platform. My Late Formative figure (10.3 hectares) is the sum of Smith et al.'s Khonkho Wankane figure and Janusek's Putuni figure. While Janusek's figure technically is not given as a component size for Late Formative Putuni, I here include the entire mound's area in the Late Formative component size because Putuni is a mound that was enlarged by Late Formative people (but also see Lémuz Aguirre (2011: 48) and Janusek (2015: Figure 10), which suggest a smaller component size). For a Late Formative Khonkho/Putuni figure that roughly corresponds to mine, see Janusek (2015: 130) and Lémuz Aguirre (2011: 59), where the discussion of regional settlement patterns implies that Khonkho and Putuni had a combined Late Formative 2 component size of about 9.5 hectares. Regarding the contiguity of Khonkho and Putuni, see Lémuz Aguirre (2011: 47).
- There are also two other substantial Late Formative surface scatters nearby to the west (see Janusek 2015: Figures 3 and 10), but I have not included them because they seem to represent quite temporary occupation (Janusek 2015: 138–139). Note, however, that since this conclusion is based on excavation, my exclusion of these areas differs from my normal procedures in this database, which focus on surface evidence.
- The site has a Tiwanaku component which earlier scholars considered very significant, but more recent in-depth excavations have demonstrated that the Tiwanaku occupation was actually minor (Janusek 2013, 2015). The Tiwanaku component is therefore excluded from this database, but it should be noted that this exclusion contrasts with my normal procedures in this database,

since the Tiwanaku surface scatters are indeed extensive (Lémuz Aguirre 2011: 49,61–62; Janusek 2015: 130,138). The site also has post-Tiwanaku components (Lémuz Aguirre 2011: 49), but these are also of less regional importance (Janusek 2013: 21) and therefore excluded from this database.

Site Size: Lémuz Aguirre (2011: 47–48)

Component Types: Janusek (2015: 129–136,139); Marsh (2013); Smith (2013); Janusek (2013: 11–12)

GP18 (Cerro Chijcha)

UTM Coordinates and Elevation: Smith et al. (2014: Figure 2a). For the elevation, Google Earth DEM.

Component Sizes:

- For the Middle Formative and the Late Formative, Smith et al. (2014: Table 1). Also see Smith et al.'s note below their table, regarding Sectors 1 and 4, and see my notes regarding the Tiwanaku and Inca component sizes.
- For the Tiwanaku and Inca periods, Smith et al. (2014: Table 1, pages 109,112). Smith et al. (2014: Table 1) gives 11.5 hectares for the Tiwanaku and Inca components, but excludes Sectors 1 and 4 because they have lower density ceramic scatters. In contrast, I have added the full sizes of Sector 1 (5 hectares) and Sector 4 (0.25 hectare) to the Tiwanaku and Inca components, because the ceramic density in Sectors 1 and 4 (5–10 sherds per square meter) is still high enough that most Titicaca surveyors probably would have included these areas in their component size estimates (e.g., Bandy 2001: 40–41). It should be noted that I do not have specific information on the component sizes within Sectors 1 and 4, and that I therefore simply added the entire sectors' areas to the Tiwanaku and Inca components. I did this for the Tiwanaku and Inca components but not for the Middle and Late Formative components because: 1) the Tiwanaku and Inca components in the high-density areas (i.e., Table 1)

are much larger than the Formative components, 2) Middle Formative ceramics are absent in Sector 1 (i.e., 5 of the 5.25 low-density hectares), 3) raising the Late Formative component size by 5.25 hectares would make it equivalent to my figure for Khonkho Wankane/Putuni, which is probably inappropriate, and 4) the density of Formative ceramics in Sector 2 is low, and Sector 2 is adjacent to Sector 1 (i.e., 5 of the 5.25 low-density hectares). Nevertheless, my Late Formative component size may be somewhat underestimated, and my Tiwanaku and Inca component sizes somewhat overestimated.

Site Size: Smith et al. (2014: 109–112)

Component Types: Smith et al. (2014: 110,112–115)

GP19 (Amaizama China)

UTM Coordinates and Elevation: Stanish et al. (1997: Figure 57), georeferenced in ArcGIS using Landsat 8 imagery. After deriving coordinates from this georeferenced map, I shifted the coordinates .7 km. to the southwest, based on my comparison of the site description (Stanish et al. 1997: 87) to Google Earth imagery. For the elevation, Google Earth DEM.

Component Sizes and Site Size:

- Stanish et al. (1997: 87). Stanish et al. give the site size as a range from 6 to 10 hectares, so I have used the midpoint. Specific component size information is not available (though see Stanish 2003: 149), but both the Late Formative and Tiwanaku components are described as large, so I have used the site size for the component sizes.
- Regarding the regional importance of Amaizama China during the Late Formative, see Stanish (2003: 151–152). Regarding the regional importance of Amaizama China during the Tiwanaku period, see Stanish (2003: 180). There are also Middle Formative, Altiplano, and Inca components, but these are of less regional importance (Stanish et al. 1997: 87) and I have therefore not included them in this database.

Component Types: Stanish et al. (1997: 87); Stanish (2003: 180)

GP20 (Punanave)

UTM Coordinates and Elevation: Schultze (2008: 471). Also see Schultze (2008: 453), regarding the coordinate system.

Component Sizes:

- For the Late Formative, Stanish (2003: 149)
- For the Tiwanaku period, Schultze (2008: 471). Tiwanaku component size information is not available, so I have used the site size. I did this because the Late Formative and Tiwanaku components are the major occupations (Stanish et al. 2005a: 308). Nevertheless, this may be an overestimate.
- Regarding the regional importance of Punanave during the Tiwanaku period, see Stanish (2003: 187–188). There are also post-Tiwanaku components, but they are not major occupations (Stanish et al. 2005a: 308), and I therefore have not included them in this database.

Site Size: Schultze (2008: 471). Also see Stanish et al. (2005a: 307–308), who provide an estimate of 12 to 15 hectares.

Component Types: Stanish (2003: 187); Stanish et al. (2005a: 307–308); Schultze (2008: 471–472); Schultze (2013: 244–245)

GP21 (Hatuncolla)

UTM Coordinates and Elevation: Julien (1983: 109). I transformed the coordinates using ArcGIS's PSAD_1956_To_WGS_1984_8 transformation (I assumed that the originals were in PSAD56), and then, based on comparison to Google Earth imagery, I shifted the coordinates .25 km. to the east. For the elevation, Google Earth DEM.

Component Sizes and Site Size: Stanish (2003: 240–241). Stanish estimates the component size as a range from 50 to 80 hectares, so I have used the midpoint. Also see Julien (1983: 93,plate 3a), for a comparable figure of about 75 hectares, and Hyslop (1984: 126–127), for a comparable figure of about 50 hectares. Regarding the absence of Altiplano period occupations and their nearby presence, see Julien (1983: 3,94,107,245,plate 3a); Stanish (2003: 215–216,240). Regarding the original location of the Formative stelae from Hatuncolla, see Julien (1983: 109).

Component Types: Julien (1983: 89–90,94,99–102,256); Stanish (2003: 82,215,241–242); Arkush (2005: 237). Remains of corporate ritual architecture have not been definitively identified, but I have chosen to consider the combination of suggestive architectural remains and Cieza's historical mention of a temple at Hatuncolla sufficient evidence to code for corporate ritual. For a related issue, see Hyslop (1990: 101).

APPENDIX C

Settlement Pattern Database Part III: Chronologies

C.1 Intensive Surveys Chronology Table

In the scripts presented in Appendix D, Table C.1 is referred to with the file name "chronolo gy_NEEDS_PROOFREADING_AND_TIWA_LOWER_REVISION_NO_BLANKS_ NO_SPACES.csv".

For citations and notes, see the comments at the bottom of Figure 1.8.

Table C.1: Intensive Surveys Chronology

survey _code	phase _code	survey_name	phase_name_basin	start	end	group
pk	a	Pukara_Valley	Early_Formative	-1500	-800	mf
pk	b	Pukara_Valley	Middle_Formative	-800	-200	mf
pk	c	Pukara_Valley	Late_Formative	-200	400	lf
pk	d	Pukara_Valley	Altiplano	950	1450	al
pk	e	Pukara_Valley	Inca	1450	1533	in
hp	a	Huancane-Putina	Early_Formative	-1300	-750	mf
hp	b	Huancane-Putina	Middle_Formative	-750	-200	mf
hp	c	Huancane-Putina	Late_Formative	-200	400	lf
hp	d	Huancane-Putina	Early_Huana	100	750	lf
hp	e	Huancane-Putina	Late_Huana	750	850	tw
hp	f	Huancane-Putina	Early_Northern_Tiwanaku	750	850	tw
hp	g	Huancane-Putina	Late_Northern_Tiwanaku	850	950	tw
hp	h	Huancane-Putina	Early_Altiplano	950	1275	al
hp	i	Huancane-Putina	Middle_Altiplano	1275	1400	al
hp	j	Huancane-Putina	Late_Altiplano	1400	1450	al
hp	k	Huancane-Putina	Early_Inca	1450	1500	in
hp	l	Huancane-Putina	Late_Inca	1500	1533	in
hp	m	Huancane-Putina	Early_Colonial	1533	1600	co
is	a	Island_of_the_Sun	Late_Archaic	-2000	-1300	ef
is	b	Island_of_the_Sun	Early_Formative	-1300	-800	mf
is	c	Island_of_the_Sun	Middle_Formative	-800	-200	mf
is	d	Island_of_the_Sun	Late_Formative	-200	600	lf
is	e	Island_of_the_Sun	Tiwanaku	600	1100	tw
is	f	Island_of_the_Sun	Altiplano	1100	1450	al
is	g	Island_of_the_Sun	Inca	1450	1532	in
jp	a	Juli-Pomata	Early_Formative	-1300	-800	mf
jp	b	Juli-Pomata	Middle_Formative	-800	-200	mf
jp	c	Juli-Pomata	Late_Formative	-200	600	lf
jp	d	Juli-Pomata	Tiwanaku	600	1100	tw
jp	e	Juli-Pomata	Altiplano	1100	1450	al
jp	f	Juli-Pomata	Inca	1450	1532	in

jp	g	Juli-Pomata	Colonial	1532	1700	co
qt	a	Qawra_Thaki	Formative	-1300	600	lf
qt	b	Qawra_Thaki	Tiwanaku	600	1100	tw
qt	c	Qawra_Thaki	Altiplano	1100	1450	al
qt	d	Qawra_Thaki	Inca	1450	1533	in
qt	e	Qawra_Thaki	Colonial	1533	1800	co
tr	a	Taraco_Peninsula	Early_Formative_1	-1500	-1000	mf
tr	b	Taraco_Peninsula	Early_Formative_2	-1000	-800	mf
tr	c	Taraco_Peninsula	Middle_Formative	-800	-250	mf
tr	d	Taraco_Peninsula	Late_Formative_1	-250	300	lf
tr	e	Taraco_Peninsula	Late_Formative_2	300	500	lf
tr	f	Taraco_Peninsula	Tiwanaku	500	1100	tw
tr	g	Taraco_Peninsula	Altiplano	1100	1450	al
tr	h	Taraco_Peninsula	Inca	1450	1540	in
tr	i	Taraco_Peninsula	Early_Colonial	1540	1600	co
kt	a	Katari_Valley	Early_Formative_2_and_Middle_Formative	-1000	-200	mf
kt	b	Katari_Valley	Late_Formative	-200	500	lf
kt	c	Katari_Valley	Tiwanaku	500	1150	tw
kt	d	Katari_Valley	Altiplano	1150	1475	al
kt	e	Katari_Valley	Inca	1475	1540	in
kt	f	Katari_Valley	Early_Colonial	1540	1570	co
kt	g	Katari_Valley	Late_Colonial	1570	1800	co
tl	a	Lower_Tiwanaku_Valley	Middle_Formative	-800	-200	mf
tl	b	Lower_Tiwanaku_Valley	Late_Formative_1	-200	300	lf
tl	c	Lower_Tiwanaku_Valley	Late_Formative_2	300	500	lf
tl	d	Lower_Tiwanaku_Valley	Tiwanaku_IV	500	800	tw
tl	e	Lower_Tiwanaku_Valley	Tiwanaku_V	800	1150	tw
tl	f	Lower_Tiwanaku_Valley	Altiplano	1150	1470	al
tl	g	Lower_Tiwanaku_Valley	Inca	1470	1540	in
tl	h	Lower_Tiwanaku_Valley	Early_Colonial	1540	1600	co
tm	a	Middle_Tiwanaku_Valley	Middle_Formative	-800	-200	mf
tm	b	Middle_Tiwanaku_Valley	Late_Formative_1	-200	300	lf
tm	c	Middle_Tiwanaku_Valley	Late_Formative_2	300	500	lf
tm	d	Middle_Tiwanaku_Valley	Tiwanaku_IV	500	800	tw
tm	e	Middle_Tiwanaku_Valley	Tiwanaku_V	800	1150	tw

tm	f	Middle_Tiwanaku_Valley	Altiplano	1150	1470	al
tm	g	Middle_Tiwanaku_Valley	Inca	1470	1540	in
tm	h	Middle_Tiwanaku_Valley	Early_Colonial	1540	1600	co

C.2 Inter-Survey Chronology Table

In the scripts presented in Appendix D, Table C.2 is referred to with the file name "GapsAndPeripheriesChron_NO_BLANKS_NO_SPACES.csv".

Table C.2: Inter-Survey Chronology

survey_code	phase_code	survey_name	phase_name_basin	start	end	group
gp	a	Gaps	Early_Formative	-2000	-1300	ef
gp	b	Gaps	Middle_Formative	-1300	-200	mf
gp	c	Gaps	Late_Formative	-200	600	lf
gp	d	Gaps	Tiwanaku	600	1000	tw
gp	e	Gaps	Altiplano	1000	1450	al
gp	f	Gaps	Inca	1450	1532	in
pe	a	Peripheries	Early_Formative	-2000	-1300	ef
pe	b	Peripheries	Middle_Formative	-1300	-200	mf
pe	c	Peripheries	Late_Formative	-200	600	lf
pe	d	Peripheries	Tiwanaku	600	1000	tw
pe	e	Peripheries	Altiplano	1000	1450	al
pe	f	Peripheries	Inca	1450	1532	in

APPENDIX D

Scripts for Macro-scale Study I

This appendix contains the source code for the figures in Chapter 3. The software versions used to run this code are R 3.2.3 64-bit (with packages Bolstad2 1.0-28, extrafont 0.17, ggplot2 2.1.0, gtools 3.5.0, maptools 0.8-39, nlme 3.1-122, reshape2 1.4.1, rgdal 1.1-3, rgeos 0.3-17, scales 0.3.0, sp 1.2-1, spatstat 1.44-1) and ArcGIS 10.3 with the accompanying Python 2.7.8 distribution, all on Windows 7.

D.1 R: Calculation Scripts

D.1.1 Initial Database Modifications (C:/Real/SantaFe/R/2__Calculate/1__InitialDatabaseModifications/)

Listing D.1: CalculateCombineSurveyWithInterSurvey__EXPERIMENTAL.R

```r
#THIS SCRIPT COMBINES THE SURVEY AND INTER-SURVEY DATA INTO ONE DATAFRAME.

#external files loader start---------------------------------------------
#Set the working directory.
setwd("C:/Real/SantaFe/R/")
#Load the intensive surveys' .csv file into a dataframe.
TiticacaDataSurvey <- read.csv(file = "1__Source/titicaca__surveys__r__LAST__SFI__VERSION__NO__SPACES__NO__BLANKS.csv", header = TRUE)
#Load the inter-survey .csv file into a dataframe.
TiticacaDataInterSurvey <- read.csv(file = "1__Source/Gaps__r__UNFINISHED__10JAN16__NO__BLANKS__NO__SPACES.csv", header = TRUE)
#external files loader end-----------------------------------------------

```

```
#internal script start-----------------------------------------------------
#The two dataframes created above have the same headers, and therefore can be combined simply with rbind().
TiticacaData <- rbind(TiticacaDataSurvey, TiticacaDataInterSurvey)
```

Listing D.2: CalculateChron_EXPERIMENTAL.R

```
#THIS SCRIPT COMBINES THE CHRONOLOGY TABLES AND MAKES ANY NECESSARY INITIAL MODIFICATIONS.
#!!!SEE BELOW REGARDING REMOVAL OF GAPS-ALTIPLANO.

#external files loader start-----------------------------------------------
#Set the working directory.
setwd("C:/Real/SantaFe/R/")
#Load the surveys' chronology table into a dataframe.
TiticacaChronSurvey <- read.csv(file = "1_Source/chronology_NEEDS_PROOFREADING_AND_TIWA_LOWER_REVISION_NO_BLANKS_NO_SPACES.csv", header = TRUE)
#Load the inter-survey and peripheries chronology table into a dataframe.
TiticacaChronInterSurveyAndPer <- read.csv(file = "1_Source/GapsAndPeripheriesChron_NO_BLANKS_NO_SPACES.csv", header = TRUE)
#external files loader end-------------------------------------------------

#internal script start-----------------------------------------------------
#AT THE MOMENT, THERE ARE NO COMPONENTS ENTERED FOR THE ALTIPLANO PERIOD OF THE GAPS (survey_code == "gp"). Furthermore, there are no components entered for the peripheries (survey_code == "pe"), and probably never will be for the R scripts (they are more for the python/GIS work). This will cause problems for some of the calculate scripts, so remove these from the chronology table.
TiticacaChronInterSurveyAndPer <- TiticacaChronInterSurveyAndPer[TiticacaChronInterSurveyAndPer$survey_code != "pe",]
TiticacaChronInterSurveyAndPer <- droplevels(TiticacaChronInterSurveyAndPer)
#TEMPORARY!!!
```

```
TiticacaChronInterSurveyAndPer <- TiticacaChronInterSurveyAndPer[TiticacaChronInterSurveyAndPer$phase_code != "e",]

#The two dataframes created above have the same headers, and therefore can be combined simply with rbind().
TiticacaChron <- rbind(TiticacaChronSurvey, TiticacaChronInterSurveyAndPer)

#Create a new variable in the chronology dataframe to store phase midpoints. This is primarily used in the graphing scripts, to locate x-axis values in scripts that plot various changes through time.
TiticacaChron$midp <- NA
#Calculate the phase midpoints.
TiticacaChron$midp <- (TiticacaChron$start + TiticacaChron$end) / 2

#Create a new variable in the chronology dataframe that concatenates the "survey_code" and "phase_code" fields. This will allow later scripts to have faster, vectorized code, using match(), rather than slower nested for() loops.
#The two fields will simply be concatenated without any space, dash, etc between the two parts.
TiticacaChron$survey_phase <- paste(TiticacaChron$survey_code, TiticacaChron$phase_code, sep = "")
```

Listing D.3: CalculateCompSplit_EXPERIMENTAL.R

```
#THIS SCRIPT SPLITS THE COMP FIELD OF THE COMPONENTS DATA TABLES AND ADDS THE SPLIT PARTS TO NEW FIELDS "survey", "site", "sector", "phase", AND "survey_phase" (the last being a concatenation of the "survey" and "phase" fields)
#Written by Eric Rupley and modified by Karl La Favre

#external files loader start-----------------------------------------
#Set the working directory.
setwd("C:/Real/SantaFe/R/")
```

```r
#Run the script to combine the survey .csv file with the inter-survey .csv file, into a dataframe called TiticacaData.
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateCombineSurveyWithInterSurvey_EXPERIMENTAL.R")
#Remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run.
remove(list= ls()[!(ls() %in% c("TiticacaData", "PreservedFromCaller"))])
#external files loader end-----------------------------------------------

#internal script start-----------------------------------------------------
#In the components dataframe, split the "comp" field into separate, new fields for survey, site, sector, and phase.

#First, split on the two dashes in each of the values of "comp". This will create 3 segments for each value: 1) two-letter survey code, 2) site number and sector number, with a period between them, and 3) one-letter phase code.
#strsplit() returns a list of vectors, where each vector holds the strings which result from splitting one of the values of "comp".
dashSplit <- strsplit(as.character(TiticacaData[,"comp"]), split = "-")
#Simplify this list into a single vector using unlist(), and then use it to fill a 3-column matrix, by row. Thus, the matrix will have one column for each of the 3 segments of the split strings.
dashSplitMat <- matrix(unlist(dashSplit), ncol = 3, byrow = TRUE)
#The 1st and 3rd columns are finished but the 2nd column needs to be further split, on the period.
#Because the period is a regex metacharacter, one of two things must be done to prevent its interpretation as a regex metacharacter: 1) put the period inside [] (i.e., put it in a character class), or 2) specify fixed = TRUE.
periodSplit <- strsplit(dashSplitMat[,2], split = ".", fixed = TRUE)
#Create a matrix for these 2 segments, in the same manner as above.
periodSplitMat <- matrix(unlist(periodSplit), ncol = 2, byrow = TRUE)
```

```r
#Combine this 2nd matrix with the 1st and 3rd columns of the 1st matrix. Convert the resulting matrix to a dataframe.
fullySplit <- data.frame(cbind(dashSplitMat[,1], periodSplitMat, dashSplitMat[,3]))
#The new fields (other than "survey_phase") have now been created. Give them useful names.
names(fullySplit) <- c("survey", "site", "sector", "phase")
#Combine these new fields/columns with the rest of the data in TiticacaData.
TiticacaDataCompSplit <- cbind("comp" = TiticacaData[,1], fullySplit, TiticacaData[,-1])

#Also, to allow later scripts to have faster, vectorized code, using match(), rather than slower for() loops, add a field that concatenates the "survey" and "phase" fields. This will also help simplify other parts of later scripts, wherever each phase of each survey needs to be treated separately.
#The two fields will simply be concatenated without any space, dash, etc between the two parts.
TiticacaDataCompSplit$survey_phase <- paste(TiticacaDataCompSplit$survey, TiticacaDataCompSplit$phase, sep = "")

#Earlier versions of various scripts used "TiticacaData" to name a dataframe that was neither comp-split nor multi-sector aggregated.
#Thus, in case I made an error anywhere in changing from "TiticacaData" to "TiticacaDataSectorAggr", this remove() will help catch the error.
#This is redundant given that the call to this script should be accompanied by an extensive remove(), but this is useful as a reminder of this particularly important remove().
remove(TiticacaData)
```

Listing D.4: CalculateSupraSurveyGroups_EXPERIMENTAL.R

```r
#THIS SCRIPT ADDS 2 MORE FIELDS TO THE COMPONENTS DATAFRAME TO DEFINE WHICH SUPRA-SURVEY SPATIAL AND TEMPORAL GROUPS EACH COMPONENT BELONGS TO
```

```
↪. THE SPATIAL GROUPS ARE: 1) NORTHERN TITICACA SURVEYS AND INTER-SURVEY
↪DATA, 2) CONTIGUOUS SOUTHERN TITICACA SURVEYS, 3) OTHER SOUTHERN
↪TITICACA SURVEYS AND INTER-SURVEY DATA. THE TEMPORAL GROUPS ARE: EARLY
↪FORMATIVE, MIDDLE FORMATIVE, LATE FORMATIVE, TIWANAKU, ALTIPLANO, INCA,
↪AND COLONIAL (SEE THE "group" FIELD IN THE CHRONOLOGY .CSV FILES.)

#external files loader start-----------------------------------------
#Set the working directory.
setwd("C:/Real/SantaFe/R/")
#run script to split the "comp" field in the components dataframe into new
↪ fields for "survey", "site", "sector", and "phase"
#this creates a modified version of the survey .csv file and the inter-
↪survey .csv file, a dataframe called TiticacaDataCompSplit
#note that this script re-sets the working directory, but at the time of
↪writing it is the same directory as set above
source("2_Calculate/1_InitialDatabaseModifications/CalculateCompSplit_
↪EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the
↪workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataCompSplit", "
↪PreservedFromCaller"))])
#Load the modified chronology tables. This creates a dataframe called
↪ TiticacaChron
#Note that this script re-sets the working directory, but at the time of
↪writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_
↪EXPERIMENTAL.R")
#external files loader end-------------------------------------------

#internal script start-----------------------------------------------
#SPATIAL GROUPING BEGIN------------------------------------
#Add a new field for the supra-survey spatial group code to the components
↪ dataframe.
TiticacaDataCompSplit$group_spatial <- "code"
#For designating the contiguous southern Titicaca surveys group, it will
```

```
be best to select the corresponding components using the actual survey codes. In contrast, for A)the northern Titicaca surveys and inter-survey data and B) the other southern Titicaca surveys and inter-survey data, it will be better to primarily select the corresponding components by UTMs, because the inter-survey components will otherwise have to be individually selected (since they all belong to survey code "gp").
#First assign a code to the contiguous southern Titicaca surveys group.
TiticacaDataCompSplit$group_spatial[TiticacaDataCompSplit$survey == "tr" | TiticacaDataCompSplit$survey == "kt" | TiticacaDataCompSplit$survey == "tl" | TiticacaDataCompSplit$survey == "tm"] <- "south_cont"
#Assign a code to the other southern Titicaca survey and inter-survey components. My division of northern and southern Titicaca at the Ilave and Suches Rivers follows Stanish (2003: 129, 145, 170, 189, 196-197).
#First, assign the code to sites on the eastern side of Lake Titicaca, south of the Suches River. Place the east-west boundary between this selection and the next selection (for the western side of Lake Titicaca) relatively far west, so that the Island of the Sun and the whole Copacabana Peninsula are also selected by this "eastern" selection. This somewhat counter-intuitive selection is made because the Island of the Sun and northern tip of the Copacabana Peninsula clearly should be part of the southern Titicaca group (e.g., the important Tiwanaku presence), yet are slightly above the latitude I have used to define the Ilave River.
#Note that the use of a single northing to represent the Ilave River and a single northing to represent the Suches River will cause sites near the rivers to possibly be mis-classified, since the rivers do not follow east-west courses. With my current dataset, however, this is not a problem.
TiticacaDataCompSplit$group_spatial[TiticacaDataCompSplit$group_spatial != "south_cont" & TiticacaDataCompSplit$nutm19 < 8270000 & TiticacaDataCompSplit$eutm19 > 460000] <- "south_noncont"
#Second, assign the code to sites on the western side of Lake Titicaca, south of the Ilave River. The "eutm19" part is technically unnecessary, since the Suches River is further north than the Ilave River, but I will retain it here for clarity.
```

```
TiticacaDataCompSplit$group_spatial[TiticacaDataCompSplit$group_spatial != "south_cont" & TiticacaDataCompSplit$nutm19 < 8220000 & TiticacaDataCompSplit$eutm19 < 460000] <- "south_noncont"
#Assign a code to the northern Titicaca survey and inter-survey components. For simplicity, just assign any components still lacking a group code to the northern group.
TiticacaDataCompSplit$group_spatial[TiticacaDataCompSplit$group_spatial != "south_cont" & TiticacaDataCompSplit$group_spatial != "south_noncont"] <- "north"
#SPATIAL GROUPING END---------------------------------------

#TEMPORAL GROUPING BEGIN------------------------------------
#Add a new field for the supra-survey temporal group code to the components dataframe.
TiticacaDataCompSplit$group_temporal <- "code"
#For each component, get the appropriate supra-survey temporal group code from the TiticacaChron dataframe and assign it to the component.
TiticacaDataCompSplit$group_temporal <- TiticacaChron$group[match(TiticacaDataCompSplit$survey_phase, TiticacaChron$survey_phase)]
#TEMPORAL GROUPING END--------------------------------------

TiticacaDataSupraGrouped <- TiticacaDataCompSplit
```

Listing D.5: CalculateMultiSectorAggregation_EXPERIMENTAL_UNFINISHED.R

```
#THIS SCRIPT AGGREGATES SECTORS WHEN THE SAME PHASE IS PRESENT IN MULTIPLE SECTORS OF A SITE
#written by Eric Rupley and modified by Karl La Favre

#external files loader start--------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
# load package needed for alphanumeric sort at end
library(gtools)
#run script to assign components to supra-survey groups.
```

```r
#this creates a modified version of the survey .csv file and the inter-survey .csv file , a dataframe called TiticacaDataSupraGrouped
#it also loads the chronology tables with initial modifications , a dataframe called TiticacaChron , but this will be removed immediately below.
#note that this script re-sets the working directory , but at the time of writing it is the same directory as set above
source("2_Calculate/1_InitialDatabaseModifications/CalculateSupraSurveyGroups_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace , so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSupraGrouped", "PreservedFromCaller"))])
#external files loader end-------------------------------------------

#internal script start-----------------------------------------------
# prepare output container
TiticacaDataSectorAggr <- TiticacaDataSupraGrouped

# loop over surveys which have multi_sector elements
for (k in as.character(unique(TiticacaDataSupraGrouped$survey[TiticacaDataSupraGrouped$multi_sector=="1"]))){
   # loop over sites which have multi_sector elements
   for (j in as.character(unique(TiticacaDataSupraGrouped$site[TiticacaDataSupraGrouped$survey==k & TiticacaDataSupraGrouped$multi_sector=="1"]))) {
      # get site centroid (change later...)
      z <- round(mean(TiticacaDataSupraGrouped$masl[which(TiticacaDataSupraGrouped$survey==k & TiticacaDataSupraGrouped$site==j)]),0)
      x <- round(mean(TiticacaDataSupraGrouped$eutm19[which(TiticacaDataSupraGrouped$survey==k & TiticacaDataSupraGrouped$site==j)]),0)
      y <- round(mean(TiticacaDataSupraGrouped$nutm19[which(TiticacaDataSupraGrouped$survey==k & TiticacaDataSupraGrouped$site
```

```
==j)]),0)

    # loop over phases to be grouped within a site
    for (i in as.character(unique(TiticacaDataSupraGrouped$phase[which(TiticacaDataSupraGrouped$survey==k & TiticacaDataSupraGrouped$site==j & TiticacaDataSupraGrouped$multi_sectors=="1" & TiticacaDataSupraGrouped$hab=="1")]))) {
      # get lines which are for indexed site and period, but multiple collection areas
      these.lines <- which(TiticacaDataSupraGrouped$survey==k & TiticacaDataSupraGrouped$site==j & TiticacaDataSupraGrouped$multi_sectors=="1" & TiticacaDataSupraGrouped$hab=="1" & TiticacaDataSupraGrouped$phase==i)

      # aggregate sizes
      site_period_min <- sum(TiticacaDataSupraGrouped$size_min[these.lines],na.rm=T)
      site_period_max <- sum(TiticacaDataSupraGrouped$size_max[these.lines],na.rm=T)
      site_period_abs <- sum(TiticacaDataSupraGrouped$size_abs[these.lines],na.rm=T)

      # do mild backstop against combined NA+real values
      if (site_period_abs==0) { site_period_abs <- NA}
      if (site_period_min==0 & site_period_max==0) {
        site_period_min <- NA
        site_period_max <- NA
      }
      # but no check to make sure size_abs and size ranges do not co-occur

      # compose and spit out line
      # we'll modify values in first line
      out <- TiticacaDataSupraGrouped[these.lines[1],]
      # recompose comp
```

```
            out[1] <- paste(unlist(out[2]),paste(formatC(out[3],digits=0,width=4,format="d",flag=0),"00",sep="."),unlist(out[5]),sep="-")
            # set sector to 0
            out[4] <- "00" # because we didn't set type to numeric, eg as.numeric()
            # set multi_component flag to 0
            out[6] <- 0
            # change masl
            out[7] <- z
            # change eutm19
            out[8] <- x
            # change nutm19
            out[9] <- y
            # add in various aggregations
            out[10] <- site_period_abs
            out[11] <- site_period_min
            out[12] <- site_period_max

            out <- data.frame(out)
            names(out) <- names(TiticacaDataSupraGrouped)

            TiticacaDataSectorAggr <- rbind(TiticacaDataSectorAggr,out)
        }
    }
}

# exclude processed lines
TiticacaDataSectorAggr <- TiticacaDataSectorAggr[which(TiticacaDataSectorAggr$multi_sectors=="0"),]

# sort output alphanumerically
TiticacaDataSectorAggr <- TiticacaDataSectorAggr[mixedorder(gsub("-","",TiticacaDataSectorAggr$comp)),]
```

D.1.2 Archaeological Context (C:/Real/SantaFe/R/2_Calculate/2_ArchaeologicalContext/)

Listing D.6: CalculateComponentAggregateSizeBySurveyAndPhase_EXPERIMENTAL.R

```r
#CALCULATE COMPONENT AGGREGATE SPATIAL SIZE BY SURVEY AND BY PHASE
#!!!NOTE THAT FOR SURVEYS WITHOUT COMPONENT SIZE INFORMATION (AT THE TIME OF WRITING, ONLY THE QAWRA THAKI SURVEY), TOTAL SITE SIZE IS USED INSTEAD OF COMPONENT SIZE, THEREFORE OVERESTIMATING THE AGGREGATE SPATIAL SIZE FOR EACH PHASE OF SUCH SURVEYS.

#external files loader start-------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to aggregate sectors when a site has multiple sectors with the same phase
#this creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/1_InitialDatabaseModifications/CalculateMultiSectorAggregation_EXPERIMENTAL_UNFINISHED.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr", "PreservedFromCaller"))])
#Load the modified chronology tables. This creates a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_EXPERIMENTAL.R")
#external files loader end---------------------------------------------

#internal script start-------------------------------------------------
```

```r
#create new variable in the components dataframe to store min-max component size midpoint
TiticacaDataSectorAggr$size_midp <- NA
#create new variable in chronology table to store aggregate component spatial size
TiticacaChron$aggcompsize <- 0
#calculate aggregate component spatial size for each phase of each survey
#loop through components dataframe
for (i in 1:nrow(TiticacaDataSectorAggr)) {
  #loop through chronology dataframe
  for (j in 1:nrow(TiticacaChron)) {
    #if the currrent component from the components dataframe matches the survey and the phase of the current row in the chronology dataframe then add the component's spatial size to the total for that survey and phase
    if (TiticacaDataSectorAggr$survey_phase[i] == TiticacaChron$survey_phase[j]) {
      #calculate for components with absolute spatial size
      if (is.na(TiticacaDataSectorAggr$size_abs[i]) == FALSE) {
        #add current component's size to the previous sum for the phase and survey
        TiticacaChron$aggcompsize[j] <- TiticacaChron$aggcompsize[j] + TiticacaDataSectorAggr$size_abs[i]
      }
      #calculate for components with spatial size ranges
      if (is.na(TiticacaDataSectorAggr$size_min[i]) == FALSE) {
        #calculate midpoint between minimum and maximum
           TiticacaDataSectorAggr$size_midp[i] <- (TiticacaDataSectorAggr$size_min[i] + TiticacaDataSectorAggr$size_max[i])/2
        #add current component's midpoint size to the previous sum for the phase and survey
        TiticacaChron$aggcompsize[j] <- TiticacaChron$aggcompsize[j] + TiticacaDataSectorAggr$size_midp[i]
      }
```

```
            #calculate for components for which only site size (not component size) information exists (at the time of writing, only the Qawra Thaki survey). This code simply treats the site size as if it were the component size, and therefore overestimates the component sizes.
            if (is.na(TiticacaDataSectorAggr$size_abs[i]) == TRUE & is.na(TiticacaDataSectorAggr$size_max[i]) == TRUE) {
                #add current component's SITE size to the previous sum for the phase and survey
                TiticacaChron$aggcompsize[j] <- TiticacaChron$aggcompsize[j] + TiticacaDataSectorAggr$sitesize[i]
            }
        }
    }
}
```

Listing D.7: CalculateNumberOfSitesBySurveyAndPhase_EXPERIMENTAL.R

```
#THIS SCRIPT CALCULATES NUMBER OF SITES BY SURVEY AND BY PHASE. IT ALSO CACLCULATES A NORMALIZED NUMBER OF SITES FOR EACH PHASE OF EACH SURVEY, WHERE THE PHASE WITH THE MOST SITES FOR EACH SURVEY HAS A NORMALIZED COUNT OF 100. IT ALSO CALCULATES NUMBER OF SITES BY SURVEY AND PHASE, CORRECTED FOR TAPHONOMIC BIAS USING SUROVELL ET AL. 2009.

#external files loader start-----------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to aggregate sectors when a site has multiple sectors with the same phase
#this creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/1_InitialDatabaseModifications/CalculateMultiSectorAggregation_EXPERIMENTAL_UNFINISHED.R")
```

```
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr", "PreservedFromCaller"))])
#Load the modified chronology tables. This creates a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_EXPERIMENTAL.R")
#external files loader end-------------------------------------------

#internal script start-----------------------------------------------
#create new variable in chronology dataframe to store number of sites by survey and phase
TiticacaChron$numsites <- 0
#create new variable in chronology dataframe to store normalized number of sites by survey and phase
TiticacaChron$numsites_norm <- 0
#create new variable in chronology dataframe to store taphonomically corrected number of sites by survey and phase. Also create an intermediate variable used just in calculating the former.
TiticacaChron$numsites_surovell <- 0
TiticacaChron$numsites_surovell_intermediate <- 0
#Loop through each phase of each survey.
for (sp_code in TiticacaChron$survey_phase) {
  #count number of unique sites for this phase of this survey, and add the count to the TiticacaChron dataframe
  TiticacaChron$numsites[TiticacaChron$survey_phase == sp_code] <- length(unique(TiticacaDataSectorAggr$site[TiticacaDataSectorAggr$survey_phase == sp_code]))
}
#calculate the normalized number for each phase of each survey.
for (sp_code in TiticacaChron$survey_phase) {
  #Divide this phase's number of sites by the number of sites of the
```

```r
phase with the largest number in this survey, and multiply by 100.
    TiticacaChron$numsites_norm[TiticacaChron$survey_phase == sp_code] <- TiticacaChron$numsites[TiticacaChron$survey_phase == sp_code] / max(TiticacaChron$numsites[TiticacaChron$survey_code == substr(sp_code, 1, 2)], na.rm = TRUE) * 100
}
#calculate the taphonomically corrected number of sites for each phase of each survey (see Surovell et al. 2009).
for (sp_code in TiticacaChron$survey_phase) {
    currMidpnt <- TiticacaChron$midp[TiticacaChron$survey_phase == sp_code]
    currMidpntBP <- 1950 - currMidpnt
    SurovellNsubT <- 5726442 * ((currMidpntBP + 2176.4) ^ -1.3925309)
    #Divide each number of sites by the corresponding value of n-sub-t.
    TiticacaChron$numsites_surovell_intermediate[TiticacaChron$survey_phase == sp_code] <- TiticacaChron$numsites[TiticacaChron$survey_phase == sp_code] / SurovellNsubT
}
#Normalize these values, such that the largest value = 1.
for (sp_code in TiticacaChron$survey_phase) {
    TiticacaChron$numsites_surovell[TiticacaChron$survey_phase == sp_code] <- TiticacaChron$numsites_surovell_intermediate[TiticacaChron$survey_phase == sp_code] / max(TiticacaChron$numsites_surovell_intermediate)
}
```

D.1.3 Systemic Context (C:/Real/SantaFe/R/2_Calculate/3_SystemicContext/)

Listing D.8: CalculateBandyPopulationEstimateByComponent_EXPERIMENTAL.R

```r
#THIS SCRIPT CALCULATES POPULATION SIZE FROM COMPONENT SPATIAL SIZE, FOR EACH COMPONENT
#SOURCE: BANDY 2001: 67, 71-72
#source only deals with absolute component sizes, not minimum-maximum ranges
#!!!NOTE THAT FOR SURVEYS WITHOUT COMPONENT SIZE INFORMATION (AT THE TIME
```

```
OF WRITING, ONLY THE QAWRA THAKI SURVEY), TOTAL SITE SIZE IS USED INSTEAD OF COMPONENT SIZE, THEREFORE OVERESTIMATING THE POPULATION SIZE FOR EACH PHASE OF SUCH SURVEYS.

#external files loader start-----------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to aggregate sectors when a site has multiple sectors with the same phase
#this creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/1_InitialDatabaseModifications/CalculateMultiSectorAggregation_EXPERIMENTAL_UNFINISHED.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr", "PreservedFromCaller"))])
#external files loader end-------------------------------------------------

#internal script start-----------------------------------------------------
#Create new variable in components dataframe to store population size.
#Below, "pop" will only be calculated for habitation components. Thus, in effect, this line assigns NA for "pop" to nonhabitation components. Assigning NA to nonhabitation components for population size is better than assigning 0 because this prevents nonhabitation components from affecting mean sizes, etc.
TiticacaDataSectorAggr$pop <- NA
#Create new variable in components dataframe to store min-max component size midpoint.
TiticacaDataSectorAggr$size_midp <- NA
#Create new variable in components dataframe to store normalized population size (size / largest size of a particular phase and survey).
TiticacaDataSectorAggr$PercOfLargest <- NA
```

```
#Calculate population for components which meet 3 conditions: 1)habitation, 2) absolute spatial size, 3) greater than .25 hectare.
TiticacaDataSectorAggr$pop[
    TiticacaDataSectorAggr$hab > 0 &
    is.na(TiticacaDataSectorAggr$size_abs) == FALSE &
    TiticacaDataSectorAggr$size_abs > .25
] <- (((sqrt(TiticacaDataSectorAggr$size_abs[
    TiticacaDataSectorAggr$hab > 0 &
    is.na(TiticacaDataSectorAggr$size_abs) == FALSE &
    TiticacaDataSectorAggr$size_abs > .25
]*10000))-20)^2)/150
#If the component meets conditions 1 and 2 but not 3, set the population to 1 household thus 6 people.
TiticacaDataSectorAggr$pop[
    TiticacaDataSectorAggr$hab > 0 &
    is.na(TiticacaDataSectorAggr$size_abs) == FALSE &
    TiticacaDataSectorAggr$size_abs <= .25
] <- 6

#Prepare to do the same for components with min-max spatial sizes rather than absolute spatial sizes, by calculating the midpoint between each component's minimum spatial size and maximum spatial size.
TiticacaDataSectorAggr$size_midp[is.na(TiticacaDataSectorAggr$size_min) == FALSE] <-
(TiticacaDataSectorAggr$size_min[is.na(TiticacaDataSectorAggr$size_min) == FALSE] +
TiticacaDataSectorAggr$size_max[is.na(TiticacaDataSectorAggr$size_min) == FALSE]) / 2
#Calculate population for components which meet 3 conditions: 1)habitation, 2) min-max spatial size, 3) greater than .25 hectare.
TiticacaDataSectorAggr$pop[
    TiticacaDataSectorAggr$hab > 0 &
    is.na(TiticacaDataSectorAggr$size_min) == FALSE &
    TiticacaDataSectorAggr$size_midp > .25
```

```
] <- (((sqrt(TiticacaDataSectorAggr$size_midp[
    TiticacaDataSectorAggr$hab > 0 &
    is.na(TiticacaDataSectorAggr$size_min) == FALSE &
    TiticacaDataSectorAggr$size_midp > .25
]*10000))-20)^2)/150
#If the component meets conditions 1 and 2 but not 3, set the population to 1 household thus 6 people.
TiticacaDataSectorAggr$pop[
    TiticacaDataSectorAggr$hab > 0 &
    is.na(TiticacaDataSectorAggr$size_min) == FALSE &
    TiticacaDataSectorAggr$size_midp <= .25
] <- 6

#Calculate for components for which only site size (not component size) information exists (at the time of writing, only the Qawra Thaki survey). This code simply treats the site size as if it were the component size, and therefore overestimates the population sizes.
#Calculate population for components which meet 3 conditions: 1)habitation, 2) only site size, not component size, available, 3) greater than .25 hectare.
TiticacaDataSectorAggr$pop[
    TiticacaDataSectorAggr$hab > 0 &
    is.na(TiticacaDataSectorAggr$size_abs) == TRUE & is.na(TiticacaDataSectorAggr$size_max) == TRUE &
    TiticacaDataSectorAggr$sitesize > .25
] <- (((sqrt(TiticacaDataSectorAggr$sitesize[
    TiticacaDataSectorAggr$hab > 0 &
    is.na(TiticacaDataSectorAggr$size_abs) == TRUE & is.na(TiticacaDataSectorAggr$size_max) == TRUE &
    TiticacaDataSectorAggr$sitesize > .25
]*10000))-20)^2)/150
#If the component meets conditions 1 and 2 but not 3, set the population to 1 household thus 6 people.
TiticacaDataSectorAggr$pop[
    TiticacaDataSectorAggr$hab > 0 &
```

```
    is.na(TiticacaDataSectorAggr$size_abs) == TRUE & is.na(TiticacaDataSectorAggr$size_max) == TRUE &
    TiticacaDataSectorAggr$sitesize <= .25
] <- 6


#Add data for normalized population sizes (population / largest population from a particular phase and survey).
#Loop through components.
for (i in 1:nrow(TiticacaDataSectorAggr)) {
    #Calculate population size/largest population size for each component.
    TiticacaDataSectorAggr$PercOfLargest[i] <- (TiticacaDataSectorAggr$pop[i] / max(TiticacaDataSectorAggr$pop[TiticacaDataSectorAggr$survey_phase == TiticacaDataSectorAggr$survey_phase[i]], na.rm=TRUE)) * 100
}
```

Listing D.9: CalculateBandyPopulationEstimateByComponentDates_EXPERIMENTAL.R

```
#THIS SCRIPT ASSIGNS A CALENDAR YEAR DATE TO EACH OF THE COMPONENTS/POPULATION SIZES

#external files loader start------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate a Bandy population estimate for each component
#this creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateByComponent_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr", "PreservedFromCaller"))])
```

```
#Load the modified chronology tables. This creates a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_EXPERIMENTAL.R")
#external files loader end---------------------------------------------------

#internal script start---------------------------------------------------
#initialize variable for date
TiticacaDataSectorAggr$calendar <- NA
#for the calendar year date, use the midpoint of the component's phase's range, retrieved from the TiticacaChron dataframe.
TiticacaDataSectorAggr$calendar <- TiticacaChron$midp[match(TiticacaDataSectorAggr$survey_phase, TiticacaChron$survey_phase)]
```

Listing D.10: CalculateBandyPopulationEstimateByComponentRanks_EXPERIMENTAL.R

```
#THIS SCRIPT CALCULATES RANKS (WITHIN PARTICULAR PHASES OF PARTICULAR SURVEYS) FOR THE COMPONENTS' BANDY POPULATION SIZE ESTIMATES
#THESE ARE PRIMARILY USED IN RANK-SIZE GRAPHS
#THIS SCRIPT ALSO CALCULATES MY IMPLEMENTATION OF DRENNAN AND PETERSON'S (2004) "COEFFICIENT A"

#external files loader start---------------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate a Bandy population estimate for each component
#this creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateByComponent_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the
```

```
workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr", "PreservedFromCaller"))])
#Load the modified chronology tables. This creates a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_EXPERIMENTAL.R")
#external files loader end--------------------------------------------------

#internal script start------------------------------------------------------
#initialize variable for rank
TiticacaDataSectorAggr$Rank <- NA
#get ranks
#create loop through the components dataframe to select the components from each survey and phase, one survey and phase at a time
for (sp_code in TiticacaChron$survey_phase) {
    #calculate ranks. the option na.last="keep" means that NA values in the input are given a rank of NA
    #rank function needs a negative input in order to get the order descending
    #The rank() function's default method for dealing with ties (how ranks should be assigned to equal values -- default is assigning the mean to all) causes serious problems in rank-size graphs, including plotting multiple sites at the same XY point, related distortion of the curve's shape, and even occasionally lines that do not begin at the first rank. Therefore, change the method for dealing with ties to random assignment of ranks within tied groups.
    TiticacaDataSectorAggr$Rank[TiticacaDataSectorAggr$survey_phase == sp_code] <- rank(-TiticacaDataSectorAggr$pop[TiticacaDataSectorAggr$survey_phase == sp_code], na.last = "keep", ties.method = "random")
}
#create new dataframe with sorted ranks, so that the plots do not have lines that double-back on themselves. Also, remove NAs (non-habitation
```

```
sites) with the option na.last=NA.
TiticacaDataSectorAggrRankSorted <- TiticacaDataSectorAggr[order(TiticacaDataSectorAggr$Rank, na.last=NA),]

#REPLICATE DRENNAN AND PETERSON'S (2004) "COEFFICIENT A"-----------------
#load a package with a function for calculating integrals
library(Bolstad2)
#Add a field to the chronology table to store a "Coefficient A" value for each phase of each survey.
TiticacaChron$coeff_a <- NA
#Loop through each phase of each survey.
for (sp_code2 in TiticacaChron$survey_phase) {
  #If there is only one component for this phase of this survey, the below code will malfunction and cause problems with the calculations for subsequent phases (this is in fact a problem with my dataset, for the Tiwanaku III phase of the Middle Tiwanaku Valley). Therefore, only execute the below code if there is more than one component for this phase of this survey.
  if (length(TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey_phase == sp_code2]) > 1) {
    #Drennan and Peterson (2004) calculate their areas in log-log space, but my integral calculation will be conducted in non-log space. Therefore, to make my calculations equivalent to Drennan and Peterson's calculations, I need to log-transform both my x and y data.
    ranksLogged <- log10(TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey_phase == sp_code2])
    normSizeLogged <- log10(TiticacaDataSectorAggrRankSorted$PercOfLargest[TiticacaDataSectorAggrRankSorted$survey_phase == sp_code2])

    #Create a line that is equivalent in my non-log space to Drennan and Peterson's log-normal line in their log-log space.
    #The use of na.rm=TRUE is not actually necessary here, since NAs have already been removed above, but it is a useful reminder that
```

```
problems will be introduced here if NAs do exist.
lowestRank <- max(TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey_phase == sp_code2], na.rm= TRUE)
rank1Size <- max(TiticacaDataSectorAggrRankSorted$PercOfLargest[TiticacaDataSectorAggrRankSorted$survey_phase == sp_code2], na.rm= TRUE)
logNormX <- c(1, lowestRank)
logNormY <- c(rank1Size, rank1Size / lowestRank)
logNormXtransformed <- log10(logNormX)
logNormYtransformed <- log10(logNormY)

#If calculated on these rank-size and log-normal curves, the integrals would be the area between the curves and y=0.  I instead want the area between the curves and a horizontal line emerging from the bottom of the log-normal line (such a horizontal line is equivalent to the bottom of Drennan and Peterson's squares). So, I will shift both curves vertically so that the bottom of the log-normal line is at y=0. Remember, though, that the rank-size curve can extend below this square (e.g., Drennan and Peterson 2004: Fig. 2g).
squareBottomY <- log10(100 / lowestRank)
normSizeLoggedYshifted <- normSizeLogged - squareBottomY
logNormYtransformedYshifted <- logNormYtransformed - squareBottomY

#Re-scale the curves, such that the the square defined by the log-normal line has an area equal to 1 on each side of the log-normal line. The square will then be equivalent to Drennan and Peterson's, except not in log-log space. Note that there are different ways to accomplish such a square (e.g., the square could have a height and width both equal to the square root of 2, as mine does, or it could have a height of 2 and a width of 1), but since we are interested in areas, they are equivalent (just to check, I tried a height of 2 and a width of 1, and got the same results for A). Importantly, if the dimensions of the square are changed between
```

```
these alternatives, then the calculation of X-axis-intercepts below must also be changed.
maxX <- log10(lowestRank)
maxY <- max(logNormYtransformedYshifted)
logNormXtransformedRescaled <- logNormXtransformed / maxX * sqrt(2)
ranksLoggedRescaled <- ranksLogged / maxX * sqrt(2)
logNormYtransformedYshiftedRescaled <- logNormYtransformedYshifted / maxY * sqrt(2)
normSizeLoggedYshiftedRescaled <- normSizeLoggedYshifted / maxY * sqrt(2)


#Since the rank-size curve has been log10-transformed (and also otherwise modified), it may have negative Y values.  For regions of the curve which are below 0, the integral will calculate a negative area, and add it to the positive area for regions of the curve above 0.  This is a problem as we are trying to replicate Drennan and Peterson's "coefficient A": the area below zero must have the same sign as the area under the log-normal line (e.g., Drennan and Peterson 2004: Fig. 2g). So, we will separately calculate the areas above and below 0.
#First create new vectors, one to store positive Y values and one to store negative Y values. For reasons discussed below regarding the X-intercept, also create new X-value vectors.
normSizePositivePortion <- normSizeLoggedYshiftedRescaled
normSizeNegativePortion <- normSizeLoggedYshiftedRescaled
ranksPositivePortion <- ranksLoggedRescaled
ranksNegativePortion <- ranksLoggedRescaled
#We need the new Y vectors to have the same length as the original X vector, so that the Y values still match up to their X values. Therefore, instead of removing the positive or negative Y values, set them to 0.
#If the rank-size curve goes below Y=0 and we simply keep the original vector of X values, then the X-axis-intercept will be inaccurately represented in both the positive and negative
```

```
    ↪portions (e.g., when a negative value is replaced with zero and
    ↪then matched to its original X value, a point directly above the
    ↪negative point is created, rather than one along the line between
    ↪the negative point and the preceeding point). Therefore, for the
    ↪below loop, create a variable that tracks the sign, and compare
    ↪its value each iteration to the previous iteration's value; when
    ↪they are different, this identifies that the X-axis-intercept
    ↪needs to be calculated and needs to replace the original X value.
    ↪Since this is a rank-size curve, there will be a maximum of 1 X-
    ↪axis-intercept.
    normSizeSign <- 1
    #Loop through the rank-size curve's points.
    for (i in 1:length(normSizeLoggedYshiftedRescaled)) {
      #Save the sign of the previous rank-size curve Y value.
      previousNormSizeSign <- normSizeSign
      #If the current point in the rank-size curve has a negative Y
      ↪value, change its value to 0 in the positive portion vector. If
      ↪ the current point in the rank-size curve has a positive Y
      ↪value, change its value to 0 in the negative portion vector.
      ↪Also record the current point's Y value sign in the "
      ↪normSizeSign" value.
      if (normSizeLoggedYshiftedRescaled[i] < 0) {
      ↪normSizePositivePortion[i] <- 0; normSizeSign <- -1}
      if (normSizeLoggedYshiftedRescaled[i] > 0) {
      ↪normSizeNegativePortion[i] <- 0; normSizeSign <- 1}
      #If the sign of the current point's Y value is different than the
      ↪ sign of the previous point's Y value, then calculate the X-
      ↪axis-intercept and use it to replace the X value from the
      ↪original vector. Since this is a rank-size curve, this code
      ↪will execute once at most.
      if (previousNormSizeSign != normSizeSign) {
        #First, calculate the slope between this point and the
        ↪previous point.
        normSizeSlope <- (normSizeLoggedYshiftedRescaled[i] -
        ↪normSizeLoggedYshiftedRescaled[i - 1]) / (
```

```
ranksLoggedRescaled[i] - ranksLoggedRescaled[i - 1])
            #Now use this slope to calculate the X-axis-intercept between the current point and the previous point.  NOTE THAT THIS CALCULATION RELIES ON THE Y-AXIS-INTERCEPT BEING EQUAL TO THE SQUARE ROOT OF 2, AS IT IS HERE AFTER THE ABOVE RESCALING.
            normSizeXintercept <- -sqrt(2) / normSizeSlope
            #In the positive portion's X vector, replace the original vector's X value for this point with this X-axis intercept. Also, the negative portion's X vector should have its X value shifted to the same value, except FOR THE PREVIOUS POINT.
            ranksPositivePortion[i] <- normSizeXintercept
            ranksNegativePortion[i - 1] <- normSizeXintercept
        }
    }


    #get the integral for the positive portion of the rank-size curve
    rankSizeIntegralPos <- sintegral(ranksPositivePortion, normSizePositivePortion)$int
    #get the integral for the negative portion of the rank-size curve
    rankSizeIntegralNeg <- sintegral(ranksNegativePortion, normSizeNegativePortion)$int
    #Get the integral for the log-normal line. This should always be 1.
    checkLogNormIntegral <- sintegral(logNormXtransformedRescaled, logNormYtransformedYshiftedRescaled)$int

    #Subtract the log-normal integral (=1) from the rank-size integral for the portion of the rank-size curve above y=0. Thus, as in Drennan and Peterson (2004), a convex curve will have a positive value whereas a concave curve will have a negative value. If there is a portion of the rank-size curve below the square (below y=0), then add it (as the negative value it already is) to the integral for the portion above y=0. Thus, as desired, a negative A value
```

```
        ↪will become even more negative with the addition of the integral
        ↪for the portion below y=0.
        #This is equivalent to Drennan and Peterson's (2004) "Coefficient A"
        rankSizeCoeffA <- rankSizeIntegralPos - 1 + rankSizeIntegralNeg

        #Add this value of "Coefficient A" to the corresponding phase of the
        ↪ corresponding survey in the chronology dataframe.
        TiticacaChron$coeff_a[TiticacaChron$survey_phase == sp_code2] <-
        ↪rankSizeCoeffA
    }
}
#END OF REPLICATING DRENNAN AND PETERSON'S "COEFFICIENT A"---------------
```

Listing D.11: CalculateBandyPopulationEstimateBySurveyAndPhase_EXPERIMENTAL.R

```
#THIS SCRIPT CALCULATES TOTAL POPULATION SIZE FOR EACH PHASE OF EACH
↪SURVEY. IT ALSO CALCULATES A NORMALIZED POPULATION SIZE FOR EACH PHASE
↪OF EACH SURVEY, WHERE THE PHASE WITH THE HIGHEST POPULATION FOR EACH
↪SURVEY HAS A NORMALIZED POPULATION OF 100.

#external files loader start-----------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population size for each component in the
↪components dataframe (multi-sector aggregated)
#this creates a modified version of the survey data .csv file and the
↪inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#note that this script re-sets the working directory, but at the time of
↪writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/
↪CalculateBandyPopulationEstimateByComponent_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the
↪workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr", "
↪PreservedFromCaller"))])
```

```
#Load the modified chronology tables. This creates a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_EXPERIMENTAL.R")
#external files loader end--------------------------------------------

#internal script start--------------------------------------------
#add population total variable to chronology dataframe
TiticacaChron$pop <- 0
#add normalized population variable to chronology dataframe
TiticacaChron$pop_norm <- 0
#calculate population totals for each phase of each survey
for (sp_code in TiticacaChron$survey_phase) {
	TiticacaChron$pop[TiticacaChron$survey_phase == sp_code] <- sum(TiticacaDataSectorAggr$pop[TiticacaDataSectorAggr$survey_phase == sp_code], na.rm=TRUE)
}
#calculate the normalized populations for each phase of each survey.
for (sp_code in TiticacaChron$survey_phase) {
  #Divide this phase's population by the population of the phase with the largest population in this survey, and multiply by 100.
  TiticacaChron$pop_norm[TiticacaChron$survey_phase == sp_code] <- TiticacaChron$pop[TiticacaChron$survey_phase == sp_code] / max(TiticacaChron$pop[TiticacaChron$survey_code == substr(sp_code, 1, 2)], na.rm = TRUE) * 100
}
```

Listing D.12: CalculateBandyPopulationEstimateDensityBySurveyAndPhase_EXPERIMENTAL.R

```
#THIS SCRIPT CALCULATES THE POPULATION (BANDY ESIMATE) DENSITY FOR EACH PHASE OF EACH SURVEY
#eventually need to add small extra shapefiles e.g. small islands near
```

```
island of sun, 2nd Qawra Thaki survey area

#external files loader start------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate total population for each phase of each survey in the chronology table
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])
#load survey boundary shapefiles
library(rgdal)
pk_bound_shp <- readOGR(dsn="1_Source/shapefiles/Pukara",layer="PukaraValley")
is_bound_shp <- readOGR(dsn="1_Source/shapefiles/IslandSun",layer="IslandSun")
jp_bound_shp <- readOGR(dsn="1_Source/shapefiles/JuliPomata",layer="JuliPomata")
tr_bound_shp <- readOGR(dsn="1_Source/shapefiles/TaracoPen",layer="TaracoPeninsulaSurveyBoundary")
kt_bound_shp <- readOGR(dsn="1_Source/shapefiles/Katari",layer="KatariValleySurveyBoundary")
tm_bound_shp <- readOGR(dsn="1_Source/shapefiles/TiwanakuCentral",layer="TiwanakuCentralValleySurveyBoundary")
tl_bound_shp <- readOGR(dsn="1_Source/shapefiles/TiwanakuLower",layer="
```

```
TiwanakuLowerValleySurveyBoundary")
hp_bound_shp <- readOGR(dsn="1_Source/shapefiles/HuancanePutina",layer="HuancanePutinaSurveyBoundary")
qt_bound_shp <- readOGR(dsn="1_Source/shapefiles/QawraThaki",layer="QawraThakiSurveyBoundary")
#external files loader end----------------------------------------------

#internal script start--------------------------------------------------
#add variable for population density to chronology table
TiticacaChron$popdensity <- 0
#create dataframe to store survey boundary areas. when getting the survey codes, exclude the "gaps" sites and "peripheries" sites because they don't have defined areas/shapefiles.
SurveyCodes <- unique(TiticacaChron$survey_code[TiticacaChron$survey_code != "gp" & TiticacaChron$survey_code != "pe"])
BoundaryAreas <- data.frame(Surv = SurveyCodes, BoundAr = 0)

#calculate spatial size of each survey area
getClass("Polygon")
for (survey_bound in SurveyCodes) {
    BoundaryAreas$BoundAr[BoundaryAreas$Surv == survey_bound] <- sapply(slot(get(paste(survey_bound,"_bound_shp",sep="")), "polygons"), function(x) sapply(slot(x, "Polygons"), slot, "area"))
}
#for each phase of each survey, calculate the population density
TiticacaChron$popdensity[TiticacaChron$survey_code != "gp" & TiticacaChron$survey_code != "pe"] <-
TiticacaChron$pop[TiticacaChron$survey_code != "gp" & TiticacaChron$survey_code != "pe"] /
(BoundaryAreas$BoundAr[match(TiticacaChron$survey_code[TiticacaChron$survey_code != "gp" & TiticacaChron$survey_code != "pe"], BoundaryAreas$Surv)] / 1000000)
```

Listing D.13: CalculateBandyPopulationEstimatePercentInLargestSiteBy-

SurveyAndPhase_EXPERIMENTAL.R

```
#THIS SCRIPT CALCULATES THE FRACTION OF POPULATION IN THE LARGEST SITE FOR EACH PHASE OF EACH SURVEY. IT ALSO CALCULATES A NORMALIZED FRACTION OF POPULATION IN THE LARGEST SITE FOR EACH PHASE OF EACH SURVEY, WHERE THE PHASE WITH THE HIGHEST FRACTION OF POPULATION FOR EACH SURVEY HAS A NORMALIZED FRACTION OF 1.

#external files loader start-------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to 1) calculate population size for each component in components dataframe and to 2) calculate total population for each phase of each survey in chronology dataframe
#this creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#this also creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])
#external files loader end---------------------------------------------

#internal script start-------------------------------------------------
#add variables for population size in largest site, both absolute and fraction, to chronology table
TiticacaChron$poplargest_abs <- 0
TiticacaChron$poplargest_perc <- 0
#add variable for normalized fraction
TiticacaChron$poplargest_perc_norm <- 0

```

```
#calculate largest site population in numbers of people for each phase of each survey
for (sp_code in TiticacaChron$survey_phase) {
    TiticacaChron$poplargest_abs[TiticacaChron$survey_phase == sp_code] <- max(TiticacaDataSectorAggr$pop[TiticacaDataSectorAggr$survey_phase == sp_code], na.rm=TRUE)
}
#for each phase of each survey, calculate the fraction of population in the largest site
TiticacaChron$poplargest_perc <- TiticacaChron$poplargest_abs / TiticacaChron$pop

#calculate the normalized fractions in largest site for each phase of each survey.
for (sp_code in TiticacaChron$survey_phase) {
   #Divide this phase's fraction by the fraction of the phase with the largest fraction in this survey.
    TiticacaChron$poplargest_perc_norm[TiticacaChron$survey_phase == sp_code] <- TiticacaChron$poplargest_perc[TiticacaChron$survey_phase == sp_code] / max(TiticacaChron$poplargest_perc[TiticacaChron$survey_code == substr(sp_code, 1, 2)], na.rm = TRUE)
}
```

Listing D.14: CalculateBandyPopulationEstimateFractionInComponentTypesBySurveyAndPhase_EXPERIMENTAL.R

```
#THIS SCRIPT CALCULATES THE FRACTION OF POPULATION IN EACH COMPONENT TYPE (NON-RITUAL HABITATION, RITUAL HABITATION, BURIAL HABITATION, DEFENSIVE HABITATION) FOR EACH PHASE OF EACH SURVEY. FOR EACH COMPONENT TYPE, IT TREATS POSSIBLE (0.5) AND CONFIDENT (1) COMPONENTS AS SEPARATE TYPES. IT ALSO CALCULATES NORMALIZED FRACTIONS FOR EACH TYPE FOR EACH PHASE OF EACH SURVEY, WHERE THE PHASE WITH THE HIGHEST FRACTION OF POPULATION FOR EACH SURVEY HAS A NORMALIZED FRACTION OF 1.
#external files loader start-------------------------------------------
#set working directory
```

```
setwd("C:/Real/SantaFe/R/")
#run script to 1) calculate population size for each component in components dataframe and to 2) calculate total population for each phase of each survey in chronology dataframe
#this creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#this also creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])
#external files loader end-------------------------------------------

#internal script start-----------------------------------------------
#add new fields for population fraction in each component type to the chronology table.
TiticacaChron$popNonRitHab <- 0
TiticacaChron$popRitConf <- 0
TiticacaChron$popRitPoss <- 0
TiticacaChron$popBurConf <- 0
TiticacaChron$popBurPoss <- 0
TiticacaChron$popDefConf <- 0
TiticacaChron$popDefPoss <- 0
#add new fields for normalized fractions
TiticacaChron$popNonRitHab_norm <- 0
TiticacaChron$popRitConf_norm <- 0
TiticacaChron$popRitPoss_norm <- 0
TiticacaChron$popBurConf_norm <- 0
TiticacaChron$popBurPoss_norm <- 0
TiticacaChron$popDefConf_norm <- 0
```

```
TiticacaChron$popDefPoss_norm <- 0

#The "hab" field will require several changes. First, .5 and .75 codes for the "hab" field should be changed to 1, to simplify the data. Second, because here we are interested in distinguishing components with evidence for corporate ritual from components without evidence for corporate ritual, the "hab" field should be changed to 0 when there is .5 or 1 for the "rit" field. THUS AFTER THIS, ZERO IN THE "HAB" FIELD CAN SIGNIFY EITHER LACK OF HABITATION *OR* PRESENCE OF BOTH HABITATION AND RITUAL.
TiticacaDataHabAlt <- TiticacaDataSectorAggr
TiticacaDataHabAlt$hab[TiticacaDataHabAlt$hab == .5 | TiticacaDataHabAlt$hab == .75] <- 1
TiticacaDataHabAlt$hab[TiticacaDataHabAlt$rit > 0] <- 0

#calculate fraction of population in each component type, for each phase of each survey.
# 3 nested loops will be used:
# outer-most loop:    type confidence    (0.5 or 1)
# middle loop:        type               (non-ritual habitation, ritual, burial, defensive)
# inner-most loop:    survey and phase   ("hpa","isb", etc.)
#set up 2 iterations, one for confident types and one for possible types.
for (i in 1:2) {
    #create objects to be passed to the inner-most loop below, during the outer-most loop's iteration for confident types.
    if (i == 1) {
        typeFracts <- c("popNonRitHab", "popRitConf", "popBurConf", "popDefConf")
        typeCodes <- c("hab", "rit", "bur", "def")
        typeConfVal <- 1
    }
    #create objects to be passed to the inner-most loop below, during the outer-most loop's iteration for possible types.
    if (i == 2) {
```

```
      typeFracts <- c("popRitPoss", "popBurPoss", "popDefPoss")
      typeCodes <- c("rit", "bur", "def")
      typeConfVal <- 0.5
   }
   #set the middle loop's counter to 0.
   middleLoopIter <- 0
   #loop through the new field names in TiticacaChron, for either the confident or the possible types.
   for(typeFraction in typeFracts) {
      #count this iteration.
      middleLoopIter <- middleLoopIter + 1
      #use the iteration count to define which of TiticacaDataHabAlt's component type fields ("hab", "rit", "bur", or "def") will be used during this iteration of the middle loop.
      typeCode <- typeCodes[middleLoopIter]
      #loop through each phase of each survey.
      for (sp_code in TiticacaChron$survey_phase) {
         #For this phase of this survey, use the middle loop's variable to select which of the new fields should be calculated.
         TiticacaChron[[typeFraction]][TiticacaChron$survey_phase == sp_code] <-
            #Sum the populations of all components that are from this phase of this survey and that have the outer-most loop's specified confidence for the middle loop's specified type.
            sum(TiticacaDataHabAlt$pop[TiticacaDataHabAlt$survey_phase == sp_code & TiticacaDataHabAlt[[typeCode]] == typeConfVal], na.rm = TRUE) /
            #And then divide this sum by the total population for this phase of this survey, to obtain the component type's fraction of population.
            TiticacaChron$pop[TiticacaChron$survey_phase == sp_code]
      }
   }
}

```

```
#for each new field just calculated, now calculate a normalized version, for each phase of each survey.
#presently, I haven't used these fields in the graph scripts, but I will retain this code for possible future use.
#loop through the new fields, which were just calculated above.
for (field in c("popNonRitHab", "popRitConf", "popBurConf", "popDefConf", "popRitPoss", "popBurPoss", "popDefPoss")) {
    #loop through each phase of each survey.
    for (sp_code in TiticacaChron$survey_phase) {
        #For this phase of this survey, use the outer loop's variable to select which of the new fields should now be converted to a normalized version. Add "_norm" to the end of the outer loop's variable so that the normalized field rather than the non-normalized field is changed.
        TiticacaChron[[paste(field, "_norm", sep = "")]][TiticacaChron$survey_phase == sp_code] <-
            #Divide this phase's fraction for this type by...
            TiticacaChron[[field]][TiticacaChron$survey_phase == sp_code] /
            #...the largest fraction for this type among all phases in this survey.
            max(TiticacaChron[[field]][TiticacaChron$survey_code == substr(sp_code, 1, 2)], na.rm = TRUE)
    }
}
#In some cases, the above inner loop divides by zero and therefore creates NaN. Change these to 0.
for (field_norm in c("popNonRitHab_norm", "popRitConf_norm", "popBurConf_norm", "popDefConf_norm", "popRitPoss_norm", "popBurPoss_norm", "popDefPoss_norm")) {
    TiticacaChron[[field_norm]][is.nan(TiticacaChron[[field_norm]])] <- 0
}
```

D.2 R: Graphing Scripts

D.2.1 Helper Scripts (C:/Real/SantaFe/R/3_GraphScripts/1_HelperScripts/)

Listing D.15: GraphColorPalette.R

```
#THIS SCRIPT IS CALLED BY OTHER SCRIPTS TO CREATE A COLOR PALETTE FOR PLOT
↪ OUTPUT

#Create color palette for graphs - first parameter is # of colors and
↪therefore will need to be changed as more surveys are added. Presently,
↪I use a number of colors equivalent to roughly half the number of
↪surveys, and then re-use the colors with different line types, etc.
colorpal <- rainbow(5,s=1,v=1,start=.1,end=1,alpha=1)
```

Listing D.16: GraphOutputPDF.R

```
#THIS SCRIPT IS CALLED BY OTHER SCRIPTS TO CREATE A PDF IMAGE FILE FOR
↪PLOT OUTPUT
#IT RECEIVES THESE VARIABLES AS INPUT: ImageName, ImageWidth, ImageHeight

#This package is typically used to allow non-standard fonts, but for the
↪moment I am just using it for font embedding.
library(extrafont)
loadfonts()
#Since I am using Windows, it is necessary to specify the path to
↪Ghostscript, for the font embedding.
Sys.setenv(R_GSCMD = "C:/Program Files/gs/gs9.19/bin/gswin64c.exe")
#The actual font embedding will be done at the end of each graph script,
↪using embed_fonts()
#embed_fonts() doesn't embed ZapfDingbats, so below I use pdf(...,
↪useDingbats = FALSE)

#add subdirectory name, timestamp, and file extension to the specified
↪image filename
```

```
ImageNameModi1 <- paste("/4_GraphOutput/",ImageName,Sys.time(), ".pdf", sep = "")
#get rid of the colons in the timestamp
ImageNameModi2 <- gsub(":","",ImageNameModi1)
#add working directory path. this can't be done earlier because the gsub command will remove the colon in C:/
ImageNameModi3 <- paste(getwd(),ImageNameModi2,sep="")
#use this filename to create a pdf file to store plotting output. pdf is used because it is a vector format.
pdf(file = ImageNameModi3, width = ImageWidth, height = ImageHeight, useDingbats = FALSE)
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
#can't do remove(ls()) because this script is called after various other scripts and this would risk removing wanted objects
remove(list= c("ImageName","ImageWidth","ImageHeight","ImageNameModi1","ImageNameModi2"))
```

Listing D.17: GraphSingleYSingleDiachronicPlotTemplate.R

```
#THIS SCRIPT IS CALLED BY OTHER SCRIPTS TO PROVIDE THE BASIC (SHARED) CODE FOR A CATEGORY OF GRAPHS THAT INVOLVES 1) TIME ON THE X-AXIS, 2) ONLY ONE VARIABLE ON THE Y-AXIS, AND MULTIPLE LINES DEPICTING THIS VARIABLE, ONE FOR EACH SURVEY, AND 3) ONLY ONE PLOT, RATHER THAN MULTIPLE PANELS/FACETS.
#Much of this script relies on [[]] notation, like dataFrame[[column]] , rather than $ notation, like dataFrame$column , because [[]] permits the use of variable column names rather than the $ notation's hard-coded string.

#Remove the "Gaps" (intersurvey) components, so that they don't interfere with getting the maximum Y value.
TiticacaChron <- TiticacaChron[TiticacaChron$survey_code != "gp",]
TiticacaChron <- droplevels(TiticacaChron)

```

```
#Get maximum Y value.
Max_y <- max(TiticacaChron[[yVarPass]], na.rm = TRUE)
#Set margins
par(mar=c(3, 3.5, 1, 0) + 0.1)
#Set initial values for variables that will control each survey's color, line style, and point style.
colorIndex <- 1
lineStyle <- 1
pointStyle <- 16

#Draw plot and first line.
plot(x = TiticacaChron$midp[TiticacaChron$survey_code == "pk"], y = TiticacaChron[[yVarPass]][TiticacaChron$survey_code == "pk"], ylim = c(0,Max_y), xlim = c(-2000, 2000), type = "o", col = colorpal[colorIndex], lty = lineStyle, pch = pointStyle, axes = FALSE, ann = FALSE)
#Draw X-axis.
axis(1, at=seq(-2000,2000,250))
mtext(1,text="Years", line=2)
#Loop through the remaining surveys. I have manually specified each survey code (rather than e.g. using unique()), so that the plotting order is controlled.
for (s_code in c("hp","jp","is","tr","kt","tl","tm","qt")) {
  #Set the color, line style, and point style to be used for this survey.
  colorIndex <- colorIndex + 1
  if (colorIndex == 6) {colorIndex <- 1; lineStyle <- 5; pointStyle <- 15}
  #Draw the current survey's line.
  lines(x = TiticacaChron$midp[TiticacaChron$survey_code == s_code], y = TiticacaChron[[yVarPass]][TiticacaChron$survey_code == s_code], type = "o", col = colorpal[colorIndex], lty = lineStyle, pch = pointStyle)
}

#Draw the legend. Occasionally a legend in the top left will overlap some lines, so in these exceptions the calling script passes a string describing which location should be used for the legend.
```

```
#This is the default (upper left), to be used when the calling script makes no legend location specification. Default cex values are also specified because in alternative legends these will sometimes need to be changed.
legendYval <- Max_y
cexValue <- 1
ptCexValue <- 1
#If the calling script supplies an alternative location, redefine the legend's parameters.
if (exists("legendLocation")) {
    if (legendLocation == "bottomLeft") {legendYval <- Max_y / 3.6; cexValue <- .74; ptCexValue <- .74}
    if (legendLocation == "topLeftSmall") {legendYval <- Max_y; cexValue <- .82; ptCexValue <- .82}
}
#Draw legend.
legend(x = -2125, y = legendYval, title = "Surveys", legend = c("Pukara Valley", "Huancane-Putina", "Juli-Pomata", "Island of the Sun", "Taraco Peninsula", "Katari Valley", "Lower Tiwanaku Valley", "Middle Tiwanaku Valley", "Qawra Thaki [site size]"), col = colorpal, lty=c(1,1,1,1,1,5,5,5,5), pch=c(16,16,16,16,16,15,15,15,15), cex = cexValue, pt.cex = ptCexValue)
```

D.2.2 Archaeological Context (C:/Real/SantaFe/R/3_GraphScripts/2_ArchaeologicalContext/)

Listing D.18: GraphNumberOfSitesBySurvey_EXPERIMENTAL.R

```
#GRAPH NUMBER OF SITES VERSUS TIME BY SURVEY

#external files loader start------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate number of sites versus time by survey
#this creates a modified version of the chronology .csv files, a dataframe
```

```
called TiticacaChron
#this also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used in this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/2_ArchaeologicalContext/CalculateNumberOfSitesBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphNumberOfSitesBySurvey"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-------------------------------------------

#internal script start-------------------------------------------
#Set the Y variable, using a string that will be passed to a template script.
yVarPass <- "numsites"
#Run the applicable graph template. The template will receive the desired
```

```
Y variable from this script, via "yVarPass".
source("3_GraphScripts/1_HelperScripts/GraphSingleYSingleDiachronicPlotTemplate.R")

#Add additional components to the plot, anything not dealt with by the template script.
#Add Y-Axis.
axis(2, at=seq(0,Max_y,25))
mtext(2, text = "Number of Sites", line = 2.5)
#Add plot title.
title(main = "Number of Sites through Time by Survey")
#internal script end-----------------------------------------------------

#external files saver start----------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.19: GraphNumberOfSitesBySurveyNormalized_EXPERIMENTAL.R

```
#GRAPH NORMALIZED NUMBER OF SITES VERSUS TIME BY SURVEY

#external files loader start--------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate normalized number of sites versus time by survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#this also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used in this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/2_ArchaeologicalContext/
```

```
CalculateNumberOfSitesBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphNumberOfSitesBySurveyNormalized"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-----------------------------------------------

#internal script start-----------------------------------------------
#Set the Y variable, using a string that will be passed to a template script.
yVarPass <- "numsites_norm"
#Run the applicable graph template.  The template will receive the desired Y variable from this script, via "yVarPass".
source("3_GraphScripts/1_HelperScripts/GraphSingleYSingleDiachronicPlotTemplate.R")

#Add additional components to the plot, anything not dealt with by the template script.
#Add Y-Axis.
```

```
axis(2, at=seq(0,Max_y,25))
mtext(2, text = "Normalized Number of Sites (% of Survey's Largest Number of Sites)", line = 2.5)
#Add plot title.
title(main = "Normalized Number of Sites through Time by Survey")
#internal script end-----------------------------------------------------

#external files saver start---------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.20: GraphNumberOfSitesBySurveyTaphonomicallyCorrected_EXPERIMENTAL.R

```
#GRAPH TAPHONOMICALLY CORRECTED NUMBER OF SITES VERSUS TIME BY SURVEY

#external files loader start--------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate taphonomically corrected number of sites versus time by survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#this also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used in this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/2_ArchaeologicalContext/CalculateNumberOfSitesBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","
```

```
PreservedFromCaller")))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphNumberOfSitesBySurveyTaphonomicallyCorrected"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end--------------------------------------------------

#internal script start------------------------------------------------------
#Set the Y variable, using a string that will be passed to a template script.
yVarPass <- "numsites_surovell"
#Run the applicable graph template.  The template will receive the desired Y variable from this script, via "yVarPass".
source("3_GraphScripts/1_HelperScripts/GraphSingleYSingleDiachronicPlotTemplate.R")

#Add additional components to the plot, anything not dealt with by the template script.
#Add Y-Axis.
axis(2, at=seq(0,Max_y,.1))
mtext(2, text = "Taphonomically Corrected Number of Sites", line = 2.5)
#Add plot title.
title(main = "Number of Sites, Corrected for Taphonomic Bias Using
```

```
Surovell et al. 2009")
#internal script end-----------------------------------------------

#external files saver start------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

D.2.3 Systemic Context

D.2.3.1 Population Size (C:/Real/SantaFe/R/3_GraphScripts/3_SystemicContext/1_PopulationSize/)

Listing D.21: GraphPopulationSizeBasinWide_EXPERIMENTAL.R

```
#THIS SCRIPT CREATES A GRAPH FOR TITICACA BASIN-WIDE POPULATION THROUGH TIME

#external files loader start-----------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population sizes for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
```

```r
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphPopulationSizeBasinWide"
#specify image dimensions in inches
ImageWidth <- 6.5
ImageHeight <- 8.3
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")
#external files loader end-----------------------------------------------

#internal script start---------------------------------------------------
#create sequence of points in time each separated by 100 years
#offset by 1 year so that there is no double-counting of the population at the transition year between phases
#chop off the colonial period estimates by having the last time point be at 1501, because not all surveys have colonial period estimates and therefore the colonial total (basin-wide) estimate comes out too low
#there is a similar but more complicated issue with the start point.  1300 BC seems like a good compromise because most surveys have initial estimates by then and it does not chop off a lot of the early time
#note that a phase like Huancane-Putina's "Inca I" phase (1450-1500 A.D.) is excluded from the calculations because of how this sequence was created.
Centuries <- seq(-1299,1501,100)
#create a dataframe for total population of all surveys by century
TotalPop <- data.frame(cent = Centuries, pop = 0)

#calculate population totals for each century date within the total population dataframe
#first create loop through total population by centuries dataframe
for (i in 1:nrow(TotalPop)) {
```

```
    #loop through chronology dataframe
    for (j in 1:nrow(TiticacaChron)) {
        #if the current century date in the total population dataframe falls within the date range for the current phase in the chronology dataframe then add the chronology dataframe's population value to the total population dataframe's population sum for that century date
        if(TiticacaChron$start[j] < TotalPop$cent[i] & TiticacaChron$end[j] > TotalPop$cent[i]) { TotalPop$pop[i] <- TotalPop$pop[i] + TiticacaChron$pop[j] }
    }
}

#Correct for taphonomic bias using Surovell et al. 2009.
#Create a vector of values calculated using equation 1 of Surovell et al. 2009. The values in this vector will be Surovell et al.'s n-sub-t, whereas the values of t will be the century values used above, converted to BP.
CenturiesBP = 1950 - Centuries
SurovellNsubT = 5726442 * ((CenturiesBP + 2176.4) ^ -1.3925309)
#Divide each population sum by the corresponding value of n-sub-t.
PopsTaphonCorr = TotalPop$pop / SurovellNsubT
#Normalize these values, such that the largest value = 1.
PopsTaphonCorrNorm = PopsTaphonCorr / max(PopsTaphonCorr)

#get maximum population size from total population dataframe
Max_y <- max(TotalPop$pop,na.rm = TRUE)
#draw graph
#Divide the page into two plots, one for the taphonomic-corrected data and one for the uncorrected data.
par(mfrow=c(2,1))
#set margins
par(mar=c(3, 3.5, 2, 0) + 0.1)
#Draw the uncorrected data.
#because the smoothing is meant only as a visual aid, I haven't invested
```

```
much thought into it.
SmoothingSpline = smooth.spline(TotalPop$cent, TotalPop$pop, spar=0.4)
plot(x = TotalPop$cent,y = TotalPop$pop, ylim = c(0,Max_y), xlim = c(-1500, 1600), pch = 3, cex = .6, axes = FALSE, ann = FALSE)
lines(SmoothingSpline, col="#FF0000")
axis(1, at=seq(-1500,1600,250))
axis(2, at=seq(0,Max_y,10000))
mtext(1,text="Years", line=2)
mtext(2, text="Population Size (Estimated Number of People)", line=2.5)
title(main = "A) Population Size through Time, Pan-Titicaca Scale:\nAggregate Curve for 9 Surveys and the Inter-survey Dataset")
#Do the same for the taphonomic-corrected data.
SmoothingSpline2 = smooth.spline(TotalPop$cent, PopsTaphonCorrNorm, spar=0.4)
plot(x = TotalPop$cent,y = PopsTaphonCorrNorm, ylim = c(0,1), xlim = c(-1500, 1600), pch = 3, cex = .6, axes = FALSE, ann = FALSE)
lines(SmoothingSpline2, col="#FF0000")
axis(1, at=seq(-1500,1600,250))
axis(2, at=seq(0,1,.2))
mtext(1,text="Years", line=2)
mtext(2, text="Relative Population Size", line=2.5)
title(main = "B) Corrected for Taphonomic Bias Using Surovell et al. 2009")
#internal script end-----------------------------------------------

#external files saver start------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.22: GraphPopulationSizeBySurvey_EXPERIMENTAL.R

```
#GRAPH POPULATION SIZES BY SURVEY AND BY PHASE

```

```
#external files loader start-----------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population sizes for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphPopulationSizeBySurvey"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-------------------------------------------------

```

```
#internal script start--------------------------------------------------
#Set the Y variable, using a string that will be passed to a template script.
yVarPass <- "pop"
#Run the applicable graph template. The template will receive the desired Y variable from this script, via "yVarPass".
source("3_GraphScripts/1_HelperScripts/GraphSingleYSingleDiachronicPlotTemplate.R")

#Add additional components to the plot, anything not dealt with by the template script.
#Add Y-Axis
axis(2, at=seq(0,Max_y,2500))
mtext(2, text ="Population Size (Estimated Number of People)", line=2.5)
#Add plot title.
title(main = "Population Size through Time by Survey")
#internal script end----------------------------------------------------

#external files saver start---------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.23: GraphPopulationSizeBySurveyNormalized_EXPERIMENTAL.R

```
#GRAPH NORMALIZED POPULATION SIZES BY SURVEY AND BY PHASE

#external files loader start--------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population sizes for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter
```

```
-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphPopulationSizeBySurveyNormalized"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-----------------------------------------------

#internal script start--------------------------------------------------
#Set the Y variable, using a string that will be passed to a template script.
yVarPass <- "pop_norm"
#This graph requires an alternative location for the legend; specify a string describing the location, to be passed to the template.
legendLocation <- "topLeftSmall"
```

```
#Run the applicable graph template. The template will receive the desired Y variable from this script, via "yVarPass".
source("3_GraphScripts/1_HelperScripts/GraphSingleYSingleDiachronicPlotTemplate.R")

#Add additional components to the plot, anything not dealt with by the template script.
#Add Y-Axis
axis(2, at=seq(0,Max_y,25))
mtext(2, text = "Normalized Population Size (% of Survey's Largest Population Size)", line = 2.5)
#Add plot title.
title(main = "Normalized Population Size through Time by Survey")
#internal script end--------------------------------------------------

#external files saver start-------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.24: GraphPopulationDensityBySurvey_EXPERIMENTAL.R

```
#GRAPH POPULATION DENSITY BY SURVEY THROUGH TIME

#external files loader start------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population density for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of
```

```
writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateDensityBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphPopulationDensityBySurvey"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-------------------------------------------

#internal script start---------------------------------------------
#Set the Y variable, using a string that will be passed to a template script.
yVarPass <- "popdensity"
#Run the applicable graph template.  The template will receive the desired Y variable from this script, via "yVarPass".
source("3_GraphScripts/1_HelperScripts/GraphSingleYSingleDiachronicPlotTemplate.R")

#Add additional components to the plot, anything not dealt with by the
```

```
template script.
#Add Y-Axis.
axis(2, at=seq(0,Max_y,25))
mtext(2,text="Population Density (Estimated Number of People Per Square Kilometer)", line=2.5)
#Add plot title.
title(main = "Population Density through Time by Survey")
#internal script end-----------------------------------------------

#external files saver start-------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

D.2.3.2 Population Distribution (C:/Real/SantaFe/R/3_GraphScripts/3_SystemicContext/2_PopulationDistribution/)

Listing D.25: GraphPopulationSizeInLargestSiteBySurvey_EXPERIMENTAL.R

```
#GRAPH POPULATION FRACTION IN LARGEST SITE BY SURVEY AND BY PHASE

#external files loader start-------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population percents in largest site for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
```

```
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimatePercentInLargestSiteBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphPopulationSizeInLargestSiteBySurvey"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-----------------------------------------------

#internal script start-----------------------------------------------
#Set the Y variable, using a string that will be passed to a template script.
yVarPass <- "poplargest_perc"
#Run the applicable graph template.  The template will receive the desired Y variable from this script, via "yVarPass".
source("3_GraphScripts/1_HelperScripts/GraphSingleYSingleDiachronicPlotTemplate.R")

#Add additional components to the plot, anything not dealt with by the
```

```
template script.
#Add Y-Axis.
axis(2, at=seq(0,Max_y,.1))
mtext(2, text = "Fraction of Population in Largest Site", line = 2.5)
#Add plot title.
title(main = "Fraction of Population in Largest Site through Time by Survey")
#internal script end---------------------------------------------------

#external files saver start-------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.26: GraphPopulationSizeInLargestSiteBySurveyNormalized_EXPERIMENTAL.R

```
#GRAPH POPULATION FRACTION IN LARGEST SITE, NORMALIZED, BY SURVEY AND BY PHASE

#external files loader start------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate normalized population fractions in largest site for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimatePercentInLargestSiteBySurveyAndPhase_EXPERIMENTAL.R")
```

```
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphPopulationSizeInLargestSiteBySurveyNormalized"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-----------------------------------------------

#internal script start---------------------------------------------------
#Set the Y variable, using a string that will be passed to a template script.
yVarPass <- "poplargest_perc_norm"
#This graph requires an alternative location for the legend; specify a string describing the location, to be passed to the template.
legendLocation <- "bottomLeft"
#Run the applicable graph template.  The template will receive the desired Y variable from this script, via "yVarPass".
source("3_GraphScripts/1_HelperScripts/GraphSingleYSingleDiachronicPlotTemplate.R")

#Add additional components to the plot, anything not dealt with by the
```

```
template script.
#Add Y-Axis.
axis(2, at=seq(0,Max_y,.1))
mtext(2, text = "Normalized Fraction of Pop. in Largest Site (Fraction of Survey's Largest Fraction)", line = 2.5)
#Add plot title.
title(main = "Normalized Fraction of Population in Largest Site through Time by Survey")
#internal script end-----------------------------------------------------

#external files saver start-------------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.27: GraphHistogramsPopulationSupraAndPanScales_EXPERIMENTAL.R

```
#GRAPH HISTOGRAMS OF POPULATION SIZES FOR THE SUPRA-SURVEY AND PAN-TITICACA SCALES.
#ONCE THE ARAPA-TARACO DATA IS ADDED, IT MIGHT BE DESIRABLE TO PLOT A COMBINED HUPU/ARTA SCALE HERE.

#external files loader start----------------------------------------------
#load the ggplot2 package
library(ggplot2)
#also load the scales package
library(scales)
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population sizes for each component of each survey
#this creates a modified version of the surveys.csv file and the inter-survey.csv file, a dataframe called TiticacaDataSectorAggr
#note that this script re-sets the working directory, but at the time of
```

```
writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateByComponent_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","PreservedFromCaller"))])
#Load the modified chronology tables. This creates a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_EXPERIMENTAL.R")

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphHistogramsPopulationSupraAndPanScales"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")
#external files loader end---------------------------------------------

#internal script start-------------------------------------------------
#Reorder the factor levels for the group_temporal field, so that the plotting order is correct.
TiticacaDataSectorAggr$group_temporal <- factor(TiticacaDataSectorAggr$group_temporal, levels = c("ef", "mf", "lf", "tw", "al", "in", "co"))
#Relatedly, create better labels for the group_temporal facets. "in" (the Inca label) needs to be quoted to avoid an error.
group_temporal_labels <- c(ef = "2000-1300 B.C.", mf = "1300-200 B.C.", lf = "200BC-600AD", tw = "Tiwanaku", al = "Altiplano", "in" = "Inca", co = "Colonial")
```

```
#Also create labels for the group_spatial facets.
group_spatial_labels <- c(north = "Northern", south_cont = "Southern Contiguous", south_noncont = "Other Southern")

#First plot the supra-survey scale.
#Set the dataset and the X variable.
popSupraHistograms <- ggplot(data = TiticacaDataSectorAggr, mapping = aes(x = pop))
#Add a histogram layer, specify that it should be a density histogram, specify that the bar fill color should distinguish supra-survey groups, and set the bin-width to .25 (see notes in survey-scale histograms script regarding binwidth).
popSupraHistograms + geom_histogram(aes(y = ..density.., fill = group_spatial), binwidth = .25) +
    #Prevent display of a legend for the fill colors.
    guides(fill = FALSE) +
    #Set the X-axis to be logarithmic, set its divisions, and prevent scientific notation.
    scale_x_continuous(trans= "log10", breaks = c(10,100,1000,10000), labels = scales::comma) +
    #Set the Y-axis's divisions.
    scale_y_continuous(breaks = c(1,2,3)) +
    #Create the plot's title and the axis titles.
    labs(title = "Component Population Size Histograms, Survey and Inter-survey Data, Supra-Survey Scale\nBin Width = 25% of Each Division; Density above 3 Cropped", x = "Population", y = "Density (4 = 100%)") +
    #Set the "zoom", the portion that will be visible.
    coord_cartesian(xlim = c(5,35000), ylim = c(0,3)) +
    #Facet the plot, such that each temporal group of each spatial group has its own facet. Also use the labels created above.
    facet_grid(group_spatial ~ group_temporal, labeller = labeller(group_temporal = group_temporal_labels, group_spatial = group_spatial_labels)) +
    #Rotate the X-axis's tick labels to prevent problems with labels
```

```
overlapping, prevent display of X-axis minor division gridlines, and change size for facet titles.
  theme(axis.text.x = element_text(angle = 90, vjust = 0), panel.grid.minor.x = element_blank(), strip.text = element_text(size = 10))

#Now plot the pan-Titicaca scale.
popPanHistograms <- ggplot(data = TiticacaDataSectorAggr, mapping = aes(x = pop))
#In contrast to the above plot, don't create a density plot.
popPanHistograms + geom_histogram(binwidth = .25) +
  scale_x_continuous(trans= "log10", breaks = c(10,100,1000,10000), labels = scales::comma) +
  scale_y_continuous(breaks = c(0,250,500,750,1000)) +
  labs(title = "Component Population Size Histograms, Survey and Inter-survey Data, Pan-Titicaca Scale\nBin Width = 25% of Each Division", x = "Population", y = "Count") +
  coord_cartesian(xlim = c(5,35000)) +
  #Facet the plot, such that each temporal group has its own facet. Also use the labels created above.
  facet_grid(. ~ group_temporal, labeller = labeller(group_temporal = group_temporal_labels)) +
  theme(axis.text.x = element_text(angle = 90, vjust = 0), panel.grid.minor = element_blank(), strip.text = element_text(size = 10))

#Now plot the low-end (in both x and y dimensions) only, for the supra-survey scale.
popSupraLowHistograms <- ggplot(data = TiticacaDataSectorAggr, mapping = aes(x = pop))
popSupraLowHistograms + geom_histogram(aes(fill = group_spatial), binwidth = 50) +
  guides(fill = FALSE) +
  #In contrast to the previous plots, don't use a logarithmic X-axis.
  scale_x_continuous(breaks = c(0,1000), labels = scales::comma) +
  scale_y_continuous(breaks = c(0,25,50)) +
  labs(title = "Component Population Size Histograms, Survey and Inter-
```

```
survey Data, Supra-Survey Scale\nBin Width = 50; Population Sizes Under 2000 Only; Counts above 50 Cropped", x = "Population", y = "Count") +
    coord_cartesian(xlim = c(5,2000), ylim = c(0,50)) +
    facet_grid(group_spatial ~ group_temporal, labeller = labeller(group_temporal = group_temporal_labels, group_spatial = group_spatial_labels)) +
    theme(axis.text.x = element_text(angle = 90, vjust = 0), panel.grid.minor.x = element_blank(), strip.text = element_text(size = 10))

#Now plot the low-end (in both x and y dimensions) only, for the pan-Titicaca scale.
popPanLowHistograms <- ggplot(data = TiticacaDataSectorAggr, mapping = aes(x = pop))
popPanLowHistograms + geom_histogram(binwidth = 50) +
    scale_x_continuous(breaks = c(0,1000), labels = scales::comma) +
    scale_y_continuous(breaks = c(0,25,50)) +
    labs(title = "Component Population Size Histograms, Survey and Inter-survey Data, Pan-Titicaca Scale\nBin Width = 50; Population Sizes Under 2000 Only; Counts above 50 Cropped", x = "Population", y = "Count") +
    coord_cartesian(xlim = c(5,2000), ylim = c(0,50)) +
    facet_grid(. ~ group_temporal, labeller = labeller(group_temporal = group_temporal_labels)) +
    theme(axis.text.x = element_text(angle = 90, vjust = 0), panel.grid.minor.x = element_blank(), strip.text = element_text(size = 10))
#internal script end-------------------------------------------------

#external files saver start---------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.28: GraphHistogramsPopulationBySurveyAndPhasePaneledIndividualy_EXPERIMENTAL.R

```
#GRAPH HISTOGRAM OF POPULATION SIZES BY SURVEY AND BY PHASE, PANELED
↪INDIVIDUALY

#external files loader start------------------------------------------
#load the ggplot2 package, which will help with creating decent histograms
↪ with logarithmic x axes
library(ggplot2)
#also load the scales package, which will allow easy modification of the
↪ggplot2 axes
library(scales)
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population sizes for each component of each
↪survey
#this creates a modified version of the surveys .csv file and the inter-
↪survey .csv file, a dataframe called TiticacaDataSectorAggr
#note that this script re-sets the working directory, but at the time of
↪writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/
↪CalculateBandyPopulationEstimateByComponent_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the
↪workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","
↪PreservedFromCaller"))])
#Load the modified chronology tables. This creates a dataframe called
↪ TiticacaChron
#Note that this script re-sets the working directory, but at the time of
↪writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_
↪EXPERIMENTAL.R")

#create image output pdf file
#first specify filename without extension
```

```
ImageName <- "GraphHistogramsPopulationBySurveyAndPhasePaneledIndividualy"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end---------------------------------------------

#internal script start-------------------------------------------------
#The coding of color by rainbow(), which was used in the GraphColorPalette.R script, is #RRGGBBAA, whereas for ggplot2 we need the last two digits (alpha transparency) trimmed off.
colorpalTrim <- substr(colorpal,1,7)
#Get the proper number of colors, one for each survey.
barColors <- rep(colorpalTrim, times=2)[1:9]
#Remove components from the "Gaps" (inter-survey) dataset.
TiticacaDataSectorAggr <- TiticacaDataSectorAggr[TiticacaDataSectorAggr$survey != "gp",]
TiticacaDataSectorAggr <- droplevels(TiticacaDataSectorAggr)
#Reorder the factor levels for the survey field, so that the plotting order is correct.
TiticacaDataSectorAggr$survey <- factor(TiticacaDataSectorAggr$survey, levels = c("pk", "hp", "jp", "is", "tr", "kt", "tl", "tm", "qt"))
#Create labels for the survey facets.
survey_labels <- c(hp = "Huancane", is = "Is. Sun", jp = "Juli-P.", kt = "Katari", pk = "Pukara", "qt" = "Qawra Th.", tl = "Tiwa. Low", tm = "Tiwa. Mid", tr = "Taraco P.")
#Create annotations which will provide more information on which phase a
```

```
facet represents (beyond just "a","b","c",etc.).
#This will involve adding fake data to Titichron in order to position the text at the desired X and Y coordinates.
#Remove the inter-survey data, so that an extra row of facets isn't created.
chronAnnotate <- TiticacaChron[TiticacaChron$survey_code != "gp",]
#Create X and Y values for the first plot.
chronAnnotate$x1 <- 500
chronAnnotate$y1 <- 3
#Create X and Y values for the second plot.
chronAnnotate$x2 <- 1000
chronAnnotate$y2 <- 15
#Rename the "survey_code" and "phase_code" fields to the same names as those in TiticacaDataSectorAggr, so that the annotations will be distributed to the facets in the same manner.
names(chronAnnotate)[names(chronAnnotate) == "survey_code"] <- "survey"
names(chronAnnotate)[names(chronAnnotate) == "phase_code"] <- "phase"
#Change the underscores in the "phase_name_basin" field to newline characters, so that the annotations fit.
chronAnnotate$phase_name_basin <- gsub("_", "\n", chronAnnotate$phase_name_basin, fixed = TRUE)
#This is an inelegant way to deal with a particularly long name in "phase_name_basin", but it works.
chronAnnotate$phase_name_basin[chronAnnotate$phase_name_basin == "Early\nFormative\n2\nand\nMiddle\nFormative"] <- "E.Form._2;\nMiddle\nFormative"

#Two plots will be created below. Create a list of ggplot2 objects that will be shared by both plots. This can then be simply added to each plot.
commonPlot <- list(
    #Both plots should be faceted, such that each phase of each survey has its own facet. Also use the labels created above.
    facet_grid(survey ~ phase, labeller = labeller(survey = survey_labels)),
```

```
    #Define the color scheme for the bars' fill (also see the layer specifications below, where these colors are mapped to the variable "survey"), and prevent display of a legend for these colors.
    scale_fill_manual(values=barColors, guide = FALSE),
    #Rotate the X-axis's tick labels to prevent problems with labels overlapping, prevent display of X-axis minor division gridlines, and change size for Y facet titles.
    theme(axis.text.x = element_text(angle = 90, vjust = 0), panel.grid.minor.x = element_blank(), strip.text.y = element_text(size = 8))
)

#When using trans="log10" for the x-axis, it appears that "binwidth" is quantified as a fraction of the space between the divisions.  Thus, binwidth=.25 will create 4 bins between 10 and 100, 4 bins between 100 and 1000, 4 bins between 1000 and 10000, etc. Relatedly, with binwidth=.25, don't be surprised to see more than 4 bins for the range 0-100, because the 4 bins are actually between 10 and 100.
#Use density rather than count for the y-axis, so that surveys with very different counts can be compared. Density is the percentage of total divided by the bar width. Luckily, for some reason it seems that the log10 x-axis does not mess this up: e.g., in Middle Tiwanaku Valley phase C, the single site of Tiwanaku is large and therefore far to the right on the x-axis, but still has a bar of the same height as e.g. Island of the Sun phase A where all the sites are in the left-most bin.
#Set the dataset and the X variable.
popHistograms <- ggplot(data = TiticacaDataSectorAggr, mapping = aes(x = pop))
#Add a histogram layer, specify that it should be a density histogram, specify that the bar fill color should distinguish surveys, and set the bin-width to .25 (see notes above regarding binwidth).
popHistograms + geom_histogram(aes(y = ..density.., fill = survey), binwidth = .25) +
    #Now add the plot components that are shared by both plots and stored in the list "commonPlot".
    commonPlot +
```

```
    #Now add remaining components not stored in "commonPlot"
    #Set the X-axis to be logarithmic, set its divisions, and prevent scientific notation.
    scale_x_continuous(trans= "log10", breaks = c(10,100,1000,10000), labels = scales::comma) +
    #Set the Y-axis's divisions.
    scale_y_continuous(breaks = c(2,4)) +
    #Create the plot's title and the axis titles.
    labs(title = "Component Population Size Histograms, Survey Scale, Bin Width = 25% of Each Division", x = "Population", y = "Density (4 = 100%)") +
    #Set the "zoom", the portion of the X-axis that will be visible.
    coord_cartesian(xlim = c(5,35000)) +
    #Add annotations to clarify which phase each facet represents, beyond just "a","b","c", etc.
    geom_text(data = chronAnnotate, mapping = aes(x = x1, y = y1, label = phase_name_basin), size = 2)

#Then plot the low-end (in both x and y dimensions) only. Note that coord_cartesian(ylim=) will cut off the tops of high bars.
#It might be preferable to use a frequency polygon instead of histograms so that it is obvious when the extreme y-values have been chopped off at the top. However, I have stuck with histograms because bars make the binning clearer.
#Above 2000 population, we only have the famous sites: Tiwanaku (Tiwa I-V, Inca, Colonial), Pukara (Late Formative), Lukurmata (Tiwa, Inca, Colonial -- last 2 of which are actually a problem with the database). So, we can easily exclude the portion of the graph above 2000 population now, since we have already established with the first graph that these sites clearly constitute the highest tier in the settlement hierarchy, and proceed with establishing where other tiers are.
#Set the dataset and the X variable.
popHistogramsLowEnd <- ggplot(data = TiticacaDataSectorAggr, mapping = aes(x = pop))
#Add a histogram layer, specify that the bar fill color should distinguish
```

```
surveys, and set the bin-width to 50, in effect a smaller bin-width than above.
popHistogramsLowEnd + geom_histogram(aes(fill = survey), binwidth = 50) +
    #Now add the plot components that are shared by both plots and stored in the list "commonPlot".
    commonPlot +
    #Now add remaining components not stored in "commonPlot"
    #Set the X-axis's divisions and prevent scientific notation. Note that, unlike the previous plot, there is no need for a logarithmic axis, since the below use of coord_cartesian() will crop out the X-axis outliers.
    scale_x_continuous(breaks = c(0,1000), labels = scales::comma) +
    #Set the Y-axis's divisions.
    scale_y_continuous(breaks = c(5,15,25)) +
    #Create the plot's title and the axis titles.
    labs(title = "Pop. Histograms, Survey Scale (Sizes Under 2000 Only, Counts Above 25 Cropped), Bin Width = 50", x = "Population", y = "Count") +
    #This is the most important difference from the previous plot: crop/zoom both axes to increase visibility and therefore allow the smaller binwidth set above.
    coord_cartesian(ylim = c(0,25), xlim = c(0,2000)) +
    #Add annotations to clarify which phase each facet represents, beyond just "a","b","c", etc.
    geom_text(data = chronAnnotate, mapping = aes(x = x2, y = y2, label = phase_name_basin), size = 2)
#internal script end-----------------------------------------------------

#external files saver start---------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.29: GraphRankSizePopulationBySurveyAndPhasePaneledBySimilarPhase_NormalizedSizeOverLargestSize_EXPERIMENTAL.R

```
#GRAPH RANK-SIZE OF POPULATION SIZES BY SURVEY AND BY PHASE, PANELED BY SIMILAR PHASE
#NORMALIZED BY PLOTTING SIZE/LARGEST SIZE, RATHER THAN SIZE
#This script is unnecessarily long and should be simplified.

#external files loader start-------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate ranks for each component of each survey
#this creates a modified version of the surveys .csv file and the inter-survey .csv file, called TiticacaDataSectorAggrRankSorted
#this also creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateByComponentRanks_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggrRankSorted", "TiticacaChron", "PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphRankSizePopulationBySurveyAndPhasePaneledBySimilarPhase_NormalizedSizeOverLargestSize"
#specify image dimensions in inches
ImageWidth <- 6.5
ImageHeight <- 8.3
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

```

```r
#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-----------------------------------------------

#internal script start---------------------------------------------------
#Remove the "Gaps" (intersurvey) components, so that they don't interfere with getting the maximum Y values.
TiticacaDataSectorAggrRankSorted <- TiticacaDataSectorAggrRankSorted[TiticacaDataSectorAggrRankSorted$survey != "gp",]
TiticacaDataSectorAggrRankSorted <- droplevels(TiticacaDataSectorAggrRankSorted)
#set y axis maximum to 100 because this represents the largest site, like a percent
Max_y <- 100
#get maximum number of components in a phase in a survey i.e. maximum number of ranks
Max_x <- max(TiticacaDataSectorAggrRankSorted$Rank, na.rm = TRUE)
#draw graph
#prevent scientific notations
options("scipen" = 10)
#prepare tick marks
xTicks <- c(1,10,100,1000)
yTicks <- c(.01,.1,1,10,100)
#set up multiple panels
par(mfrow=c(4,2))
par(mar = c(2,2,2,1))
par(oma = c(0,0,1.5,0))
par(cex.main = 1)

#draw
plot(x = TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey == "pk" &
```

```
↪TiticacaDataSectorAggrRankSorted$phase == "a"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "pk" &
↪TiticacaDataSectorAggrRankSorted$phase == "a"], log ="xy", ylim = c
↪(.01,100), xlim = c(1, 1000), type = "l", col = colorpal[1], lwd = 1.2,
↪lty = 1, cex = .5, axes = FALSE, ann = FALSE)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "a"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "a"], type = "l", col =
↪colorpal[2], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "a"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "a"], type = "l", col =
↪colorpal[3], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "is" &
↪TiticacaDataSectorAggrRankSorted$phase == "b"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "is" &
↪TiticacaDataSectorAggrRankSorted$phase == "b"], type = "l", col =
↪colorpal[4], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "a"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "a"], type = "l", col =
↪colorpal[5], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
TiticacaDataSectorAggrRankSorted$survey == "tr" & TiticacaDataSectorAggrRankSorted$phase == "b"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "tr" & TiticacaDataSectorAggrRankSorted$phase == "b"], type = "l", col = colorpal[5], lwd = 2, lty = 1, cex = .5)
abline(log10(100),-1,untf=F)
axis(1, at=xTicks)
axis(2, at=yTicks, labels=ifelse(yTicks >= 1, sprintf("%.0f", yTicks), sprintf("%.2f", yTicks)))
title(main="c. 1500 BC - 800 BC", line = 0)

plot(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "pk" & TiticacaDataSectorAggrRankSorted$phase == "b"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "pk" & TiticacaDataSectorAggrRankSorted$phase == "b"], log ="xy", ylim = c(.01,100), xlim = c(1, 1000), type = "l", col = colorpal[1], lwd = 1.2, lty = 1, cex = .5, axes = FALSE, ann = FALSE)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "hp" & TiticacaDataSectorAggrRankSorted$phase == "b"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "hp" & TiticacaDataSectorAggrRankSorted$phase == "b"], type = "l", col = colorpal[2], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "jp" & TiticacaDataSectorAggrRankSorted$phase == "b"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "jp" & TiticacaDataSectorAggrRankSorted$phase == "b"], type = "l", col = colorpal[3], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
TiticacaDataSectorAggrRankSorted$survey == "is" & TiticacaDataSectorAggrRankSorted$phase == "c"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[TiticacaDataSectorAggrRankSorted$survey == "is" & TiticacaDataSectorAggrRankSorted$phase == "c"], type = "l", col = colorpal[4], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey == "tr" & TiticacaDataSectorAggrRankSorted$phase == "c"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[TiticacaDataSectorAggrRankSorted$survey == "tr" & TiticacaDataSectorAggrRankSorted$phase == "c"], type = "l", col = colorpal[5], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey == "kt" & TiticacaDataSectorAggrRankSorted$phase == "a"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[TiticacaDataSectorAggrRankSorted$survey == "kt" & TiticacaDataSectorAggrRankSorted$phase == "a"], type = "l", col = colorpal[1], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey == "tl" & TiticacaDataSectorAggrRankSorted$phase == "a"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[TiticacaDataSectorAggrRankSorted$survey == "tl" & TiticacaDataSectorAggrRankSorted$phase == "a"], type = "l", col = colorpal[2], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey == "tm" & TiticacaDataSectorAggrRankSorted$phase == "a"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[TiticacaDataSectorAggrRankSorted$survey == "tm" & TiticacaDataSectorAggrRankSorted$phase == "a"], type = "l", col = colorpal[3], lwd = 1.2, lty = 5, cex = .5)
abline(log10(100),-1,untf=F)
```

```
axis(1, at=xTicks)
axis(2, at=yTicks, labels=ifelse(yTicks >= 1, sprintf("%.0f", yTicks),
↪sprintf("%.2f", yTicks)))
title(main="c. 800 BC - 200 BC", line = 0)

plot(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "pk" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "pk" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"], log ="xy", ylim = c
↪(.01,100), xlim = c(1, 1000), type = "l", col = colorpal[1], lwd = 1.2,
↪lty = 1, cex = .5, axes = FALSE, ann = FALSE)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"], type = "l", col =
↪colorpal[2], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"], type = "l", col =
↪colorpal[2], lwd = 2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"], type = "l", col =
↪colorpal[3], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
↪TiticacaDataSectorAggrRankSorted$survey == "is" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "is" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"], type = "l", col =
↪colorpal[4], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"], type = "l", col =
↪colorpal[5], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"], type = "l", col =
↪colorpal[5], lwd = 2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "b"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "b"], type = "l", col =
↪colorpal[1], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "b"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "b"], type = "l", col =
↪colorpal[2], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
TiticacaDataSectorAggrRankSorted$survey == "tl" & TiticacaDataSectorAggrRankSorted$phase == "c"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "tl" & TiticacaDataSectorAggrRankSorted$phase == "c"], type = "l", col = colorpal[2], lwd = 2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "tm" & TiticacaDataSectorAggrRankSorted$phase == "b"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "tm" & TiticacaDataSectorAggrRankSorted$phase == "b"], type = "l", col = colorpal[3], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "tm" & TiticacaDataSectorAggrRankSorted$phase == "c"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "tm" & TiticacaDataSectorAggrRankSorted$phase == "c"], type = "l", col = colorpal[3], lwd = 2, lty = 5, cex = .5)
abline(log10(100),-1,untf=F)
axis(1, at=xTicks)
axis(2, at=yTicks, labels=ifelse(yTicks >= 1, sprintf("%.0f", yTicks), sprintf("%.2f", yTicks)))
title(main="c. 200 BC - 600 CE", line = 0)

plot(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "hp" & TiticacaDataSectorAggrRankSorted$phase == "e"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "hp" & TiticacaDataSectorAggrRankSorted$phase == "e"], log ="xy", ylim = c(.01,100), xlim = c(1, 1000), type = "l", col = colorpal[2], lwd = 1, lty = 1, cex = .5, axes = FALSE, ann = FALSE)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"], type = "l", col =
↪colorpal[2], lwd = 1.5, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "g"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "g"], type = "l", col =
↪colorpal[2], lwd = 2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"], type = "l", col =
↪colorpal[3], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "is" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "is" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"], type = "l", col =
↪colorpal[4], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"], type = "l", col =
↪colorpal[5], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"], type = "l", col =
↪colorpal[1], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"], type = "l", col =
↪colorpal[2], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"], type = "l", col =
↪colorpal[2], lwd = 2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tm" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tm" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"], type = "l", col =
↪colorpal[3], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tm" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tm" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"], type = "l", col =
↪colorpal[3], lwd = 2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
↪TiticacaDataSectorAggrRankSorted$survey == "qt" &
↪TiticacaDataSectorAggrRankSorted$phase == "b"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "qt" &
↪TiticacaDataSectorAggrRankSorted$phase == "b"], type = "l", col =
↪colorpal[4], lwd = 1.2, lty = 5, cex = .5)
abline(log10(100),-1,untf=F)
axis(1, at=xTicks)
axis(2, at=yTicks, labels=ifelse(yTicks >= 1, sprintf("%.0f", yTicks),
↪sprintf("%.2f", yTicks)))
title(main="c. 600 CE - 1000 CE", line = 0)

plot(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "pk" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "pk" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"], log ="xy", ylim = c
↪(.01,100), xlim = c(1, 1000), type = "l", col = colorpal[1], lwd = 1.2,
↪lty = 1, cex = .5, axes = FALSE, ann = FALSE)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "h"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "h"], type = "l", col =
↪colorpal[2], lwd = 1, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "i"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "i"], type = "l", col =
↪colorpal[2], lwd = 1.5, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "j"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "j"], type = "l", col =
↪colorpal[2], lwd = 2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"], type = "l", col =
↪colorpal[3], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "is" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "is" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"], type = "l", col =
↪colorpal[4], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "g"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "g"], type = "l", col =
↪colorpal[5], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "d"], type = "l", col =
↪colorpal[1], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"], type = "l", col =
↪colorpal[2], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tm" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tm" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"], type = "l", col =
↪colorpal[3], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "qt" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "qt" &
↪TiticacaDataSectorAggrRankSorted$phase == "c"], type = "l", col =
↪colorpal[4], lwd = 1.2, lty = 5, cex = .5)
abline(log10(100),-1,untf=F)
axis(1, at=xTicks)
axis(2, at=yTicks, labels=ifelse(yTicks >= 1, sprintf("%.0f", yTicks),
↪sprintf("%.2f", yTicks)))
title(main="c. 1000 CE - 1450 CE", line = -1)

plot(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "pk" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "pk" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"], log ="xy", ylim = c
↪(.01,100), xlim = c(1, 1000), type = "l", col = colorpal[1], lwd = 1.2,
↪lty = 1, cex = .5, axes = FALSE, ann = FALSE)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
TiticacaDataSectorAggrRankSorted$survey == "hp" &
TiticacaDataSectorAggrRankSorted$phase == "k"],y =
TiticacaDataSectorAggrRankSorted$PercOfLargest[
TiticacaDataSectorAggrRankSorted$survey == "hp" &
TiticacaDataSectorAggrRankSorted$phase == "k"], type = "l", col =
colorpal[2], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
TiticacaDataSectorAggrRankSorted$survey == "hp" &
TiticacaDataSectorAggrRankSorted$phase == "l"],y =
TiticacaDataSectorAggrRankSorted$PercOfLargest[
TiticacaDataSectorAggrRankSorted$survey == "hp" &
TiticacaDataSectorAggrRankSorted$phase == "l"], type = "l", col =
colorpal[2], lwd = 2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
TiticacaDataSectorAggrRankSorted$survey == "jp" &
TiticacaDataSectorAggrRankSorted$phase == "f"],y =
TiticacaDataSectorAggrRankSorted$PercOfLargest[
TiticacaDataSectorAggrRankSorted$survey == "jp" &
TiticacaDataSectorAggrRankSorted$phase == "f"], type = "l", col =
colorpal[3], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
TiticacaDataSectorAggrRankSorted$survey == "is" &
TiticacaDataSectorAggrRankSorted$phase == "g"],y =
TiticacaDataSectorAggrRankSorted$PercOfLargest[
TiticacaDataSectorAggrRankSorted$survey == "is" &
TiticacaDataSectorAggrRankSorted$phase == "g"], type = "l", col =
colorpal[4], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
TiticacaDataSectorAggrRankSorted$survey == "tr" &
TiticacaDataSectorAggrRankSorted$phase == "h"],y =
TiticacaDataSectorAggrRankSorted$PercOfLargest[
TiticacaDataSectorAggrRankSorted$survey == "tr" &
TiticacaDataSectorAggrRankSorted$phase == "h"], type = "l", col =
colorpal[5], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
TiticacaDataSectorAggrRankSorted$survey == "kt" & TiticacaDataSectorAggrRankSorted$phase == "e"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "kt" & TiticacaDataSectorAggrRankSorted$phase == "e"], type = "l", col = colorpal[1], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "tl" & TiticacaDataSectorAggrRankSorted$phase == "g"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "tl" & TiticacaDataSectorAggrRankSorted$phase == "g"], type = "l", col = colorpal[2], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "tm" & TiticacaDataSectorAggrRankSorted$phase == "g"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "tm" & TiticacaDataSectorAggrRankSorted$phase == "g"], type = "l", col = colorpal[3], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "qt" & TiticacaDataSectorAggrRankSorted$phase == "d"],y = TiticacaDataSectorAggrRankSorted$PercOfLargest[ TiticacaDataSectorAggrRankSorted$survey == "qt" & TiticacaDataSectorAggrRankSorted$phase == "d"], type = "l", col = colorpal[4], lwd = 1.2, lty = 5, cex = .5)
abline(log10(100),-1,untf=F)
axis(1, at=xTicks)
axis(2, at=yTicks, labels=ifelse(yTicks >= 1, sprintf("%.0f", yTicks), sprintf("%.2f", yTicks)))
title(main="c. 1450 CE - 1540 CE", line = -1)

plot(x = TiticacaDataSectorAggrRankSorted$Rank[ TiticacaDataSectorAggrRankSorted$survey == "hp" &
```

```
↪TiticacaDataSectorAggrRankSorted$phase == "m"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "hp" &
↪TiticacaDataSectorAggrRankSorted$phase == "m"], log ="xy", ylim = c
↪(.01,100), xlim = c(1, 1000), type = "l", col = colorpal[2], lwd = 1.2,
↪lty = 1, cex = .5, axes = FALSE, ann = FALSE)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "g"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "jp" &
↪TiticacaDataSectorAggrRankSorted$phase == "g"], type = "l", col =
↪colorpal[3], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "i"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tr" &
↪TiticacaDataSectorAggrRankSorted$phase == "i"], type = "l", col =
↪colorpal[5], lwd = 1.2, lty = 1, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "f"], type = "l", col =
↪colorpal[1], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "g"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "kt" &
↪TiticacaDataSectorAggrRankSorted$phase == "g"], type = "l", col =
↪colorpal[1], lwd = 2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
```

```
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "h"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tl" &
↪TiticacaDataSectorAggrRankSorted$phase == "h"], type = "l", col =
↪colorpal[2], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "tm" &
↪TiticacaDataSectorAggrRankSorted$phase == "h"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "tm" &
↪TiticacaDataSectorAggrRankSorted$phase == "h"], type = "l", col =
↪colorpal[3], lwd = 1.2, lty = 5, cex = .5)
lines(x = TiticacaDataSectorAggrRankSorted$Rank[
↪TiticacaDataSectorAggrRankSorted$survey == "qt" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"],y =
↪TiticacaDataSectorAggrRankSorted$PercOfLargest[
↪TiticacaDataSectorAggrRankSorted$survey == "qt" &
↪TiticacaDataSectorAggrRankSorted$phase == "e"], type = "l", col =
↪colorpal[4], lwd = 1.2, lty = 5, cex = .5)
abline(log10(100),-1,untf=F)
axis(1, at=xTicks)
axis(2, at=yTicks, labels=ifelse(yTicks >= 1, sprintf("%.0f", yTicks),
↪sprintf("%.2f", yTicks)))
title(main="c. 1540 CE - 1600 CE", line = -0.5)

#make empty plot for universal legend
plot(x = c(1,100), y = c(1,100), type = "n", ylim = c(1,100), xlim = c
↪(1,100), axes = FALSE, ann = FALSE)
legend(x = 1, y = 100, cex = 1, legend = c("Pukara Valley", "Huancane-
↪Putina", "Juli-Pomata", "Island of the Sun", "Taraco Peninsula", "Katari
↪ Valley", "Lower Tiwanaku Valley", "Middle Tiwanaku Valley", "Qawra
↪Thaki [site size]"), col = colorpal, lty=c(1,1,1,1,1,5,5,5,5))
text(88,50, "If multiple\nsub-phases are\nplotted together,\nthe later\
↪nphases have\nprogressively\nthicker lines.", cex=1)
```

```
mtext("Normalized Rank-Size by Phase (Rank on X-axes and Normalized Population Estimate on Y-axes)",side=3,outer = TRUE, cex=.8)
#internal script end----------------------------------------------------

#external files saver start---------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.30: GraphRankSizePopulationBySurveyAndPhasePaneledIndividualy_NormalizedSizeOverLargestSize_EXPERIMENTAL.R

```
#GRAPH RANK-SIZE OF POPULATION SIZES BY SURVEY AND BY PHASE, PANELED INDIVIDUALY

#external files loader start--------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate ranks for each component of each survey
#this creates a modified version of the surveys .csv file and the inter-survey .csv file, called TiticacaDataSectorAggrRankSorted
#this also creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateByComponentRanks_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggrRankSorted", "TiticacaChron", "PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
```

```
ImageName <- "GraphRankSizePopulationBySurveyAndPhasePaneledIndividualy_NormalizedSizeOverLargestSize"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-------------------------------------------------

#internal script start----------------------------------------------------
#Remove the "Gaps" (intersurvey) components, so that they don't interfere with getting the maximum Y values.
TiticacaDataSectorAggrRankSorted <- TiticacaDataSectorAggrRankSorted[TiticacaDataSectorAggrRankSorted$survey != "gp",]
TiticacaDataSectorAggrRankSorted <- droplevels(TiticacaDataSectorAggrRankSorted)
#set y axis maximum to 100 because this represents the largest site, like a percent
Max_y <- 100
#get maximum number of components in a phase in a survey i.e. maximum number of ranks
Max_x <- max(TiticacaDataSectorAggrRankSorted$Rank, na.rm = TRUE)
#draw graph
#prevent scientific notations
options("scipen" = 10)
#prepare tick marks
xTicks <- c(1,10,100,1000)
yTicks <- c(.01,.1,1,10,100)
```

```r
#set up multiple panels
par(mfrow=c(5,7))
par(mar = c(1, 0, 1.5, 1))
par(oma = c(1, 2, 3, 0))
par(cex.main = .7)
#draw
colorIndex <- 0
lineStyle <- 1
subPlotLocationCounter <- 1
#Loop through surveys. I have manually specified each survey code (rather than e.g. using unique()) so that the plotting order is controlled.
for (s_code3 in c("pk","hp","jp","is","tr","kt","tl","tm","qt")) {
  #set the color and line type to be used for this survey
  colorIndex <- colorIndex + 1
  if (colorIndex == 6) {colorIndex <- 1; lineStyle <- 5}
  #now that one survey is selected, create loop to select the components from each phase, one phase at a time
  for (p_code3 in TiticacaChron$phase_code[TiticacaChron$survey_code == s_code3]) {
    #draw each phase in each survey
    plot(x = TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey == s_code3 & TiticacaDataSectorAggrRankSorted$phase == p_code3], y = TiticacaDataSectorAggrRankSorted$PercOfLargest[TiticacaDataSectorAggrRankSorted$survey == s_code3 & TiticacaDataSectorAggrRankSorted$phase == p_code3], log ="xy", ylim = c(.01,100), xlim = c(1, 1000), type = "l", col = colorpal[colorIndex], lwd = 1.2, lty = lineStyle, axes = FALSE, ann = FALSE)
    abline(log10(100),-1,untf=F)
    if ((subPlotLocationCounter - 1) %% 7 == 0) {
      axis(2, at=yTicks, labels=ifelse(yTicks >= 1, sprintf("%.0f", yTicks), sprintf("%.2f", yTicks)))
    }
    else {
```

```r
            axis(2, at=yTicks, labels=FALSE)
        }
        if ((subPlotLocationCounter > 28 && subPlotLocationCounter < 36) || (subPlotLocationCounter > 63)) {
            axis(1, at=xTicks)
        }
        else {
            axis(1, at=xTicks, labels=FALSE)
        }
        #title(xlab="Rank")
        #title(ylab="Normalized Population")
        if (s_code3 == "kt" && p_code3 == "a") {
            title(main="Katari_Valley\nE_Form_2_and_Mid_Form", cex.main=0.81)
        }
        else {
            title(main=paste(TiticacaChron$survey_name[TiticacaChron$survey_code == s_code3 & TiticacaChron$phase_code == p_code3], "\n", TiticacaChron$phase_name_basin[TiticacaChron$survey_code == s_code3 & TiticacaChron$phase_code == p_code3]), cex.main=0.81)
        }
        #Add text for my equivalent of Drennan and Peterson's (2004) "Coefficient A"
        text(x = 150, y = 65, cex = 1, labels = paste("A =", round(TiticacaChron$coeff_a[TiticacaChron$survey_code == s_code3 & TiticacaChron$phase_code == p_code3], digits = 3)))
        #Add text for the sample size.
        text(x = 280, y = 20, cex = 1, labels = paste("n =", length(TiticacaDataSectorAggrRankSorted$Rank[TiticacaDataSectorAggrRankSorted$survey == s_code3 & TiticacaDataSectorAggrRankSorted$phase == p_code3])))
        #To get the main title on all pages, it needs to be done within this loop, once for each page.
        if (subPlotLocationCounter == 1 || subPlotLocationCounter == 36) {
            title("Rank-Size by Survey and Phase (Rank on X-axes and Normalized Population Size on Y-axes)\nCoefficient A after
```

```
Drennan and Peterson (2004)", outer = TRUE, cex.main=1.5)
        }
        #Increase the counter which keeps track of the subplot location.
        subPlotLocationCounter <- subPlotLocationCounter + 1
    }
}
#internal script end---------------------------------------------------

#external files saver start---------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

D.2.3.3 Site Types (C:/Real/SantaFe/R/3_GraphScripts/3_SystemicContext/3_SiteTypes/)

Listing D.31: GraphComponentSizesIndividuallyByTypeThroughTime_EXPERIMENTAL.R

```
#THIS SCRIPT GRAPHS EACH COMPONENT AS A POINT, WITH ITS X VALUE BEING ITS CALENDAR YEAR AND ITS Y VALUE BEING ITS SIZE (POPULATION AND/OR SPATIAL SIZE). THE POINTS ARE ALSO DISTINGUISHED BY SITE TYPE.
#WHEN embed_fonts() IS USED (SEE BELOW AND GraphOutputPDF.R), THE ALPHA TRANSPARENCY IN THIS SCRIPT DOESN'T WORK CORRECTLY. THE IMAGES I HAVE INCLUDED IN THIS DISSERTATION OF THIS SCRIPT'S FIRST AND THIRD PLOTS WERE ACTUALLY MADE WITHOUT embed_fonts() .

#external files loader start--------------------------------------------
#Load the ggplot2 package, which will help with creating a plot with so many points.
library(ggplot2)
#Also load the scales package, which will allow easy modification of the ggplot2 axes.
library(scales)
```

```r
#Set working directory.
setwd("C:/Real/SantaFe/R/")
#Run script to calculate Bandy population estimates and associate each of them with the midpoint of their phases's date range.
#This creates a modified version of the surveys .csv file and the inter-survey .csv file, called TiticacaDataSectorAggr
#This also creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateByComponentDates_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr", "TiticacaChron", "PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphPopulationSizesIndividuallyByTypeThroughTime"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
#presently unused in this script
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-----------------------------------------

```

```
#internal script start-----------------------------------------------------
#Populations will be plotted for 1) non-ritual habitation components and 2) ritual components. Spatial sizes will be plotted for all 4 site types. Because the spatial sizes are split between the "size_abs" and "size_midp" fields (and, for Qawra Thaki, "sitesize"), one combined field needs to be created here for plotting.
TiticacaDataSectorAggr$size_plot <- NA
#For components with an entry for "size_abs", assign this entry to "size_plot".
TiticacaDataSectorAggr$size_plot[is.na(TiticacaDataSectorAggr$size_abs) == FALSE] <- TiticacaDataSectorAggr$size_abs[is.na(TiticacaDataSectorAggr$size_abs) == FALSE]
#For components without an entry for "size_abs", assign the entry for "size_midp" to "size_plot". Qawra Thaki components will be assigned NA here; see the next line.
TiticacaDataSectorAggr$size_plot[is.na(TiticacaDataSectorAggr$size_abs) == TRUE] <- TiticacaDataSectorAggr$size_midp[is.na(TiticacaDataSectorAggr$size_abs) == TRUE]
#Deal with the Qawra Thaki survey, for which both "size_abs" and "size_midp" are NA.
TiticacaDataSectorAggr$size_plot[is.na(TiticacaDataSectorAggr$size_plot) == TRUE] <- TiticacaDataSectorAggr$sitesize[is.na(TiticacaDataSectorAggr$size_plot) == TRUE]
#There are too many points for the different site types to be plotted together effectively. Therefore, split the components into new dataframes. The non-ritual habitation components will have one dataframe, but the other site types will each have two dataframes, one for "possible" components and one for "confident" components. The "possible" and "confident" components are split up because they will be plotted as separate layers in order to control the plotting order in cases where "possible" and "confident" points overlap eachother.
TiticacaDataSectorAggrHabNotRit <- TiticacaDataSectorAggr[TiticacaDataSectorAggr$hab > 0 & TiticacaDataSectorAggr$rit == 0,]
TiticacaDataSectorAggrRitPoss <- TiticacaDataSectorAggr[TiticacaDataSectorAggr$rit == 0.5,]
```

```
TiticacaDataSectorAggrRitConf <- TiticacaDataSectorAggr[
↪TiticacaDataSectorAggr$rit == 1,]
TiticacaDataSectorAggrBurPoss <- TiticacaDataSectorAggr[
↪TiticacaDataSectorAggr$bur == 0.5,]
TiticacaDataSectorAggrBurConf <- TiticacaDataSectorAggr[
↪TiticacaDataSectorAggr$bur == 1,]
TiticacaDataSectorAggrDefPoss <- TiticacaDataSectorAggr[
↪TiticacaDataSectorAggr$def == 0.5,]
TiticacaDataSectorAggrDefConf <- TiticacaDataSectorAggr[
↪TiticacaDataSectorAggr$def == 1,]
#For comparability, the plotting space should be the same size for each of
↪ the site types, despite the fact that different site types have quite
↪different maximum sizes. To facilitate this, get the maximum size
↪regardless of site type. This will have to be done separately for both
↪population and spatial size, because both will be used for some of the
↪plots below.
maxPop <- max(TiticacaDataSectorAggr$pop, na.rm=TRUE)
maxSpat <- max(TiticacaDataSectorAggr$size_plot, na.rm=TRUE)

#Create a list of ggplot2 objects that will be shared across all of the
↪plots. This can then be simply added to each plot.
commonPlot <- list(
    #Set the X-axis divisions.
    scale_x_continuous(breaks = seq(-2000,2000,250)),
    #Prevent X-axis and Y-axis minor division gridlines.
    theme(panel.grid.minor.x = element_blank(), panel.grid.minor.y =
    ↪element_blank())
)

#Draw plots.
#To increase visibility of points where multiple points are plotted in the
↪ same x-y location, jittering will be used. It appears that the way in
↪which jitter height and width parameters are interpreted differs between
↪ ggplot2 2.0.0 and previous versions. Prior to 2.0.0, it appears that
↪when height or width is specified, that number is simply added and
```

```
subtracted from the data (such that a jitter width of 50 would take points at 500 A.D. and spread them between 450 A.D. and 550 A.D.). In contrast, in ggplot2 2.0.0, it appears that the specified height or width is in effect multiplied by .4 (or in wording more similar to the ggplot2 documentation, the specified height or width is relative to the default, "40% of the resolution of the data," such that a specified width of .5 would take points at x = 100 (whatever the units/"resolution" might be) and spread them between x = 99.8 and x = 100.2.) Or, by analogy to the previous example, a width of 50 would take points at x = 500 and spread them between x = 480 and x = 520).
#Note that, in both 2.0.0 and prior versions, because a logarithmic Y-axis is used, the Y jittering parameter is relative to log-transformed Y values (actually, when combined with ggplot2 2.0.0's 40% effect discussed above, this makes a convenient rough equivalence between the height parameter and the actual jitter in untransformed values, e.g., height = .25 is roughly a 25% change to the non-logged Y values). Also note that if only one of the X and Y parameters is specified, the other will still be jittered, at the default 40%.
#Note that certain jitter parameters could cause points to fall outside the visible area, depending on their relationship to coord_cartesian()'s zooming of the plot.
#It is preferable when there are overlapping "possible" and "confident" points to have the "confident" points on top, because they are of greater interest. Therefore, separate layers will be used when a site type has both "possible" and "confident" points, and the "confident" layer will be added last.
#Replicating the y-axis on the right side would be ideal, but it appears that this can't be done with ggplot2 without hacks (but see package cowplot).

#Plot populations for the non-ritual habitation sites.
#Note that components with .5 or .75 codings for habitation (i.e., possible habitation sites) are also included here (see the dataframe splitting above).
#Set the dataset and the X and Y variables.
```

```r
ggplot(data = TiticacaDataSectorAggrHabNotRit, mapping = aes(x = calendar, y = pop)) +
  #Add a jitter layer, specify the amount of jitter, and set the points' color and alpha transparency.
  geom_jitter(position = position_jitter(width = 125, height = .25), color = alpha("#FF0000", 1/5)) +
  #Set the Y-axis major divisions, and set the Y-axis to logarithmic.
  scale_y_continuous(breaks = c(10,50,100,500,1000,5000,10000,30000), trans= "log10") +
  #Create the plot title and axis titles.
  labs(title = "Individual Component Population Estimates Through Time:\nHabitation Components without Evidence of Corporate Ritual.\nSurvey and Inter-Survey Data.", x = "Years C.E. (Phase midpoints; Inaccuracies of 50 years or less added to each point for visibility)", y = "Population (Inaccuracies of ~25% or less added to each point for visibility)") +
  #Set the "zoom".
  coord_cartesian(ylim = c(4.5, maxPop + 7000), xlim = c(-1800,1800), expand = FALSE) +
  #Add the components common to all plots.
  commonPlot

#Plot populations for ritual sites.
#The components with "confident" type evidence should be plotted on top of the components with "possible" type evidence. Therefore, leave ggplot() without arguments, and instead specify the arguments in separate layers with separate datasets, with the "confident" layer being added last.
ggplot() +
  #Add jitter layer for the "possible" ritual sites. Specify the dataset, the X and Y variables, and the color for these points(see scale_color_manual below). Also specify the amount of jitter.
  geom_jitter(data = TiticacaDataSectorAggrRitPoss, mapping = aes(x = calendar, y = pop, color = "color1"), position = position_jitter(width = 125, height = .2)) +
  #Do the same for the "confident" ritual sites.
```

```
    geom_jitter(data = TiticacaDataSectorAggrRitConf, mapping = aes(x = calendar, y = pop, color = "color2"), position = position_jitter(width = 125, height = .2)) +
    #Specify the Y-axis major divisions, and set the Y-axis to logarithmic.
    scale_y_continuous(breaks = c(10,50,100,500,1000,5000,10000,30000), trans= "log10") +
    #Set the color legend's title, specify the colors to be used, and set the legend's item labels.
    scale_color_manual(name="Confidence in Evidence\nfor Corporate Ritual", values=c("color1" = "#FF00FF", "color2" = "#0000CC"), labels=c("Possible", "Confident")) +
    #Create the plot title and the axis titles.
    labs(title = "Individual Component Population Estimates Through Time:\nComponents with Evidence of Corporate Ritual.\nSurvey and Inter-Survey Data.", x = "Years C.E. (Phase midpoints; Inaccuracies of 50 years or less added to each point for visibility)", y = "Population (Inaccuracies of ~20% or less added to each point for visibility)") +
    #Set the "zoom".
    coord_cartesian(ylim = c(4.5, maxPop + 7000), xlim = c(-1800,1800), expand = FALSE) +
    #Position the legend.
    theme(legend.position = c(0, 1), legend.justification = c(0, 1)) +
    #Add the components common to all plots.
    commonPlot

#Plot spatial sizes for non-ritual habitation sites.
#Note that components with .5 or .75 codings for habitation (i.e., possible habitation sites) are also included here.
#See the first plot for explanations of these components.
ggplot(data = TiticacaDataSectorAggrHabNotRit, mapping = aes(x = calendar, y = size_plot)) +
    geom_jitter(position = position_jitter(width = 125, height = .12), color = alpha("#FF0000", 1/5)) +
    scale_y_continuous(breaks = c(.01,.05,.1,.5,1,5,10,50,100,500), trans="log10", labels = scales::comma) +
```

```r
    labs(title = "Individual Component Spatial Sizes Through Time:\nHabitation Components without Evidence of Corporate Ritual.\nSurvey and Inter-Survey Data.", x = "Years C.E. (Phase midpoints; Inaccuracies of 50 years or less added to each point for visibility)", y = "Hectares (Inaccuracies of ~12% or less added to each point for visibility)") +
    coord_cartesian(ylim = c(.0017, maxSpat + 150), xlim = c(-1800,1800), expand = FALSE) +
    commonPlot

#Plot spatial sizes for ritual sites.
#See the second plot for explanations of these components.
ggplot() +
    geom_jitter(data = TiticacaDataSectorAggrRitPoss, mapping = aes(x = calendar, y = size_plot, color = "color1"), position = position_jitter(width = 125, height = .2)) +
    geom_jitter(data = TiticacaDataSectorAggrRitConf, mapping = aes(x = calendar, y = size_plot, color = "color2"), position = position_jitter(width = 125, height = .2)) +
    scale_y_continuous(breaks = c(.01,.05,.1,.5,1,5,10,50,100,500), trans="log10", labels = scales::comma) +
    scale_color_manual(name="Confidence in Evidence\nfor Corporate Ritual", values=c("color1" = "#FF00FF", "color2" = "#0000CC"), labels=c("Possible", "Confident")) +
    labs(title = "Individual Component Spatial Sizes Through Time:\nComponents with Evidence of Corporate Ritual.\nSurvey and Inter-Survey Data.", x = "Years C.E. (Phase midpoints; Inaccuracies of 50 years or less added to each point for visibility)", y = "Hectares (Inaccuracies of ~20% or less added to each point for visibility)") +
    coord_cartesian(ylim = c(.0017, maxSpat + 150), xlim = c(-1800,1800), expand = FALSE) +
    theme(legend.position = c(0, 1), legend.justification = c(0, 1)) +
    commonPlot

#Plot spatial sizes for burial sites.
```

```
#See the second plot for explanations of these components.
ggplot() +
  geom_jitter(data = TiticacaDataSectorAggrBurPoss, mapping = aes(x = calendar, y = size_plot, color = "color1"), position = position_jitter(width = 125, height = .2)) +
  geom_jitter(data = TiticacaDataSectorAggrBurConf, mapping = aes(x = calendar, y = size_plot, color = "color2"), position = position_jitter(width = 125, height = .2)) +
  scale_y_continuous(breaks = c(.01,.05,.1,.5,1,5,10,50,100,500), trans="log10", labels = scales::comma) +
  scale_color_manual(name="Confidence in Evidence\nfor Burial", values=c("color1" = "#FFBB00", "color2" = "#DD5000"), labels=c("Possible", "Confident")) +
  labs(title = "Individual Component Spatial Sizes Through Time:\nComponents with Evidence of Human Burial.\nSurvey and Inter-Survey Data.", x = "Years C.E. (Phase midpoints; Inaccuracies of 50 years or less added to each point for visibility)", y = "Hectares (Inaccuracies of ~20% or less added to each point for visibility)") +
  coord_cartesian(ylim = c(.0017, maxSpat + 150), xlim = c(-1800,1800), expand = FALSE) +
  theme(legend.position = c(0, 1), legend.justification = c(0, 1)) +
  commonPlot

#Plot spatial sizes for defensive sites.
#See the second plot for explanations of these components.
ggplot() +
  geom_jitter(data = TiticacaDataSectorAggrDefPoss, mapping = aes(x = calendar, y = size_plot, color = "color1"), position = position_jitter(width = 125, height = .2)) +
  geom_jitter(data = TiticacaDataSectorAggrDefConf, mapping = aes(x = calendar, y = size_plot, color = "color2"), position = position_jitter(width = 125, height = .2)) +
  scale_y_continuous(breaks = c(.01,.05,.1,.5,1,5,10,50,100,500), trans="log10", labels = scales::comma) +
  scale_color_manual(name="Confidence in Evidence\nfor Defensive Walls",
```

```
values=c("color1" = "#00CD99", "color2" = "#008800"), labels=c("Possible", "Confident")) +
    labs(title = "Individual Component Spatial Sizes Through Time:\nComponents with Evidence of Defensive Walls.\nSurvey and Inter-Survey Data.", x = "Years C.E. (Phase midpoints; Inaccuracies of 50 years or less added to each point for visibility)", y = "Hectares (Inaccuracies of ~20% or less added to each point for visibility)") +
    coord_cartesian(ylim = c(.0017, maxSpat + 150), xlim = c(-1800,1800), expand = FALSE) +
    theme(legend.position = c(0, 1), legend.justification = c(0, 1)) +
    commonPlot
#internal script end-------------------------------------------

#external files saver start-------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.32: GraphFractionOfPopulationInComponentTypesBySurvey_EXPERIMENTAL.R

```
#THIS SCRIPT GRAPHS THE FRACTION OF THE POPULATION IN EACH OF 3 COMPONENT TYPES (RITUAL, BURIAL, DEFENSIVE), THROUGH TIME, BY SURVEY. EACH OF THE 3 COMPONENT TYPES GETS A SEPARATE PAGE. EACH OF THESE PAGES IS SUBDIVIDED INTO 2 PARALLEL PLOTS, ONE FOR ONLY COMPONENTS WITH CONFIDENT EVIDENCE FOR TYPE AND ONE FOR COMPONENTS WITH EITHER CONFIDENT OR POSSIBLE EVIDENCE FOR TYPE.

#external files loader start------------------------------------
#Set working directory
setwd("C:/Real/SantaFe/R/")
#Run script to calculate the fractions of population in each of the 4 component types (including non-ritual habitation, which won't be plotted here, since it is simply 1 - ritConf - ritPoss), for each phase of each
```

```
survey.
#This creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataHabAlt
#This also creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateFractionInComponentTypesBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataHabAlt","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphFractionOfPopulationInComponentTypesBySurvey"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-------------------------------------------

#internal script start-------------------------------------------------
#TiticacaChron presently has the confident and possible types' fractions in separate fields. The confident fields will work for the first half of
```

```
each page, but for the second half of each page the confident and possible fractions need to be summed.
#Create new fields to hold these sums.
TiticacaChron$popRitBoth <- 0
TiticacaChron$popBurBoth <- 0
TiticacaChron$popDefBoth <- 0
#Calculate the sums.
TiticacaChron$popRitBoth <- TiticacaChron$popRitConf + TiticacaChron$popRitPoss
TiticacaChron$popBurBoth <- TiticacaChron$popBurConf + TiticacaChron$popBurPoss
TiticacaChron$popDefBoth <- TiticacaChron$popDefConf + TiticacaChron$popDefPoss
#Loop through the 3 pairs of component type fields. Use the portions of the field names that come before "Conf" and "Both", so that both "Conf" and "Both" fields can be referenced using this loop variable.
for (fieldPrefix in c("popRit", "popBur", "popDef")) {
   #Divide the page into upper and lower halves, one for fields ending in "Conf" and one for fields ending in "Both".
   par(mfrow=c(2,1))
   #Set subplot margins.
   par(mar = c(3,3,1.5,0))
   #Create strings that will be inserted into the plots' titles.
   if (fieldPrefix == "popRit") {titleTypeVar <- "Corporate Ritual"}
   if (fieldPrefix == "popBur") {titleTypeVar <- "Human Burial"}
   if (fieldPrefix == "popDef") {titleTypeVar <- "Defensive Walls"}
   #Now that 1 pair of component type fields has been selected by the outer loop, loop through each field of this pair.
   for (fieldSuffix in c("Conf", "Both")) {
      #Create strings that will be inserted into the plots' titles.
      if (fieldSuffix == "Conf") {titleConfidenceVar <- "Confident"}
      if (fieldSuffix == "Both") {titleConfidenceVar <- "Confident or Possible"}
      #Set initial values for variables that will control each survey's color, line style, and point style.
```

```
    colorIndex <- 1
    lineStyle <- 1
    pointStyle <- 16

    #Draw the current half's plot and first line.
    plot(x = TiticacaChron$midp[TiticacaChron$survey_code == "pk"], y = TiticacaChron[[paste(fieldPrefix, fieldSuffix, sep = "")]][TiticacaChron$survey_code == "pk"], ylim = c(0, 1), xlim = c(-2000, 2000), type = "o", col = colorpal[colorIndex], lty = lineStyle, pch = pointStyle, axes = FALSE, ann = FALSE)
    #Draw X-axis.
    axis(1, at=seq(-2000,2000,250))
    title(xlab="Years", line = 2)
    #Loop through the remaining surveys. I have manually specified each survey code (rather than e.g. using unique()), so that the plotting order is controlled.
    for (s_code in c("hp","jp","is","tr","kt","tl","tm","qt")) {
      #Set the color, line style, and point style to be used for this survey.
      colorIndex <- colorIndex + 1
      if (colorIndex == 6) {colorIndex <- 1; lineStyle <- 5; pointStyle <- 15}
      #Draw the current survey's line.
      lines(x = TiticacaChron$midp[TiticacaChron$survey_code == s_code], y = TiticacaChron[[paste(fieldPrefix, fieldSuffix, sep = "")]][TiticacaChron$survey_code == s_code], type = "o", col = colorpal[colorIndex], lty = lineStyle, pch = pointStyle)
    }
    #If this is the top half of the page, draw a legend.
    if (fieldSuffix == "Conf") {
      legend(x = -2125, y = 1, title = "Surveys", legend = c("Pukara Valley", "Huancane-Putina", "Juli-Pomata", "Island of the Sun", "Taraco Peninsula", "Katari Valley", "Lower Tiwanaku Valley", "Middle Tiwanaku Valley", "Qawra Thaki [site size]"), col = colorpal, lty=c(1,1,1,1,1,5,5,5,5), pch=c
```

```
            (16,16,16,16,16,15,15,15,15), cex = .85)
        }
        #Add Y-Axis
        axis(2, at=seq(0, 1, .2))
        title(ylab="Fraction", line = 2)
        #Add plot title.
        title(main = paste("Fraction of Population in Components with", titleConfidenceVar , "Evidence for", titleTypeVar), cex.main = 1)
    }
}
#internal script end-----------------------------------------------

#external files saver start-------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.33: GraphBoxwhiskersByTypeByPhase_EXPERIMENTAL.R

```
#THIS SCRIPT DRAWS COMPONENT SIZE BOX-AND-WHISKER PLOTS. FIRST, IT CREATES BOX-AND-WHISKER PLOTS THAT COMPARE SPATIAL SIZES FOR NON-RITUAL HABITATION COMPONENTS, RITUAL COMPONENTS, BURIAL COMPONENTS, AND DEFENSIVE COMPONENTS. SECOND, IT CREATES BOX-AND-WHISKER PLOTS THAT COMPARE POPULATION ESTIMATES FOR NON-RITUAL HABITATION COMPONENTS AND RITUAL COMPONENTS.  IN BOTH CASES, 3 SEPARATE SCALES ARE PLOTTED: PAN-TITICACA SCALE, SUPRA-SURVEY SPATIAL GROUPS SCALE, AND SURVEY SCALE.
#WHEN embed_fonts() IS USED (SEE BELOW AND GraphOutputPDF.R), THE ALPHA TRANSPARENCY IN THIS SCRIPT DOESN'T WORK CORRECTLY.

#external files loader start-------------------------------------------
#Load the ggplot2 package.
library(ggplot2)
#Load the scales package, which will allow easy modification of the ggplot2 axes.
```

```
library(scales)
#Load the reshape2 package, which will allow easy conversion of the 4 site type fields into one field that may then be set as the ggplot's X-axis variable.
library(reshape2)
#Set working directory.
setwd("C:/Real/SantaFe/R/")
#Run script to calculate Bandy population estimates for each component.
#This creates a modified version of the surveys .csv file and the inter-survey .csv file, called TiticacaDataSectorAggr
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateByComponent_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr", "PreservedFromCaller"))])
#Load the modified chronology tables. This creates a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_EXPERIMENTAL.R")

#create image output pdf file
#IN CONTRAST TO MY USUAL PRACTICE, THIS SCRIPT WILL OUTPUT MULTIPLE .PDF FILES, TO ALLOW PAGES OF DIFFERENT SIZES. THE SETTINGS HERE WILL ONLY APPLY TO THE FIRST .PDF. BELOW THESE SETTINGS WILL BE CHANGED MULTIPLE TIMES, BUT TO REDUCE CLUTTER I WON'T DEMARCATE THESE RESETS WITH "EXTERNAL FILES LOADER START", ETC. COMMENTS.
#first specify filename without extension
ImageName <- "GraphBoxwhiskersByTypeByPhase_HectaresPanScale"
#specify image dimensions in inches
ImageWidth <- 6.5
```

```r
ImageHeight <- 8.3
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
#currently unused in this script, as an alternative set of colors is used below
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-----------------------------------------------------

#internal script start---------------------------------------------------------
#DATA MODIFICATION SECTION START--------------------------------
#Populations will be plotted for 1) non-ritual habitation components and 2) ritual components. Spatial sizes will be plotted for all 4 site types. Because the spatial sizes are split between the "size_abs" and "size_midp" fields (and, for Qawra Thaki, "sitesize"), one combined field needs to be created here for plotting.
TiticacaDataSectorAggr$size_plot <- NA
#For components with an entry for "size_abs", assign this entry to "size_plot".
TiticacaDataSectorAggr$size_plot[is.na(TiticacaDataSectorAggr$size_abs) == FALSE] <- TiticacaDataSectorAggr$size_abs[is.na(TiticacaDataSectorAggr$size_abs) == FALSE]
#For components without an entry for "size_abs", assign the entry for "size_midp" to "size_plot". Qawra Thaki components will be assigned NA here; see the next line.
TiticacaDataSectorAggr$size_plot[is.na(TiticacaDataSectorAggr$size_abs) == TRUE] <- TiticacaDataSectorAggr$size_midp[is.na(TiticacaDataSectorAggr$size_abs) == TRUE]
#Deal with the Qawra Thaki survey, for which both "size_abs" and "size_midp" are NA.
```

```
TiticacaDataSectorAggr$size_plot[is.na(TiticacaDataSectorAggr$size_plot) == TRUE] <- TiticacaDataSectorAggr$sitesize[is.na(TiticacaDataSectorAggr$size_plot) == TRUE]
#The "hab" field will require several changes. First, .5 and .75 codes for the "hab" field should be changed to 1, to simplify the plots. Second, because here we are interested in distinguishing components with evidence for corporate ritual from components without evidence for corporate ritual, the "hab" field should be changed to 0 when there is .5 or 1 for the "rit" field. THUS AFTER THIS, ZERO IN THE "HAB" FIELD CAN SIGNIFY EITHER LACK OF HABITATION *OR* PRESENCE OF BOTH HABITATION AND RITUAL.
TiticacaDataSectorAggr$hab[TiticacaDataSectorAggr$hab == .5 | TiticacaDataSectorAggr$hab == .75] <- 1
TiticacaDataSectorAggr$hab[TiticacaDataSectorAggr$rit > 0] <- 0

#The site type fields must be combined into one field in order to be used as the X-axis for the boxplots. I have chosen to use the reshape2 package's melt() function to accomplish this.
#First, get rid of columns that aren't necessary for the boxplots. This is important because the melt() function will reorganize the table into "long form," such that it has one field holding the previous field names and one field holding those previous fields' values. The previous field names for the 4 component types ("hab", "rit", "bur", "def") will be used as the boxplots' X-values, so other previous field names (i.e., pre-melt columns) need to be excluded. Some other fields besides the 4 component types also need to be saved here ("survey", "phase", "group_spatial", "group_temporal", "pop", and "size_plot"); to see how they will also be excluded from the melted data's new field which holds the previous field names, see the next line regarding the "ID variables."
#THE ORDER OF THE RETAINED COLUMNS IS DETERMINED BY THE ORDER OF THE CHARACTER VECTOR USED HERE. THIS, IN TURN, DETERMINES THE FACTOR LEVEL ORDER IN THE MELTED DATA. THIS, IN TURN, DETERMINES THE PLOTTING ORDER (FROM LEFT TO RIGHT WITHIN EACH FACET) AND THE LEGEND'S LABEL ORDER. IN OTHER WORDS, LACK OF AWARENESS OF THE ORDER OF THE CHARACTER VECTOR HERE WILL LIKELY CAUSE THE PROGRAMMER TO ENTER LEGEND LABELS IN INCORRECT
```

```
ORDER, BELOW IN "scale_fill_manual".
TiticacaBoxplotsData <- TiticacaDataSectorAggr[,c("survey","phase","hab","rit","bur","def","group_spatial","group_temporal","pop","size_plot")]
#Now use reshape2's melt() to create a field called "variable" (with values of "hab", "rit", "bur", and "def") and a field called "value" (with values of 0, 0.5, and 1). In other words, the table will become 4 times longer, since each row will be split into 4 rows, each containing the value for one of the 4 site type fields. All of the other remaining fields ("survey", "phase", "group_spatial", "group_temporal", "pop", "size_plot") will be set to ID variables, or in other words will be repeated in each of the 4 rows.
TiticacaBoxplotsDataMelted <- melt(TiticacaBoxplotsData, id.vars = c("survey", "phase", "group_spatial", "group_temporal", "pop", "size_plot"))
#Values of 0 for the 4 component types indicate absence of evidence for that component type, so it is key that these rows are not used to compute the boxes-and-whiskers (for example, if the boxes-and-whiskers were created before this line, components with ANY value for "bur", including 0, would have their sizes included in the calculations for the burial boxes-and-whiskers, which defeats the entire point of making these boxes-and-whiskers). Remove these rows. This is the critical step that actually distinguishes the 4 component types from eachother in the boxplots.
TiticacaBoxplotsDataMelted <- TiticacaBoxplotsDataMelted[TiticacaBoxplotsDataMelted$value != 0,]
#DATA MODIFICATION SECTION END---------------------------------

#PLOT PRELIMINARY WORK SECTION START---------------------------
#Reorder the factor levels for the group_temporal field, so that the plotting order is correct.
TiticacaBoxplotsDataMelted$group_temporal <- factor(TiticacaBoxplotsDataMelted$group_temporal, levels = c("ef", "mf", "lf", "tw", "al", "in", "co"))
#Relatedly, create better labels for the group_temporal facets. "in" (the Inca label) needs to be quoted to avoid an error.
```

```r
group_temporal_labels <- c(ef = "2000-1300BC", mf = "1300-200BC", lf = "200BC-600AD", tw = "Tiwanaku", al = "Altiplano", "in" = "Inca", co = "Colonial")
#Also create labels for the group_spatial facets.
group_spatial_labels <- c(north = "Northern", south_cont = "Southern Contiguous", south_noncont = "Other Southern")
#Also create labels for the survey facets.
survey_labels <- c(gp = "Inter-survey", hp = "Huancane-Putina", is = "Is. of the Sun", jp = "Juli-Pomata", kt = "Katari", pk = "Pukara", "qt" = "Qawra Thaki", tl = "Tiwanaku Lower", tm = "Tiwanaku Middle", tr = "Taraco Pen.")
#Create annotations for the survey-scale plots which will provide more information on which phase a facet represents (beyond just "a","b","c", etc.).
#This will involve adding fake data to TiticacaChron in order to position the text at the desired X and Y coordinates.
chronAnnotate <- TiticacaChron
#Create X and Y values for the spatial size plot. The large component sizes in the Middle Tiwanaku Valley and the Pukara Valley force the use of alternate positions for these annotations.
chronAnnotate$x1 <- 2.5
chronAnnotate$y1 <- 200
chronAnnotate$y1[chronAnnotate$survey_code == "tm"] <- .005
chronAnnotate$y1[chronAnnotate$survey_code == "pk"] <- 400
#Create X and Y values for the population plot.
chronAnnotate$x2 <- 1.5
chronAnnotate$y2 <- 15000
#Rename the "survey_code" and "phase_code" fields to the same names as those in TiticacaDataSectorAggr, so that the annotations will be distributed to the facets in the same manner.
names(chronAnnotate)[names(chronAnnotate) == "survey_code"] <- "survey"
names(chronAnnotate)[names(chronAnnotate) == "phase_code"] <- "phase"
#Change the underscores in the "phase_name_basin" field to newline characters, so that the annotations fit.
chronAnnotate$phase_name_basin <- gsub("_", "\n", chronAnnotate$phase_name
```

```
_basin, fixed = TRUE)
#This is an inelegant way to deal with a particularly long name in "phase_name_basin", but it works.
chronAnnotate$phase_name_basin[chronAnnotate$phase_name_basin == "Early\nFormative\n2\nand\nMiddle\nFormative"] <- "Early\nForm._2;\nMiddle\nFormative"

#Create a list of ggplot2 objects that will be shared across all of the plots. This can then be simply added to each plot.
commonPlot <- list(
    #Add a boxplot layer to the plots. Furthermore, specify that fill color will distinguish the component types ("hab", "rit", "bur", and "def", which are in TiticacaBoxplotsDataMelted's field "variable"). Finally, specify that alpha transparency will distinguish the "possible" (0.5) from the "confident" (1) components; these values of 0.5 and 1 are held in TiticacaBoxplotsDataMelted's "value" field.
    geom_boxplot(aes(fill = variable, alpha = as.factor(value))),
    #Set the alpha transparency values, which will distinguish "possible" from "confident" components. The legend automatically created for these isn't clear, so prevent its display and instead add text below to the X-axis of each plot to clarify the significance of the transparency. THE FACTOR LEVEL ORDER OF as.factor(value) DETERMINES WHICH OF THE TWO VALUES IN "value" (0.5 and 1) WILL RECEIVE EACH OF THE TRANSPARENCY VALUES SPECIFIED HERE; KEEP THIS IN MIND WHEN SPECIFYING THE TWO NUMBERS IN THIS VECTOR.
    scale_alpha_manual(values = c(.4,1), guide = FALSE),
    #Remove the Y-axis's minor division lines, and remove the X-axis tick marks and labels.
    theme(panel.grid.minor.y = element_blank(), axis.ticks.x = element_blank(), axis.text.x = element_blank())
)
#PLOT PRELIMINARY WORK SECTION END------------------------------

#FINAL PLOTTING SECTION START-----------------------------------
#First, draw the boxplots for spatial size, for all 4 component types.
```

```

#First, draw boxplots for spatial size for the entire Titicaca region, by supra-survey temporal group.
#Set the dataset and the X and Y variables.
box_spat_titicaca <- ggplot(data = TiticacaBoxplotsDataMelted, mapping = aes(x = variable, y = size_plot))
#Now add the plot components that are shared across all plots and stored in the list "commonPlot".
box_spat_titicaca + commonPlot +
    #Now add components that are not stored in "commonPlot"
    #Set the Y-axis's major divisions, make the axis logarithmic, and prevent scientific notation.
    scale_y_continuous(breaks = c(.01,.05,.1,.5,1,5,10,50,100,500), trans="log10", labels = scales::comma) +
    #Set the box fill colors, which will distinguish the component types. THE PLOTTING ORDER AND LEGEND LABEL ORDER OF THE COMPONENT TYPES IS DETERMINED BY THE FACTOR LEVEL ORDER OF "VARIABLE", WHICH IS IN TURN DETERMINED BY THE COLUMN ORDER IN THE PRE-MELT DATA. THEREFORE, WHEN SPECIFYING THE ORDER OF THE LEGEND LABELS, IT IS CRITICAL TO BE AWARE OF THE COLUMN ORDER IN THE DATAFRAME THAT WAS INPUT TO melt(). SEE ABOVE, WHERE COLUMNS ARE REMOVED IMMEDIATELY PRIOR TO melt().
    scale_fill_manual(values = c("#F8766D", "#00BFC4", "#FFFF00", "#7CAE00"), name = "Component Type", labels = c("Non-ritual Habitation", "Corporate Ritual", "Burial", "Defensive")) +
    #Set the plot's title and axis labels. The significance of the alpha transparency is made clear here on the X-axis, rather than using the automatically generated legend. SEE THE CREATION OF commonPlot ABOVE REGARDING THE RELATIONSHIP BETWEEN TRANSPARENCY VALUES AND TYPE CONFIDENCE VALUES.
    labs(title = "Distribution of Spatial Sizes by Component Type\nTiticaca Survey and Inter-survey Data.\nPan-Titicaca Scale", x = "Solid boxes = components with clear evidence for type\nTransparent boxes = components with possible evidence for type", y = "Hectares") +
    #Position the legend and set the facet labels' text size.
    theme(legend.position = c(0, 1), legend.justification = c(0, 1), strip.
```

```
text = element_text(size = 8)) +
    #Facet the plot by temporal group.
    facet_grid(. ~ group_temporal, labeller = labeller(group_temporal = group_temporal_labels))

#Second, draw boxplots for spatial size by supra-survey spatial and temporal groups.
#Close the previous .pdf and create a new .pdf with different dimensions.
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
#specify filename without extension
ImageName <- "GraphBoxwhiskersByTypeByPhase_HectaresSupraScale"
#specify image dimensions in inches
ImageWidth <- 6.5
ImageHeight <- 16
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")
#set the dataset and the X and Y variables.
box_spat_supra <- ggplot(data = TiticacaBoxplotsDataMelted, mapping = aes(x = variable, y = size_plot))
#Now add the plot components that are shared across all plots and stored in the list "commonPlot".
box_spat_supra + commonPlot +
    #Now add components that are not stored in "commonPlot"
    #Set the Y-axis's major divisions, make the axis logarithmic, and prevent scientific notation.
    scale_y_continuous(breaks = c(.01,.05,.1,.5,1,5,10,50,100,500), trans="log10", labels = scales::comma) +
    #Set the box fill colors, which will distinguish the component types. THE PLOTTING ORDER AND LEGEND LABEL ORDER OF THE COMPONENT TYPES IS DETERMINED BY THE FACTOR LEVEL ORDER OF "VARIABLE", WHICH IS IN TURN DETERMINED BY THE COLUMN ORDER IN THE PRE-MELT DATA. THEREFORE, WHEN SPECIFYING THE ORDER OF THE LEGEND LABELS, IT IS CRITICAL TO BE AWARE
```

```
OF THE COLUMN ORDER IN THE DATAFRAME THAT WAS INPUT TO melt(). SEE ABOVE, WHERE COLUMNS ARE REMOVED IMMEDIATELY PRIOR TO melt().
  scale_fill_manual(values = c("#F8766D", "#00BFC4", "#FFFF00", "#7CAE00"), name = "Component Type", labels = c("Non-ritual Habitation", "Corporate Ritual", "Burial", "Defensive")) +
  #Set the plot's title and axis labels. The significance of the alpha transparency is made clear here on the X-axis, rather than using the automatically generated legend. SEE THE CREATION OF commonPlot ABOVE REGARDING THE RELATIONSHIP BETWEEN TRANSPARENCY VALUES AND TYPE CONFIDENCE VALUES.
  labs(title = "Distribution of Spatial Sizes by Component Type\nTiticaca Survey and Inter-survey Data.\nSupra-Survey Group Scale", x = "Solid boxes = components with clear evidence for type\nTransparent boxes = components with possible evidence for type", y = "Hectares") +
  #Position the legend and set the facet labels' text size.
  theme(legend.position = c(.5, 1), legend.justification = c(.5,1), strip.text = element_text(size = 12)) +
  #Facet the plot by supra-survey spatial and temporal groups.
  facet_grid(group_temporal ~ group_spatial, labeller = labeller(group_temporal = group_temporal_labels, group_spatial = group_spatial_labels))

#Third, draw boxplots for spatial size by survey and phase.
#Close the previous .pdf and create a new .pdf with different dimensions.
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
#specify filename without extension
ImageName <- "GraphBoxwhiskersByTypeByPhase_HectaresSurveyScale"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 34
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")
```

```
#set the dataset and the X and Y variables.
box_spat_survey <- ggplot(data = TiticacaBoxplotsDataMelted, mapping = aes(x = variable, y = size_plot))
#Now add the plot components that are shared across all plots and stored in the list "commonPlot".
box_spat_survey + commonPlot +
  #Now add components that are not stored in "commonPlot"
  #Set the Y-axis's major divisions, make the axis logarithmic, and prevent scientific notation.
  scale_y_continuous(breaks = c(.01,.05,.1,.5,1,5,10,50,100,500), trans="log10", labels = scales::comma) +
  #Set the box fill colors, which will distinguish the component types. THE PLOTTING ORDER AND LEGEND LABEL ORDER OF THE COMPONENT TYPES IS DETERMINED BY THE FACTOR LEVEL ORDER OF "VARIABLE", WHICH IS IN TURN DETERMINED BY THE COLUMN ORDER IN THE PRE-MELT DATA. THEREFORE, WHEN SPECIFYING THE ORDER OF THE LEGEND LABELS, IT IS CRITICAL TO BE AWARE OF THE COLUMN ORDER IN THE DATAFRAME THAT WAS INPUT TO melt(). SEE ABOVE, WHERE COLUMNS ARE REMOVED IMMEDIATELY PRIOR TO melt().
  scale_fill_manual(values = c("#F8766D", "#00BFC4", "#FFFF00", "#7CAE00"), name = "Component Type", labels = c("Non-ritual Habitation", "Corporate Ritual", "Burial", "Defensive")) +
  #Set the plot's title and axis labels. The significance of the alpha transparency is made clear here on the X-axis, rather than using the automatically generated legend. SEE THE CREATION OF commonPlot ABOVE REGARDING THE RELATIONSHIP BETWEEN TRANSPARENCY VALUES AND TYPE CONFIDENCE VALUES.
  labs(title = "Distribution of Spatial Sizes by Component Type\nTiticaca Survey and Inter-survey Data.\nSurvey Scale", x = "Solid boxes = components with clear evidence for type\nTransparent boxes = components with possible evidence for type", y = "Hectares") +
  #Position the legend, and set the facet labels' text size.
  theme(legend.position = c(1, 1), legend.justification = c(1, 1), strip.text = element_text(size = 12)) +
  #Facet the plot by survey and phase.
  facet_grid(survey ~ phase, labeller = labeller(survey = survey_labels))
```

```
    +
  #Add annotations to clarify which phase each facet represents, beyond just "a","b","c", etc.
  geom_text(data = chronAnnotate, mapping = aes(x = x1, y = y1, label = phase_name_basin), size = 2.5)

#The spatial size boxplots are now finished. Now draw the boxplots for population size, only for non-ritual habitation components and ritual components.
#Before these plots are made, remove the lines in TiticacaBoxplotsDataMelted which do not have either "hab" or "rit" for their "variable".
TiticacaBoxplotsDataMeltedHabRit <- TiticacaBoxplotsDataMelted[TiticacaBoxplotsDataMelted$variable == "hab" | TiticacaBoxplotsDataMelted$variable == "rit",]

#First do boxplots for the entire Titicaca region.
#Close the previous .pdf and create a new .pdf with different dimensions.
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
#specify filename without extension
ImageName <- "GraphBoxwhiskersByTypeByPhase_PopPanScale"
#specify image dimensions in inches
ImageWidth <- 6.5
ImageHeight <- 8.3
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")
#Set the dataset and the X and Y variables.
box_pop_titicaca <- ggplot(data = TiticacaBoxplotsDataMeltedHabRit, mapping = aes(x = variable, y = pop))
#Now add the plot components that are shared across all plots and stored in the list "commonPlot".
box_pop_titicaca + commonPlot +
```

```
	#Now add components that are not stored in "commonPlot"
	#Set the Y-axis's major divisions, make the axis logarithmic, and prevent scientific notation.
	scale_y_continuous(breaks = c(10,50,100,500,1000,5000,10000,30000), trans= "log10", labels = scales::comma) +
	#Set the box fill colors, which will distinguish the component types. THE PLOTTING ORDER AND LEGEND LABEL ORDER OF THE COMPONENT TYPES IS DETERMINED BY THE FACTOR LEVEL ORDER OF "VARIABLE", WHICH IS IN TURN DETERMINED BY THE COLUMN ORDER IN THE PRE-MELT DATA. THEREFORE, WHEN SPECIFYING THE ORDER OF THE LEGEND LABELS, IT IS CRITICAL TO BE AWARE OF THE COLUMN ORDER IN THE DATAFRAME THAT WAS INPUT TO melt(). SEE ABOVE, WHERE COLUMNS ARE REMOVED IMMEDIATELY PRIOR TO melt().
	scale_fill_manual(values = c("#F8766D", "#00BFC4"), name = "Component Type", labels = c("Non-ritual Habitation", "Corporate Ritual")) +
	#Set the plot's title and axis labels. The significance of the alpha transparency is made clear here on the X-axis, rather than using the automatically generated legend. SEE THE CREATION OF commonPlot ABOVE REGARDING THE RELATIONSHIP BETWEEN TRANSPARENCY VALUES AND TYPE CONFIDENCE VALUES.
	labs(title = "Distribution of Population: Non-Ritual Habitation versus Corporate Ritual\nTiticaca Survey and Inter-survey Data.\nPan-Titicaca Scale", x = "Solid boxes = components with clear evidence for type\nTransparent boxes = components with possible evidence for type", y = "Population") +
	#Position the legend and set the facet labels' text size.
	theme(legend.position = c(0, 1), legend.justification = c(0, 1), strip.text = element_text(size = 8)) +
	#Facet the plot by temporal group.
	facet_grid(. ~ group_temporal, labeller = labeller(group_temporal = group_temporal_labels))

#Second, draw boxplots for population size by supra-survey spatial group and phase.
#Close the previous .pdf and create a new .pdf with different dimensions.
dev.off()
```

```r
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
#specify filename without extension
ImageName <- "GraphBoxwhiskersByTypeByPhase_PopSupraScale"
#specify image dimensions in inches
ImageWidth <- 6.5
ImageHeight <- 16
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")
#Set the dataset and the X and Y variables.
box_pop_supra <- ggplot(data = TiticacaBoxplotsDataMeltedHabRit, mapping = aes(x = variable, y = pop))
#Now add the plot components that are shared across all plots and stored in the list "commonPlot".
box_pop_supra + commonPlot +
    #Now add components that are not stored in "commonPlot"
    #Set the Y-axis's major divisions, make the axis logarithmic, and prevent scientific notation.
    scale_y_continuous(breaks = c(10,50,100,500,1000,5000,10000,30000), trans= "log10", labels = scales::comma) +
    #Set the box fill colors, which will distinguish the component types. THE PLOTTING ORDER AND LEGEND LABEL ORDER OF THE COMPONENT TYPES IS DETERMINED BY THE FACTOR LEVEL ORDER OF "VARIABLE", WHICH IS IN TURN DETERMINED BY THE COLUMN ORDER IN THE PRE-MELT DATA. THEREFORE, WHEN SPECIFYING THE ORDER OF THE LEGEND LABELS, IT IS CRITICAL TO BE AWARE OF THE COLUMN ORDER IN THE DATAFRAME THAT WAS INPUT TO melt(). SEE ABOVE, WHERE COLUMNS ARE REMOVED IMMEDIATELY PRIOR TO melt().
    scale_fill_manual(values = c("#F8766D", "#00BFC4"), name = "Component Type", labels = c("Non-ritual Habitation", "Corporate Ritual")) +
    #Set the plot's title and axis labels. The significance of the alpha transparency is made clear here on the X-axis, rather than using the automatically generated legend. SEE THE CREATION OF commonPlot ABOVE REGARDING THE RELATIONSHIP BETWEEN TRANSPARENCY VALUES AND TYPE CONFIDENCE VALUES.
```

```
    labs(title = "Distribution of Population: Non-Ritual Habitation versus Corporate Ritual\nTiticaca Survey and Inter-survey Data.\nSupra-Survey Group Scale", x = "Solid boxes = components with clear evidence for type\nTransparent boxes = components with possible evidence for type", y = "Population") +
    #Position the legend and set the facet labels' text size.
    theme(legend.position = c(.5, 1), legend.justification = c(.5, 1), strip.text = element_text(size = 12)) +
    #Facet the plot by supra-survey spatial and temporal groups.
    facet_grid(group_temporal ~ group_spatial, labeller = labeller(group_temporal = group_temporal_labels, group_spatial = group_spatial_labels))

#Third, draw boxplots for population size by survey and phase.
#Close the previous .pdf and create a new .pdf with different dimensions.
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
#specify filename without extension
ImageName <- "GraphBoxwhiskersByTypeByPhase_PopSurveyScale"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 34
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")
#Set the dataset and the X and Y variables.
box_pop_survey <- ggplot(data = TiticacaBoxplotsDataMeltedHabRit, mapping = aes(x = variable, y = pop))
#Now add the plot components that are shared across all plots and stored in the list "commonPlot".
box_pop_survey + commonPlot +
    #Now add components that are not stored in "commonPlot"
    #Set the Y-axis's major divisions, make the axis logarithmic, and prevent scientific notation.
```

```
    scale_y_continuous(breaks = c(10,50,100,500,1000,5000,10000,30000), trans= "log10", labels = scales::comma) +
    #Set the box fill colors, which will distinguish the component types. THE PLOTTING ORDER AND LEGEND LABEL ORDER OF THE COMPONENT TYPES IS DETERMINED BY THE FACTOR LEVEL ORDER OF "VARIABLE", WHICH IS IN TURN DETERMINED BY THE COLUMN ORDER IN THE PRE-MELT DATA. THEREFORE, WHEN SPECIFYING THE ORDER OF THE LEGEND LABELS, IT IS CRITICAL TO BE AWARE OF THE COLUMN ORDER IN THE DATAFRAME THAT WAS INPUT TO melt(). SEE ABOVE, WHERE COLUMNS ARE REMOVED IMMEDIATELY PRIOR TO melt().
    scale_fill_manual(values = c("#F8766D", "#00BFC4"), name = "Component Type", labels = c("Non-ritual Habitation", "Corporate Ritual")) +
    #Set the plot's title and axis labels. The significance of the alpha transparency is made clear here on the X-axis, rather than using the automatically generated legend. SEE THE CREATION OF commonPlot ABOVE REGARDING THE RELATIONSHIP BETWEEN TRANSPARENCY VALUES AND TYPE CONFIDENCE VALUES.
    labs(title = "Distribution of Population: Non-Ritual Habitation versus Corporate Ritual\nTiticaca Survey and Inter-survey Data.\nSurvey Scale", x = "Solid boxes = components with clear evidence for type\nTransparent boxes = components with possible evidence for type", y = "Population") +
    #Position the legend and set the facet labels' text size.
    theme(legend.position = c(1, 1), legend.justification = c(1, 1), strip.text = element_text(size = 12)) +
    #Facet the plot by survey and phase.
    facet_grid(survey ~ phase, labeller = labeller(survey = survey_labels)) +
    #Add annotations to clarify which phase each facet represents, beyond just "a","b","c", etc.
    geom_text(data = chronAnnotate, mapping = aes(x = x2, y = y2, label = phase_name_basin), size = 2.5)
#FINAL PLOTTING SECTION END-------------------------------------
#internal script end-----------------------------------------------

#external files saver start----------------------------------------
```

```
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

D.2.4 Multiple Variables (C:/Real/SantaFe/R/3_GraphScripts/4_MultipleVariables/)

Listing D.34: GraphComparePopulationEstimateToComponentAggregateSizeBySurvey_EXPERIMENTAL.R

```
#COMPARE POPULATION ESTIMATES TO AGGREGATE COMPONENT SPATIAL SIZES VERSUS TIME BY SURVEY

#external files loader 1 start-----------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate aggregate component spatial sizes
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#this also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used in this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/2_ArchaeologicalContext/CalculateComponentAggregateSizeBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

#create image output pdf file
#first specify filename without extension
ImageName <- "
```

```
GraphComparePopulationEstimateToComponentAggregateSizeBySurvey"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader 1 end------------------------------------------

#internal script 1 start---------------------------------------------
#Remove the "Gaps" (intersurvey) components, so that they don't interfere with getting the maximum Y value.
TiticacaChron <- TiticacaChron[TiticacaChron$survey_code != "gp",]
TiticacaChron <- droplevels(TiticacaChron)
#first plot aggregate component size by survey through time
#get maximum aggregate component size by survey and phase
Max_y_1 <- max(TiticacaChron$aggcompsize,na.rm = TRUE)
#set margins
par(mar=c(3, 3.5, 1, 3.5) + 0.1)
#Set initial values for variables that will control each survey's color and line style.
colorIndex <- 1
lineStyle <- 1
#Draw plot with first line.
plot(x = TiticacaChron$midp[TiticacaChron$survey_code == "pk"], y = TiticacaChron$aggcompsize[TiticacaChron$survey_code == "pk"], ylim = c(0,Max_y_1), xlim = c(-2000, 2000), type = "o", col = colorpal[colorIndex], lty = lineStyle, pch = 16, axes = FALSE, ann = FALSE)
axis(2, at=seq(0,Max_y_1,50), ylim = c(0,Max_y_1))
```

```
mtext(2,text="Aggregate Component Spatial Size (hectares)", line=2.5)
#Loop through the remaining surveys. I have manually specified each survey code (rather than e.g. using unique()), so that the plotting order is controlled.
for (s_code in c("hp","jp","is","tr","kt","tl","tm","qt")) {
  #Set the color and line type to be used for this survey.
  colorIndex <- colorIndex + 1
  if (colorIndex == 6) {colorIndex <- 1; lineStyle <- 5}
  #Draw the current survey's line.
  lines(x = TiticacaChron$midp[TiticacaChron$survey_code == s_code], y = TiticacaChron$aggcompsize[TiticacaChron$survey_code == s_code], type = "o", col = colorpal[colorIndex], lty = lineStyle, pch = 16)
}
#save first graph -- don't let second graphing operation overwrite it
par(new = TRUE)
#internal script 1 end-----------------------------------------------------

#external files loader 2 start----------------------------------------------
#make sure that below called script does not remove ImageNameModi3, step 1
PreservedFromCaller <- ImageNameModi3
#run script to calculate population sizes for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#this can't be run earlier in this script because then it would in effect erase changes made to the TiticacaChron dataframe by the first sourced script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateBySurveyAndPhase_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
```

```r
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])
#make sure that above called script does not remove ImageNameModi3, step 2
ImageNameModi3 <- PreservedFromCaller
remove(PreservedFromCaller)

#get colorpal again, since it has been remove()d
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")

#external files loader 2 end-------------------------------------------------

#internal script 2 start-----------------------------------------------------
#Remove the "Gaps" (intersurvey) components, so that they don't interfere with getting the maximum Y value.
TiticacaChron <- TiticacaChron[TiticacaChron$survey_code != "gp",]
TiticacaChron <- droplevels(TiticacaChron)
#get maximum population size by survey and phase
Max_y_2 <- max(TiticacaChron$pop, na.rm = TRUE)
#Set initial values for variables that will control each survey's color and line style.
colorIndex <- 1
lineStyle <- 1
#Draw plot with first line.
plot(x = TiticacaChron$midp[TiticacaChron$survey_code == "pk"], y = TiticacaChron$pop[TiticacaChron$survey_code == "pk"], ylim = c(0,Max_y_2), xlim = c(-2000, 2000), type = "o", col = colorpal[colorIndex], lty = lineStyle, pch = 17, axes = FALSE, ann = FALSE)
axis(1, at=seq(-2000,2000,250))
axis(4, at=seq(0,Max_y_2,2500), ylim = c(0,Max_y_2))
mtext(1,text="Years", line=2)
mtext(4,text="Population Size (Estimated Number of People)", line=2.5)
#Loop through the remaining surveys. I have manually specified each survey code (rather than e.g. using unique()), so that the plotting order is controlled.
for (s_code in c("hp","jp","is","tr","kt","tl","tm","qt")) {
```

```
    #Set the color and line type to be used for this survey.
    colorIndex <- colorIndex + 1
    if (colorIndex == 6) {colorIndex <- 1; lineStyle <- 5}
    #Draw the current survey's line.
    lines(x = TiticacaChron$midp[TiticacaChron$survey_code == s_code], y = TiticacaChron$pop[TiticacaChron$survey_code == s_code], type = "o", col = colorpal[colorIndex], lty = lineStyle, pch = 17)
}
#Create entire plot's title and legend.
title(main = "Comparison of Aggregate Component Spatial Sizes and Population Estimates")
legend(x = -2100, y = 30000, legend = c("Pukara Valley Component Size", "Huancane-Putina Component Size", "Juli-Pomata Component Size", "Island of the Sun Component Size", "Taraco Peninsula Component Size", "Katari Valley Component Size", "Lower Tiwanaku Valley Component Size", "Middle Tiwanaku Valley Component Size", "Qawra Thaki [site size] Component Size", "Pukara Valley Population", "Huancane-Putina Population", "Juli-Pomata Population", "Island of the Sun Population", "Taraco Peninsula Population", "Katari Valley Population", "Lower Tiwanaku Valley Population", "Middle Tiwanaku Valley Population", "Qawra Thaki [site size] Population"), col = rep(c(colorpal, colorpal[1:4]), times = 2), lty=rep(c(1,1,1,1,1,5,5,5,5), times = 2), pch = c(rep(16, times = 9), rep(17, times = 9)), cex = .92)
#internal script 2 end-----------------------------------------------

#external files saver start-----------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.35: GraphPopulationSizeAndPercentInLargestAndNumberSites_PaneledBySurvey_EXPERIMENTAL.R

```
#GRAPH SEVERAL VARIABLES (POPULATION SIZE; FRACTION OF POPULATION IN
```

```
LARGEST SITE; # OF SITES) THROUGH TIME, PANELED BY SURVEY
#THIS GRAPH WILL BE SPLIT OVER 2 PAGES. TO SIMPLIFY THE R CODE, I JUST PLOT BOTH PAGES TO A ONE-PAGE PDF WITH ROUGHLY DOUBLE HEIGHT. ADOBE ACROBAT CAN BE USED TO CROP THE OUTPUT PDF INTO TWO DIFFERENT PDF FILES.

#external files loader start-------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population fractions in largest site for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimatePercentInLargestSiteBySurveyAndPhase_EXPERIMENTAL.R")
#need to rename TiticacaChron because it will be replaced by the next sourced script
TiticacaChronWithPercLargest <- TiticacaChron
#variable of interest is now TiticacaChronWithPercLargest$poplargest_perc
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaChronWithPercLargest","PreservedFromCaller"))])
#prevent TiticacaChronWithPercLargest from being remove()ed by below called script
PreservedFromCaller <- TiticacaChronWithPercLargest

#run script to calculate population sizes for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
```

```
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateBySurveyAndPhase_EXPERIMENTAL.R")
#need to rename TiticacaChron because it will be replaced by the next sourced script
TiticacaChronWithPopEst <- TiticacaChron
#variable of interest is now TiticacaChronWithPopEst$pop_norm
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaChronWithPopEst","PreservedFromCaller"))])
#bring back TiticacaChronWithPercLargest
TiticacaChronWithPercLargest <- PreservedFromCaller
#prevent TiticacaChronWithPercLargest and TiticacaChronWithPopEst from being remove()ed by below called script
PreservedFromCaller <- list(TiticacaChronWithPercLargest, TiticacaChronWithPopEst)

#run script to calculate number of sites for each phase of each survey
#this creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#it also creates a modified version of the surveys .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr, but this is not used within this script
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/2_ArchaeologicalContext/CalculateNumberOfSitesBySurveyAndPhase_EXPERIMENTAL.R")
#for consistency with above renamings of TiticacaChron, rename TiticacaChron
TiticacaChronWithNumSites <- TiticacaChron
```

```
#variable of interest is now TiticacaChronWithNumSites$numsites
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaChronWithNumSites","PreservedFromCaller"))])
#bring back TiticacaChronWithPercLargest and TiticacaChronWithPopEst
TiticacaChronWithPercLargest <- PreservedFromCaller[[1]]
TiticacaChronWithPopEst <- PreservedFromCaller[[2]]
remove(PreservedFromCaller)

#create image output pdf file
#first specify filename without extension
ImageName <- "GraphPopulationSizeAndPercentInLargestAndNumberSites_PaneledBySurvey"
#specify image dimensions in inches
ImageWidth <- 6.5
ImageHeight <- 16.9
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#runs script to create color palette for graph, stored in variable named colorpal
#script needs to be modified as more surveys are added to the survey .csv file
source("3_GraphScripts/1_HelperScripts/GraphColorPalette.R")
#external files loader end-----------------------------------------------

#internal script start---------------------------------------------------
#Remove the "Gaps" (intersurvey) components, so that they don't interfere with getting the maximum Y values.
TiticacaChronWithNumSites <- TiticacaChronWithNumSites[TiticacaChronWithNumSites$survey_code != "gp",]
TiticacaChronWithNumSites <- droplevels(TiticacaChronWithNumSites)
TiticacaChronWithPercLargest <- TiticacaChronWithPercLargest[
```

```
↪TiticacaChronWithPercLargest$survey_code != "gp",]
TiticacaChronWithPercLargest <- droplevels(TiticacaChronWithPercLargest)
TiticacaChronWithPopEst <- TiticacaChronWithPopEst[TiticacaChronWithPopEst
↪$survey_code != "gp",]
TiticacaChronWithPopEst <- droplevels(TiticacaChronWithPopEst)
#start drawing
#set up multiple panels
par(mfrow=c(10,2))
#outer margins
par(oma = c(0, 1, 0, 1))
#font sizes
par(cex.main = 1.2)
par(cex.axis = 1)
#loop through surveys
#initialize colorIndex, which will be incremented as each new survey is
↪started in loop
colorIndex <- 0
#create variables to identify which iteration is the first for each side
↪of the graph, so that a legend can be placed there
firstRunLeft <- TRUE
firstRunRight <- TRUE
#Loop through surveys. I have manually specified each survey code (rather
↪than e.g. using unique()) so that the plotting order is controlled.
for (s_code in c("pk","hp","jp","is","tr","kt","tl","tm","qt")) {
   colorIndex <- colorIndex + 1
   if (colorIndex == 6) {colorIndex <- 1}
   #first plot normalized population size through time
   #set margins -- these will be changed when the 3rd and 4th variables
   ↪are plotted
   par(mar = c(4, 2, 1, 3))
   #get maximum normalized population size
   Max_y_1 <- max(TiticacaChronWithPopEst$pop_norm, na.rm = TRUE)
   #draw graph
   plot(x = TiticacaChronWithPopEst$midp[TiticacaChronWithPopEst$survey_
   ↪code == s_code], y = TiticacaChronWithPopEst$pop_norm[
```

```
TiticacaChronWithPopEst$survey_code == s_code], xlim = c(-2000, 2000), ylim = c(0,Max_y_1), type = "o", col = colorpal[colorIndex], lty = 1, pch = 16, axes = FALSE, ann = FALSE)
axis(4, at=seq(0,Max_y_1,20), ylim = c(0,Max_y_1))
mtext(4,text="Norm. Pop. Size", line=2.5, cex = .8)
title(main=TiticacaChronWithPopEst$survey_name[TiticacaChronWithPopEst$survey_code == s_code & TiticacaChronWithPopEst$phase_code == "a"])
#create legend only for top graphs
if (firstRunLeft == TRUE) {
   legend(x = -2100, y = 110, cex = .9, pt.cex = 1, y.intersp = 1.7, seg.len = 3, legend = c("Normalized\nPopulation Size", "Fraction of Pop.\nin Largest Site"),lty=c(1:2), pch=c(16,16), bty = "n")
   firstRunLeft <- FALSE
}
#save first graph -- don't let second graphing operation overwrite it
par(new = TRUE)

#now over-plot fraction of population in largest site through time
#set maximum y to 1 because this graph's y-axis displays decimal fraction of population
Max_y_2 <- 1
#draw graph
plot(x = TiticacaChronWithPercLargest$midp[TiticacaChronWithPercLargest$survey_code == s_code],y = TiticacaChronWithPercLargest$poplargest_perc[TiticacaChronWithPercLargest$survey_code == s_code], xlim = c(-2000, 2000), ylim = c(0,Max_y_2), type = "o", col = colorpal[colorIndex], lty = 2, pch = 16, axes = FALSE, ann = FALSE)
axis(2, at=seq(0,Max_y_2,.2), ylim = c(0,Max_y_2))
mtext(2,text="Fraction in Largest", line=2, cex = .8)
axis(1, at=seq(-2000,2000,250))
mtext(1,text="Years", line=2, cex = .8)

#now start new graph and again plot normalized population through time
#start new graph
par(new = FALSE)
```

```r
#since this plot is on the right side of the page, change left and right margins
par(mar = c(4, 3, 1, 2))
#draw graph
plot(x = TiticacaChronWithPopEst$midp[TiticacaChronWithPopEst$survey_code == s_code],y = TiticacaChronWithPopEst$pop_norm[TiticacaChronWithPopEst$survey_code == s_code], xlim = c(-2000, 2000), ylim = c(0,Max_y_1), type = "o", col = colorpal[colorIndex], lty = 1, pch = 17, axes = FALSE, ann = FALSE)
axis(2, at=seq(0,Max_y_1,20), ylim = c(0,Max_y_1))
title(main=TiticacaChronWithPopEst$survey_name[TiticacaChronWithPopEst$survey_code == s_code & TiticacaChronWithPopEst$phase_code == "a"])
#create legend only for top graphs
if (firstRunRight == TRUE) {
    legend(x = -2100, y = 110, cex = .9, pt.cex = 1, y.intersp = 1.7, seg.len = 3, legend = c("Normalized\nPopulation Size", "Number of\nSites"),lty=c(1,2),pch=c(17,17), bty = "n")
    firstRunRight <- FALSE
}
#save first graph -- don't let second graphing operation overwrite it
par(new = TRUE)

#now over-plot number of sites through time
#get maximum number of sites
Max_y_2 <- max(TiticacaChronWithNumSites$numsites,na.rm = TRUE)
#draw graph
plot(x = TiticacaChronWithNumSites$midp[TiticacaChronWithNumSites$survey_code == s_code],y = TiticacaChronWithNumSites$numsites[TiticacaChronWithNumSites$survey_code == s_code], xlim = c(-2000, 2000), ylim = c(0,Max_y_2), type = "o", col = colorpal[colorIndex], lty = 2, pch = 17, axes = FALSE, ann = FALSE)
axis(4, at=seq(0,Max_y_2,50), ylim = c(0,Max_y_2))
mtext(4,text="# of Sites", line=2, cex = .8)
axis(1, at=seq(-2000,2000,250))
mtext(1,text="Years", line=2, cex = .8)
```

```

    #start new graph
    par(new = FALSE)
}
#internal script end-----------------------------------------------------

#external files saver start----------------------------------------------
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

D.3 R: Spatial Statistics: Calculation Scripts (C:/Real/SantaFe/R/5_SpatialCalculate/)

Listing D.36: SpatStatPrelim_EXPERIMENTAL.R

```
#THIS SCRIPT DOES PRELIMINARY WORK FOR ANY ANALYSIS THAT USES THE spatstat PACKAGE (E.G., SPATIAL CLUSTER ANALYSIS). IN OTHER WORDS, IT DOES THE spatstat WORK WHICH IS NOT SPECIFIC TO A PARTICULAR spatstat ANALYTICAL METHOD (E.G., RIPLEY'S K). SPECIFICALLY, IT CREATES OBJECTS OF spatstat's CLASS "ppp", WHICH CAN THEN BE USED AS INPUT TO spatstat's FUNCTIONS.
#THIS SCRIPT PREPARES DATA FOR EACH OF THE SURVEY DATASETS AND FOR THE SOUTHERN CONTIGUOUS SURVEYS COMBINED DATASET (ONCE THE ARAPA-TARACO DATA IS ADDED, THIS WORK SHOULD ALSO BE PERFORMED ON THE COMBINED HUANCANE-PUTINA AND ARAPA-TARACO DATA).

#external files loader start---------------------------------------------
#Load the spatstat package.
library(spatstat)
#Load the maptools package, which will perform an intermediate step in the conversion of shapefiles into spatstat-supported data types.
library(maptools)
#Load the rgeos package, which will be used to create a union from
```

```
multiple shapefiles for the southern contiguous surveys.
library(rgeos)
#set working directory
setwd("C:/Real/SantaFe/R/")
#run script to calculate population size for each component in the components dataframe (multi-sector aggregated)
#this creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("2_Calculate/3_SystemicContext/CalculateBandyPopulationEstimateByComponent_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("TiticacaDataSectorAggr", "PreservedFromCaller"))])
#Load the modified chronology tables. This creates a dataframe called TiticacaChron
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("2_Calculate/1_InitialDatabaseModifications/CalculateChron_EXPERIMENTAL.R")
#Use maptools to convert the survey boundary shapefiles into the sp package's class "SpatialPolygons". To ensure that the object is of class "SpatialPolygons" rather than "SpatialPolygonsDataFrame", use as(,"SpatialPolygons")
#For the code further below to function properly, the first two letters in these object names must match the survey codes used in TiticacaChron$survey_code.
hp_bound_sp <- as(readShapeSpatial("1_Source/shapefiles/HuancanePutina/HuancanePutinaSurveyBoundary.shp"), "SpatialPolygons")
is_bound_sp <- as(readShapeSpatial("1_Source/shapefiles/IslandSun/IslandSun.shp"), "SpatialPolygons")
jp_bound_sp <- as(readShapeSpatial("1_Source/shapefiles/JuliPomata/JuliPomata.shp"), "SpatialPolygons")
```

```r
kt_bound_sp <- as(readShapeSpatial("1_Source/shapefiles/Katari/KatariValleySurveyBoundary.shp"), "SpatialPolygons")
pk_bound_sp <- as(readShapeSpatial("1_Source/shapefiles/Pukara/PukaraValley.shp"), "SpatialPolygons")
qt_bound_sp <- as(readShapeSpatial("1_Source/shapefiles/QawraThaki/QawraThakiSurveyBoundary.shp"), "SpatialPolygons")
tr_bound_sp <- as(readShapeSpatial("1_Source/shapefiles/TaracoPen/TaracoPeninsulaSurveyBoundary.shp"), "SpatialPolygons")
tm_bound_sp <- as(readShapeSpatial("1_Source/shapefiles/TiwanakuCentral/TiwanakuCentralValleySurveyBoundary.shp"), "SpatialPolygons")
tl_bound_sp <- as(readShapeSpatial("1_Source/shapefiles/TiwanakuLower/TiwanakuLowerValleySurveyBoundary.shp"), "SpatialPolygons")
#external files loader end-------------------------------------------

#internal script start-----------------------------------------------
#Remove the "Gaps" (intersurvey) rows from the chronology dataframe, since spatstat analysis won't be performed on the intersurvey data.
TiticacaChron <- TiticacaChron[TiticacaChron$survey_code != "gp",]
TiticacaChron <- droplevels(TiticacaChron)
#Create a character vector holding all of the remaining survey codes. This will help with iteration.
surveyCodes <- unique(TiticacaChron$survey_code)
#Convert the SpatialPolygons objects to the spatstat package's class of "owin".
#Loop through the survey codes, which serve as prefixes for both the sp and the spatstat objects.
for (survey_code in surveyCodes) {
    assign(
        #Define the name for the new spatstat object.
        paste(survey_code, "_bound_owin", sep = ""),
        #Convert the sp object to a spatstat object.
        as(get(paste(survey_code, "_bound_sp", sep = "")), "owin")
    )
}
#Also create a new sp object for the southern contiguous surveys, and then
```

```
convert it to an owin object.
southernUnion1 <- gUnion(tm_bound_sp, tl_bound_sp)
southernUnion2 <- gUnion(southernUnion1, tr_bound_sp)
southernUnion_bound_sp <- gUnion(southernUnion2, kt_bound_sp)
southernUnion_bound_owin <- as(southernUnion_bound_sp, "owin")
#At present, this creates sp/owin objects with 2 extremely small holes between the Taraco Peninsula and the Lower Tiwanaku Valley. This is caused by extremely small differences (about a billionth of a meter) in 2 pairs of coordinates. In ArcGIS, neither manual editing with snapping nor manually changing the coordinates seems to help, so it probably would be best to reduce the precision of the coordinates in both shapefiles.  I don't imagine these holes will cause any problem, but this should be fixed in the future.

#For each phase of each survey, create 9 point-pattern objects of class "ppp". "ppp" is the fundamental class of the spatstat package. These 9 will be: 1) all habitation components, 2) habitation components with confident evidence of corporate ritual, 3) habitation components with confident or possible evidence of corporate ritual, 4) components with confident evidence of human burial, 5) components with confident or possible evidence of human burial, 6)components with confident evidence of defensive walls, 7) components with confident or possible evidence of defensive walls, 8) components with a population equal to or greater than 60, 9) components with a population equal to or greater than 120.
#Many of these ppp objects reject a small number of points as being outside the window; in the future this should be changed in at least some cases, probably by modifying the original shapefiles. There are also a few warnings about duplicate points -- investigate this.
#Loop through each phase of each survey.
for (sp_code in TiticacaChron$survey_phase) {
   #Define which owin object will be used as the ppp object's window.
   currentBound <- get(paste(substr(sp_code, 1, 2), "_bound_owin", sep = ""))
   #Define the all-habitation ppp object's name and then create the object.
```

```r
  assign(
    #Define name for all-habitation ppp object, for this phase of this survey.
    paste(sp_code, "_ppp_hab", sep = ""),
    #Create all-habitation ppp object, for this phase of this survey.
    ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$hab > 0], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$hab > 0], window = currentBound)
  )
  #Do the same for habitation components with confident evidence of corporate ritual.
  assign(
    paste(sp_code, "_ppp_ritConf", sep = ""),
    ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$hab > 0 & TiticacaDataSectorAggr$rit == 1], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$hab > 0 & TiticacaDataSectorAggr$rit == 1], window = currentBound)
  )
  #Do the same for habitation components with confident or possible evidence of corporate ritual.
  assign(
    paste(sp_code, "_ppp_ritPoss", sep = ""),
    ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$hab > 0 & TiticacaDataSectorAggr$rit > 0], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$hab > 0 & TiticacaDataSectorAggr$rit > 0], window = currentBound)
  )
  #Do the same for components with confident evidence of human burial.
  assign(
```

```
    paste(sp_code, "_ppp_burConf", sep = ""),
    ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$bur == 1], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$bur == 1], window = currentBound)
)
#Do the same for components with confident or possible evidence of human burial.
assign(
    paste(sp_code, "_ppp_burPoss", sep = ""),
    ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$bur > 0], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$bur > 0], window = currentBound)
)
#Do the same for components with confident evidence of defensive walls.
assign(
    paste(sp_code, "_ppp_defConf", sep = ""),
    ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$def == 1], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$def == 1], window = currentBound)
)
#Do the same for components with confident or possible evidence of defensive walls.
assign(
    paste(sp_code, "_ppp_defPoss", sep = ""),
    ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$def > 0], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$def > 0], window = currentBound)
```

```
    )
    #Do the same for medium habitation sites.
    #IF THE POPULATION PARAMETER HERE IS CHANGED, THE TITLES IN THE GRAPH SCRIPTS MUST ALSO BE CHANGED.
    assign(
        paste(sp_code, "_ppp_habMed", sep = ""),
        ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$pop >= 60 & is.na(TiticacaDataSectorAggr$pop) == FALSE], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$pop >= 60 & is.na(TiticacaDataSectorAggr$pop) == FALSE], window = currentBound)
    )
    #Do the same for large habitation sites.
    #IF THE POPULATION PARAMETER HERE IS CHANGED, THE TITLES IN THE GRAPH SCRIPTS MUST ALSO BE CHANGED.
    assign(
        paste(sp_code, "_ppp_habBig", sep = ""),
        ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$pop >= 120 & is.na(TiticacaDataSectorAggr$pop) == FALSE], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$survey_phase == sp_code & TiticacaDataSectorAggr$pop >= 120 & is.na(TiticacaDataSectorAggr$pop) == FALSE], window = currentBound)
    )
}
#Do the same for the combined southern contiguous surveys.
#Use unique() on the ppp objects so that duplicate points are removed (duplicates are frequent due to the coarseness of the chronology, e.g. Tiwa IV and V components are both used for the Tiwanaku phase).
for (temp_group in c("ef","mf", "lf", "tw", "al", "in", "co")) {
    assign(
        paste("southernUnion_", temp_group, "_ppp_hab", sep = ""),
        unique(ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_
```

```
temporal == temp_group & TiticacaDataSectorAggr$hab > 0], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$hab > 0], window = southernUnion_bound_owin))
)
assign(
  paste("southernUnion_", temp_group, "_ppp_ritConf", sep = ""),
  unique(ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$hab > 0 & TiticacaDataSectorAggr$rit == 1], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$hab > 0 & TiticacaDataSectorAggr$rit == 1], window = southernUnion_bound_owin))
)
assign(
  paste("southernUnion_", temp_group, "_ppp_ritPoss", sep = ""),
  unique(ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$hab > 0 & TiticacaDataSectorAggr$rit > 0], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$hab > 0 & TiticacaDataSectorAggr$rit > 0], window = southernUnion_bound_owin))
)
assign(
  paste("southernUnion_", temp_group, "_ppp_burConf", sep = ""),
  unique(ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$bur == 1], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_
```

```
group & TiticacaDataSectorAggr$bur == 1], window = southernUnion_bound_owin))
  )
  assign(
    paste("southernUnion_", temp_group, "_ppp_burPoss", sep = ""),
    unique(ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$bur > 0], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$bur > 0], window = southernUnion_bound_owin))
  )
  assign(
    paste("southernUnion_", temp_group, "_ppp_defConf", sep = ""),
    unique(ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$def == 1], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$def == 1], window = southernUnion_bound_owin))
  )
  assign(
    paste("southernUnion_", temp_group, "_ppp_defPoss", sep = ""),
    unique(ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$def > 0], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$def > 0], window = southernUnion_bound_owin))
  )
  assign(
    paste("southernUnion_", temp_group, "_ppp_habMed", sep = ""),
```

```r
        unique(ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$pop >= 60 & is.na(TiticacaDataSectorAggr$pop) == FALSE], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$pop >= 60 & is.na(TiticacaDataSectorAggr$pop) == FALSE], window = southernUnion_bound_owin))
    )
    assign(
        paste("southernUnion_", temp_group, "_ppp_habBig", sep = ""),
        unique(ppp(x = TiticacaDataSectorAggr$eutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$pop >= 120 & is.na(TiticacaDataSectorAggr$pop) == FALSE], y = TiticacaDataSectorAggr$nutm19[TiticacaDataSectorAggr$group_spatial == "south_cont" & TiticacaDataSectorAggr$group_temporal == temp_group & TiticacaDataSectorAggr$pop >= 120 & is.na(TiticacaDataSectorAggr$pop) == FALSE], window = southernUnion_bound_owin))
    )
}
```

Listing D.37: NearestNeighborCalculate_EXPERIMENTAL.R

```r
#THIS SCRIPT PERFORMS NEAREST NEIGHBOR CLUSTER ANALYSIS ON EACH OF THE SURVEY DATASETS AND ON THE SOUTHERN CONTIGUOUS SURVEYS COMBINED DATASET (ONCE THE ARAPA-TARACO DATA IS ADDED, IT SHOULD ALSO BE PERFORMED ON THE COMBINED HUANCANE-PUTINA AND ARAPA-TARACO DATA). IT DOES THIS SEPARATELY FOR 1) ALL HABITATION COMPONENTS, 2) HABITATION COMPONENTS WITH CONFIDENT EVIDENCE OF CORPORATE RITUAL, 3) HABITATION COMPONENTS WITH CONFIDENT OR POSSIBLE EVIDENCE OF CORPORATE RITUAL, 4) COMPONENTS WITH CONFIDENT EVIDENCE OF HUMAN BURIAL, 5) COMPONENTS WITH CONFIDENT OR POSSIBLE EVIDENCE OF HUMAN BURIAL, 6) COMPONENTS WITH CONFIDENT EVIDENCE OF DEFENSIVE WALLS, 7) COMPONENTS WITH CONFIDENT OR POSSIBLE EVIDENCE OF DEFENSIVE WALLS, 8) HABITATION COMPONENTS WITH MEDIUM OR
```

```r
LARGE POPULATION SIZE, 9) HABITATION COMPONENTS WITH LARGE POPULATION SIZE.

#external files loader start-------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#Run script to prepare data for cluster analysis. This creates a large number of objects of the spatstat package's class "ppp".
#This also creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#This also creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("5_SpatialCalculate/SpatStatPrelim_EXPERIMENTAL.R")
#I typically would use remove() here to get rid of extraneous objects, but in this case I won't.
#external files loader end---------------------------------------------

#internal script start-------------------------------------------------
#Calculate the Clark and Evans (1954) nearest neighbor R index, for each ppp object. Use clarkevans.test() so that a Monte Carlo p-value is also computed. clarkevans.test() will output "htest" objects.
#Loop through each phase of each survey.
for (sp_code in TiticacaChron$survey_phase) {
  #Loop through the 9 types of ppp objects (all habitation, habitation with confident ritual, habitation with confident or possible ritual, confident burial, confident or possible burial, confident defensive, confident or possible defensive, medium to large sites, large sites).
  for (comp_type in c("_hab", "_ritConf", "_ritPoss", "_burConf", "_burPoss", "_defConf", "_defPoss", "_habMed", "_habBig")) {
    #Define which ppp object will be used.
    currentPpp <- get(paste(sp_code, "_ppp", comp_type, sep = ""))
    #Define the htest object's name and then create the object.
    assign(
```

```r
      #Define name for the htest object, for this component type and this phase of this survey.
      paste(sp_code, "_nnR", comp_type, sep = ""),
      #Create htest object, for this component type and this phase of this survey.
      clarkevans.test(currentPpp, correction = c("cdf"), alternative = c("two.sided"), nsim = 99)
    )
  }
}
#Do the same for the combined southern contiguous surveys.
for (temp_group in c("ef","mf", "lf", "tw", "al", "in", "co")) {
  #Loop through the 9 types of ppp objects.
  for (comp_type in c("_hab", "_ritConf", "_ritPoss", "_burConf", "_burPoss", "_defConf", "_defPoss", "_habMed", "_habBig")) {
    #Define which ppp object will be used.
    currentPpp <- get(paste("southernUnion_", temp_group, "_ppp", comp_type, sep = ""))
    #Define the htest object's name and then create the object.
    assign(
      #Define name for the htest object, for this component type and this temporal group.
      paste("southernUnion_", temp_group, "_nnR", comp_type, sep = ""),
      #Create htest object, for this component type and this temporal group.
      clarkevans.test(currentPpp, correction = c("cdf"), alternative = c("two.sided"), nsim = 99)
    )
  }
}
#This produces some warnings about no non-missing arguments to min/max; check to make sure these warnings are only produced for ppp objects without any points.

#Collect the R and p values from each htest object, into a dataframe.
```

```r
#Create vectors that will eventually be columns in the dataframe.
surveyVals <- character()
phaseVals <- character()
typeVals <- character()
rVals <- numeric()
pVals <- numeric()
#Begin with the individual surveys.
#Loop through each phase of each survey.
for (sp_code in TiticacaChron$survey_phase) {
  #Loop through the 9 types.
  for (comp_type in c("_hab", "_ritConf", "_ritPoss", "_burConf", "_burPoss", "_defConf", "_defPoss", "_habMed", "_habBig")) {
    #Define which htest object will be used.
    currentHtest <- get(paste(sp_code, "_nnR", comp_type, sep = ""))
    #Add the survey, phase, and type identifiers, and the R and p values, to the vectors.
    surveyVals <- c(surveyVals, substr(sp_code, 1, 2))
    phaseVals <- c(phaseVals, substr(sp_code, 3, 3))
    typeVals <- c(typeVals, gsub("_", "", comp_type, fixed = TRUE))
    #Use as.numeric() to get rid of the name.
    rVals <- c(rVals, as.numeric(currentHtest$statistic))
    pVals <- c(pVals, currentHtest$p.value)
  }
}
#Now add the results for the combined southern contiguous surveys.
for (temp_group in c("ef","mf", "lf", "tw", "al", "in", "co")) {
  for (comp_type in c("_hab", "_ritConf", "_ritPoss", "_burConf", "_burPoss", "_defConf", "_defPoss", "_habMed", "_habBig")) {
    #Define which htest object will be used.
    currentHtest <- get(paste("southernUnion_", temp_group, "_nnR", comp_type, sep = ""))
    #Add the survey, phase, and type identifiers, and the R and p values, to the vectors.
    surveyVals <- c(surveyVals, "soco")
    phaseVals <- c(phaseVals, temp_group)
```

```r
        typeVals <- c(typeVals, gsub("_", "", comp_type, fixed = TRUE))
        rVals <- c(rVals, as.numeric(currentHtest$statistic))
        pVals <- c(pVals, currentHtest$p.value)
    }
}
#Combine the vectors into a dataframe.
clarkEvansResults <- data.frame(survey = surveyVals, phase = phaseVals, type = typeVals, r = rVals, p = pVals)
```

Listing D.38: RipleysKcalculate_EXPERIMENTAL.R

```r
#THIS SCRIPT PERFORMS RIPLEY'S K FUNCTION CLUSTER ANALYSIS ON EACH OF THE SURVEY DATASETS AND ON THE SOUTHERN CONTIGUOUS SURVEYS COMBINED DATASET (ONCE THE ARAPA-TARACO DATA IS ADDED, IT SHOULD ALSO BE PERFORMED ON THE COMBINED HUANCANE-PUTINA AND ARAPA-TARACO DATA). IT DOES THIS SEPARATELY FOR 1) ALL HABITATION COMPONENTS, 2) HABITATION COMPONENTS WITH CONFIDENT EVIDENCE OF CORPORATE RITUAL, 3) HABITATION COMPONENTS WITH CONFIDENT OR POSSIBLE EVIDENCE OF CORPORATE RITUAL, 4) COMPONENTS WITH CONFIDENT EVIDENCE OF HUMAN BURIAL, 5) COMPONENTS WITH CONFIDENT OR POSSIBLE EVIDENCE OF HUMAN BURIAL, 6) COMPONENTS WITH CONFIDENT EVIDENCE OF DEFENSIVE WALLS, 7) COMPONENTS WITH CONFIDENT OR POSSIBLE EVIDENCE OF DEFENSIVE WALLS, 8) HABITATION COMPONENTS WITH MEDIUM OR LARGE POPULATION SIZE, 9) HABITATION COMPONENTS WITH LARGE POPULATION SIZE.

#external files loader start-----------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#Run script to prepare data for cluster analysis. This creates a large number of objects of the spatstat package's class "ppp".
#This also creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#This also creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#note that this script re-sets the working directory, but at the time of
```

```
writing it is the same directory as set above
source("5_SpatialCalculate/SpatStatPrelim_EXPERIMENTAL.R")
#I typically would use remove() here to get rid of extraneous objects, but in this case I won't.
#external files loader end---------------------------------------------------

#internal script start------------------------------------------------------
#Calculate Ripley's K function, for each ppp object. This will output objects of class "fv".
#Use envelope() so that a Monte Carlo significance band is also obtained (for the line representing randomness).
#Use spatstat's Lest(), rather than Kest(), so that this transformation is automatically applied: sqrt(K(r) / pi) .  This transformation makes the line representing randomness equivalent to y = x (where y is L and x is r). Thus in the plot below, a horizontal line (y = 0) representing randomness can be obtained by subtracting r from L.
#For edge effects, use the isotropic correction method (I haven't investigated the options in depth, but this seems to be a good choice). Also prevent reversion to another correction method even if the dataset is large, by setting the "nlarge" parameter to infinity.
#The values of "nsim" and "nrank" determine the significance level of the significance band. For the default pointwise method, the significance level is equal to 2 * nrank/(1 + nsim). Therefore, my values of nrank = 5 and nsim = 199 create significance bands with a significance level of .05.
#Loop through each phase of each survey.
for (sp_code in TiticacaChron$survey_phase) {
  #Loop through the 9 types of ppp objects (all habitation, habitation with confident ritual, habitation with confident or possible ritual, confident burial, confident or possible burial, confident defensive, confident or possible defensive, medium to large sites, large sites).
  for (comp_type in c("_hab", "_ritConf", "_ritPoss", "_burConf", "_burPoss", "_defConf", "_defPoss", "_habMed", "_habBig")) {
    #Define which ppp object will be used.
    currentPpp <- get(paste(sp_code, "_ppp", comp_type, sep = ""))
```

```
        #Define the fv object's name and then create the object.
        assign(
            #Define name for fv object, for this component type and this phase of this survey.
            paste(sp_code, "_ripKtransL", comp_type, sep = ""),
            #Create fv object, for this component type and this phase of this survey. IF nrank OR nsim IS CHANGED, THE TITLES OF THE PLOTS IN RipleysKgraph.R ALSO NEED TO BE CHANGED.
            envelope(currentPpp, fun = Lest, correction = c("isotropic"), nlarge = Inf, nrank = 5, nsim = 199)
        )
    }
}
#Do the same for the combined southern contiguous surveys.
for (temp_group in c("ef","mf", "lf", "tw", "al", "in", "co")) {
    #Loop through the 9 types of ppp objects.
    for (comp_type in c("_hab", "_ritConf", "_ritPoss", "_burConf", "_burPoss", "_defConf", "_defPoss", "_habMed", "_habBig")) {
        #Define which ppp object will be used.
        currentPpp <- get(paste("southernUnion_", temp_group, "_ppp", comp_type, sep = ""))
        #The larger sample size of the habitation components of the combined southern contiguous surveys (relative to the individual surveys or to the other component types of the combined southern contiguous surveys) means that a lower significance level (.01) can be used here without dramatically altering the results.
        if (comp_type == "_hab") {simRankVal <- 1} else {simRankVal <- 5}
        #Define the fv object's name and then create the object.
        assign(
            #Define name for fv object, for this component type and this temporal group.
            paste("southernUnion_", temp_group, "_ripKtransL", comp_type, sep = ""),
            #Create fv object, for this component type and this temporal group. IF nrank OR nsim IS CHANGED, THE TITLES OF THE PLOTS IN
```

```
RipleysKgraph.R ALSO NEED TO BE CHANGED.
            envelope(currentPpp, fun = Lest, correction = c("isotropic"), nlarge = Inf, nrank = simRankVal, nsim = 199)
        )
    }
}
```

D.4 R: Spatial Statistics: Graphing Scripts (C:/Real/SantaFe/R/6_SpatialGraphScripts/)

Listing D.39: NearestNeighborGraph_EXPERIMENTAL.R

```
#THIS SCRIPT GRAPHS RESULTS OF CLARK-EVANS NEAREST-NEIGHBOR CLUSTER ANALYSIS.

#external files loader start-------------------------------------------
#load ggplot2 for graphing.
library(ggplot2)
#set working directory
setwd("C:/Real/SantaFe/R/")
#Run script to perform nearest neighbor cluster analysis. This creates a dataframe called "clarkEvansResults".
#This also creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called "TiticacaDataSectorAggr".
#This also creates a modified version of the chronology .csv files, a dataframe called "TiticacaChron".
#Note that this script re-sets the working directory, but at the time of writing it is the same directory as set above.
source("5_SpatialCalculate/NearestNeighborCalculate_EXPERIMENTAL.R")
#remove all objects except the intended products of the script from the workspace, so that they are not present as further scripts run
remove(list= ls()[!(ls() %in% c("clarkEvansResults","TiticacaDataSectorAggr","TiticacaChron","PreservedFromCaller"))])

```

```
#create image output pdf file. This will also be changed below after the first graph is finished.
#first specify filename without extension
ImageName <- "GraphNearestNeighborSurveys_page1"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")
#external files loader end-----------------------------------------------

#internal script start---------------------------------------------------
#Create a new column in the dataframe, to store a boolean for whether the p-value is greater or less than .05 (i.e., if the R value is statistically significant for R != 1, at an alpha level of .05). In the plot, there will be two different types of points based on this boolean value.
clarkEvansResults$sigPass <- FALSE
clarkEvansResults$sigPass[clarkEvansResults$p <= .05 & is.na(clarkEvansResults$p) == FALSE] <- TRUE
#Remove types that won't be used in this graph to reduce clutter.
clarkEvansResults <- clarkEvansResults[clarkEvansResults$type != "habBig" & clarkEvansResults$type != "burConf" & clarkEvansResults$type != "defConf",]
clarkEvansResults <- droplevels(clarkEvansResults)
#Reorder the factor levels for the type field, so that the plotting/legend order is correct.
clarkEvansResults$type <- factor(clarkEvansResults$type, levels = c("hab", "habMed", "ritConf", "ritPoss", "burPoss", "defPoss"))

#Create a list of ggplot elements that will be shared across all of the plots. This can then be simply added to the ggplots.
commonPlot <- list(
  #Add a points layer. Distinguish component types by the inner fill
```

```
    #Set the fill color of the points. Distinguish statistical significance by the points' border color. Set the shape to a shape that can have colors specified for both the inner fill and the outer border. Set the size and the stroke (width of outer border).
    geom_point(mapping = aes(fill = type, color = sigPass), shape = 21, size = 2, stroke = 2),
    #Set the axis titles' size and the Y axis labels' size. Also, because the expression used to allow >= in one of the legend's items causes right alignment, set legends' text alignment to the left.
    theme(axis.title = element_text(size = 12), axis.text.y = element_text(size = 12), legend.text.align = 0),
    #Set the colors which will distinguish p-values above .05 from p-values equal to or below .05. Also create a title for the legend for these colors.
    scale_color_manual(values = c("#FFFFFF", "#000000"), name = "p <= .05 for R != 1"),
    #Set the colors which wil distinguish the component types. Also set the legend's title, item height, and item labels.
    #THE PLOTTING ORDER AND LEGEND LABEL ORDER OF THE COMPONENT TYPES IS DETERMINED BY THE FACTOR LEVEL ORDER OF "type". KEEP THIS IN MIND WHEN SPECIFYING THE LABELS, AND SEE THE FACTOR RE-ORDERING ABOVE.
    scale_fill_manual(values = c("#FF968D", "#880000", "#000099", "#00BFC4", "#FFFF00", "#7CAE00"), name = "Component Type", guide = guide_legend(keyheight = 1.75), labels = c("\nHabitation\n", "\nHabitation with\nPopulation >= 60\n", "\nHabitation with\nConfident Evidence\nfor Corporate Ritual\n", "\nHabitation with\nConfident or\nPossible Evidence \nfor Corporate Ritual\n", "\nComponents with\nConfident or\nPossible Evidence\nfor Human Burial\n", "\nComponents with\nConfident or\nPossible Evidence\nfor Defensive Walls\n"))
)

#Create three separate dataframes, two to split up the individual surveys to put them on different pages, and one for the combined southern contiguous surveys.
clarkEvansResultsSurveys1 <- clarkEvansResults[clarkEvansResults$survey %
```

```
in% c("pk", "hp", "jp", "is", "tr"),]
clarkEvansResultsSurveys1 <- droplevels(clarkEvansResultsSurveys1)
clarkEvansResultsSurveys2 <- clarkEvansResults[clarkEvansResults$survey %in% c("kt", "tl", "tm", "qt"),]
clarkEvansResultsSurveys2 <- droplevels(clarkEvansResultsSurveys2)
clarkEvansResultsSoco <- clarkEvansResults[clarkEvansResults$survey == "soco",]
clarkEvansResultsSoco <- droplevels(clarkEvansResultsSoco)
#Reorder the factor levels for the survey field, so that the plotting order is correct.
clarkEvansResultsSurveys1$survey <- factor(clarkEvansResultsSurveys1$survey, levels = c("pk", "hp", "jp", "is", "tr"))
clarkEvansResultsSurveys2$survey <- factor(clarkEvansResultsSurveys2$survey, levels = c("kt", "tl", "tm", "qt"))
#Create labels for the survey facets.
survey_labels <- c(hp = "Huancane-P.", is = "Is. of the Sun", jp = "Juli-Pomata", kt = "Katari", pk = "Pukara", "qt" = "Qawra Thaki", tl = "Tiwanaku Lower", tm = "Tiwanaku Middle", tr = "Taraco Pen.")

#Create the plot for the first set of individual surveys.
#Set the dataset, and set the x and y variables.
nnRplotSurv1 <- ggplot(data = clarkEvansResultsSurveys1, mapping = aes(x = phase, y = r))
#Add the ggplot elements which are common to all the plots in this script.
nnRplotSurv1 + commonPlot +
   #Now add any remaining elements.
   #Facet the plot by survey, and label these facets with better labels.
   facet_grid(. ~ survey, labeller = labeller(survey = survey_labels)) +
   #Set the facet labels' size.
   theme(strip.text = element_text(size = 11)) +
   #Add a plot title and axes titles.
   labs(title = "Cluster Analysis: Nearest Neighbor (Clark and Evans 1954)", x = "Phase", y = "R")
#save image i.e. shut down graphics device
dev.off()
```

```r
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)

#create image output pdf file. This will be changed again below.
#first specify filename without extension
ImageName <- "GraphNearestNeighborSurveys_page2"
#specify image dimensions in inches
ImageWidth <- 8.3
ImageHeight <- 6.5
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#Create the plot for the second set of individual surveys.
#Set the dataset, and set the x and y variables.
nnRplotSurv2 <- ggplot(data = clarkEvansResultsSurveys2, mapping = aes(x = phase, y = r))
#Add the ggplot elements which are common to all the plots in this script.
nnRplotSurv2 + commonPlot +
  #Now add any remaining elements.
  #Facet the plot by survey, and label these facets with better labels.
  facet_grid(. ~ survey, labeller = labeller(survey = survey_labels)) +
  #Set the facet labels' size.
  theme(strip.text = element_text(size = 11)) +
  #Add a plot title and axes titles.
  labs(title = "Cluster Analysis: Nearest Neighbor (Clark and Evans 1954)", x = "Phase", y = "R")
#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)

#create image output pdf file.
#first specify filename without extension
ImageName <- "GraphNearestNeighborSoco"
```

```
#specify image dimensions in inches
ImageWidth <- 6.5
ImageHeight <- 8.3
#run script to create pdf based on 3 above input variables
#this script inherits the working directory specified above
source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

#Reorder the factor levels for the phase field, so that the plotting order is correct.
clarkEvansResultsSoco$phase <- factor(clarkEvansResultsSoco$phase, levels = c("ef", "mf", "lf", "tw", "al", "in", "co"))

#Create the plot for the combined southern contiguous surveys.
#Set the dataset, and set the x and y variables.
nnRplotSoco <- ggplot(data = clarkEvansResultsSoco, mapping = aes(x = phase, y = r))
#Add the ggplot elements which are common to all the plots in this script.
nnRplotSoco + commonPlot +
  #Now add any remaining elements.
  #Add a plot title and axes titles.
  labs(title = "Cluster Analysis: Nearest Neighbor (Clark and Evans 1954)\nCombined Southern Contiguous Surveys", x = "Phase", y = "R") +
  #Set the size for the X axis labels (this can't be done in commonPlot because the other plot can't handle large X axis text size).
  theme(axis.text.x = element_text(size = 12))

#save image i.e. shut down graphics device
dev.off()
#Embed fonts. See the script GraphOutputPDF.R
embed_fonts(ImageNameModi3)
```

Listing D.40: RipleysKgraph_EXPERIMENTAL.R

```
#THIS SCRIPT GRAPHS RESULTS OF RIPLEY'S K FUNCTION CLUSTER ANALYSIS.

```

```
#external files loader start--------------------------------------------------
#set working directory
setwd("C:/Real/SantaFe/R/")
#Run script to perform Ripley's K function cluster analysis. This creates a large number of objects of the spatstat package's class "fv".
#This also creates a modified version of the survey data .csv file and the inter-survey .csv file, a dataframe called TiticacaDataSectorAggr
#This also creates a modified version of the chronology .csv files, a dataframe called TiticacaChron
#note that this script re-sets the working directory, but at the time of writing it is the same directory as set above
source("5_SpatialCalculate/RipleysKcalculate_EXPERIMENTAL.R")
#I typically would use remove() here to get rid of extraneous objects, but in this case I won't.
#In contrast to my other scripts, "GraphOutputPDF.R" is source()ed below, rather than within the external files loader section.
#external files loader end----------------------------------------------------

#internal script start--------------------------------------------------------
#For each component type of each phase of each survey, plot the transformed results of Ripley's K function. Subtract r from all of the y variables; this makes a visually-convenient line at y = 0 equivalent to the expectation for randomness.
#For better comparability, make all of the panels have the same range for the X-axis (this is not practical for the Y-axis, however, because of the great differences in Y-value ranges between the different panels). Examine the fv objects created above to get the maximum x. Since the maximum X is determined by the boundary window rather than the points, this can be done just once for each survey.
#Initialize variable to store the maximum X.
maxX <- 0
#Loop through each each survey. The vector "surveyCodes" was created in SpatStatPrelim.R .
for (survey_code in surveyCodes) {
	#Get a fv object corresponding to this survey (any will work; the
```

```
        result will be the same regardless).
        currentFv <- get(paste(survey_code, "a_ripKtransL_hab", sep = ""))
        #Get this fv object's maximum x value.
        currentMaxX <- max(currentFv$r)
        if (currentMaxX > maxX) {maxX <- currentMaxX}
}
#Nothing similar is necessary for the combined southern contiguous surveys, because all the fv objects were created with the same owin.
#Loop through the 9 types of fv objects (all habitation, habitation with confident ritual, habitation with confident or possible ritual, confident burial, confident or possible burial, confident defensive, confident or possible defensive, medium to large sites, large sites).
for (comp_type in c("_hab", "_ritConf", "_ritPoss", "_burConf", "_burPoss", "_defConf", "_defPoss", "_habMed", "_habBig")) {
    #create image output pdf file
    #first specify filename without extension
    ImageName <- paste("RipleysK", comp_type, sep = "")
    #specify image dimensions in inches
    ImageWidth <- 6.5
    ImageHeight <- 8.3
    #run script to create pdf based on 3 above input variables
    #this script inherits the working directory specified above
    source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

    #Set up multiple panels.
    par(mfrow=c(5,3))
    #Margins.
    par(mar = c(3, 2, 4, 2))
    par(oma = c(1, 1, 5, 0))
    #Loop through each phase of each survey.
    for (sp_code in TiticacaChron$survey_phase) {
        #Define which fv object will be plotted now.
        currentFv <- get(paste(sp_code, "_ripKtransL", comp_type, sep = ""))
        #If Lest() had 0 points or only 1 point in the input ppp object, the result will be a vector composed of only NaN values. Prevent
```

```
    plotting in such cases.
    if (all(is.nan(currentFv$obs)) == FALSE) {
      #Except for the all habitation fv objects, prevent plotting if there was insufficient data to calculate a significance band.
      if (comp_type == "_hab" || all(is.na(currentFv$hi)) == FALSE) {
        #Create the title for this panel.
        panelTitle <- gsub("_", " ", paste(TiticacaChron$survey_name[TiticacaChron$survey_phase == sp_code], TiticacaChron$phase_name_basin[TiticacaChron$survey_phase == sp_code], sep = "\n"), fixed = TRUE)
        #Plot the fv object for this phase of this survey. Subtract r from all of the y variables.
        plot(currentFv, fmla = . - r ~ r, main = panelTitle, legend = FALSE, xlim = c(0, maxX), xlab = NULL, ylab = NULL)
        #Add axes labels.
        mtext(1, text = "r", line = 2)
        mtext(2, text = "L", line = 2, las = 1)
        #Add overall title to the page.
        if (comp_type == "_hab") {titleType <- "All Habitation Components"}
        if (comp_type == "_ritConf") {titleType <- "Habitation Components with Confident Evidence of Corporate Ritual"}
        if (comp_type == "_ritPoss") {titleType <- "Habitation Components with Confident or Possible Evidence of Corporate Ritual"}
        if (comp_type == "_burConf") {titleType <- "Components with Confident Evidence of Human Burial"}
        if (comp_type == "_burPoss") {titleType <- "Components with Confident or Possible Evidence of Human Burial"}
        if (comp_type == "_defConf") {titleType <- "Components with Confident Evidence of Defensive Walls"}
        if (comp_type == "_defPoss") {titleType <- "Components with Confident or Possible Evidence of Defensive Walls"}
        if (comp_type == "_habMed") {titleType <- "Habitation Components with Population Estimates of 60 or Greater"}
```

```
                if (comp_type == "_habBig") {titleType <- "Habitation Components with Population Estimates of 120 or Greater"}
                mtext(3, text = paste("Cluster Analysis: Ripley's K\n", titleType, "\nalpha = .05", sep = ""), outer = TRUE)
            }
        }
    }
    #save this iteration's plot, i.e. shut down graphics device
    dev.off()
    #Embed fonts. See the script GraphOutputPDF.R
    embed_fonts(ImageNameModi3)
}

#Now plot the results for the combined southern contiguous surveys.
#Loop through the 9 types of fv objects.
for (comp_type in c("_hab", "_ritConf", "_ritPoss", "_burConf", "_burPoss", "_defConf", "_defPoss", "_habMed", "_habBig")) {
    #create image output pdf file
    #first specify filename without extension
    ImageName <- paste("RipleysKsouthcont", comp_type, sep = "")
    #specify image dimensions in inches
    ImageWidth <- 6.5
    ImageHeight <- 8.3
    #run script to create pdf based on 3 above input variables
    #this script inherits the working directory specified above
    source("3_GraphScripts/1_HelperScripts/GraphOutputPDF.R")

    #Set up multiple panels.
    par(mfrow=c(5,3))
    #Margins.
    par(mar = c(3, 2, 4, 2))
    par(oma = c(1, 1, 5, 0))
    #Loop through each temporal group.
    for (temp_group in c("ef","mf", "lf", "tw", "al", "in", "co")) {
        #Define which fv object will be plotted now.
```

```
currentFv <- get(paste("southernUnion_", temp_group, "_ripKtransL", comp_type, sep = ""))
#If Lest() had 0 points or only 1 point in the input ppp object, the result will be a vector composed of only NaN values. Prevent plotting in such cases.
if (all(is.nan(currentFv$obs)) == FALSE) {
  #Except for the all habitation fv objects, prevent plotting if there was insufficient data to calculate a significance band.
  if (comp_type == "_hab" || all(is.na(currentFv$hi)) == FALSE) {
    #Create the title for this panel.
    if (temp_group == "ef") {panelTitle <- "Early Formative"}
    if (temp_group == "mf") {panelTitle <- "Middle Formative"}
    if (temp_group == "lf") {panelTitle <- "Late Formative"}
    if (temp_group == "tw") {panelTitle <- "Tiwanaku"}
    if (temp_group == "al") {panelTitle <- "Altiplano"}
    if (temp_group == "in") {panelTitle <- "Inca"}
    if (temp_group == "co") {panelTitle <- "Colonial"}
    #Plot the fv object for this temporal group. Subtract r from all of the y variables.
    plot(currentFv, fmla = . - r ~ r, main = panelTitle, legend = FALSE, xlab = NULL, ylab = NULL)
    #Add axes labels.
    mtext(1, text = "r", line = 2)
    mtext(2, text = "L", line = 2, las = 1)
    #Add overall title to the page.
    if (comp_type == "_hab") {titleType <- "All Habitation Sites"; titleSigVal <- " = .01"}
    if (comp_type == "_ritConf") {titleType <- "Habitation Sites with Confident Evidence of Corporate Ritual"; titleSigVal <- " = .05"}
    if (comp_type == "_ritPoss") {titleType <- "Habitation Sites with Confident or Possible Evidence of Corporate Ritual"; titleSigVal <- " = .05"}
    if (comp_type == "_burConf") {titleType <- "Components with Confident Evidence of Human Burial"; titleSigVal <- " = .05"
```

```
                }
                if (comp_type == "_burPoss") {titleType <- "Components with Confident or Possible Evidence of Human Burial"; titleSigVal <- " = .05"}
                if (comp_type == "_defConf") {titleType <- "Components with Confident Evidence of Defensive Walls"; titleSigVal <- " = .05"}
                if (comp_type == "_defPoss") {titleType <- "Components with Confident or Possible Evidence of Defensive Walls"; titleSigVal <- " = .05"}
                if (comp_type == "_habMed") {titleType <- "Habitation Components with Population Estimates of 60 or Greater"; titleSigVal <- " = .05"}
                if (comp_type == "_habBig") {titleType <- "Habitation Components with Population Estimates of 120 or Greater"; titleSigVal <- " = .05"}
                mtext(3, text = paste("Cluster Analysis: Ripley's K, for Combined Southern Contiguous Surveys\n", titleType, "\nalpha", titleSigVal, sep = ""), outer = TRUE)
            }
        }
    }
    #save this iteration's plot, i.e. shut down graphics device
    dev.off()
    #Embed fonts. See the script GraphOutputPDF.R
    embed_fonts(ImageNameModi3)
}
```

D.5 Python: Population Maps (C:/Real/SantaFe/FundamentalGeographic/Scripts)

Listing D.41: PanTiticacaPopulationMaps_EXPERIMENTAL.py

```
#-------------------------------------------------------------------
```

```
#THIS SCRIPT CREATES POPULATION MAPS AND POPULATION CHANGE MAPS FOR THE ENTIRE TITICACA REGION THROUGH TIME.
#The output of this script will be a series of exported images.
#-----------------------------------------------------------------------

#-----------------------------------------------------------------------
#FUTURE WORK:
#NOTE FOR WHEN THE ARAPA-TARACO DATA IS ADDED: SEE THE SPECIAL HANDLING OF TARACO BELOW.
#SHOULD ADD A SCALE.
#-----------------------------------------------------------------------

#-----------------------------------------------------------------------
#REQUIRED MANUAL WORK:
#A .MXD FILE NEEDS TO BE MANUALLY CREATED BEFORE RUNNING THIS SCRIPT (FOR THE PATH, SEE THE VARIABLE "popMXDpath" BELOW). ARCOBJECTS COULD PROBABLY BE USED TO AUTOMATE THIS, BUT IT ISN'T WORTH THE TROUBLE IN THIS CASE. THE IMAGE SIZE NEEDS TO BE SET MANUALLY.
#THIS .MXD FILE ALSO NEEDS A MANUALLY CREATED LEGEND, POSITIONED AS DESIRED. SET THE LEGEND BACKGROUND TO 10% GRAY, SINCE THE MAP WILL USE A HILLSHADE BACKGROUND AS WELL AS WHITE LINES. IN ORDER TO REMOVE THE LEGEND TITLE, ENTER A SPACE FOR THE TITLE AND REDUCE THE SPACING BETWEEN THE TITLE AND THE LAYERS.
#-----------------------------------------------------------------------

#Section 1: Get tools---------------------------------------------------
#Use python 3's "/" (floating point division) rather than python 2's "/" (integer division)
from __future__ import division
#Import the arcpy module in order to access ArcGIS. Note that while ESRI documentaion encourages "from arcpy import env" and "from arcpy.sa import *" here, I prefer to instead keep an explicit namespace hierarchy; therefore, my arcpy code differs from ESRI's by always explicitly using "arcpy.sa." to prefix spatial analyst functions and by always using "arcpy.env" instead of "env".
```

```python
import arcpy
#Import the math module, used here for sqrt().
import math
#-----------------------------------------------------------------------

#Section 2: Define parameters------------------------------------------
#These are variables from throughout the script that we want to alter to see how the output changes.

#Ultimately, population and population change will be depicted as a raster, where each cell's value refers to the archaeological components within that raster cell. Set the raster cell size here. The unit is meters, because arcpy.env.outputCoordinateSystem is set to a UTM projection, below.
popRasterCellSizeParam = 3000
#-----------------------------------------------------------------------

#Section 3: Preliminary Work: licenses, file paths, archaeological components databases, and environmental settings
#-----------------------------------------------------------------------
#Licenses-------------------------------------
#Check out the ArcGIS Spatial Analyst license.
arcpy.CheckOutExtension("Spatial")
#File paths-----------------------------------
#Set the ArcGIS workspaces. ALSO SEE "popMXDpath" BELOW; ANY ALTERATION TO THE WORKSPACE PATH ALSO NEEDS TO BE MADE FOR THE .MXD PATH.
arcpy.env.workspace = "C:/Real/SantaFe/FundamentalGeographic/Working/newoutput3/"
arcpy.env.scratchWorkspace = arcpy.env.workspace

#Define the path for the .mxd file to be used in this script; this needs to be the full path. A .mxd is used because the final output of this script will be a series of exported images.
popMXDpath = "C:/Real/SantaFe/FundamentalGeographic/Working/newoutput3/pop.mxd"
```

```
#Create a MapDocument object using this path.
popMXD = arcpy.mapping.MapDocument(popMXDpath)

#Define paths for input files.
#Set the path to the file that models different lake levels.
lakeTiticacaShapefilePath = "C:/Real/SantaFe/FundamentalGeographic/Data/Bathymetry_BoulangeLazzaro1981_DRAFT.shp"
#Set the path to the terrain background file.
hillshadeLayerPath = "C:/Real/SantaFe/FundamentalGeographic/Data/hillshade.lyr"
#Set the path to the archaeological site databases.
#USE A SCHEMA.INI FILE TO DEFINE THE FIELD TYPES DERIVED FROM THIS CSV FILE. WHEN CREATING THIS SCHEMA.INI FILE YOU ALSO HAVE TO THINK ABOUT HOW MISSING/NON-APPLICABLE DATA SHOULD BE CODED IN THE CSV FILE ("NA", "-1", "0", ETC).
#THIS IS JUST A PLACEHOLDER FILE.
#First get the sites from the intensive surveys.
surveysTablePath = "C:/Real/SantaFe/FundamentalGeographic/Data/titicaca_surveys_python_LAST_SFI_VERSION_NO_SPACES_NO_BLANKS.csv"
#Second get the sites from the gaps between the intensive surveys.
gapsTablePath = "C:/Real/SantaFe/FundamentalGeographic/Data/Gaps_python_UNFINISHED_10JAN16_NO_BLANKS_NO_SPACES.csv"
#Define the paths for the survey boundaries. Generally it would be nicer to use arcpy.da.Walk here, but to make it quicker to remove some of these if desired, I will leave this as is.
boundariesFolder = "C:/Real/SantaFe/FundamentalGeographic/Data/SurveyBounds/"
pkBoundPath = boundariesFolder + "Pukara/PukaraValley.shp"
hpBoundPath = boundariesFolder + "HuancanePutina/HuancanePutinaSurveyBoundary.shp"
isBoundPath = boundariesFolder + "IslandSun/IslandSun.shp"
isMoonBoundPath = boundariesFolder + "IslandSun/IslandMoon.shp"
isChuyuBoundPath = boundariesFolder + "IslandSun/IslandSunChuyu.shp"
isKenataBoundPath = boundariesFolder + "IslandSun/IslandSunKenata.shp"
isKhoaBoundPath = boundariesFolder + "IslandSun/IslandSunKhoa.shp"
```

```
isPallallaBoundPath = boundariesFolder + "IslandSun/IslandSunPallalla.shp"
jpBoundPath = boundariesFolder + "JuliPomata/JuliPomata.shp"
trBoundPath = boundariesFolder + "TaracoPen/TaracoPeninsulaSurveyBoundary.shp"
trSikuyaBoundPath = boundariesFolder + "TaracoPen/TaracoPeninsulaSurveyBoundarySikuyaIsland.shp"
ktBoundPath = boundariesFolder + "Katari/KatariValleySurveyBoundary.shp"
tlBoundPath = boundariesFolder + "TiwanakuLower/TiwanakuLowerValleySurveyBoundary.shp"
tmBoundPath = boundariesFolder + "TiwanakuCentral/TiwanakuCentralValleySurveyBoundary.shp"
qtBoundPart1Path = boundariesFolder + "QawraThaki/QawraThakiSurveyBoundary.shp"
qtBoundPart2Path = boundariesFolder + "QawraThaki/QawraThakiSurveyBoundary2.shp"
#Combine all of these shapefiles into one shapefile.
#Merge parameters: input feature classes or tables; output feature class or table; field mappings [not used here]
#Note that this tool is affected by arcpy.env.outputCoordinateSystem; since this is not set, the output coordinate system will be the same as the input's.
combiBoundPath = "surveyBoundsCombi.shp"
arcpy.Merge_management([pkBoundPath, hpBoundPath, isBoundPath, isMoonBoundPath, isChuyuBoundPath, isKenataBoundPath, isKhoaBoundPath, isPallallaBoundPath, jpBoundPath, trBoundPath, trSikuyaBoundPath, ktBoundPath, tlBoundPath, tmBoundPath, qtBoundPart1Path, qtBoundPart2Path], combiBoundPath)

#Define paths for symbology templates.
lakeTemplatePath = "C:/Real/SantaFe/FundamentalGeographic/Data/lakeTemplate.lyr"
boundsTemplatePath = "C:/Real/SantaFe/FundamentalGeographic/Data/boundariesTemplate.lyr"
#I have chosen to use the same raster classification for all of the population rasters (rather than having different population ranges
```

```
define the classes for different time spans). Therefore, this template should use a "Classified" symbology (not, e.g., a "Stretched" symbology), and the class break values and labels should be specified in this template. If, conversely, different classifications tailored to each time span were desired instead, one would set the color ramp and the number of classes in this template, but then, after using UpdateLayer() to apply the template, would use the reclassify() method of the RasterClassifiedSymbology class to reset the classification based on the original source data.
popRastTemplatePath = "C:/Real/SantaFe/FundamentalGeographic/Data/popRastTemplate.lyr"
#In addition to the classes for positive and negative change, this template should have a class for 0% change, and this class should be set to "no color" so that the hillshade background is visible beneath the 0% cells. Also, because of how change from 0 is dealt with (see below), the upper bound of the highest class has to be quite high.
popChangeRastTemplatePath = "C:/Real/SantaFe/FundamentalGeographic/Data/popChangeRastTemplate.lyr"

#Define paths for intermediate output files. When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
surveysShpPath = "surveys.shp"
gapsShpPath = "gaps.shp"
surveysAndGapsShpPath = "surveys_and_gaps.shp"
#These filenames will have a variable suffix, so omit the extension; the suffix and extension will be added below.
timeSpanLakePolygonPath = "lakePoly"
popRasterPath = "popRast"

#Define paths for final output files. When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
#These filenames will have variable prefixes and suffixes, so omit the extensions; the prefix, suffix, and extension will be added below.
```

```
#CAUTION: ANY FILES ALREADY AT THESE PATHS WILL BE OVERWRITTEN.
popMXDexportPath = "population"
popChangeMXDexportPath = "changeFromPrevious"

#Archaeological sites (components, technically)------------------------
#Import the archaeological surveys table
#First, create a feature layer from the table file
#MakeXYEventLayer parameters: input table; X coordinate field; Y coordinate field; output layer name; spatial reference[I have chosen to define the projection using an EPSG code; the code 32719 is for WGS84 UTM 19S; note that this tool is not affected by the output coordinate system environmental setting, but the CopyFeatures tool below is]; Z coordinate field [not used here]
arcpy.MakeXYEventLayer_management(surveysTablePath, "eutm19", "nutm19", "XYsurveysLayer", arcpy.SpatialReference(32719))
#Second, save this feature layer as a feature class. Because arcpy.env.outputCoordinateSystem has not been set yet, the output coordinate system will be the same as the input's.
#CopyFeatures parameters: input features; output feature class; geodatabase configuration keyword [not used here]; geodatabase spatial grid 1 [not used here]; " 2 [not used here]; " 3 [not used here]
arcpy.CopyFeatures_management("XYsurveysLayer", surveysShpPath)
#Do the same for the archaeological inter-survey data.
arcpy.MakeXYEventLayer_management(gapsTablePath, "eutm19", "nutm19", "XYgapsLayer", arcpy.SpatialReference(32719))
arcpy.CopyFeatures_management("XYgapsLayer", gapsShpPath)
#Combine the survey and inter-survey data into one shapefile.
#Merge parameters: input feature classes or tables; output feature class or table; field mappings [not used here]
#Note that this tool is affected by arcpy.env.outputCoordinateSystem; since this is not set, the output coordinate system will be the same as the input's.
arcpy.Merge_management([surveysShpPath, gapsShpPath], surveysAndGapsShpPath)

```

```
#Environmental settings---------------------
#Set environmental settings that will ensure that output rasters have appropriate extent and coordinate system (these will also affect vector data).
#IT IS IMPORTANT TO NOTE THAT ALL DATASETS USED IN THIS SCRIPT SHOULD FALL ENTIRELY WITHIN THIS EXTENT, OR ELSE THEIR PORTIONS WHICH FALL OUTSIDE THIS EXTENT WILL NOT BE PROCESSED.
arcpy.env.extent = surveysAndGapsShpPath
arcpy.env.outputCoordinateSystem = surveysAndGapsShpPath
#------------------------------------------------------------------

#Section 4: Create population maps.------------------------------------
#The archaeological components ("surveysAndGapsShpPath") have attributes for spatial size but not population size. Add a field for population size and calculate its values. To estimate the population, use the methods described in Bandy 2001: 67, 71-72.
#Add the field.
#AddField_management() parameters: input to which field will be added; field name to be added; field type; precision [number of digits on both sides of decimal]; scale [number of digits after decimal]; length [not used here; text/blob types only]; field alias [not used here]; whether field can have null values [not used here]; whether field is required [not used here]; field domain [not used here]
arcpy.AddField_management(surveysAndGapsShpPath, "pop", "FLOAT", 7, 1)
#Calculate the values.
#Create an UpdateCursor that retrieves the newly created field ("pop") and the fields that will be used to calculate its values ("size_abs", "size_min", "size_max", "sitesize", and "hab").
with arcpy.da.UpdateCursor(surveysAndGapsShpPath, ("size_abs", "size_min", "size_max", "sitesize", "hab", "pop")) as compCursor:
    #Loop through each row of the attribute table. The row's values for the fields specified above will be in a list, in the order specified above.
    for compRow in compCursor:
        #Only calculate population if this component is a habitation
```

```
    component. Note that the use of > 0 here means that uncertain (0.5 and 0.75 codes) habitation components are also included.
    if compRow[4] > 0:
        #If this row doesn't have a NA/missing value for "size_abs" (absolute size), use the "size_abs" value to calculate the population for this component.
        if compRow[0] != -1:
            #The minimum population size is 1 household (6 people), so only calculate population if the spatial size is equivalent to more than one household. Otherwise, assign a population of 6 to this component.
            if compRow[0] > .25:
                compRow[5] = (((math.sqrt(compRow[0] * 10000)) - 20)**2) / 150
            else:
                compRow[5] = 6
        #If this row doesn't have a NA/missing value for "size_min", use the "size_min" and "size_max" values to calculate the population for this component.
        if compRow[1] != -1:
            #First get the midpoint between the "size_min" and "size_max" values.
            sizeMid = (compRow[1] + compRow[2]) / 2
            if sizeMid > .25:
                compRow[5] = (((math.sqrt(sizeMid * 10000)) - 20)**2) / 150
            else:
                compRow[5] = 6
        #If this row has NA/missing values for both "size_abs" and "size_min", use the "sitesize" value to calculate the population for this component.
        if compRow[0] == -1 and compRow[1] == -1:
            if compRow[3] > .25:
                compRow[5] = (((math.sqrt(compRow[3] * 10000)) - 20)**2) / 150
            else:
```

```
            compRow[5] = 6
        #When the "pop" field was added above, the values were all set to 0, because this is a numeric field in a shapefile. Therefore, nonhabitation components currently have 0 for "pop", since their values were not altered by the above calculations. This is fine for this script, but in other contexts it would often be preferable to have nonhabitation components' population values set to null. This could be done by using a geodatabase instead of a shapefile (see arcpy.AddField_management(field_is_nullable=)).
        #Use the modified list to update the row.
        compCursor.updateRow(compRow)

#Define the time spans that will be used; one map will be created for each of these spans. The starting/ending years are chosen to match points of lake level change, and therefore the time spans generally subdivide cultural phases. Exceptions to this (i.e., defining the time spans by lake level change rather than cultural change) are the start/end dates for the Tiwanaku period and the end date for Inca period, which are cultural changes that have the same lake level before and after the change.
timeSpanList = ["1500BC-1100BC", "1100BC-850BC","850BC-450BC","450BC-250BC","250BC-0BC","0BC-250AD","250AD-600AD","600AD-1000AD","1000AD-1150AD","1150AD-1450AD","1450AD-1540AD","1540AD-1600AD"]
#Associate the time spans with their respective lake levels. Use a python dictionary for this.
timeSpanLakeLevelDict = {timeSpanList[0] : 5, timeSpanList[1] : 15, timeSpanList[2] : 0, timeSpanList[3] : 15, timeSpanList[4] : 0, timeSpanList[5] : 15, timeSpanList[6] : 0, timeSpanList[7] : 0, timeSpanList[8] : 0, timeSpanList[9] : 15, timeSpanList[10] : 0, timeSpanList[11] : 0}
#Associate the time spans with the appropriate survey-specific phases. Use a python dictionary for this.
#Mapping the phases to the lake levels is complicated; this is a rough draft of such a mapping. This mapping often takes all sites dated to a broader cultural phase and associates ALL of them with a narrower time
```

```
span defined by lake level. This amplifies a problem that exists even before subdividing the cultural phases into lake level time spans, the problem of having "overestimated maps" (sensu Ammerman 1981: 77).
timeSpanPhasingDict = {timeSpanList[0] : ["pk-a","is-b","jp-a","tr-a","hp-a","qt-a","gp-a"], timeSpanList[1] : ["pk-a","is-b","jp-a","tr-b","hp-a","qt-a","kt-a", "gp-b"], timeSpanList[2] : ["pk-b","is-c","jp-b","tr-c","hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"], timeSpanList[3] : ["pk-b","is-c","jp-b","tr-c","hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"], timeSpanList[4] : ["pk-c","is-d","jp-c","tr-d","hp-c","qt-a","kt-b","tm-b","tl-b", "gp-c"], timeSpanList[5] : ["pk-c","is-d","jp-c","tr-d","hp-c","hp-d","qt-a","kt-b","tm-b","tl-b", "gp-c"], timeSpanList[6] : ["is-d","jp-c","tr-e","hp-c","hp-d","qt-a","kt-b","tm-c","tl-c", "gp-c"], timeSpanList[7] : ["is-e","jp-d","tr-f","hp-e","hp-f","hp-g","qt-b","kt-c","tm-d","tm-e","tl-d","tl-e", "gp-d"], timeSpanList[8] : ["pk-d","is-f","jp-e","tr-g","hp-h","qt-c","kt-d","tm-f","tl-f","gp-e"], timeSpanList[9] : ["pk-d","is-f","jp-e","tr-g","hp-h","hp-i","hp-j","qt-c","kt-d","tm-f","tl-f", "gp-e"], timeSpanList[10] : ["pk-e","is-g","jp-f","tr-h","hp-k","hp-l","qt-d","kt-e","tm-g","tl-g", "gp-f"], timeSpanList[11] : ["jp-g","tr-i","hp-m","qt-e","kt-f","kt-g","tm-h","tl-h"]}

#Turn the bathymetric contours into a feature layer, so that the Select Layer By Attribute tool can be used on it.
#MakeFeatureLayer parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
arcpy.MakeFeatureLayer_management(lakeTiticacaShapefilePath, "bathymetryLayer")
#Do the same for the archaeological components.
arcpy.MakeFeatureLayer_management(surveysAndGapsShpPath, "compsLayer")

#Each iteration of the below loop will create one population raster. These rasters will be re-used in section 5, so create a list to store the filenames for these rasters.
popRasterList = []
#The lake level which is associated with each of these filenames also will
```

```
be needed in section 5, so also create a dictionary which will associate each filename in the above list with a lake level. The above list is still necessary because, unlike a dictionary, it has an order, and this order will be used to put the rasters in chronological order.
popRastLakeLevDict = {}

#To make the exported .pdf files better organized, a number prefix will be added to each .pdf (the first file produced will have a prefix of 1, the second a prefix of 2, etc.). Create a counter for this.
exportNumber = 0

#Loop through the time spans. Each iteration of this loop will create one map.
for timeSpan in timeSpanList:
    #Select (in the ArcGIS sense) the lake level that corresponds to this time span, using the SelectLayerByAttribute tool.
    #This searches the feature layer created above and selects its bathymetric line that has an "Elevation" value that matches the loop variable's corresponding value in the python dictionary which associates time spans with lake levels.
    #SelectLayerByAttribute parameters: input feature layer; selection type; SQL where clause
    arcpy.SelectLayerByAttribute_management("bathymetryLayer", "NEW_SELECTION", '"Elevation" = ' + str(timeSpanLakeLevelDict[timeSpan]))
    #Turn the selected bathymetric line into a polygon.
    #FeatureToPolygon parameters: line or polygon input features; output polygon feature class; cluster tolerance, i.e. minimum distance separating feature coordinates [default of .001 meter used here]; attributes [not used here; no longer works anyway]; label features, i.e. points which will be used as attributes for the output polygons [not used here]
    currentLakePolyPath = timeSpanLakePolygonPath + timeSpan.replace("-", "_") + ".shp"
    arcpy.FeatureToPolygon_management("bathymetryLayer",
```

```
    ↪currentLakePolyPath)

    #Select the archaeological components which correspond to this time
    ↪span.
    #Clear the selection from the previous iteration of this loop. This is
    ↪necessary because in the below loop "ADD_TO_SELECTION" will be used
    ↪rather than "NEW_SELECTION".
    arcpy.SelectLayerByAttribute_management("compsLayer", "CLEAR_SELECTION"
    ↪)
    #Get a python list of the survey-specific phases which correspond to
    ↪this time span.
    currentListOfPhases = timeSpanPhasingDict[timeSpan]
    #Loop through these survey-specific phases.
    for surveyPhase in currentListOfPhases:
        #Separate the survey-phase code into the survey segment and the
        ↪phase segment.
        currentSurvey = surveyPhase[0:2]
        currentPhase = surveyPhase[-1]
        #Select components from this phase of this survey. Use "
        ↪ADD_TO_SELECTION" so that this selection is added to the
        ↪selections from previous iterations of this loop. In the SQL
        ↪expression, use "LIKE" rather than "=", so that wildcards may be
        ↪used, and use a percent wildcard to represent an unlimited number
        ↪of any characters between the survey and phase codes. This works
        ↪because the format used in the "comp" field is [survey code]-[site
        ↪#].[sector#]-[phase code] (e.g., gp-0001.01-a).
        arcpy.SelectLayerByAttribute_management("compsLayer", "
        ↪ADD_TO_SELECTION", '"comp" LIKE ' + "'" + currentSurvey + '%' +
        ↪currentPhase + "'")

    #In some cases, a survey will have more than one phase which
    ↪corresponds to a time span (for example, Huancane Putina has 3 phases
    ↪ in the 1150AD-1450AD time span). For any site which has components
    ↪from multiple phases in the same time span, it will generally be best
    ↪ to use just one of the components when creating the time span's
```

```
population sums. Otherwise, this site's population can be "double-counted". To prevent this, loop through the components which have been selected above, and in cases where the same site has multiple components selected, deselect the smaller components.
with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as outerCursor:
    for outerRow in outerCursor:
        outerComp = outerRow[0].encode('utf-8')
        outerPop = outerRow[1]
        #For each component in the outer loop, loop through the components again to search for components from the same site and sector.
        with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as innerCursor:
            for innerRow in innerCursor:
                innerComp = innerRow[0].encode('utf-8')
                innerPop = innerRow[1]
                #The format used in the "comp" field is [survey code]-[site#].[sector#]-[phase code] (e.g., gp-0001.01-a). Therefore, two components from the same site can be matched by comparing the "comp" field without the final character.
                if outerComp[0 : -1] == innerComp[0 : -1]:
                    #If the outer loop's component is smaller than the inner loop's component, deselect the outer loop's component.
                    if outerPop < innerPop:
                        arcpy.SelectLayerByAttribute_management("compsLayer", "REMOVE_FROM_SELECTION", '"comp" = ' + "'" + outerComp + "'")
#If a site has multiple largest components (with equal sizes), the above loop has left all of them still selected. Create another nested loop through the table, and if the outer loop's site-sector has one or more site-sector matches in the table, then remove the outer loop's component from the selection. This will leave only the last (lowest in the table) of the equal-size components.
```

```
with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as outerCursor:
    for outerRow in outerCursor:
        outerComp = outerRow[0].encode('utf-8')
        outerPop = outerRow[1]
        with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as innerCursor:
            for innerRow in innerCursor:
                innerComp = innerRow[0].encode('utf-8')
                innerPop = innerRow[1]
                #Prevent a component from deselecting itself based on a match to itself, since "outerComp[0 : -1] == innerComp[0 : -1]" will always be "True" when a component is the same in both the outer and inner loop. This would result in the entire table being de-selected. This can be prevented by using "and outerComp != innerComp".
                if outerComp[0 : -1] == innerComp[0 : -1] and outerComp != innerComp:
                    arcpy.SelectLayerByAttribute_management("compsLayer", "REMOVE_FROM_SELECTION", '"comp" = ' + "'" + outerComp + "'")

#The inter-survey data uses a coarse chronology, which leads Taraco to figure prominently on the 250AD-600AD map, even though this is probably inappropriate (see Stanish and Levine 2011). Prevent this here.
#Nothing should be altered in the other Late Formative time spans, so only do this if the 250AD-600AD time span is currently being processed.
if timeSpan == "250AD-600AD":
    #Deselect Taraco, so that it doesn't contribute to the rasterization below.
    arcpy.SelectLayerByAttribute_management("compsLayer", "REMOVE_FROM_SELECTION", '"comp" = ' + "'gp-0009.01-c'")

```

```
    #Now that the components belonging to this time span have been selected, convert them to a raster, since a map of these points at the scale of the entire Titicaca region will not be clear. This rasterization also allows a useful depiction of population size: each raster cell will represent the sum of the populations of the components which fall within that raster cell.
    #PointToRaster_conversion() parameters: input points; input's field used to assign values to output raster; output raster path; raster cell value assignment method when more than one input point falls within an output raster cell; priority field [not used here]; raster cell size
    currentPopRasterPath = popRasterPath + timeSpan.replace("-", "_") + ".tif"
    arcpy.PointToRaster_conversion("compsLayer", "pop", currentPopRasterPath, "SUM", "", popRasterCellSizeParam)
    #Add this raster's filename to the list which holds all of the iterations' rasters' filenames.
    popRasterList += [currentPopRasterPath]
    #Also associate this filename with the corresponding lake level. This will be helpful in section 5.
    popRastLakeLevDict[currentPopRasterPath] = str(timeSpanLakeLevelDict[timeSpan])

    #So that this raster can be added to the .mxd, create an arcpy.mapping.Layer object from it.
    #First, create a layer using MakeRasterLayer_management().
    #MakeRasterLayer_management() parameters: input raster; output raster layer; SQL expression [not used here]; extent [not used here]; band selection [not used here]
    #If there is already a layer from the previous iteration, delete it.
    if arcpy.Exists("currentPopRasterLayer"):
        arcpy.Delete_management("currentPopRasterLayer")
    arcpy.MakeRasterLayer_management(currentPopRasterPath, "currentPopRasterLayer")
    #Now create an arcpy.mapping.Layer object from this raster layer.
```

```
popLayerObj = arcpy.mapping.Layer("currentPopRasterLayer")
#Add this mapping.Layer object to the .mxd's data frame.
#In a previous version of this script, I used "popMXDdf = arcpy.mapping.ListDataFrames(popMXD)[0]" above and then used "popMXDdf" throughout the script, similar to examples in ESRI documentation. However, this caused problems after the first iteration of this loop. Therefore I use "arcpy.mapping.ListDataFrames(popMXD)[0]" whenever the data frame needs to be referenced.
#AddLayer() parameters: DataFrame; layer; position [not used here]
arcpy.mapping.AddLayer(arcpy.mapping.ListDataFrames(popMXD)[0], popLayerObj)
#Apply symbology from the population raster template.
#First create a layer object from the template .lyr file.
popRastTemplateObj = arcpy.mapping.Layer(popRastTemplatePath)
#Define the layer to be updated.
#ListLayers() parameters: MapDocument or Layer; wildcard limiter; DataFrame
popRastUpdateObj = arcpy.mapping.ListLayers(popMXD, "currentPopRasterLayer", arcpy.mapping.ListDataFrames(popMXD)[0])[0]
#Now use UpdateLayer() to apply this template layer object's symbology to the population raster object for this iteration.
#UpdateLayer() parameters: DataFrame; Layer object to update; Layer object template; whether to update only symbology
arcpy.mapping.UpdateLayer(arcpy.mapping.ListDataFrames(popMXD)[0], popRastUpdateObj, popRastTemplateObj, True)
#Change how this layer appears in the legend.
#ListLayoutElements() parameters: MapDocument; element type; wildcard limiter [not used here]
legend = arcpy.mapping.ListLayoutElements(popMXD, "LEGEND_ELEMENT")[0]
#ListStyleItems() parameters: style file path [full path not required for "ESRI.style"]; style folder name; wildcard limiter
style = arcpy.mapping.ListStyleItems("ESRI.style", "Legend Items", "Horizontal Single Symbol Label Only")[0]
legend.updateItem(popRastUpdateObj, style)

```

```
#Also add a layer to the .mxd for the Lake Titicaca lake level polygon created above for this time span.
if arcpy.Exists("currentLakePolyLayer"):
    arcpy.Delete_management("currentLakePolyLayer")
arcpy.MakeFeatureLayer_management(currentLakePolyPath, "currentLakePolyLayer")
lakeLayerObj = arcpy.mapping.Layer("currentLakePolyLayer")
#This will need to be the top layer.
arcpy.mapping.AddLayer(arcpy.mapping.ListDataFrames(popMXD)[0], lakeLayerObj, "TOP")
#Apply symbology from the lake template.
#First create a layer object from the template .lyr file.
lakeTemplateObj = arcpy.mapping.Layer(lakeTemplatePath)
#Define the layer to be updated.
lakeUpdateObj = arcpy.mapping.ListLayers(popMXD, "currentLakePolyLayer", arcpy.mapping.ListDataFrames(popMXD)[0])[0]
#Now use UpdateLayer() to apply this template layer object's symbology to the lake layer object for this iteration.
arcpy.mapping.UpdateLayer(arcpy.mapping.ListDataFrames(popMXD)[0], lakeUpdateObj, lakeTemplateObj, True)
#It seems that transparency isn't applied from the template. However, there is a transparency property of the Layer object that can be modified. Modify this so that the population raster cell extents are visible beneath the lake layer.
lakeUpdateObj.transparency = 25
#Remove this layer from the legend.
for legend in arcpy.mapping.ListLayoutElements(popMXD, "LEGEND_ELEMENT"):
    for legLayer in legend.listLegendItemLayers():
        if legLayer.name == "currentLakePolyLayer":
            legend.removeItem(legLayer)

#Also add a layer to the .mxd for the survey boundaries. It would generally make sense to do this outside of the loop instead, since this will be the same layer for every iteration, but I prefer to keep
```

```
    all of the layer-addition code together and similar.
    if arcpy.Exists("Survey_Boundaries"):
        arcpy.Delete_management("Survey_Boundaries")
    arcpy.MakeFeatureLayer_management(combiBoundPath, "Survey_Boundaries")
    boundsLayerObj = arcpy.mapping.Layer("Survey_Boundaries")
    #This will need to be the top layer.
    arcpy.mapping.AddLayer(arcpy.mapping.ListDataFrames(popMXD)[0], boundsLayerObj, "TOP")
    #Apply symbology from the boundaries template.
    #First create a layer object from the template .lyr file.
    boundsTemplateObj = arcpy.mapping.Layer(boundsTemplatePath)
    #Define the layer to be updated.
    boundsUpdateObj = arcpy.mapping.ListLayers(popMXD, "Survey_Boundaries", arcpy.mapping.ListDataFrames(popMXD)[0])[0]
    #Now use UpdateLayer() to apply this template layer object's symbology to the boundaries layer object for this iteration.
    arcpy.mapping.UpdateLayer(arcpy.mapping.ListDataFrames(popMXD)[0], boundsUpdateObj, boundsTemplateObj, True)

    #Also add a layer to the .mxd for the hillshade background.
    #Unlike the other layers, this layer will be created directly from a .lyr file.
    hillshadeLayerObj = arcpy.mapping.Layer(hillshadeLayerPath)
    #This will need to be the bottom layer.
    arcpy.mapping.AddLayer(arcpy.mapping.ListDataFrames(popMXD)[0], hillshadeLayerObj, "BOTTOM")
    #Remove this layer from the legend.
    for legend in arcpy.mapping.ListLayoutElements(popMXD, "LEGEND_ELEMENT"):
        for legLayer in legend.listLegendItemLayers():
            if legLayer.name == "hillshade.tif":
                legend.removeItem(legLayer)

    #Export the .mxd for this time span.
    #ExportToPDF() parameters: MapDocument object; output path; data frame
```

```
    [not used here]; data frame export width [not used here]; data frame export height [not used here]; resolution DPI; image quality [default of "BEST" used here]; color space [default of RGB used here]; whether to compress vectors and text [default of True used here]; image compression ["JPEG" used here]; how to deal with pictures [default of "RASTERIZE_BITMAP" used here]; convert markers [default of False used here]; embed fonts [default of True used here]; whether to include pdf layers and/or attributes [default of "LAYERS_ONLY"]; georeference [default of True used here]; jpeg quality [0-100]
    #CAUTION: ANY FILE ALREADY AT THIS PATH WILL BE OVERWRITTEN.
    exportNumber += 1
    currentPopMXDexportPath = str(exportNumber) + popMXDexportPath + timeSpan.replace("-", "_") + ".pdf"
    arcpy.mapping.ExportToPDF(popMXD, currentPopMXDexportPath, resolution = 300, image_compression = "JPEG", jpeg_compression_quality = 70)

    #To prepare for the next iteration, clear the .mxd.
    #Clear all of the layers.
    for dataframe in arcpy.mapping.ListDataFrames(popMXD):
        #ListLayers() parameters: MapDocument or Layer; wildcard limiter [not used here]; DataFrame
        for layer in arcpy.mapping.ListLayers(popMXD, "", dataframe):
            #RemoveLayer() parameters: DataFrame; layer object
            arcpy.mapping.RemoveLayer(dataframe, layer)
    #Also clear the legend.
    for legend in arcpy.mapping.ListLayoutElements(popMXD, "LEGEND_ELEMENT"):
        for legLayer in legend.listLegendItemLayers():
            legend.removeItem(legLayer)
    #Save the .mxd.
    popMXD.save()
    #-----------------------------------------------------------------

#Section 5: Create population change maps.-------------------------------------------------------
```

```
#Create maps similar to those in section 4, except for population change (percent difference) instead of population.
#Loop through the filenames for the population rasters created in section 4.
for popRaster in popRasterList:
    #If this isn't the first iteration of this loop...
    if popRaster != popRasterList[0]:
        #Use map algebra to determine the percent difference in population between the previous population raster and the current population raster. Since these rasters were created while looping through "timeSpanList", and "timeSpanList" has the time spans in chronological order, this is equivalent to determining the difference in population between one time span and the chronologically previous time span.
        #Map algebra division will be used, and if a raster cell is divided by 0 or NoData the result will be NoData. This will be a problem because newly settled cells will appear to have no change in the population change maps. If a raster cell had no (selected) points in its area when the raster was created above, it will have a value of NoData; if it had points but these were all nonhabitation components, it will have a value of 0. Therefore, before doing the map algebra division, change both NoData and 0 values to a small value, using Con().
        #Con parameters: raster which defines TRUE and FALSE; cell output value if TRUE; cell output if FALSE; SQL where clause [not used here]
        popRasterWithoutNoData = arcpy.sa.Con(arcpy.sa.IsNull(popRaster), 0.1, arcpy.sa.Raster(popRaster))
        popRasterWithoutNoDataOrZeros = arcpy.sa.Con(popRasterWithoutNoData == 0, 0.1, popRasterWithoutNoData)
        prevRasterWithoutNoData = arcpy.sa.Con(arcpy.sa.IsNull(prevRaster), 0.1, arcpy.sa.Raster(prevRaster))
        prevRasterWithoutNoDataOrZeros = arcpy.sa.Con(prevRasterWithoutNoData == 0, 0.1, prevRasterWithoutNoData)
        #Now that the rasters have had NoData values and zeros removed,
```

```
    calculate the population change for each raster cell, as a percent difference.
    popDifference = (popRasterWithoutNoDataOrZeros - prevRasterWithoutNoDataOrZeros) / prevRasterWithoutNoDataOrZeros * 100

    #So that this raster can be added to the .mxd, create an arcpy.mapping.Layer object from it.
    if arcpy.Exists("currentPopChangeRasterLayer"):
        arcpy.Delete_management("currentPopChangeRasterLayer")
    arcpy.MakeRasterLayer_management(popDifference, "currentPopChangeRasterLayer")
    popChangeLayerObj = arcpy.mapping.Layer("currentPopChangeRasterLayer")
    #Add this layer object to the .mxd.
    arcpy.mapping.AddLayer(arcpy.mapping.ListDataFrames(popMXD)[0], popChangeLayerObj)
    #Apply symbology from the population change raster template.
    #First create a layer object from the template .lyr file.
    popChangeRastTemplateObj = arcpy.mapping.Layer(popChangeRastTemplatePath)
    #Define the layer to be updated.
    popChangeRastUpdateObj = arcpy.mapping.ListLayers(popMXD, "currentPopChangeRasterLayer", arcpy.mapping.ListDataFrames(popMXD)[0])[0]
    #Now use UpdateLayer() to apply this template layer object's symbology to the population change raster object for this iteration.
    arcpy.mapping.UpdateLayer(arcpy.mapping.ListDataFrames(popMXD)[0], popChangeRastUpdateObj, popChangeRastTemplateObj, True)
    #Change how this layer appears in the legend.
    legend = arcpy.mapping.ListLayoutElements(popMXD, "LEGEND_ELEMENT")[0]
    style = arcpy.mapping.ListStyleItems("ESRI.style", "Legend Items", "Horizontal Single Symbol Label Only")[0]
```

```
        legend.updateItem(popChangeRastUpdateObj, style)

        #Also add a layer for the lake level.
        #Select the appropriate line in the bathymetry layer from section 4, using the dictionary created in section 4 for this purpose.
        arcpy.SelectLayerByAttribute_management("bathymetryLayer", "NEW_SELECTION", "Elevation = " + popRastLakeLevDict[popRaster])
        #Convert this line to a polygon.
        currentLakePolyPath = timeSpanLakePolygonPath + popRaster.replace(".tif", "") + ".shp"
        arcpy.FeatureToPolygon_management("bathymetryLayer", currentLakePolyPath)
        #Make a feature layer from this newly created file, and then make a mapping.Layer object from it.
        if arcpy.Exists("currentLakePolyLayer"):
            arcpy.Delete_management("currentLakePolyLayer")
        arcpy.MakeFeatureLayer_management(currentLakePolyPath, "currentLakePolyLayer")
        lakeLayerObj = arcpy.mapping.Layer("currentLakePolyLayer")
        #Add the lake level layer to the .mxd.
        arcpy.mapping.AddLayer(arcpy.mapping.ListDataFrames(popMXD)[0], lakeLayerObj, "TOP")
        #Apply symbology from the lake template.
        lakeTemplateObj = arcpy.mapping.Layer(lakeTemplatePath)
        lakeUpdateObj = arcpy.mapping.ListLayers(popMXD, "currentLakePolyLayer", arcpy.mapping.ListDataFrames(popMXD)[0])[0]
        arcpy.mapping.UpdateLayer(arcpy.mapping.ListDataFrames(popMXD)[0], lakeUpdateObj, lakeTemplateObj, True)
        lakeUpdateObj.transparency = 25
        #Remove this layer from the legend.
        for legend in arcpy.mapping.ListLayoutElements(popMXD, "LEGEND_ELEMENT"):
            for legLayer in legend.listLegendItemLayers():
                if legLayer.name == "currentLakePolyLayer":
                    legend.removeItem(legLayer)
```

```python

    #Also add a layer to the .mxd for the survey boundaries.
    if arcpy.Exists("Survey_Boundaries"):
        arcpy.Delete_management("Survey_Boundaries")
    arcpy.MakeFeatureLayer_management(combiBoundPath, "Survey_Boundaries")
    boundsLayerObj = arcpy.mapping.Layer("Survey_Boundaries")
    arcpy.mapping.AddLayer(arcpy.mapping.ListDataFrames(popMXD)[0], boundsLayerObj, "TOP")
    #Apply symbology from the boundaries template.
    boundsTemplateObj = arcpy.mapping.Layer(boundsTemplatePath)
    boundsUpdateObj = arcpy.mapping.ListLayers(popMXD, "Survey_Boundaries", arcpy.mapping.ListDataFrames(popMXD)[0])[0]
    arcpy.mapping.UpdateLayer(arcpy.mapping.ListDataFrames(popMXD)[0], boundsUpdateObj, boundsTemplateObj, True)

    #Also add a layer to the .mxd for the hillshade background.
    hillshadeLayerObj = arcpy.mapping.Layer(hillshadeLayerPath)
    arcpy.mapping.AddLayer(arcpy.mapping.ListDataFrames(popMXD)[0], hillshadeLayerObj, "BOTTOM")
    #Remove this layer from the legend.
    for legend in arcpy.mapping.ListLayoutElements(popMXD, "LEGEND_ELEMENT"):
        for legLayer in legend.listLegendItemLayers():
            if legLayer.name == "hillshade.tif":
                legend.removeItem(legLayer)

    #Export the .mxd.
    #Create the output image's filename. The extension must be changed from the loop variable's ".tif" to ".pdf". The filename has the later of the two phases being compared.
    #CAUTION: ANY FILE ALREADY AT THIS PATH WILL BE OVERWRITTEN.
    exportNumber += 1
    currentPopChangeMXDexportPath = str(exportNumber) + popChangeMXDexportPath + popRaster.replace(".tif", ".pdf")
```

```
        arcpy.mapping.ExportToPDF(popMXD, currentPopChangeMXDexportPath, resolution = 300, image_compression = "JPEG", jpeg_compression_quality = 70)
        #Clear the .mxd.
        for dataframe in arcpy.mapping.ListDataFrames(popMXD):
            for layer in arcpy.mapping.ListLayers(popMXD, "", dataframe):
                arcpy.mapping.RemoveLayer(dataframe, layer)
        for legend in arcpy.mapping.ListLayoutElements(popMXD, "LEGEND_ELEMENT"):
            for legLayer in legend.listLegendItemLayers():
                legend.removeItem(legLayer)
        popMXD.save()

    #Store this iteration's population raster filename, so that it can be used in the next iteration.
    prevRaster = popRaster

#Check in spatial analyst license.
arcpy.CheckInExtension("Spatial")
```

APPENDIX E

Scripts for Macro-scale Study II

This appendix contains the source code for the figures in Chapter 4. The software versions used to run this code are ArcGIS 10.3 with the accompanying Python 2.7.8 distribution (for all Python scripts which require ArcPy), and standard Python 3.5.1 64-bit (for all Python scripts which don't require ArcPy), all on Windows 7. Python package versions used are matplotlib 1.5.1 and networkx 1.11.

E.1 Staple Finance (C:/Real/SantaFe/Agriculture/Scripts/)

Listing E.1: 1_LandClassification_EXPERIMENTAL.py

```
#-----------------------------------------------------------------
#THIS SCRIPT CREATES RASTERS FOR AGRICULTURAL PRODUCTIVITY/POTENTIAL. IT CREATES SEPARATE RASTERS FOR DIFFERENT LAKE LEVELS. IT ALSO CREATES SEPARATE RASTERS FOR INTENSIVE VERSUS UNINTENSIVE PRODUCTIVITY.

#TOPOGRAPHY AND HYDROLOGY ARE THE DETERMINANTS OF PRODUCTIVITY IN THIS MODEL. IN THIS MODEL THE RELATIONSHIPS BETWEEN THESE VARIABLES DRAWS FROM GRIFFIN AND STANISH (2007): APPENDIX A, AND STANISH (2003): 34-40.

#THE OUTPUT OF THIS SCRIPT IS 3 RASTERS PER LAKE LEVEL: 1) AN UNRANKED, QUALITATIVE LAND CLASSIFICATION (CELL VALUES ARE, E.G., LOW PAMPAS = 1, HIGH PAMPAS = 2, ETC.), 2) A QUANTITATIVE CLASSIFICATION OF PRODUCTIVITY DURING UNINTENSIVE USE (CELL VALUES ARE IN KILOCALORIES A.K.A. FOOD CALORIES), 3) A QUANTITATIVE CLASSIFICATION OF PRODUCTIVITY DURING
```

```
INTENSIVE USE (CELL VALUES ARE IN KILOCALORIES).
#-------------------------------------------------------------------

#-------------------------------------------------------------------
#FUTURE WORK:
#A more sophisticated model would account for 1) swampy areas and 2) springs. Regarding the former, Griffin and Stanish had a land class for swampy areas, based on maps. Regarding the latter, they modeled springs probabilistically, by randomly assigning springs to a certain fraction of the patches (Griffin and Stanish 2007: 33). This was more appropriate to an ABM than it is to my analysis. Griffin and Stanish (2007) don't mention the probabilities they used in modeling springs, but after examining the ABM's code which Griffin provided to me, I believe I have determined them: 25% for locations below 3900 masl and 15% for locations above 3900 masl (see "Constants.java", lines 51-52). Ecological locations are defined in the ABM as 1.5Km. X 1.5Km. patches (Griffin and Stanish 2007: 8), so in the ABM any 1.5Km. X 1.5Km. area below 3900 masl has a 25% probability of having a spring, and any 1.5Km. X 1.5 Km. area above 3900 masl has a 15% probability of having a spring. This is roughly equivalent to any hectare below 3900 masl having a .1% probability of having a spring and any hectare above 3900 masl having a .07% probability of having a spring. These probabilities are so small that if one tries to increase the cal/ha value for all locations by dividing up the benefit based on these probabilities, it has almost no effect on the cal/ha values (e.g., the difference between raised field per hectare value (10000k) and pasture per hectare value (160k) is 9840k, but if one multiplies this by the probability of a spring (.001) it only changes from 160k to 170k (9840k * .001 = 9840 cal).
#a more sophisticated model would incorporate fallow times (see Griffin and Stanish 2007: Table A-2) and rainfall (see Revue Hydrobiologie Tropicale 1981 Boulange and Jaen Figure 14)
#may want to increase the resolution of the output rasters (by just splitting the cells into several with the same value) -- in the next script, if a Thiessen is small compared to the raster cells, the Thiessen could be unrepresented in the rasterized version made for
```

```
ZonalStatistics() -- see Help regarding this. Resample() seems to be the right tool to use. However, since the raster cells refer to the values for that area, the values will also have to be changed; therefore, make any changes to resolution at the same time that the conversion from cal/hectare to cal/raster cell is done (presently near the bottom of this script). Of course, another option is to use a higher resolution raster and see if any Thiessens are missing, but this may alter the land classification too.
#-----------------------------------------------------------------------

#Section 1: Get tools---------------------------------------------------
#Import the arcpy module in order to access ArcGIS. Note that while ESRI documentaion encourages "from arcpy import env" and "from arcpy.sa import *" here, I prefer to instead keep an explicit namespace hierarchy; therefore, my arcpy code differs from ESRI's by always explicitly using "arcpy.sa." to prefix spatial analyst functions and by always using "arcpy.env" instead of "env".
import arcpy
#Import the os module, necessary here for creating workspace folders.
import os
#-----------------------------------------------------------------------

#Section 2: Define parameters-------------------------------------------
#When distinguishing pampas from hillsides by considering each cell's surrounding neighborhood of cells, this parameter will be used as the circular neighborhood's radius. The unit is the XY map unit of the DEM.
neighborhoodSizeParam = 1000
#This parameter also refers to the neighborhood defined by the above parameter. The difference between a raster cell's elevation and the minimum elevation within the neighborhood must be less than this paramter for it to be defined as a pampas cell rather than a hillside cell. The unit is the DEM's elevation unit.
pampasDiffParam = 20

```

```
#This parameter specifies the maximum distance a raster cell classified as "near-lake" can be from Lake Titicaca.
lakeBufferParam = "1000 Meters"
#This parameter specifies the maximum distance a raster cell classified as "near-river" can be from a river.
riverBufferParam = "500 Meters"
#-----------------------------------------------------------------------

#Section 3: Preliminary Work: licenses, file paths, environmental settings, and combining the rivers shapefiles
#-----------------------------------------------------------------------
#Licenses----------------------------------
#Check out the ArcGIS Spatial Analyst license.
arcpy.CheckOutExtension("Spatial")
#File paths--------------------------------

#Define the path where all output (both scratch and final) will be stored (some of it in subdirectories of this path). This string will be used in constructing other strings for paths below.
outputPath = "C:/Real/SantaFe/Agriculture/Working/finaloutput3/"

#Define paths-------
#Define paths for input files.
#Set the path to the Digital Elevation Model.
#THIS IS JUST A PLACEHOLDER FILE.
#FOR THE CONVERSION FROM KILOCALORIES/HECTARE TO KILOCALORIES (SECTION 5) AS IT IS CURRENTLY WRITTEN, THE DEM MUST HAVE AN XY UNIT OF METERS.
elevationPath = "C:/Real/SantaFe/LeastCostPaths/Working/GmtedClipReproj.tif"
#Set the path to the file that models different lake levels.
lakeTiticacaShapefilePath = "C:/Real/SantaFe/Agriculture/Data/Bathymetry_BoulangeLazzaro1981_DRAFT.shp"
#Set the paths to the directories with line (occasionally polygon) shapefiles representing the Titicaca region's rivers. The files in these directores will be combined into one file, later in this section.
```

```
#THESE FILES ARE JUST PLACEHOLDERS.
riversPeruPath = "C:/Real/SantaFe/Agriculture/Data/Rivers/Peru/"
riversBoliviaPath = "C:/Real/SantaFe/Agriculture/Data/Rivers/Bolivia/"
#Also set the path for the shapefile which will be the result of combining all of the files at these two paths.
riversCombinedPath = outputPath + "allRivers.shp"

#Define paths for intermediate output files.
#These variables will only be used after the definition of the ArcGIS workspace environmental setting, so full paths are not required.
lakeLevelPolygonPath = "lake_level_polygon.shp"
lakeTiticacaRasterizedPath = "lakeraster"
topoClassedMinusLakePath = "topocl_nolak"
lakeBufferPath = "lake_buffer.shp"
lakeBufferRasterizedPath = "lake_buff"
riversBufferPath = "rivers_buffer.shp"
riversBufferRasterizedPath = "rivers_buff"

#Define paths for final output files. These variables will only be used after the definition of the ArcGIS workspace environmental setting, so full paths are not required.
landClassPath = "landClass"
landValueUnintensivePath = "landValUnint"
landValueIntensivePath = "landValInt"

#Environmental settings---------------------
#Set environmental settings that will ensure that output rasters match the DEM's extent, cell alignment, and coordinate system (the extent and coordinate system will also affect vector data).
#IT IS IMPORTANT TO NOTE THAT ALL DATASETS USED IN THIS SCRIPT SHOULD FALL ENTIRELY WITHIN THIS EXTENT, OR ELSE THEIR PORTIONS WHICH FALL OUTSIDE THIS EXTENT WILL NOT BE PROCESSED.
arcpy.env.extent = elevationPath
arcpy.env.snapRaster = elevationPath
arcpy.env.outputCoordinateSystem = elevationPath
```

```
#Use the GetRasterProperties tool to get the cell size of the DEM. This will be used in the FeatureToRaster tool below, to ensure that output rasters have the same cell size as the DEM.
#parameters: input raster; property being queried (cell size in X dimension, it is assumed here to be the same as Y); band [not used here]
demCellSizeResult = arcpy.GetRasterProperties_management(elevationPath, "CELLSIZEX")
#change the result object to a string
demCellSizeString = demCellSizeResult.getOutput(0)
#change the string to a floating point number
demCellSize = float(demCellSizeString)

#Combine the rivers shapefiles into one shapefile.---------------
#Set the workspace, briefly, to the first of the two directories with rivers files (this workspace won't be used for most of the script).
arcpy.env.workspace = riversPeruPath
#Get a list of the feature classes in this workspace.
riversPeruShapefiles = arcpy.ListFeatureClasses()
#Combine these files into one file.
#Merge_management() parameters: input feature classes or tables; output feature class or table; field mappings [not used here]
#Note that this tool is affected by the output coordinate system environmental setting
arcpy.Merge_management(riversPeruShapefiles, outputPath + "riversPeru.shp")
#Merge the second directory's rivers files.
boliviaMinorRiversPath = riversBoliviaPath + "IGMriosMenoresFromIGM1toMillionScaleMaps_ActualizadoAOctubre2015.shp"
boliviaMajorRiversPath = riversBoliviaPath + "IGMriosPrincipalesFromIGM1toMillionScaleMaps_ActualizadoAOctubre2015.shp"
#The Bolivia major rivers shapefile first must be converted from polygons to lines.
#PolygonToLine() parameters: input; output; whether to identify neighboring polygon information
```

```
arcpy.PolygonToLine_management(boliviaMajorRiversPath, outputPath + "majRivBolivPolyToLines.shp", "IGNORE_NEIGHBORS")
#Merge the Bolivia major and minor rivers.
arcpy.Merge_management([boliviaMinorRiversPath, outputPath + "majRivBolivPolyToLines.shp"], outputPath + "riversBolivia.shp")
#Now combine the Peru and Bolivia files.
arcpy.Merge_management([outputPath + "riversPeru.shp", outputPath + "riversBolivia.shp"], riversCombinedPath)

#Begin main loop; set workspace--------------
#Loop through the lake levels to create a new workspace for each. This loop extends beyond Section 3.
for lakeLevel in ["0","5","15"]:
    #Workspace----------
    #Create a workspace folder for this lake level.
    #Define the path. All folders above the leaf (the final folder) must already exist, since mkdir() is used rather than makedirs().
    lakeLevWorkspace = outputPath + "lakeLev" + lakeLevel
    #Attempt to make a folder at this path.
    try:
        os.mkdir(lakeLevWorkspace)
    #mkdir() will not create a folder if it already exists.
    except OSError as childFolderError:
        print("OSError: " + str(childFolderError))
    #Set the ArcGIS workspaces to this newly created folder.
    arcpy.env.workspace = lakeLevWorkspace
    arcpy.env.scratchWorkspace = arcpy.env.workspace
#--------------------------------------------------------------------

    #Section 4: Land Classification 1-----------------------------------
    #This section assigns an agricultural productivity class to each raster cell. This first classification only involves unordered types (e.g., low pampas = 1, high pampas = 2, where the number values have no significance), rather than a definition of the type's productivity value/worth. These classes' productivity values/worth will be
```

```
addressed in a subsequent section.
#The final product of this section is a raster with the values:
# 1 = low pampas without river          6 = low pampas with river
# 2 = high pampas without river         7 = high pampas with river
# 3 = hillsides without river           8 = hillsides with river
# 4 = puna without river                9 = puna with river
# 5 = near-lake without river           10 = near-lake with river
# NoData = inside lake (Note that the subsistence value of the lake is considered in the subsequent script, "2_Catchments.py").
#This classification is relatively similar to that used by Griffin and Stanish (2007: Appendix A).

#Section 4.1: Topography-------------------------------
#First, topography/elevation will be examined. In the subsequent subsection, hydrology will be examined.

#First, define pampas versus hillsides. The pampas will later be divided into low pampas and high pampas.
#Raster cells in the pampas (plains) should be surrounded by raster cells with similar elevations (not just the immediately neighboring cells, but the larger neighborhood). Therefore, get the minimum elevation in each cell's larger neighborhood, and compare it to the cell's own elevation. If the difference is small, the cell is defined as pampa rather than hillside. Use minimum, rather than e.g., range, so that cells at the base of hills are defined as pampas.
#FocalStatistics() parameters: input raster; neighborhood shape, size, and units [here, circle's radius in map units rather than number of cells]; statistic to calculate; whether to ignore NoData values in the neighborhood [here, "DATA" means ignore]
neighborsMin = arcpy.sa.FocalStatistics(elevationPath, arcpy.sa.NbrCircle(neighborhoodSizeParam, "MAP"), "MINIMUM", "DATA")
#Make a raster where each cell is equal to the difference between the cell's elevation and the neighborhood's minimum.
neighborsDiff = arcpy.sa.Raster(elevationPath) - neighborsMin
#Define pampas.
```

```
#Con parameters: raster which defines TRUE and FALSE; cell output value if TRUE; cell output if FALSE; SQL where clause [not used here]
pampas = arcpy.sa.Con(neighborsDiff < pampasDiffParam, arcpy.sa.Raster(elevationPath), 0)
#Define low pampas. Values in this raster will be 1 for low pampas and 0 for all other cells.
lowPampas = (pampas > 0) & (pampas < 3900)
#Define high pampas. Values in this raster will be 2 for high pampas and 0 for all other cells.
#conditions
highPampas = (pampas > 0) & (pampas >= 3900) & (pampas < 4000)
#convert 1 to 2
highPampas = highPampas * 2
#Define hillsides. Values in this raster will be 3 for hillsides and 0 for all other cells.
#conditions
hillsides = (pampas == 0) & (arcpy.sa.Raster(elevationPath) < 4000)
#convert 1 to 3
hillsides = hillsides * 3
#Define puna. Values in this raster will be 4 for puna and 0 for all other cells.
#conditions
puna = arcpy.sa.Raster(elevationPath) >= 4000
#convert 1 to 4
puna = puna * 4
#Add the 4 rasters created above together. Thus, in this new raster, the land classification thus far is:
# 1 = low pampas
# 2 = high pampas
# 3 = hillsides
# 4 = puna
topoClassed = lowPampas + highPampas + hillsides + puna
#------------------------------------------------------

#Section 4.2: Hydrology--------------------------------
```

```
#In considering hydrology, first the lake will be considered and then rivers will be considered.
#The lake will be used for 2 different modifications. First, all cells inside the lake will be changed to NoData. Second, all cells near the lake will be changed to a different land class.
#Remember that the lake is being modeled at 3 different levels, since its level has varied through time. Each level is considered in one iteration of the loop which encloses most of this script.

#Section 4.2.1: Lake cells to NoData--------------
#Change cells inside Lake Titicaca to NoData.
#Turn the bathymetric contours into a feature layer, so that the Select Layer By Attribute tool can be used on it.
#MakeFeatureLayer parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
arcpy.MakeFeatureLayer_management(lakeTiticacaShapefilePath, "bathymetryLayer" + lakeLevel)
#Select (in the ArcGIS sense) the lake level that the current iteration of the loop is using, using the SelectLayerByAttribute tool.
#This searches the feature layer created above and selects its line that has an "Elevation" value that matches the loop variable.
#SelectLayerByAttribute parameters: input feature layer; selection type; SQL where clause
arcpy.SelectLayerByAttribute_management("bathymetryLayer" + lakeLevel, "NEW_SELECTION", "Elevation = " + lakeLevel)
#Turn the selected bathymetric line into a polygon, so that when it is rasterized, the cells in the interior of the line will also be coded as within the lake (rather than just the line itself being coded as within the lake)
#FeatureToPolygon parameters: line or polygon input features; output polygon feature class; cluster tolerance, i.e. minimum distance separating feature coordinates [default of .001 meter used here]; attributes [not used here; no longer works anyway]; label features, i.e. points which will be used as attributes for the output polygons [
```

```
not used here]
arcpy.FeatureToPolygon_management("bathymetryLayer" + lakeLevel, lakeLevelPolygonPath)
#Turn the bathymetric polygon that was just created into a raster, so that it can be used in map algebra.
#FeatureToRaster parameters: input dataset; input's attribute field that is used to assign output raster's cell values; output raster path; output raster cell size
arcpy.FeatureToRaster_conversion(lakeLevelPolygonPath, "FID", lakeTiticacaRasterizedPath, demCellSize)
#In the land classification raster created above, set cells that correspond to Lake Titicaca (and therefore to the bathymetric raster that was just created) to NoData. This is done here by: STEP 1) using IsNull to create a raster that changes NoData values in the bathymetric raster to 1, and all other values to 0 (such that the lake will be composed of cells with a value of 0, and non-lake areas will be composed of cells with a a value of 1); STEP 2) using a Boolean NOT operator (~) on the raster that was just created in step 1, which changes 1s to 0s, and 0s to 1s (such that the lake will now be composed of cells with a value of 1, and non-lake areas will be composed of cells with a value of 0); STEP 3) running the SetNull tool on this raster just created in step 2, which changes 1s to NoData and replaces 0s with the values from the land classification raster (such that the lake is composed of cells with a value of NoData, and the non-lake areas are composed of cells from the land classification raster).
#SetNull parameters: input raster that defines TRUE and FALSE; output for FALSE cells in the input raster; SQL where clause [not used here]
topoClassedMinusLake = arcpy.sa.SetNull(~(arcpy.sa.IsNull(lakeTiticacaRasterizedPath)), topoClassed)
#Save the output.
topoClassedMinusLake.save(topoClassedMinusLakePath)
#-------------------------------------------------

#Section 4.2.2: Near lake cells-------------------
```

```
#Change raster cells that are near Lake Titicaca to their own land class.
#Create a buffer around the lake. This will be used to reclassify raster cells that are within a certain distance from the lakeshore. This distance is set by a parameter in section 2 above. It is important to use the Buffer tool's "OUTSIDE_ONLY" parameter so that raster cells within the lake (coded as NoData above) are not reclassified.
#Buffer_analysis() parameters: input features; output feature class; buffer distance or field; side of input to buffer [here, "OUTSIDE_ONLY" specifies that the interior of the input should not be included in the output]; line end type [not used here]; dissolve option [not used here]; dissolve field [not used here]; method [the default, planar, is used here]
arcpy.Buffer_analysis(lakeLevelPolygonPath, lakeBufferPath, lakeBufferParam, "OUTSIDE_ONLY")
#Turn the buffer polygon that was just created into a raster, so that it can be used in map algebra.
#FeatureToRaster parameters: input dataset; input's attribute field that is used to assign output raster's cell values; output raster path; output raster cell size
arcpy.FeatureToRaster_conversion(lakeBufferPath, "FID", lakeBufferRasterizedPath, demCellSize)
#Create a raster in which near-lake cells are classified as 5 and all other cells retain their classes from the topographic classification.
#To create the raster which defines TRUE and FALSE, first use IsNull() on the rasterized buffer, such that cells outside the buffer = 1 and cells inside the buffer = 0. Then use the ~ operator to reverse these values, such that cells outside the buffer = 0 and cells inside the buffer = 1.
#Con parameters: raster which defines TRUE and FALSE; cell output value if TRUE; cell output if FALSE; SQL where clause [not used here]
topoAndLakeClassed = arcpy.sa.Con(~(arcpy.sa.IsNull(lakeBufferRasterizedPath)), 5, arcpy.sa.Raster(topoClassedMinusLakePath))
```

```
#Thus, in this new raster, the land classification thus far is:
# 1 = low pampas
# 2 = high pampas
# 3 = hillsides
# 4 = puna
# 5 = near-lake
# NoData = inside lake
#At the moment, all cells within the buffer are converted to 5/near-lake, but an alternative would be to only convert cells previously classed as 1/low pampas.
#-----------------------------------------------------

#Section 4.2.3: Rivers-----------------------------
#Modify the land classes for cells which are near rivers. The resulting land class for a cell near a river depends on its prior class: each of the 5 classes defined above will have a "with river" and a "without river" version.
#Create a buffer around the lines representing rivers. This will be used to reclassify raster cells that are within a certain distance from the rivers. This distance is set by a parameter in section 2 above.
#Buffer_analysis() parameters: input features; output feature class; buffer distance or field; side of input to buffer [here, default of "FULL" is used]; line end type [here, default of "ROUND" is used]; dissolve option [here, default of "NONE" is used]; dissolve field [not used here]; method [here, default of "PLANAR" is used]
arcpy.Buffer_analysis(riversCombinedPath, riversBufferPath, riverBufferParam)
#Turn the buffer polygon that was just created into a raster, so that it can be used in map algebra.
#FeatureToRaster parameters: input dataset; input's attribute field that is used to assign output raster's cell values; output raster path; output raster cell size
arcpy.FeatureToRaster_conversion(riversBufferPath, "FID", riversBufferRasterizedPath, demCellSize)
```

```
#Create a raster in which near-river cells are re-classified and all other cells retain their prior classes.
#To create the raster which defines TRUE and FALSE, first use IsNull() on the rasterized buffer, such that cells outside the buffer = 1 and cells inside the buffer = 0. Then use the ~ operator to reverse these values, such that cells outside the buffer = 0 and cells inside the buffer = 1.
#Since each new class is based on the prior class, a simple way to achieve the new classes is to add 5 to each near-river cell. Thus, for example, a low pampas cell (= 1) which is near a river will be reclassified as a low pampas cell with river (= 6), whereas a high pampas cell (= 2) will be reclassified as a high pampas cell with river (= 7). Cells which are not near rivers will simply be left as is.
#Con parameters: raster which defines TRUE and FALSE; cell output value if TRUE; cell output if FALSE; SQL where clause [not used here]
topoAndHydroClassed = arcpy.sa.Con(~(arcpy.sa.IsNull(riversBufferRasterizedPath)), topoAndLakeClassed + 5, topoAndLakeClassed)
#Thus, in this new raster, the land classification is as stated at the beginning of section 4.
topoAndHydroClassed.save(landClassPath)
#-----------------------------------------------------------------

#Section 5: Land Classification 2------------------------------------
#The above classification is useful for some types of analyses. Other types of analyses demand that these unordered classes be converted to classes which quantify the classes' productivity value/worth. Such a land classification will be created in this section.
#This classification is relatively similar to that used by Griffin and Stanish (2007: Appendix A).
#To prepare the raster for the Reclassify() tool, use the CalculateStatistics_management() tool.
#CalculateStatistics() parameters: input raster; x skip factor [GRID always uses 1]; y skip factor [GRID always uses 1]; values to ignore
```

```
[not used here]; whether to skip if statistics already exist [default of no used here]; area to calculate for [not used here]
arcpy.CalculateStatistics_management(topoAndHydroClassed)
#Convert the land classifications into kilocalories/hectare values.
#The kilocalories/hectare values are derived from Griffin and Stanish 2007: Tables A-1 and A-2. Note that Griffin and Stanish use "kcal" in an unconventional way, and that in contrast I use it in the conventional way. In my use, 1 cal is the energy required to heat 1 gram of water 1 degree C, and 1000 cal = 1 kcal = 1 "food calorie". In contrast, Griffin and Stanish use 1 kcal to signify 1000 "food calories". Therefore, the remap values I use below are all 1000 times larger than the values in Griffin and Stanish's Table A-2.
#Note that the subsistence value of cells within the lake (coded as NoData in these rasters) is considered in the subsequent script, "2_Catchments.py".
#Reclassify() parameters: input raster; field with values to reclassify; Remap object; whether cells with input values missing a corresponding entry in the remap table should be left as is, or changed to NoData
kcalPerHa_unintensive = arcpy.sa.Reclassify(topoAndHydroClassed, "VALUE", arcpy.sa.RemapValue([[1,160000], [2,160000], [3,3900000], [4,160000], [5,1000000], [6,1000000], [7,160000], [8,3900000], [9,160000], [10,1000000]]), "NODATA")
kcalPerHa_intensive = arcpy.sa.Reclassify(topoAndHydroClassed, "VALUE", arcpy.sa.RemapValue([[1,160000], [2,160000], [3,3900000], [4,160000], [5,1000000], [6,10000000], [7,160000], [8,7800000], [9,160000], [10,10000000]]), "NODATA")
#Convert the land classifications from kilocalories/hectare to kilocalories. In other words, convert from kilocalories/hectare to kilocalories/raster cell. This will allow the next script to simply calculate sums of these raster cells' values to get the total caloric value of an area.
cellSizeHectares = (demCellSize ** 2) / 10000
kcal_unintensive = kcalPerHa_unintensive * cellSizeHectares
kcal_intensive = kcalPerHa_intensive * cellSizeHectares
```

```
    kcal_unintensive.save(landValueUnintensivePath)
    kcal_intensive.save(landValueIntensivePath)

#Check in spatial analyst license.
arcpy.CheckInExtension("Spatial")
```

Listing E.2: 2_Catchments_EXPERIMENTAL.py

```
#-----------------------------------------------------------------
#THIS SCRIPT USES THE LAND CLASSIFICATIONS CREATED BY THE PREVIOUS SCRIPT ("1_LandClassification.py") TO QUANTIFY THE SUBSISTENCE PRODUCTIVITY OF THE CATCHMENT FOR EACH ARCHAEOLOGICAL COMPONENT. IT DOES THIS SEPARATELY FOR INTENSIVE AND UNINTENSIVE PRODUCTION. THIS SCRIPT ALSO ACCOUNTS FOR THE SUBSISTENCE VALUE OF THE LAKE/FISHING, WHICH WAS NOT CONSIDERED IN THE PREVIOUS SCRIPT.

#TWO ALTERNATIVE METHODS OF DEFINING CATCHMENTS ARE USED. ONE USES A BUFFER AROUND EACH SITE (I.E., A CIRCULAR POLYGON OF THE SAME RADIUS FOR EACH SITE). THE SECOND METHOD USES A THIESSEN POLYGON AROUND EACH SITE (I.E., A POLYGON REPRESENTING ALL OF THE AREA WHICH IS CLOSEST TO A PARTICULAR SITE RATHER THAN ANY OTHER SITE).

#The output of this script is a series of .csv files. These files have three fields: component ID (from the input components databases); time span (see section 4); catchment value (see section 5). Note that the inter-survey components (those whose "comp" value begins with "gp") are included in the files for the buffer analysis but not in the files for the Thiessen analysis.
#-----------------------------------------------------------------

#-----------------------------------------------------------------
#FUTURE WORK:
#remove sites from small islands for island of the sun survey and taraco pen survey
#deal with multiple sectors -- relatedly, see how having multiple phases
```

```
from one survey in the same time span is (already) dealt with
#incorporate fishing into the thiessen catchments somehow (it has already been done for the buffers).
#-----------------------------------------------------------------------

#Section 1: Get tools--------------------------------------------------
#This future statement is used to enable Python 3 syntax when using print() to write to files (I am running this script with Python 2.7)
from __future__ import print_function
#Import the arcpy module in order to access ArcGIS.
import arcpy
#Import the math module, used here for sqrt()
import math
#-----------------------------------------------------------------------

#Section 2: Define parameters------------------------------------------
#For the first method of defining catchments, this parameter defines the circular buffers' radius. The unit is meters because arcpy.env.outputCoordinateSystem will be set to a UTM projection.
#See my dissertation's body text regarding why I have used 500 meters.
catchBufferRadiusParam = 500
#-----------------------------------------------------------------------

#Section 3: Preliminary Work: licenses, file paths, environmental settings, and the archaeological components databases
#-----------------------------------------------------------------------
#Licenses-------------------------------------
#Check out the ArcGIS Spatial Analyst license.
arcpy.CheckOutExtension("Spatial")
#File paths-----------------------------------

#Define the path where all input from the previous script ("1_LandClassification.py") is (though in subdirectories of this path -- see notes on workspace, immediately below) and where all output of the current script (both scratch and final) will be stored.
```

```
#IT IS CRITICAL THAT THIS IS THE SAME PATH STORED IN THE VARIABLE "outputPath" IN THE PREVIOUS SCRIPT ("1_LandClassification.py"), SO THAT THE CORRECT INPUT IS USED.
IOpath = "C:/Real/SantaFe/Agriculture/Working/finaloutput3/"

#Workspace----------
#The previous script ("1_LandClassification.py") set the workspace for each iteration of its main loop to a folder pertaining to that iteration's lake level. In contrast, the workspace for this script will be one level up, in the folder which contains these lake level folders. Therefore, when using files from the previous script, the file's lake level folder must be specified.
arcpy.env.workspace = IOpath
arcpy.env.scratchWorkspace = arcpy.env.workspace
#Define paths-------
#Define paths for input files.
#Set the path to the Titicaca archaeological surveys database.
#USE A SCHEMA.INI FILE TO DEFINE THE FIELD TYPES DERIVED FROM THESE CSV FILES. WHEN CREATING THIS SCHEMA.INI FILE YOU ALSO HAVE TO THINK ABOUT HOW MISSING/NON-APPLICABLE DATA SHOULD BE CODED IN THE CSV FILE ("NA", "-1", "0", ETC).
#THIS IS JUST A PLACEHOLDER FILE.
surveysTablePath = "C:/Real/SantaFe/Agriculture/Data/titicaca_surveys_python_LAST_SFI_VERSION_NO_SPACES_NO_BLANKS.csv"
#Set the path to the Titicaca inter-survey database.
#THIS IS JUST A PLACEHOLDER FILE.
gapsTablePath = "C:/Real/SantaFe/Agriculture/Data/Gaps_python_UNFINISHED_10JAN16_NO_BLANKS_NO_SPACES.csv"
#Define the paths for the survey boundaries.
boundariesFolder = "C:/Real/SantaFe/Agriculture/Data/SurveyBounds/"
pkBoundPath = boundariesFolder + "Pukara/PukaraValley.shp"
hpBoundPath = boundariesFolder + "HuancanePutina/HuancanePutinaSurveyBoundary.shp"
isBoundPath = boundariesFolder + "IslandSun/IslandSun.shp"
jpBoundPath = boundariesFolder + "JuliPomata/JuliPomata.shp"
```

```
trBoundPath = boundariesFolder + "TaracoPen/TaracoPeninsulaSurveyBoundary.shp"
ktBoundPath = boundariesFolder + "Katari/KatariValleySurveyBoundary.shp"
tlBoundPath = boundariesFolder + "TiwanakuLower/TiwanakuLowerValleySurveyBoundary.shp"
tmBoundPath = boundariesFolder + "TiwanakuCentral/TiwanakuCentralValleySurveyBoundary.shp"
#The Qawra Thaki survey boundary is split into two shapefiles. Combine them.
qtBoundPart1Path = boundariesFolder + "QawraThaki/QawraThakiSurveyBoundary.shp"
qtBoundPart2Path = boundariesFolder + "QawraThaki/QawraThakiSurveyBoundary2.shp"
qtBoundPath = "qtCombined.shp"
arcpy.Merge_management([qtBoundPart1Path, qtBoundPart2Path], qtBoundPath)
#Create a dictionary that stores the two-letter survey codes as keys and the file paths as values. It is important that the keys match the survey codes used in the archaeological components databases' "comp" field.
boundPathDict = {"pk" : pkBoundPath, "hp" : hpBoundPath, "is" : isBoundPath, "jp" : jpBoundPath, "tr" : trBoundPath, "kt" : ktBoundPath, "tl" : tlBoundPath, "tm" : tmBoundPath, "qt" : qtBoundPath}

#Define paths for output files from the previous script. Because of the arcpy.env.workspace setting, full paths are not required; HOWEVER, WHEN THESE VARIABLES ARE USED BELOW, THEY WILL NEED TO BE PREFIXED WITH A PARTICULAR LAKE LEVEL FOLDER (SEE NOTES ON WORKSPACE, ABOVE).
landClassPath = "landClass"
landValueUnintensivePath = "landValUnint"
landValueIntensivePath = "landValInt"

#Define paths for intermediate output files. Because of the arcpy.env.workspace setting, full paths are not required.
surveysShpPath = "surveys.shp"
gapsShpPath = "gaps.shp"
surveysAndGapsShpPath = "surveys_and_gaps.shp"
```

```
#These files will have suffixes for survey and phase added, so omit the extension. The suffixes and the extension will be added below.
bufferPath = "buffer"
thiessenPath = "thiessen"
thiessenClippedPath = "thiessenclip"
thiessenRasterPath = "thiRa"
thiessenZonalStatsUnintTablePath = "thiessenstats_unint"
thiessenZonalStatsIntTablePath = "thiessenstats_int"
#In addition to survey and phase suffixes, these files will have FID suffixes.
bufferRastPath = "b"
landCellsInBuffPath = "l"
bufferZonalStatsUnintTablePath = "buffstats_unint"
bufferZonalStatsIntTablePath = "buffstats_int"

#Also define the path to the DEM used in the previous script. This won't be directly used in this script, but is used in this script to mimic the environmental settings of the previous script.
#THIS IS JUST A PLACEHOLDER FILE.
elevationPath = "C:/Real/SantaFe/LeastCostPaths/Working/GmtedClipReproj.tif"

#Define paths for final output files.
#TAKE CARE WITH THESE VARIABLES: THEY ARE USED BELOW FOR THE PATHS FOR WRITING TO TEXT FILES, AND WILL OVERWRITE ANY FILE ALREADY AT THESE PATHS.
buffUnintenCSVPath = IOpath + "bufferCatchments_unintensive.txt"
buffIntenCSVPath = IOpath + "bufferCatchments_intensive.txt"
thiessUnintenCSVPath = IOpath + "thiessenCatchments_unintensive.txt"
thiessIntenCSVPath = IOpath + "thiessenCatchments_intensive.txt"

#Environmental settings----------------------
#IT IS IMPORTANT TO NOTE THAT ALL DATASETS USED IN THIS SCRIPT SHOULD FALL ENTIRELY WITHIN THIS EXTENT, OR ELSE THEIR PORTIONS WHICH FALL OUTSIDE THIS EXTENT WILL NOT BE PROCESSED.
```

```
arcpy.env.extent = elevationPath
arcpy.env.snapRaster = elevationPath
arcpy.env.outputCoordinateSystem = elevationPath
#Use the GetRasterProperties tool to get the cell size of the DEM. This will be used in the PolygonToRaster() tool below, to ensure that output rasters have the same cell size as the DEM.
#parameters: input raster; property being queried (cell size in X dimension, it is assumed here to be the same as Y); band [not used here]
demCellSizeResult = arcpy.GetRasterProperties_management(elevationPath, "CELLSIZEX")
#change the result object to a string
demCellSizeString = demCellSizeResult.getOutput(0)
#change the string to a floating point number
demCellSize = float(demCellSizeString)

#Archaeological sites (components, technically)------------------------
#Import the archaeological surveys table
#First, create a feature layer from the table file
#MakeXYEventLayer parameters: input table; X coordinate field; Y coordinate field; output layer name; spatial reference[I have chosen to define the projection using an EPSG code; the code 32719 is for WGS84 UTM 19S; note that this tool is not affected by the output coordinate system environmental setting, but the CopyFeatures tool below is]; Z coordinate field [not used here]
arcpy.MakeXYEventLayer_management(surveysTablePath, "eutm19", "nutm19", "XYsurveysLayer", arcpy.SpatialReference(32719))
#Second, save this feature layer as a feature class
#CopyFeatures parameters: input features; output feature class; geodatabase configuration keyword [not used here]; geodatabase spatial grid 1 [not used here]; " 2 [not used here]; " 3 [not used here]
arcpy.CopyFeatures_management("XYsurveysLayer", surveysShpPath)
#Do the same for the archaeological inter-survey data.
arcpy.MakeXYEventLayer_management(gapsTablePath, "eutm19", "nutm19", "XYgapsLayer", arcpy.SpatialReference(32719))
arcpy.CopyFeatures_management("XYgapsLayer", gapsShpPath)
```

```
#Combine the survey and inter-survey data into one shapefile.
#Merge parameters: input feature classes or tables; output feature class or table; field mappings [not used here]
#Note that this tool is affected by the output coordinate system environmental setting
arcpy.Merge_management([surveysShpPath, gapsShpPath], surveysAndGapsShpPath)

#The archaeological components ("surveysAndGapsShpPath") have attributes for spatial size but not population size. Add a field for population size and calculate its values. To estimate the population, use the methods described in Bandy 2001: 67, 71-72.
#Add the field.
#AddField_management() parameters: input to which field will be added; field name to be added; field type; precision [number of digits on both sides of decimal]; scale [number of digits after decimal]; length [not used here; text/blob types only]; field alias [not used here]; whether field can have null values [not used here]; whether field is required [not used here]; field domain [not used here]
arcpy.AddField_management(surveysAndGapsShpPath, "pop", "FLOAT", 7, 1)
#Calculate the values.
#Create an UpdateCursor that retrieves the newly created field ("pop") and the fields that will be used to calculate its values ("size_abs", "size_min", "size_max", "sitesize", and "hab").
with arcpy.da.UpdateCursor(surveysAndGapsShpPath, ("size_abs", "size_min", "size_max", "sitesize", "hab", "pop")) as compCursor:
    #Loop through each row of the attribute table. The row's values for the fields specified above will be in a list, in the order specified above.
    for compRow in compCursor:
        #Only calculate population if this component is a habitation component. Note that the use of > 0 here means that uncertain (0.5 and 0.75 codes) habitation components are also included.
        if compRow[4] > 0:
            #If this row doesn't have a NA/missing value for "size_abs" (
```

```
        absolute size), use the "size_abs" value to calculate the population for this component.
        if compRow[0] != -1:
            #The minimum population size is 1 household (6 people), so only calculate population if the spatial size is equivalent to more than one household. Otherwise, assign a population of 6 to this component.
            if compRow[0] > .25:
                compRow[5] = (((math.sqrt(compRow[0] * 10000)) - 20)**2) / 150
            else:
                compRow[5] = 6
        #If this row doesn't have a NA/missing value for "size_min", use the "size_min" and "size_max" values to calculate the population for this component.
        if compRow[1] != -1:
            #First get the midpoint between the "size_min" and "size_max" values.
            sizeMid = (compRow[1] + compRow[2]) / 2
            if sizeMid > .25:
                compRow[5] = (((math.sqrt(sizeMid * 10000)) - 20)**2) / 150
            else:
                compRow[5] = 6
        #If this row has NA/missing values for both "size_abs" and "size_min", use the "sitesize" value to calculate the population for this component.
        if compRow[0] == -1 and compRow[1] == -1:
            if compRow[3] > .25:
                compRow[5] = (((math.sqrt(compRow[3] * 10000)) - 20)**2) / 150
            else:
                compRow[5] = 6
    #When the "pop" field was added above, the values were all set to 0, because this is a numeric field in a shapefile. Therefore, nonhabitation components currently have 0 for "pop", since their
```

```
        values were not altered by the above calculations. This is fine for this script, but in other contexts it would often be preferable to have nonhabitation components' population values set to null. This could be done by using a geodatabase instead of a shapefile (see arcpy.AddField_management(field_is_nullable=)).
        #Use the modified list to update the row.
        compCursor.updateRow(compRow)
#---------------------------------------------------------------------

#Section 4: Catchment spatial definition, both methods-------------------
#Define the space covered by the components' catchments, using both the buffer method and the Thiessen polygon method. The buffer method could be accomplished without any consideration of A) chronology or B) survey boundaries. Both of these are critical for the Thiessen polygon method, however. Because the Thiessen polygon method assigns space/area to its nearest point feature (archaeological component), chronology is essential for determining which points/components should be considered when assigning this space. Consideration of survey boundaries is also essential to the Thiessen polygon method, because only space within the boundaries should be assigned to the components; otherwise, points near the survey boundaries would have enormous Thiessen polygons because of the missing data outside the boundaries. So, because both survey and phase are important to the Thiessen method, structure the catchment definition code for both methods based on this need, despite the fact that it is irrelevant to the buffer method.

#Most of the remainder of this script will be within a loop in which each iteration treats one survey (or the inter-survey data). To use in the creation of this loop, create a python list that stores the unique survey codes from the components database.
#Create an empty list for this.
surveyCodeList = []
#Create a SearchCursor which retrieves the "comp" field from the components database.
with arcpy.da.SearchCursor(surveysAndGapsShpPath, ("comp", )) as
```

```
compCursor:
    #Loop through each row of the attribute table. The row's values for the fields specified above will be in a list, in the order specified above.
    for compRow in compCursor:
        #Get the first two characters of the "comp" field: this is the survey code for this component.
        sCode = compRow[0][0:2].encode('utf-8')
        #If this survey code isn't already in the list...
        if sCode not in surveyCodeList:
            #...then add it.
            surveyCodeList += [sCode]

#Because the level of Lake Titicaca alters the land values in the near-shore areas, the catchment analysis must be chronologically structured with consideration of the chronology of the lake levels, not just the archaeological phases. Therefore, it isn't possible to just set up another loop through the phases as defined in the components databases (where the final character in the "comp" field's values denotes an archaeological phase). Instead, these steps are necessary: 1) a series of time spans which account for both cultural chronology and lake level change must be defined, 2) each timespan must be assigned a lake level, and 3) then each phase of each survey in the components databases must be correlated with one or more of the time spans.
#THIS MUST MATCH THE LIST WITH THE SAME NAME IN "3_CatchmentAnalysis.py"; WHILE IT WOULD BE MORE ELEGANT TO PICKLE THE LIST FROM ONE SCRIPT TO THE NEXT, I PREFER TO SIMPLY REPLICATE THIS LIST SO I CAN USE DIFFERENT VERSIONS OF PYTHON FOR THE TWO SCRIPTS WITHOUT WORRYING ABOUT COMPATIBILITY.
timeSpanList = ["1500BC_1100BC", "1100BC_850BC","850BC_450BC","450BC_250BC","250BC_0BC","0BC_250AD","250AD_600AD","600AD_1000AD","1000AD_1150AD","1150AD_1450AD","1450AD_1540AD","1540AD_1600AD"]
#Associate the time spans with their respective lake levels. Use a python dictionary for this.
timeSpanLakeLevelDict = {timeSpanList[0] : 5, timeSpanList[1] : 15,
```

```
timeSpanList[2] : 0, timeSpanList[3] : 15, timeSpanList[4] : 0, timeSpanList[5] : 15, timeSpanList[6] : 0, timeSpanList[7] : 0, timeSpanList[8] : 0, timeSpanList[9] : 15, timeSpanList[10] : 0, timeSpanList[11] : 0}
#Associate the time spans with the appropriate survey-specific phases. Use a python dictionary for this.
#Mapping the phases to the lake levels is complicated; this is a rough draft of such a mapping. This mapping often takes all sites dated to a broader cultural phase and associates ALL of them with a narrower time span defined by lake level. This amplifies a problem that exists even before subdividing the cultural phases into lake level time spans, the problem of having "overestimated maps" (sensu Ammerman 1981: 77).
timeSpanPhasingDict = {timeSpanList[0] : ["pk-a","is-b","jp-a","tr-a","hp-a","qt-a","gp-a"], timeSpanList[1] : ["pk-a","is-b","jp-a","tr-b","hp-a","qt-a","kt-a", "gp-b"], timeSpanList[2] : ["pk-b","is-c","jp-b","tr-c","hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"], timeSpanList[3] : ["pk-b","is-c","jp-b","tr-c","hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"], timeSpanList[4] : ["pk-c","is-d","jp-c","tr-d","hp-c","qt-a","kt-b","tm-b","tl-b", "gp-c"], timeSpanList[5] : ["pk-c","is-d","jp-c","tr-d","hp-c","hp-d","qt-a","kt-b","tm-b","tl-b", "gp-c"], timeSpanList[6] : ["is-d","jp-c","tr-e","hp-c","hp-d","qt-a","kt-b","tm-c","tl-c", "gp-c"], timeSpanList[7] : ["is-e","jp-d","tr-f","hp-e","hp-f","hp-g","qt-b","kt-c","tm-d","tm-e","tl-d","tl-e", "gp-d"], timeSpanList[8] : ["pk-d","is-f","jp-e","tr-g","hp-h","qt-c","kt-d","tm-f","tl-f","gp-e"], timeSpanList[9] : ["pk-d","is-f","jp-e","tr-g","hp-h","hp-i","hp-j","qt-c","kt-d","tm-f","tl-f", "gp-e"], timeSpanList[10] : ["pk-e","is-g","jp-f","tr-h","hp-k","hp-l","qt-d","kt-e","tm-g","tl-g", "gp-f"], timeSpanList[11] : ["jp-g","tr-i","hp-m","qt-e","kt-f","kt-g","tm-h","tl-h"]}

#Turn the archaeological components shapefile into a feature layer, so that the Select Layer By Attribute tool can be used on it.
#MakeFeatureLayer parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
arcpy.MakeFeatureLayer_management(surveysAndGapsShpPath, "compsLayer")
```

```
#The ultimate product of the below loop will be a series of python lists of strings, where each string represents one CSV-format line. Create lists that will be extended in the below loop and then printed to .csv files after the loop has completed. Also create headers here, but do not add a newline character after them.
buffUnintenCSVlist = ["comp,time_span,sum,pop"]
buffIntenCSVlist = ["comp,time_span,sum,pop"]
thiessUnintenCSVlist = ["comp,time_span,sum,pop"]
thiessIntenCSVlist = ["comp,time_span,sum,pop"]

#Loop through the surveys.
for survey in surveyCodeList:
    #Loop through the time spans.
    for timeSpan in timeSpanList:
        #Determine which of this survey's phase(s) (the phases used in the components databases, in the "comp" field) correspond to this time span.
        #Create a list to hold these phases.
        surveyPhaseList = []
        #Loop through all of the survey/phase codes which correspond to this time span.
        for spCode in timeSpanPhasingDict[timeSpan]:
            #If the survey part of the code matches the outer loop's current survey...
            if spCode[0:2] == survey:
                #...then add the phase part of the code (the final character) to the list.
                surveyPhaseList += [spCode[-1]]
        #A survey may not have any phase for this time span, so only continue if the list created above is non-empty.
        if len(surveyPhaseList) > 0:
            #Select (in the ArcGIS sense) components from the outer loop's survey and the inner loop's time span, using the SelectLayerByAttribute() tool. Because multiple phases can
```

```
        correspond to one time span (e.g., for Huancane-Putina's Tiwanaku-period components), first use SelectLayerByAttribute()'s "NEW_SELECTION" parameter value and then, if necessary, use SelectLayerByAttribute()'s "ADD_TO_SELECTION" parameter value.
        #In the SQL expression, use "LIKE" rather than "=", so that wildcards may be used, and use a percent wildcard to represent an unlimited number of any characters between the survey and phase codes. This works because the format used in the "comp" field is [survey code]-[site#].[sector#]-[phase code] (e.g., gp-0001.01-a).
        #SelectLayerByAttribute parameters: input feature layer; selection type; SQL where clause
        arcpy.SelectLayerByAttribute_management("compsLayer", "NEW_SELECTION", '"comp" LIKE ' + "'" + survey + '%' + surveyPhaseList[0] + "'")
        #The above line used the first element in "surveyPhaseList"; check to see if there are further elements, and if there are, use SelectLayerByAttribute() with the "ADD_TO_SELECTION" parameter value to add them to the selection created above.
        if len(surveyPhaseList) > 1:
            for remainderSp in surveyPhaseList[1:]:
                arcpy.SelectLayerByAttribute_management("compsLayer", "ADD_TO_SELECTION", '"comp" LIKE ' + "'" + survey + '%' + remainderSp + "'")
        #In many cases, multiple components from the same site will currently be selected, because a time span can have multiple phases from the same survey (e.g., Middle Tiwanaku Valley's Tiwanaku IV and Tiwanaku V are both in the time span 600AD-1000AD). Such cases are problematic for the Thiessen catchment definition method, since defining what area is closest to each point has no real answer for points with the same location; such cases are also problematic for the buffer catchment definition method, since such sites will be double-counted (or triple-, etc.) in calculations of mean catchment value, etc. Therefore, in cases where a site has multiple selected
```

```
components because a survey has multiple phases for this time span, deselect all except the component with the largest size.
with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as outerCursor:
    for outerRow in outerCursor:
        outerComp = outerRow[0]
        outerPop = outerRow[1]
        #For each component in the outer loop, loop through the components again to search for components from the same site and sector.
        with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as innerCursor:
            for innerRow in innerCursor:
                innerComp = innerRow[0]
                innerPop = innerRow[1]
                #The format used in the "comp" field is [survey code]-[site#].[sector#]-[phase code] (e.g., gp-0001.01-a). Therefore, two components from the same site can be matched by comparing the "comp" field without the final character.
                if outerComp[0 : -1] == innerComp[0 : -1]:
                    #If the outer loop's component is smaller than the inner loop's component, deselect the outer loop's component.
                    if outerPop < innerPop:
                        arcpy.SelectLayerByAttribute_management("compsLayer", "REMOVE_FROM_SELECTION", '"comp" = ' + "'" + outerComp + "'")
#If a site has multiple largest components (with equal sizes), the above loop has left all of them still selected. Create another nested loop through the table, and if the outer loop's site-sector has one or more site-sector matches in the table, then remove the outer loop's component from the selection. This will leave only the last (lowest in the table) of the equal-size components.
```

```python
with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as outerCursor:
    for outerRow in outerCursor:
        outerComp = outerRow[0]
        outerPop = outerRow[1]
        with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as innerCursor:
            for innerRow in innerCursor:
                innerComp = innerRow[0]
                innerPop = innerRow[1]
                #Prevent a component from deselecting itself based on a match to itself, since "outerComp[0 : -1] == innerComp[0 : -1]" will always be "True" when a component is the same in both the outer and inner loop. This would result in the entire table being de-selected. This can be prevented by using "and outerComp != innerComp".
                if outerComp[0 : -1] == innerComp[0 : -1] and outerComp != innerComp:
                    arcpy.SelectLayerByAttribute_management("compsLayer", "REMOVE_FROM_SELECTION", '"comp" = ' + "'" + outerComp + "'")
#Remove any non-habitation components from the selection. Note that the use of = 0 here means that uncertain (0.5 and 0.75 codes) habitation components are left in the selection.
arcpy.SelectLayerByAttribute_management("compsLayer", "REMOVE_FROM_SELECTION", '"hab" = 0')

#Define the components' catchments using method 1 (circular buffers).
#Buffer parameters: input features; output feature class; buffer distance; side option [not used here]; line end option [not used here]; dissolve option [not used here]; dissolve field [not used here]; planar or geodesic method [default of "PLANAR" used here]
```

```
        arcpy.Buffer_analysis("compsLayer", bufferPath + survey + timeSpan + ".shp", catchBufferRadiusParam)

        #Thiessen polygons don't make sense for the inter-survey data, since these sites don't have data on their surrounding sites. Therefore, only perform the Thiessen analysis if the outer loop hasn't specified the inter-survey data.
        if survey != "gp":
            #Define the components' catchments using method 2 (Thiessen polygons).
            #CreateThiessenPolygons_analysis() parameters: input points; output polygons; which fields to transfer from input to output
            arcpy.CreateThiessenPolygons_analysis("compsLayer", thiessenPath + survey + timeSpan + ".shp", "ALL")
            #This tool uses the env.extent setting if it has been set (as it has been in this script), or the input extent plus 10% if it hasn't. Either of these will create inappropriately sized polygons at the edges of the survey areas, so the polygons now must be clipped to the survey boundaries.
            #Clip_analysis() parameters: input to be clipped; feature(s) used to clip the input; output; cluster tolerance [not used here]
            arcpy.Clip_analysis(thiessenPath + survey + timeSpan + ".shp", boundPathDict[survey], thiessenClippedPath + survey + timeSpan + ".shp")
#-----------------------------------------------------------------

#Section 5: Catchment value calculation, both methods--------------------
        #The catchments' areas were defined in the previous section. In this section, the agricultural value of these catchments will be calculated, using the land value classifications from the previous script ("1_LandClassification.py").
        #This section continues the loop created in section 4.
        #The ZonalStatisticsAsTable() tool will be used below. This tool
```

```
    will have 2 input rasters: the catchments defined above will be used to make an input zonal definition raster, and the land value classification rasters from the previous script ("1_LandClassification.py") will be used as the input values raster. Using these inputs, ZonalStatisticsAsTable() will calculate the sum of the latter's values in the former's zones. In other words, it will calculate each catchment's total agricultural value.

    #First do the calculations using the circular buffers. The Thiessen polygons will be used later.
    #ZonalStatisticsAsTable() can't be applied to all of the circular buffers at once because, unlike the Thiessen polygons, there can be overlap in the buffer polygons. Because ZonalStatisticsAsTable() uses a raster input for zone definition (either directly input or converted by the tool from a vector input), it doesn't correctly retain the buffer polygons' size in cases of overlap. Therefore, create a loop to process the buffer polygons individually.
    #First, turn the buffers shapefile into a feature layer, so that the Select Layer By Attribute tool can be used on it.
    arcpy.MakeFeatureLayer_management(bufferPath + survey + timeSpan + ".shp", "bufferLayer")
    #Using a SearchCursor in a python list comprehension, create a list that contains the unique IDs of the buffer polygons (from the "FID" field). This will be used in creating the loop through the buffers.
    buffFIDlist = [str(row[0]) for row in arcpy.da.SearchCursor("bufferLayer", ("FID", ))]
    #Loop through the buffers.
    for buffer in buffFIDlist:
        arcpy.SelectLayerByAttribute_management("bufferLayer", "NEW_SELECTION", '"FID" = ' + buffer)
        #Although ZonalStatisticsAsTable() can accept a vector input for the zone definition (which it will convert to a raster),
```

```
            ESRI recommends using a raster input since this allows greater control over the rasterization. Convert the currently selected buffer polygon to a raster.
        #PolygonToRaster_conversion() parameters: input polygons; input's field used for output values; output raster; method used when multiple input features are in a cell [not used here]; priority field [not used here]; cell size
        arcpy.PolygonToRaster_conversion("bufferLayer", "FID", bufferRastPath + survey + timeSpan[0:6] + buffer, cellsize = demCellSize)
        #Use this raster as the zonal definition input raster to ZonalStatisticsAsTable(), and use the land value classification rasters created in the previous script ("1_LandClassification.py") as the values raster input. Use ZonalStatisticsAsTable() to calculate the sum of the land values within the catchment.
        #Determine which Lake Titicaca level corresponds to this time span, so that the land classification rasters for that lake level can be used for the values raster input.
        timeSpanLakeLevel = str(timeSpanLakeLevelDict[timeSpan])
        #It is important that ZonalStatisticsAsTable()'s "ignore_nodata" parameter is set to ignore NoData values, or else any catchment that includes any cells inside the lake (which is coded as NoData) will have a sum of NoData.
        #ZonalStatisticsAsTable() parameters: zonal definition input raster; zonal definition input raster's field used to define zones; values input raster (contains the values for which the statistic will be calculated); output table; whether to ignore NoData values ("DATA") or to set the statistic to NoData if any NoData cells are present in the zone ("NODATA"); which statistic to calculate
        #Calculate the catchment's land value sum for unintensive production.
        buffZonalStatsUninten = arcpy.sa.ZonalStatisticsAsTable(bufferRastPath + survey + timeSpan[0:6] + buffer, "VALUE", "
```

```
↪lakeLev" + timeSpanLakeLevel + "/" +
↪landValueUnintensivePath, bufferZonalStatsUnintTablePath +
↪survey + timeSpan[0:6] + buffer, "DATA", "SUM")
#Calculate the catchment's land value sum for intensive
↪production.
buffZonalStatsInten = arcpy.sa.ZonalStatisticsAsTable(
↪bufferRastPath + survey + timeSpan[0:6] + buffer, "VALUE", "
↪lakeLev" + timeSpanLakeLevel + "/" + landValueIntensivePath,
↪ bufferZonalStatsIntTablePath + survey + timeSpan[0:6] +
↪buffer, "DATA", "SUM")

#It is better to give the lake a subsistence value rather than
↪ treating it as NoData (as it is in the land value rasters
↪created in the previous script). Otherwise, for example,
↪phases with lower lake levels will typically have higher
↪catchment values simply because the catchments have fewer
↪NoData cells. However, it doesn't quite make sense to assign
↪ a kilocalorie value to a hectare of lake (as is done for
↪the non-lake cells), since it is access to the lake more
↪generally that is more important. Therefore, fishing
↪kilocalorie amounts will be assigned to catchments based on
↪how large the in-lake fraction of the catchment is. A
↪catchment with 50% lake cells will be given the kilocalories
↪ equivalent to a year's fishing (in addition to the
↪kilocalories from the other 50%'s agricultural value);
↪catchments with smaller or larger fractions of lake cells
↪will have proportionally fewer or more kilocalories assigned
↪ to them from fishing.
#Calculation of fishing annual yield: 11 kg./trip and 20 trips
↪/month (Orlove 2002: 89) = 2640 kg./year/fisher. If 90% of
↪fish weight is usable meat (Stark and Voorhies 1978: 280),
↪then this is reduced to 2376 kg./year/fisher (note, however,
↪ that the Titicaca native species seem to be bonier than the
↪ average fish (e.g., Orlove 2002: 133); data on usable meat
↪more specific to Lake Titicaca would be preferable). If kcal
```

```
↪./kg. usable meat is ~1000 (Stark and Voorhies 1978: 280),
↪then annual yield is 2376000 kcal./fisher (again, data more
↪specific to Lake Titicaca would be preferable). Note that
↪Orlove's "Native gear only" kg./trip and kg./hour figures
↪are significantly higher than the other figures (Orlove
↪2002: online appendix "Seasonality_fishing.xls"); this is
↪confusing since the book seems to suggest that nylon gill
↪nets have increased catch (Orlove 2002: 230) (though the use
↪ of nylon gill nets is also linked to species change (Orlove
↪ 2002: 140)). Since I am unsure of the reason for the high "
↪Native gear only" figure even after reading the book with
↪this figure in mind, I have used the general figure instead.
↪ Also note that Carachi make up a large portion of the fish
↪caught in Orlove's survey and that individual fishers who
↪have catches almost entirely composed of Carachi can have
↪high total catches (Orlove 2002: online appendices, "
↪Fish_Dist.xls", "Ret_per_fman.xls"), so it seems unlikely
↪that the kg.-per-trip figure has been significantly inflated
↪ by the introduction of the non-native trout and silverside.
#Because the 20th century fishers who produced the
↪quantitative data on fish catch are often also substantially
↪ involved in agriculture (Orlove 2002: 113-114), I have made
↪ the typical 20th century annual fishing catch equivalent to
↪ 50% of a catchment rather than 100%. This also makes some
↪sense in terms of geography, since a site never has a buffer
↪ catchment composed entirely of the lake.
#For reasons discussed in my dissertation body text, I make a
↪catchment refer to 10 households, so the kilocalorie amount
↪calculated above (2376000) needs to be multiplied by 10
↪(23760000).
#First, get the number of raster cells in this buffer
↪catchment (this is the number of both lake and non-lake
↪cells).
with arcpy.da.SearchCursor(bufferRastPath + survey + timeSpan
↪[0:6] + buffer, ("COUNT",)) as countCursor:
```

```
        for row in countCursor:
            cellCount = row[0]
    #Determine the number of land cells in the buffer's area. First, use map algebra to add the rasterized buffer to one of the land value rasters. In the output of this map algebra, the only non-NoData cells will be cells which are both within the buffer and outside the lake, since cells outside the buffer in the rasterized buffer are NoData and cells within the lake in the land value raster are NoData.
    mapAlgBuffPlusLandVal = arcpy.sa.Raster(bufferRastPath + survey + timeSpan[0:6] + buffer) + arcpy.sa.Raster("lakeLev" + timeSpanLakeLevel + "/" + landValueIntensivePath)
    #While the land cells within the buffer have now been isolated (they are the only non-NoData cells), they will typically have different values; create a new raster in which they all have the same value, so that they can be easily counted. Use IsNull() to create a raster that changes NoData values in the above raster to 1, and all other values to 0; then, reset the 1 values back to NoData, and set the 0 values to 1. Thus, the land cells within the buffer will all have a value of 1, and all other cells will have a value of NoData, which is convenient for counting the land cells within the buffer using a SearchCursor.
    #SetNull parameters: input raster that defines TRUE and FALSE; output for FALSE cells in the input raster; SQL where clause [not used here]
    landCellsInBuff = arcpy.sa.SetNull(arcpy.sa.IsNull(mapAlgBuffPlusLandVal), 1)
    landCellsInBuff.save(landCellsInBuffPath + survey + timeSpan[0:6] + buffer)
    #Use a SearchCursor to get the number of land cells within the buffer, but check first that landCellsInBuff isn't entirely composed of NoData and set the land cells count to 0 if it is entirely composed of NoData.
    landCellsInBuffProperties = arcpy.
```

```
GetRasterProperties_management(landCellsInBuffPath + survey + timeSpan[0:6] + buffer, "ALLNODATA")
landCellsInBuffPropertiesOutput = int(landCellsInBuffProperties.getOutput(0))
if landCellsInBuffPropertiesOutput != 1:
    with arcpy.da.SearchCursor(landCellsInBuffPath + survey + timeSpan[0:6] + buffer, ("COUNT", )) as countCursor:
        for row in countCursor:
            landCount = row[0]
else:
    landCount = 0
#Determine the number of lake cells within the buffer catchment.
lakeCount = cellCount - landCount
#Determine what portion of the buffer catchment is composed of lake cells.
lakePortion = float(lakeCount) / cellCount
#Calculate a caloric value based on this portion of the catchment. Make a fraction of 1 equal to 47520000 kcal.
lakeKcal = lakePortion * 47520000

#Use a SearchCursor to retrieve the result of ZonalStatisticsAsTable() for unintensive production.
with arcpy.da.SearchCursor(buffZonalStatsUninten, ("SUM", )) as sumCursor:
    for row in sumCursor:
        #To account for fallowing and other issues, multiply the sum by .25. See my dissertation's body text for further details.
        sumAg = float(row[0]) * .25
        #Add the lake/fish catchment value to this sum.
        sumAgAndFish = str(sumAg + lakeKcal)
        #In preparation for printing this result to the final output .csv file, concatenate this sum, using commas, with the time span currently being processed, with the
```

```
        currently selected "comp" ID from the buffer layer, and with this component's population. This will be one line in the .csv file, but a newline character should not be inserted here; print(,sep = "\n") will be used below when writing to the file.
        #Get the "comp" ID and the "pop" population value.
        with arcpy.da.SearchCursor("bufferLayer", ("comp", "pop")) as buffCursor:
            for innerRow in buffCursor:
                comp = innerRow[0].encode('utf-8')
                pop = str(innerRow[1])
                #Concatenate the four parts of the CSV line into one string. Put this string into a list so that when it is used to extend a list it won't be exploded to characters.
                csvLine = [comp + "," + timeSpan + "," + sumAgAndFish + "," + pop]
                #Add this CSV line to the list of CSV lines for buffer catchments and unintensive production.
                buffUnintenCSVlist += csvLine
#Do the same for intensive production.
with arcpy.da.SearchCursor(buffZonalStatsInten, ("SUM", )) as sumCursor2:
    for row in sumCursor2:
        sumAg = float(row[0]) * .25
        sumAgAndFish = str(sumAg + lakeKcal)
        with arcpy.da.SearchCursor("bufferLayer", ("comp", "pop")) as buffCursor2:
            for innerRow in buffCursor2:
                comp = innerRow[0].encode('utf-8')
                pop = str(innerRow[1])
                csvLine = [comp + "," + timeSpan + "," + sumAgAndFish + "," + pop]
                buffIntenCSVlist += csvLine

```

```python
            #To prevent problems caused by file proliferation, delete the intermediate data created in this iteration.
            arcpy.Delete_management(bufferRastPath + survey + timeSpan[0:6] + buffer)
            arcpy.Delete_management(bufferZonalStatsUnintTablePath + survey + timeSpan[0:6] + buffer)
            arcpy.Delete_management(bufferZonalStatsIntTablePath + survey + timeSpan[0:6] + buffer)
            arcpy.Delete_management(landCellsInBuffPath + survey + timeSpan[0:6] + buffer)
        #Once all of the iterations are finished, also delete the layer, so that this same layer name can be used in subsequent iterations of the timespan loop without a suffix.
        arcpy.Delete_management("bufferLayer")

        #Now use ZonalStatisticsAsTable() with the Thiessen polygon catchments. Since there isn't polygon overlap with the Thiessen polygons, this can be done for all of the polygons at once.
        if survey != "gp":
            #Rasterize the Thiessen polygons.
            arcpy.PolygonToRaster_conversion(thiessenClippedPath + survey + timeSpan + ".shp", "FID", thiessenRasterPath + survey + timeSpan[0:6], "MAXIMUM_AREA", cellsize = demCellSize)
            #This is unnecessary since it is also done above, but I will retain it for clarity.
            timeSpanLakeLevel = str(timeSpanLakeLevelDict[timeSpan])
            #Calculate catchment sums for unintensive production.
            thiessenZonalStatsUninten = arcpy.sa.ZonalStatisticsAsTable(thiessenRasterPath + survey + timeSpan[0:6], "VALUE", "lakeLev" + timeSpanLakeLevel + "/" + landValueUnintensivePath, thiessenZonalStatsUnintTablePath + survey + timeSpan[0:6], "DATA", "SUM")
            #Calculate catchment sums for intensive production.
            thiessenZonalStatsInten = arcpy.sa.ZonalStatisticsAsTable(thiessenRasterPath + survey + timeSpan[0:6], "VALUE", "
```

```
lakeLev" + timeSpanLakeLevel + "/" + landValueIntensivePath, thiessenZonalStatsIntTablePath + survey + timeSpan[0:6], "DATA", "SUM")
#Use a SearchCursor to retrieve the result of ZonalStatisticsAsTable() for unintensive production. Also get the "VALUE" field, which is equivalent to the "FID" field of the Thiessen polygons; this will be used to search the Thiessen polygons for the "comp" value that corresponds to each sum.
with arcpy.da.SearchCursor(thiessenZonalStatsUninten, ("SUM", "VALUE")) as sumCursor3:
    for row in sumCursor3:
        #Get the sum calculated by ZonalStatisticsAsTable().
        sum = str(row[0])
        #Get the "VALUE" field's value which corresponds to this sum.
        searchFID = str(row[1])
        #Search for this value in the "FID" field of the Thiessen polygons, and in the matching row get the "comp" and "pop" fields' values.
        with arcpy.da.SearchCursor(thiessenClippedPath + survey + timeSpan + ".shp", ("comp", "pop"), '"FID" = ' + searchFID) as thiessenCursor:
            for innerRow in thiessenCursor:
                comp = innerRow[0].encode('utf-8')
                pop = str(innerRow[1])
                #Concatenate the four parts of the CSV line into one string. Put this string into a list so that when it is used to extend a list it won't be exploded to characters.
                csvLine = [comp + "," + timeSpan + "," + sum + "," + pop]
                #Add this CSV line to the list of CSV lines for thiessen catchments and unintensive production.
                thiessUnintenCSVlist += csvLine
```

```
                #Do the same for intensive production.
                with arcpy.da.SearchCursor(thiessenZonalStatsInten, ("SUM", "VALUE")) as sumCursor4:
                    for row in sumCursor4:
                        sum = str(row[0])
                        searchFID = str(row[1])
                        with arcpy.da.SearchCursor(thiessenClippedPath + survey + timeSpan + ".shp", ("comp", "pop"), '"FID" = ' + searchFID) as thiessenCursor:
                            for innerRow in thiessenCursor:
                                comp = innerRow[0].encode('utf-8')
                                pop = str(innerRow[1])
                                csvLine = [comp + "," + timeSpan + "," + sum + "," + pop]
                                #Add this CSV line to the list of CSV lines for thiessen catchments and intensive production.
                                thiessIntenCSVlist += csvLine

#Write the sums and their identifying information to the .txt files.
#TAKE CARE WITH THIS SECTION -- IT WILL OVERWRITE ANY FILES ALREADY AT THESE PATHS.
try:
    buffUnintenCSVFile = open(buffUnintenCSVPath, "w")
    #Use * to unpack the list, and then use sep="\n" to separate the unpacked items with a newline character.
    print(*buffUnintenCSVlist, file = buffUnintenCSVFile, sep = "\n")
except IOError as sumsWriteError:
    print("IOError: " + str(sumsWriteError))
finally:
    buffUnintenCSVFile.close()

try:
    buffIntenCSVFile = open(buffIntenCSVPath, "w")
    print(*buffIntenCSVlist, file = buffIntenCSVFile, sep = "\n")
except IOError as sumsWriteError:
```

```
    print("IOError: " + str(sumsWriteError))
finally:
    buffIntenCSVFile.close()

try:
    thiessUnintenCSVFile = open(thiessUnintenCSVPath, "w")
    print(*thiessUnintenCSVlist, file = thiessUnintenCSVFile, sep = "\n")
except IOError as sumsWriteError:
    print("IOError: " + str(sumsWriteError))
finally:
    thiessUnintenCSVFile.close()

try:
    thiessIntenCSVFile = open(thiessIntenCSVPath, "w")
    print(*thiessIntenCSVlist, file = thiessIntenCSVFile, sep = "\n")
except IOError as sumsWriteError:
    print("IOError: " + str(sumsWriteError))
finally:
    thiessIntenCSVFile.close()

#Check in spatial analyst license.
arcpy.CheckInExtension("Spatial")
```

Listing E.3: 3_CatchmentAnalysis.py

```
#-------------------------------------------------------------------
#THIS SCRIPT CREATES PLOTS OF THE CATCHMENT VALUES CALCULATED IN THE PREVIOUS SCRIPT ("2_Catchments.py").
#-------------------------------------------------------------------

#-------------------------------------------------------------------
#FUTURE WORK:
#add supra-survey scale
#it would probably be best to remove qawra thaki from the pan-scale -- it seems to be seriously affecting the curve simply through its large
```

```
number of coarse-grained formative sites with low catchment values
#take inter-survey ("gp") out of thiessen plots etc.
#match colors to surveys in same manner as R scripts
#-----------------------------------------------------------------

#Section 1: Get tools----------------------------------------------
#Import the csv module, to read input.
import csv
#Import a module for creating plots.
import matplotlib.pyplot
#Import the regex module.
import re
#-----------------------------------------------------------------

#Section 2: Define paths and get data-------------------------------
#Define the path where all input from the previous script ("2_Catchments.py") is and where all output of the current script will be stored.
#IT IS CRITICAL THAT THIS IS THE SAME PATH STORED IN THE VARIABLE "IOpath" IN THE PREVIOUS SCRIPT ("2_Catchments.py"), SO THAT THE CORRECT INPUT IS USED.
IOpath = "C:/Real/SantaFe/Agriculture/Working/finaloutput4/"

#Create a list of the filenames for the input from the previous script, but omit the rest of the path, which will be added below.
inputList = ["bufferCatchments_unintensive.txt", "bufferCatchments_intensive.txt", "thiessenCatchments_unintensive.txt", "thiessenCatchments_intensive.txt"]
#Create dictionaries from the input CSV files.
#Create an outer dictionary that will be filled with inner dictionaries, one inner dictionary per input file.
csvToDictsDict = {}
#Loop through the files.
for inputFile in inputList:
    try:
        #Create a file object from the current CSV file.
```

```
        catchmentCSVfile = open(IOpath + inputFile, "r")
        #Create a csv DictReader object from the file object. The default dialect formatting parameters should be ok for this file, so I haven't specified a dialect.
        dictReader = csv.DictReader(catchmentCSVfile)
        #Create an empty dictionary for this file, that will be filled in the loop below.
        catchmentDict = {}
        #Loop through the DictReader. In each iteration, the loop variable is a dictionary that holds one line of the CSV file.
        for row in dictReader:
            #The key will be a tuple composed of the component and timespan from this line of the CSV file.
            currentKey = (row['comp'], row['time_span'])
            #Create this key within the dictionary for this file, and associate it with a tuple of the catchment value and the population value from this line of the CSV file.
            catchmentDict[currentKey] = (row['sum'], row['pop'])
        #Nest the dictionary just created into the dictionary which will have the dictionaries for all of the input CSV files.
        csvToDictsDict[inputFile] = catchmentDict
    except IOError as catchmentReadError:
        print("IOError: " + str(catchmentReadError))
    finally:
        catchmentCSVfile.close()
#-----------------------------------------------------------------


#Section 3: Create plots------------------------------------------
#Create a list of the (unique) survey codes (the first two characters of values in the "comp" field). Remember that the inter-survey ("gp") data doesn't have Thiessen catchments defined, but does have buffer catchments defined.
surveyList = []
#Loop through one of the buffer catchments dictionaries, since they have the "gp" components.
```

```python
for dictKey in csvToDictsDict["bufferCatchments_unintensive.txt"]:
    #Get the first two characters of the "comp" value, which is the first element of the dictionary key.
    surveyCode = dictKey[0][0:2]
    #If this survey code isn't already in the list, add it.
    if surveyCode not in surveyList:
        surveyList += [surveyCode]
#Define the time spans, which will structure the analysis and plotting.
#THIS MUST MATCH THE LIST WITH THE SAME NAME IN "2_Catchments.py"; WHILE IT WOULD BE MORE ELEGANT TO PICKLE THE LIST FROM ONE SCRIPT TO THE NEXT, I PREFER TO SIMPLY REPLICATE THIS LIST SO I CAN USE DIFFERENT VERSIONS OF PYTHON FOR THE TWO SCRIPTS WITHOUT WORRYING ABOUT COMPATIBILITY.
timeSpanList = ["1500BC_1100BC", "1100BC_850BC","850BC_450BC","450BC_250BC","250BC_0BC","0BC_250AD","250AD_600AD","600AD_1000AD","1000AD_1150AD","1150AD_1450AD","1450AD_1540AD","1540AD_1600AD"]
#Also create a list of the time spans' midpoints. This will be used for X-axis values. Therefore, the order of Y values within lists created further below must match this list's order.
timeSpanMidpList = []
for timeSpan in timeSpanList:
    #Split the time span string into its start and end portions.
    timeSpanSplit = timeSpan.split(sep = "_")
    #For both the start and end, if "BC" is present in the string, record this so that the number can be made negative later.
    if "BC" in timeSpanSplit[0]:
        startNeg = True
    else:
        startNeg = False
    if "BC" in timeSpanSplit[1]:
        endNeg = True
    else:
        endNeg = False
    #Remove non-numeric characters and cast the remainder to an integer.
    timeSpanStart = int(re.sub("[^0-9]", "", timeSpanSplit[0]))
    timeSpanEnd = int(re.sub("[^0-9]", "", timeSpanSplit[1]))
```

```
    #Make the dates negative if they formerly had "BC".
    if startNeg == True:
        timeSpanStart = -timeSpanStart
    if endNeg == True:
        timeSpanEnd = -timeSpanEnd
    #Get the midpoint between the start and end.
    timeSpanMidp = (timeSpanStart + timeSpanEnd) / 2
    #Extend the list with this midpoint.
    timeSpanMidpList += [timeSpanMidp]

#Loop through the different types of catchment (buffers/thiessens) and the different types of production (unintensive/intensive).
for catchAndProdType in inputList:
    #Define the dataset that will be used in this iteration.
    catchAndProdDict = csvToDictsDict[catchAndProdType]

    #Pan-Titicaca scale-------------------------
    #Calculate the mean component catchment value for each time span, at the pan-Titicaca scale. Also calculate the total catchment value (of all components) divided by the total population (of all components), for each time span, at the pan-Titicaca scale.
    panMeanCatchVals = []
    panTotalCatchOverPopVals = []
    #Loop through the time spans.
    for timeSpan in timeSpanList:
        #Create a list that will have the catchment values for all components from this time span, from all surveys and (for buffers but not thiessens) the inter-survey data. Similarly, create a list of population values for all components from this time span.
        timeSpanCatchValsList = []
        timeSpanPopValsList = []
        #Loop through the CSV-derived dataset.
        for cpDictKey in catchAndProdDict:
            #The time span for this "row" is the second element of the tuple dictionary key. If it matches the time span for which the lists
```

```
            are currently being made, then extend the lists with the catchment value and the population value which correspond to this dictionary key. The catchment value is the first value within the tuple associated with the key, and the population value is the second.
            if cpDictKey[1] == timeSpan:
                timeSpanCatchValsList += [float(catchAndProdDict[cpDictKey][0])]
                timeSpanPopValsList += [float(catchAndProdDict[cpDictKey][1])]
        #Get the mean of the catchment values in the first list.
        catchValsMean = float(sum(timeSpanCatchValsList)) / len(timeSpanCatchValsList)
        #Add this mean to the list which has all of the time spans' means.
        panMeanCatchVals += [catchValsMean]
        #Divide the sum of the catchment values by the sum of the population values.
        totalCatchOverPop = float(sum(timeSpanCatchValsList)) / float(sum(timeSpanPopValsList))
        #Add this per-capita figure to the list which has all of the time spans' per-capita figures.
        panTotalCatchOverPopVals += [totalCatchOverPop]

    #First plot the mean catchment values through time.
    #Create a figure and set its size.
    matplotlib.pyplot.figure(num = 1, figsize = (8.3, 6.5))
    #Plot time span midpoints on the X-axis and mean catchment values on the Y-axis.
    matplotlib.pyplot.plot(timeSpanMidpList, panMeanCatchVals, 'k-')
    matplotlib.pyplot.xlabel("Years")
    matplotlib.pyplot.ylabel("Mean Catchment Value (Kcal)")
    #Adjust the X-axis view.
    matplotlib.pyplot.xlim(xmax = 1700)
    #Adjust the margins.
    matplotlib.pyplot.subplots_adjust(left = .07, right = .99, top = .97, bottom = .07)
```

```
    #Save the figure.
    matplotlib.pyplot.savefig(IOpath + catchAndProdType[:-4] + "_panScale_MeanCatchmentValue.pdf", dpi = 600)
    #Close the figure.
    matplotlib.pyplot.close(1)

    #Second, plot the per-capita catchment values through time.
    #Create a figure and set its size.
    matplotlib.pyplot.figure(num = 1, figsize = (8.3, 6.5))
    #Plot time span midpoints on the X-axis and per-capita catchment values on the Y-axis.
    matplotlib.pyplot.plot(timeSpanMidpList, panTotalCatchOverPopVals, 'k-')
    matplotlib.pyplot.xlabel("Years")
    matplotlib.pyplot.ylabel("Per-Capita Catchment Value (Kcal)")
    #Adjust the X-axis view.
    matplotlib.pyplot.xlim(xmax = 1700)
    #Adjust the margins.
    matplotlib.pyplot.subplots_adjust(left = .07, right = .99, top = .97, bottom = .07)
    #Save the figure.
    matplotlib.pyplot.savefig(IOpath + catchAndProdType[:-4] + "_panScale_PerCapitaCatchmentValue.pdf", dpi = 600)
    #Close the figure.
    matplotlib.pyplot.close(1)

    #Survey scale--------------------------------
    #Calculate the mean component catchment value for each time span, for each survey. Do the same for per-capita catchment value.
    #Create a dictionary that will have survey codes as keys and, associated with the keys, lists of catchment mean values (one mean value per time span).
    survMeanCatchValsDict = {}
    #Similarly, create a dictionary for lists of per-capita catchment values.
```

```
    survPerCapitaCatchValsDict = {}
    #Loop through the surveys.
    for surveyCode in surveyList:
        #Create a list that will hold this survey's mean value for each of the time spans.
        survMeanCatchVals = []
        #Do the same for the the per-capita catchment values.
        survPerCapitaCatchVals = []
        #Loop through the time spans.
        for timeSpan in timeSpanList:
            #Create a list that will hold all of the catchment values for components from this survey and time span.
            surveyTimeSpanCatchValsList = []
            #Do the same for population values for components from this survey and time span.
            surveyTimeSpanPopValsList = []
            #Loop through the CSV-derived dataset.
            for cpDictKey in catchAndProdDict:
                #If this catchment corresponds to the outer loop's survey and the first inner loop's time span...
                if cpDictKey[1] == timeSpan and cpDictKey[0][0:2] == surveyCode:
                    #Then add the catchment's value to the list for this survey and time span...
                    surveyTimeSpanCatchValsList += [float(catchAndProdDict[cpDictKey][0])]
                    #...and add the component's population value to the list for this survey and time span.
                    surveyTimeSpanPopValsList += [float(catchAndProdDict[cpDictKey][1])]
            #If the outer loop's survey had any catchments for this time span...
            if len(surveyTimeSpanCatchValsList) > 0:
                #...get the mean of the catchment values for this survey and time span...
```

```
                survCatchValsMean = float(sum(surveyTimeSpanCatchValsList)) / len(surveyTimeSpanCatchValsList)
                #...and get the per-capita catchment for this survey and time span.
                survTotalCatchOverPop = float(sum(surveyTimeSpanCatchValsList)) / float(sum(surveyTimeSpanPopValsList))
            #Otherwise, set the mean and per-capita value to 0.
            else:
                survCatchValsMean = 0
                survTotalCatchOverPop = 0
            #Extend the list of time span means for this survey with this mean.
            survMeanCatchVals += [survCatchValsMean]
            #Extend the list of time span per-capita values for this survey.
            survPerCapitaCatchVals += [survTotalCatchOverPop]
        #Associate the list of means with the survey code.
        survMeanCatchValsDict[surveyCode] = survMeanCatchVals
        #Associate the list of per-capita values with the survey code.
        survPerCapitaCatchValsDict[surveyCode] = survPerCapitaCatchVals

    #Create anything to be shared by all of the survey-scale plots.
    #Define colors to be used.
    survColors = ["#FF9900", "#0DFF00", "#00B2FF", "#A600FF", "#FF0000"]
    #Create legend labels.
    legendLabDict = {"gp" : "Inter-survey", "hp" : "Huancane-Putina", "is" : "Is. of the Sun", "jp" : "Juli-Pomata", "kt" : "Katari", "pk" : "Pukara", "qt" : "Qawra Thaki", "tl" : "Tiwanaku Lower", "tm" : "Tiwanaku Middle", "tr" : "Taraco Pen."}

    #First plot the mean catchment values through time.
    #Create a figure and set its size.
    matplotlib.pyplot.figure(num = 1, figsize = (8.3, 6.5))
    #Name the axes/subplot, so that it can be referenced when reducing its size to fit the legend.
    subpl = matplotlib.pyplot.subplot(111)
```

```
    #Create a counter that will be used to assign a color and line style to each survey.
    plotCount = 0
    #Loop through the surveys.
    for surveyKey in survMeanCatchValsDict:
        #Assign a color and line style to this survey.
        if plotCount < 5:
            currColor = plotCount
            currStyle = "solid"
        else:
            currColor = plotCount - 5
            currStyle = "dashed"
        #Plot time span midpoints on the X-axis and mean catchment values on the Y-axis. Apply the color and line style determined above. Also add the label which will be used for this line in the legend.
        matplotlib.pyplot.plot(timeSpanMidpList, survMeanCatchValsDict[surveyKey], color = survColors[currColor], linestyle = currStyle, label = legendLabDict[surveyKey])
        plotCount += 1
    #Shrink the axes/subplot, to make room for the legend.
    #I have commented this out because it is no longer necessary due to the below subplots_adjust()
    #oldPos = subpl.get_position()
    #subpl.set_position([oldPos.x0, oldPos.y0, oldPos.width * 0.89, oldPos.height])
    #Add a legend.
    subpl.legend(loc = 'lower left', bbox_to_anchor = (1, 0.5), fontsize = 11)
    #Adjust the X-axis view.
    matplotlib.pyplot.xlim(xmax = 1700)
    #Adjust the margins.
    matplotlib.pyplot.subplots_adjust(left = .07, right = .76, top = .97, bottom = .07)
    #Add axis labels.
    matplotlib.pyplot.xlabel("Years")
```

```
    matplotlib.pyplot.ylabel("Mean Catchment Value (Kcal)")
    #Save the figure.
    matplotlib.pyplot.savefig(IOpath + catchAndProdType[:-4] + "
    ↪_surveyScale_MeanCatchmentValue.pdf", dpi = 600)
    #Close the figure.
    matplotlib.pyplot.close(1)

    #Second, plot the per-capita catchment values through time.
    matplotlib.pyplot.figure(num = 1, figsize = (8.3, 6.5))
    subpl = matplotlib.pyplot.subplot(111)
    plotCount = 0
    for surveyKey in survPerCapitaCatchValsDict:
        if plotCount < 5:
            currColor = plotCount
            currStyle = "solid"
        else:
            currColor = plotCount - 5
            currStyle = "dashed"
        #Plot time span midpoints on the X-axis and per-capita catchment
        ↪values on the Y-axis. Apply the color and line style determined
        ↪above. Also add the label which will be used for this line in the
        ↪legend.
        matplotlib.pyplot.plot(timeSpanMidpList, survPerCapitaCatchValsDict[
        ↪surveyKey], color = survColors[currColor], linestyle = currStyle,
        ↪label = legendLabDict[surveyKey])
        plotCount += 1
    #oldPos = subpl.get_position()
    #subpl.set_position([oldPos.x0, oldPos.y0, oldPos.width * 0.89, oldPos.
    ↪height])
    subpl.legend(loc = 'lower left', bbox_to_anchor = (1, 0.5), fontsize =
    ↪11)
    matplotlib.pyplot.xlim(xmax = 1700)
    matplotlib.pyplot.subplots_adjust(left = .07, right = .76, top = .97,
    ↪bottom = .07)
    matplotlib.pyplot.xlabel("Years")
```

```
    matplotlib.pyplot.ylabel("Per-Capita Catchment Value (Kcal)")
    matplotlib.pyplot.savefig(IOpath + catchAndProdType[:-4] + "_surveyScale_PerCapitaCatchmentValue.pdf", dpi = 600)
    matplotlib.pyplot.close(1)
```

E.2 Wealth Finance (C:/Real/SantaFe/LeastCostPaths/Scripts/)

E.2.1 Foundation for Both Analyses

Listing E.4: 1_CreateRoutes_EXPERIMENTAL.py

```
#-----------------------------------------------------------------
#THIS SCRIPT DEFINES TRAVEL ROUTES IN THE LAKE TITICACA REGION.  TO DO THIS, IT CALCULATES A LARGE NUMBER OF LEAST COST PATHS BETWEEN GRID POINTS AND POINTS ARRANGED IN A CIRCLE AROUND EACH GRID POINT.
#Nearly all of this script is placed within the function "createRoutes", and at the end of this script this function is run separately for each of several levels of Lake Titicaca (at different times in the past, the lake had different depths). Defining a function in this way, unlike running a loop where each iteration is a lake level, allows multiprocessing to be used, where each lake level is worked on in a separate process.
#The output of this script is a series of rasters, one per lake level. In these, each raster cell has the total number of least-cost-paths which cross it.
#CITATIONS: I changed from gridpoint-to-gridpoint paths to a set of points radially around each grid point, inspired by Verhagen et al 2013 ``The Long and Winding Road'' and Verhagen ``On the Road to Nowhere''
#-----------------------------------------------------------------

#-----------------------------------------------------------------
#FUTURE WORK:
#at the moment, the output of the cost paths is somewhat questionable -- the paths seem sometimes unaffected by serious topography, e.g. some
```

```
paths (though in the minority) go over rather than around the mountain by lago winamarka
#still an issue with points in lake titicaca, because paths lead from other points to meaningless places on the lakeshore; try instead to make a new dataset from the fishnet that excludes ones that overlap the lake (should be able to use the intersect_analysis tool?)
#A more sophisticated model would modify the DEM inside the lake, so that dry-period travelers have to descend into and ascend out of the modern-day lake (the satellite DEMs have one elevation for the entire lake). This could be done using the bathymetric lines.
#Tripcevich online post: "I came up with the table for Tobler values posted on MapAspects in 2009 (in ArcGIS version 9.3) and after a few hours struggling with Path Distance in Arcmap 10.3 my conclusion is it's broken in the current version. Even their example table on the Esri help file produces the same transformation as a bunch of 0 values. I've tried various values and while the built in COS and LINEAR seem to work I can't get it to accept any format of VF Table. Consider using the original GRID command line PathDistance or use the new ArcGIS Pro. I just checked and ToblerAway.txt works as expected in ArcGIS Pro 1.0. best, Nico" [http://gis.stackexchange.com/questions/94731/cost-distance-tool-not-producing-logical-answer]. I'm not sure what the issue was -- i test-calculated a few cells on a path distance raster and they seem to have properly used the llama VfTable
#-------------------------------------------------------------------

#Section 1: Get tools---------------------------------------------------
#This future statement is used to enable Python 3 syntax when using print() to write to files (I am running this script with Python 2.7)
from __future__ import print_function
#Import the arcpy module in order to access ArcGIS. Note that while ESRI documentaion encourages "from arcpy import env" and "from arcpy.sa import *" here, I prefer to instead keep an explicit namespace hierarchy; therefore, my arcpy code differs from ESRI's by always explicitly using "arcpy.sa." to prefix spatial analyst functions and by always using "arcpy.env" instead of "env".
```

```
import arcpy
#Import the python multiprocessing module, so that multiple processor cores can be used.
import multiprocessing
#Import the os module, necessary here for creating workspace folders.
import os
#Import the time module, necessary here for testing performance.
import time
#Import the random module, necessary here for introducing noise into the fishnet label points' locations.
import random
#ArcGIS will generate massive .xml history log files (over 1 GB) for scripts which involve as many geoprocessing function calls as this script does. Therefore, turn history logging off. I don't know if this has a substantial performance effect, but this seems possible. At minimum, turning the logging off will make it unnecessary to remember to manually delete these .xml files.
arcpy.SetLogHistory(False)
#-----------------------------------------------------------------------

def createRoutes(lakeLevel):

    #Section 2: Define parameters-----------------------------------------
    #These are variables from throughout the script that we want to alter to see how the output changes. The goal here is to see how sensitive this analysis is to 2 kinds of changes to the script: 1) changes in the amount of computation (e.g., how many least cost paths are calculated), and 2) changes in how past societies and agents are modeled (e.g., how llama caravans travel; what kinds of sites should be defined as hubs). This script contains only parameters of the first type, but subsequent scripts will also have parameters of the second type.
    #This is the height and width of the fishnet cells. In other words, this determines how many least cost path source ("from") points will be used to model travel potential.
```

```
fishnetCellSizeParam = 10000
#The first variable here is the radius of the circular buffers created around each fishnet label point (i.e., the grid points). The second variable here is the maximum permitted distance between points on the circumference of each of the buffers around the fishnet label points. In other words, these two parameters collectively determine how many least cost path destination ("to") points will be used to model travel potential.
bufferDistanceParam = 100000
bufferPointsParam = 15000
#These are the minimum and maximum values for the noise to be introduced into the fishnet label points' locations. Specifically, these values will be the endpoints used in a random integer generator. The values are in meters.
fishNoiseMinParam = 1
fishNoiseMaxParam = 2500
#-----------------------------------------------------------------

#Section 3: Preliminary Work: licenses, file paths, and environmental settings
#-----------------------------------------------------------------
#Licenses-----------------------------------
#Check out the ArcGIS Spatial Analyst license.
arcpy.CheckOutExtension("Spatial")

#File paths---------------------------------

#Define the path where all output (both scratch and final) will be stored (some of it in subdirectories of this path). This string will be used in constructing other strings for paths below.
outputPath = "C:/Real/SantaFe/LeastCostPaths/Working/finaloutput1/"

#Workspace----------
#Create a workspace folder for this lake level (and therefore for a particular child process). This simplifies file naming, and is also
```

```
done because using multiprocessing with arcpy, according to some online forum posters, encounters problems if scratch workspaces are not separate for the child processes.
#Define the path. All folders above the leaf (the final folder) must already exist, since mkdir() is used rather than makedirs().
childProcessWorkspace = outputPath + "lakeLev" + lakeLevel
#Attempt to make a folder at this path.
try:
    os.mkdir(childProcessWorkspace)
#mkdir() will not create a folder if it already exists.
except OSError as childFolderError:
    print("OSError: " + str(childFolderError))
#Set the ArcGIS workspaces to this newly created folder.
arcpy.env.workspace = childProcessWorkspace
arcpy.env.scratchWorkspace = arcpy.env.workspace
#Define paths-------
#Define paths for input files.
#Set the path to the Digital Elevation Model. The PathDistance tool below uses my vertical factor table which relates slope to the time in hours that it costs to cross one meter, so the DEM should use a projection in meters.
#THIS IS JUST A PLACEHOLDER FILE.
elevationPath = "C:/Real/SantaFe/LeastCostPaths/Working/GmtedClipReproj.tif"
#Set the path to the file that models different lake levels.
lakeTiticacaShapefilePath = "C:/Real/SantaFe/LeastCostPaths/Data/Bathymetry_BoulangeLazzaro1981_DRAFT.shp"
#Set the path to the vertical factor table.  This is an input to the ArcGIS Spatial Analyst PathDistance tool, and defines the relationship between slope and cost (here, time).
#THIS IS JUST A PLACEHOLDER FILE.
verticalFactorTablePath = "C:/Real/SantaFe/LeastCostPaths/Data/TripcevichLlamaVerticalFactorTable_SUPER_SLOPPY_DRAFT_DIVIDED_BY_1000.txt"

```

```
#Define paths for intermediate output files. When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
backlinkPath = "bcklnk"
bufferPointsPath = "buffer_points.shp"
demMinusLakePath = "dem_nolak"
fishnetBufferPath = "fishbuffers.gdb/fishbuf"
fishnetLabelPath = "fishnet_label.shp"
fishnetPath = "fishnet.shp"
lakeLevelPolygonPath = "lake_level_polygon.shp"
lakeTiticacaRasterizedPath = "lakeraster"
mapAlgPath = "mapalgsave"
prevMapAlgPath = "prevmapalg"
#When circular buffers are created below, they need to be written to a geodatabase rather than a shapefile, because we want to control how the curved lines are densified (shapefiles automatically densify curved lines, and this results in a quantity of vertices that is different from what we want; geodatabases do not densify the curves). Create an empty geodatabase here to later be used for this purpose.
#CreateFileGDB parameters: folder where the geodatabase will be created; name of the geodatabase; the ArcGIS version for the geodatabase ["CURRENT" uses the currently installed version of ArcGIS]
arcpy.CreateFileGDB_management(childProcessWorkspace, "fishBuffers.gdb", "CURRENT")

#Define paths for final output files.
#Define the path for the least-cost-path-sums raster.
summedCostPathsPath = "sum"
#TAKE CARE WITH THIS VARIABLE: IT IS USED BELOW FOR THE PATH FOR WRITING TO A TEXT FILE, AND WILL OVERWRITE ANY FILE ALREADY AT THIS PATH.
#Define the path for the performance test text file.
timeTestFilePath = outputPath + "timeTest_createRoutes_lev" + lakeLevel + ".txt"

```

```
#Environmental settings---------------------
#Set environmental settings that will ensure that output rasters match the DEM's extent, cell alignment, and coordinate system (the extent and coordinate system will also affect vector data). Matching the extent is particularly important because when the SetNull tool is used below on the bathymetric raster, the desired output is much larger than the extent of the lake itself.
#IT IS IMPORTANT TO NOTE THAT ALL DATASETS USED IN THIS SCRIPT SHOULD FALL ENTIRELY WITHIN THIS EXTENT, OR ELSE THEIR PORTIONS WHICH FALL OUTSIDE THIS EXTENT WILL NOT BE PROCESSED.
arcpy.env.extent = elevationPath
arcpy.env.snapRaster = elevationPath
arcpy.env.outputCoordinateSystem = elevationPath
#Use the GetRasterProperties tool to get the cell size of the DEM. This will be used in the FeatureToRaster tool below, to ensure that the bathymetric raster has the same cell size as the DEM.
#parameters: input raster; property being queried (cell size in X dimension, it is assumed here to be the same as Y); band [not used here]
demCellSizeResult = arcpy.GetRasterProperties_management(elevationPath, "CELLSIZEX")
#change the result object to a string
demCellSizeString = demCellSizeResult.getOutput(0)
#change the string to a floating point number
demCellSize = float(demCellSizeString)
#-------------------------------------------------------------

#Section 4: Create a fishnet.-------------------------------------
#Create a fishnet.  What we actually want is its labels, which form a grid of points, each point at the center of one fishnet square.  In section 6, these points will be used as the startpoints of least cost paths.
#CreateFishnet parameters: file path; fishnet origin; y-axis coord (line between origin and y-axis specifies angle); cell width; cell height; number of rows; number of columns; coordinates of opposite
```

```
corner; boolean for whether labels should be added; template for extent[optional, not included here]; boolean for lines or polygons in fishnet [optional, not included here]
arcpy.CreateFishnet_management(fishnetPath, "300000 8100000", "300000 8100010", fishnetCellSizeParam, fishnetCellSizeParam, "", "", "600000 8400000", "LABELS")
#Add noise to the positions of the fishnet labels. This is necessary to prevent grid-like patterns in the areas that are defined below as high-travel-potential areas. This grid-like patterning would form because paths in the cardinal directions would be overlapped by similar paths from many fishnet label points.
#Use an UpdateCursor to modify the coordinates of the fishnet labels.
#UpdateCursor parameters: input; list or tuple of field names to "select" and modify [here the "SHAPE@XY" token is used instead of field names, so that the coordinates can be modified; this returns a tuple with x,y]; SQL where clause [not used here]; spatial reference [not used here]; explode to points [not used here]; SQL prefix and postfix clauses [not used here]
#A with/as statement is used to ensure file closure and release of the lock.
with arcpy.da.UpdateCursor(fishnetLabelPath, ["SHAPE@XY"]) as cursor:
    #Loop through the cursor's rows; each iteration modifies one of the fishnet label points.
    for row in cursor:
        #Get a random integer within a parameter-specified range, to be added to the current fishnet label point's x coordinate.
        fishNoiseX = random.randint(fishNoiseMinParam, fishNoiseMaxParam)
        #Also, randomly change the sign of this integer. First, create a list holding -1 and 1. Then, use randrange() to randomly select from a range starting at 0, ending before 2, and with steps of 1 (i.e., 0 or 1). Use the output of randrange() as an index to the list of -1 and 1. Finally, multiply the noise value from above by this -1 or 1.
        positiveOrNegative = [-1, 1]
        currentSignX = positiveOrNegative[random.randrange(0,2,1)]
```

```
        fishNoiseX = fishNoiseX * currentSignX
        #Do the same for the y coordinate.
        fishNoiseY = random.randint(fishNoiseMinParam, fishNoiseMaxParam)
        currentSignY = positiveOrNegative[random.randrange(0,2,1)]
        fishNoiseY = fishNoiseY * currentSignY
        #The UpdateCursor's .updateRow method is necessary to commit the changes. The input for this method is a list or tuple of values, in the same order as the fields specified for the UpdateCursor above. Here we will have a one-item list for this input, containing another list (thus the double square brackets) with the x,y coordinates modified by the noise defined above. row[0] refers to the coordinates (the first item within a list, which is itself a list), whereas row[0][0] refers to the first item within the interior nested list, which is the x coordinate.
        cursor.updateRow([[row[0][0] + fishNoiseX, row[0][1] + fishNoiseY]])
    #Turn the fishnet labels into a feature layer, so that Select Layer By Attribute tool can be used on it.
    #MakeFeatureLayer parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
    arcpy.MakeFeatureLayer_management(fishnetLabelPath, "fishnetLayer")
    #Create a python list that contains the unique IDs of the fishnet labels (from the "FID" field of the shapefile).
    #This line first creates a SearchCursor for the fishnet labels shapefile, and then uses a For loop to iterate through the SearchCursor and get the value of the "FID" field for each row. This line uses a list comprehension.
    #In case it isn't already, cast each list item to a string, for easy use in file naming below.
    fishnetFIDlist = [str(row.FID) for row in arcpy.SearchCursor(fishnetLabelPath)]
    #------------------------------------------------------------------

```

```
#Section 5: Create a Digital Elevation Model that treats Lake Titicaca as impassable
#-----------------------------------------------------------------
#Turn the bathymetric contours into a feature layer, so that the Select Layer By Attribute tool can be used on it.
#MakeFeatureLayer parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
arcpy.MakeFeatureLayer_management(lakeTiticacaShapefilePath, "bathymetryLayer")
#Select (in the ArcGIS sense) the lake level that the "createRoutes" function's argument specifies, using the SelectLayerByAttribute tool.
#This searches the feature layer created above and selects its line that has an "Elevation" value that matches the "createRoutes" function's argument.
#SelectLayerByAttribute parameters: input feature layer; selection type; SQL where clause
arcpy.SelectLayerByAttribute_management("bathymetryLayer","NEW_SELECTION","Elevation = " + lakeLevel)
#Turn the selected bathymetric line into a polygon, so that when it is rasterized, the cells in the interior of the line will also be coded as within the lake (rather than just the line itself being coded as within the lake)
#FeatureToPolygon parameters: line or polygon input features; output polygon feature class; cluster tolerance, i.e. minimum distance separating feature coordinates [default of .001 meter used here]; attributes [not used here; no longer works anyway]; label features, i.e. points which will be used as attributes for the output polygons [not used here]
arcpy.FeatureToPolygon_management("bathymetryLayer", lakeLevelPolygonPath)
#Turn the bathymetric polygon that was just created into a raster, so that it can be used in map algebra.
#FeatureToRaster parameters: input dataset; input's attribute field that is used to assign output raster's cell values; output raster
```

```
↪path; output raster cell size
arcpy.FeatureToRaster_conversion(lakeLevelPolygonPath, "FID",
↪lakeTiticacaRasterizedPath, demCellSize)
#In the Digital Elevation Model, set cells that correspond to Lake
↪Titicaca (and therefore to the bathymetric raster that was just
↪created) to NoData. This is done here by: STEP 1) using IsNull to
↪create a raster that changes NoData values in the bathymetric raster
↪to 1, and all other values to 0 (such that the lake will be composed
↪of cells with a value of 0, and non-lake areas will be composed of
↪cells with a a value of 1); STEP 2) using a Boolean NOT operator (~)
↪on the raster that was just created in step 1, which changes 1s to 0s
↪, and 0s to 1s (such that the lake will now be composed of cells with
↪ a value of 1, and non-lake areas will be composed of cells with a
↪value of 0); STEP 3) running the SetNull tool on this raster just
↪created in step 2, which changes 1s to NoData and replaces 0s with
↪the values from the DEM (such that the lake is composed of cells with
↪ a value of NoData, and the non-lake areas are composed of cells from
↪ the DEM).
#SetNull parameters: input raster that defines TRUE and FALSE; output
↪for FALSE cells in the input raster; SQL where clause [not used here]
demMinusLake = arcpy.sa.SetNull(~(arcpy.sa.IsNull(
↪lakeTiticacaRasterizedPath)), elevationPath)
#Save the output.
demMinusLake.save(demMinusLakePath)
#-----------------------------------------------------------------

#Section 6: Calculate least cost paths and sum them with map algebra
#-----------------------------------------------------------------
#THIS LOOP (ALONG WITH ITS INNER LOOP) CALCULATES THE LEAST COST PATHS
↪BETWEEN EACH FISHNET LABEL POINT AND EACH POINT WITHIN THE CIRCLE
↪SURROUNDING THIS FISHNET LABEL POINT. AS IT DOES THIS, IT ALSO SUMS
↪THE LEAST COST PATHS USING ARCGIS MAP ALGEBRA.
#This boolean is used below when deleting the previous iteration's
↪backlink raster: since there will be no previous backlink raster on
↪the first iteration, a different action must be taken when this
```

```
boolean is True.
lcpOuterLoopFirstIteration = True
#This boolean is used below during the map algebra: since there will be no previous raster to add to during the first iteration of the inner loop, a different action must be taken when this boolean is True.
lcpInnerLoopFirstIteration = True
#These two above booleans could easily be combined, but shouldn't be because (technically though not very realistically), if the first fishnet label point were placed in the lake, the outer loop would have its second iteration before the inner loop's first iteration.
#Create a list that will hold data on the time taken to run each iteration of this loop, for performance testing.
perfTimeLog = []
#Loop through the python list that contains the unique IDs of the fishnet labels
for fishnetOuterLoopItem in fishnetFIDlist:
    #Determine how long the previous iteration of this loop took to complete.
    if lcpOuterLoopFirstIteration == False:
        fishLoopEnd = time.time()
        fishLoopElapsed = fishLoopEnd - fishLoopStart
        perfTimeLog += ["FiOuLo: " + str(fishLoopElapsed)]
    #Get the starting time of this iteration.
    fishLoopStart = time.time()

    #Select (in the ArcGIS sense) the current fishnet label, using the SelectLayerByAttribute tool.
    #This line searches the feature layer created above and selects its point that has a "FID" value that matches the current item in the python list being looped through.
    #SelectLayerByAttribute parameters: input feature layer; selection type; SQL where clause
    arcpy.SelectLayerByAttribute_management("fishnetLayer","NEW_SELECTION","FID = " + fishnetOuterLoopItem)
    #Now that the current fishnet label point has been selected, use the
```

```
PathDistance tool on it. This creates a raster where each cell represents the least cost to get to that cell from the current fishnet label point. It also creates a backlink raster representing the direction that should be moved from each cell in order to return to the current fishnet label point while re-tracing the least cost path from the fishnet label point to the cell.
#This tool here takes into account two things: 1) the increased distance covered when moving over non-flat terrain (determined by the pythagorean theorem; ESRI calls this "actual surface distance"), and 2) the speeding-up or slowing-down of movement when moving over non-flat terrain (determined by using a vertical factor table created using Nico Tripcevich's ethnoarchaeological study of llama caravans)
#Note that the ESRI documentation uses "to" and "from" in misleading ways when discussing anisotropic surfaces and paths. Pay attention instead to their use of the words "source" and "destination."
#The rasters are saved to a path created by concatenating the path defined above with the current FID value (the loop variable)
#PathDistance parameters: source point; input cost raster [not used here]; input surface raster (elevation, used to calculate actual surface distance); input horizontal raster [not used here]; horizontal factor [not used here]; input vertical raster (elevation again, used to calculate slope for vertical factor calculation); vertical factor (defines relationship between slope and cost/time); maximum cost before switching to NoData [not used here]; file path for output backlink raster
#Before running the PathDistance tool, delete the backlink raster that was created by the previous iteration's PathDistance tool. arcpy.env.overwriteOutput is set to False, so we can't use the same path to make the current backlink. An alternative would be to concatenate the outer loop's item name to the backlink path, thereby creating a different file for each iteration's backlink -- this is not a good alternative, however, for the reasons
```

```
        discussed in the below note regarding proliferation of rasters in the workspace.
        #If this is the first iteration, there won't be a backlink raster at this path yet. Use an if-then statment and the above-defined boolean to deal with this.
        if lcpOuterLoopFirstIteration == False:
            arcpy.Delete_management(backlinkPath)
        else:
            lcpOuterLoopFirstIteration = False
        currentPathDist = arcpy.sa.PathDistance("fishnetLayer", "", demMinusLakePath, "", "", demMinusLakePath, arcpy.sa.VfTable(verticalFactorTablePath), "", backlinkPath)
        #If tempted to save this output, remember two things that make saving a lot of rasters a bad idea: 1) there are limits on the number of GRID rasters that can be in an ArcGIS workspace, and therefore the script will stop running once this limit is reached. 2) having a large number of files in a folder severely affects ArcGIS's speed of accessing that folder, such that as these and other rasters build up in the workspace the script will run MUCH slower.
        #If the path distance and backlink rasters that were just created were for a point within Lake Titicaca, they will be completely composed of NoData values and this will cause the script to stop running during the next loop. To prevent this, use the GetRasterProperties tool to check if the path distance raster is completely composed of NoData values, and only run the next loop if the result is false.
        #GetRasterProperties parameters: input raster; property being queried [whether all cells are NODATA]; band [not used here]
        pathDistanceAllNoDataResult = arcpy.GetRasterProperties_management(currentPathDist,"ALLNODATA")
        #Change this result object to a string.
        pathDistanceAllNoDataResultString = pathDistanceAllNoDataResult.getOutput(0)
        #Only allow the next loop to run if the result from the
```

```
    GetRasterProperties tool is FALSE.
    if pathDistanceAllNoDataResultString != "1":
        #Create a ring of points around the currently selected fishnet label point. In the below loop, the least cost path between the currently selected fishnet label point and each point on this ring will be calculated.
        #First, create a circular buffer around the currently selected fishnet label point.
        #Buffer parameters: input features; output feature class; buffer distance; side option [not used here]; line end option [not used here]; dissolve option [not used here]; dissolve field [not used here]; planar or geodesic method ["PLANAR" means that, if the input is in a projected coordinate system, Euclidean buffers are created rather than calculating distances over a curved surface]
        #Before running the Buffer tool, delete the buffer and buffer points that were created by the previous iteration.
        #If this is the first iteration, there won't be any buffer or buffer points to delete yet. Rather than creating an extra boolean to deal with this, just re-use the one created for the inner loop.
        if lcpInnerLoopFirstIteration == False:
            arcpy.Delete_management("bufferPointsLayer")
            arcpy.Delete_management(fishnetBufferPath)
            arcpy.Delete_management(bufferPointsPath)
        arcpy.Buffer_analysis("fishnetLayer", fishnetBufferPath, bufferDistanceParam, method="PLANAR")
        #Second, create vertices on the curved circumference of the buffer, so that they can be turned into points.
        #Densify parameters: input features; densification method ["DISTANCE" means that the number of created vertices is set using a maximum permitted distance between vertices]; distance; max deviation from original [not used here]; max angle from original [not used here]
        #Keep in mind that this tool directly modifies the input file
```

```
        arcpy.Densify_edit(fishnetBufferPath, "DISTANCE", bufferPointsParam)
        #Third, make points from the vertices that were just created by the Densify tool.
        #FeatureVerticesToPoints parameters: input features; output point feature class; which locations to output as points ["ALL" creates a point at each input vertex]
        arcpy.FeatureVerticesToPoints_management(fishnetBufferPath, bufferPointsPath, "ALL")
        arcpy.MakeFeatureLayer_management(bufferPointsPath, "bufferPointsLayer")
        #Create a python list that contains the unique IDs of the buffer points that were just created (from the "FID" field).
        #This line first creates a SearchCursor for the buffer points feature class, and then uses a For loop to iterate through the SearchCursor and get the value of the "FID" field for each row. This line uses a list comprehension.
        #In case it isn't already, cast each list item to a string, for easy use in file naming below.
        bufferPointsList = [str(row.FID) for row in arcpy.SearchCursor(bufferPointsPath)]
        #Create an inner loop that loops through the python list that contains the unique IDs of the buffer points.
        #This loop will be used to create least cost paths to each of the buffer points from the outer loop's current fishnet label point. It will also sum them with map algebra.
        for bufferPointsListItem in bufferPointsList:
            #Select (in the ArcGIS sense) the inner loop's current buffer point, using the SelectLayerByAttribute tool
            arcpy.SelectLayerByAttribute_management("bufferPointsLayer", "NEW_SELECTION", "FID = " + bufferPointsListItem)
            #Calculate the least cost path to the inner loop's current point from the outer loop's current point.
            #CostPath parameters: point to which least cost path is calculated [here this is just one point, but in other cases
```

```
this can be multiple points]; input cost distance raster; input backlink raster; path type; destination field [not used here]
costPathOutput = arcpy.sa.CostPath("bufferPointsLayer", currentPathDist, backlinkPath, "EACH_CELL")
#Below, map algebra will be performed on the cost paths calculated so far (the corresponding cells of each cost path raster will be added together to create a new raster that sums all the cost path rasters). For any particular raster cell, a NoData value for that cell in ANY of the rasters being added together will result in an output value of NoData for that particular cell (location). Because this script will add many rasters together, this would create an output raster completely filled with NoData values. Therefore, NoData values must first be changed to 0.
#This is achieved by using ArcGIS's Con tool, which performs an if/else evaluation on a raster. Here, first a raster is created where the original raster's NoData values are coded as TRUE and the other values are coded as FALSE. The TRUE raster cells are then changed to 0, whereas the FALSE raster cells are changed back to the values in the original raster.
#Con parameters: raster which defines TRUE and FALSE; cell output value if TRUE; cell output if FALSE; SQL where clause [not used here]
costPathOutputNullToZero = arcpy.sa.Con(arcpy.sa.IsNull(costPathOutput), 0, costPathOutput)
#The fishnet label point, since it is the source for all the least cost paths calculated during this iteration of the outer loop, will cause the corresponding raster cell in the outer loop's final output (the map algebra sum raster) to be coded as a place with many least cost paths. This will, inappropriately, cause the outer loop's final output to have a grid of raster cells coded as places with many least cost paths, even though this has nothing to do with topography
```

```
and everything to do with the grid of fishnet label points. This can be prevented by recoding the source raster cell here. The CostPath's output codes source cells as 1 and path cells as 3. Therefore, change 1 to 0 and 3 to 1.
#Note that this line would not also do the job of the previous Con() in its absence, because this line would not change NoData values.
costPathConOutput = arcpy.sa.Con(costPathOutputNullToZero == 3, 1, 0)

#Some gymnastics are required in order to prevent the persistence of scratch files made in this loop (which will lead to major problems -- see the note above regarding the PathDistance tool's output and raster proliferation in the workspace). Originally I coded the "else" action in the map algebra below (which is now "mapAlgRaster = arcpy.sa.Raster(prevMapAlgPath) + costPathConOutput") as "mapAlgRaster = mapAlgRaster + costPathConOutput", and this led to each iteration producing one persistent CostPath raster in the scratch workspace. This was because the Con tool's output references the scratch files made by the CostPath tool, and then, via the Con tool's output, "mapAlgRaster" also referenced these same scratch files. Thus, "mapAlgRaster" must be saved (rather than just having a reference to the CostPath tool's scratch files), or else the scratch files will still exist during subsequent iterations of this loop. Saving "mapAlgRaster" solves this problem, but then creates another: if we save "mapAlgRaster", then during the next iteration, since arcpy.env.overwriteOutput is set to False, the newer "mapAlgRaster" can't be saved to the same path. Therefore, here we will retrieve that saved file from the previous iteration, rename it for further use, and then delete the original to free up that path (an alternative would be to use the loop variables in the path, but deleting the previous file is then a bit messy because this is in a
```

```
nested loop).
#There won't be a file to rename and delete during the first iteration of this loop, so use an if-then statement here.
if lcpInnerLoopFirstIteration == False:
    #Create a raster object from the previously saved file.
    prevSum = arcpy.sa.Raster(mapAlgPath)
    #Save the raster object to a different path.
    prevSum.save(prevMapAlgPath)
    #Delete the file at the older path.
    arcpy.Delete_management(mapAlgPath)
#Perform the map algebra. If this is the first cost path, simply set "mapAlgRaster" to the Con output. During subsequent iterations of this inner loop, instead add the current Con output to all of the previous cost paths.
if lcpInnerLoopFirstIteration == True:
    mapAlgRaster = costPathConOutput
else:
    mapAlgRaster = arcpy.sa.Raster(prevMapAlgPath) + costPathConOutput
#Save the result of the map algebra, for the reasons discussed above.
mapAlgRaster.save(mapAlgPath)
#arcpy.env.overwriteOutput is set to False and in the next iteration we will attempt to write a raster to the same path "prevMapAlgPath". Therefore, delete this file now that it is no longer needed, to free up that path. It will not exist during the first iteration of this loop, so use an if-then statement here.
if lcpInnerLoopFirstIteration == False:
    arcpy.Delete_management(prevMapAlgPath)
else:
    #If this is the (end of the) first iteration of this loop, change this boolean so that the proper actions are taken in all subsequent iterations of this loop.
    lcpInnerLoopFirstIteration = False
```

```

    #Once all the cost path rasters have been added together, save the resulting raster. This file is a raster where each cell has a value equal to the sum of the corresponding cells in all the cost path rasters created during the loop which just finished. In other words, locations which are crossed by many of the least cost paths will have high values.
    mapAlgRaster.save(summedCostPathsPath)

    #Now that the script is done, write the performance log for this lake level to a text file.
    #TAKE CARE WITH THIS -- IT WILL OVERWRITE ANY FILE ALREADY AT THIS PATH.
    try:
        perfLogFile = open(timeTestFilePath, "w")
        #Use * to unpack the list, and then use sep="\n" to separate the unpacked items with a newline character.
        print(*perfTimeLog, file = perfLogFile, sep = "\n")
    except IOError as perfLogWriteError:
        print("IOError: " + str(perfLogWriteError))
    finally:
        perfLogFile.close()
    #------------------------------------------------------------------

#Section 7: Run function to create routes--------------------------------
#When running a script that uses multiprocessing from PythonWin IDE, the python.exe will not by default be correct. Specify where to find the python executable.
multiprocessing.set_executable("C:\Python27\ArcGIS10.3\pythonw.exe")

#Define the multiprocessing function that will call the createRoutes function.
def mainFunction():
    #Create a python list that contains the desired bathymetric contours' depths (from the "Elevation" field of the bathymetry shapefile). Thus
```

```
    ↪, here we are modeling the lake at modern level, 5 meters below
    ↪modern, and 15 meters below modern.
    #THE LIST ITEMS NEED TO BE STRINGS rather than integers, because the
    ↪createRoutes function assumes they are strings (does not cast them to
    ↪ strings).
    lakeLevelsList = ["0","5","15"]
    #Set up multiprocessing.
    #Create a pool of worker processes.
    pool = multiprocessing.Pool()
    #Have each worker process run the createRoutes function for one of the
    ↪lake levels.
    pool.map(createRoutes, lakeLevelsList)
    #Clean up the multiprocessing using .close() and .join().
    pool.close()
    pool.join()
    #Check in spatial analyst license.
    arcpy.CheckInExtension("Spatial")

#Run this script. mainFunction() is called, which itself calls the core of
↪ this script, createRoutes().
#This if-then statement is required when using python multiprocessing with
↪ Windows OS.
if __name__ == '__main__':
    mainFunction()
```

Listing E.5: 2_CreateHubs_EXPERIMENTAL.py

```
#-----------------------------------------------------------------
#THIS SCRIPT DEFINES WHICH SITES ARE TRAVEL HUBS. TO DO THIS, IT SELECTS
↪THOSE SITES THAT ARE NEAR THE BEST OF THE ROUTES DEFINED IN THE PREVIOUS
↪ SCRIPT ("1_CreateRoutes.py").
#The output of this script is a series of points shapefiles, one shapefile
↪ per lake level. These points are the sites which have been defined as
↪hubs for each lake level.
#-----------------------------------------------------------------
```

```python

#Section 1: Get tools-------------------------------------------------------
#This future statement is used to enable Python 3 syntax when using print() to write to files (I am running this script with Python 2.7)
from __future__ import print_function
#Import the arcpy module in order to access ArcGIS.
import arcpy
#Import the python multiprocessing module, so that multiple processor cores can be used.
import multiprocessing
#---------------------------------------------------------------------------

def createHubs(lakeLevel):

    #Section 2: Define parameters---------------------------------------
    #The previous script (1_CreateRoutes.py) created rasters in which each cell represents the number of least-cost-paths that cross it (I will refer to this as the cell's "least-cost-path-sum"). In this script, map algebra will be used to distinguish raster cells with "high" least-cost-path-sums from raster cells with "low" least-cost-path-sums. "High" and "low" should be defined based on the frequency distribution of the least-cost-path-sums (e.g., the top 10%) rather than by some pre-defined value of least-cost-path-sum (e.g., more than 15 least-cost-paths). The parameter defined here is the fraction of the least-cost-path-sum frequency distribution that will be used to define "best routes" cells. For example, imagine that we have a raster with 100 cells and that these cells have least-cost-path-sum values that range from 0 to 5. Further imagine that only 10 of the 100 cells have a value of 4 or 5. If the parameter here has been set to .1 (10%), then 4 will be defined as the minimum least-cost-path-sum value that will be considered "best routes".
    #This parameter should be a number between 0 and 1. An interesting possibility is .2 (see White and Barber 2012), but this seems to be too high for this context (i.e., the Lake Titicaca region and/or how I have calculated the least-cost-path-sums).
```

```
#Technically, the percent of the distribution that will be selected can (and usually will) be higher than this parameter. This is because least-cost-path-sum values are selected until this percent parameter is exceeded, but the final value selected may itself exceed this parameter.
pathsSumPercentParam = .05
#The purpose of this parameter is to get rid of isolated "best routes" cells, and to instead retain only continuous paths of "best routes" cells (because we are modeling routes). Technically, this is the dangle tolerance used when vectorizing the raster which defines "best routes" cells. In other words, this is, more or less, the minimum length required for a string of adjacent raster cells to be converted into a line. This parameter is in meters.
manyPathsDangleTolerParam = 1000
#This is the maximum travel time (in hours) that an archaeological site defined as a "travel hub" can be from a "best routes" raster cell. In other words, archaeological sites that can be reached from a "best routes" cell in this amount of time or less will be considered travel hubs, whereas those sites which can not be reached in this amount of time will not be considered travel hubs. Ultimately, this matters because "travel hubs" will be defined as a certain type of node in the network with certain types of edges.
#ALSO SEE "resetHoursFromHighTravPotenCellsParam" IN "4_NetworkCreationPart2.py".
hoursFromHighTravPotenCellsParam = .25
#-----------------------------------------------------------------

#Section 3: Preliminary Work: licenses, file paths, environmental settings, and archaeological sites database
#-----------------------------------------------------------------
#Licenses-----------------------------------
#Check out the ArcGIS Spatial Analyst license.
arcpy.CheckOutExtension("Spatial")
#File paths-----------------------------------

```

```
#Define the path where all input from the previous script ("1_CreateRoutes.py") is and where all output of the current script (both scratch and final) will be stored (some of it in subdirectories of this path). This string will be used in constructing other strings for paths below.
#IT IS CRITICAL THAT THIS IS THE SAME PATH STORED IN THE VARIABLE "outputPath" IN THE PREVIOUS SCRIPT ("1_CreateRoutes.py"), SO THAT THE CORRECT INPUT IS USED.
IOpath = "C:/Real/SantaFe/LeastCostPaths/Working/finaloutput1/"

#Workspace----------
#Define a workspace folder for this lake level (and therefore for a particular child process). This simplifies file naming, and is also done because using multiprocessing with arcpy, according to some online forum posters, encounters problems if scratch workspaces are not separate for the child processes.
#Define the path. This folder was created by the previous script ("1_CreateRoutesAndHubs.py").
childProcessWorkspace = IOpath + "lakeLev" + lakeLevel
#Set the ArcGIS workspaces to this folder.
arcpy.env.workspace = childProcessWorkspace
arcpy.env.scratchWorkspace = arcpy.env.workspace
#Define paths-------
#Define paths for input files.
#Set the path to the Digital Elevation Model. This file isn't directly used in this script; it is used here to mimic the environmental settings used in the previous script ("1_CreateRoutes.py").
#THIS IS JUST A PLACEHOLDER FILE.
elevationPath = "C:/Real/SantaFe/LeastCostPaths/Working/GmtedClipReproj.tif"
#Set the path to the Titicaca archaeological surveys database.
#At present, this warning is not necessary because only the "comp" and utm fields are used in this script, but it is good to keep in mind: USE A SCHEMA.INI FILE TO DEFINE THE FIELD TYPES DERIVED FROM THIS CSV FILE. WHEN CREATING THIS SCHEMA.INI FILE YOU ALSO HAVE TO THINK
```

```
ABOUT HOW MISSING/NON-APPLICABLE DATA SHOULD BE CODED IN THE CSV FILE ("NA", "-1", "0", ETC).
#THIS IS JUST A PLACEHOLDER FILE.
surveysTablePath = "C:/Real/SantaFe/LeastCostPaths/Data/titicaca_surveys_python_LAST_SFI_VERSION_NO_SPACES_NO_BLANKS.csv"
#Set the path to the Titicaca inter-survey database.
#THIS IS JUST A PLACEHOLDER FILE.
gapsTablePath = "C:/Real/SantaFe/LeastCostPaths/Data/Gaps_python_UNFINISHED_10JAN16_NO_BLANKS_NO_SPACES.csv"
#Set the path to the vertical factor table.  This is an input to the ArcGIS Spatial Analyst PathDistance tool, and defines the relationship between slope and cost (here, time).
#THIS IS JUST A PLACEHOLDER FILE.
verticalFactorTablePath = "C:/Real/SantaFe/LeastCostPaths/Data/TripcevichLlamaVerticalFactorTable_SUPER_SLOPPY_DRAFT_DIVIDED_BY_1000.txt"

#Define paths for intermediate output files from the previous script (1_CreateRoutes.py) that will be re-used here. When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
demMinusLakePath = "dem_nolak"

#Define paths for final output files from the previous script (1_CreateRoutes.py). When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
summedCostPathsPath = "sum"

#Define paths for intermediate output files created by this script. When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
costPathsSumVectorizedPath = "cpsum_vect.shp"
gapsShpPath = "gaps.shp"
pathDistancePath = "pd"
surveysShpPath = "surveys.shp"
```

```
surveysAndGapsShpPath = "surveys_and_gaps.shp"
valuesExtractedPath = "values_extracted.shp"

#Define paths for final output files. When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
#Define the path for the raster which will define the best routes.
costPathsSumReRasterizedPath = "cpsum_rera"
#Define the path for the points shapefile which will contain the sites determined to be hubs.
lakeLevelHubs = "hubsLakeLevel.shp"
#TAKE CARE WITH THIS VARIABLE: IT IS USED BELOW FOR THE PATH FOR WRITING TO A TEXT FILE, AND WILL OVERWRITE ANY FILE ALREADY AT THIS PATH.
#Define the path for the least-cost-paths-sums frequency distribution text file.
lcpSumsFreqDistFilePath = IOpath + "lcpSumsFreqDist" + lakeLevel + ".txt"

#Environmental settings---------------------
#Carry over the environmental settings from the previous script (1_CreateRoutes.py).
#IT IS IMPORTANT TO NOTE THAT ALL DATASETS USED IN THIS SCRIPT SHOULD FALL ENTIRELY WITHIN THIS EXTENT, OR ELSE THEIR PORTIONS WHICH FALL OUTSIDE THIS EXTENT WILL NOT BE PROCESSED.
arcpy.env.extent = elevationPath
arcpy.env.snapRaster = elevationPath
arcpy.env.outputCoordinateSystem = elevationPath
#Use the GetRasterProperties tool to get the cell size of the DEM. This will be used in the PolylineToRaster tool below.
#parameters: input raster; property being queried (cell size in X dimension, it is assumed here to be the same as Y); band [not used here]
demCellSizeResult = arcpy.GetRasterProperties_management(elevationPath, "CELLSIZEX")
```

```
    #change the result object to a string
    demCellSizeString = demCellSizeResult.getOutput(0)
    #change the string to a floating point number
    demCellSize = float(demCellSizeString)

    #Archaeological sites (components, technically)--------
    #Import the archaeological surveys table
    #First, create a feature layer from the table file
    #MakeXYEventLayer parameters: input table; X coordinate field; Y
    ↪coordinate field; output layer name; spatial reference[I have chosen
    ↪to define the projection using an EPSG code; the code 32719 is for
    ↪WGS84 UTM 19S; note that this tool is not affected by the output
    ↪coordinate system environmental setting, but the CopyFeatures tool
    ↪below is]; Z coordinate field [not used here]
    arcpy.MakeXYEventLayer_management(surveysTablePath, "eutm19", "nutm19",
    ↪ "XYsurveysLayer", arcpy.SpatialReference(32719))
    #Second, save this feature layer as a feature class
    #CopyFeatures parameters: input features; output feature class;
    ↪geodatabase configuration keyword [not used here]; geodatabase
    ↪spatial grid 1 [not used here]; " 2 [not used here]; " 3 [not used
    ↪here]
    arcpy.CopyFeatures_management("XYsurveysLayer", surveysShpPath)
    #Do the same for the archaeological inter-survey data.
    arcpy.MakeXYEventLayer_management(gapsTablePath, "eutm19", "nutm19", "
    ↪XYgapsLayer", arcpy.SpatialReference(32719))
    arcpy.CopyFeatures_management("XYgapsLayer", gapsShpPath)
    #Combine the survey and inter-survey data into one shapefile.
    #Merge parameters: input feature classes or tables; output feature
    ↪class or table; field mappings [not used here]
    #Note that this tool is affected by the output coordinate system
    ↪environmental setting
    arcpy.Merge_management([surveysShpPath, gapsShpPath],
    ↪surveysAndGapsShpPath)
    #--------------------------------------------------------------

```

```
#Section 4: Define Best Routes--------------------------------------
#From the previous script ("1_CreateRoutes.py"), we now have a raster in which each cell represents the number of least-cost-paths that cross it (I will refer to this as the cell's "least-cost-path-sum"). Below, map algebra will be used to distinguish raster cells with "high" least-cost-path-sums from rasters cells with "low" least-cost-path-sums. "High" and "low" should be defined based on the frequency distribution of the least-cost-path-sums (e.g., the top 10%) rather than by some pre-defined value of least-cost-path-sum (e.g., more than 15 least-cost-paths). Therefore, here we will "select" the parameter-defined fraction of the distribution. For example, imagine that we have a raster with 100 cells and that these cells have least-cost-path-sum values that range from 0 to 5. Further imagine that only 10 of the 100 cells have a value of 4 or 5. If the parameter above has been set to .1 (10%), then 4 will be defined here as the minimum least-cost-path-sum value we should use later in the map algebra.
#First, get the frequency ("COUNT") for each value ("VALUE") of the least-cost-path-sums. Extract them from the ArcGIS table and put them into a python dictionary, using a dictionary comprehension.
pathsSumDict = {int(row.VALUE) : int(row.COUNT) for row in arcpy.SearchCursor(summedCostPathsPath)}
#Get the total count (equivalent to the total number of raster cells).
pathsSumTotalCount = 0
for pathsSumDictItem in pathsSumDict:
    #Raster cells with a value of 0 should be ignored: they will be the vast majority of the cells, and this will cause many reasonable settings for the percent parameter to result in the selection of all the raster's cells (e.g., if 85% of the raster cells have a value of 0, and the percent parameter is set to .2, then every cell in the raster will be selected). If the frequency distribution is a power-law distribution, this is equivalent to setting Xmin (see Newman 2005) to 1.
    if pathsSumDictItem != 0:
        pathsSumTotalCount += pathsSumDict[pathsSumDictItem]
```

```python
    #Get the values again, and this time put them alone into a python list.
    pathsSumValuesList = [int(row.VALUE) for row in arcpy.SearchCursor(summedCostPathsPath)]
    #Put the list in order from highest to lowest value.
    pathsSumValuesList.sort()
    pathsSumValuesList.reverse()
    #Initialize the variable that will keep track of what fraction of the distribution has been "selected" so far.
    pathsSumCumulativePercent = 0
    #Loop through the values of the least-cost-path-sums, from highest to lowest.
    for pathsSumValuesListItem in pathsSumValuesList:
        #If previous iterations have not exceeded the parameter-defined fraction of the distribution, continue to "select" the next (smaller) value.
        if pathsSumCumulativePercent < pathsSumPercentParam:
            #Calculate this value's relative frequency. It is critical that floating point numbers are used, or else the result of the division will always be 0.
            currentRelFreq = float(pathsSumDict[pathsSumValuesListItem]) / float(pathsSumTotalCount)
            #Add this relative frequency to previous iterations' relative frequencies.
            pathsSumCumulativePercent += currentRelFreq
            #Define which least-cost-path-sum value was just processed. The last iteration of this if-then statement will make this variable equivalent to the smallest value that is still within the parameter-defined fraction of the distribution. This value will then be used as a minimum value in the map algebra below.
            smallestPathsSumValueUnderParam = pathsSumValuesListItem

    #Additionally, characterize the frequency distribution of the least-cost-path-sums. This will be useful for determining whether the "pathsSumPercentParam" was appropriately chosen. The frequency distribution data will be input to another script, "
```

```
CostPathSumPowerLawFit.py". Note that I haven't included this script in this dissertation's appendices, because I haven't yet developed it particularly far.
#The other script will do the actual analysis. In this script, just save the data in a format appropriate to the powerlaw module: reformat the raster data so that it is a list of the observations (a list with one element per raster cell).
#Create an empty list to hold this data.
pathsSumObservList = []
#Loop through the least-cost-path-sums values.
for pathsSumDictKey in pathsSumDict:
    #Create a list in which the current least-cost-path-sums value is repeated, such that there is one list item per raster cell with that value. In other words, create a list where the raster table's "VALUE" field is repeated a number of times equal to its "COUNT" field.
    pathsSumValueRepeated = [pathsSumDictKey] * pathsSumDict[pathsSumDictKey]
    #Use this list to extend the list holding the data for all the least-cost-path-sums values.
    pathsSumObservList.extend(pathsSumValueRepeated)
#Save the least-cost-path-sums frequency distribution data for this lake level to a text file, so that it can be analyzed by "CostPathSumPowerLawFit.py".
#TAKE CARE WITH THIS -- IT WILL OVERWRITE ANY FILE ALREADY AT THIS PATH.
try:
    lcpSumsFreqDistFile = open(lcpSumsFreqDistFilePath, "w")
    print(pathsSumObservList, file = lcpSumsFreqDistFile)
except IOError as lcpSumsFreqDistWriteError:
    print("IOError: " + str(lcpSumsFreqDistWriteError))
finally:
    lcpSumsFreqDistFile.close()

#Use ArcGIS map algebra to create a new raster from the one created in
```

```
the previous script. This new raster will code cells that have over a certain number of least cost paths (determined by a parameter in Section 2, and its above use) on them as 1, and cells with fewer least cost paths on them as 0. In other words, this new raster will define the areas that are most attractive for travel.
manyPathsRaster = arcpy.sa.Raster(summedCostPathsPath) >= smallestPathsSumValueUnderParam
#In the raster that was just created, continuous (unbroken) linear features are more indicative of an attractive pathway than isolated cells are. Only retain linear features of a minimum length defined by a parameter in section 2.
#Convert the raster to lines (vectorize it), and use the tool's dangle tolerance to get rid of isolated cells and short lines.
#RasterToPolyline parameters: input raster (must be an integer raster); output polyline feature class; background value ["ZERO" means do not create lines from raster cells that have a value <=0 or NoData]; minimum line dangle length to retain; option to simplify output geometry; raster field used to assign values to the lines [default used here: "VALUE" will be used and will create a field in the output called "GRID_CODE"]
arcpy.RasterToPolyline_conversion(manyPathsRaster, costPathsSumVectorizedPath, "ZERO", manyPathsDangleTolerParam, "NO_SIMPLIFY")
#CREATE THE RASTER WHICH DEFINES THE BEST ROUTES, by creating a raster version of the polylines that were just created. The original "manyPathsRaster" had values of 1 for many-path-cells and values of 0 for other cells. These values were then used for the "GRID_CODE" field in the polylines created from the raster. This "GRID_CODE" field will now be used for the new raster cells' values; therefore, 1 will mean "best route" and NoData will mean "not best route" (but unlike in the original raster, isolated "best routes" cells and short lines of them have now been removed).
#PolylineToRaster parameters: input polylines; polyline field used to assign values to raster cells; output raster path; cell assignment method ["MAXIMUM_LENGTH" means that when multiple lines are within
```

```
the same raster cell, the raster cell value is taken from the line with the longest length; this should be irrelevant]; priority field, used to select which of multiple lines in a raster cell should be used to assign a value to the raster cell [this should be irrelevant]; cell size for output raster
arcpy.PolylineToRaster_conversion(costPathsSumVectorizedPath, "GRID_CODE", costPathsSumReRasterizedPath, "MAXIMUM_LENGTH", "NONE", demCellSize)
#This section is no longer necessary (since the RasterToPolyline output will be used instead), but I will leave it here commented-out.
#To prepare this raster for use below in the PathDistance tool, change the 0 cells to NoData cells. The PathDistance tool treats cells with any valid values, including 0, as source cells, so these 0 cells must be changed to NoData.
#SetNull parameters: input raster that defines TRUE and FALSE; output for FALSE cells in the input raster; SQL where clause [not used here]
#manyPathsRasterNoZeros = arcpy.sa.SetNull(manyPathsRaster == 0, manyPathsRaster)
#Save the raster.
#manyPathsRasterNoZeros.save(manyPathsPath)

#Create another raster that will code cells as 1 when they are less than a certain amount of travel time (using the llama caravan function) from the best routes. This can be thought of as a cost buffer. This raster will later be used below to define travel hubs: sites which are less than a certain amount of travel time from the best travel routes.
#Issue to test: is it best to use the vectorized or rasterized best routes as input here?
#PathDistance parameters: source cells; input cost raster [not used here]; input surface raster (elevation, used to calculate actual surface distance); input horizontal raster [not used here]; horizontal factor [not used here]; input vertical raster (elevation again, used to calculate slope for vertical factor calculation); vertical factor (defines relationship between slope and cost/time);
```

```
maximum cost before switching to NoData [not used here]; file path for output backlink raster [not used here]
majorRoutesPathDistanceOutput = arcpy.sa.PathDistance(costPathsSumVectorizedPath, "", demMinusLakePath, "", "", demMinusLakePath, arcpy.sa.VfTable(verticalFactorTablePath), "", "")
majorRoutesCostRaster = pathDistancePath + "_rtes"
#This is also used in the scripts "3_NetworkCreationPart1.py" and "DistanceToBestRoutes.py".
majorRoutesPathDistanceOutput.save(majorRoutesCostRaster)
#Now that the PathDistance raster has been created, use it to create a new raster. This new raster will have 1 for cells that are less than a certain amount of travel time from the source cells (from the best routes cells). This amount of time is defined by a parameter in section 2.
closeToHighTravPotenCells = arcpy.sa.Raster(majorRoutesCostRaster) <= hoursFromHighTravPotenCellsParam
travelHubRaster = pathDistancePath + "_hubs"
closeToHighTravPotenCells.save(travelHubRaster)
#-----------------------------------------------------------------

#Section 5: Define sites that are travel hubs------------------------
#In this section we will use the "travelHubRaster" raster created in Section 4 to select a subset of the archaeological sites. This subset will consist of travel hubs, i.e., sites near the best routes.
#Create a feature layer from the combined survey and inter-survey data shapefile.  This will be used below to determine which sites are on the 1 cells in the "travelHubRaster" raster.
#parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
arcpy.MakeFeatureLayer_management(surveysAndGapsShpPath, "sitesLayer")
#Use the ExtractValuesToPoints tool to add an attribute to the site points that defines whether each point is on a raster cell that is within the parameter-defined amount of travel time from one of the best routes (in other words, whether each site is on a raster cell
```

```
that is coded 1 on the raster that was just created). In the attribute that is added to the shapefile, a value of 1 indicates that the site is below or equal to the parameter-defined travel time from a "best routes" raster cell, whereas a value of 0 indicates that the site is more than the parameter-defined travel time from "best routes" raster cells. A site on a raster NoData cell (in the modeled lake) will receive a value of -9999. Note that technically the distance being measured is to the center of the raster cell that the site is on, rather than the site point itself; therefore, with a low resolution raster the results may not be as desired.
#ExtractValuesToPoints parameters: input point features [provides location data]; input raster [provides value data]; output point feature class [contains points with values derived from the raster]; interpolation option ["NONE" specifies that the cell center's value will be used, rather than deriving the value from surrounding cells]; add attributes option ["VALUE_ONLY" specifies that other fields in the raster's attribute table will be ignored]
arcpy.sa.ExtractValuesToPoints("sitesLayer", travelHubRaster, valuesExtractedPath, "NONE", "VALUE_ONLY")
#Create a new shapefile that contains only the archaeological sites with a value of 1 for the attribute that was just added by the ExtractValuesToPoints tool (i.e., only sites which are on cells with a value of 1 in the raster that defines areas that are less than the parameter-defined travel time away from one of the best routes).
#First, make a feature layer from the shapefile that was just created by the ExtractValuesToPoints tool. This is done so that the SelectLayerByAttribute tool can be used.
#MakeFeatureLayer parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
arcpy.MakeFeatureLayer_management(valuesExtractedPath, "valExtLayer")
#Second, select only those sites which have a value of 1 in the field that was added by the ExtractValuesToPoints tool.
#SelectLayerByAttribute parameters: input feature layer; selection type; SQL where clause
```

```
    arcpy.SelectLayerByAttribute_management("valExtLayer","NEW_SELECTION","RASTERVALU = 1")
    #Third, use this selection to create a new shapefile.
    #CopyFeatures parameters: input features; output feature class; geodatabase configuration keyword [not used here]; geodatabase spatial grid 1 [not used here]; " 2 [not used here]; " 3 [not used here]
    arcpy.CopyFeatures_management("valExtLayer", lakeLevelHubs)
    #We want to be able to use the ExtractValuesToPoints tool again on this file, later, so we need to remove the "RASTERVALU" field from the shapefile's attribute table.
    #DeleteField parameters: input table; field to be deleted
    arcpy.DeleteField_management(lakeLevelHubs, ["RASTERVALU"])
    #----------------------------------------------------------------

#Section 6: Run function to create hubs----------------------------------
#When running a script that uses multiprocessing from PythonWin IDE, the python .exe will not by default be correct. Specify where to find the python executable.
multiprocessing.set_executable("C:\Python27\ArcGIS10.3\pythonw.exe")

#Define the multiprocessing function that will call the createHubs function.
def mainFunction():
    #Create a python list that contains the desired bathymetric contours' depths (from the "Elevation" field of the bathymetry shapefile). Thus, here we are modeling the lake at modern level, 5 meters below modern, and 15 meters below modern.
    #THE LIST ITEMS NEED TO BE STRINGS rather than integers, because the createHubs function assumes they are strings (does not cast them to strings).
    lakeLevelsList = ["0","5","15"]
    #Set up multiprocessing.
    #Create a pool of worker processes.
    pool = multiprocessing.Pool()
```

```
    #Have each worker process run the createHubs function for one of the lake levels.
    pool.map(createHubs, lakeLevelsList)
    #Clean up the multiprocessing using .close() and .join().
    pool.close()
    pool.join()
    #Check in spatial analyst license.
    arcpy.CheckInExtension("Spatial")

#Run this script. mainFunction() is called, which itself calls the core of this script, createHubs().
#This if-then statement is required when using python multiprocessing with Windows OS.
if __name__ == '__main__':
    mainFunction()
```

E.2.2 Wealth Finance Analysis 1: Network Analysis

Listing E.6: 3_NetworkCreationPart1_EXPERIMENTAL.py

```
#-----------------------------------------------------------------------
#THIS SCRIPT BEGINS THE CONSTRUCTION OF NETWORKS FROM THE HUBS DEFINED IN THE PREVIOUS SCRIPT ("2_CreateHubs.py"). IT DOES ANY TASKS IN THE NETWORK CONSTRUCTION WHICH REQUIRE ARCGIS; ANY TASKS IN THE NETWORK CONSTRUCTION WHICH DO NOT REQUIRE ARCGIS WILL INSTEAD BE PERFORMED IN THE SUBSEQUENT SCRIPT ("4_NetworkCreationPart2.py").
#The output of this script is a series of network adjacency lists in .txt files, one file for each lake level.
#-----------------------------------------------------------------------

#Section 1: Get tools-----------------------------------------------------
#This future statement is used to enable Python 3 syntax when using print() to write to files (I am running this script with Python 2.7)
from __future__ import print_function
#Import the arcpy module in order to access ArcGIS.
```

```
import arcpy
#Import the python multiprocessing module, so that multiple processor cores can be used.
import multiprocessing
#Import the time module, necessary here for testing performance.
import time
#Suppress ArcGIS .xml history logging.
arcpy.SetLogHistory(False)
#------------------------------------------------------------------------

def networkCreationPart1(lakeLevel):

    #Section 2: Define parameters--------------------------------------
    #This is the maximum travel time (in hours) that can separate a pair of travel hubs that have an edge defined between them. In other words, two nodes will have an edge between them if the travel time separating them is this amount of time or less. This is only 1 of 2 criteria used to define these edges, however (see the following parameter).
    #Note: this test is anisotropic (i.e, it is applied separately to each of the 2 travel directions). Imagine that Node A to Node B has a travel time less than this parameter even though Node B to Node A has a travel time more than this parameter. In this case, the adjacency list will have "A B" for Node A's line, but will have "B " for Node B's line. The consequences of this depend on how the adjacency list is used: the anisotropy of this script's test of edge criterion 1 will have consequences if the network analysis that uses this adjacency list creates a directed rather than an undirected graph.
    hubEdgeCriterion1TimeParam = 35
    #This is the maximum travel time (in hours) that can be spent traveling off of "best routes" raster cells before an edge is no longer defined between two travel hubs. This is a way to make sure that edges are only defined when both nodes are along the SAME travel corridor.
    #Remember that both A) travel from the first hub onto the path and B)
```

```
travel from the path to the second hub must be accounted for in this maximum cost.
hubEdgeCriterion2TimeParam = .66

#Section 3: Preliminary Work: licenses, file paths, and environmental settings
#---------------------------------------------------------------------------
#Licenses-------------------------------------
#Check out the ArcGIS Spatial Analyst license.
arcpy.CheckOutExtension("Spatial")
#File paths-----------------------------------

#Define the path where all input from the previous scripts ("1_CreateRoutes.py" and "2_CreateHubs.py") is and where all output of the current script (both scratch and final) will be stored (some of it in subdirectories of this path). This string will be used in constructing other strings for paths below.
#IT IS CRITICAL THAT THIS IS THE SAME PATH STORED IN THE VARIABLE "outputPath" IN "1_CreateRoutes.py" AND IN THE VARIABLE "IOpath" IN "2_CreateHubs.py", SO THAT THE CORRECT INPUT IS USED.
IOpath = "C:/Real/SantaFe/LeastCostPaths/Working/finaloutput1/"

#Workspace----------
#Define a workspace folder for this lake level (and therefore for a particular child process). This simplifies file naming, and is also done because using multiprocessing with arcpy, according to some online forum posters, encounters problems if scratch workspaces are not separate for the child processes.
#Define the path. This folder was created by the script "1_CreateRoutes.py".
childProcessWorkspace = IOpath + "lakeLev" + lakeLevel
#Set the ArcGIS workspaces to this folder.
arcpy.env.workspace = childProcessWorkspace
arcpy.env.scratchWorkspace = arcpy.env.workspace
#Define paths-------
```

```
#Define paths for input files.
#Set the path to the Digital Elevation Model. This file isn't directly used in this script; it is used here to mimic the environmental settings used in "1_CreateRoutesAndHubs.py".
#THIS IS JUST A PLACEHOLDER FILE.
elevationPath = "C:/Real/SantaFe/LeastCostPaths/Working/GmtedClipReproj.tif"
#Set the path to the vertical factor table.  This is an input to the ArcGIS Spatial Analyst PathDistance tool, and defines the relationship between slope and cost (here, time).
#THIS IS JUST A PLACEHOLDER FILE.
verticalFactorTablePath = "C:/Real/SantaFe/LeastCostPaths/Data/TripcevichLlamaVerticalFactorTable_SUPER_SLOPPY_DRAFT_DIVIDED_BY_1000.txt"

#Define paths for intermediate output files from the previous scripts ("1_CreateRoutes.py" and "2_CreateHubs.py") that will be re-used here. When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
demMinusLakePath = "dem_nolak"
surveysAndGapsShpPath = "surveys_and_gaps.shp"
#Define paths for final output files from the previous script ("2_CreateHubs.py"). When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
costPathsSumReRasterizedPath = "cpsum_rera"
lakeLevelHubs = "hubsLakeLevel.shp"
majorRoutesCostRaster = "pd_rtes"

#Define paths for intermediate output files created by this script. When used as a parameter for an ArcGIS tool, these strings will be prefixed with the arcpy.env.workspace path.
edgeCriterion1ShpPath = "edge1.shp"
edgeCriterion2ShpPath = "edge2.shp"
freeRoutesPath = "manyinv"
travTimeExtractedPath = "hubsTimesFromBestRtes.shp"
```

```

#Define paths for final output files.
#TAKE CARE WITH THESE VARIABLES: THEY ARE USED BELOW FOR THE PATHS FOR WRITING TO TEXT FILES, AND WILL OVERWRITE ANY FILE ALREADY AT THESE PATHS.
#Define the path for the adjacency lists which will be later used in the subsequent network creation script ("4_NetworkCreationPart2.py").
AdjacencyListFilePath = IOpath + "AdjacencyListLakeLevel" + lakeLevel + ".txt"
#Define the path for the edge lists with travel times, which will be later used in the subsequent network creation script ("4_NetworkCreationPart2.py").
EdgeListCrit1WithTimesFilePath = IOpath + "EdgeListCrit1WithTimesLakeLevel" + lakeLevel + ".txt"
#Define the path for the nearest-best-route-to-hub-travel-times list, which will be later used in the subsequent network creation script.
nearestRouteTravelTimeFilePath = IOpath + "nearestRouteTravelTimesLakeLevel" + lakeLevel + ".txt"
#Define the path for the performance test text file.
timeTestFilePath = IOpath + "timeTest_NetworkCreationPart1_lev" + lakeLevel + ".txt"
#Environmental settings---------------------
#Carry over the environmental settings from the script "1_CreateRoutes.py".
#IT IS IMPORTANT TO NOTE THAT ALL DATASETS USED IN THIS SCRIPT SHOULD FALL ENTIRELY WITHIN THIS EXTENT, OR ELSE THEIR PORTIONS WHICH FALL OUTSIDE THIS EXTENT WILL NOT BE PROCESSED.
#THE ENVIRONMENTAL SETTING FOR EXTENT WILL BE CHANGED BELOW.
arcpy.env.extent = elevationPath
arcpy.env.snapRaster = elevationPath
arcpy.env.outputCoordinateSystem = elevationPath
#-----------------------------------------------------------------

#Section 4: Network Creation Part 1--------------------------------
#In this section we will begin to construct a network from the travel
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hubs which were defined in Section 5 of "2_CreateHubs.py". In order to receive an edge (link) between them, a pair of travel hubs must satisfy two criteria: 1) be within the parameter-defined travel time of each other; 2) both be along the same "best route" (defined here as not being separated by more than the parameter-defined amount of travel off of "best route" cells).
#Make a feature layer from the travel hubs shapefile that was created in Section 5 of "2_CreateHubs.py". This is done so that the SelectLayerByAttribute tool can be used on it.
#MakeFeatureLayer parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
arcpy.MakeFeatureLayer_management(lakeLevelHubs, "hubsLayer")
#Create a python list that contains the unique IDs of the travel hubs (from the "FID" field of the shapefile). This will be used in the loop below.
#This line first creates a SearchCursor for the travel hubs shapefile, and then uses a For loop to iterate through the SearchCursor and get the value of the "FID" field for each row. This line uses a list comprehension.
#In case it isn't already, cast each list item to a string, for easy use in file naming below.
hubFIDlist = [str(row.FID) for row in arcpy.SearchCursor(lakeLevelHubs)]

#Create a raster that codes "best routes" cells (defined in section 4 of "2_CreateHubs.py") as 0 (technically, a very small value close to 0, because cost raster inputs to the PathDistance tool can't accept 0 values; the precision of ESRI GRIDs is 6 decimal places), and other cells as 1. This raster will be used below when testing edge criterion 2, as a cost raster for the PathDistance tool, to make the "best routes" cells free to travel over, and the other cells will simply have their travel costs multiplied by 1. This is done because we want to link travel hubs together only when they are both near the same "best route".
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#First, change the NoData values to 0 in the raster that defines "best routes" cells.
#Con parameters: raster which defines TRUE and FALSE; cell output value if TRUE; cell output if FALSE; SQL where clause [not used here]
majorRoutesNoDataToZero = arcpy.sa.Con(arcpy.sa.IsNull(costPathsSumReRasterizedPath), 0, 1)
#Second, change the 1s to 0s and the 0s to 1s.
majorRoutesInverse = arcpy.sa.Con(majorRoutesNoDataToZero == 1, 0.000001, 1)
majorRoutesInverse.save(freeRoutesPath)

#Create an empty python list that will later serve as an adjacency list (in the network science sense) for the network of travel hubs created for this lake level. This list will be extended at the end of each iteration of the below loop.
lakeLevelAdjacencyList = []
#Do the same for a list that will serve as an edge list with an additional column for travel time between each pair of nodes. This list will be a side-product of edge criterion 1's work, and therefore will contain all edges satisfying edge criterion 1 but not necessarily edge criterion 2. This list will be extended during each iteration of the edge criterion 1 section.
#This list will ultimately be used to make a 3-column CSV file. Create headers here, but do not add a newline character.
lakeLevelEdgeListCrit1WithTimes = ["fromNode,toNode,time"]

#Before running the PathDistance tool in the below loop, reset the environmental setting for extent. This will help reduce the file size for the PathDistance output.
#ALL DATASETS USED IN THE BELOW LOOP MUST FALL ENTIRELY WITHIN THIS EXTENT, OR ELSE THEIR PORTIONS WHICH FALL OUTSIDE THIS EXTENT WILL NOT BE PROCESSED.
arcpy.env.extent = surveysAndGapsShpPath
#This boolean is used below when deleting the previous iteration's ExtractValuesToPoints shapefile: since there will be no previous
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    shapefile on the first iteration, a different action must be taken when this boolean is True.
    edgeLoopFirstIteration = True
    #Create a list that will hold data on the time taken to run each iteration of the below loop, for performance testing.
    perfTimeLog = []

    #Loop through the travel hubs.
    for travelHubItem in hubFIDlist:
        #Determine how long the previous iteration of this loop took to complete, for the performance log.
        if edgeLoopFirstIteration == False:
            edgeLoopEnd = time.time()
            edgeLoopElapsed = edgeLoopEnd - edgeLoopStart
            perfTimeLog += ["EdLo: " + str(edgeLoopElapsed)]
        #Get the starting time of this iteration.
        edgeLoopStart = time.time()

        #Select the current travel hub.
        #SelectLayerByAttribute parameters: input feature layer; selection type; SQL where clause
        arcpy.SelectLayerByAttribute_management("hubsLayer","NEW_SELECTION", "FID = " + travelHubItem)

        #EDGE CRITERION 1-----------------------------------
        #For the current travel hub, create an accumulated cost raster with the PathDistance tool. This is needed because the first criterion for defining edges between travel hubs is that they are within the parameter-defined travel time from each other. This raster represents travel time from the current travel hub. Travel time is calculated using the same llama caravan function used in the previous scripts ("1_CreateRoutes.py" and "2_CreateHubs.py") to define "best routes". The same lake-level-adjusted DEMs used in the previous scripts are used here again.
        #A maximum cost before switching to NoData is specified for the
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```
PathDistance tool here. This should significantly reduce processing time and moreover is a convenient way to define the maximum travel cost that can separate two travel hubs before an edge is no longer defined between them (see the use of ExtractValuesToPoints and SelectLayerByAttribute later in this loop).
#PathDistance parameters: source cells; input cost raster [not used here]; input surface raster (elevation, used to calculate actual surface distance); input horizontal raster [not used here]; horizontal factor [not used here]; input vertical raster (elevation again, used to calculate slope for vertical factor calculation); vertical factor (defines relationship between slope and cost/time); maximum cost before switching to NoData; file path for output backlink raster [not used here]
hubEdgeCriterion1PathDistanceOutput = arcpy.sa.PathDistance("hubsLayer", "", demMinusLakePath, "", "", demMinusLakePath, arcpy.sa.VfTable(verticalFactorTablePath), hubEdgeCriterion1TimeParam, "")
#Define which other travel hubs satisfy criterion 1 for having an edge with the current travel hub. Do this by selecting all travel hubs that are on a raster cell that has some value (anything other than NoData) from the raster that was just created by the PathDistance tool.
#First, use the ExtractValuesToPoints tool to add an attribute to the travel hub points that defines each hub's travel time from the current travel hub. Note that technically the distance being measured is to the center of the raster cell that the hub is on, rather than the hub point itself; therefore, with a low resolution raster the results may not be as desired.
#The values extracted will be the hours of travel time or else "-9999" when the raster cell's value is NoData (see the maximum cost parameter in the above use of the PathDistance tool).
#ExtractValuesToPoints parameters: input point features [provides location data]; input raster [provides value data]; output point feature class [contains points with values derived from the raster
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]; interpolation option ["NONE" specifies that the cell center's value will be used, rather than deriving the value from surrounding cells]; add atributes option ["VALUE_ONLY" specifies that other fields in the raster's attribute table will be ignored]
#Before using the ExtractValuesToPoints tool, delete its output from the previous iteration. arcpy.env.overwriteOutput is set to False, so we can't use the same path to make the current ExtractValuesToPoints shapefile. An alternative would be to concatenate the loop's item name to the shapefile path, thereby creating a different file for each iteration's ExtractValuesToPoints -- this is not a good alternative, however, for the reasons discussed in the script "1_CreateRoutes.py", near the script's first use of PathDistance, regarding proliferation of files in the workspace.
#The feature layer made from the shapefile in the previous iteration should first be deleted. In certain conditions, trying to delete the edge shapefile without first deleting the edge feature layer will cause the script to hang. I did not have this problem when running the script in ArcMap, but I did have this problem when running the script in PythonWin. I assume that this is because of some difference in how LOCK files are managed.
#If this is the first iteration, there will be no output at this path to delete; use an if-then statement and the above-defined boolean to deal with this. Wait until the second edge criterion has been dealt with below before changing "edgeLoopFirstIteration" to False.
if edgeLoopFirstIteration == False:
    arcpy.Delete_management("currentHubEdgeCriterion1Layer")
    arcpy.Delete_management(edgeCriterion1ShpPath)
arcpy.sa.ExtractValuesToPoints(lakeLevelHubs, hubEdgeCriterion1PathDistanceOutput, edgeCriterion1ShpPath, "NONE", "VALUE_ONLY")
#Create a python list that contains only the travel hubs with a value other than "-9999" for the attribute that was just added by the ExtractValuesToPoints tool. In other words, select only the
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travel hubs that were under the maximum travel time set by the maximum cost parameter in the PathDistance tool above. These hubs satisfy criterion 1 for being defined as the neighbors of the current hub ("neighbor" in the network science sense of nodes with edges between them).
#First, make a feature layer from the shapefile that was just created by the ExtractValuesToPoints tool. This is done so that the SelectLayerByAttribute tool can be used.
#MakeFeatureLayer parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
arcpy.MakeFeatureLayer_management(edgeCriterion1ShpPath, "currentHubEdgeCriterion1Layer")
#Second, select only those sites which have a value other than "-9999" in the field that was added by the ExtractValuesToPoints tool.
#SelectLayerByAttribute parameters: input feature layer; selection type; SQL where clause
arcpy.SelectLayerByAttribute_management("currentHubEdgeCriterion1Layer","NEW_SELECTION","RASTERVALU <> -9999")
#Third, create a python list that contains the unique IDs (from the "comp" field) of the points that were just selected by the SelectLayerByAttribute tool.
#This line first creates a SearchCursor for the current hub's travel time layer, and then uses a For loop to iterate through the SearchCursor and get the value of the "comp" field for each row. This line uses a list comprehension.
#The list items from the SearchCursor will be unicode strings; encode these strings (convert them from unicode strings to byte strings) so that they can be used in ArcGIS SQL queries.
edgeCriterion1CompList = [row.comp.encode('utf-8') for row in arcpy.SearchCursor("currentHubEdgeCriterion1Layer")]

#EDGE CRITERION 2---------------------------------
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#Edge criterion 1 has now narrowed the selection of hubs to those that are within the parameter-defined travel time from the current hub. Edge criterion 2 will further restrict this selection by selecting only those sites which share a "best route" with the current hub. We will determine this by using the PathDistance tool with a cost raster that makes the "best routes" cells free to travel on, and a maximum cost parameter that defines the maximum time that can be spent traveling off of these "best routes" cells before an edge is no longer defined between two travel hubs. Remember that both A) travel from the first hub onto the "best route" and B) travel from the "best route" to the second hub must be accounted for in this maximum cost.
#Create the accumulated cost raster with the PathDistance tool.
#PathDistance parameters: source cells; input cost raster; input surface raster (elevation, used to calculate actual surface distance); input horizontal raster [not used here]; horizontal factor [not used here]; input vertical raster (elevation again, used to calculate slope for vertical factor calculation); vertical factor (defines relationship between slope and cost/time); maximum cost before switching to NoData; file path for output backlink raster [not used here]
hubEdgeCriterion2PathDistanceOutput = arcpy.sa.PathDistance("hubsLayer", freeRoutesPath, demMinusLakePath, "", "", demMinusLakePath, arcpy.sa.VfTable(verticalFactorTablePath), hubEdgeCriterion2TimeParam, "")
#Define which other travel hubs qualify for an edge with the current travel hub, according to edge criterion 2. Do this by selecting all travel hubs that are on a raster cell that has some value (anything other than NoData) from the raster that was just created by the PathDistance tool.
#First, use the ExtractValuesToPoints tool to add an attribute to the travel hub points that defines each hub's travel time from the current travel hub (with travel along the "best routes" considered free). Note that technically the distance being measured is to the center of the raster cell that the hub is on,
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    rather than the hub point itself; therefore, with a low resolution raster the results may not be as desired.
    #The values extracted will be the hours of travel time not along a "best route", or else "-9999" when the raster cell's value is NoData (see the maximum cost parameter in the above use of the PathDistance tool).
    #ExtractValuesToPoints parameters: input point features [provides location data]; input raster [provides value data]; output point feature class [contains points with values derived from the raster]; interpolation option ["NONE" specifies that the cell center's value will be used, rather than deriving the value from surrounding cells]; add atributes option ["VALUE_ONLY" specifies that other fields in the raster's attribute table will be ignored]
    #Before using the ExtractValuesToPoints tool, delete its output from the previous iteration. This is important to prevent file proliferation and script slowdown. If this is the first iteration, there will be no output at this path to delete; use an if-then statement and the above-defined boolean to deal with this. If this is the first iteration, set "edgeLoopFirstIteration" to False (note that this was not done when dealing with edge criterion 1, so that the if condition here would work).
    if edgeLoopFirstIteration == False:
        arcpy.Delete_management("currentHubEdgeCriterion2Layer")
        arcpy.Delete_management(edgeCriterion2ShpPath)
    else:
        edgeLoopFirstIteration = False
    arcpy.sa.ExtractValuesToPoints(lakeLevelHubs, hubEdgeCriterion2PathDistanceOutput, edgeCriterion2ShpPath, "NONE", "VALUE_ONLY")
    #Second, create a python list that contains only the travel hubs with a value other than "-9999" for the attribute that was just added by the ExtractValuesToPoints tool. In other words, select only the travel hubs that were under the maximum travel time set by the maximum cost parameter in the PathDistance tool above.
    #To make this python list, first make a feature layer from the
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    shapefile that was just created by the ExtractValuesToPoints tool. This is done so that the SelectLayerByAttribute tool can be used.
    #MakeFeatureLayer parameters: input feature class; output feature layer; SQL where clause [not used here]; input workspace [not used here]; field info [not used here]
    arcpy.MakeFeatureLayer_management(edgeCriterion2ShpPath, "currentHubEdgeCriterion2Layer")
    #Defining which hubs qualify for an edge according to edge criterion 2 is still incomplete, but at this point we want to begin considering both criteria jointly. We will continue to work with the layer that was made for edge criterion 2; we will not use the layer made for edge criterion 1 at all, but instead will use the python list that was created for edge criterion 1. This criterion 1 python list will allow us to restrict the results of SQL queries on the edge criterion 2 layer.

    #EDGE CRITERIA 1 AND 2-----------------------------
    #Now that a feature layer has been made, select only those sites which have a value other than "-9999" in the field that was added by the most recent use of the ExtractValuesToPoints tool. Furthermore, we want to only select sites that also satisfy edge criterion 1. Therefore, also add SQL to select only those sites with a "comp" field that matches one of the sites that previously satisfied edge criterion 1.
    #The SQL query will differ depending on whether the "comp" list (created for edge criterion 1) has only 1 or more than 1 item. Therefore, use two if-then statements here. If no sites satisfied edge criterion 1 (i.e., there is a 0-length "comp" list), then we simply won't do anything here.
    #SelectLayerByAttribute parameters: input feature layer; selection type; SQL where clause
    if len(edgeCriterion1CompList) > 1:
        #The use of tuple() here is just to change the square-brackets used in a list to the parentheses used in a tuple.
        arcpy.SelectLayerByAttribute_management("
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    ↪currentHubEdgeCriterion2Layer","NEW_SELECTION","\"RASTERVALU\"
    ↪<> -9999 AND \"comp\" IN " + str(tuple(edgeCriterion1CompList))
    ↪)
#The SQL syntax created by the above line will be incorrect if the
↪list only contains one item: it will be in the form ('abc',).
↪Therefore, use the below line instead when the list only has one
↪item.
if len(edgeCriterion1CompList) == 1:
    arcpy.SelectLayerByAttribute_management("
    ↪currentHubEdgeCriterion2Layer","NEW_SELECTION","\"RASTERVALU\"
    ↪<> -9999 AND \"comp\" IN (\'" + edgeCriterion1CompList[0] + "
    ↪\')")

#REDUCE SELECTION BY CHRONOLOGY----------
#The dating of the sites has not yet been considered. The networks
↪thus far have been defined by A) lake level (where the lake
↪completely blocks travel) and B) travel potential and travel costs
↪ (where sites were defined as nodes if they were close to "best
↪routes", and edges were defined if travel between a pair of nodes
↪had certain characteristics). Because the file sizes for the
↪adjacency lists and especially the edge lists will be unreasonably
↪ large otherwise, edges must now be retained only if they are
↪between two components from the same time span (time spans are
↪defined below). THIS ISN'T A FULL CONSIDERATION OF CHRONOLOGY,
↪HOWEVER, BECAUSE ALL OF THE ADJACENCY LISTS AND EDGE LISTS WILL
↪HAVE NODES FROM ALL TIME SPANS. THE *EDGES* WILL BE
↪CHRONOLOGICALLY CORRECT, BUT THE *NODES'* INCLUSION IN THE
↪ADJACENCY AND EDGE LISTS IS BASED ON LAKE LEVEL RATHER THAN
↪CHRONOLOGY. THE NODES' CHRONOLOGY WILL BE DEALT WITH IN THE SCRIPT
↪ "4_NetworkCreationPart2.py".
#Define the time spans that will be used. The starting/ending years
↪are chosen to match points of lake level change, and therefore the
↪ time spans generally subdivide cultural phases. Exceptions to
↪this use of lake levels to define the start/end dates are the
↪start/end dates for the Tiwanaku period and the end date for Inca
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period, which are cultural changes that have the same lake level before and after the change.
#THIS MUST MATCH THE LIST WITH THE SAME NAME IN "4_NetworkCreationPart2.py"; WHILE IT WOULD BE MORE ELEGANT TO PICKLE THE LIST FROM ONE SCRIPT TO THE NEXT, I PREFER TO SIMPLY REPLICATE THIS LIST SO I CAN USE DIFFERENT VERSIONS OF PYTHON FOR THE TWO SCRIPTS WITHOUT WORRYING ABOUT COMPATIBILITY.
timeSpanList = ["1500BC-1100BC", "1100BC-850BC","850BC-450BC","450BC-250BC","250BC-0BC","0BC-250AD","250AD-600AD","600AD-1000AD","1000AD-1150AD","1150AD-1450AD","1450AD-1540AD","1540AD-1600AD"]
#Associate the time spans with the appropriate survey-specific phases. Use a python dictionary for this.
#Mapping the phases to the lake levels is complicated; this is a rough draft of such a mapping. This mapping often takes all sites dated to a broader cultural phase and associates ALL of them with a narrower time span defined by lake level. This amplifies a problem that exists even before subdividing the cultural phases into lake level time spans, the problem of having "overestimated maps" (sensu Ammerman 1981: 77).
#THIS MUST MATCH THE DICTIONARY WITH THE SAME NAME IN "4_NetworkCreationPart2.py"; WHILE IT WOULD BE MORE ELEGANT TO PICKLE THE DICTIONARY FROM ONE SCRIPT TO THE NEXT, I PREFER TO SIMPLY REPLICATE THIS DICTIONARY SO I CAN USE DIFFERENT VERSIONS OF PYTHON FOR THE TWO SCRIPTS WITHOUT WORRYING ABOUT COMPATIBILITY.
timeSpanPhasingDict = {timeSpanList[0] : ["pk-a","is-b","jp-a","tr-a","hp-a","qt-a","gp-a"], timeSpanList[1] : ["pk-a","is-b","jp-a","tr-b","hp-a","qt-a","kt-a", "gp-b"], timeSpanList[2] : ["pk-b","is-c","jp-b","tr-c","hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"], timeSpanList[3] : ["pk-b","is-c","jp-b","tr-c","hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"], timeSpanList[4] : ["pk-c","is-d","jp-c","tr-d","hp-c","qt-a","kt-b","tm-b","tl-b", "gp-c"], timeSpanList[5] : ["pk-c","is-d","jp-c","tr-d","hp-c","hp-d","qt-a","kt-b","tm-b","tl-b", "gp-c"], timeSpanList[6] : ["is-d","jp-c","tr-e","hp-c","hp-d","qt-a","kt-b","tm-c","tl-c", "gp-c"], timeSpanList[7] : [
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"is-e","jp-d","tr-f","hp-e","hp-f","hp-g","qt-b","kt-c","tm-d","tm-e","tl-d","tl-e", "gp-d"], timeSpanList[8] : ["pk-d","is-f","jp-e","tr-g","hp-h","qt-c","kt-d","tm-f","tl-f","gp-e"], timeSpanList[9] : ["pk-d","is-f","jp-e","tr-g","hp-h","hp-i","hp-j","qt-c","kt-d","tm-f","tl-f", "gp-e"], timeSpanList[10] : ["pk-e","is-g","jp-f","tr-h","hp-k","hp-l","qt-d","kt-e","tm-g","tl-g", "gp-f"], timeSpanList[11] : ["jp-g","tr-i","hp-m","qt-e","kt-f","kt-g","tm-h","tl-h"]}

    #Get the current source hub's "comp" value.
    currentHubCompValue = [row.comp.encode('utf-8') for row in arcpy.SearchCursor("hubsLayer")]
    #Create a string from this list. The list's enclosing square brackets need to be removed from the string, so .join() is used instead of str().
    currentHubCompValue = "".join(currentHubCompValue)
    #Get the slice of the string that refers to the survey to which the hub belongs (the first two characters).
    currentHubSurvey = currentHubCompValue[:2]
    #Get the slice of the string that refers to the phase to which the hub belongs (the last character). Remember that this phase code is survey-specific.
    currentHubPhase = currentHubCompValue[-1:]
    #Concatenate the survey and phase codes. Insert a dash between them.
    currentHubSurveyAndPhase = currentHubSurvey + "-" + currentHubPhase
    #Loop through the dictionary which associates survey-specific phases to time spans. If the current source hub's survey-phase code is present in a list within the dictionary, add all of the other phases in that list to a list named "contemporaryList". Remember that a survey-specific phase can be in multiple time spans.
    contemporaryList = []
    for timeSpanKey in timeSpanPhasingDict:
        if currentHubSurveyAndPhase in timeSpanPhasingDict[timeSpanKey]:
            contemporaryList += timeSpanPhasingDict[timeSpanKey]
    #Use SelectLayerByAttribute()'s "SUBSET_SELECTION" to narrow the
```

```
selection made above to only those components which are in time spans which the current source hub is also in.
#ESRI documentation for 10.2+ says that || is the SQL string concatenation operator, whereas 10.1- says it is CONCAT(). Although I am using 10.3, I had trouble getting || to work, so I have used CONCAT().
arcpy.SelectLayerByAttribute_management("currentHubEdgeCriterion2Layer", "SUBSET_SELECTION", "CONCAT(CONCAT(SUBSTRING(\"comp\" FROM 1 FOR 2), '-'), SUBSTRING(\"comp\" FROM 12 FOR 1)) IN " + str(tuple(contemporaryList)))

#FINAL EDGE CRITERIA 1 AND 2 WORK--------
#Create a python list that contains the unique IDs (from the "comp" field) of the points that were just selected by the SelectLayerByAttribute tool.
#This line first creates a SearchCursor for the current hub's criterion 2 layer, and then uses a For loop to iterate through the SearchCursor and get the value of the "comp" field for each row.
#The list items from the SearchCursor will be unicode strings; encode these strings (convert them from unicode strings to byte strings) so that when they are print()ed they won't have a "u" prefix.
edgeCriteria1And2CompList = [row.comp.encode('utf-8') for row in arcpy.SearchCursor("currentHubEdgeCriterion2Layer")]
#Create a string from this list. The list's enclosing square brackets, the commas separating the list items, and the quotation marks around each list item also need to be removed from the string, so .join() is used instead of str(). join() is used here to create a string where each list item is simply separated by a space. Although this is the end of what will be a line in the .txt file, no newline character should be put here; below, print(,sep= "\n") will be used when printing to the .txt file.
edgeCriteria1And2CompList = " ".join(edgeCriteria1And2CompList)
#Associate the "comp" value of the current hub with the "comp" values of the current hub's neighbors. Concatenate the two strings
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.
currentHubAdjacencyList = currentHubCompValue + " " + edgeCriteria1And2CompList
#Use the string that was just created to extend the overall network adjacency list for this lake level. lakeLevelAdjacencyList is a python list. Be sure to put the string to be added within a list, so that it isn't exploded into individual characters.
lakeLevelAdjacencyList += [currentHubAdjacencyList]

#EDGE LIST WITH TRAVEL TIMES-----------------------
#The application of edge criteria 1 and 2 is now finished, but this work has additionally produced data which will be useful for another edge criterion in the subsequent script ("4_NetworkCreationPart2.py"). Save the specific travel times from the current hub to each of the other hubs which have satisfied edge criteria 1 and 2, so that this data can be used in the subsequent script. Use CSV format so that this data can be easily read into a python dictionary in the subsequent script.
#Create an edge list for the current source hub, with an additional column for travel time between the source hub and the target hub. Combine the current hub's ID, as retrieved above, with the IDs for each of the target hubs and the travel time to each target hub. Each string within the list produced here will be a line in the .txt file, but newline characters should not be inserted here; print(,sep = "\n") will be used below when writing to the text file.
#Create an empty list to be filled in the below SearchCursor.
currentEdgeListWithTimes = []
#Use a SearchCursor on the layer from the above work on edge criterion 1, since this layer has the travel times (edge criterion 2, in contrast, made travel over the "best routes" take 0 time).
with arcpy.da.SearchCursor("currentHubEdgeCriterion1Layer", ("comp", "RASTERVALU")) as timeCursor:
    for row in timeCursor:
        #This layer has all components which satisfy edge criterion 1
```

```
                selected. To ensure that only components which also satisfy edge criterion 2 are used in constructing the edge list, test to see if this row's "comp" value is present in the list of components which satisfy both criteria 1 and 2. Remember that this list has been converted to a string; when "in" is used to search a string, True will be returned if the former string is a substring of the latter string.
                if row[0].encode('utf-8') in edgeCriteria1And2CompList:
                    #Create a string with the current source hub, this row's target hub, and the travel time to the target hub. Then put this string into a list and use it to extend the list which will have all of target hubs for the current source hub.
                    currentEdgeListWithTimes += [currentHubCompValue + "," + row[0].encode('utf-8') + "," + str(row[1])]
        #Extend the list that has the previous source hubs' strings, with this source hub's list of strings.
        lakeLevelEdgeListCrit1WithTimes += currentEdgeListWithTimes


    #Now that the loop through the travel hubs has finished, write the finished adjacency list for this lake level to a text file.
    #TAKE CARE WITH THIS -- IT WILL OVERWRITE ANY FILE ALREADY AT THIS PATH.
    try:
        lakeLevelAdjacencyListFile = open(AdjacencyListFilePath, "w")
        #Use * to unpack the list, and then use sep="\n" to separate the unpacked items with a newline character.
        print(*lakeLevelAdjacencyList, file = lakeLevelAdjacencyListFile, sep = "\n")
    except IOError as AdjListWriteError:
        print("IOError: " + str(AdjListWriteError))
    finally:
        lakeLevelAdjacencyListFile.close()

```

```
    #Likewise, write the finished criterion 1 edge list with travel times for this lake level to a text file.
    #TAKE CARE WITH THIS -- IT WILL OVERWRITE ANY FILE ALREADY AT THIS PATH.
    try:
        lakeLevelEdgeListFile = open(EdgeListCrit1WithTimesFilePath, "w")
        print(*lakeLevelEdgeListCrit1WithTimes, file=lakeLevelEdgeListFile, sep = "\n")
    except IOError as EdgeListWriteError:
        print("IOError: " + str(EdgeListWriteError))
    finally:
        lakeLevelEdgeListFile.close()

    #Likewise, write the finished performance log for this lake level to a text file.
    #TAKE CARE WITH THIS -- IT WILL OVERWRITE ANY FILE ALREADY AT THIS PATH.
    try:
        perfLogFile = open(timeTestFilePath, "w")
        print(*perfTimeLog, file=perfLogFile, sep = "\n")
    except IOError as perfLogWriteError:
        print("IOError: " + str(perfLogWriteError))
    finally:
        perfLogFile.close()
    #-----------------------------------------------------------------

    #Section 5: Travel times to hubs from nearest "best routes"----------
    #For reasons explained in "4_NetworkCreationPart2.py", it is necessary to have data on the travel time between each hub and its nearest "best route". Gather that data here.
    #This can be done using rasters created in "2_CreateHubs.py", by arcpy.sa.PathDistance() with the "best routes" as the source cells. Use the ExtractValuesToPoints() tool to assign each hub an attribute for how far it is from its closest "best routes" cell. Note that technically the travel time being measured is to the center of the raster cell
```

```
that the site is on, rather than the site point itself; therefore, with a low resolution raster the results may not be as desired. A HUB ON A NODATA RASTER CELL (IN THE MODELED LAKE) WILL HAVE A VALUE OF -9999 ASSIGNED TO IT.
#ExtractValuesToPoints parameters: input point features [provides location data]; input raster [provides value data]; output point feature class [contains points with values derived from the raster]; interpolation option ["NONE" specifies that the cell center's value will be used, rather than deriving the value from surrounding cells]; add attributes option ["VALUE_ONLY" specifies that other fields in the raster's attribute table will be ignored]
arcpy.sa.ExtractValuesToPoints(lakeLevelHubs, majorRoutesCostRaster, travTimeExtractedPath, "NONE", "VALUE_ONLY")
#Create a list in which each item is a string which has the hub's "comp" value, a comma, and then its travel time from its nearest "best routes" cell. Each list item string will eventually be a line in a CSV file, but don't add a newline character here because print(sep = "\n") will be used.
travTimeList = [row[0].encode('utf-8') + "," + str(row[1]) for row in arcpy.da.SearchCursor(travTimeExtractedPath, ("comp", "RASTERVALU"))]
travTimeListHeaders = ["comp,travTime"]
travTimeList = travTimeListHeaders + travTimeList
#Write this list of nearest-best-route-to-hub-travel-times for this lake level to a text file.
#TAKE CARE WITH THIS -- IT WILL OVERWRITE ANY FILE ALREADY AT THIS PATH.
try:
    lakeLevelRouteToHubFile = open(nearestRouteTravelTimeFilePath, "w")
    print(*travTimeList, file = lakeLevelRouteToHubFile, sep = "\n")
except IOError as travListWriteError:
    print("IOError: " + str(travListWriteError))
finally:
    lakeLevelRouteToHubFile.close()
#----------------------------------------------------------------

```

```
#Section 6: Run function for network creation part 1---------------------
#When running a script that uses multiprocessing from PythonWin IDE, the python .exe will not by default be correct. Specify where to find the python executable.
multiprocessing.set_executable("C:\Python27\ArcGIS10.3\pythonw.exe")

#Define the multiprocessing function that will call the networkCreationPart1 function.
def mainFunction():
    #Create a python list that contains the desired bathymetric contours' depths (from the "Elevation" field of the bathymetry shapefile). Thus, here we are modeling the lake at modern level, 5 meters below modern, and 15 meters below modern.
    #THE LIST ITEMS NEED TO BE STRINGS rather than integers, because the networkCreationPart1 function assumes they are strings (does not cast them to strings).
    lakeLevelsList = ["0","5","15"]
    #Set up multiprocessing.
    #Create a pool of worker processes.
    pool = multiprocessing.Pool()
    #Have each worker process run the networkCreationPart1 function for one of the lake levels.
    pool.map(networkCreationPart1, lakeLevelsList)
    #Clean up the multiprocessing using .close() and .join().
    pool.close()
    pool.join()
    #Check in spatial analyst license.
    arcpy.CheckInExtension("Spatial")

#Run this script. mainFunction() is called, which itself calls the core of this script, networkCreationPart1().
#This if-then statement is required when using python multiprocessing with Windows OS.
if __name__ == '__main__':
    mainFunction()
```

Listing E.7: 3point5_CSVtoPickle_EXPERIMENTAL.py

```
#-----------------------------------------------------------------------
#CREATE PICKLED DICTIONARIES FROM THE CSV FILES CREATED BY THE PREVIOUS SCRIPT ("3_NetworkCreationPart1.py").
#It might make more sense for the previous script to directly create pickles rather than CSV files. However, for the moment I would like to retain the previous script as is (making CSV files rather than pickles), to allow greater flexibility with what is done with the output of the previous script. This would, for example, allow R to be used instead of Python. It also might avoid problems with using a pickle created by Python 2.x (ArcGIS's version) with Python 3.x (I don't know if this would actually present any problems, however).
#-----------------------------------------------------------------------

#Section 1: Get tools----------------------------------------------------
#Import the module for reading .csv files
import csv
#Import the module for pickling.
import pickle
#-----------------------------------------------------------------------

#Section 2: Define paths-------------------------------------------------
#Define the path where all input from the previous script ("3_NetworkCreationPart1.py") is and where all output of the current script will be stored.
#IT IS CRITICAL THAT THIS IS THE SAME PATH STORED IN THE VARIABLE "IOpath" IN "3_NetworkCreationPart1.py", SO THAT THE CORRECT INPUT IS USED.
IOpath = "C:/Real/SantaFe/LeastCostPaths/Working/finaloutput1/"

#Define the path for the output pickles. THIS WILL HAVE A LAKE LEVEL SUFFIX AND A FILE EXTENSION ADDED BELOW.
dictPicklePath = IOpath + "edgeDictPickle"
#-----------------------------------------------------------------------

#Section 3: Create pickled dictionaries from CSV files------------------
```

```
#Get the CSV-format edge lists with travel times from the previous script ("3_NetworkCreationPart1.py"). Convert these to python dictionaries.
#This will be used in section 5 of the subsequent script ("4_NetworkCreationPart2.py") to add weights to the graphs' edges in order to evaluate edge criterion 3 (see the subsequent script for what this criterion means). This method will suffice for now, but it would probably be simpler and more sensible to use such edge lists to make the initial graphs as weighted graphs from the very start, rather than using the adjacency lists to create the graphs and then using these edge lists to add weights to them.
#Loop through the lake levels. Each iteration will create 1 dictionary.
for lakeLevel in ["0","5","15"]:
    try:
        #Create a file object from the edge list CSV file for this lake level.
        edgeWeightsFile = open(IOpath + "EdgeListCrit1WithTimesLakeLevel" + lakeLevel + ".txt", "r")
        #Create a csv DictReader object from the file object. The default dialect formatting parameters should be ok for this file, so I haven't specified a dialect.
        edgeWeightsDictReader = csv.DictReader(edgeWeightsFile)
        #Create an empty dictionary, that will be filled in the loop below.
        edgeListDict = {}
        #Loop through the DictReader. In each iteration, the loop variable is a dictionary that holds one line of the CSV file.
        for row in edgeWeightsDictReader:
            #The key will be a tuple composed of the 2 nodes from this line of the CSV file.
            currentKey = (row['fromNode'], row['toNode'])
            #Create this key within the dictionary for this lake level, and associate it with the travel time value from this line of the CSV file.
            edgeListDict[currentKey] = row['time']
    except IOError as edgeWeightsReadError:
        print("IOError: " + str(edgeWeightsReadError))
```

```
    finally:
        edgeWeightsFile.close()

    #Pickle the dictionary created above.
    try:
        dictPickleFile = open(dictPicklePath + lakeLevel + ".p", "wb")
        pickle.dump(edgeListDict, dictPickleFile)
    except pickle.PicklingError as picError:
        print("PicklingError: " + str(picError))
    finally:
        dictPickleFile.close()
```

Listing E.8: 4_NetworkCreationPart2_EXPERIMENTAL.py

```
#------------------------------------------------------------------
#THIS SCRIPT FINISHES THE CONSTRUCTION OF NETWORKS FROM THE HUBS DEFINED IN THE SCRIPT "2_CreateHubs.py". IT DOES ANY TASKS IN THE NETWORK CONSTRUCTION WHICH DO NOT REQUIRE ARCGIS; ANY TASKS IN THE NETWORK CONSTRUCTION WHICH DO REQUIRE ARCGIS HAVE ALREADY BEEN PERFORMED IN THE PREVIOUS SCRIPT ("3_NetworkCreationPart1.py").
#The output of this script is a series of networkx graph objects, one for each time span in a series of time spans. These graph objects will be pickled for use in the subsequent network analysis script.
#Depending on this and previous scripts' parameters, the memory (RAM) required for this script can be quite large. Consider increasing the page file (virtual memory/swap). While increasing the page file to a sufficient size should guarantee that the script will eventually complete (as long as 64-bit Python is used), it may take a very unrealistic amount of time if the computer does not have sufficient physical memory (RAM).
#------------------------------------------------------------------

#------------------------------------------------------------------
#FUTURE WORK:
#Consider creating a second set of graphs which take the graphs already
```

```
created here and add all of the other (non-hub) components. Then, in the subsequent script, run the analyses separately for each type of graph (hubs only versus all components). There are two basic ways to create "local" edges: 1) associate the added components with their nearest hub, 2) associate the added components with hubs within a certain travel time. The first should be much easier since it won't require going back to ArcGIS; the UTM attributes would suffice, although this won't account for the lake or topography. Which of the two is more anthropologically appropriate is debateable. Potential conditions: a) edge must be between a transport hub defined above and a non-transport hub b) the 2 sites must be separated by no more than X time (maybe switch to Tobler function here?) or X distance --- to define X time or distance, I would need to get some sense of how far people move for this type (what type?) of interaction -- there are strong analogies here to catchment analysis (what is the max travel time that would allow travel, "extraction" of resources e.g. trade, and return back home?)
#Section 6 deals with the major potential issue with multi-sector sites (edges between the sectors), but it would be even better to aggregate the sectors, so that, e.g., comparison of component size to centrality would be better.
#When assigning edge weights, anisotropy is an issue when subtracting the travel-time-from-nearest-best-route from the travel time between two nodes. My current hack is to multiply the subtracted amounts by 1.02 (setting travTimeRoundParam to 1 also helps), but a better fix would actually account for the anisotropy.
#networkx is pure python, whereas some other python network modules are in C. Using one of these other modules would likely speed this and the subsequent script up dramatically.
#-----------------------------------------------------------------

#Section 1: Get tools----------------------------------------------
#Import a network analysis module.
import networkx
#Import the module for reading .csv files
import csv
```

```
#Import the multiprocessing module.
import multiprocessing
#Import the pickle module, which will be used to retrieve the previous script's output.
import pickle
#-------------------------------------------------------------------

#Section 2: Set parameters-----------------------------------------
#This parameter is used to affect how strictly edge criterion 3 is applied. This is the number of decimal digits to round to when rounding the travel times before adding them as edge weights. For example, if it is desired to keep both paths when two paths have a closely similar travel time for a pair of nodes, set this parameter to a low amount. On another note, this rounding should also prevent any Arcpy floating point precision problems, although the output from "3_NetworkCreationPart1.py" seems to not have any such problems (i.e., the data in the .txt files seem to have exactly the same travel times for identical point pairs).
travTimeRoundParam = 1
#Because some phases (especially post-Tiwanaku phases) have a large number of sites, some reasonable parameter settings in the previous scripts can cause this script to have an unrealistic run time for some time spans. This parameter in effect resets the "hoursFromHighTravPotenCellsParam" parameter in "2_CreateHubs.py", for ONLY the time spans which have unrealistic run times. This allows the desired value for "hoursFromHighTravPotenCellsParam" to be used when possible, and to be reduced when necessary. Like the original parameter, this parameter should be in hours. Also see "timeSpansToResetParam", below.
resetHoursFromHighTravPotenCellsParam = .05
#This parameter defines which time spans "resetHoursFromHighTravPotenCellsParam" will be applied to. This parameter is a list of strings which match the desired strings within "timeSpanList" below.
timeSpansToResetParam = ["1000AD-1150AD","1150AD-1450AD","1450AD-1540AD","1540AD-1600AD"]
```

```python
#----------------------------------------------------------------------

#Section 3: Define paths (also see Section 4) and set up multiprocessing
#----------------------------------------------------------------------
#Define the path where all input from the previous script ("3point5_CSVtoPickle.py") is and where all output of the current script will be stored.
#IT IS CRITICAL THAT THIS IS THE SAME PATH STORED IN THE VARIABLE "IOpath" IN "3point5_CSVtoPickle.py", SO THAT THE CORRECT INPUT IS USED.
IOpath = "C:/Real/SantaFe/LeastCostPaths/Working/finaloutput1/"

#Specify where to find the python executable for the child processes.
multiprocessing.set_executable("C:\Python35\pythonw.exe")

#Define the function that will set up multiprocessing and will call the core of this script, the netCreation2() function (see below).
def mainFunction():
    #Define the time spans that will be used; one network graph will be created for each of these spans. The starting/ending years are chosen to match points of lake level change, and therefore the time spans generally subdivide cultural phases. Exceptions to this use of lake levels to define the start/end dates are the start/end dates for the Tiwanaku period and the end date for Inca period, which are cultural changes that have the same lake level before and after the change.
    #THIS MUST MATCH THE LIST WITH THE SAME NAME IN "3_NetworkCreationPart1.py"; WHILE IT WOULD BE MORE ELEGANT TO PICKLE THE LIST FROM ONE SCRIPT TO THE NEXT, I PREFER TO SIMPLY REPLICATE THIS LIST SO I CAN USE DIFFERENT VERSIONS OF PYTHON FOR THE TWO SCRIPTS WITHOUT WORRYING ABOUT COMPATIBILITY.
    timeSpanList = ["1500BC-1100BC", "1100BC-850BC","850BC-450BC","450BC-250BC","250BC-0BC","0BC-250AD","250AD-600AD","600AD-1000AD","1000AD-1150AD","1150AD-1450AD","1450AD-1540AD","1540AD-1600AD"]
    #Set up multiprocessing.
    #Create a pool of worker processes.
    pool = multiprocessing.Pool(processes = 1)
```

```
    #Have each worker process run the netCreation2 function for one of the time spans.
    for timeSpan in timeSpanList:
        #Because I am running this on Windows, the child processes don't inherit the parent's namespace. Instead, anything that needs to be passed into a child process needs to be an argument to the function being apply()ed.
        pool.apply_async(netCreation2, kwds = {'IOpath' : IOpath, 'timeSpan' : timeSpan, 'timeSpanList' : timeSpanList})
    #Clean up the multiprocessing using .close() and .join().
    pool.close()
    pool.join()
#------------------------------------------------------------------------

#Section 4: Begin definition of the core function, netCreation2(). Define paths and get data.
#------------------------------------------------------------------------
#This function will run in the child processes created by mainFunction(). This function's most important input parameter is "timeSpan", which will be different for each child process. The other function input parameters have the same values for all child processes, and simply serve to pass objects into each child process (since this is running on Windows -- see above).
def netCreation2(IOpath, timeSpan, timeSpanList):
    #Define the path for the final output of this child process.
    crit4PicklePath = IOpath + "crit4PassedGraph" + timeSpan + ".p"
    #The adjacency lists were created in the script "3_NetworkCreationPart1.py". One will be used for the initial construction of the graph for this time span. The adjacency list used must be for the lake level that corresponds to this child process's time span.
    #Networkx adjacency list format: using defaults, each line of the input file should have this format: the node being considered at the beginning of the line, followed by its neighbor nodes each separated by whitespace, and then a newline character to move on to the next node.
```

```python
#THIS PATH WILL HAVE A LAKE LEVEL SUFFIX AND A FILE EXTENSION ADDED BELOW.
AdjacencyListFilePath = IOpath + "AdjacencyListLakeLevel"

#Create a python dictionary that holds all of the Titicaca component data (this will be used to create attributes for the nodes).
#First create a dictionary for the survey data (as opposed to the inter-survey data).
try:
    #Create a file object from the surveys .csv file.
    titicacaSurveysFile = open("C:/Real/SantaFe/LeastCostPaths/Data/titicaca_surveys_python_LAST_SFI_VERSION_NO_SPACES_NO_BLANKS.csv", "r")
    #Create a csv DictReader object from the file object.
    titicacaSurveysDictReader = csv.DictReader(titicacaSurveysFile, dialect='excel')
    #Create an empty dictionary that will be filled in the loop below.
    titicacaSurveysDictionary = {}
    #Loop through the DictReader. In each iteration, the loop variable is a dictionary that holds one line of the .csv file.
    #This loop will ultimately create a nested dictionary, in which the keys are from the .csv file's "comp" field and the values are dictionaries which each hold an entire line of the .csv file. The values in the inner dictionaries are strings.
    for row in titicacaSurveysDictReader:
        #Create a dictionary key from the "comp" field of the current line of the .csv file. Associate the whole current line of the .csv file (which is in the form of a dictionary) with this new key.
        titicacaSurveysDictionary[row['comp']] = row
except IOError as titicacaDataReadError:
    print("IOError: " + str(titicacaDataReadError))
finally:
    titicacaSurveysFile.close()
#Do the same (create a dictionary) for the inter-survey .csv file.
```

```
try:
    titicacaGapsFile = open("C:/Real/SantaFe/LeastCostPaths/Data/Gaps_python_UNFINISHED_10JAN16_NO_BLANKS_NO_SPACES.csv", "r")
    titicacaGapsDictReader = csv.DictReader(titicacaGapsFile, dialect='excel')
    titicacaGapsDictionary = {}
    for row in titicacaGapsDictReader:
        titicacaGapsDictionary[row['comp']] = row
except IOError as titicacaDataReadError:
    print("IOError: " + str(titicacaDataReadError))
finally:
    titicacaGapsFile.close()
#Now combine the survey dictionary with the inter-survey dictionary.
titicacaCombinedDictionary = titicacaSurveysDictionary.copy()
titicacaCombinedDictionary.update(titicacaGapsDictionary)

#Get the edge-list-with-travel-times pickled dictionary which corresponds to this time span's lake level. This pickle was created in "3point5_CSVtoPickle.py".
#Associate the time spans with their respective lake levels. Use a python dictionary for this.
timeSpanLakeLevelDict = {timeSpanList[0] : 5, timeSpanList[1] : 15, timeSpanList[2] : 0, timeSpanList[3] : 15, timeSpanList[4] : 0, timeSpanList[5] : 15, timeSpanList[6] : 0, timeSpanList[7] : 0, timeSpanList[8] : 0, timeSpanList[9] : 15, timeSpanList[10] : 0, timeSpanList[11] : 0}
#Unpickle the dictionary for this lake level.
try:
    dictPickleFile = open(IOpath + "edgeDictPickle" + str(timeSpanLakeLevelDict[timeSpan]) + ".p", "rb")
    edgeListDict = pickle.load(dictPickleFile)
except pickle.UnpicklingError as picError:
    print("UnpicklingError: " + str(picError))
finally:
    dictPickleFile.close()
```

```
    #Get the nearest-best-route-to-hub-travel-time list, for the lake level which corresponds to this time span. Create a dictionary keyed to "comp" values and associate each key with that hub's travel time from its nearest "best route".
    try:
        rtesToHubsFile = open(IOpath + "nearestRouteTravelTimesLakeLevel" + str(timeSpanLakeLevelDict[timeSpan]) + ".txt", "r")
        rtesToHubsDictReader = csv.DictReader(rtesToHubsFile)
        rtesToHubsDict = {}
        for row in rtesToHubsDictReader:
            currentKey = row['comp']
            rtesToHubsDict[currentKey] = row['travTime']
    except IOError as rtesToHubsReadError:
        print("IOError: " + str(rtesToHubsReadError))
    finally:
        rtesToHubsFile.close()
    #-----------------------------------------------------------------

    #Section 5: Create chronologically correct networks-----------------
    #Previously in "3_NetworkCreationPart1.py", edges were retained only if they were between two components from the same time span, but all of the adjacency lists and edge lists had nodes from all time spans. The EDGES were chronologically correct, but the NODES' inclusion in the adjacency and edge lists was based on lake level rather than chronology. Now, a separate network will be created for each time span, and each network will have only those nodes which have an archaeological component from that time span.
    #See mainFunction(), above, for notes regarding the list referenced below.
    #Associate the time spans with the appropriate survey-specific phases. Use a python dictionary for this.
    #Mapping the phases to the lake levels is complicated; this is a rough draft of such a mapping. This mapping often takes all sites dated to a broader cultural phase and associates ALL of them with a narrower
```

```
time span defined by lake level. This amplifies a problem that exists even before subdividing the cultural phases into lake level time spans, the problem of having "overestimated maps" (sensu Ammerman 1981: 77).
#THIS MUST MATCH THE DICTIONARY WITH THE SAME NAME IN "3_NetworkCreationPart1.py"; WHILE IT WOULD BE MORE ELEGANT TO PICKLE THE DICTIONARY FROM ONE SCRIPT TO THE NEXT, I PREFER TO SIMPLY REPLICATE THIS DICTIONARY SO I CAN USE DIFFERENT VERSIONS OF PYTHON FOR THE TWO SCRIPTS WITHOUT WORRYING ABOUT COMPATIBILITY.
timeSpanPhasingDict = {timeSpanList[0] : ["pk-a","is-b","jp-a","tr-a","hp-a","qt-a","gp-a"], timeSpanList[1] : ["pk-a","is-b","jp-a","tr-b","hp-a","qt-a","kt-a", "gp-b"], timeSpanList[2] : ["pk-b","is-c","jp-b","tr-c","hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"], timeSpanList[3] : ["pk-b","is-c","jp-b","tr-c","hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"], timeSpanList[4] : ["pk-c","is-d","jp-c","tr-d","hp-c","qt-a","kt-b","tm-b","tl-b", "gp-c"], timeSpanList[5] : ["pk-c","is-d","jp-c","tr-d","hp-c","hp-d","qt-a","kt-b","tm-b","tl-b", "gp-c"], timeSpanList[6] : ["is-d","jp-c","tr-e","hp-c","hp-d","qt-a","kt-b","tm-c","tl-c", "gp-c"], timeSpanList[7] : ["is-e","jp-d","tr-f","hp-e","hp-f","hp-g","qt-b","kt-c","tm-d","tm-e","tl-d","tl-e", "gp-d"], timeSpanList[8] : ["pk-d","is-f","jp-e","tr-g","hp-h","qt-c","kt-d","tm-f","tl-f","gp-e"], timeSpanList[9] : ["pk-d","is-f","jp-e","tr-g","hp-h","hp-i","hp-j","qt-c","kt-d","tm-f","tl-f", "gp-e"], timeSpanList[10] : ["pk-e","is-g","jp-f","tr-h","hp-k","hp-l","qt-d","kt-e","tm-g","tl-g", "gp-f"], timeSpanList[11] : ["jp-g","tr-i","hp-m","qt-e","kt-f","kt-g","tm-h","tl-h"]}

#Create a network object from an adjacency list made by the previous script ("3_NetworkCreationPart1.py").
lakeLevelGraph = networkx.read_adjlist(AdjacencyListFilePath + str(timeSpanLakeLevelDict[timeSpan]) + ".txt")
#Select the subset of the nodes that corresponds to this child process's time span. In other words, we will delete the nodes (and corresponding edges) that do not belong to this time span.
#Loop through the nodes. .nodes() produces a list of the nodes, and in
```

```
    ↪ this graph the nodes are strings.
    for currentNode in lakeLevelGraph.nodes():
        #Get the slice of the string that refers to the survey to which the node belongs (the first two characters).
        currentNodeSurvey = currentNode[:2]
        #Get the slice of the string that refers to the phase to which the node belongs (the last character). Remember that this phase code is survey-specific.
        currentNodePhase = currentNode[-1:]
        #Concatenate the survey and phase codes. Insert a dash between them.
        currentNodeSurveyAndPhase = currentNodeSurvey + "-" + currentNodePhase
        #Get a list of the (survey-specific) phases that correspond to the child process's time span.
        currentTimeSpanPhaseList = timeSpanPhasingDict[timeSpan]
        #Test whether the current node is from a phase that corresponds to the current time span.
        if not currentNodeSurveyAndPhase in currentTimeSpanPhaseList:
            #If it is not, delete the node from the current graph.
            lakeLevelGraph.remove_node(currentNode)

    #Remove edges which connect a node to itself (self loops). This is important for the evaluation of criterion 3 below. For related issues regarding 1) components from multiple phases within the same time span, and 2) multiple sector sites, see below.
    lakeLevelGraph.remove_edges_from(lakeLevelGraph.selfloop_edges())

    #The graph for the child process's time span is now chronologically correct (i.e., it only has nodes that correspond to the child process's time span). If this time span is one of those listed in "timeSpansToResetParam" above, then apply "resetHoursFromHighTravPotenCellsParam" to it. This is done to reduce the script's run time for time spans with large numbers of sites.
    if timeSpan in timeSpansToResetParam:
        for currentNode in lakeLevelGraph.nodes():
```

```
        travTimeFromNearestRte = float(rtesToHubsDict.get(currentNode))
        if travTimeFromNearestRte > resetHoursFromHighTravPotenCellsParam:
            lakeLevelGraph.remove_node(currentNode)
#-----------------------------------------------------------------

#Section 6: Edge (Path) Criteria 3 and 4------------------------------
#This section selects edges from the graphs made above in section 5, those edges which conform with edge criterion 3 and 4 (criteria 1 and 2 were already dealt with in the script "3_NetworkCreationPart1.py").
#These criteria might better be termed "path criteria" because they consider paths (i.e., sequences of edges) rather than just single edges, but I will use "edge criteria" so that it is clear that these conditions form a set with edge criteria 1 and 2.
#Edge criterion 3 is that only those paths (i.e., sequences of edges) which correspond to the shortest travel time between two nodes should be retained. For example, a path that travels along 3/4 of Lake Titicaca's lakeshore, counterclockwise, to connect 2 nodes, will not be selected when there is a different path that travels along 1/4 of the lakeshore, clockwise. This information can't be derived from the graph itself: it relies on the DEM-derived travel times computed between each pair of nodes that satisfied edge criterion 1 in the previous script ("3_NetworkCreationPart1.py"). Edge criterion 3 is useful for 2 reasons: 1) it is a reasonable criterion in of itself, 2) once applied, it makes criterion 4 a reasonable criterion, whereas criterion 4 would not be a reasonable criterion previously. Criterion 4 will be that, of the paths which remain after criterion 3, only the longest path (i.e., that with the largest number of edges) should be retained. This models "choke points," but would not work prior to the application of criterion 3, since a much longer travel time would also typically result in a path with a higher number of edges.
#For a particular pair of nodes, a path that satisfies criteria 3 and 4 can be selected, but paths which fail the criteria can't necessarily
```

```
be deleted. This is because a path might not satisfy edge criteria 3 and 4 for a particular pair of nodes, yet parts of that path might satisfy edge criteria 3 and 4 for other pairs of nodes. For example, a path that travels along 3/4 of Lake Titicaca's lakeshore, counterclockwise, to connnect 2 particular nodes, does not satisfy edge criteria 3 and 4 when there is a different path that travels along 1/4 of the lakeshore, clockwise, to connect the same pair of nodes; however, parts of the counterclockwise 3/4 path might nevertheless satisfy edge criteria 3 and 4 for other pairs of nodes. Therefore, the fact that this path does not satisfy criteria 3 and 4 for a particular pair of nodes tells us nothing about whether any of its edges can be deleted from the graphs made above, but if the edges do satisfy the criteria for SOME pair of nodes they can be selected and put into a new graph, and if they do not satisfy the criteria for any pair they can be excluded and not put into a new graph. Thus, new graphs will be constructed from the selected edges, rather than deleting edges in the graphs which already exist.

#Loop through each graph's edges to perform two preliminary tasks.
#First, there are two issues similar to the removal of self-loops which was done above. First, when a time span has multiple phases from the same survey (e.g., Middle Tiwanaku Valley's Tiwanaku IV and Tiwanaku V are both in the time span 600AD-1000AD), then criterion 3 will connect the same site to itself (one component to another component from the same site) rather than to the closest other site. Second, if a site has multiple sectors belonging to the same time span, then criterion 3 will connect the sectors to eachother rather than to the closest other site. Prevent these two issues here by removing such edges.
#Second, add the travel times (computed in the previous script) to the graphs, as edge weights.
#Loop through the graph's edges.
for node1, node2, attr in lakeLevelGraph.edges(data = True):
    #First task: remove edges between components from the same site.
    #Test whether the two nodes are from the same site, by comparing
```

```
their first 7 characters. This is possible because the format used in the "comp" field is [survey code]-[site#].[sector#]-[phase code] (e.g., gp-0001.01-a).
if node1[0 : 7] == node2[0 : 7]:
    #Remove the edge.
    lakeLevelGraph.remove_edge(node1, node2)
#Only proceed to the second task if the edge wasn't deleted during the first task.
else:
    #Second task: add travel times as edge weights.
    #From the edge/time dictionary unpickled in section 4, get the travel time that corresponds to this edge in the networkx graph.
    #Since they were calculated by anisotropic methods, the travel times will generally be different for node1 --> node2 and node2 --> node1. While one option would be to model the network as a directed graph, here to keep things simple I will instead simply use the smaller of the two travel times.
    #In rare cases the edge/time dictionary will have a key for (node1, node2) but not (node2, node1), or vice-versa. This occurs when edge criterion 1 is only satisfied for one travel direction. Therefore, I will use the .get() method on the dictionary and specify a default of infinity; in other words, get the key's value but if the key does not exist then set the value (travel time) to infinity, causing the other direction's travel time to be chosen by min() below.
    travTime1 = edgeListDict.get((node1, node2), float('inf'))
    travTime2 = edgeListDict.get((node2, node1), float('inf'))
    #If Edge Criterion 3 were applied strictly, this would create a problem, because one or a few edges between a pair of nodes will usually have a shorter travel time than a series of many edges between the same pair of nodes, even if the paths are in essentially the same space, because a traveler has to move off the least cost path to go to each of the intermediate nodes. This is not the intent of Edge Criterion 3 (and in fact is
```

```
basically the opposite of Edge Criterion 4), and therefore, something must be done to prevent only "long" edges from being retained. This will be done by subtracting the travel-time-from-the-nearest-best-route for each of the 2 nodes from the travel time between each pair of nodes. In other words, the edge weights will be the travel time along the "best routes" between the 2 nodes, rather than the entire travel time between the 2 nodes.
        #Note that because of the anisotropy of both the travel times between nodes and the travel times between nodes and their nearest "best routes", my method here is not perfect: only 1 of the 2 from-nearest-best-route travel times being subtracted will be for the same travel direction as the travel time between the 2 nodes. The best solution would be to have data on travel time both from and to the nearest best route and to apply it here, but my temporary hack is to simply multiply the amount by 1.02. Since it is more problematic for these amounts to be slightly too small than for them to be slightly too large, this hack should work fairly well.
        subtractFromNearestRteNode1 = float(rtesToHubsDict.get(node1)) * 1.02
        subtractFromNearestRteNode2 = float(rtesToHubsDict.get(node2)) * 1.02
        #A hub in the modeled lake will have a value of -9999 for its travel time from nearest "best route". While the best solution is to ensure that sites aren't in the modeled lake, add extra protection here by changing negative values to 0.
        if subtractFromNearestRteNode1 < 0:
            subtractFromNearestRteNode1 = 0
        if subtractFromNearestRteNode2 < 0:
            subtractFromNearestRteNode2 = 0
        #In networkx graphs, edge weights are simply an attribute, so weights can be assigned/manipulated just like any other attribute.
        modifiedTravTime = round(min(float(travTime1), float(travTime2))
```

```
            - subtractFromNearestRteNode1 - subtractFromNearestRteNode2, travTimeRoundParam)
            #Although it isn't the intent of the above line, it is possible for "modifiedTravTime" to have a negative value (e.g., when 2 nodes are closer to eachother than they are to their nearest "best routes"). Negative edge weights prevent the use of some network algorithms, so change the edge weight derived above if it is negative or zero.
            if modifiedTravTime <= 0:
                modifiedTravTime = 0.01
            attr['weight'] = modifiedTravTime

    #Apply Criteria 3 and 4.
    #Now that the edges have been assigned weights, determine, for each pair of nodes, which paths through the graph have the shortest travel time (criterion 3). Once the paths have been narrowed to this set which satisfies criterion 3, determine which of the remaining paths also satisfy criterion 4.
    #Create a new, empty graph that will hold all edges which pass criteria 3 and 4. In the below loop, whenever it is determined that a path meets edge criteria 3 and 4, this path will be added to the new graph. For a discussion of why a new graph is added to rather than deleting edges from the old graph, see above.
    crit4PassedGraph = networkx.Graph()
    #Loop through all of the nodes in the old graph.
    for aNode in lakeLevelGraph.nodes():
        #Get the nodes which are connected to this node by a path of any length (in the old graph). node_connected_component() returns a python set.
        connectedNodes = networkx.node_connected_component(lakeLevelGraph, aNode)
        #Loop through these connected nodes, if there are any.
        if len(connectedNodes) > 0:
            for connectedNode in connectedNodes:
                #For this pair of nodes ("aNode" and "connectedNode"),
```

```
determine all of the shortest paths, using the travel time edge weights (in the old graph). all_shortest_paths() RETURNS A GENERATOR OF LISTS; IT IS IMPORTANT TO REMEMBER THAT THIS CAN ONLY BE ITERATED THROUGH ONCE.
    shortestTimePaths = networkx.all_shortest_paths(lakeLevelGraph, aNode, connectedNode, weight = 'weight')
    #Because the result of all_shortest_paths() needs to be used twice below, convert the generator into a list.
    shortestTimePathsList = list(shortestTimePaths)
    #Criterion 3 has now been applied: it has narrowed the paths to the set of paths with shortest travel time. From this set, Criterion 4 will select the path(s) which furthermore is the longest (i.e., that with the largest number of edges). This models "choke points," but would not work prior to the application of criterion 3, since a much longer travel time would also typically result in a path with a higher number of edges.
    #Note that Criterion 4 should NOT be evaluated on a new graph made from the edges which pass Criterion 3. This would typically re-introduce into consideration, for any given pair of nodes, paths whose parts satisfy Criterion 3 for OTHER pairs of nodes, but which do NOT satisfy Criterion 3 for the given pair of nodes. Instead, Criterion 4 must be applied to the specific paths which satisfy Criterion 3 for a specific PAIR of nodes.
    #Initialize a variable for the maximum length (in number of edges, not time) of the paths satisfying Criterion 3 for this pair of nodes.
    maxEdgeLength = 0
    #Loop through the paths which satisfied Criterion 3.
    for shortestTimePath in shortestTimePathsList:
        #Get the length of this list/path.
        edgeLength = len(shortestTimePath)
        #If it is longer than all previously examined paths, set "maxEdgeLength" to this length.
```

```
                    if edgeLength > maxEdgeLength:
                        maxEdgeLength = edgeLength
                #Now that the maximum length has been determined, add all Criterion-3-passing paths of this length to the graph which will store all edges which have passed Criteria 3 and 4.
                #Again, loop through all of the Criterion-3-passing paths.
                for shortestTimePath in shortestTimePathsList:
                    #Again, get the length of this list/path.
                    edgeLength = len(shortestTimePath)
                    #If this path's length is equal to the longest path length, add it to the new graph.
                    if edgeLength == maxEdgeLength:
                        crit4PassedGraph.add_path(shortestTimePath)
    #If "aNode" doesn't have any edges in the old graph, there is nothing to evaluate criterion 3 and 4 against, but this node should still be added to the new graph, without edges.
    else:
        crit4PassedGraph.add_node(aNode)
#-------------------------------------------------------------------

#Section 7: Add attributes to the nodes-------------------------------
#This section adds attributes from the original components .csv files to the nodes.
#Loop through this graph's nodes.
for aNode in crit4PassedGraph.nodes():
    #For each node, add an attribute called 'attributes' and for the value of this attribute give it the dictionary that holds all of the attributes from the corresponding line in the .csv file. In other words, rather than making many separate node attributes, make a single node attribute that holds a dictionary that holds many attributes. Thus each node's attributes will be a nested dictionary.
    crit4PassedGraph.node[aNode]['attributes'] = titicacaCombinedDictionary[aNode]
#-------------------------------------------------------------------
```

```

    #Section 8: Store the graph-----------------------------------------
    #Store the Criteria-3-and-4-passed graph in a python pickle. The normal pickling function (pickle.dump) can't be used for networkx graphs; networkx has its own pickle functions.
    networkx.write_gpickle(crit4PassedGraph, crit4PicklePath)
    #-------------------------------------------------------------------

#Section 9: Run the script---------------------------------------------
#Run this script. mainFunction() is called, which itself calls the core of this script, netCreation2().
#This if-then statement is required when using python multiprocessing with Windows OS.
if __name__ == '__main__':
    mainFunction()
```

Listing E.9: 5_NetworkAnalysis_EXPERIMENTAL.py

```
#----------------------------------------------------------------------
#THIS SCRIPT ANALYZES THE GRAPH OBJECTS CREATED IN THE PREVIOUS SCRIPT ("4_NetworkCreationPart2.py").
#The output of this script is a series of networkx graph objects, one for each time span in a series of time spans. These graph objects will be pickled for use in the subsequent network visualization script. The difference between the input and output graph objects is that the output graph objects will have additional attributes calculated during this script.
#----------------------------------------------------------------------

#Section 1: Get tools---------------------------------------------------
#Import a network analysis module.
import networkx
#Import the multiprocessing module.
import multiprocessing
#----------------------------------------------------------------------
```

```

#Section 2: Set up multiprocessing---------------------------------------
#Specify where to find the python executable for the child processes.
multiprocessing.set_executable("C:\Python35\pythonw.exe")

#Define the function that will set up multiprocessing and will call the core of this script, the netAnalyse() function (see below).
def mainFunction():

    #Define the path where all input is stored and where all output will be stored. This string will be used in constructing other strings for paths below.
    #IT IS CRITICAL THAT THIS IS THE SAME PATH STORED IN THE VARIABLE "IOpath" IN "4_NetworkCreationPart2.py", SO THAT THE CORRECT INPUT IS USED.
    IOpath = "C:/Real/SantaFe/LeastCostPaths/Working/finaloutput3/"

    #This list of time spans will be used to construct file paths for retrieving the output of the previous script. THIS LIST MUST BE THE SAME AS THE LIST WITH THE SAME NAME IN THE PREVIOUS SCRIPT.
    timeSpanList = ["1500BC-1100BC", "1100BC-850BC","850BC-450BC","450BC-250BC","250BC-0BC","0BC-250AD","250AD-600AD","600AD-1000AD","1000AD-1150AD","1150AD-1450AD","1450AD-1540AD","1540AD-1600AD"]

    #Set up multiprocessing.
    #Create a pool of worker processes.
    pool = multiprocessing.Pool(processes = 3)
    #Have each worker process run the netAnalyse() function for one of the time spans.
    for timeSpan in timeSpanList:
        #Because I am running this on Windows, the child processes don't inherit the entire global namespace. Instead, anything that needs to be passed into a child process needs to be an argument to the function being apply()ed.
        pool.apply_async(netAnalyse, kwds = {'IOpath' : IOpath, 'timeSpan' :
```

```
        timeSpan})
    #Clean up the multiprocessing using .close() and .join().
    pool.close()
    pool.join()
#-----------------------------------------------------------------------

#Section 3: Begin definition of the core function, netAnalyse(). Define paths and get data.
#-----------------------------------------------------------------------

def netAnalyse(IOpath, timeSpan):
    inputPicklePath = IOpath + "crit4PassedGraph" + timeSpan + ".p"
    #The normal unpickling function (pickle.load) can't be used here; networkx has its own unpickling function.
    timeSpanGraph = networkx.read_gpickle(inputPicklePath)

    #Define the path for the final output of this child process.
    analysedPicklePath = IOpath + "analysedGraph" + timeSpan + ".p"
    #-------------------------------------------------------------------

    #Section 4: Analyze the graph---------------------------------------
    #REMEMBER THAT IN THE PREVIOUS SCRIPT, THE EDGES WERE GIVEN WEIGHTS EQUIVALENT TO THE TRAVEL TIME BETWEEN THE NODES.
    #Betweenness centrality measures-------------
    #Calculate betweenness centrality, without edge weights.
    #betweenness_centrality() parameters: input graph; number of node samples to use for estimating the betweenness centrality ["None" means don't estimate]; normalization (divide each betweenness value by the total number of node pairs in the graph (excluding the node being considered), such that the betweenness centrality values will range from 0 to 1); edge attribute to use as weight ["None" means all edge weights are equal]; whether to include the endpoints in the shortest path counts [I believe the actual implication is whether single-edge paths contribute to a node's centrality, but I haven't investigated this thoroughly]; random seed used when estimating
```

```
betweenness centrality [see "k" parameter; not used here]
btwnCent = networkx.betweenness_centrality(timeSpanGraph, k = None, normalized = True, weight = None, endpoints = False, seed = None)
#Calculate current-flow betweenness centrality (a.k.a. random-walk betweenness centrality), without edge weights.
#current_flow_betweenness_centrality() parameters: input graph; whether to normalize; weight attribute [defaults to "weight", so in our case it is important to not use the default if weights aren't desired]; matrix data type [default used here]; solver [default used here]
#Attempting to calculate current-flow betweenness centrality on an unconnected graph will cause an error. Therefore, apply the algorithm to each component of the graph instead, and combine the resulting dictionaries into one dictionary.
allComponentsCfBtwnCent = {}
componentSubGraphs = list(networkx.connected_component_subgraphs(timeSpanGraph))
for component in componentSubGraphs:
    thisComponentCfBtwnCent = networkx.current_flow_betweenness_centrality(component, normalized = True, weight = None)
    allComponentsCfBtwnCent.update(thisComponentCfBtwnCent)

#Closeness centrality measures---------------
#Calculate closeness centrality, using the travel times as edge weights.
#closeness_centrality() parameters: input graph; node to return value for [not used here]; edge attribute to use as distance (weight); whether to normalize
closeCent = networkx.closeness_centrality(timeSpanGraph, distance = 'weight', normalized = True)
#Calculate current-flow closeness centrality (a.k.a. information centrality), using the travel times as edge weights.
#current_flow_closeness_centrality() parameters: input graph; matrix data type [default used here]; solver [default used here]
#Attempting to calculate information centrality on an unconnected graph
```

```
    will cause an error. Therefore, apply the algorithm to each component of the graph instead, and combine the resulting dictionaries into one dictionary.
    allComponentsInfoCent = {}
    componentSubGraphs = list(networkx.connected_component_subgraphs(timeSpanGraph))
    for component in componentSubGraphs:
        thisComponentInfoCent = networkx.current_flow_closeness_centrality(component, weight = 'weight')
        allComponentsInfoCent.update(thisComponentInfoCent)

    #Eigenvector centrality--------------------
    #Calculate eigenvector centrality, without edge weights.
    #eigenvector_centrality_numpy() parameters: input graph; weight attribute
    eigenCent = networkx.eigenvector_centrality_numpy(timeSpanGraph, weight = None)

    #Add network measures to the attributes dictionary.
    for aVert in timeSpanGraph.nodes():
        timeSpanGraph.node[aVert]['attributes']['btwncent'] = btwnCent[aVert]
        timeSpanGraph.node[aVert]['attributes']['cfbtwncent'] = allComponentsCfBtwnCent[aVert]
        timeSpanGraph.node[aVert]['attributes']['closecent'] = closeCent[aVert]
        timeSpanGraph.node[aVert]['attributes']['infocent'] = allComponentsInfoCent[aVert]
        timeSpanGraph.node[aVert]['attributes']['eigencent'] = eigenCent[aVert]
    #------------------------------------------------------------

    #Section 5: Store the graph-----------------------------------------
    #Store the graph in a python pickle. The graph now has the results of the network analysis stored as node attributes.
```

```
    networkx.write_gpickle(timeSpanGraph, analysedPicklePath)
    #-----------------------------------------------------------------

#Section 6: Run the script--------------------------------------------
#Run this script. mainFunction() is called, which itself calls the core of this script, netAnalyse().
#This if-then statement is required when using python multiprocessing with Windows OS.
if __name__ == '__main__':
    mainFunction()
```

Listing E.10: 6_NetworkVisualization_EXPERIMENTAL.py

```
#-------------------------------------------------------------------
#THIS SCRIPT VISUALIZES THE GRAPH OBJECTS CREATED IN THE PREVIOUS SCRIPT ("5_NetworkAnalysis.py").
#-------------------------------------------------------------------

#-------------------------------------------------------------------
#FUTURE WORK:
#CHECK THAT IN THE CENTRALITY MEASURE LOOP, THE CENTRALITY MEASURE VALUES DON'T NEED TO BE CAST TO FLOATS
#ADD LAKE LEVEL POLYGONS
#-------------------------------------------------------------------

#Section 1: Get tools-----------------------------------------------
#Import a network analysis module.
import networkx
#Import a module for drawing networkx graphs.
import matplotlib.pyplot
#Import the statistics module, used for median().
import statistics
#Import the math module, used for sqrt() and ceil().
import math
#-------------------------------------------------------------------
```

```

#Section 2: Define paths and get data------------------------------------

#Define the path where all input is stored and where all output will be stored. This string will be used in constructing other strings for paths below.
#IT IS CRITICAL THAT THIS IS THE SAME PATH STORED IN THE VARIABLE "IOpath" IN "5_NetworkAnalysis.py", SO THAT THE CORRECT INPUT IS USED.
IOpath = "C:/Real/SantaFe/LeastCostPaths/Working/finaloutput3/"

#Unpickle all of the graph pickles created by the previous script ("5_NetworkAnalysis.py"), and organize them into a dictionary.
#Create an empty dictionary to hold all of the unpickled graphs.
graphsDict = {}
#This list of time spans will be used to construct file paths for retrieving the output of the previous script. THIS LIST MUST BE THE SAME AS THE LIST WITH THE SAME NAME IN THE PREVIOUS TWO SCRIPTS.
timeSpanList = ["1500BC-1100BC", "1100BC-850BC","850BC-450BC","450BC-250BC","250BC-0BC","0BC-250AD","250AD-600AD","600AD-1000AD","1000AD-1150AD","1150AD-1450AD","1450AD-1540AD","1540AD-1600AD"]
#Loop through the time spans.
for timeSpan in timeSpanList:
    #Use each time span to construct the filename for one of the pickles created in the previous script.
    analysedPicklePath = IOpath + "analysedGraph" + timeSpan + ".p"
    #Use this filename to unpickle the graph.
    graph = networkx.read_gpickle(analysedPicklePath)
    #Add this graph to the dictionary which holds all of the graphs.
    graphsDict[timeSpan] = graph
#-------------------------------------------------------------------------

#Section 3: Add a uniform attribute for component size-------------------
#The component sizes are presently spread over multiple fields. Create a single field from these.
#Loop through the graphs (technically, the keys of the graphs dictionary).
```

```
Each graph corresponds to a time span.
for timeSpanKey in graphsDict:
    #Loop through the nodes.
    for currentVert in graphsDict[timeSpanKey].nodes():
        #Get the current node's "size_abs" and "size_max" attributes. These will be used to determine which type of size data is available for this node. If an absolute component size is available, that will be used ("size_abs"). If an absolute component size isn't available, "size_abs" will have a value of "-1" as a string. If this is the case, the "size_max" field should be checked; if it has a value other than "-1", then a component size range is available, and the midpoint of this range should be used. If both the "size_abs" and "size_max" fields have a value of "-1", then only a site size is available, and this will be used.
        currentVertSizeAbs = graphsDict[timeSpanKey].node[currentVert]['attributes']['size_abs']
        currentVertSizeMax = graphsDict[timeSpanKey].node[currentVert]['attributes']['size_max']
        #If an absolute component size is available, assign it to the name "currentVertSize".
        if currentVertSizeAbs != '-1':
            currentVertSize = float(currentVertSizeAbs)
        #If an absolute component size isn't available, but a range is, calculate the midpoint and assign it to the name "currentVertSize".
        elif currentVertSizeMax != '-1':
            #Get the current node's "size_min" value, and cast it to a float.
            currentVertSizeMin = float(graphsDict[timeSpanKey].node[currentVert]['attributes']['size_min'])
            #Get the current node's "size_max" value, and cast it to a float.
            currentVertSizeMax = float(graphsDict[timeSpanKey].node[currentVert]['attributes']['size_max'])
            #Use these two values to calculate the midpoint of the range.
            currentVertSizeMid = (currentVertSizeMax - currentVertSizeMin) / 2
```

```
            #Assign this midpoint value to "currentVertSize".
            currentVertSize = currentVertSizeMid
        #If only a site size is available, use it.
        elif currentVertSizeAbs == '-1' and currentVertSizeMax == '-1':
            currentVertSize = float(graphsDict[timeSpanKey].node[currentVert]['attributes']['sitesize'])
        else:
            print('Bad input while creating the "size_unified" field!')
        #Add the value to the new field.
        graphsDict[timeSpanKey].node[currentVert]['attributes']['size_unified'] = currentVertSize
#-----------------------------------------------------------------

#Section 4: Draw the graphs---------------------------------------------
#Two different types of graph will be drawn. First, a network visualization in geographic space will be made for each time span and each centrality measure. These will be drawn during this loop. Second, scatterplots displaying the relationship between components' centrality, size, and type will be made. The data for these will be prepared in this loop, but the scatterplots will be drawn after this loop.
#Create a dictionary to hold the data for the scatterplots.
scatterplotsDataDictionary = {}
#Loop through the graphs (technically, the keys of the graphs dictionary). Each graph corresponds to a time span.
for timeSpanKey in graphsDict:
    #Below, several lists will be made, in which each list item corresponds to a particular node and defines some aspect of how that particular node should be drawn. For example, there will be a list of component sizes, with one size per node, and these sizes will be used to define how large a node should be drawn. Or, for example, there will be a list of the betweenness centrality values, one per node, and these values will be used to define what color should be used for drawing each node. It is important that all of these lists be in the same order, and that the nodes are drawn in this same order, so that each node receives the correct drawing properties. While it appears that
```

```
    the networkx .nodes() method returns a consistently ordered list, the fact that graphs in networkx are nested python dictionaries (which are fundamentally unordered) suggests that caution is warranted. It seems most secure to get a list of the nodes using .nodes() once and then always use this same list, rather than making multiple calls to .nodes() (.nodes() is also used for the default nodelist for the actual drawing of the graph via draw_networkx()).
    nodeList = graphsDict[timeSpanKey].nodes()

    #Prepare to distinguish the nodes by presence/absence of evidence for corporate ritual, by creating a list of the nodes' values for "rit". The "rit" attribute has strings "1" for present, "0.5" for possible, and "0" for absent. Convert these strings to numeric values appropriate for node sizes, so that node size can be used to distinguish nodes with different evidence for corporate ritual.
    nodeRitList = [(float(graphsDict[timeSpanKey].node[currentVertex]['attributes']['rit']) + 1) * 10 for currentVertex in nodeList]
    #Similarly, prepare to distinguish the nodes by component size. As with the above "rit" list, this will be used to set node size (some visualizations will use this list, and others will use the above "rit" list). Squareroot and then multiply the component hectare sizes by a value appropriate for setting node sizes in the graph visualization.
    nodeCompSizeList = [math.sqrt(graphsDict[timeSpanKey].node[currentVertex]['attributes']['size_unified']) * 10 for currentVertex in nodeList]

    #Node position
    #Prepare to define node positions using the nodes' UTM coordinates.
    #Create an empty dictionary. This dictionary will have node names as keys and tuples of coordinates as values. This dictionary will be used below as a parameter for draw_networkx().
    nodePositions = {}
    for presentNode in nodeList:
        #Get the current node's coordinates.
```

```
        presentNodeEasting = graphsDict[timeSpanKey].node[presentNode]['attributes']['eutm19']
        presentNodeNorthing = graphsDict[timeSpanKey].node[presentNode]['attributes']['nutm19']
        #Create a tuple that holds the current node's coordinates.
        presentNodeCoords = (int(presentNodeEasting), int(presentNodeNorthing))
        #In the dictionary, associate the current node's name (as key) with its UTM coordinates (as value).
        nodePositions[presentNode] = presentNodeCoords

    #Draw the graphs.
    #Loop through the different network centrality measures.
    for centMeasure in ['btwncent', 'cfbtwncent', 'closecent', 'infocent', 'eigencent']:
        #Create a list of the nodes' values for the current centrality measure.
        centValsList = [graphsDict[timeSpanKey].node[currentVertex]['attributes'][centMeasure] for currentVertex in nodeList]
        #Create one visualization where node sizes are based on component sizes, and another visualization where node sizes are based on evidence for corporate ritual.
        nodeSizeCodingDict = {"byCompSize" : nodeCompSizeList, "byRitEvidence" : nodeRitList}
        for nodeSizeCoding in nodeSizeCodingDict:
            #Create a figure and set its size.
            currentNetVisFig = matplotlib.pyplot.figure(num = 1, figsize = (6.5,8.3))
            #In effect, remove margins and axes.
            currentNetVisAxes = matplotlib.pyplot.Axes(currentNetVisFig, [0., 0., 1., 1.])
            currentNetVisAxes.set_axis_off()
            currentNetVisFig.add_axes(currentNetVisAxes)
            #Draw the graph.
            networkx.draw_networkx(graphsDict[timeSpanKey], nodelist =
```

```
        nodeList, pos = nodePositions, with_labels = False, node_size = nodeSizeCodingDict[nodeSizeCoding], node_color = centValsList, cmap = matplotlib.pyplot.get_cmap('Reds'), width = 0.1)
        #Set the view extent of the axes, so that each time span's plotting is in the same space no matter what the spatial extent of its network is.
        matplotlib.pyplot.xlim(325000,550000)
        matplotlib.pyplot.ylim(8120000,8360000)
        #Write the graph drawing to a file.
        matplotlib.pyplot.savefig(IOpath + centMeasure + "_" + timeSpanKey + "_" + nodeSizeCoding + ".pdf", dpi=800)
        #Close the figure.
        matplotlib.pyplot.close(1)

        #In addition to the graphs drawn above, it might be nice to get this working (writing to shapefile). It appears to currently fail because the node keys are strings.
        #networkx.write_shp(graphsDict[timeSpanKey], IOpath + timeSpanKey)


    #For each centrality measure, a plot with scatterplot subplots (one subplot per timespan) will be made outside this loop below, to display the relationship between centrality, component size, and site type.
    #Prepare data for the subplot which corresponds to this iteration's time span and centrality measure.
    #Create new lists, one size list and one centrality list for each of the "rit" values.
    ritAbsentSizes = []
    ritAbsentCentVals = []
    ritPossSizes = []
    ritPossCentVals = []
    ritPresentSizes = []
    ritPresentCentVals = []
```

```python
        for currentVertex in nodeList:
            if graphsDict[timeSpanKey].node[currentVertex]['attributes']['rit'] == "0":
                ritAbsentSizes.append(graphsDict[timeSpanKey].node[currentVertex]['attributes']['size_unified'])
                ritAbsentCentVals.append(graphsDict[timeSpanKey].node[currentVertex]['attributes'][centMeasure])
            if graphsDict[timeSpanKey].node[currentVertex]['attributes']['rit'] == "0.5":
                ritPossSizes.append(graphsDict[timeSpanKey].node[currentVertex]['attributes']['size_unified'])
                ritPossCentVals.append(graphsDict[timeSpanKey].node[currentVertex]['attributes'][centMeasure])
            if graphsDict[timeSpanKey].node[currentVertex]['attributes']['rit'] == "1":
                ritPresentSizes.append(graphsDict[timeSpanKey].node[currentVertex]['attributes']['size_unified'])
                ritPresentCentVals.append(graphsDict[timeSpanKey].node[currentVertex]['attributes'][centMeasure])
        #Also get the median centrality value for each of the 3 "rit" values, to be displayed as text on the plots.
        if len(ritAbsentCentVals) > 0:
            ritAbsentMedian = round(statistics.median(ritAbsentCentVals), 5)
        else:
            ritAbsentMedian = "NA"
        if len(ritPossCentVals) > 0:
            ritPossMedian = round(statistics.median(ritPossCentVals), 5)
        else:
            ritPossMedian = "NA"
        if len(ritPresentCentVals) > 0:
            ritPresentMedian = round(statistics.median(ritPresentCentVals), 5)
        else:
            ritPresentMedian = "NA"

```

```
        #Create a dictionary key consisting of a tuple of two strings, one for this iteration's time span and one for this iteration's centrality measure. To this key, assign a dictionary holding the lists of size values, the lists of centrality values, and the median values.
        scatterplotsDataDictionary[(timeSpanKey, centMeasure)] = {"ritAbsentSizes" : ritAbsentSizes, "ritAbsentCentVals" : ritAbsentCentVals, "ritPossSizes" : ritPossSizes, "ritPossCentVals" : ritPossCentVals, "ritPresentSizes" : ritPresentSizes, "ritPresentCentVals" : ritPresentCentVals, "ritAbsentMedian" : ritAbsentMedian, "ritPossMedian" : ritPossMedian, "ritPresentMedian" : ritPresentMedian}



#Create the scatterplots. Create one plot per centrality measure, each with time span subplots.
for centMeasure in ['btwncent', 'cfbtwncent', 'closecent', 'infocent', 'eigencent']:
    matplotlib.pyplot.figure(num = 1, figsize = (6.5, 8.3))
    #Adjust margins.
    matplotlib.pyplot.subplots_adjust(left = .08, right = .98, top = .852, bottom = .055)
    #Define how many rows and columns of subplots there should be. These will be used below as the first two parameters of matplotlib.pyplot.subplot().
    colsCount = 3
    rowsCount = math.ceil(float(len(timeSpanList)) / colsCount)
    #Determine the minimum and maximum values of the centrality values and the component sizes, for any timespan. These will be used to set the view of the axes uniformly for all timespans.
    allTimeSpansCompSizeMax = float("-inf")
    allTimeSpansCompSizeMin = float("inf")
    allTimeSpansCentValMax = float("-inf")
    allTimeSpansCentValMin = float("inf")
```

```
    for timeSpan in timeSpanList:
        dataForThisTimeSpanAndCentMeas = scatterplotsDataDictionary[(timeSpan, centMeasure)]
        compSizeMax = max(max(dataForThisTimeSpanAndCentMeas["ritAbsentSizes"], default = float("-inf")), max(dataForThisTimeSpanAndCentMeas["ritPossSizes"], default = float("-inf")), max(dataForThisTimeSpanAndCentMeas["ritPresentSizes"], default = float("-inf")))
        if compSizeMax > allTimeSpansCompSizeMax:
            allTimeSpansCompSizeMax = compSizeMax
        compSizeMin = min(min(dataForThisTimeSpanAndCentMeas["ritAbsentSizes"], default = float("inf")), min(dataForThisTimeSpanAndCentMeas["ritPossSizes"], default = float("inf")), min(dataForThisTimeSpanAndCentMeas["ritPresentSizes"], default = float("inf")))
        if compSizeMin < allTimeSpansCompSizeMin:
            allTimeSpansCompSizeMin = compSizeMin
        centValMax = max(max(dataForThisTimeSpanAndCentMeas["ritAbsentCentVals"], default = float("-inf")), max(dataForThisTimeSpanAndCentMeas["ritPossCentVals"], default = float("-inf")), max(dataForThisTimeSpanAndCentMeas["ritPresentCentVals"], default = float("-inf")))
        if centValMax > allTimeSpansCentValMax:
            allTimeSpansCentValMax = centValMax
        centValMin = min(min(dataForThisTimeSpanAndCentMeas["ritAbsentCentVals"], default = float("inf")), min(dataForThisTimeSpanAndCentMeas["ritPossCentVals"], default = float("inf")), min(dataForThisTimeSpanAndCentMeas["ritPresentCentVals"], default = float("inf")))
        if centValMin < allTimeSpansCentValMin:
            allTimeSpansCentValMin = centValMin
    #Draw
    for timeSpan in timeSpanList:
        #Determine which subplot should be used for this timespan. This will be used as the third parameter to matplotlib.pyplot.subplot().
```

```
subplot()'s third parameter designates the subplot's grid location (the grid itself having been defined by the first 2 parameters). For subplot()'s third parameter, a value of 1 is the top left location, a value of 2 is the next location in the top ROW (not column), if there is one, etc.
currentSubplot = timeSpanList.index(timeSpan) + 1
#Create a subplot in the appropriate grid location.
timeSpanSubplot = matplotlib.pyplot.subplot(rowsCount, colsCount, currentSubplot)
#Define the data to be used for this subplot.
timeSpanSubplotDataDict = scatterplotsDataDictionary[(timeSpan, centMeasure)]
#Plot component sizes on the X-axis and centrality values on the Y-axis. Distinguish the three "rit" values by color.
timeSpanSubplot.plot(timeSpanSubplotDataDict["ritAbsentSizes"], timeSpanSubplotDataDict["ritAbsentCentVals"], 'ro', markersize = 4, label = "No Evidence")
timeSpanSubplot.plot(timeSpanSubplotDataDict["ritPossSizes"], timeSpanSubplotDataDict["ritPossCentVals"], 'go', markersize = 4, label = "Possible Evidence")
timeSpanSubplot.plot(timeSpanSubplotDataDict["ritPresentSizes"], timeSpanSubplotDataDict["ritPresentCentVals"], 'bo', markersize = 4, label = "Confident Evidence")
#So that all subplots have the same view of the axes, set the subplot's axes limits. Increase or decrease each maximum or minimum by an appropriate amount to prevent partial cutoff of the point symbols.
matplotlib.pyplot.axis([allTimeSpansCompSizeMin - abs(allTimeSpansCompSizeMax * .001), allTimeSpansCompSizeMax + abs(allTimeSpansCompSizeMax * .25), allTimeSpansCentValMin - abs(allTimeSpansCentValMax * .05), allTimeSpansCentValMax + abs(allTimeSpansCentValMax * .05)])
#Set the X-axis to logarithmic, but use "symlog" so that the range from 0 to 1 is linear rather than logarithmic, so that the 0 to 1 range doesn't take up the majority of the plot space.
```

```
        timeSpanSubplot.set_xscale("symlog")
        #Reduce the tick labels' size.
        timeSpanSubplot.tick_params(labelsize = 10)
        #Add a title to this subplot.
        timeSpanSubplot.set_title(timeSpan, y = 1.01)
        #If this subplot is NOT in the last row, hide its X-axis tick labels.
        if rowsCount * colsCount - currentSubplot >= colsCount:
            timeSpanSubplot.xaxis.set_ticklabels([])
        #If this subplot is in the last row, add a X-axis label.
        else:
            matplotlib.pyplot.xlabel("Component Size (ha)")
        #If this subplot is NOT in the first column, hide its Y-axis tick labels.
        if not (float(currentSubplot - 1) / colsCount).is_integer():
            timeSpanSubplot.yaxis.set_ticklabels([])
        #If this subplot is in the first column, add a Y-axis label.
        else:
            matplotlib.pyplot.ylabel("Centrality")
        #Shrink the subplot, to make horizontal room for the medians text, and to add vertical space between this subplot and other subplots.
        oldPos = timeSpanSubplot.get_position()
        timeSpanSubplot.set_position([oldPos.x0, oldPos.y0, oldPos.width * 0.7, oldPos.height * 0.9])
        #Add a legend. Although technically this is created for one subplot, it will serve as a legend for all subplots. "bbox_to_anchor" is used to push the legend well outside the subplot.
        if currentSubplot == 2:
            timeSpanSubplot.legend(loc = 'lower left', bbox_to_anchor = (1.42, 1.25), fontsize = 11, title = "Corporate Ritual", numpoints = 1)
        #Add text listing the median centrality values for each of the "rit" types.
        matplotlib.pyplot.text(x = allTimeSpansCompSizeMax * 1.37, y = allTimeSpansCentValMin + (allTimeSpansCentValMax * .1), size = 9,
```

```
        s = "Median Y\n\nNo Rit.:\n" + str(timeSpanSubplotDataDict["ritAbsentMedian"]) + "\nRit. Poss.:\n" + str(timeSpanSubplotDataDict["ritPossMedian"]) + "\nRit. Conf.:\n" + str(timeSpanSubplotDataDict["ritPresentMedian"]))

    #Add a title to the entire figure.
    titleDictionary = {'btwncent' : 'Betweenness Centrality', 'cfbtwncent': 'Random-Walk\nBetweenness Centrality', 'closecent' : 'Closeness Centrality', 'infocent': 'Information Centrality', 'eigencent' : 'Eigenvector Centrality'}
    matplotlib.pyplot.suptitle(titleDictionary[centMeasure])
    #Save figure.
    matplotlib.pyplot.savefig(IOpath + "scatt" + centMeasure + ".pdf", dpi= 600)
    matplotlib.pyplot.close(1)
```

E.2.3 Wealth Finance Analysis 2: Proximity to Potential Major Routes

Listing E.11: DistanceToBestRoutes_EXPERIMENTAL.py

```
#-----------------------------------------------------------------
#CALCULATE AND PLOT MEAN/MEDIAN DISTANCE TO COMPONENTS' CLOSEST "BEST ROUTES" RASTER CELL, THROUGH TIME. ALSO PLOT HOW THE POPULATION IS DISTRIBUTED ACCORDING TO DISTANCE FROM THE "BEST ROUTES" CELLS (I.E., CONSIDER THE POPULATION VALUES OF COMPONENTS RATHER THAN TREATING ALL COMPONENTS AS THE SAME, AS IS DONE FOR THE MEAN/MEDIAN).
#-----------------------------------------------------------------

#-----------------------------------------------------------------
#FUTURE WORK:
#deal with multi-sector sites
#supra-survey scale
#It would be better in the diachronic plots for timespan/survey combinations without any components to not be plotted, rather than plotted at 0 as is currently done
```

```
#---------------------------------------------------------------------

#Section 1: Get tools------------------------------------------------
#Import the arcpy module in order to access ArcGIS.
import arcpy
#Import a module for plotting.
import matplotlib.pyplot
#Import the math module, used for sqrt() and ceil().
import math
#Import the regex module.
import re
#---------------------------------------------------------------------

#Section 2: Preliminary Work: licenses, file paths, environmental settings, and archaeological sites database
#---------------------------------------------------------------------
#Licenses-----------------------------------
#Check out the ArcGIS Spatial Analyst license.
arcpy.CheckOutExtension("Spatial")
#File paths---------------------------------

#Define the path where all input from the previous script ("2_CreateHubs.py") is and where all output of the current script (both scratch and final) will be stored (some of it in subdirectories of this path). This string will be used in constructing other strings for paths below.
#IT IS CRITICAL THAT THIS IS THE SAME PATH STORED IN THE VARIABLE "IOpath" IN THE PREVIOUS SCRIPT ("2_CreateHubs.py"), SO THAT THE CORRECT INPUT IS USED.
IOpath = "C:/Real/SantaFe/LeastCostPaths/Working/finaloutput2/"

#Workspace----------
arcpy.env.workspace = IOpath
arcpy.env.scratchWorkspace = arcpy.env.workspace
#Input--------------
#Set the path to the Titicaca archaeological surveys database.
```

```
#USE A SCHEMA.INI FILE TO DEFINE THE FIELD TYPES DERIVED FROM THIS CSV FILE. WHEN CREATING THIS SCHEMA.INI FILE YOU ALSO HAVE TO THINK ABOUT HOW MISSING/NON-APPLICABLE DATA SHOULD BE CODED IN THE CSV FILE ("NA", "-1", "0", ETC).
#THIS IS JUST A PLACEHOLDER FILE.
surveysTablePath = "C:/Real/SantaFe/LeastCostPaths/Data/titicaca_surveys_python_LAST_SFI_VERSION_NO_SPACES_NO_BLANKS.csv"
#Set the path to the Titicaca inter-survey database.
#THIS IS JUST A PLACEHOLDER FILE.
gapsTablePath = "C:/Real/SantaFe/LeastCostPaths/Data/Gaps_python_UNFINISHED_10JAN16_NO_BLANKS_NO_SPACES.csv"
#Set the path to the Digital Elevation Model. This file isn't directly used in this script; it is used here to mimic the environmental settings used in the previous script ("2_CreateHubs.py").
#THIS IS JUST A PLACEHOLDER FILE.
elevationPath = "C:/Real/SantaFe/LeastCostPaths/Working/GmtedClipReproj.tif"

#Previous script's output
#------------------
#These are intermediate output files from "2_CreateHubs.py". They were created by arcpy.sa.PathDistance(), with the "best routes" as the source cells. IN ADDITION TO THE PREFIX WHICH WILL BE PROVIDED BY ARCPY.ENV.WORKSPACE, THIS STRING NEEDS TO BE PREFIXED WITH "lakeLev" + [the appropriate lake level as a numeric string] .
majorRoutesCostRaster = "/pd_rtes"

#This script's intermediate output
#------------------
surveysShpPath = "surveys_DistBest.shp"
gapsShpPath = "gaps_DistBest.shp"
surveysAndGapsShpPath = "surveys_and_gaps_DistBest.shp"
#These files will receive a prefix below.
travTimeExtractedPath = "travTimeExtracted.shp"

```

```
#Environmental settings---------------------
#Carry over the environmental settings from the previous script (2_CreateHubs.py).
#IT IS IMPORTANT TO NOTE THAT ALL DATASETS USED IN THIS SCRIPT SHOULD FALL ENTIRELY WITHIN THIS EXTENT, OR ELSE THEIR PORTIONS WHICH FALL OUTSIDE THIS EXTENT WILL NOT BE PROCESSED.
arcpy.env.extent = elevationPath
arcpy.env.snapRaster = elevationPath
arcpy.env.outputCoordinateSystem = elevationPath

#Archaeological sites (components, technically)------------
#Import the archaeological surveys table
#First, create a feature layer from the table file
#MakeXYEventLayer parameters: input table; X coordinate field; Y coordinate field; output layer name; spatial reference[I have chosen to define the projection using an EPSG code; the code 32719 is for WGS84 UTM 19S; note that this tool is not affected by the output coordinate system environmental setting, but the CopyFeatures tool below is]; Z coordinate field [not used here]
arcpy.MakeXYEventLayer_management(surveysTablePath, "eutm19", "nutm19", "XYsurveysLayer", arcpy.SpatialReference(32719))
#Second, save this feature layer as a feature class
#CopyFeatures parameters: input features; output feature class; geodatabase configuration keyword [not used here]; geodatabase spatial grid 1 [not used here]; " 2 [not used here]; " 3 [not used here]
arcpy.CopyFeatures_management("XYsurveysLayer", surveysShpPath)
#Do the same for the archaeological inter-survey data.
arcpy.MakeXYEventLayer_management(gapsTablePath, "eutm19", "nutm19", "XYgapsLayer", arcpy.SpatialReference(32719))
arcpy.CopyFeatures_management("XYgapsLayer", gapsShpPath)
#Combine the survey and inter-survey data into one shapefile.
#Merge parameters: input feature classes or tables; output feature class or table; field mappings [not used here]
#Note that this tool is affected by the output coordinate system environmental setting
```

```
arcpy.Merge_management([surveysShpPath, gapsShpPath], surveysAndGapsShpPath)

#The archaeological components ("surveysAndGapsShpPath") have attributes for spatial size but not population size. Add a field for population size and calculate its values. To estimate the population, use the methods described in Bandy 2001: 67, 71-72.
#Add the field.
#AddField_management() parameters: input to which field will be added; field name to be added; field type; precision [number of digits on both sides of decimal]; scale [number of digits after decimal]; length [not used here; text/blob types only]; field alias [not used here]; whether field can have null values [not used here]; whether field is required [not used here]; field domain [not used here]
arcpy.AddField_management(surveysAndGapsShpPath, "pop", "FLOAT", 7, 1)
#Calculate the values.
#Create an UpdateCursor that retrieves the newly created field ("pop") and the fields that will be used to calculate its values ("size_abs", "size_min", "size_max", "sitesize", and "hab").
with arcpy.da.UpdateCursor(surveysAndGapsShpPath, ("size_abs", "size_min", "size_max", "sitesize", "hab", "pop")) as compCursor:
    #Loop through each row of the attribute table. The row's values for the fields specified above will be in a list, in the order specified above.
    for compRow in compCursor:
        #Only calculate population if this component is a habitation component. Note that the use of > 0 here means that uncertain (0.5 and 0.75 codes) habitation components are also included.
        if compRow[4] > 0:
            #If this row doesn't have a NA/missing value for "size_abs" (absolute size), use the "size_abs" value to calculate the population for this component.
            if compRow[0] != -1:
                #The minimum population size is 1 household (6 people), so only calculate population if the spatial size is equivalent
```

```
        to more than one household. Otherwise, assign a population of 6 to this component.
        if compRow[0] > .25:
            compRow[5] = (((math.sqrt(compRow[0] * 10000)) - 20)**2) / 150
        else:
            compRow[5] = 6
    #If this row doesn't have a NA/missing value for "size_min", use the "size_min" and "size_max" values to calculate the population for this component.
    if compRow[1] != -1:
        #First get the midpoint between the "size_min" and "size_max" values.
        sizeMid = (compRow[1] + compRow[2]) / 2
        if sizeMid > .25:
            compRow[5] = (((math.sqrt(sizeMid * 10000)) - 20)**2) / 150
        else:
            compRow[5] = 6
    #If this row has NA/missing values for both "size_abs" and "size_min", use the "sitesize" value to calculate the population for this component.
    if compRow[0] == -1 and compRow[1] == -1:
        if compRow[3] > .25:
            compRow[5] = (((math.sqrt(compRow[3] * 10000)) - 20)**2) / 150
        else:
            compRow[5] = 6
#When the "pop" field was added above, the values were all set to 0, because this is a numeric field in a shapefile. Therefore, nonhabitation components currently have 0 for "pop", since their values were not altered by the above calculations. This is fine for this script, but in other contexts it would often be preferable to have nonhabitation components' population values set to null. This could be done by using a geodatabase instead of a shapefile (see arcpy.AddField_management(field_is_nullable=)).
```

```python
        #Use the modified list to update the row.
        compCursor.updateRow(compRow)
#-------------------------------------------------------------

#Section 3: Calculate statistics regarding distance from "best routes"
#-------------------------------------------------------------
#Preliminary work-------------------------------
#Define the time spans that will be used; the statistics will be calculated for each of these spans. The starting/ending years are chosen to match points of lake level change, and therefore the time spans generally subdivide cultural phases. Exceptions to this (i.e., defining the time spans by lake level change rather than cultural change) are the start/end dates for the Tiwanaku period and the end date for Inca period, which are cultural changes that have the same lake level before and after the change.
timeSpanList = ["1500BC-1100BC", "1100BC-850BC","850BC-450BC","450BC-250BC","250BC-0BC","0BC-250AD","250AD-600AD","600AD-1000AD","1000AD-1150AD","1150AD-1450AD","1450AD-1540AD","1540AD-1600AD"]
#Also create a list of the time spans' midpoints. This will be used for X-axis values when plotting in Section 4. Therefore, the order of Y values within lists created further below must match this list's order.
timeSpanMidpList = []
for timeSpan in timeSpanList:
    #Split the time span string into its start and end portions.
    timeSpanSplit = timeSpan.split("-")
    #For both the start and end, if "BC" is present in the string, record this so that the number can be made negative later.
    if "BC" in timeSpanSplit[0]:
        startNeg = True
    else:
        startNeg = False
    if "BC" in timeSpanSplit[1]:
        endNeg = True
    else:
        endNeg = False
```

```
    #Remove non-numeric characters and cast the remainder to an integer.
    timeSpanStart = int(re.sub("[^0-9]", "", timeSpanSplit[0]))
    timeSpanEnd = int(re.sub("[^0-9]", "", timeSpanSplit[1]))
    #Make the dates negative if they formerly had "BC".
    if startNeg == True:
        timeSpanStart = -timeSpanStart
    if endNeg == True:
        timeSpanEnd = -timeSpanEnd
    #Get the midpoint between the start and end.
    timeSpanMidp = (timeSpanStart + timeSpanEnd) / 2
    #Extend the list with this midpoint.
    timeSpanMidpList += [timeSpanMidp]
#Associate the time spans with their respective lake levels. Use a python
↪dictionary for this.
timeSpanLakeLevelDict = {timeSpanList[0] : 5, timeSpanList[1] : 15,
↪timeSpanList[2] : 0, timeSpanList[3] : 15, timeSpanList[4] : 0,
↪timeSpanList[5] : 15, timeSpanList[6] : 0, timeSpanList[7] : 0,
↪timeSpanList[8] : 0, timeSpanList[9] : 15, timeSpanList[10] : 0,
↪timeSpanList[11] : 0}
#Associate the time spans with the appropriate survey-specific phases. Use
↪ a python dictionary for this.
#Mapping the phases to the lake levels is complicated; this is a rough
↪draft of such a mapping. This mapping often takes all sites dated to a
↪broader cultural phase and associates ALL of them with a narrower time
↪span defined by lake level. This amplifies a problem that exists even
↪before subdividing the cultural phases into lake level time spans, the
↪problem of having "overestimated maps" (sensu Ammerman 1981: 77).
timeSpanPhasingDict = {timeSpanList[0] : ["pk-a","is-b","jp-a","tr-a","hp-
↪a","qt-a","gp-a"], timeSpanList[1] : ["pk-a","is-b","jp-a","tr-b","hp-a"
↪,"qt-a","kt-a", "gp-b"], timeSpanList[2] : ["pk-b","is-c","jp-b","tr-c",
↪"hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"], timeSpanList[3] : ["pk-b","
↪is-c","jp-b","tr-c","hp-b","qt-a","kt-a","tm-a","tl-a", "gp-b"],
↪timeSpanList[4] : ["pk-c","is-d","jp-c","tr-d","hp-c","qt-a","kt-b","tm-
↪b","tl-b", "gp-c"], timeSpanList[5] : ["pk-c","is-d","jp-c","tr-d","hp-c
↪","hp-d","qt-a","kt-b","tm-b","tl-b", "gp-c"], timeSpanList[6] : ["is-d"
```

```
,"jp-c","tr-e","hp-c","hp-d","qt-a","kt-b","tm-c","tl-c", "gp-c"], timeSpanList[7] : ["is-e","jp-d","tr-f","hp-e","hp-f","hp-g","qt-b","kt-c","tm-d","tm-e","tl-d","tl-e", "gp-d"], timeSpanList[8] : ["pk-d","is-f","jp-e","tr-g","hp-h","qt-c","kt-d","tm-f","tl-f","gp-e"], timeSpanList[9] : ["pk-d","is-f","jp-e","tr-g","hp-h","hp-i","hp-j","qt-c","kt-d","tm-f","tl-f", "gp-e"], timeSpanList[10] : ["pk-e","is-g","jp-f","tr-h","hp-k","hp-l","qt-d","kt-e","tm-g","tl-g", "gp-f"], timeSpanList[11] : ["jp-g","tr-i","hp-m","qt-e","kt-f","kt-g","tm-h","tl-h"]}

#Create a list of the survey codes (the first two characters of values in the "comp" field). This will be used when calculating statistics by survey and plotting by survey.
#Retrieving the unique survey codes from "surveysAndGapsShpPath" would mean that new surveys could be added to the database without modifying this script. However, I haven't done this because I want to specify the order of this list so that it can be used to specify the plotting order of the surveys.
surveyList = ["pk","hp","jp","is","tr","kt","tl","tm","qt","gp"]

#Make a feature layer from the archaeological components, so that the Select Layer By Attribute tool can be used on it.
arcpy.MakeFeatureLayer_management(surveysAndGapsShpPath, "compsLayer")

#Create lists for the mean and median travel times, to be filled in the below loop. Each list item will be the mean or median for one time span, at the pan-Titicaca scale.
meanTravTimeList = []
medianTravTimeList = []
#Similarly, but for the survey scale, create dictionaries of such lists, keyed to the survey codes.
survMeanTravTimeListsDict = {}
survMedianTravTimeListsDict = {}
for surveyCode in surveyList:
    survMeanTravTimeListsDict[surveyCode] = []
    survMedianTravTimeListsDict[surveyCode] = []
```

```
#Also create a dictionary which will have lists of all travel times (rather than mean/median), at the pan-Titicaca Scale. This dictionary will eventually be keyed to time span.
panCompTravTimesListsDict = {}
#Create a similar dictionary, except for component population values (as a fraction of total population), rather than travel times.
panCompPopListsDict = {}
#Create dictionaries similar to the above 2 dictionaries, except at the Survey Scale. These dictionaries will eventually be keyed to tuples which combine survey with time span.
survCompTravTimesListsDict = {}
survCompPopListsDict = {}

#Selection by time span-------------------------
#Loop through the time spans.
for timeSpan in timeSpanList:
    #Select the archaeological components which correspond to this time span.
    #Clear the selection from the previous iteration of this loop. This is necessary because in the below loop "ADD_TO_SELECTION" will be used rather than "NEW_SELECTION".
    arcpy.SelectLayerByAttribute_management("compsLayer", "CLEAR_SELECTION")
    #Get a python list of the survey-specific phases which correspond to this time span.
    currentListOfPhases = timeSpanPhasingDict[timeSpan]
    #Loop through these survey-specific phases.
    for surveyPhase in currentListOfPhases:
        #Separate the survey-phase code into the survey segment and the phase segment.
        currentSurvey = surveyPhase[0:2]
        currentPhase = surveyPhase[-1]
        #Select components from this phase of this survey. Use "ADD_TO_SELECTION" so that this selection is added to the selections from previous iterations of this loop. In the SQL
```

```
expression, use "LIKE" rather than "=", so that wildcards may be used, and use a percent wildcard to represent an unlimited number of any characters between the survey and phase codes. This works because the format used in the "comp" field is [survey code]-[site #].[sector#]-[phase code] (e.g., gp-0001.01-a).
        arcpy.SelectLayerByAttribute_management("compsLayer", "ADD_TO_SELECTION", '"comp" LIKE ' + "'" + currentSurvey + '%' + currentPhase + "'")

    #In some cases, a survey will have more than one phase which corresponds to a time span (for example, Huancane Putina has 3 phases in the 1150AD-1450AD time span). For any site which has components from multiple phases in the same time span, it will generally be best to select just one of the components. Otherwise, this site will be "double-counted". To prevent this, loop through the components which have been selected above, and in cases where the same site has multiple components selected, deselect the smaller components.
    with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as outerCursor:
        for outerRow in outerCursor:
            outerComp = outerRow[0].encode('utf-8')
            outerPop = outerRow[1]
            #For each component in the outer loop, loop through the components again to search for components from the same site and sector.
            with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as innerCursor:
                for innerRow in innerCursor:
                    innerComp = innerRow[0].encode('utf-8')
                    innerPop = innerRow[1]
                    #The format used in the "comp" field is [survey code]-[site #].[sector#]-[phase code] (e.g., gp-0001.01-a). Therefore, two components from the same site can be matched by comparing the "comp" field without the final character.
                    if outerComp[0 : -1] == innerComp[0 : -1]:
```

```
                    #If the outer loop's component is smaller than the inner loop's component, deselect the outer loop's component.
                    if outerPop < innerPop:
                        arcpy.SelectLayerByAttribute_management("compsLayer", "REMOVE_FROM_SELECTION", '"comp" = ' + "'" + outerComp + "'")
#If a site has multiple largest components (with equal sizes), the above loop has left all of them still selected. Create another nested loop through the table, and if the outer loop's site-sector has one or more site-sector matches in the table, then remove the outer loop's component from the selection. This will leave only the last (lowest in the table) of the equal-size components.
with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as outerCursor:
    for outerRow in outerCursor:
        outerComp = outerRow[0].encode('utf-8')
        outerPop = outerRow[1]
        with arcpy.da.SearchCursor("compsLayer", ("comp", "pop")) as innerCursor:
            for innerRow in innerCursor:
                innerComp = innerRow[0].encode('utf-8')
                innerPop = innerRow[1]
                #Prevent a component from deselecting itself based on a match to itself, since "outerComp[0 : -1] == innerComp[0 : -1]" will always be "True" when a component is the same in both the outer and inner loop. This would result in the entire table being de-selected. This can be prevented by using "and outerComp != innerComp".
                if outerComp[0 : -1] == innerComp[0 : -1] and outerComp != innerComp:
                    arcpy.SelectLayerByAttribute_management("compsLayer", "REMOVE_FROM_SELECTION", '"comp" = ' + "'" + outerComp + "'")

```

```
#Calculate statistics-----------------------
#The selection of components is now complete for this time span. Use the ExtractValuesToPoints() tool to assign each component an attribute for how far it is from its closest "best routes" cell. Note that technically the distance being measured is to the center of the raster cell that the site is on, rather than the site point itself; therefore, with a low resolution raster the results may not be as desired. A COMPONENT ON A NODATA RASTER CELL (IN THE MODELED LAKE) WILL HAVE A VALUE OF -9999 ASSIGNED TO IT, WHICH WOULD SEVERELY AFFECT THE CALCULATIONS. WHILE THE IDEAL SOLUTION IS TO MAKE SURE THAT NO COMPONENTS FALL INSIDE THE MODELED LAKE, FURTHER PROTECTION AGAINST THIS PROBLEM IS PROVIDED BY SQL QUERIES WITHIN THE BELOW SEARCHCURSORS. HOWEVER, THESE SQL QUERIES SIMPLY EXCLUDE THE PROBLEMATIC COMPONENTS, AND THEREFORE DATA IS LOST AND THE RESULTS MAY BE SKEWED.
#It is important that the raster which corresponds to this time span's lake level is used.
#ExtractValuesToPoints parameters: input point features [provides location data]; input raster [provides value data]; output point feature class [contains points with values derived from the raster]; interpolation option ["NONE" specifies that the cell center's value will be used, rather than deriving the value from surrounding cells]; add attributes option ["VALUE_ONLY" specifies that other fields in the raster's attribute table will be ignored]
arcpy.sa.ExtractValuesToPoints("compsLayer", "lakeLev" + str(timeSpanLakeLevelDict[timeSpan]) + majorRoutesCostRaster, timeSpan.replace("-", "_") + travTimeExtractedPath, "NONE", "VALUE_ONLY")

#Pan-Titicaca Scale------
#Create a list of this time span's components' travel times to their nearest "best routes" cell. Exclude values of -9999 (see above) with an SQL query for only non-negative values of "RASTERVALU".
travTimeList = [float(row[0]) for row in arcpy.da.SearchCursor(timeSpan.replace("-", "_") + travTimeExtractedPath, ("RASTERVALU", ), '"RASTERVALU" >= 0')]
```

```
    #Use this list to calculate the mean travel time for this time span, for the pan-Titicaca scale.
    travTimeMean = float(sum(travTimeList)) / len(travTimeList)
    #Do the same for the median.
    sortedTravTimeList = sorted(travTimeList)
    midIndex = (len(sortedTravTimeList) - 1) // 2
    if len(sortedTravTimeList) % 2:
        travTimeMedian = sortedTravTimeList[midIndex]
    else:
        travTimeMedian = (sortedTravTimeList[midIndex] + sortedTravTimeList[midIndex + 1]) / float(2)
    #Add this mean and this median to the lists which will have the means and medians for all time spans.
    meanTravTimeList += [travTimeMean]
    medianTravTimeList += [travTimeMedian]

    #Create a list of this time span's components' populations. This list needs to have the same order as "travTimeList", and it needs to similarly exclude components with values of -9999 for "RASTERVALU".
    popList = [float(row[0]) for row in arcpy.da.SearchCursor(timeSpan.replace("-", "_") + travTimeExtractedPath, ("pop", ), '"RASTERVALU" >= 0')]
    #Convert this list from absolute population sizes to fractions of the time span's total population.
    timeSpanTotalPop = float(sum(popList))
    popFracList = []
    for pop in popList:
        popFracList += [pop / timeSpanTotalPop]

    #Associate the list of components' travel times and the list of components' population fractions with a dictionary key of this time span.
    panCompTravTimesListsDict[timeSpan] = travTimeList
    panCompPopListsDict[timeSpan] = popFracList

```

```
#Survey Scale------------
#Loop through the survey codes.
for survey in surveyList:
    #Create a list similar to "travTimeList", except that it only has travel times for components from this survey.
    survTravTimeList = [float(row[0]) for row in arcpy.da.SearchCursor(timeSpan.replace("-", "_") + travTimeExtractedPath, ("RASTERVALU", ), '"RASTERVALU" >= 0 AND "comp" LIKE ' + "'" + survey + "%'")]
    #If this survey has any components from this time span...
    if len(survTravTimeList) > 0:
        #...use this list to calculate the mean travel time for this time span, for this survey.
        survTravTimeMean = float(sum(survTravTimeList)) / len(survTravTimeList)
        #Do the same for the median.
        sortedSurvTravTimeList = sorted(survTravTimeList)
        midIndex = (len(sortedSurvTravTimeList) - 1) // 2
        if len(sortedSurvTravTimeList) % 2:
            survTravTimeMedian = sortedSurvTravTimeList[midIndex]
        else:
            survTravTimeMedian = (sortedSurvTravTimeList[midIndex] + sortedSurvTravTimeList[midIndex + 1]) / float(2)
    #If this survey doesn't have any components from this time span...
    else:
        #Assign 0 to the mean and median for this time span, for this survey.
        survTravTimeMean = 0
        survTravTimeMedian = 0
    #Add this time span's mean to the list of means for this survey.
    survMeanTravTimeListsDict[survey] += [survTravTimeMean]
    #Do the same for the median.
    survMedianTravTimeListsDict[survey] += [survTravTimeMedian]

    #Create a list similar to "popList", except that it only has populations for components from this survey.
```

```
        survPopList = [float(row[0]) for row in arcpy.da.SearchCursor(timeSpan.replace("-", "_") + travTimeExtractedPath, ("pop", ), '"RASTERVALU" >= 0 AND "comp" LIKE ' + "'" + survey + "%'")]
        #Convert this list from absolute population sizes to fractions of the time span's total population for this survey.
        survPopFracList = []
        if len(survPopList) > 0:
            survTimeSpanTotalPop = float(sum(survPopList))
            for survPop in survPopList:
                survPopFracList += [survPop / survTimeSpanTotalPop]

        #Associate the list of components' travel times and the list of components' population fractions with a dictionary key composed of this time span and this survey's code. IF THIS SURVEY DOESN'T HAVE ANY COMPONENTS FOR THIS TIME SPAN, THESE LISTS WILL BOTH BE EMPTY LISTS.
        survCompTravTimesListsDict[(timeSpan, survey)] = survTravTimeList
        survCompPopListsDict[(timeSpan, survey)] = survPopFracList
#-----------------------------------------------------------------

#Section 4: Plot---------------------------------------------------------
#Pan-Titicaca Scale--------------------------
#Plot the mean and median travel times from closest "best route", through time, for pan-Titicaca scale.
#Create a figure and set its size.
matplotlib.pyplot.figure(num = 1, figsize = (8.3, 6.5))
#Plot time span midpoints on the X-axis and mean/median travel time values on the Y-axis. Also create legend labels.
matplotlib.pyplot.plot(timeSpanMidpList, meanTravTimeList, 'r-', label = "Mean")
matplotlib.pyplot.plot(timeSpanMidpList, medianTravTimeList, 'b-', label = "Median")
#Add axis labels.
matplotlib.pyplot.xlabel("Years B.C./A.D.")
matplotlib.pyplot.ylabel("Travel Time (Hours)")
```

```
#Add legend.
matplotlib.pyplot.legend(bbox_to_anchor = (.19, .97), fontsize = 13)
#Add title.
matplotlib.pyplot.title("Mean and Median Travel Time from Nearest Major
↪Route, Pan-Titicaca Scale")
#Adjust the X-axis view.
matplotlib.pyplot.xlim(xmax = 1700)
#Adjust the margins.
matplotlib.pyplot.subplots_adjust(left = .07, right = .99, top = .93,
↪bottom = .07)
#Save the figure.
matplotlib.pyplot.savefig(IOpath + "
↪panScale_MeanAndMedianTravelTimesToBestRoutes.pdf", dpi = 600)
#Close the figure.
matplotlib.pyplot.close(1)

#Plot the distribution of population according to distance from closest "
↪best route", by time span, for the pan-Titicaca scale. Each time span
↪will be in a different subplot.
panScalePopFig = matplotlib.pyplot.figure(num = 1, figsize = (6.5, 8.3))
#Create the histogram bins. To aid visual comprehension of the plot, it
↪will be best to simply have this the same for each subplot.
#Create an empty list that will be filled with the bin edges.
travBinList = []
#Determine the maximum travel time of components from any time span. Time
↪span is irrelevant here because the bins will be the same for each
↪subplot.
allSpanMax = 0
for spanDictKey in panCompTravTimesListsDict:
    spanMax = max(panCompTravTimesListsDict[spanDictKey])
    if spanMax > allSpanMax:
        allSpanMax = spanMax
#Use this maximum to limit the bins. Loop through the potential bin edges,
↪ and use each one only if it is less than the maximum travel time which
↪was just determined.
```

```
for binEdge in [0, .25, .5, .75, 1, 2, 3, 4, 5]:
    if binEdge < allSpanMax:
        travBinList += [binEdge]
#Add the right-most bin edge, the maximum travel time.
travBinList += [allSpanMax]
#Define how many rows and columns of subplots there should be. These will be used below as the first two parameters of matplotlib.pyplot.subplot().
colsCount = 3
rowsCount = math.ceil(float(len(timeSpanList)) / colsCount)
#Loop through the timespans by looping through the dictionary keys of "panCompTravTimesListsDict". The key can be used in pyplot.hist() to retrieve both the list of travel times for this timespan and the list of population fractions for this timespan.
for spanDictKey in panCompTravTimesListsDict:
    #Determine which subplot should be used for this timespan. This will be used as the third parameter to matplotlib.pyplot.subplot(). subplot()'s third parameter designates the subplot's grid location (the grid itself having been defined by the first 2 parameters). For subplot()'s third parameter, a value of 1 is the top left location, a value of 2 is the next location in the top ROW (not column), if there is one, etc.
    currentSubplot = timeSpanList.index(spanDictKey) + 1
    #Create a subplot in the appropriate grid location.
    panScalePopSubplot = matplotlib.pyplot.subplot(rowsCount, colsCount, currentSubplot)
    #Draw a histogram in this subplot. So that the Y-axis depicts fraction of the population rather than absolute population size (thereby making the subplots easily comparable), assign the components' fractions of timespan total population as the weights. Weights mean that each travel time value will contribute this weight, rather than 1, to the appropriate bin count. The histogram bars should therefore sum to 1.
    panScalePopSubplot.hist(panCompTravTimesListsDict[spanDictKey], weights = panCompPopListsDict[spanDictKey], bins = travBinList, color = "
```

```
#3377FF")
    #Add a title to this subplot.
    panScalePopSubplot.set_title(spanDictKey)
    #If this subplot is NOT in the last row, hide its X-axis tick labels.
    if rowsCount * colsCount - currentSubplot >= colsCount:
        panScalePopSubplot.xaxis.set_ticklabels([])
    #If this subplot is NOT in the first column, hide its Y-axis tick labels.
    if not (float(currentSubplot - 1) / colsCount).is_integer():
        panScalePopSubplot.yaxis.set_ticklabels([])
    #So that all subplots have the same view of the axes, set the subplot's axes limits.
    matplotlib.pyplot.axis([0, allSpanMax + .5, 0, 1.1])
#Create a title for the entire plot.
panScalePopFig.suptitle("Population Distribution According to Distance from Closest Major Route,\nPan-Titicaca Scale:\nTravel Time (Hours) on X-axis and Fraction of Population on Y-axis")
#Adjust margins.
matplotlib.pyplot.subplots_adjust(left = .05, right = .99, top = .88, bottom = .03)
#Save the figure.
matplotlib.pyplot.savefig(IOpath + "panScale_PopulationDistributionTravelTimeToBestRoute.pdf", dpi = 600)
#Close the figure.
matplotlib.pyplot.close(1)

#Survey Scale-------------------------------------
#Create anything to be shared by multiple survey-scale plots.
#Define colors to be used.
survColors = ["#FF9900", "#0DFF00", "#00B2FF", "#A600FF", "#FF0000"]
#Create legend labels.
legendLabDict = {"gp" : "Inter-survey", "hp" : "Huancane-Putina", "is" : "Is. of the Sun", "jp" : "Juli-Pomata", "kt" : "Katari", "pk" : "Pukara", "qt" : "Qawra Thaki", "tl" : "Tiwanaku Lower", "tm" : "Tiwanaku Middle", "tr" : "Taraco Pen."}
```

```python

#Plot the mean travel times from closest "best route", through time, for the survey scale.
matplotlib.pyplot.figure(num = 1, figsize = (8.3, 6.5))
#Name the axes/subplot, so that it can be referenced when reducing its size to fit the legend.
subpl = matplotlib.pyplot.subplot(111)
#Create a counter that will be used to assign a color and line style to each survey.
plotCount = 0
#Loop through the surveys.
for survKey in survMeanTravTimeListsDict:
    #Assign a color and line style to this survey.
    if plotCount < 5:
        currColor = plotCount
        currStyle = "solid"
    else:
        currColor = plotCount - 5
        currStyle = "dashed"
    matplotlib.pyplot.plot(timeSpanMidpList, survMeanTravTimeListsDict[survKey], color = survColors[currColor], linestyle = currStyle, label = legendLabDict[survKey])
    plotCount += 1
#Shrink the axes/subplot, to make room for the legend.
#oldPos = subpl.get_position()
#subpl.set_position([oldPos.x0, oldPos.y0, oldPos.width * 0.89, oldPos.height])
#Add a legend.
subpl.legend(loc = 'lower left', bbox_to_anchor = (1, 0.5), fontsize = 11)
#Add a title.
matplotlib.pyplot.title("Mean Travel Time from Nearest Major Route, Survey Scale", y = 1.03)
#Adjust the X-axis view.
matplotlib.pyplot.xlim(xmax = 1700)
#Add axis labels.
```

```python
matplotlib.pyplot.xlabel("Years B.C./A.D.")
matplotlib.pyplot.ylabel("Travel Time (Hours)")
#Adjust margins.
matplotlib.pyplot.subplots_adjust(left = .07, right = .76, top = .93, bottom = .07)
#Save the figure.
matplotlib.pyplot.savefig(IOpath + "surveyScale_MeanTravelTimesToBestRoutes.pdf", dpi = 600)
#Close the figure.
matplotlib.pyplot.close(1)

#Do the same for the median travel times.
matplotlib.pyplot.figure(num = 1, figsize = (8.3, 6.5))
subpl = matplotlib.pyplot.subplot(111)
plotCount = 0
for survKey in survMedianTravTimeListsDict:
    if plotCount < 5:
        currColor = plotCount
        currStyle = "solid"
    else:
        currColor = plotCount - 5
        currStyle = "dashed"
    matplotlib.pyplot.plot(timeSpanMidpList, survMedianTravTimeListsDict[survKey], color = survColors[currColor], linestyle = currStyle, label = legendLabDict[survKey])
    plotCount += 1
#oldPos = subpl.get_position()
#subpl.set_position([oldPos.x0, oldPos.y0, oldPos.width * 0.89, oldPos.height])
subpl.legend(loc = 'lower left', bbox_to_anchor = (1, 0.5), fontsize = 11)
matplotlib.pyplot.title("Median Travel Time from Nearest Major Route, Survey Scale", y = 1.03)
matplotlib.pyplot.xlim(xmax = 1700)
matplotlib.pyplot.xlabel("Years B.C./A.D.")
matplotlib.pyplot.ylabel("Travel Time (Hours)")
```

```
matplotlib.pyplot.subplots_adjust(left = .07, right = .76, top = .93, bottom = .07)
matplotlib.pyplot.savefig(IOpath + "surveyScale_MedianTravelTimesToBestRoutes.pdf", dpi = 600)
matplotlib.pyplot.close(1)

#Plot the distribution of population according to distance from closest "best route", by time span, for the Survey Scale. This plot will be composed of many subplots, where each subplot is for a particular combination of survey and time span.
survScalePopFig = matplotlib.pyplot.figure(num = 1, figsize = (13, 8.3))
#Create the histogram bins. To aid visual comprehension of the plot, it will be best to simply have this the same for each subplot.
survTravBinList = []
#Determine the maximum travel time of components from any survey and any time span. Survey and time span are irrelevant here because the bins will be the same for each subplot.
allSurvSpanMax = 0
for survSpanDictKey in survCompTravTimesListsDict:
    if len(survCompTravTimesListsDict[survSpanDictKey]) > 0:
        survSpanMax = max(survCompTravTimesListsDict[survSpanDictKey])
    else:
        survSpanMax = 0
    if survSpanMax > allSurvSpanMax:
        allSurvSpanMax = survSpanMax
#Use this maximum to limit the bins. Loop through the potential bin edges, and use each one only if it is less than the maximum travel time which was just determined.
for binEdge in [0, .25, .5, .75, 1, 2, 3, 4, 5]:
    if binEdge < allSurvSpanMax:
        survTravBinList += [binEdge]
#Add the right-most bin edge, the maximum travel time.
survTravBinList += [allSurvSpanMax]
#Define how many rows and columns of subplots there should be. These will be used below as the first two parameters of matplotlib.pyplot.subplot()
```

```
↪.
survRowsCount = len(surveyList)
spanColsCount = len(timeSpanList)
#Loop through the survey-timespan combinations by looping through the tuple dictionary keys of "survCompTravTimesListsDict". The key can be used in pyplot.hist() to retrieve both the list of travel times for this survey-timespan combination and the list of population fractions for this survey-timespan combination.
for survSpanDictKey in survCompTravTimesListsDict:
    #Determine which subplot should be used for this survey-timespan combination.
    currentTimespan = survSpanDictKey[0]
    currentSurveyCode = survSpanDictKey[1]
    currentColumn = timeSpanList.index(currentTimespan) + 1
    currentRow = surveyList.index(currentSurveyCode) + 1
    #This will be used as the third parameter to matplotlib.pyplot.subplot(). subplot()'s third parameter designates the subplot's grid location (the grid itself having been defined by the first 2 parameters). For subplot()'s third parameter, a value of 1 is the top left location, a value of 2 is the next location in the top ROW (not column), if there is one, etc.
    currentSubplot = ((currentRow - 1) * spanColsCount) + currentColumn
    #Create a subplot in the appropriate grid location.
    survScalePopSubplot = matplotlib.pyplot.subplot(survRowsCount, spanColsCount, currentSubplot)
    #If this subplot is in the first row, add a title to this subplot. This will, in effect, be a title for a column of subplots.
    if currentRow == 1:
        survScalePopSubplot.set_title(currentTimespan.replace("-", "-\n"), size = 11)
    #If this subplot is in the first column, add a Y-axis label to this subplot. This will, in effect, be a title for a row of subplots.
    if currentColumn == 1:
        survScalePopSubplot.set_ylabel(currentSurveyCode, size = 11, rotation = 0)
```

```
        survScalePopSubplot.yaxis.labelpad = 10
    #If this subplot is in the last column, add a Y-axis label on the right to this subplot. This will, in effect, be a title for a row of subplots.
    if currentColumn == len(timeSpanList):
        survScalePopSubplot.yaxis.set_label_position("right")
        survScalePopSubplot.set_ylabel(currentSurveyCode, size = 11, rotation = 0)
        survScalePopSubplot.yaxis.labelpad = 10
        #Also switch tick labels to the right.
        survScalePopSubplot.yaxis.tick_right()
        survScalePopSubplot.yaxis.set_ticks_position("both")
    #If this subplot is NOT in the first or last column, hide its Y-axis tick labels.
    if currentColumn != 1 and currentColumn != len(timeSpanList):
        survScalePopSubplot.yaxis.set_ticklabels([])
    #Otherwise, format the Y-axis tick labels.
    else:
        survScalePopSubplot.yaxis.set_tick_params(which = "both", labelsize = 8)
    #If this subplot is NOT in the last row, hide its X-axis tick labels.
    if currentRow != survRowsCount:
        survScalePopSubplot.xaxis.set_ticklabels([])
    #Otherwise, format the X-axis tick labels.
    else:
        survScalePopSubplot.xaxis.set_tick_params(which = "both", labelsize = 8)
    #Don't plot at this grid location if this survey-timespan combination doesn't have any components.
    if len(survCompTravTimesListsDict[survSpanDictKey]) > 0:
        #Draw a histogram in this subplot. So that the Y-axis depicts fraction of the population rather than absolute population size (thereby making the subplots easily comparable), assign the components' fractions of survey-timespan total population as weights. Weights mean that each travel time value will contribute
```

```
        this weight, rather than 1, to the appropriate bin count. The histogram bars should therefore sum to 1.
        survScalePopSubplot.hist(survCompTravTimesListsDict[survSpanDictKey], weights = survCompPopListsDict[survSpanDictKey], bins = survTravBinList, color = "#3377FF")
    #So that all subplots have the same view of the axes, set the subplot's axes limits.
    matplotlib.pyplot.axis([0, allSurvSpanMax + .5, 0, 1.1])
#Create a title for the entire plot. I have commented this out because I will crop this image into two separate files, and use a caption instead of a title.
#survScalePopFig.suptitle("Population Distribution According to Distance from Closest Major Route, Survey Scale: Travel Time (Hours) on X-axis and Fraction of Population on Y-axis")
matplotlib.pyplot.figtext(.205, 0.01, "Travel Time (Hours)")
matplotlib.pyplot.figtext(.655, 0.01, "Travel Time (Hours)")
matplotlib.pyplot.figtext(.001, 0.59, "Fraction of Population", rotation = "vertical")
matplotlib.pyplot.figtext(.985, 0.59, "Fraction of Population", rotation = "vertical")
#Adjust margins.
matplotlib.pyplot.subplots_adjust(left = .05, right = .94, top = .95, bottom = .05)
#Save the figure.
matplotlib.pyplot.savefig(IOpath + "surveyScale_PopulationDistributionTravelTimeToBestRoute.pdf", dpi = 600)
#Close the figure.
matplotlib.pyplot.close(1)
#------------------------------------------------------------------
#Check in spatial analyst license.
arcpy.CheckInExtension("Spatial")
```

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