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Between Collapse and Mobility: Resilience in the Third Millennium B.C. Southern Levant

Author
Karoll, Amy Beth

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Between Collapse and Mobility:

Resilience in the Third Millennium B.C.

Southern Levant

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Near Eastern Languages and Cultures

by

Amy Beth Karoll

2020

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ABSTRACT OF DISSERTATION

Between Collapse and Mobility:

Resilience in the Third Millennium B.C.

Southern Levant

by

Amy Beth Karoll

Doctor of Philosophy in Near Eastern Languages and Cultures

University of California, Los Angeles, 2020

Professor Aaron A. Burke, Chair

The Early Bronze IV (EB IV, c. 2500-2000 B.C.) in the ancient Near East was a period of rapid and systemic change. Towards the end of the third millennium B.C., much of the population abandoned villages and cities across the Levant. For the past 50 years this period has been characterized as a “collapse,” even though the veracity of this has been questioned in recent years. The reality of this period is more nuanced. This dissertation examines how local populations adapted to changes in economic systems, specifically changes in trade routes and subsistence regimes. This started with the establishment of the so-called “urbanization” of the Early Bronze II-III (EB II-III, c. 3000-2500 B.C.) and resulted in a drastic shift in settlement patterns and a deurbanization in the EB IV. This study will explore alternative explanations that situate people as active agents in a resilient socioeconomic system. The changes in settlement locations, a reflection of economic and political systems, were conscious choices, shaped and limited by various factors. Rather than a sudden collapse of the previous social structure due to catastrophic climatic change disrupting agricultural production, it appears that the EB IV transition was the logical consequence of individuals actively responding to their steadily changing environment. Geographic Information Systems (GIS) is used to show that settlement locations in the Levant were strongly influenced by environmental factors including a flooding of the coastal plain and an aridification of inland valleys in addition to shifts subsistence patterns. There was a shift in the location of sheep rearing to the liminal zones at the edges of dry-farming, in agriculture from centralized locations around tells to a more ruralized, village based system and a shift north of olive and grape production, from the southern to the northern Levant. Data was extracted from satellite imagery and environmental models to determine agricultural and pastoral zones as well as settlement patterns at the local level. Results illustrate that populations during the EB II-III became so entrenched in their previous modes of living, overexploiting the landscape and available resources, that it was no longer sustainable, and communities moved into different environmental niches to survive.

The dissertation of Amy Beth Karoll is approved.

Gregson T. Schachner

Glen M. MacDonald

Elizabeth F. Carter

Aaron A. Burke, Committee Chair

University of California, Los Angeles
2020

DEDICATION

I dedicate this dissertation to the six people in my life who inspire me to do my best and are the reason I keep pushing. Elliot, Emmett, Eleanor, Hudson, Beckett, and Anastasia, Auntie Amy wants you to know that anything is possible!

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CURRICULUM VITAE

EDUCATION

2011-Present	PhD. Candidate in Near Eastern Languages and Cultures (Levantine Archaeology) University of California, Los Angeles
2009-2011	M.A. in Anthropology (Archeology) University of Arkansas
2005-2009	B.S. in Archaeological Studies (Anthropology) University of Wisconsin-La Crosse Highest University Honors and Archaeology Honors

ARCHAEOLOGICAL FIELD AND LAB WORK

Summer 2018	Surveyor and GIS Director. The Tel Dan Excavations and Turning Points Project. Directed by Drs. David Ilan, Yifat Thareani, and Aaron Burke.
Summer 2016	Data Supervisor and Coordinator: JCHP, Israel. Directed and Supervised by Dr. Aaron Burke.

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Summer 2015	Data Coordinator: The Jaffa Cultural Heritage Project, Study Season at UCLA. Directed by Dr. Aaron Burke.
Summer 2014	Field Director, Lion Temple Area Supervisor, and Data Coordinator: The Jaffa Cultural Heritage Project, Israel. Directed by Drs. Aaron Burke and Martin Peilstöcker.
Summer 2013	Ramses Gate Area Supervisor, and Data Coordinator: The Jaffa Cultural Heritage Project, Israel. Directed by Drs. Aaron Burke and Martin Peilstöcker. Graduate Summer Research Mentorship: The Jaffa Cultural Heritage Project, Israel. Supervised by Dr. Aaron Burke.
2012-2016	The Jaffa Cultural Heritage Project. Directed and Supervised by Dr. Aaron Burke. Organizing an Online Database, Overseeing and Creating GIS datasets, Digitizing
Summer 2012	Staff, Excavations Supervisor, and Data Coordinator: The Jaffa Cultural Heritage Project, Israel. Directed by Drs. Aaron Burke and Martin Peilstöcker. Graduate Summer Research Mentorship: The Jaffa Cultural Heritage Project, Israel. Supervised by Dr. Aaron Burke.
2011-2012	Graduate Student Researcher: The Jaffa Cultural Heritage Project. Directed and Supervised by Dr. Aaron Burke. Organizing an Online Database, Overseeing and Creating GIS datasets, Digitizing.
Summer 2011	Staff and Excavations Supervisor: The Jaffa Cultural Heritage Project, Israel. Directed by Drs. Aaron Burke and Martin Peilstöcker.
Summer 2010	Co-Area Supervisor, Trench Supervisor and Lab Coordinator: The Tell Qarqur Expedition, Syria. Directed by Drs. Jesse Casana and Rudolph Dornemann.
Summer 2007	Crew Member: Prehistoric Parotani Settlement Project, Cochabamba, Bolivia. Directed by Drs. Tim McAndrews and Claudia Rivera.
2005-2009	Volunteer: Mississippi Valley Archaeology Center. Supervised by Dr. Constance Arzigian. Recurated, Inventoried, Cleaned Artifacts, did Heavy Fraction, Floated

PUBLICATIONS

Burke, Aaron Alexander, Martin Peilstöcker, Amy Beth Karoll, George A. Pierce, Nadia Ben-Marzouk, Felix Höflmayer, Jacob C. Damm, Andrew Danielson, Brian Damiata, and Michael W. Dee. (2017). "The

Archaeology of Insurgency and Social Interaction: Excavations of the New Kingdom Egyptian Fortress in Jaffa, 2011-2014." *American Journal of Archaeology* 121:85-133.

CONFERENCE PAPERS AND POSTERS

November 2019	*Between Collapse and Mobility: Environmental Refugees in the Third-Millennium B.C. southern Levant*. American Schools of Oriental Research Annual Meeting. San Diego, CA.
	Interconnected Communities in the Eastern Mediterranean and Western Asia—The Third to Early Second Millennia B.C.E. Co-Chaired with Nadia Ben-Marzouk. American Schools of Oriental Research Annual Meeting. San Diego, CA.
May 2019	*Landscapes of Change: Archaeological Survey and Jordan in the Late Third Millennium B.C.E*. American Center of Oriental Research. Amman, Jordan.
December 2018	*Landscapes of Change: Utilizing Archaeological Survey in Secondary Analysis*. W.F. Albright Institute of Archaeological Research. Jerusalem, Israel.
November 2018	*Between Resilience and Collapse: Living through a Vulnerable System in the EB IV*. American Schools of Oriental Research Annual Meeting. Denver, CO.
November 2017	*Between Collapse and Mobility: Quantifying Shifts in the Third Millennium B.C. southern Levant*. American Schools of Oriental Research Annual Meeting. Boston, MA.
January 2015	*Excavating New Kingdom Jaffa: The 2014 Season*. Presented with Aaron A. Burke and Martin Peilstöcker, Archaeological Institute of America Annual Meeting. New Orleans, LA.
November 2014	*Excavating New Kingdom Jaffa: The 2014 Season*. Presented with Aaron A. Burke and Martin Peilstöcker. American Schools of Oriental Research Annual Meeting. San Diego, CA.
February 2014	*Urbanism and Mobility: The Bronze Age in the southern Levant*. "People in Motion: Mobility, Migration, and Exchange." Fourth Annual UCLA Cotsen Institute of Archaeology Conference. Los Angeles, CA..
February 2012	*The Early Bronze IV in the northern Levant*. The Cotsen Institute of Archaeology's Wednesday Seminar Series. Los Angeles, CA.
November 2011	*The Early Bronze IV to Middle Bronze I Transition at Tell Qarqur.* American Schools of Oriental Research Annual Meeting. San Francisco, CA..
April 2011	*Reconsidering the End of the Early Bronze Age in Western Syria.* Society for American Archaeology 76th Annual Meeting. Sacramento, CA.

AWARDS

Jan-April 2019	Council of American Overseas Research Centers Fellow, The American Center of Oriental Research, Amman, Jordan.
Aug-Dec 2018	Educational and Cultural Affairs Junior Research Fellow, W.F. Albright Institute of Archaeological Research, Jerusalem, Israel.
2014-2015	Graduate Research Mentorship from the Graduate Division, University of California, Los Angeles
Summer 2013	Graduate Summer Research Mentorship from the Graduate Division, University of California, Los Angeles
Summer 2012	Graduate Summer Research Mentorship from the Graduate Division, University of California, Los Angeles
Summer 2012	Heritage Excavation Fellowship, American Schools of Oriental Research International
2011-2012	University Fellowship, University of California, Los Angeles

1 FRAMING THE PROBLEM: CONTEXTUALIZING THE EARLY BRONZE IV

The Early Bronze Age IV (EB IV, c.2500-2000 B.C.) in the ancient Near East has been characterized as a phase of transformation that has sparked considerable debate for decades.[1] The late third millennium B.C. represents a time of significant change and transformation in how populations utilized and moved across the landscape. Even though this period has been explored since the 1950s, little consensus has been reached regarding the impetuses for change and perceived movements of the region's inhabitants during this period. It has been hypothesized that the previous system of centralized urban centers, typically located on mounded tell sites, broke down. The majority of the population left or abandoned major EB II-III settlements across the southern Levant (Chesson 2018). Evidence from a landscape and settlement perspective indicated that there was some degree of change from the EB II-III to the EB IV. This was generally agreed upon, but the severity and impetus for this change were not. Therefore, this dissertation focuses on the transition from the EB II-III to the EB IV in order to understand how and why changes in settlement locations occurred. This study postulates that the changes that occurred during the transition to the EB IV were due to a confluence of reasons including the environment, population movements, and subsistence strategies. In addition, these changes can be explained through models of resilience and robusticity.

In order to fully analyze these changes, this chapter focuses on the introductory materials and ideas necessary to understand the approaches utilized in this study. First, it addresses the previous scholarship, then the geographic scope, and finally the chronological scope and problems with defining the Early Bronze IV. This chapter also introduces various surveys

[1] For further discussion on the Early Bronze IV, see examples from: (Albright 1961; 1966; R. Cohen 1992; S. L. Cohen 2018; D'Andrea 2014; Dever 1980; 1985b; 1992b; 1992a; 1995; Dunseth, Finkelstein, and Shahack-Gross 2018; Goren 1996; Kennedy 2015b; 2016; Palumbo 1990; Prag 2014; Richard 1987; 2010; Schwartz 2017; 2017).

utilized and from where the data for over 7000 sites was collated. Since the dates for the EB IV have changed significantly in recent years, Table 1.1 elucidates the chronology that were implemented in this study.

Table 1.1: Dating of the Early and Middle Bronze Age used in this study

Period	**Dates Used in this Study**[2]
Early Bronze II	3000 – 2850 B.C.
Early Bronze III	2850 – 2500 B.C.
Early Bronze IV	2500 – 2000 B.C.
Middle Bronze I	2000 – 1800 B.C.
Middle Bronze II	1800 – 1600 B.C.

1.1 ORGANIZATION OF THIS STUDY

This dissertation is organized into six body chapters with an introduction and conclusion. Four chapters (Chapter 4-7) explore a different aspect of the Early Bronze IV and how it relates to the larger questions of collapse and resilience. This chapter, the introduction, addresses the background necessary for this study. First, it looks at previous hypotheses of how the EB IV is characterized in previous literature and why the transition from the EB III to EB IV occurred. Second, the geographic nature of the southern Levant is summarized and analyzed. Emphasis is placed on the three regions that are explored, each of which is delineated by isohyet and watershed areas. These are the refugia (350+ mm of annual rainfall), the zone of uncertainty (between 200 and 350 mm of annual rainfall), and the area that is poor for agriculture (less than 200 mm of annual rainfall).[3]

[2] Based on new radiocarbon dates and statistical modeling (Regev et al. 2012)
[3] These areas are based on the dry-farming limits for wheat in the ancient Near East and was first proposed as means to analyze ancient environmental zones by Tony Wilkinson (2000b).

Chapter 2 looks at the historical and archaeological contexts for the Early Bronze IV. It is the history of the Levant in particular and the ancient Near East in general during the EB II-III and the EB IV and presents background information necessary to understand this transition. It also addresses subregions and geographic zones within the southern Levant to track settlement data and highlight both the differences and continuities between the two periods. In particular, the Negev, Coastal Plain, major valleys, Central Hill country, and the Jordan Valley are addressed, as are some of the different populations that may have been present in the Levant during the Early Bronze Age.

Chapter 3 contains the primary archaeological and anthropological hypotheses employed in this study. Since the primary focus is the interactions between humans and their environment from a settlement perspective, the main theoretical model revolves around settlement archaeology and resilience explanation. This study predominantly follows the core of Wilkinson's (2003, 4) definition of landscape archaeology as "an attempt to describe, interpret, and understand the development of the cultural features that occur on the surface of the earth. This includes both human settlements along with the land between or beyond them." Interpretations for why the EB IV is different from earlier or later periods are framed in hypotheses of resilience and robusticity.

Chapters 4, 5, 6, and 7 represent most of the analytical work. Chapter 4 looks at the environmental data available for the ancient Near East and the Levant specifically during the Early Bronze Age. The proxy stack,[4] including speleothems, sea levels, sedimentology and soils, macrobotany, and palynology, shed light on environmental conditions of the ancient Levant during the Early Bronze Age. This chapter highlights some of the environmental data that is

[4] "Proxy stack" refers to the analysis of multiple types of data that can be utilized in environmental reconstructions.

present for the entirety of the ancient Near East, and the world, as it pertains to environmental reconstructions.

Chapter 5 is the settlement reconstruction and analysis of sites against environmental data. Patterns emerged that showed an increase in the number of sites in areas that were not as well suited for agriculture during the EB IV as opposed to the EB II-III. This pattern was observed for the entirety of the ancient Near East and the Levant in particular.. Two case studies are explored, the Negev and the Central Hill country of modern Israel. Both regions saw an increase in the number of sites, which is in direct contrast to the major valleys and the coastal plain. Why these changes occurred in these two regions is explored, looking at potential changes in trade routes and changes in agricultural and horticultural practices.

Chapter 6 of this dissertation looks at the agricultural and horticultural practices of the ancient Near East, with an emphasis on the Levant. First, it looks at the previous studies done in the northern Jazira and the Middle Euphrates region around Mari. The texts from Middle Bronze Age Mari are also analyzed, but not in detail as they are outside the temporal purview of this dissertation. Then it delves into the environmental requirements for agriculture in the Levant, and how agricultural practices are affected in the region by various outside influences, including population pressures and movement. Horticulture is also explored, specifically olive and grape cultivation. Agriculture was heavily relied upon throughout the entirety of the Early Bronze Age, although this shifts to smaller-scale ventures during the EB IV. Olive production increases throughout the Early Bronze Age, reaching a maximum in the southern Levant during the EB III and the beginning of the EB IV. A shift towards the north occurred in the number of olive trees during the later EB IV that seems to be outside of the range predicted by normal environmental conditions.

Chapter 7 explores the pastoral activities of the Early Bronze Age Levant, with an emphasis on wool production. It looks at the sustainability of wool production, including the carrying capacity of sheep and goats for any given region in the Levant. The Ebla texts from the northern Levant, especially as they relate to the EB IVA, are explored in greater detail. The corpus recovered from Palace G at Ebla contained a significant amount of written evidence for textile and wool production in the northern Levant. It also estimates the amount of wool that could be produced with given herd sizes for sheep. This is then compared to excavated sheep and goat remains uncovered in the Levant in an attempt to model patterns of ancient pastoralism and herding.

Chapter 8 discusses the foregoing results and provides some conclusions stemming from this research. Specifically, it contextualizes the changes that occur through the Early and Middle Bronze Ages in a pattern of resilience. This theoretical framework posits that sociopolitical changes are part of a culture's lifecycle. "Collapse" is an inherent part of the system. It concludes that the major changes in the southern Levant during this period are a direct result of EB II-III populations' failure to adapt to changes.

Four appendices look at the specific site data. In addition to surveys and data used for this dissertation, Appendix A looks at the important archaeological sites mentioned within this text, Appendix B articulates the methodology employed in this dissertation, Appendix C looks at the floral and faunal data utilized, and Appendix D provides a gazetteer of all sites that were used within this study.

1.2 Previous Scholarship

Multiple studies and hypotheses on the nature of the EB IV in the ancient Near East broadly and the southern Levant, in particular, have been explored over the past 50 years (Albright 1966;

Dever 1973; 1980). One major problem with analyzing the EB IV starts with trying to categorize and apply a label to this period. These distinctions are only particularly important when attempting to reconcile different studies. This dissertation utilizes the terminology "Early Bronze IV" and "EB IV," but early studies did not agree if it belonged to the Early Bronze Age (EBA), to the Middle Bronze Age (MBA), or was separate from both. These differences stem from trying to determine if this period was the last phase of the EBA or the first phase of the MBA based mostly on ceramic forms. Different scholars utilized different terminology, which created biases within their work. Therefore, in the literature, a number of different names can apply to this period including the Early Bronze IV, Middle Bronze I, Intermediate Bronze Age, and Early Bronze-Middle Bronze Age. Utilizing the different terms influenced the types of research questions that were being asked in previous studies, as well as how the period was portrayed. If it was seen as part of the Early Bronze Age, the continuities between the EBA and EB IV were more heavily portrayed and the end of urbanization. If the period was labeled the MB I, it was seen as an abrupt change from the EBA and the beginnings of a new era of urbanism. It was particularly difficult to analyze when the period was given the terminology "Intermediate Bronze Age" because it divorced it from both the previous and succeeding periods and was treated as something exception versus a part of cultural continuum. Even though recently a consensus among scholars was reached as to the timing of this period, whether to call it the "Early Bronze IV" or "Intermediate Bronze Age" was still debated between different schools of thought.[5]

Several hypotheses explored why the changes from the EB II-III occurred, including from invaders (Kenyon 1966) to the environment (Weiss 2000b; 2014), from simple explanations to complex. An exploration of these old hypotheses was necessary. A lot of data in

[5] The "Intermediate Bronze Age" is used almost exclusively by Israeli scholars.

this dissertation and upon which basic conclusions were drawn comes from these earlier studies and can be revisited considering newer knowledge and studies. Knowing how and why data was collected and possible biases inherent in it can allow for reevaluation. In addition, many of these earlier studies contributed to our knowledge of the EB IV and provide interesting and insightful revelations about the EB IV that were still applicable.

1.2.1 First Studies

The foundational work on the Early Bronze IV still forms the basis of all modern studies on the period. Most of the initial data that the EB IV ceramic typologies were based on were uncovered in cemeteries (Guy 1938; Kenyon 1960a). It was a distinctive ceramic sequence that corresponded to a shift in settlement and burial patterns (Ilan 2002). Because there was no clear stratigraphic levels to base these early ceramic studies upon, scholars who first encountered what is today known to be Early Bronze IV material culture during the 19th century to the early 20th century tended to date it either too early or late, not fully understanding the cultural sequence (D'Andrea 2014). The clear relative chronologies are based on the few sites with *longue dureé* occupations, like Bab edh-Dhra (Rast and Schaub 1978) and Khirbet Iskander (Parr 1960). This included placing the material remains anywhere from the Neolithic through the LBA. This was due, in large part, to a lack of controlled stratified sequences and a limited number of excavated materials.

William Foxwell Albright (1924) was the first to assign the ceramic sequence to the EBA based on surveys in south-central Transjordan. Albright (1932), based on his excavations of Tell Beit Mirsim, outlined a ceramic assemblage and typology that he placed in the last phase of the Early Bronze Age and the first of the Middle Bronze Age. He dated the materials to the late 3rd millennium B.C. due to perceived similarities with MBA sequences, which was better understood at the time (Albright 1932). G. Ernest Wright (1938) reassessed earlier studies and likewise assigned their remains to the EBA. These studies were the basis for the basic ceramic typology still in use today. Early excavations often contained little occupational debris that could be associated with the EB IV, thus changes in the ceramic assemblage were hypothesized to also reflect social changes.

1.2.2 Invasion Explanations

One of the earliest attempts at describing not only the relative chronology of the Early Bronze IV but the onus of change was placed on the shoulders of a new people group, the Amorites and put forth as the “Amorite hypothesis.” Wright (1938) first suggested that changes at the end of the EB III could be due to an invasive population. He identified this population as the Amorites, a nomadic group known at the time from biblical texts. It was later supported by Albright (1957; 1961) and Nelson Glueck (1950).

Kathleen Kenyon (1966) was the first to propose the model through which to analyze this theoretical perspective. Her hypothesis was highly influenced by and heavily reliant upon her work at Jericho (Tell es-Sultan) and its substantial EB IV cemetery (Kenyon 1951; 1960a; 1960b; 1976; 1981). She concluded that changes were not the result of temporal differences based on the examination of tombs, the differences in mortuary practices, grave goods, and burial chamber and shaft tomb construction. Rather, shifts were conjectured to be due to the presence of different nomadic groups (Kenyon 1966, 76). She saw the invasions of Amorites as the reason behind the fundamental changes to social organizations, namely the abandonment of urban centers at the start of the EB IV (though dated by her to 2200 B.C.) and the instigation of a nomadic lifestyle in the southern Levant. They were also behind the reintroduction of urbanism at the start of the second millennium B.C. She theorized that the ceramic typological differences at sites that at the time were thought to be contemporaneous were a result of different "raids" by nomadic populations in the Levant instead of temporal changes in artifact forms (Kenyon 1951). Specifically, she saw two waves of "Amorites" entering from the steppes of Syria beginning in the EB IV. They invaded the northern Levant first, demolishing major settlements like Ebla, Ugarit, and Byblos on the move southwards (Kenyon 1966). She saw the Amorites came in and took over the lands in the Central Hill country and the inland valleys, pushing local groups to the coastal plain. At this point, the city-state structure that was established in the region during the Early Bronze II-III was replaced by a tribal based, semi-nomadic pastoral organization (Kenyon 1966).

This explanation was partially adopted and accepted by later scholars, many of whom attempted to couch her observed changes in other terminology.[6] The idea of a whole scale invasion was mostly abandoned, with less caustic words like "infiltration" replacing "invasion."[7] Recent studies attempted to further nuance Amoritization in the Levant. A recent study and analysis by Aaron Burke (2021) suggests that the formation of Amorite identity in the early second millennium, as it was presented in previous studies, was instead a byproduct.

1.2.3 Ceramics

After the invasion hypotheses for impetuses of changes were explored and in part dismissed, archaeologists began exploring internal, more localized reasons behind societal fluctuations during the EB IV. One approach to this was identifying shifts in ceramic forms as a proxy

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[6] For further discussions on different terms utilized within this theoretical frameworks, see: (Amiran 1960, 224–25; Dever, Lance, and Wright 1970, 145; Dever 1971, 211–25; Prag 1974, 106–7; Tufnell 1958, 41–42; P. W. Lapp 1967, 111–16; Kochavi 1963)

[7] The Amorites were not the only invasive population pointed towards for change at the end of the EB III. Paul W. Lapp (1967) and Moshe Kochavi (1967) pointed towards Transcaucasian Kurgans as the primary invaders. Benjamin Mazar (1968) saw the changes as primarily caused by Egyptian military invasion. The Amorite nomads entered the Levant during this turbulent time. These two hypotheses never gained much traction.

indicator of social changes. Ruth Amiran (1960) created the first systematic attempt to date the Early Bronze IV and a ceramic typology to explain changes across time and space for this period. She looked at the EB IV[8] from a ceramic perspective. She noticed marked differences in ceramic types based on their location, and therefore divided the EB IV into three “Families” that were originally based on geographic and chronologic differentiations. Initially, Family A (southern) and Family B (northern) were divided based on shapes and decorations.[9] The final group, Family C, incorporated components from both Families A and B, but was still distinct.[10] Chronologically, Family C was the latest. She made this assertion based, primarily, on the use of red slip, a hallmark of the later MBA subphases.

This was not the final form of her typology, as she made later revisions. She added a Family D to the typology, which she identified based on some idiosyncrasies in ceramic form found only in the Bethel-Jerusalem area.[11] She later reworked this scheme, condensing Families B and C into a single “Northern Group,” Family A designated as the “Southern Group,” and Family D termed the “Bethel Group.” She also amended her chronology, deducing all the family groups occurred, for the most part, simultaneously (Amiran 1974).

Eliezer Oren (1973) revised Amiran’s Northern Family, mostly from the viewpoint of the Beth Shan cemetery and Syria. Instead of dividing the typology based mainly on location, he instead did it mostly based on chronological assessments, observed stratigraphy. He split his ceramic sequence into two phases, A and B. Amiran’s Families B and C were collapsed into

[8] She originally called it the “MB I,” but later revised to the EB IV.
[9] Family A was decorated with wavy or zigzag combing and some group puncturing. Family B was decorated with single, dispersed, linear grooves, sometimes in a fish-bone pattern.
[10] Family C, also called the “Megiddo Family,” was sometimes decorated with red slip and red painting and was sometimes painted with white straight or wavy lines.
[11] This included features like cylindrical small jars with flat bases.

Oren's earlier Family A and Amiran's Family A was renamed by Oren as Family B and was dated later (Oren 1973).

Adding to the culture historical approach that Amiran developed and making substantial changes to it, William Dever (1971; 1973; 1980; 1992b) divided the southern Levantine typology into seven different geographic families and three temporal units. Looking at the families first, his Northern Family was restricted to the Upper Galilee and the Huleh Valley, where the ceramic repertoire resembled Syrian forms. The North-Central Family contained the Jezreel Valley, Lower Galilee, Northern Central Hills, Beth Shan, and the Northern Transjordan and was characterized by Syrian caliciform imports. The Jericho-Jordan Family encompassed the eastern portion of the Central Hill country and the Transjordanian Plateau and included characteristics of the central and southern traditions. The Southern Family contained the southern Coastal Plain, Negev, and Sinai, typified by wavy and linear combed directions on small forms. The Central Hill Family was in the Northern Central Hill country and corresponds mostly to Amiran's Family D. It contained characteristics of both the Jordan Valley and Southern repertoire and was characterized by simple pottery forms with little decoration. The Coastal Family was on the Coastal Plain and contained similarities to the North-Central Family. The final family was the Transjordan Family, based mostly on newer publications from that region.

Dever would later also divide the EB IV into three subsequent phases, the EB IVA, EB IVB, and EB IVC. Dever originally dated the EB IVA to the time of Albright's EB IV, corresponding to around 2200 B.C., and contained mostly the Transjordan Family. The EB IVB was put around 2100 B.C. and linked to Amiran's Families B, C, and D. Dever's family groups contained the Northern Family, North Central Family, Jericho-Jordan Valley Family, and parts of the Central Hill Family. His last phase corresponded to Amiran's MB I and Family A and

Oren's EB IVB, which was from around 2000 to 1900 B.C. The Central Hill Family and Southern Family were incorporated into this period. It was from this point that Dever generated his pastoral nomadic model that relied heavily on the dating of the above phases (Dever 1980).

Recently, Dever's original typologies were further altered based on new evidence. Ceramic evidence from several sites excavated since the original inception of the model contained pottery from different families in the same context. This led to the conclusion that the families may instead represent different but simultaneous conventions (Falconer, Magness-Gardiner, and Metzger 1984; Richard and Boraas 1984).[12] It was put further hypothesized that his typology highlighted spatial, rather than temporal, differences.[13] The families and chronology could, instead, represent localized horizons of a common southern Levantine milieu (D'Andrea 2014).

Dever's attempt was at such a broad scale geographically that some of the more nuanced differences in each regional group were necessarily glossed over. This makes creating a secure chronology even more difficult between varying regions. Dever's Family System does highlight one problem with creating a chronology for the Early Bronze IV in the southern Levant, in addition to the ancient Near East in general. A high degree of regionalism was present that makes correlating different assemblages difficult. Another problem was a lot of the earlier evidence for the EB IV material culture comes from funerary and burial contexts, which was not always representative of the entirety of the ceramic repertoire for a period. There was a dearth of information from settlement contexts, and relating the material culture of the dead with that of the living in the EB IV has proven a unique challenge (D'Andrea 2012b, 17). Added to this was

[12] A lot of this evidence came from the Transjordan.

[13] During the EB II-III there was a higher degree of continuity across the entire region in the ceramic assemblage of the southern Levant than during the EB IV (Amiran 1970). Because of this, the idea arose that during the EB IV there was more regionalism and less political cohesion (Falconer 1994b).

a lack of radiocarbon dates for the EB IV with which to tie the relative ceramic chronology to absolute dates. This situation changed within the past decade with multiple large scale radiocarbon projects for the southern Levant (Falconer and Fall 2016; Höflmayer, Kamlah, et al. 2016; Höflmayer, Yasur-Landau, et al. 2016; Höflmayer et al. 2014; Regev, Miroschedji, and Boaretto 2012).

The Negev assemblage was refined after the excavations of sites such as Be'er Resisim and Horvat Ein Ziq, mostly by William Dever in collaboration with Rudolph Cohen (1978; 1979; 1981). The ceramic forms were like the Southern Family and the Transjordan. Petrographically, the ceramics were mostly coming from outside the Negev (Goren 1996). What this suggested was that not only was chronology an issue with ceramics in the EB IV southern Levant, but so was regionalism. The population in the discrete regions that shared information between them was no longer a viable explanation. Rather, it looks like the regions were trading more than merely ideas, including the ceramic vessels themselves.

In a recent article, Marta D'Andrea (2012b) revised this chronology, specifically as it pertains to the south-central Transjordan,[14] from south of the Madaba Plains to the Feynan region and its relationship to the central Negev. She was heavily influenced by her work at the EB IV site of Khirbet Iskander in Jordan that contained both settlement and mortuary remain. At Khirbet Iskander, D'Andrea identified a technological difference throughout the EB IV and divided the assemblage into three phases. Phase 1 was characterized by simple vessel forms that resembled EB II morphology, Phase 2 saw the rise of wheel fashioned vessels that were regularly rilled and grooved on a slow wheel, and Phase 3 contained band- and wavy-combed vessels

[14] Dever originally placed the ceramic assemblage from the Transjordan in the earliest EB IV sequence for the southern Levant, but this was later questioned due to the discoveries at Khirbet Iskander. Here these ceramics were contained in the same level that Dever had dated to two separate periods.

(D'Andrea 2012b, 25).[15] Based on these forms, she also drew conclusions about neighboring regions (D'Andrea 2012b, 41). The central Negev ceramic forms were connected to the south-central Transjordan during the later EB III and later EB IV. In the Dead Sea basin, there was very limited to no contact, based on ceramics, with the central Negev during the EB IV. The Feynan region appears to be in contact with sites further west starting in the EB II.

The studies on ceramic assemblages were the first attempts at explaining the different ways the EB IV manifested by looking at regionalism. Each subset contained slightly different material remains and ceramic forms. The results of these studies were two-fold. First, scholars cemented a relative chronology for the Early Bronze IV that also accounted for regional variations. Second, they highlighted the regionalism inherent in the Early Bronze IV. The earlier EB III as much more ubiquitous over a larger area. Both settlement distributions and ceramic assemblages were integrated to understand the EB IV regional changes. Later models of change focused on the mechanisms of change, rather than just their physical manifestations.

1.2.4 Socioeconomic Models

Once the ceramic sequence and the material evidence was figured out, as was established in the above models, it was then possible to further elaborate on the different reasons changes in the material record might have occurred. After elucidating his ceramic typology, William Dever (1980) was one of the first to look at the social implications of changes during the Early Bronze IV, not simply the timing and mechanisms of change. By this point, the only significantly

[15] Although these three phases were based on ceramic assemblages from Tell Iskander, they are reflected in other ceramic assemblages from the Transjordan, including Phase 1 and Phase2 at Tell Iktanu in the Jordan Valley, Tell es-Sultan, and Tell Umm Hammad. Phase 1 ceramics are mostly cups with incurved walls, bowls with rolled rims, and large basins with flaring walls and flattened rims. Phase 2 ceramics have a high degree of continuity with Phase 1, The main difference is the introduction of the inverted-rilled rim bowls and holemouth cooking pots with squared rims that are folded inwards. Phase 3 ceramics mostly date to the late EB IV. Phase 3 has more red-slipped wares and bowls with rilled-rims. A forerunner of the MBA repertoire, the straight-sided cooking-pots, starts during this period (D'Andrea 2012a, 26).

excavated EB IV site in the southern Levant was Be'er Resisim, an EB IV village in the Negev with no monumental or elite architecture. Since very few actual villages or settlements were discovered, Dever postulated that settlements as typified by the Negev remains represented a semi-seasonal encampment structure based on small extended families or clans that survived largely on pastoral nomadism (Dever 1985b). This was in stark contrast to urbanism that was perceived to be present during the EB II-III. Based on socioeconomic models developed in other regions and based on anthropological hypotheses, the EB IV may represent a period of collapse from the EB II-III city-state organization, reverting to a tribal level that had not been observed in the region since the Neolithic (Dever 1995). Dever proposes that this change occurred, in part, due to the complete breakdown of the earlier city-state system and the abandonment of the large tell system, with an internal shift in political mechanizations instead of external invaders. This model was, in part, a response to Kenyon's "Amorite Hypothesis" and other invasion hypotheses, attempting to provide a more nuanced, less outside oriented explanation for changes. It was in this vein that he created his "families" model of regional assemblage (Dever 1985a).

Suzanne Richard (1987; 1990) also put forth a socioeconomic model to explain changes in social structures during the Early Bronze IV, in this case based upon her excavations of the site of Khirbet Iskander in the Transjordan. It was one of the few truly "urban" EB IV sites, complete with a large city wall and possibly even a gateway (Richard 1987). She hypothesizes that the pastoral nomad model espoused by Dever obscures the complexities inherent in EB VI social groups and instead concludes that the EB IV was composed of "loosely integrated society comprising a large pastoral element, small agricultural communities, and a few regional centers that reflect an adaptation to a level of political autonomy probably best explained by the chiefdom model" (Richard and Boraas 1988, 128). She later goes on to further distinguish this explanation by stressing the exchange between agriculturalists and pastoralists, especially their abilities to maintain specialization. In times of stress, fewer individuals would specialize in a mode of production, and adaptive strategies become more varied in response to these conditions (Richard 2010).

Another socioeconomic exploration of the EB IV was done by Gaetano Palumbo (1990). He attempted an ambitious synthesis of the EB IV, proposing a more ruralized population was dominant in addition to highly regional adaptations. According to Palumbo (1990, 131), enduring groups, including pastoral nomads, semi-nomads, peasants, villages, and urban dwellers, were excluded from the previous system centered on tells but their interrelationships were intensified. The urban component, therefore, does not disappear, but rather was ruralized. The production sphere was taken out of an urban setting and was instead placed in smaller productive units like farms or hamlets, with production oriented more along the lines of pastoralism with some agricultural activity to supplement the pastoral component.

Stephen Falconer (Falconer 1994a; 1994b; 1995; 2016; Falconer and Fall 2016) proposed an explanation on ruralization. He hypothesized that there was no evolutionary progression from “less complex” to “more complex” and urbanization. Changes within a given social construct were not necessarily “progressions” as it was previously thought, simply shifts in societal makeup. Bronze Age societies saw intermittent changes in social structure, with the foundation and then abandonment of large fortified towns and various levels of stratified settlement hierarchies (Falconer 2016, 61). Much of this explanation started with his study of Tell el-Hayyat in the Jordan River Valley in modern Jordan. Tell el-Hayyat had occupations beginning in the EB IV and continuing into the MB II. [16] Based on ceramic and artifactual evidence, some

[16] This is explored further in detail in later chapters.

interaction between the inhabitants in this region occurred but with a degree of ruralization. Production and consumption were aimed at long-term continuity rather than at short-term economics.

Excavations at EB IV rural settlements throughout the Levant show sedentary populations continued to exist despite the abandonment of the larger towns. A settlement hierarchy during the late 3rd millennium B.C. can be inferred based on rank-size analysis. While the coastal plain and central valleys of the Levant saw the rise of the largest sites and settlements, Falconer (1995) observes that it was the smaller sites in the Jordan Valley that contain site clusters that might represent distinct polities. The coastal plain and hill country settlement pattern suggests a highly denucleated and fluctuating configuration.

Falconer and Savage (1995) proposed a model that integrated spatial statistics and rank-size in order to explain changes in population numbers. Their study highlights the intermittent and varied trajectories of urbanization established in the Early Bronze Age in the southern Levant.[17] For the southern Levant, they compared the rank-size distributions for the coastal plain, the Central Hill country, and the Jordan valley for the Early Bronze I through the Middle Bronze II. Falconer and Savage note a convex rank-size distribution for the Central Hill country, with a decline of site area and population size during the Early Bronze III, when other regions in the southern Levant were witnessing a boom in population. They interpret this as a shift in the subsistence strategy and the regional populations. From the EB I through EB III the smaller settlements were gradually abandoned, with centralization on the larger tells. A decrease in the visible populations into the Early Bronze IV can be observed, which they attributed to an

[17] They also look at other regions in the ancient Near East as a point of comparison.

increase in pastoralism resulted in a less archaeologically detectable population (Falconer and Savage 1995, 54).

Greenberg's (2019) study on the Levantine Bronze Age attempts a new perspective on the sociopolitical atmosphere of the Bronze Age as a whole with a chapter on the Early Bronze IV. He also puts forth a explanation centered around the decentralization of urban centers and the economy and addresses regionalism and local settlement trajectories that were different across the region (Greenberg 2019, 136). Ultimately, Greenberg sees the late third millennium B.C. in the southern Levant as a rejoinder to EB III urbanism and the stresses associated with that form of social organization. It was a "risk-minimizing" approach that allowed for a more diversified resource base for a more scattered population (Greenberg 2019, 137). This tracks with what were explored later in this dissertation. However, ultimately this study falls back into older patterns of exploring the EB IV by looking at the major sites excavated and does not consider smaller settlements.

The best current studies on the Early Bronze IV were been done by Marta D'Andrea (2012b; 2014; 2018). She takes it further and proposes a new approach to (1) define the regional cultural horizons for the EB IV southern Levant plus the internal EB IV chronology based on ceramic sequences linked, if possible, to radiocarbon dates; (2) propose socioeconomic interpretations of synchronic and diachronic transformation of ceramics, settlement patterns, and burial customs based on the regional analysis of ceramics; and (3) define southern Levantine EB IV communities (D'Andrea 2014, 6). Building off studies by William Dever (1980a, 1985a, 1992), D'Andrea contextualizes the EB IV and situating it not just in space and time, but also explicating societal implications for these changes. The Early Bronze IV, more so than in other periods, contained regional differences in pottery that were not highly intermingled. There was evidence for connections and large-scale trade during this period, but also a high degree of regionalization. This may be indicative of smaller groups that were relatively self-sufficient. With no overarching polity to organize and control ancient Levantine populations, smaller groups emerged with a shared history but with a high degree of autonomy. Her studies were used, in part, as a foundation for this current study. Whereas her primary attention was on material culture and primarily ceramics, this study examines mostly at settlement locations and patterns.

1.2.5 Conclusion

Various approaches to the EB IV have been made over the years. Each hypothesis attempts to explain what happened during this period from different points of view, whether they focused on invasion of foreign people groups, regionalism as highlighted by stylistics and artifactual change, or socioeconomic models of change. The EB IV was a difficult period to characterize. Early scholars were unclear how to define it, pointing towards various similarities with both the previous and the later period that affected how the period was interpreted, to its exact timing. This was not helped by the fact very few excavated sites contain a continuous sequence from the EB III to MB I. This study builds upon these earlier studies, continuing to use ideas like regionalism and generally accepting D'Andrea's ceramic sequence and regionalism as correct.

1.3 Geographic and Chronological Scope

The Levant and the ancient Near East represent a variety of different ecological niches, each capable of sustaining diverse economic endeavors, food production, and social structures. The interactions between these diverse regions made the Near East primed for early civilizations (Kuhrt 1995). The scope of this current project is large, and therefore strict geographic and temporal limits must be set. The core area of research for this project is the southern Levant, which is defined as the areas encompassed by the modern boundaries of Israel, western Jordan, Palestine/West Bank, the Sinai Peninsula, and southern Lebanon. As a comparison, the northern Levant will also be addressed, which includes northern Lebanon, Syria west of the Euphrates River, and the Hatay region of Turkey in the Orontes River basin. The Middle Euphrates River Valley in modern Syria, the Jazira at the intersection of Syria, Turkey, and Iraq, and the Lower Euphrates River Valley and what was once the core of Mesopotamia is also addressed for broad analogies. Each of these different regions is highlighted in Figure 1.1.

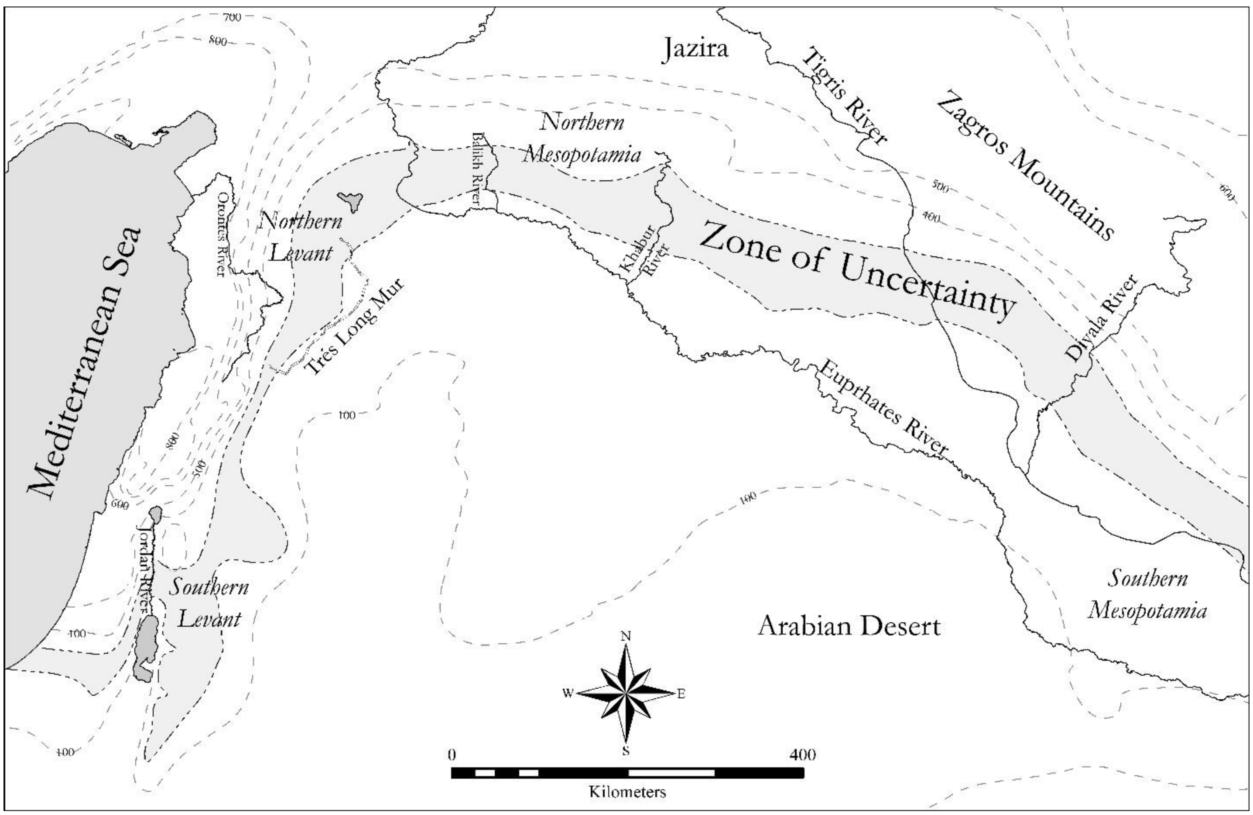

Figure 1.1: Map of the ancient Near East with the southern Levant, northern Levant, northern Mesopotamia, and southern Mesopotamia labeled. Zone of uncertainty is highlighted (isohyet between 250mm and 300mm). Map by author.

1.3.1 Levantine Geography

The geography of the Levant in particular, and the ancient Near East more generally, is diverse. Ranging from coastal plains to expansive, hot deserts, from mountains and steppes to extremely fertile valleys, this region encompasses many different environmental niches in a relatively small area (Wilkinson 2003). From west to east, the Levant begins with a low, wide coastal zone that narrows further north along the Mediterranean coast (Faust and Ashkenazy 2007). It is typified by sand dunes, poorly drained, swampy expanses, and kurkar rock ridges. It has a typical Mediterranean climate, with hot, dry summers and cool, wet winters (Wilkinson 2003). Going further inland is two hilly and mountain regions, with fertile valleys between. These hilly regions are well suited for horticulture and pastoral activities, whereas the valleys are best suited for agriculture (Manning 2005). Beyond the second ridge is the Jordan Valley, and the Dead Sea dividing the Cisjordan hills from the Transjordan mountains. The northern part of the Transjordan and Cisjordan are marked by seasonal wadis and runoffs (Hill 2004). South of the Dead Sea is marked by vast deserts, namely the Aravah and Negev. The Transjordanian plateau is relatively flat and fertile, but just beyond and further east is more desert.

Within this expansive landscape, this project considers three sub-regions of the ancient Near East: the "zone of uncertainty," the refugia, and the areas of the Levant that do not fit easily into either category.[18] The first area is what Tony Wilkinson et al. (2014) have called the "zone of uncertainty," namely the areas at the edge of dry-farming agriculture (Figure 1.1). It is located within the region that rainfall is between 300 and 200 mm per year. Agriculture is risky and agropastoral systems are relatively normal (Wilkinson et al. 2014, 53). Cereal grain agriculture requires a minimum of 200 mm of annual rainfall to be sustainable without additional water procurement systems (Zohary 1995). Agropastoralism is situated to absorb risks and incorporate them within the system. This was mostly controlled, at least during the EBA, by the upper

[18] These categories are exclusively based on rainfall zones. Temperature is a very important component in the region, as well, directly affecting agricultural and pastoral activities. However, it has not been extensively used in modern studies and does not have a large basis for comparison. Rainfall and temperature will both be examined in relation to the location of settlements later in this dissertation.

echelons of society. When royal and elite households were able to control larger economies, they could form a stronger system than more localized economies are able. If yields are sufficient and institutions could absorb the risk, these otherwise marginal landscapes could become very productive. However, this only works within a certain range of political-economic niches (Wilkinson et al. 2014, 57).

The second area is what Harvey Weiss (2014, 367) terms the “refugia” and defines it as areas in the ancient Near East with access to karstic rivers and a reliable annual water source. Weiss looks at a definition of “refugia,” specifically the Orontes and Euphrates River Valleys, that is too restrictive for the current project. Therefore, this study also includes all reliable drainage systems and areas that receive more than 300 mm of rain annually in the “refugia.” Specifically, the Bekaa, the Homs area, the Ghab, and the Amuq is considered. This tends to represent agriculturally secure areas of production, places where populations could potentially retreat in times of sustained drought (Weiss 2014).

The final region gets less than 200 mm of annual rainfall per year and is not in an area with reliable, freshwater sources. In the southern Levant, this is the desert regions south of the Dead Sea Basin and east of the Transjordanian Plateau. It is the vast desert regions of the Middle East. This area was utilized for many different purposes, from pastoral nomadism to metal extractions, seasonal gathering to hunting. These ventures were also not mutually exclusive or devoid of agricultural pursuits.

These three regions exist within the southern Levant. Other sites centered on major tells in the northern Levant and northern Mesopotamia served as comparisons for settlement patterning in the ancient Near East during the EB IV. These include Ebla (Matthiae and Marchetti 2013), Qatna (al-Maqdissi et al. 2002; Bartl and Al-Maqdissi 2007; Thalmann 2007), Leilan (Ristvet 2007; Ristvet and Weiss 2000; Weiss 1986; 1990; Weiss et al. 1991), Hamoukar (Ur 2002; 2010b), Mozan (Buccellati 1998; Buccellati and Kelly-Buccellati 1994; 1995), Brak (Eidem and Warburton 1996; Matthews 2000; 2003; D. Oates and Oates 1997; J. Oates 2001), Mari (Geyer and Monchambert 2003), Banat (McClellan 1998), es-Sweyhat (Danti 2000; Danti and Zettler 1998; Wilkinson 2004), and other general surveys (Bunnens 2007; Hammade and Koike 1992; McClellan and Porter 1990; Schwartz et al. 2000; Wilkinson 1994; 2000a; Wilkinson and Tucker 1995a; Wilkinson, Peltenburg, et al. 2007; Yukich 2013).

1.3.2 Chronology

Chronologically, this project looks at the Early Bronze IV (EB IV, c. 2500-2000 B.C.). To best contextualize this, examples from the earlier phases of the EBA are addressed. The following Middle Bronze Age is only addressed when necessary, mostly when written texts are present. The EB IV is also further subdivided, whenever possible, based predominantly on terminology employed in the northern Levant, (i.e., EB IVA, EB IVB, EB IVC) where continuous occupation of sites during the EB IV makes such designations possible. The only notable exception to this is Khirbet Iskander in modern Jordan. Additionally, the Middle Bronze Age is divided into two separate categories based on cultural remains, the MB I and the MB II. This study forgoes the previously utilized MB IIA for the MB I and MB IIB for the MB II.

In the southern Levant, a debate over terminology concerning the transition from the Early Bronze to the Middle Bronze Age transpired. The problem was further complicated when the period was compared across regions in the ancient Near East. This period was called a few different things, including the Early Bronze IV (EB IV), Intermediate Bronze Age (IBA), and the Middle Bronze I (MB I). This reflects the material culture, whether it was regarded to be a continuation of the Early Bronze Age III material or represents the first phase of the Middle Bronze Age.

As previously mentioned, the EB IV was first recognized as distinct by W.F. Albright (1932), who originally called it the MB I. This terminology was preserved later on in the surveys by Nelson Glueck (1933; 1939a; 1939b; 1940), who also recognized it as a distinct, the EBA-MBA period. G.E. Wright (1937) was the first to utilize the term "EB IV" to designate this period, even though he saw it as directly prior to what Albright had identified as the MB I. Later revisions to the chronology would show that these two periods were, instead, contemporaneous (Dever 1973). Kathleen Kenyon (1952) introduced another term for her excavations at Jericho, the Intermediate Early Bronze-Middle Bronze (EB-MB). The IBA was predominantly used in the southern Levant by Israeli scholars who, in adopting it, see it as a means to resolve the issue and defined the period as its own, differentiated period and to ignore the question of continuity between the EBA and MBA and divorces it from both periods (Bunimovitz and Greenberg 2006; S. L. Cohen 2009).[19]

Another problem emerges when trying to articulate the internal division within the Early Bronze IV. Some studies rely on a bipartite (Nigro 2003; 2007; Oren 1973), tripartite (Dever 1973; 1995), or no division (Amiran 1996; Bunimovitz and Greenberg 2006; Kenyon 1966) into sub-periods. Dever's tripartite system was typically the most cited (Dever 1973). He divided the Early Bronze IV into three subperiods, each roughly a century-long based between c. 2300-2000 B.C. and corresponding to varying families of ceramics in a relatively chronological, though slightly overlapping, system (Dever 1973). This was further complicated by different

[19] This, however, divorces the period from any connections with the previous or latter periods and tends to treat it as if existed in a vacuum. It oversimplifies the relationship and overall continuity from the Early to Middle Bronze Age. This period, in makeup, is more similar to the Early Bronze Age than the later Middle Bronze Age and is not a separate entity. Therefore, I treat it as part of the Early Bronze Age and adopt the EB IV terminology.

terminology between regions, with the southern Levant, northern Levant, Middle Euphrates River Valley, and even subregions within each labeling the subperiods differently.

All these various terminologies also affect the periodization that follows. Since the MB I was so extensively utilized in the Levant to designate this period, the three other Middle Bronze phases were designated Middle Bronze IIA (MB IIA), Middle Bronze IIB (MB IIB), and Middle Bronze IIC (MB IIC). If the EB IV was used to label this period, then the three phases of the MBA should be identified, respectively, as the Middle Bronze I (MB I), Middle Bronze II (MB II), and Middle Bronze III (MB III). This research project is going to preserve the EB IV label for the terminal phase of the late third millennium B.C., and use the MB I, MB II, and MB III to refer to the three phases of the MBA (see Table 1.2).

Table 1.2. Absolute chronologies of the Levant during the Middle Bronze Age.

Period	**Dates Used in this Study**
Early Bronze IV	2500 – 2000 B.C.
Middle Bronze I	2000 – 1800 B.C.
Middle Bronze II	1800 – 1600 B.C.
Middle Bronze III	1600 – 1530 B.C.

1.3.2.1 Absolute Chronology: King's List and Written Documents

Until recently, the timing of the Early and Middle Bronze Ages was tied into the absolute chronology of king's lists, which proved rather problematic in periods prior to the Iron Age (Brinkman 1977; Kantor 1992). A relative chronology was mostly established based upon the reign of kings of Babylon and Egypt, but anchoring it to an absolute date was challenging due to the existence of a "Dark Age" between the end of the Old Babylonian period (Middle Bronze

Age) and the beginning of the Kassite period (Late Bronze Age). A solar eclipse dated to exactly 763 B.C. allows for precise dating of the Near East after c. 1500 B.C. when combined with historical texts (Gasche et al. 1998). A sighting of Venus mentioned during the reign of the penultimate king of Old Babylon[20], though, possibly occurred in three different years: 1651 B.C., 1595 B.C., and 1531 B.C. (Gasche et al. 1998). These three dates correspond to what scholars referred to as the High, Middle, and Low Chronology (Barjamovic, Hertel, and Larsen 2012; Höflmayer, Kamlah, et al. 2016; Höflmayer and Streit 2018; Höflmayer, Yasur-Landau, et al. 2016). [21] This complicates the absolute dating of the earlier periods without the use of chronometric methods.

Further complicating issues in the northern Levant and especially the southern Levant, absolute dates for the EBA and MBA were derived from major urban centers in northern and southern Mesopotamia and Egypt (Akkermans and Schwartz 2004). Outside of Ebla in the northern Levant, no written documents or personal names in the region corroborated with documents from other regions. It was possible to tie in the chronology from the northern Mesopotamian city-state of Mari (Tell Hariri) to Ur during the Ur III period (Roux 1992; Mellaart 1979; Heimpel 2003; Gelb 1992), just prior to the Old Babylonian kingdom. Both Sargon and Naram-Sin of the Akkadian Empire also claimed to conquer Mari in an earlier period. The king-list of Ebla (Tell Mardikh) can tie into Mari, and in that way, the chronology can be extended into the northern Levant. Based on similarities with ceramic styles between Ebla and other regions in the northern Levant, especially the Orontes Valley, it might be possible to

[20] This is derived from the Venus Tablet of Ammisaduqa, in particular Omens 1 and 57 in the *Enuma Anu Series* of the penultimate king, Ammisaduqa of the Old Babylonian Period (Gurzadyan 2003, 3). The tablet mentions omens associated with a siting of Venus on the horizon at sunrise during a full moon, a relatively rare occurrence that only happened every 45 or so years.

[21] The Middle Chronology has been utilized the most, and in recent years, with the synchronization of radiocarbon dates, appears to be the "correct" chronology

extrapolate contemporaneity. Until recently, the dates associated with the typology was also extended into the southern Levant with no clear synchronism to support and creating further complications.

At the site of Tell Mardikh/Ebla in northern Syria a corpus of over 20,000 texts recording various economic and political activities of Ebla's elites was uncovered in a palace complex (Matthiae 1978; 1980; 2004; 2007; Matthiae and Marchetti 2013; Mazzoni 2002; Pinnock 2013). Palace G, corresponding to the first half of the EB IV, ended in destruction. Since both Sargon and Naram-Sin of Akkad claim to destroy the site, and based on the mostly accepted historical "Middle Chronology,"[22] the EB IVA sequence at Ebla (Tell Mardikh IIB1) was conjectured to end at c. 2300 B.C. (Fiorentino et al. 2008, 56). Since many of the ceramic sequences for the northern Levant were similar, typified by caliciform wares and the "Hama Goblet" (Cooper 1998; 2006; Dornemann 1999; 2012; Fugmann 1958; Karoll 2011; Mazzoni 1994; 2002), this was taken as the date for the end of the EB IVA in the northern Levant. Drawing upon similarities in ceramic forms from the southern Levant (Dever 1995), this datum point was also adopted for the southern Levant.

Synchronisms with Egyptian king's lists and chronologies were also attempted. The chronology in Egypt was based on king's lists that were later synchronized with radiocarbon dates (S. L. Cohen 2002; Kitchen 1997; Bronk Ramsey et al. 2010). Connections between the southern Levant and Egypt were apparent based on Egyptian objects in the Levant (Höflmayer and Eichmann 2014) and Levantine ceramics in Egyptian royal tombs (Braun 2005). Based on an

[22] The earlier chronology of the ancient Near East is dependent on dating the fall of Babylon. The end of the Old Babylonian period is murky, and there is a possible "dark age" between it and the Middle Babylonian period (Kuhrt 1995; van de Mieroop 2004). There is a tablet of the Old Babylonian period that mentions a sighting of Venus during the reign of the penultimate king, which has three possible dates. This resulted in the High, Middle, and Low chronologies. Due to the number of different chronologies proposed, a "dark age" of a varying number of years can be placed between the end of the Old Babylonian period and c.1500 B.C.

earlier chronology synchronized with Egyptian kings, the end of the EB III coincided with the end of the 6th Dynasty and subsequently the Old Kingdom, and the EB IV was contemporary with the First Intermediate Period (A. Mazar 1990, 169).

During the Early Bronze IB (c. 3300-3000 B.C.), written chronologies for Egypt could be tied into southern Levantine chronologies for the first time. This period was traditionally placed at the beginning of Dynasty 1 in Egypt (Braun 2009). In addition to both imitation and imported Egyptian ceramics, serekhs mentioning kings of pre-Dynastic Egypt make an appearance in the southern Levant. For example, one at Arad in the Negev mentioned Narmer (Amiran 1996). In this way, in addition to attempting to tie the chronologies with the Mesopotamian sequences, Amiran and others attempted to link it with the kings and associated chronologies of Egypt. Although a better case can be made to tie in the southern Levantine chronology with Egypt than with Mesopotamia, it still was tenuous. Little synchronicity between the two regions during the EB IV can be observed. Studies were also done to link the absolute radiocarbon chronology in the southern Levant to the king's lists of Egypt (Höflmayer 2015). Although a very powerful tool in understanding the ancient Near East and Egyptian history, written records were problematic when applied to grasping the absolute chronology in early periods.

1.3.2.2 Absolute Chronology: Radiocarbon Dating

With such problems relying on relative chronologies tied to distant historical documents in order to establish an absolute chronology, recent emphasis was placed on establishing a local absolute chronology for the southern Levant using radiocarbon dating. Several new radiocarbon samples were run in recent years and Bayesian models utilized to tighten the absolute chronology (Höflmayer et al. 2014; Höflmayer, Kamlah, et al. 2016; Regev et al. 2012; Regev, Miroschedji, and Boaretto 2012). Now, for the first time, the southern Levant had an absolute chronology with which to anchor the relative chronology without relying on distant synchronicities.[23] This was done with surprising results.

New studies utilizing radiocarbon dates from secure strata at various sites across the southern Levant greatly changed EB IV studies, putting the EB III to EB IV transition at c. 2500 B.C. (Greenberg 2019). Tell Fadous-Kfarabida in southern Lebanon contains a continuous occupation from the Chalcolithic through to the Middle Bronze Age (Höflmayer et al. 2014). From the site, a total of 32 short-lived[24] radiocarbon samples were taken, three from the MBA, six from the EB IV, twenty from the EB III, three from the EB II, and one from the EB I, which allows for absolute dating of the transitions between these periods. By using Bayesian modeling based on the assumption that each phase was discrete and in chronological order, the transition between the EB III and EB IV can be moved to around 2500 B.C., if not earlier (Höflmayer et al. 2014, 539).

Table 1.3: Comparison of old and new radiocarbon chronology for the Early and Middle Bronze Age

Period	**New Dates**	**Old Dates**
Early Bronze II	3000 – 2850 B.C.	3000 – 2650 B.C.
Early Bronze III	2850 – 2500 B.C.	2650 – 2300 B.C.
Early Bronze IV	2500 – 2000 B.C.	2300 – 2000 B.C.
Middle Bronze I	2000 – 1800 B.C.	2000 – 1800 B.C.
Middle Bronze II	1800 – 1600 B.C.	1800 – 1600 B.C.

[23] There was also a large study done in the Jazira with radiocarbon dates from the late third millennium B.C. (Ristvet 2011). Over 100 radiocarbon dates were run from 6 sites in the region. There is no date available for the beginning or end of the third millennium B.C. Based on these radiocarbon dates, the EB IV in the Jazira region also needs to be extended back, maybe as far as 2500 B.C. or even earlier.
[24] The utilized seeds, pips, and other annual plants instead of the longer lived and utilized trees and timber.

A larger study of radiocarbon dates in the southern Levant combined 420 samples from 57 sites (Regev, Miroschedji, and Boaretto 2012; Regev et al. 2012). Of these, 78 came from the EB III and 27 from the EB IV, allowing for a relatively accurate absolute dating of these two periods and the transition between them. For the EB III, nine sites were utilized whereas for the EB IV only seven sites were dated. With the exception of a couple of outliers, the latest EB III date lies between 2500 and 2450 B.C. (Regev et al. 2012, 559). The dates for the EB IV were much more varied, with the earliest beginning date from Be'er Resisim in the Negev at c. 2850 B.C. and the latest ending date after c. 2000 B.C. (Regev et al. 2012, 559). Utilizing Bayesian modeling, the overall transition from the EB III to the EB IV can be placed between 2570 and 2520 B.C. (Regev et al. 2012, 560). Dates can be changed, and the transition occurred over roughly a century, beginning at some sites at c. 2400 B.C. (Regev et al. 2012, 561).[25] See Table 1.3 for a comparison of the old and new dates.

At the site of Pella in Jordan, 10 accelerator mass spectrometry (AMS) radiocarbon dates from the Early Bronze Age were run (Bourke et al. 2009). The material utilized was all short-lived plant remains, predominantly cereals. This would still allow for the revised date of the beginning of the EB IV at around 2500 B.C., as was evidenced at other sites in the southern Levant.

When the EB IV was dated to c. 2200 B.C. it corresponded with a hyper-climatic episode, which was set concretely at 4.2 ka BP (Weiss 2017a). With the new dates, this event can no longer the catalyst for the EB IV (Höflmayer 2014). Climate, however, still likely played an important role in restructuring EB IV southern Levantine societies. It simply can no longer be the

[25] A conference was held at the University of Chicago in March of 2014 on the timing and manifestation of the EB IV, to update the discussion in light of these new radiocarbon dates. The results of this are currently being published (Höflmayer 2017).

primary explanation. This shift in the chronology also means an extra 300 years needed to be taken into consideration. The material culture and number of sites dated to the EB IV based predominantly on ceramic sequences needs to be reassessed.

1.4 Data Sets

Most of the data for this study was derived from the Israel Antiquities Authority (IAA) and the Department of Antiquities in Jordan (DAJ). This was supplemented with academic surveys carried out for various reasons. Understanding how and why these surveys were conducted was imperative to incorporate them into this study. Below are the surveys that were conducted independent of the IAA or DAJ in Jordan, as well as those conducted in Lebanon and Syria where there is no easily accessible central repository. There are some caveats that need to be said before looking at the data itself.

Using different surveys has provided some unique challenges. Different surveyors utilize different methodologies, have different research questions, among other things, that influence the data that are collected and how they are presented. There are different resolutions both temporally and spatially, with different recording practices. Therefore, this study recorded the data to the highest resolution possible. There are several caveats, however, that need to be addressed. Each individual survey presented also discusses any possible problems or caveats that need to be kept in mind when integrating the data.

1.4.1 Surveys of the southern Levant

The primary source of data for the southern Levant that were not the government-sponsored surveys during the Early Bronze IV was Gaetano Palumbo (1990). His book gathers together surveys and splits them into both settlement and cemetery categories. There were 269 cemeteries and 1027 settlements in his study. He examines the geographic distribution, locational patterns, and the ceramic assemblage. He does this for the entirety of the EB IV, especially as it relates to the EB III and MB I. It does not contain enough data for the entirety of the EBA and MBA to be used to analyze these changes, but it was a good starting point.

Another source of information for this study was Magen Broshi and Ram Gophna's article from 1986. They relied on previous survey information and personal communications with other scholars to generate their list of sites occupied during the MBA (Broshi and Gophna 1986, 74–75). If there was no categorical assessment for the site size, they classified the site into one of five categories, each with a different mean area. If the site had a known area or was ramparted, that was added.

In a study by Ram Gophna and Juval Portugali (1988) concentrating on the coastal plain, they looked at population and settlement in the southern Levant. This study was predominantly the Chalcolithic through the MBA, looking at similar regions like the earlier study. They performed analyses on the distribution, by region and period, of the number and area of sites and the calculated populations (Gophna and Portugali 1988, 12). This study was not as extensive temporally or geographically as the one by Broshi and Gophna two years earlier.

The survey conducted by Israel Finkelstein and published in *The Archaeology of the Israelite Settlement* attempted, as its primary aim, to understand the settlement history of the Israelites during the 12^{th} and 11^{th} centuries (Finkelstein 1988). He amasses the archaeological data to understand the Iron Age of ancient Israel plus presents the survey data he and a team collected in the territory of Ephraim in the Central Hill country of modern Israel. The survey area consisted of about 1,050 km^2 of the Central Hill country. Although his primary aim was to understand the Iron Age, he still recorded every period of occupation at the various sites, which includes 1 Chalcolithic, 13 Early Bronze, 26 Middle Bronze, and 1 Late Bronze Age (LBA) site.

Another study led by Finkelstein (Finkelstein et al. 1997) also had as its goal the elucidation of the same region. The goal of this survey was to understand the region around Shiloh in preparation for the excavations of this site. A total of 585 sites were recorded, with around 30 for (Finkelstein, Lederman, and Bunimovitz 1997, 11)the EBIV. The surveyors recorded site name, grid references, type of site, geographic location, elevation, site size, topography, distance to water, references to previous surveys, and the periods that were occupied.

The final major, predominantly scholarly publication utilized in the present study was by Adam Zertal (2004) on the Manasseh hill country. The standard Israel survey grid was not adopted in this case, since the surveyors believed that the system was too arbitrary to adequately represent the natural boundaries of the territory of Manasseh. The survey encompassed a total of 2,700 km^2 (Zertal 2004, 1). Of the sites recorded in this survey, 135 were occupied during the EB IV.

These were used to supplement the primary data source, information derived from government-sponsored surveys with the aim of documenting all culturally sensitive archaeological remains in Israel, Palestine/West Bank Jordan. The Archaeological Survey of Israel was first established in 1964 and aimed to publish a comprehensive archaeological survey in modern Israel. The country of Israel was split into 100x100m squares and systematically surveyed by a team of archaeologists. The first survey map, the Map of ‘Atlit, was published in 1978 (Ronen and Olami 1978). Since then, another 38 books were added. In 2006 these books were digitized and published online, available for public access. It was from this website that the data for this dissertation was derived. Each surveyor was allowed some autonomy with how they performed the surveys, based predominantly on the multiple microenvironments present in Israel including personal preference.

Data for the southern Levant was also derived from the Jordanian Department of Antiquities website (http://www.megajordan.org/). The Middle Eastern Geodatabase for Antiquities (MEGA)-Jordan was a collaboration between the Getty Conservation Institute, the World Monuments Fund, and the Department of Antiquities in Jordan (DAJ). They also published all known archaeological data from within Jordan and made it publicly available. MEGA-Jordan is the primary tool of the DAJ to manage the archaeological sites in Jordan, as well as to inventory them.[26]

1.4.2 Surveys of the Northern Levant

Surveys from the northern Levant were conducted differently than those of the south. The two primary modern countries that envelope this region, Syria and Lebanon, had not performed nationwide surveys along the same lines as Israel and Jordan. Instead, data were derived predominantly from surveys done by different academic institutions in pursuit of specific theoretically questions.

The Ebla Chora Project (ECP) looked at an area of around 3,500 km^2 around the site of Ebla and subdivided the area into three regions based on the surrounding ecology, including the basaltic foothills (Area A), the Matkh depression (Area B), and the steppe and the el-Hass and Shbeyt ranges (Area C) (Mantellini, Micale, and Peyronel 2013). Area A was represented by low annual rainfall (around 300 mm) and was semiarid. The area was typically limestone with some basalt outcrops and was not as densely settled as the neighboring regions. The only water supply was from dug wells (Mantellini, Micale, and Peyronel 2013, 164). Area B was an irregular,

[26] Jordan has not done a systemic survey of the entirety of the country. Rather, MEGA-Jordan serves as a repository for all sites excavated in Jordan, including those sponsored by the state and those as part of academic endeavors.

relatively flat marshland through which Nahr el-Quweiq flows. Since there were only three EBA sites located on the western end of this depression, with the remainder around the edges, it might be the location of an ancient lake. There was a relatively dense occupation of the Matkh area during the late third millennium B.C. (Mantellini, Micale, and Peyronel 2013, 165). Area C was the easternmost region and includes a diverse range of ecological niches and zones. The center of the area was a low basalt flow. The eastern limit represents the only direct passage to the Jabbul Lake and, ultimately, Umm el-Marra. The southern part of this area was mostly arid (100-200 mm isohyet), and there was little evidence of stable, sedentary communities in this area (Mantellini, Micale, and Peyronel 2013, 167).

A number of reports that were printed that deal with the surveys around the Homs Gap in modern Syria (Bradbury 2011; Bradbury and Philip 2011; Ibáñez et al. 2006; King 2002; Philip et al. 2002; 2005; Philip, Bradbury, and Jabour 2011). The Homs Gap represents a trade and invasion route from the coastal plain to the interior throughout antiquity.

Surveys from 2004-2005 were carried out by a joint Syrian Lebanese-Spanish team and looked at the area around the modern city of Homs. The project area encompasses about 560 km^2 and incorporates a few different ecological niches, including the Orontes River valley, basalt plateaus and hills, and the Bouqaia Basin. The project aimed to not only record sites that dated from the Paleolithic to the Ottoman period, but also the origin and development of the Neolithic and the organization of urban centers during the EB IV (Ibáñez et al. 2006, 187). They first surveyed for the large, obviously visible sites on the landscape and then performed a selective survey in areas that they thought hunter-gathers and the first farmers were most likely to settle (Ibáñez et al. 2006, 188). In total, 132 archaeological sites were recorded over two survey seasons. Of these, 20 were occupied during the EB III-IV and MB I-II.

Tell Mastuma was in northwest Syria, specifically the Iblid district, on an old route from Aleppo to the Mediterranean around modern Latakia. It was between the Rouj Basin, the Jebel al-Zawiya, and the Iblid plains. Tell Mastuma was excavated by the Ancient Orient Museum, Tokyo from 1980-1995. The original aim of the project was to elucidate the EBA strata, but upon initial investigation, the large amount of Iron Age materials ultimately shifted efforts to this later period. A team surveyed the region around the tell, predominantly focused on the Early Bronze and Iron Age, in 1993. In total, 22 tell-type settlements were discovered.

Two surveys conducted around the Sajur valley region, by the Euphrates River, were performed in the late 1970s under the direction of AMT Moore (Cauvin and Sanlaville 1981). The team was predominantly interested in the Paleolithic periods, but they coalesced a relatively complete inventory of sites with systematic collection of artifacts. The sites that were identified consisted predominantly of tells, ruined villages, and emptied tombs that were easily identifiable from the car. A total of 82 sites were surveyed in the region.

Surveys around the site of Tell Rifa'at along the Qoueiq River were conducted by a team led by John Matthers (Matthers 1978; 1981a). The survey was conducted from 1977-1979 under the sponsorship of the Institute of Archaeology, London University. The emphasis of the survey switched from concentrating predominantly on the area around Tell Rifa'at, in a triangle from Aleppo to Bab to Aazaz, to a study of the River Qoueiq and its immediate area. The basin was roughly 100 km north to south and 40 km east to west in the north and narrowing to around 25 km closer to Aleppo. The surveyors predominantly used a French map to discover the sites in the survey area. They were able to add nine total to those already articulated on the map, bringing the total up to 88 sites dating from the Pre-Pottery Neolithic (c. 7500 B.C.) through modern times (Matthers 1981b). Each site was recorded and photographed. Surface finds like flints, sherds, and other diagnostic materials were collected. They only retained rims, bases, and other diagnostic ceramic sherds, discarding the rest. The location of the sites was calculated by using a telescopic alidade.

The University of Tsukuba, led by Takuya Iwasaki and Akira Tsuneki, conducted regional surveys in the Rouj Basin, a small rift valley in northwest Syria (Iwasaki and Tsuneki 2003). The primary emphasis of the study was to understand the transition from village to city in the basin. Tell type cells were the primary data point collected, with surface finds collected to determine periods of occupation. In total, they discovered 33 tells in the basin, most located at the terminus of stream flows. Fieldwork was carried out from 1990-1992. In addition to surveys, shovel test pits were dug at four tells (Tell Aray 1 and 2, Tell el-Kerkh 2, and Tell Abd el-Aziz) to generate a ceramic chronology for the valley from the Neolithic through the Early Bronze Age (Iwasaki and Tsuneki 2003, 2:1).

Finally, supplemental data was added from *A History of Syria in One Hundred Sites* (Kanjou and Tsuneki 2016). This book explores recent excavations in Syria, spanning from the Paleolithic through the Islamic period. Thirty-three sites were explicated from the Bronze and Iron Age across Syria, including the northern Levant, Middle Euphrates, and Jazira region. All the sites were already in other surveys and databases, but further descriptions of the sites themselves and new data was presented in this volume.

2 CHANGE ACROSS TIME: CHARACTERIZATIONS OF THE EARLY BRONZE AGE IN THE SOUTHERN LEVANT

The history of the Early Bronze Age (EB), as it is known today, is complex. From the seeds of urbanization established during the EB I to the rise of cities in the EB II, to their disappearance in the EB IV, this period has garnered a lot of attention and various hypotheses as to the mechanisms behind change. The following chapter outlines the culture-history of the Early Bronze Age in the Levant, laying out the critical groundwork needed for analysis of the reasons behind the changes in the later chapters. The chapter also addresses the archaeological and historical knowledge of the frequently debated EB II-III and EB IV. All of the sites and regions mentioned in this chapter are in Figure 2.1.[27]

Since it was first identified in the 1920s by W.F. Albright, the Early Bronze IV was the center of debate. Very little consensus was reached on the nature of this period. The material culture was relatively well known. Early studies based primarily on the excavation of a few key sites in the southern Levant like Jericho, Megiddo, and in the Negev, demonstrate a rapid abandonment of cities at the end of the EB III and a more rural economy dependent on pastoral activities. To unpack these assertions, this chapter addresses the archaeological and historical knowledge of the EB II-III and the EB IV.

[27] This chapter also attempts to highlight the continuities between the Early Bronze Age subperiods. The Early Bronze IV is not a separate period, but rather a part of the progression of the EBA. The period ultimately concludes the EBA while bridging the gap into the MBA.

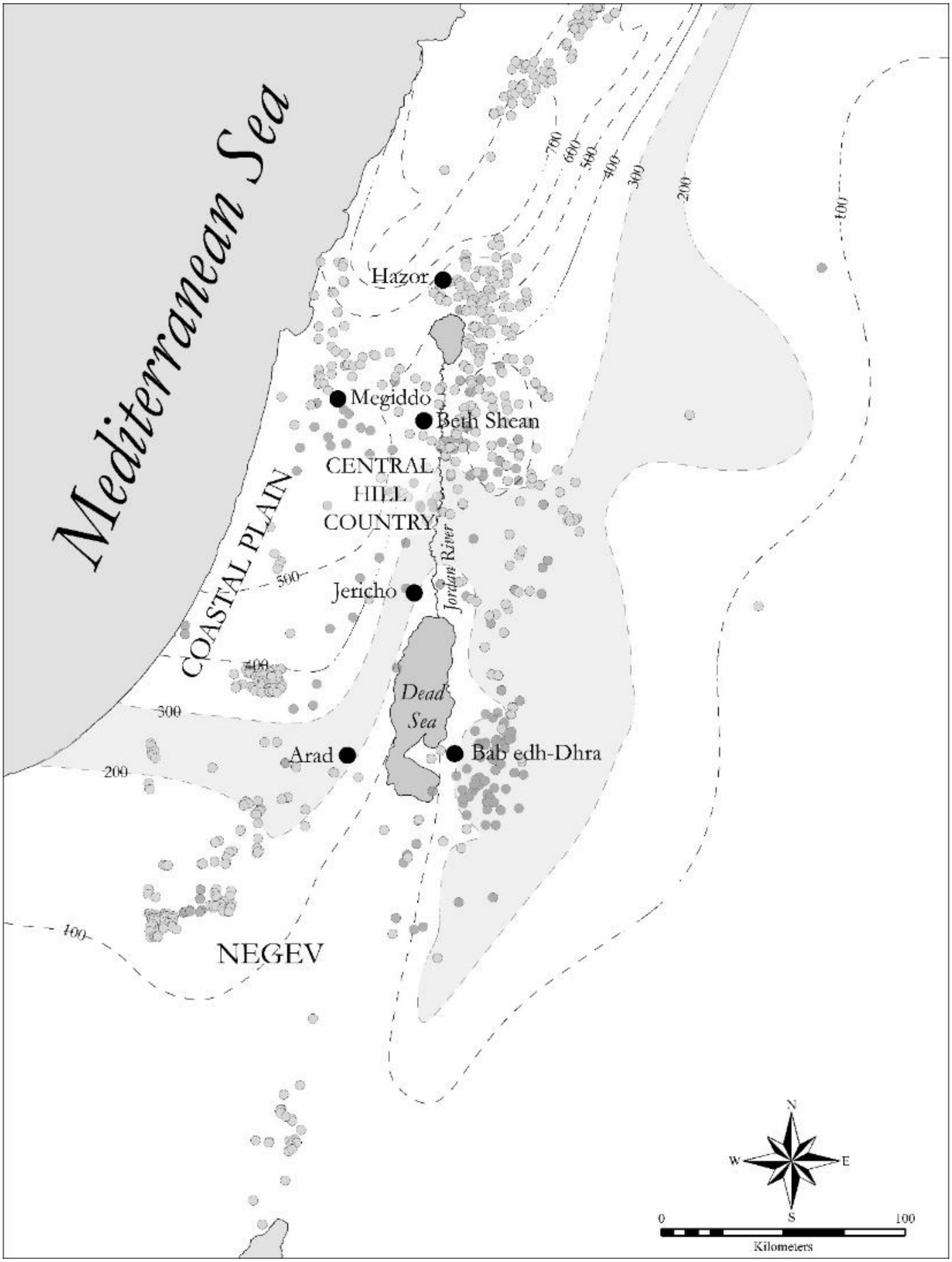

Figure 2.1: Archaeological sites and regions mentioned in this chapter, with Early Bronze II-III sites. Map by author.

2.1 REGIONAL EARLY BRONZE AGE SETTLEMENTS AND BURIALS

The beginning of the Early Bronze Age saw drastic changes from the previous Chalcolithic. During the EB I, small, ephemeral sites dotted the landscape (Amiran 1981; 1996; Bietak and Czerny 2008; A. Mazar 1990; Kuhrt 1995). In the northern Levant and Mesopotamia, the beginning of the EB I marked the end of the Uruk period (Algaze 1993; Rothman 2001). In the southern Levant the EB I was a distinct transition from the Chalcolithic. Populations were primarily centered on an integration of both sedentary and mobile ways of existence, including agriculture, horticulture, and herding practices (A. Mazar 1992). Other developments, like the introduction of the plow and riverine irrigation, allowed for more intensive agriculture (Akkermans and Schwartz 2004). The development and expansion of horticulture[28] during this period was particularly important, allowing for the production of wine and olive oil on a larger scale and changing the face of the economic and social landscape (Salavert 2008). During this phase, settlements were more dispersed across the landscape and not agglomerated into a few, major centers (Chesson 2018). The mobile sectors of society became a more central focus of the society. It also set the stage for heavier international interactions that would come in the following periods (A. Mazar 1992). New copper mines and veins in the Feynan area of Jordan were exploited and an increase in metallurgical productions occurred (R. B. Adams 2003). For the dating of the various subphases of the EBA in the southern Levant, see Table 2.1.

[28] Horticulture is the cultivation of fruits nuts, and vegetables. It differs from agriculture because it does not incorporate cereals, grains, or other large-scale crops. In this study it will mostly represent olive and grape production.

Table 2.1: Dating of the Early Bronze Age subphases

Period	**Dates Used in this Study**
Early Bronze I	3900 – 3000 B.C.
Early Bronze II	3000 – 2850 B.C.
Early Bronze III	2850 – 2500 B.C.
Early Bronze IV	2500 – 2000 B.C.

It was during the Early Bronze IB (c. 3100 B.C.) the standard EBA system, typified by villages, came into existence (Falconer 1995). This transition to village life was not synchronously. Indeed, the transition almost seems more experimental than intentional. Regional centers started to emerge. An increase in settlements in previously unoccupied areas also transpired (Philip 2003). The EB I was the first period with clear evidence of international contact with the southern Levant, specifically as it related to the control of trade with Predynastic/early Dynastic Egypt (Gophna 1992; Harrison 1993). Indeed, one scholar asserts that trade with Egypt motivated southern Levantine populations to congregate in larger centers (Esse 1989). The Early Bronze I cultural groups first established the basis of urbanism and a centralization of settlement hierarchies.

Scholars have also observed various burial types, including rock-cut tombs, cemeteries, cave burials, dolmens in the Golan, and cairns in the Negev during this period (Al-Shorman 2010; Fraser 2018; Ilan 2002). A lot of the variability in tomb types was likely regional, which some interpret to represent cultural divisions (Ilan 2002, 99). Particular burial types were located in different regions, including *nawamis* in the Sinai, tumuli in the Negev, dolmens and cists east of the Jordan River, and caves and rock-cut tombs in the coastal plain (Ilan 2002, 99). The secondary burials in *nawamis* and other built forms were in areas that were mostly arid with a relatively high bedrock. The majority of the tombs contained individuals, although some group burials were present, which are interpreted to be kin-based since they contained males, females, adults, and children (Ilan 2002). Cremation was present, but not common.

The subsequent EB II and EB III subperiods have been more difficult to distinguish archaeologically. Both the EB II and EB III utilized similar ceramic traditions, aside from the presence of Egyptian exports in the EB II. As a result, many surveys conducted in the southern Levant do not differentiate the EB II and EB III and instead lump them together. As a result, little can be said about the EB II and EB III separately, since it is difficult to track exactly what was going on from one period to the next.

What is clear is that there was a drastic change from the Early Bronze I to the Early Bronze II. Populations abandoned their previous village settlement patterns and bought into a much more rigid system that involved fortified sites, urban spread, and increased industrialization (Chesson 2018). In the subsequent EB III, there was a large drop in the number of settled sites. Instead, populations started to congregate into heavily fortified cities with few sedentary villages in between (Chesson 2018; Gophna and Gazit 2006). There was also a steep decline in the scale of industry and in specialization. In short, through the end of the EB III, populations started to congregate into fewer but larger settlements with less diversity overall between settlement types.

EB II-III fortified sites were relatively numerous and most were located along important water sources or near roadways. Additionally, fortifications grew throughout the periods. What began as walls that were three to four meters wide during the EB II became seven or more meters thick during the late EB II and the EB III (Aharoni 1993a). Nonetheless, only a few of these sites were large with long stratigraphic sequences. Exceptions include Yarmuth, Megiddo, Ai, Khirbet ez-Zeraqun, and Bab edh-Dhra.

The fortified sites of the EB II-III were fairly uniform in appearance and in material culture (Chesson 2018). Double fortification walls were present, as well as an increase in the construction of temples and palaces. Temples were usually identified by broad-rooms with entrance porticoes (Amiran 1981). Palace complexes were not uniform across sites, but they were all well-planned and carefully built. Greenberg (2017) sees this as more of a "corporate" social and political strategy. Individual cities were no longer self-reliant. Heavy investment in one mode of subsistence, predominantly led by reliance on one type of agricultural practice and crop per settlement, meant that each city and each community was reliant upon one another to survive (Chesson 2018).

EB II-III populations utilized new farming technologies, including check dams, ox-drawn ploughs, the use of donkeys, and horticulture (Philip et al. 2002; Philip 2003). Each of these new systems involved substantial time and labor investments, sometimes for relatively low yield. For example, olive and grape cultivation required years of advanced planning and regular maintenance to produce any viable crops (Joffe 1993; Stager 1985). Irrigation projects required the reorganization of labor and large-scale investment to build and maintain such systems (Helms 1981; 1989). These changes not only affected the agropastoralism and trade routes of the Early Bronze Age but also drastically modified the physical landscape. This possibly resulted in the growth of land ownership groups that were likely organized around specific, elite kinship lines (Philip 2003, 116).

Evidence for mortuary practices is lacking for the EB II-III, however. This was rather striking, as both the earlier and later periods, namely the EB I and the EB IV, contain a number of documented cemeteries (Philip 2003). Many of the burials of the EB II-III were intramural, although some outside burials were present (Ilan 2002). The rituals associated with these burials, including the locations and the artifacts, reflected more of a "communal" aspect than the previous period (Chesson 1999). Collective burials were the norm, and it was rare to have an individual burial from this time (Ilan 2002). Only two walled settlements in the southern Levant contained an associated cemetery of shaft and chamber tombs, namely Jericho and Bab edh-Dhra' (Kenyon 1960a; 1960b; Schaub and Rast 1989).

At Bab edh-Dhra', evidence for a drastic change in burial practices throughout the Early Bronze Age can be observed. This site, located near the Dead Sea in modern-day Jordan, was one of the few sites to contain a continuous burial sequence for the entirety of the EBA (Chesson 1999; Rast and Schaub 1979; Schaub and Rast 1989). The cemetery was rough 75 ha and was around 200-500 meters southwest of the major settlement area (Chesson 1999). The most conspicuous tomb type from the EB II-III was the charnel house. Indeed, there was a progression from shaft tombs in the EB I, to circular charnel houses and then rectangular charnel houses in the EB II-III. Finally, in the subsequent EB IV, populations returned to utilizing shaft tombs. The charnel house had a transitional phase, with round houses during the terminal EB IB into the early EB II that resulted in the large, rectilinear structures of the EB II-III. A total of 10 charnel houses dated to the EB II-III were excavated at the site. These houses were locations of secondary burials, with the skeletal remains largely disarticulated.

The excavators argue that a shift in urban life happened here that was reflected within the mortuary practices. During the non-urban period, shaft tombs were utilized and may be reflective of a household identification. The household was the primary unit. During the urbanized period, charnel houses and shared burials were utilized, maybe reflecting more of a social, community-based identification (Chesson 1999, 137). It was part of a secondary mortuary ritual, wherein community members interred their dead in the charnel houses as a final step in the treatment of the dead (Chesson 1999, 153). The charnel houses also represented an alteration of the conception of urbanism and extended the kinship organizations. These large, conspicuous graves were visible across the landscape and were part of the visual presentation of the EB II-III city. It may also indicate a merging of individual burials with the ancestral group (Philip 2003, 117).

The Early Bronze Age was based on the interconnectivity of regions. Each individual region specialized and relied on different forms of subsistence practices and different forms of product specialization. Each region also was subject to varying environmental conditions that limited the number and types of choices that people could make. In order to understand this as a whole, it is important to look at each individual region in isolation before combining it into a greater narrative of change. The following looks at the desert region, the coastal plain, and the major valley systems of the Levant.

2.1.1 Arad and the Negev

In the Negev, rainfall was not sufficient for "dry-farming,"[29] nor was there a steady enough water supply to perform irrigated agriculture (Wilkinson 2003). Rainfall was sporadic and unreliable from year to year, season to season (Kedar 1957). It also falls within the 100 mm isohyet, making it a very dry, very marginal community (Shahack-Gross and Finkelstein 2008, 966). It was possible, though, to perform agriculture in such a remote environment. Gathering runoff from a relatively large catchment area could allow for an area that only gets 100 mm of rain annually to receive enough supplemental moisture to get the equivalent water supply of an area that falls within the 300-500 mm isohyet (Maisels 1993; Wilkinson 2003). In order to do this, a

[29] The fields are fed by the rain and require the area to fall above the 200-300 mm isohyet.

catchment area of roughly 12 times the size of the cultivated plot was required (Kedar 1957, 180). To allow the landscape to provide extra runoff, long ditches lined with stones were built to aid in transfer of water from the higher altitudes down (Wilkinson 2003). These features had not been excavated, but a surface survey of the area around some of the runoff channels discovered pot sherds of four periods: the Early Bronze IV, the Iron Age, the early Byzantine, and the late Byzantine (Evenari, Shanan, and Tadmor 1982, 119). These features allowed for enough runoff.

Some major cities, like Arad[30] in the semiarid region of the northern Negev, were far from the things typically associated with city life. They were far from roads, water ways, and good agricultural lands (Winter-Livneh, Svoray, and Gilead 2010). Most of the settlements were either smaller in size or ephemeral in nature in the Negev, with a few notable exceptions (Bienkowski and Galor 2006; S. A. Rosen 2017; Winter-Livneh, Svoray, and Gilead 2010). Several smaller settlements were also uncovered via survey in the region (Avni 1992; R. Cohen 1992; R. Cohen and Dever 1978; 1979; 1981; S. A. Rosen 1987; Haiman 1989; 1992; 1996; 1999; 2009). Lumped together, a total of 1194 sites were discovered via survey in the Negev for the EB II-III. It was possible to split this up in some of the surveys, with 612 sites in the EB II and 333 sites in the EB III.

Of importance to the Early Bronze Age discussion of the Negev is the copper trade. There is also the possibility for an increase in the copper trade during this period. The primary source for copper was in the Wadi Faynan of Jordan, and to reach trade centers the copper

[30] Arad was an important city in the Negev desert during the Bronze and Iron Ages. It was typically identified with modern Tel ‘Arad, about 26 km east of Beersheba, and was at the northeastern corner of the Arad Valley. It was a deeply stratified and fairly tall archaeological site. A total of five excavation seasons on the citadel between 1962 and 1967 occurred (Aharoni 1968; 1981; 1993a; Aharoni and Amiran 1964; V. Sasson 1982). It was a relatively large site during the Early Bronze Age, reaching around 11 ha in size. The city wall measured around 1200 m, was 2.4 m thick, and contained both gates and towers. There was a plan to the city, with residential areas and planned streets throughout. It was the largest city in the Negev during the Early Bronze Age. Specifically, during the EB II it was the commercial center for the region, connecting a large, interconnected system of smaller sites in the area. There was clear contact with Egypt during this period, with Egyptian pottery in Stratum IV.

needed to get across the Negev desert (Levy et al. 2002; Muniz 2007). There was an increase in the number of sites in the Negev during the EB IV, which may be accounted for by trade routes (Haiman 1992; 1996; 2009). The full implications of the copper trade are explored in Chapter 4.3.

2.1.2 Desertion of the Coastal Plain

The coastal plain of the southern Levant is relatively narrow and accounts for a small portion of the overall land of the region (Wilkinson 2003). The region is crisscrossed with former estuaries and still present rivers, draining into the Mediterranean Sea. This results in a region that is, at times, rather swampy and poorly drained (Raban 1985). The coast was the main road traversed from the northern polities and Mesopotamia through to Egypt (Raban 1988). A significant decline in the number of settlements in the coastal plain of the southern Levant during the Early Bronze II-III occurred. Based on current evidence, this was the first region partially abandoned, and a forced restructuring before the EB IV. By looking at both surveys and excavation data, Avraham Faust and Yosef Ashkenazy (2007; 2009) show that the EB II-III saw a decline in population size and settlement numbers in the coastal plain. They only found six sites in the coastal plain for that period, and this study can add no additional settlement locations. All of them were in the refugia. Interestingly, there were so few sites in the region when there was clear evidence of large-scale trade along the coast. The urbanization of the coastal plain started in the Middle Bronze Age.

Faust and Ashkenzy (2007; 2009) propose that this abandonment of the coastal plain by the EB III was mostly in response to an increase in precipitation . Since there were significant drainage problems within the region, an increase of precipitation caused a spread of swampy areas which were poor for agriculture and increased the likelihood of disease. The coastal plain became a difficult region to inhabit. Although this was likely a significant contributing factor, it would not be able to solely account for so few sites in the region. It was possible that, as population started to gather into more centralized locations, they did so in regions that were more favorable for agriculture. Again, it was likely that this was part of the reasoning. It would also be possible that the few sites that were left on the coastal plain participated in maritime trade and performed down the line trade into the more fertile, densely populated valleys. There was evidence for international trade at sites in the Jezreel and further inland. It seems, then, that these sites in the coastal plain, although limited in population, were possibly specialized trade centers. There was, however, little evidence that this was necessarily the case.

2.1.3 Utilization of the Major Valleys and the Central Hill country

Interestingly, settlements that were present during the EB II-III were clustered along the border between the coastal plain and mountains, with a small concentration in the northern coastal plain, then up into the Central Hill country (Faust and Ashkenazy 2007, 28). A large part of the population was concentrated in the hill country, specifically the Galilee, Samaria, and Judah, at a density that was not met at any other time (A. Mazar 1992). The few cities crystalized their power and started to control hinterland hamlets and farming communities. Individuals at these sites established, for the first time, some territorial city-states. As these centers, like Hazor, Beth Yerah, Beth Shean, Megiddo, and Lachish garnered more control, the small, competing settlements were abandoned and populations moved to the Early Bronze III major cities. The number of overall sites diminished during the EB III, whereas aggregate site area increased (Broshi and Gophna 1984). Foreign influence also greatly diminished, as the Akkadian empire collapsed in southern Mesopotamia and the First Intermediate Period began in Egypt. The brief international age of the EB I and II disappeared.

During the EB II-III large, central sites that typified the fertile valleys of the inland southern Levant, like the Shephelah and the Jezreel, were heavily occupied. A number of large sites were particularly important to understanding how this area was utilized in the past, including Megiddo, Beth Shean, and Hazor.

Megiddo or Tell el-Mutesellim, contains a long and extensive history. It has been excavated considerably since 1903 by a number of different expeditions: the first from 1903-1905 by a German team; in 1925 by the Oriental Institute of the University of Chicago; in the 1960s by Hebrew University; and a recent endeavor by Tel Aviv University and The George Washington University (Finkelstein et al. 2000). It was a prominent feature in the Jezreel, raising 50m above the surrounding area and covering around 6 ha (Aharoni 1993). It was positioned to control the access into the Jezreel from the Sharon. Whatever power was able to control Megiddo during the Bronze and Iron Ages was able to control the main corridor from Egypt up into modern Syria (Ussishkin 1995).

By the Early Bronze I, Megiddo was already an important cultic center for the surrounding area (M. J. Adams, Finkelstein, and Ussishkin 2014). During this period the settlement was relatively large, covering a large area around the tell, up to 50ha (Finkelstein and Ussishkin 2006). A very large temple complex discovered in Stratum XVIII at the site, with a smaller one just below in Stratum XIX, was excavated (M. J. Adams, Finkelstein, and Ussishkin 2014). There was a brief hiatus in occupation and utilization of the site during the Early Bronze II (Esse 1991).

Beth Shean was located at the confluence of the Jezreel and Jordan Valleys and controls access from the Mediterranean coast inland east of the Jordan River. Excavations began, albeit in a limited capacity, from 1921 to 1933 by the University of Pennsylvania. Renewed excavations began in 1983 and then from 1989 to 1996 under Amihai Mazar and Hebrew University. During the Early Bronze I, a large building with pithoi and burnt grain was uncovered, leading to the hypothesis that there possibly was a grain-storage establishment at the site (A. Mazar 2000). Little to no occupation at the site during the EB II can be observed, with renewed occupations during the EB III. During the EB III, six stratigraphic levels were encountered, dating from potentially the terminal phase of the EB II through the end of the EB III. Of the ceramics encountered, the majority were locally produced Khirbet Kerak ware.

Hazor was located at the southern boundary of the Huleh Valley in northern modern Israel. It was a large Canaanite and Israelite settlement 14 km north of the Sea of Galilee. Tell el-Qedah was first identified as the site of ancient Hazor in 1875 by J.L Porter. Hazor was mentioned multiple times in history, from Egyptian sources[31] to the Bible. Excavations began in 1928 with a sounding by John Garstang and continued from 1955-1958 under Yigal Yadin and the James A. de Rothschild Expedition on behalf of Hebrew University, then again beginning in 1990 under Amon Ben-Tor for Hebrew University. Earlier periods at the site were not as well-known due to heavy occupation of the site in late periods, but during the Early Bronze Age, the majority of the settlement was confined to the upper tell. Occupations began in the Early Bronze II, continued into the Early Bronze III, with only ephemeral remains for the Early Bronze IV (Amnon 2013). There may be a large, monumental structure excavated on the upper tell beneath the royal palace of the MBA (Zuckerman 2013). This would indicate that a relatively large population was centered at Hazor during the Early Bronze III, and represented one of only a couple of large sites located in the Huleh Valley during the EBA (Greenberg 2002, 78). Most of the smaller settlements around Hazor were abandoned, with only a few remaining in place. It

[31] The Egyptian Execration texts (c. 1800-1700 B.C.), the campaign list of Thutmose III (c. 1450 B.C.), and the Amarna letters (c. 1350 B.C.) all mention Hazor.

seems like there was a higher population concentration on Hazor during the EB III, with possibly settlers from the surrounding area moving to the larger center.

2.2 Cross-Regional Early Bronze Age Observations

One problem with understanding the Early Bronze IV in the southern Levant was the paucity of information on settlements, especially when compared to the large number of cemeteries that were discovered and excavated. This led to some interesting early interpretations of the Early Bronze IV predominantly as a land of the dead (Chesson 2007; E. N. Cooper 2007; Ilan 2002; Matney et al. 2012). Large cemeteries have particularly been excavated and published from Megiddo, Beth-Shean, Hazorea, Dhahr Mirzbaneh, Gibeon, Jericho, Lachish, Khirbet Kirmil, Tell el-‘Ajjul, Khirbet Iskander, and Bab edh-Dhra’ (Dever 1995).

Dever (1995, 287) identified four main problems with utilizing data predominantly derived from tombs, especially as it related to social structure. First, tombs only give a small subset of the material culture that was present from the full repertoire that would be present during that period. Second, the models developed on tomb assemblages did not necessarily offer good explanations as to what was occurring in antiquity. Third, not enough data was available to make more than tentative conclusions. Finally, social structure was not the only explanation for any variation within tomb forms and content. To assume that a correlation between social stratification and burial assemblages occurred is to potentially miss the intricate details of the Early Bronze IV.


Figure 2.2: Dolmen in the Golan. Photo by author (taken 8/23/2016).

As opposed to the earlier EBA phases, during the EB IV individual burials return as the standard. They were deliberately placed, and relatively meager grave goods selected by the living population. Built tombs in the Golan, Negev, Sinai, and fields east of the Jordan, like dolmens and cairns, in addition to shaft tombs, dominate the assemblage (Figure 2.2). Many of the shaft tombs, cairns, and dolmens from the EB I were reused, and many more established in the same areas (Fraser 2018; Kennedy 2015a; Palumbo 1990).

Most early explanations centered on the EB IV as a time of pastoral nomads, where cemeteries were the only remaining evidence for an otherwise ephemeral population. Later surveys discovered a larger quantity of EB IV settlements in the southern Levant, and excavations show that a majority of them were built at new and previously unoccupied locations, although a few, like at Megiddo, were built on already established EBA cities (S. L. Cohen

2018). Since a number of the early sites discovered were small encampments and villages along marginal zones suggested a non-nucleated pattern of settlement, with little to no hierarchy that was present during the Early Bronze II-III (Dever 1995). The cultural makeup, instead, seemed based predominantly on small-scale, kinship networks controlled mostly by localized social systems. The Early Bronze IV was recently characterized as a time of extreme regionalism (S. L. Cohen 2009; D'Andrea 2014; Dever 1980). The landscape was not devoid of settlements during the EB IV. Rather, the major urban centers were abandoned, and several, household-centered settlements established in the marginal areas (Fall, Lines, and Falconer 1998). The number of sites in the marginal regions, like the Negev and the Sinai, greatly increased and the number of sites in the coastal and hill country decreased. A predominantly rural landscape prevailed in the southern Levant during the EB IV.

2.2.1 Amorite Question

If climate was not the main impetus for the shift in economic and political structures of the EB IV, then other reasons must be explored. One possible explanation involves mass population movement that could have occurred prior to environmental degradation, namely by the Amorites (Weiss 2017b). The Amorites, *amurru* in Akkadian or MAR.TU/ MAR.DU in Sumerian, were originally thought to be a nomadic group of which a portion had settled and eventually gained control of large expanses of southern and northern Mesopotamia (Buccellati 1990; 2008; Kenyon 1966; Nichols and Weber 2006). The first mentions of MAR.TU occur in the Ebla texts (Archi 1985), with a homeland near modern Jebel Bishri (Buccellati 1966; Frayne 1997; Michalowski 2011). The best evidence for Amorite identity comes from the Ur III period, c. 2100-200 B.C. (Buccellati 1966; Burke 2021; Frayne 1997; Michalowski 2011). There was evidence the Amorites moved across vast distances and infringed on local communities at this time. This entanglement may account for the shifting settlement patterns. Other historical and archaeological attempts at explaining the EB IV is further explored in the section below.

The group known as the Amorites were traditionally at the center of discourse concerning human agency and adaptation during the transition between the late third and second millennia B.C. Previous studies recognize that a considerable Amorite population movement occurred prior to environmental change around 2200 B.C. (Burke 2017; 2021). This suggests that social issues and active choices by Amorites contributed to their initial relocation rather than previously suggested notions centered on environmental determinism (Archi 1985; Buccellati 2008; Kenyon 1966; Nichols and Weber 2006). In order to further nuance studies on Amorites, Harvey Weiss (Weiss 2014; 2017b) defines a two-stage process of "Amoritization." The first stage resulted in a shift of settlements from northern Mesopotamia into the "refugia" in response to the 4.2 kya BP event, and the second stage with a resettlement of former abandoned areas and settling of the nomadic component during the early second millennium B.C. Recent work by Aaron Burke (Burke 2017; 2021) questions the exclusive concern with pastoral nomadism in this model, while suggesting consideration of a chain of events relevant to the relocation of what were effectively environmental refugees.

"Amoritization" therefore presents three interrelated problems. First, too much emphasis was placed on climatic changes. Second, additional clarification on what it meant to be "Amorite" was needed. Third, difficulties of identifying a nomadic economy were not addressed. Although the two-stage process likely represented movement of Amorites in the late third and second millennium B.C., Weiss's portrayal of individuals as passive to changing climatic conditions was likely too simplistic. This type of unilateral causation to the Amorite question prevailed in the literature since the mid-20th century. Popularized by Kathleen Kenyon (1966) and discussed in Chapter 1 of this dissertation, the “invader hypothesis” pinned the collapse of the EBA tell based system on an invading horde of Amorites.

Mechanisms behind ancient population movement needs added clarification, including individual responses. What it means to be an Amorite also needs more discussion. When first mentioned in historical literature during the EBA, Amorites were portrayed as a mobile sector of society (Frayne 1997). A cultural memory of this identity was preserved in the second millennium B.C.[32], but Amorites were clearly integrated into Near Eastern communities at that point and were largely sedentary (Dalley 1984; Heimpel 2003). Furthermore, “Amoritization” does not consider complexities of pastoral nomadism, assuming it was a subsistence mechanism easily adopted and abandoned.

Later studies attempted to further nuance the pastoral-nomadic component of Amorites and the question of late third millennium B.C. culture, especially as it related to the question of Amorite identity (Burke 2021; Hammer 2018; Arbuckle and Hammer 2018). This initial portrayal of early Amorites as solely pastoralists was, likely, a result of reading too much into the texts available for the late third and early second millennium B.C. These texts identified this group with mobility and as sheep herders (Buccellati 2008; Heimpel 2003). Many scholars also tied the appearance of the Amorites into the 4.2 kya event, connecting it to the settlement abandonment observed in northern Mesopotamia. Although the impact of this climatic episode was debatable, if it was as widespread as previously imagined it would have had the same adverse effect on pastoralism as it was proposed to have on agriculture. The environmental niche

[32] For example, Zimri-Lim (an Amorite king of Mari) called himself “the king of Mari and *māt Ḫana*” (Heimpel 2003). *Māt* is the bound form of *mātum*, translated as “land of.” Hana is typified in the literature as “the land of mobile herdsmen” (Fleming 2009, 231). This titulary preserves a memory of when Zimri-Lim’s ancestors were part of the mobile populace still discussed in letters during his reign. By this point, though, he and many Amorites were fully sedentary.

for pastoral activities would change as well, leaving these communities equally vulnerable and not in a unique position to absorb previous agriculturalists (Arbuckle and Hammer 2018). Along the same line, these studies also call into question the dimorphic aspect of agropastoral societies and instead portraying pastoralism as a highly dynamic and resilient mode of subsistence that was fully integrated into communities practicing both pastoralism and agriculture.

Looking at dimorphic societies (A. Porter 2011; Rowton 1974), the relationship between sedentary and pastoral groups involves a high degree of interaction and intermingling. Even the idea of a dimorphic economy creates juxtaposes two sectors that may not be an entirely accurate reflection of original conditions. Social order was very important, and treatment of the dead was central to that order. Death was a disruption of the order, and rituals were in place to make it more manageable. One way to deal with this was through ancestor rituals. Ancestor burials were important places on the landscape, which helped to delineate territories and would also place power in the hands of an emerging elite (A. Porter 2002b, 1).

Anne Porter (2002a; 2002b; 2011) addresses the Amorite question, from the view of ritual, mobility, and death. She argues that in the beginnings of kingship in northern Mesopotamia, legitimacy was contrived through the control of rituals, specifically ancestral traditions, that created real and fictive descent structures. It allowed for two specific types of identity. First, it was practical because ancestor burials delineated rights to land and property. It was also a means to ensure access, for specific populations, to resources in liminal areas. Second, it was an abstract that gave a sense of shared identity (A. Porter 2002b, 7). In mobile societies, this was particularly important because the entire group was not always together. Portions of the population were typically siphoned off periodically to tend to flocks or procure other resources. This shared identity, especially in tribal settings, allowed the cohesiveness to remain even when the group was not altogether. At the site of Banat, the process of sedentarization of mobile groups and the emergence of an elite could be demarcated through three main phases (A. Porter 2002a, 25). The White Monument at Banat was visible across the landscape and has been postulated to be a place of ancestor worship. During stage one, rituals were localized on the burial mound, which was representative of the tribal ancestors, in order to forge a group identity. Habitual ritual at these places put special significance on this one place. In the second stage, power would be consolidated into a single genealogy, manifested through control of ritual, ideology, and territory as it was encapsulated in the monument. During this stage, as seen at Banat, additional mortuary mounds were abandoned while all emphasis was placed on the White Monument, which was continued to be used. Finally, an elite emerged and was institutionalized through more elaborate buildings. The elite at Banat, in addition to many other late third millennium B.C. cities, were not demarcated through more elaborate goods or other clear markers. Rather, they appeared to be in the center of social structures, controlling access to goods along with access to ancestors in general. Changes in spatial organization of the site and burial practices indicate that there was increased social stratification. This process can also be seen at the sites of Ebla and Mari in the late third millennium B.C., where ancestor traditions forged a social organization by creating an idealized image of society. Specifically in Amorite traditions, tribal unity formed a sense of genealogy that was manipulated by the king in order to forge a corporate system (A. Porter 2002b, 5).

Giorgio Buccellati (2008) later argues that Amorites were not necessarily a unique ethnic group in the Euphrates River Valley, but rather a peasant group in the *zôr* that later invaded from the steppe. He looked at history, philology, archaeology, and geography to analyze the Amorite question. Although archaeology can loosely be formed around these interpretations, he relied heavily on an understanding of written records for the period that mentioned invading Amorites from the steppe, especially at the site of Mari in the Middle Euphrates River Valle. His interpretations were based on seven major points: (1) Amorites were originally peasants not nomads; (2) the "domestication of the steppe" occurred when population pressure forced the Amorites out of the *zôr* to the steppe; (3) during this there was an almost complete autonomy from the state; (4) there was also a relative military and political independence from the growing administrations of the Euphrates Valley; (5) nomadization of the peasants occurred rather than the sedentarization of nomads; (6) eventually, Amorites went back to the valleys as invaders from the steppe; (7) Amorites were likely rural Akkadians (Buccellati 2008, 142–43). Demographic pressures eventually forced Amorites into the steppe where they thrived by controlling the trade of commodities like wool and salt. New forms of social organization were necessary and thus the tribe was created in order to facilitate in the sedentarization of the population and allowed groups to form a bond within the community based outside of real kinship (Burke 2008; 2013; 2014).

Further clarification was provided by Aaron Burke (2014; 2017; 2021) on the identity and manifestation of Amorite culture in the ancient Near East, including their origins. He agrees with Buccellati (2008) by not looking at "Amorite" as a distinct ethnicity, instead focusing on the attributes and communities of practice that led to a shared identity by a group that could be identified as "Amorite." Specifically, he explores the development of settlement patterns, direct-axis temples, written records, and shared iconography that were utilized across a vast landscape, from the southern Levant to southern Mesopotamia. By looking at the ecological niches they could exploit based on mobility, including agropastoralism and mercenaryism, he suggests a new paradigm through which to explore Amorite identity. He sees a collective Amorite identity beginning in upper Mesopotamia from a communal agropastoral proficiency at what was now understood to be the beginning of the EB IV, c. 2500-2000 B.C. Over a few hundred years, a collective identity emerged based on collective practices and traditions, binding communities together into a tribal setting. One of the unifying features was the utilization of the zone of uncertainty during the early formative years of Amorite exploitation of the landscape. It was during these formative years that the Amorite identity was forged, something that would be applied during the Middle Bronze Age where the classification of Amorites was more easily attained with the claims of multiple kings and dynasties of Mesopotamia of Amorite ancestry and origin.

2.2.2 Pastoral Nomadism

The idea populations reverted to pastoral nomadism as a coping mechanism in times of abrupt change and later resettle in cities once conditions improved has prevailed in archaeological literature, especially as it pertains to the EB IV (Jahn 2007; Levy 1992; Marx 1992; Meadow 1992; A. Porter 2011).[33] This has long been a part of the narrative about the EB IV and is still an explanation that is relied upon today (A. Porter 2011). Although pastoralism was a component of the EB IV economy, such heavy emphasis on pastoral-nomadism oversimplified dimorphic economy and complex interrelationships between different sub-areas in the ancient Near East (Hammer 2012). J. David Schloen (2001; 2017) also discounted a two-sector society, with a royal administration in contention with a rural, relatively independent segment of society. In order to develop a model through which to understand ancient population movement across the landscape, the first various characteristics and definitions of pastoral-nomads was explored in a general sense, then specifically as it relates to the Early Bronze Age Near East. This was mostly

[33] The same can also be said of the formation of the Iron I settlements in the Central Hill Country of Israel (Bunimovitz and Greenberg 2004; Finkelstein 1984; 1988), which can be utilized as a comparative example.

accomplished by comparing modern ethnographic accounts to ancient societies, even though texts were utilized where available.

Another question to answer was why movement occurred at all. Steve Rosen (2008; 2009; 2017) looked at this in the Negev desert of the southern Levant, emphasizing on three problematic concepts that were integrated into studies on pastoral-nomads. First, he addressed heavy reliance on ethnographic analogy for an archaeological explanation of the past. Second, he looked at the reliability of historical and anthropological resources that were employed in understanding pastoral-nomads to date. The third problem was the most difficult and involved how "pastoral-nomadism" had been addressed previously. Rosen critiqued early views through a *longue dureé* approach by comparing data across the Negev from the end of the 6th millennium B.C. and continuing straight into the modern period. He used a definition of pastoral-nomadism predicated on four distinct criteria, including a reliance on herd animals instead of agriculture, tribal organization in association with herding, ideas of pastoralism and herd ownership, and weighted economic relationship that resulted in some dependence on a settled, agricultural society (S. A. Rosen 2008, 119). In the Negev, he saw these criteria as an evolutionary trajectory, where each criterion was met more or less in order as time progresses. The process began in the Neolithic and ended in the Early Bronze Age where the earliest trade between desert nomadic population and a settled population first emerged (S. A. Rosen 2008, 120). A number of innovations and technologies, including pack animals (particularly the camel in later periods), woven tents, water catchment systems, and eventually guns, further impacted the life of a pastoral nomad in the Negev (S. A. Rosen 2009, 125).

Previous ideas of a purely nomadic society, first proposed in the mid-20th century, were shown to be a fallacy. Instead, agriculture was either integrated into seasonal rounds of pastoral groups or trade was required to provide these goods (Alizadeh 2006; Banning and Köhler-Rollefson 1992; Barfield 1993; Cribb 1991; Eldar, Nir, and Nahlieli 1992; LaBianca 1997; Lönnqvist 2000; Rowton 1973; 1974; 1976a; 1976b; 1976c; 1977). Societies were dimorphic, incorporating both modes of economy. Therefore, this study does not address urban agriculturalists and pastoral nomads as a dichotomy, but rather attempts to situate these concepts along a spectrum, where each was reliant upon the other. Variations within pastoral systems, especially as they change over time during the late third millennium B.C., was addressed in order to identify the impact pastoral nomads had on economic, social, and political regimes of this period.

2.3 CONCLUSIONS

Several questions pertaining to nomads need to be addressed throughout this study, including why specific regions were inhabited, how do these groups survived in marginal areas, what type of economy was at play, and why populations moved as they did. To begin, why did populations choose to inhabit regions suited for pastoralism in the first place, and how did they survive there? Pastoral nomads occupied a niche of society that was not always in the easiest places to live. In Finkelstein's (1992) examination of pastoralists on the fringe during the Early Bronze IV in the southern Levant, the author uses three main sources of information available to scholars in ancient Israel including ethnographic materials (19^{th} century travelers, Bedouin groups), historical sources (the Bible, Amarna letters), and the archaeological record (Finkelstein 1992, 133) to analyze what he terms the "ecological frontier," which includes the Central Hill country of modern Israel and Palestine/West Bank and regions east of the Jordan River like the basalt areas of the Golan (Finkelstein 1992, 135). These areas were not marginal because they were unsuitable climatologically, like the Negev and the Sinai deserts, but because they were harder to access.[34] Specifically, Finkelstein looks at how populations came into this region and settled there by exploring two demographic models. In the first model, prosperity in urban areas of the lowlands transpired that resulted in settlers coming in stages to the highlands. This happened in three steps: new settlements were founded on the eastern part of the central mountainous range and fringes of the desert; when these places became more densely occupied, individuals traveled further abroad into more hilly, forested regions; finally, some sites in these areas grew in size and became large, political units (Finkelstein 1992, 136). The second model examines the EB IV as a time of crisis in the entire country. This resulted in the hill country absorbing a higher population as individuals abandoned major urban centers (Finkelstein 1992, 137). Populations spread across the landscape in a scattered means. In northern Samaria and parts of the lowland's groups were sedentary alongside predominantly nomadic society. The main gist of Finkelstein's argument states that, although there was always at least a partial nomadic portion to societies of the ancient southern Levant, the population would increase in less desirable areas during times of stress because these regions were able to absorb disenfranchised populations.

A big increase in the number of sites in the Jordan Valley and the Negev ensued during the beginning of the EB IV. If populations abandoned the large, centralized cities of the EB II-III, then the only place they could retreat to in the region were the areas that were less occupied. Both the Negev and the Jordan Valley were conducive to pastoral nomadism. One community could control several flocks in these regions. The sites in the Negev and Jordan were on average, smaller. These could be small, localized villages for pastoral nomads to pass through as they move for the seasonal grazing grounds.

[34] The main source of subsistence consisted of animal husbandry and dry farming, some horticulture in the heart of the hilly region, and a mixed economy in other areas.

Permanent settlements were established in the Negev during the EB IV, which made the remnants of the population visible for the first time in this region (Finkelstein 1989a). These communities were not completely isolated but were involved in a greater network of communication, exchange, and local trade that allowed for a more diversified socioeconomic system than previously thought (D'Andrea 2012b; Burke 2021). They also displayed a small degree of site hierarchy in the marginal zones (Fall, Lines, and Falconer 1998; Haiman 2009).

The increase in the Negev could also be a result of the increase of trade industries. Evidence for copper trade can be observed still during the EB IV, which could have even increased. More individuals in the Negev could have facilitated this increase in trade. It was possible that one local community-controlled at least a portion of the copper trade while still engaging in a dimorphic society. They could control the trade, and easily move the goods while doing seasonal rounds and moving the flocks. The goods from the flocks and the copper trade could then go back to the localized, agricultural community base and be distributed. With all the movement of groups for pastoral nomadism, the need for strict control of trade routes and the protection of large amounts of goods (like at Karum Kanesh) would not be necessary. Smaller amounts of copper could travel in smaller groups.

The Central Hill country of the southern Levant was bounded by the Jezreel Valley in the north and the Beersheba Valley in the south. In particular, this study addresses a sub-set of this area, namely the regions of Manasseh and Ephraim, both encompassed within "Samaria." These distinctions were based on the limits of the two surveys from which the data was derived, which centered predominantly on the "Israelite" period of the Iron Age (Ilan 2018). These distinctions do not necessarily reflect anything inherent within the archaeological record, especially for the

Early and Middle Bronze Age, but since they represent a rather cohesive unit for analysis and a means for comparison with previous research they were utilized.

During the Early Bronze II-III, many of the small, sedentary villages established in the Early Bronze I were abandoned in favor of larger, centralized settlements. This pattern was observable across the entirety of the southern Levant. The Early Bronze II-III witnessed the first urban experiment in the ancient Near East. A relatively large number of EB II-III fortified sites were established throughout the southern Levant, many located along important water sources and near roadways. Large tombs containing multiple primary burials dominated the Early Bronze II-III type.

The EB IV settlement patterns shifted, likely a reflection of changes in the social and economic environment. The landscape was not devoid of settlements during the EB IV. The number of sites in the marginal regions, like the Negev and the Sinai, greatly increased and the number of sites in the coastal and fertile valleys decreased. Temporary settlements, many continuously reused throughout the 400 years of the EB IV, were established in the Negev, which made the remnants of the population visible for the first time in this region. These communities were not completely isolated but were involved in a greater network of communication, exchange, and local trade that allowed for a more diversified socioeconomic system than previously thought.

The EB IV in the southern Levant was typified by a rural landscape with several distinct sub-regional groups. First recognized by William Dever (1980; 1987; 1992b; 1995) based on the distribution of ceramic "family" groups, this aspect of the EB IV made generating a reliable relative chronology across the regions difficult. Dever specifically identified seven different "cultural-geographical" groups: Transjordan, Northern, North-Central, Central Hill, Jordan

Valley, Coastal, and Southern. A number of sub-varieties within each category further complicate the matter, with some differences in the assemblages from the northern coastal plain and the southern coastal plain, among others. A recent study by Marta D'Andrea (2012b) attempted to remedy this regional problem by concentrating on the south-central Transjordan and the central Negev, utilizing pottery technology instead of ceramic morphology to connect the regions.

The end of the EB IV and transition into the MB I was gradual and represented a relatively continuous shift rather than an abrupt break in the sequence. The number of sites in the MB I was greatly reduced from the EB IV, but the population increased back to levels similar that of the EB II and EB III. Population levels did not recover fully, however, until the MB II, when it not only reached the levels of the first urban expansion but far exceeded it. This cycle was representative of the ebb and flow of population in the region outside of just the EBA.

3 CRITICALLY READING TRANSITIONS: ANALYZING SETTLEMENT PATTERNS

Explanations for the transition from the Early Bronze III to Early Bronze IV fall into two primary categories. First, there are functional models. According to these interpretations, if environmental, political, or socioeconomic situations changed, only a limited number of viable responses could happen. For example, the EB IV transition is treated as a period of abrupt, sudden change in settlement structures and population makeup. When large, city-state structures in the southern Levant, centered around major tells in agricultural productive valleys, were abandoned, only a set number of societal responses are perceived to permit physical survival. However, these purely functional explanations only apply if the human species can be boiled down to logical choices for simply physical survival. This oversimplification of the human experience largely paints communities as passive victims in an otherwise unrelenting world and divorces them from active agency. nevertheless, functionalist interpretations do introduce a limiter on choices for cultural groups in regards to their survival.

The second explanatory approach highlights individual choices communities and groups make to survive. When the Early Bronze II-III saw the rise of complex city-state systems in the southern Levant, specific decisions were made that created changes in the local environment, interactions with other communities, and specializations within the community. To control these various communities, agricultural practices were taken out of local control and a centralized authority made decisions about such issues. This resulted in the rapid expansion of surplus production within communities, but it also decreased variety and innovation of agricultural practices. If this sector of society were to become vulnerable and fail, the rest of the system would be weakened. It was an active choice by the governing bodies to reduce the variability in agriculture in order to facilitate rapid expansion, ultimately leading to fissures within the socioeconomic sphere. In the end, changes in environmental conditions might push this system over the edge, but in it, people were not passive victims. Rather, they were agents of their own demise, and these choices forced change during the Early Bronze IV.

To identify how changes manifested in the EB II and the mechanisms of those changes, this chapter explores the interconnections between the two explanatory approaches.[35] Settlement locations and manifestations were limited by environmental conditions, and the sociopolitical landscape of the region. Although these changes and choices were not dictated by environmental conditions, it would be remiss to say that the environment was not a major driving force in Early Bronze Age cultures. The environment and local landscape changed as communities lived there and interacted with it, slowly changing local conditions. These new landscape conditions forced populations to again shift their interactions with their landscapes, creating an ever-evolving cycle of adaptation and change. This is explored using niche theory. Additionally, a number of these changes were conscious choices by ruling persons to control individuals and impart a measure of predictability. For societies to grow as large as they did, direct oversight by governing bodies was needed to feed many people under their control as well as to impose a sense of shared group cohesion.

3.1 Human Responses to the Environment

The location of ancient settlement patterns was dictated by several different factors, including outside forces like the environment. Previous thoughts on the end of the EB III point towards a degrading environment as the impetus for change (Wilkinson 1994). A lot of circumstantial evidence arose, which points towards a hyper-arid period at 4.2 kya BP. This used to correspond

[35] This narrows down the focus even further as necessitated by the length and scope of this study

with the beginning of the EB IV and spawned several theories centered on environmental determinism (Coombes and Barber 2005; Frenkel 1994; Hrebiniak and Joyce 1985).

Environmental determinism was the idea that the physical environment was the ultimate determining factor for the manifestations of societies and why they change. At its simplest, the environment was the fundamental answer to all cultural questions. At the end of the EB II-III cities disappeared. Because it was hypothesized the EB II-III was based first and foremost on agricultural activities in marginal zones and its end was originally dated to the same time as the 4.2 kya BP[36] environmental "collapse," this downturn in the site numbers was blamed on the environment (Weiss 1997; 2000b; 2014). Without irrigation to provide extra water in arid environments, a minimum of 200 mm of annual rainfall was required to perform dry-farming agriculture (Wilkinson 1997). Agriculture within this isohyet, though, was still inherently risky in the ancient Near East. The area between the 200 and 300 mm isohyets, dubbed the "zone of uncertainty" by the Fragile Crescent Project (Galiatsatos et al. 2009), was a relatively reliable zone for agricultural in times of climatic stability. It was inherently risky and "uncertain" because slight declines in precipitation could result in a system-wide breakdown (A. M. Rosen 2007). This theory was put forth based mostly on data derived from the northern Jazira. The zone of uncertainty represented a large swath of the agricultural land of the EB III. The zone was abandoned at roughly 2200 B.C. and groups moved to more agriculturally secure regions. Populations in locations that had a more diversified water procurement systems, including reliance on irrigation like in the Euphrates and Orontes basins, and utilization of cultigens more likely to survive and even thrive in times of climatic stress. That is not to say that climate and the environment are the only contributing factors to cultural change. Rather it can stress an already

[36] The timing, degree of change, and manifestation of this event will be explored in Chapter 4.

fragile system and necessitate the move to a different location or a reconfiguration of socioeconomic systems to endure.

However, concentrating solely on external factors paints a partial picture. Sites and settlements left patterns inscribed on the ancient landscape through processes like resource procurement, trade routes, social interactions, among others. Beyond just changes to the physical landscape, these patterns provide ways to understand ancient human interactions with their environments. Populations were active participants in environmental changes. They shaped their landscapes to fit their needs. As they made alternations to the landscape, it forced new adaptations in response to unforeseen repercussions to those alterations, creating a never-ending loop of change and adaptation.

3.1.1 Analyzing Settlements in the Levant

In the broadest sense, settlement archaeology was concerned with understanding how past populations determined site locations (Evans and Gould 1982; Wilkinson, Gibson, et al. 2007). It was a means to analyze, understand, and explain various distributions of archaeological sites, principally their spatial distribution (Ashmore 2002). The physical landscape, in addition to environmental conditions, plays a major part in the selection of places to live and perform everyday activities. Therefore, the landscape was an important aspect of settlement archaeology. Because of this, Geographic Information Systems (GIS) has become an indispensable tool to help in these types of analyses.

A high degree of overlap between what can be termed “settlement archaeology” and “landscape archaeology” exists. In many recent publications, “landscape archaeology” has become synonymous with phenomenology (Barrett and Ko 2009; Heidegger 1988; Tilley 1994). This, however, was not always the case, and studying the landscape has continued to be an important aspect of settlement archaeology (Ashmore and Knapp 1999). Attempts to bridge the gap between seeing the landscape as a physical manifestation and as a metaphysical, experiential display have been few and far between. One notable exception was Ken Kvamme's (1997) aptly titled "Ranter's Corner." In this article, he points out that archaeologists who study landscapes diverge in their views of physical and social environments. Those who study natural environments were thought to put too much emphasis on environmental determinism. These archaeologists utilize GIS as a means to demonstrate natural changes. One reason for this dichotomy was because the natural environment was perceived as easier to analyze. There tend to be only one or two explanations for changes in the natural environment. Also, with the use of new technologies like GIS, understanding natural phenomena were much easier. This has caused a bias towards the natural. These polarized camps, however, oversimplify elements of change. A multiplicity of landscapes can arise through which people navigate, and it was only in understanding and analyzing various aspects, including natural and ideational, that any interpretations of ancient lifeways can be achieved. Eric Hirsch (1995, 23) characterizes landscapes as " a series of related, if contradictory, moments—perspectives—which cohere in what can be recognized as a singular form: landscape as a cultural process."

In the ancient Near East, settlement archaeology began with a captivation with monumental earthworks and tells began with aerial photography (Breasted 1933). After these initial aerial surveys, many sites located through aerial photography were corroborated with a terrestrial survey. Robert Braidwood's *Mounds in the Plain of Antioch* (1937) was an influential piece of cementing surveys as a means of studying ancient societies in the Near East. The original goal of his project was to find a site with Hittite monumental architecture, but Braidwood still recorded every site he and his team encountered during surveys in the region. He eventually collated 178 sites from the Neolithic to Islamic periods. By doing so, he was able to track temporal shifts in large-scale settlement patterns and did the first comprehensive settlement study of the Levant. In contrast, early settlement archaeology in the southern Levant was mostly concerned with historical geography and an attempt to locate places mentioned in the Bible (Aharoni 1979; Albright 1921). Although there were a large number of tells located in the southern Levant, interest had more to do with their relation to biblical cities rather than as monuments themselves (Glueck 1933; 1939a; 1959).[37]

A shift towards a more holistic view of settlements incorporating more than simply spatial patternings first took place in the Americas. In Peru, Gordon Willey (1953) combined the use of aerial photography and settlement survey in his groundbreaking study of the Virú Valley. He analyzed the interconnectivity of sites in this valley to understand economic, political, and environmental factors that influenced societies in ancient Peru. This represents the first study in landscapes to move beyond explicating origins and fanciful stories behind large, monumental architecture to focus more on interpretations of function and associations between sites. It was a breakthrough in regional application to landscape and settlement studies and developed a methodology that has been replicated and followed since.

In the ancient Near East, the first comprehensive survey and landscape study was performed by Robert McCormick Adams (1965). His foundational piece, *Land Behind Baghdad*, explored the location of tells on the Diyala Plain of modern Iraq, ancient southern Mesopotamia, to determine shifts in settlement patterns and occupations from the Uruk period (c.4000 B.C.) through modern times. This represents one of the first attempts to integrate historical,

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[37] For a complete discussion on historical geography in the southern Levant, see Aharoni 1979.

archaeological, and geomorphological data into a comprehensive study to investigate ancient Mesopotamia. It was in the same academic milieu as Willey's study of the Virú Valley in Peru.

Since then, several thorough surveys have been done in the Near East. Surveys range from attempting to understand ancient environments, ancient settlement patterns, a comprehensive survey of all features, off-site sherd scatters, interrelationships between regions, settlement locations, the rise of empires, collapse of civilizations, among others. These have been carried out across the entirety of the Near East, from the northern Levant (Archi 1980; 1981; Bartl and Al-Maqdissi 2007; Bradbury 2011; Thalmann 2007; Casana and Wilkinson 2005), to northern Mesopotamia (Algaze, Breuninger, and Knudstad 1994; Geyer and Monchambert 2003; Wilkinson 1995; 2004; Wilkinson and Tucker 1995a; Wilkinson, Peltenburg, et al. 2007), from southern Mesopotamia (Robert McCormick Adams 1981; Ur 2002) to the southern Levant (Broshi and Finkelstein 1992; Broshi and Gophna 1984; 1986; R. Cohen 1997; Finkelstein 1989b; 1993; Finkelstein, Lederman, and Bunimovitz 1997; Gophna and Kochavi 1966; Zertal 2004). In the southern Levant, in particular, recent attention has been on natural environments, specifically as it relates to desert environments in the Sinai and Negev (R. Cohen and Dever 1978; 1979; 1981; Haiman 1989; S. A. Rosen 1987).

Of particular importance to this study were the interactions between societal choices in settlement location and the landscape, especially as it relates to the physical environment. An example of this type of study was done by J. Brett Hill (2000). He looked at anthropogenic and natural factors that led to environmental degradation in Jordan. He further considered what factors led people to degrade their environment, and then the measures they took to adjust to these new conditions (Hill 2000, 221). The degradation of the environment was a major factor in the location of settlements in the Wadi al-Hasa drainage system. Settlement locations overtime throughout the system were not reliant so much upon variations in available water, rather on relocations necessary due to human alterations of the landscape. To determine this, he looked at several spatial statistics of the location of sites to other sites in addition to available resources. Nearest Neighbor was the primary method. This indicated that there was a greater degree of change in the location of individual sites versus the location of groups of sites (Hill 2000, 225). A cost-surface was generated to analyze the paths to water sources, and it appears that the population preferred to settle in areas with large, productive catchment systems versus areas with access to an already available water source, like a wadi.

Keeping all of the above in mind, this dissertation primarily follows the core of Tony Wilkinson's (2003, 4) definition of landscape archaeology as "an attempt to describe, interpret, and understand the development of the cultural features that occur on the surface of the earth. This includes both human settlements as well as the land between or beyond them." The cultural landscape and how it relates to and was influenced by the natural environment were the central concentration of study.

3.1.2 Niche Theory

A more nuanced theory to look at changes in the environment and cultural responses to it was Niche Construction Theory (NCT). It was first proposed by Richard Lewontin (1982) in the context of biology. He proposed at its most basic manifestation that "environment" was a construct, where species occupy a specific environment and, by inhabiting it, alter the environment. Once an environment was changed, the species must alter its interactions with the environment. Once these interactions change, it again alters the environment. This cycle continues until the environment had changed completely and may no longer be hospitable to that species (Odling-Smee, Laland, and Feldman 2003, 419). Species were not just victims of the environment but actively change and alter it. Therefore, “environments” were not static. They were ever-changing and vary based on each circumstance.

A niche, at its most basic, was constrained by two things: first, physical environments, and, second, biological needs of the species in question (Laland and O’Brien 2011). A niche was a single instant in time. Under this model, biological needs or physical environment can change at any point, rendering the former niche no longer relevant. A new niche must be found or constructed to survive. The niche of a species was defined as “an area [where] each point of which corresponds to a possible environmental state permitting the species to exist indefinitely”(Hutchinson 1957, 416).

The concept of “niche” had been adapted from biology into numerous social sciences, including anthropological archaeology (Popielarz and Neal 2007). A “niche” of a species was defined as “an area [where] each point of which corresponds to a possible environmental state permitting the species to exist indefinitely” (Hutchinson 1957, 416). This idea, as it concerns landscape archaeology, was premised on three statements: humans live in a physical environment; the physical environment was varied over a large area; the niche of a human was the part of the physical environment that it can use and to which it had access (Kvamme 2006, 12). The social environment also places restrictions on the available niche, creating a dynamic niche that was reliant on both sets of constraints.

Although niches rely heavily on the physical environment and biological systems, as was evident from its original inception, when applied to human environments it also considers cultural systems. Humans not only subconsciously affect their surroundings but also consciously alter the landscape. This was through constructing shelters, monumental architecture, tombs, and other structures in addition to the formation of subsistence systems, like agricultural fields and animal pens. These features left a permanent record encoding change on the landscape.

Organisms can change the selection pressures by 1) perturbation, which occurs when the organism physically changes the environment; and 2) relocation, which occurs when the organism changes its movement through space and time. At the same time, the organism can be the one initiating the change or reacting to the change. Humans, it can be argued, were very good at niche manipulation and construction. NCT differs from the usual evolutionary theory in that niche construction allows for acquired characteristics to influence the selection of genes (Laland and O'Brien 2010).

In the archaeological record, this can be explored in climatic change. Humans have the unique propensity to and were forcefully adept at constructing and destructing their surrounding environment. This was not a characteristic unique to only the human species. Humans have simply taken it to a level unseen in other species. People tend to alter their natural environment, causing certain reactions within the "niche" being exploited, and potentially causing a change to occur to accommodate the manipulation of the natural environment. Because archaeologists study and analyze humans, not only was natural selection involved but also cultural selection. Another good example was the origins of agriculture—humans started to manipulate their natural environment and as a result, changed the genetic makeup of the plants and animals they were using and, in that way, created different niches for the plants, as well as for themselves.

3.2 HUMAN INTERACTION WITH THE ENVIRONMENT

Theories to explain changes during the Early Bronze IV tend to look at the idea of "collapse." When looking at the large temporal scale, which was possible through archaeology, settlement abandonment and other indicators of "collapse" appear commonplace throughout human history

(Fisher, Hill, and Feinman 2009, 4).[38] Across the world, in every environmental setting, cultures have undergone cycles of change (Butzer 2012; Butzer and Endfield 2012; E. N. Cooper 2006a; Dillehay, Kolata, and Moseley 2004; Erickson 1999; Feinman et al. 2012; Kolata 1993; Paine and Freter 1996; Schwartz 2006; Seltzer and Hastorf 1990; J. M. Shaw 2003; Yoffee 2010). How and why societies emerge, fluctuate, and eventually disappear remains an area of significant research focus. Although a popular term in archaeological literature, the usefulness of "collapse" as a concept to analyze the *longue dureé* was debatable. Typically, collapse in the archaeological literature was seen as the complete failure of a system to adapt to new circumstances.

Shmuel Eisenstadt (1988) saw the concept of collapse as particularly difficult because it assumes a complete break in previous political systems and the related cultures. If this was the case, then "collapse" never occurred concerning the Early Bronze IV. Joseph Tainter (1990) boils down collapse to a discontinuity between the benefits to rising costs, a description influenced by Leslie White's (1943) theory for cultural advancement due to technological developments and capture of energy.[39] Joseph Tainter (1990, 4) thinks "a society has collapsed when it displays a rapid, significant loss of an established level of sociopolitical complexity." He identifies eight factors that indicate collapse: (1) lower degree of social differentiation; (2) less specialization, both economically and occupationally; (3) decrease in consolidated power; (4) less top-down control of individual actions; (5) fewer monumental and state-sponsored projects;

[38] Joseph Tainter (1990, 2) cites eleven approaches that might explain collapse: resource depletion, new resources, catastrophes, insufficient response to circumstances, other complex societies, intruders, conflict, social dysfunction, cosmological reasons, chance concatenation of events, and economic explanations. In the case of Mesopotamia and the ancient Near East, Norm Yoffee (1988, 45) identifies nonindigenous people, bureaucratic mismanagement, disruption of trade routes, environmental degradation, divine behavior, among others, as the primary explanations for "collapse."

[39] When marginal returns decline, a leader or group can validate their control and justify a need for centralized power, when cost rises faster than benefits. Collapse may also occur when benefits fall while cost remains constant (Tainter 1990, 205). This occurs predominately as systems develop, for the more complex each interlocking part, there is an increase in the potential for problems, divergences, and inconsistencies (Tainter 1990, 116).

(6) less contact between the core and periphery; (7) decrease in the flow of goods and knowledge; and (8) less organization of individuals and groups. Jared Diamond (2006, 3) defines collapse as "a dramatic decrease in human population and/or political/economic/social complexity, over a considerable area, for an extended time." According to Glenn Schwartz (2006, 6), collapse typically contains at least one of the following features: (1) states dividing into smaller political entities, (2) urban center abandonment, (3) failure of economic systems, and (4) the desertion of established ideologies.

Several factors were cited as reasons behind collapse. One such example was foreign invaders and groups of "others" (Schwartz 2006). This was the case with Kathleen Kenyon's (1966) Amorite invasion theory. Although not utilizing "collapse" explicitly, she identifies an outside force as the sole impetus for change. That was not to say that conquering groups have no role to play in societal changes. To place all blame on one group, though, was remiss. Changes in the archaeological record were much more complicated.

Climate change was another often-cited reason for collapse. A system dependent on agriculture, especially if it was pushing the limits of sustainability, was vulnerable to climate change. A more contemporary example of this phenomenon can be observed in the "Little Ice Age" (Fagan 2000). This occurred directly after the Medieval Climate Optimum, which allowed for the agricultural expansion into northern climes. Once climate changed to more favorable conditions, these fields failed, and populations were forced to restructure their subsistence patterns to accommodate the new climatic conditions. Internal problems can cause collapses, as well, like the overstress of agriculture on the landscape (Wilkinson 1997). The stress on one mode of production, like an over-reliance on wheat in the ancient Near East and abandoning a more diversified subsistence pattern can overexert the physical environment. In the end, collapse was most likely due to a variety of both environmental hazards and anthropogenic processes forcing changes to previously established socionatural systems.

Based on these observations, criteria, and various definitions, the end of the Early Bronze Age in the ancient Near East have been typically identified as a period of “collapse.” Egypt (Bell 1971), the Indus Valley (Possehl 1997), the Euphrates River region (E. N. Cooper 2006a), the northern Jazira (Ur 2010a), the southern Levant (Falconer and Savage 1995), and parts of the northern Levant (R. J. Braidwood and Braidwood 1960; Matthiae 1981) saw disruptions to sociocultural systems at this time. Degrees of change and its ultimate effect on the social makeup of the Near East, as well as the timing of each of these events concerning one another, was still unclear (Butzer 2012; Weiss 2017a; Wilkinson et al. 2014).

As an example that relates directly to this project, the Akkadian Empire’s disappearance and collapse were often pointed to as the tipping point that precipitated the demise of EBA cities (Weiss et al. 1993; Weiss 2000a). The Akkadian Empire (c. 2350-2150 B.C.) began when Sargon of Akkad united ancient Mesopotamia under the auspices of one city-state. After only about 200 years, the Akkadian Empire vanished. Norm Yoffee (1988) attempts to explain this “collapse” as a failure of Sargon and his predecessors to adequately integrate the Early Dynastic system of city-states that had previously existed into the new empire, causing unrest and several rebellions within the system. Akkadian kings did not form a cohesive, politically centered group, rather they left original city rulers in charge, just now answering to the Akkadians (van de Mieroop 2004). A strong, local identity still prevailed since the Akkadian kings were too invested in furthering their foreign excursions, both militarily and economically, trying to forge a local identity. Since each governate in the empire still saw themselves as distinct, it resulted in a weakened system that allowed for internal problems leading towards “collapse.”

In this study, “collapse” was used in the sense of a catastrophic change in socioeconomic systems, including the abandonment of cities. It does not, following many of the above definitions, include a decrease in complexity. This would be problematic and assumes that the EB IV was an inherently less “complex” time than the previous EBA and later MBA. The EB IV, though, was different. No obvious “king” or political figure controlling everything was present, but that does not mean there was less complexity on the large scale. Instead, Tainter’s (1990) definition regarding energy was applicable. During the EB IV, costs to continue the EBA city-state system were too great with regard to benefits returned and, therefore, something had to drastically shift. In that sense, the EBA system did “collapse” because its vulnerabilities made it ultimately unsustainable. This, though, did not result in a total system abandonment as was described in many of the definitions. “Collapse” in this project was used about a drastic change to a previous mode of existence but was not used to describe what came after.

3.2.1 Resilience Theory

Archaeologists have recently questioned the utility of “collapse” as a concept through which to analyze changes in antiquity, intensifying in response to the somewhat sensational work of Jared Diamond (1997; 2006; 2012). “Collapse,” grossly oversimplifies social interactions and manifestations of cultures and suggests an inherently, overwhelmingly negative response to relatively rapid change. As an alternative, Patricia McAnany and Norman Yoffee (2010, 10) look at “resilience,” defined as “the ability of a system to absorb disturbance and still retain its basic function and structure.” Resilience was the ability of a system to take in turbulences and to experience alterations yet still maintain, in one form or another, the same purpose and basic arrangement (Iannone 2014).

Resilience was not a new concept. It was initially derived from ecology based on studies of functional responses of predator and prey systems (Adger 2000). It was originally envisioned as a theory of stability, as a comparative framework to look at the capability of an ecosystem to maintain itself over time. C.S. Holling (1973) was typically credited with first outlining resilience theory. He looked at forest insects and other small organic populations that tend to ebb and flow, but still able to survive climatic extremes due to their adaptive qualities (Holling 1973; 2001). Ecological systems were subject to several unstable factors and shocks, caused by geophysical and climatological variability. According to Holling, “resilience determines the persistence of relationships within a system and was a measure of the ability of these systems to absorb changes of state variables, driving variables, and parameters, and still persist” (Holling 1973, 17). When applied to anthropology, the emphasis was on societal and cultural systems. At its most basic, societies were not rigid and able to absorb some perturbations.

In practice, one of the first applications of resilience outside of ecology was by Andrew Vayda and Bonnie McCay (1975), who critiqued the use of ecology in anthropology, especially from the viewpoint of Roy Rappaport’s (2000) *Pigs for the Ancestors*. Rappaport postulates that an ecosystem was self-maintaining and preserves equilibrium. Instead, Vayda and McCay argue for an adaptive system that fluctuated and did not necessarily self-regulate (Vayda and McCay 1975).

As a case study, Clark Erickson (1999) looked at the question of “collapse” at Tiwanaku. Instead of following environmental deterministic models of previous scholarship, he looked at the rise and fall of societies in the region as cyclical, with waxing and waning of socioeconomic conditions a reflection of oscillations in the environment. He utilizes a “bottom-up” approach, specifically. Environments and human interactions with them were dynamic processes and no baseline can be defined around which changes vacillate, from favorable conditions to less favorable conditions.

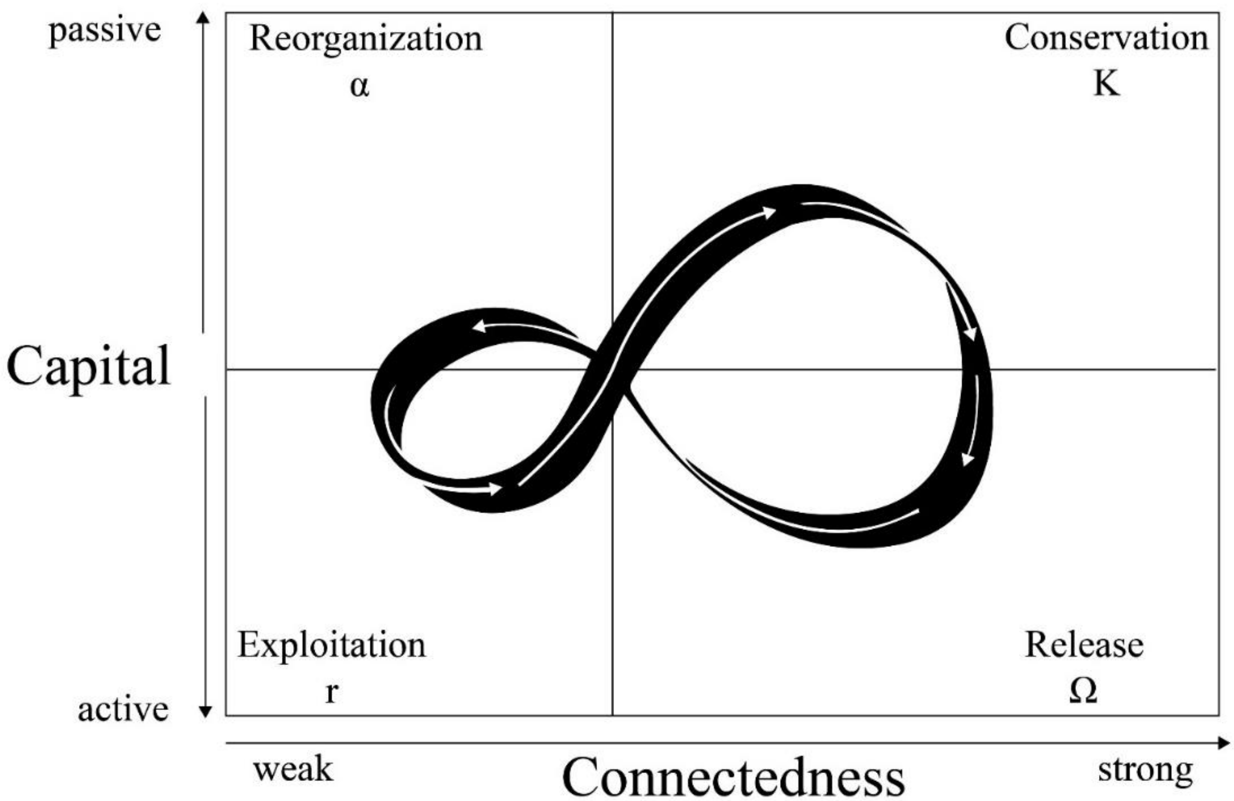

Figure 3.1: Resilience Mobius. Image by author adapted from Redman and Kinzig 2003.

The graphical representation of resilience theory and the adaptive cycle[40] was a Mobius that was controlled by four functions (Redman and Kinzig 2003):

1. Exploitation (r phase): the rapid establishment of a population in disturbed areas
2. Conservation (K phase): energy was stored and slowly accumulated
3. Release (Ω phase): a system's vulnerabilities were exploited and there was a sudden release of the accumulated energy
4. Reorganization (α phase): resources were reorganized into a new system that takes advantage of changes

[40] Three properties shape the adaptive cycle: wealth (the potential of a system that can change); control (the degree of relatedness, the flexibility or rigidity of a system); and adaptive capacity (the measure of a systems vulnerability and ultimate resilience) (Holling 2001, 393–94).

At this point, the cycle either starts again or sociocultural systems was unable to reorganize and ultimately collapses (Figure 3.1).[41]

The first part of this cycle, consisting of the growth phase (r) and conservation phase (K), was typified by slow, aggregated change and was relatively stable. The system was still being formed and there were very few inherent vulnerabilities to be exploited. A shift from r to K resulted in short-term predictability and potential increases. This could correspond to the first invasion, colonization, or reestablishment of previous socioeconomic systems in an undisturbed or previously abandoned area, followed by the establishment of administrative buildings and institutions, intensification of specialization and food production, as well as an increase in social complexity to maintain growth (Bergstrand et al. 2014; Redman 2005). As a cultural group moves through the K phase, resources were scarcer and the system becomes more rigid, causing it to be more vulnerable to external shocks. In social terms, people have established rhythms and specific ways of doing things. When the cumulative structure (Ω) was released and undergoes subsequent reorganization (α), the system sustains abrupt changes, some of which may be catastrophic (Walker et al. 2010). The transition between these two phases was very uncertain. At its most extreme, the result was a complete system failure with a total overhaul or a complete abandonment of the system (Gunderson and Holling 2002). During reorganization (α), a system was loosely organized and connected, resulting in heightened flexibility in the system. It was also during this phase that a nucleation of the ecosystems occurs (Gunderson and Holling 2002). This, in turn, leads back into a phase of exploitation.

[41] Arguments can be made that certain cultures did collapse, but it appears that the majority of societies hypothesized to "collapse" reorganized into a better system. Jared Diamond (2006) takes a catastrophic approach to collapse that needs to be tempered, but he was likely correct in pointing out a few exceptional cases of collapse in antiquity, including Rapa Nui and Norse Greenland.

In addition to these four components to adaptive cycles, the two axes also play an important role in resilience. The vertical axis of an adaptive cycle represents the capacity for resources to transform (Peeples, Barton, and Schmich 2006). It suggests that the availability of potential resources was different at varying phases in the adaptive cycle. The horizontal axis represents the connectedness of a system. It was the intensity of associations between different factors within an adaptive cycle. It was how much a change in one aspect affects other aspects of the system. Typically, the more interconnected, the more rigid and ultimately less resilient a system (Peeples, Barton, and Schmich 2006). If a system was less connected, it might be able to take in fluctuations in one part of the system without profoundly altering it entirely (Peeples, Barton, and Schmich 2006).

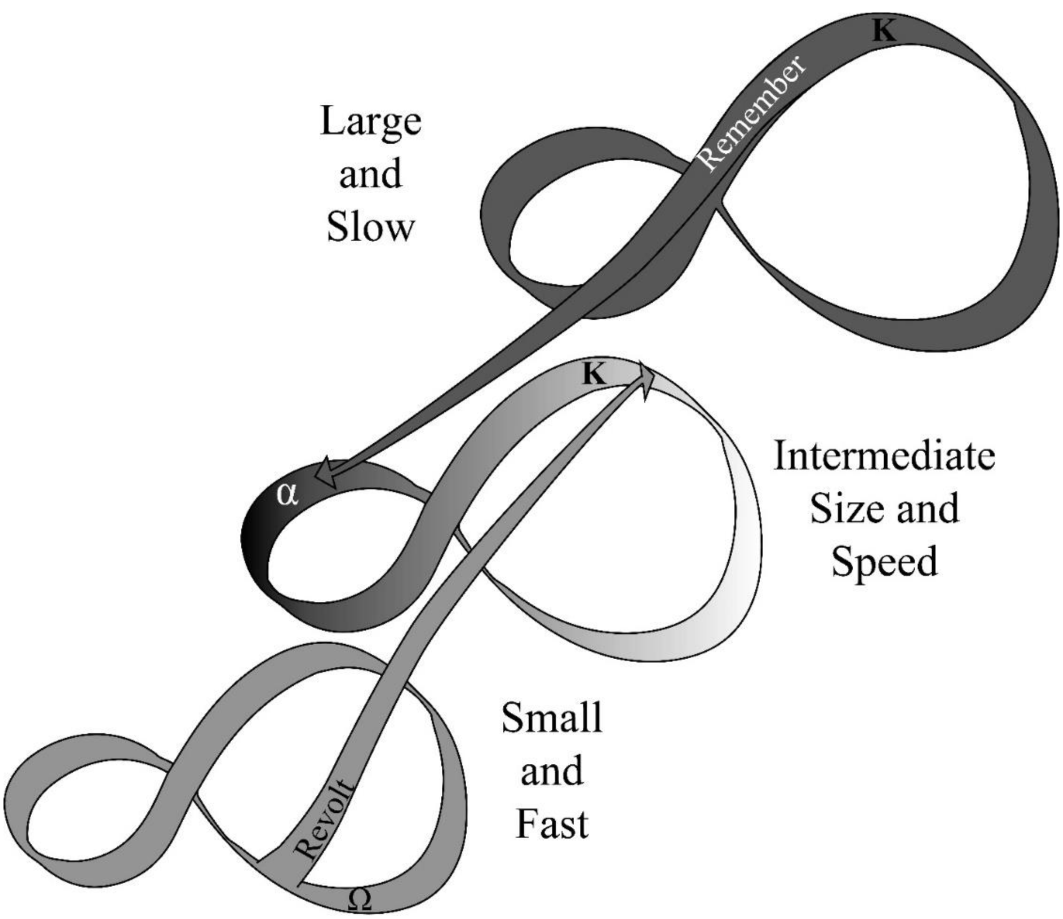

Figure 3.2: Panarchy cycle, representing nestled resilience Mobiuses. Image by author adapted from Redman 2005.

Systems consist of not just one adaptive cycle, but multiple, interconnected dynamics that can be arranged on a spatial-temporal hierarchy, with higher levels encompassing slower processes across a larger area and lower levels functioning at a quicker velocity over a smaller area (Gunderson and Holling 2002). Therefore, each cycle does not operate in a vacuum but acts in conjunction with other cycles, and to understand a system at any point or scale, the entirety of adaptive cycles at all scales needs to be understood. This nesting of cycles may allow for stabilities because it provides memories of the past to be preserved at a higher scale and allows for a model upon which to base a renewal of the system. A memory preserved at a higher scale can be imposed on a smaller scale, and likely could result in the reestablishment of the same systems (Redman 2005). This same interconnectedness of cycles that allow for recovery also had the opposite effect and create a systemic breakdown, with small scale cycles syncing and causing a disruption so severe recovery was near impossible (Redman 2005, 72). This theoretical framework was called panarchy (Figure 3.2).[42]

Five ways that archaeology can benefit from resilience theory are elucidated (Redman and Kinzig 2003). First, ecologists can only look at partial, incomplete adaptive cycles. Archaeologists, on the other hand, have the benefit of a *longue dureé* approach and can analyze not only complete cycles, but also multiple complete, interrelated cycles. Second, archaeologists can see essential causes of collapse, as well as systems that may have helped resilience in the short term but were ultimately detrimental in the long-term. Third, archaeologists can study how resilient the major "firsts" of civilizations were, including agriculture, urbanism, and industrialism. Analyzing questions of how populations first responded to and utilized these

[42] C.S. Holling (2001, 390) defines panarchy as "how a healthy system can invent and experiment, benefiting from inventions that create opportunity while being kept safe from those that destabilize because of their nature or excessive exuberance.

systems was possible. Fourth, archaeology allows incorporating interconnected systems of ecology, sociology, and policy to be explored dynamically. Fifth, archaeology can see "inevitable" features of increased complexity, including social stratification, specialization, and ecological simplification.

Interrelated with resilience theory, drastic changes can be viewed as the intersection of sustainability and vulnerability. Sustainable societies tend to thrive and were relatively flexible, where the risk of collapse was ultimately low (W. C. Clark and Dickson 2003). On the opposite end of the spectrum, vulnerable societies tend to reflect rigidity and surviving at the threshold of viability, where the risk of collapse was high, especially if those vulnerabilities were exposed or exploited (Iannone 2014).

"Sustainability was the capacity to create, test, and maintain adaptive capability" (Holling 2001, 390). In modern terms, "environmental sustainability, poverty alleviation, and social justice were intimately linked, and local populations need to be engaged as active participants in the design and governance of interventions, not as a matter of courtesy or as a technical strategy, but because it was their right" (Castro, Taylor, and Brokensha 2012, 4). Sustainability depends on interactions between internal and external forces, including social, political, ecological, economic, foreign interactions, region-wide environmental disruptions, and conflict (Holling 2001, 390). It was the intersection between shifting objectives and changes beyond their control, including external pressures and climatic factors (W. C. Clark and Dickson 2003, 8059). Studies of sustainability in antiquity were mostly confined to terms of resilience and collapse.

Vulnerability was, in many ways, the antithesis of sustainability. Whereas societies that attempt a sustainable agenda meets the needs of their population while still maintaining either equilibrium or even growth, vulnerability was pushed by actions that support "selfishness"

(Adger 2006, 270). Vulnerability studies began in geography with natural hazards and disasters, especially as they relate to human-environment interactions (Janssen et al. 2000). The social vulnerability may refer "to the inability of people, societies, and organizations to cope with negative impacts from natural hazards or other shock/disasters" (Oliver-Smith et al. 2012, 2). It was "a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity" (Adger 2006, 273).

This, though, was where consensus on vulnerability ends. Identifying measures to quantify vulnerability was difficult because many phenomena involved were not directly measurable (Luers et al. 2003, 256). Vulnerability was the confluence of political, economic, and environmental factors to which a people were incapable of adapting to, resisting, or absorbing and were ultimately stressors that undermine the capability of cultural groups to self-maintain (Gallopín 2006; Luers et al. 2003).[43] Also, each one of these factors was culturally specific. An economic vulnerability in one state may be an advantage in another. Typically, vulnerability was connoted negatively, implying a susceptibility to harm and was an inability to overcome stressors and adapt (Adger 2006, 268; Luers 2005, 214)). Features that may be initially beneficial and may temporarily increase productivity can, in the long run, increase vulnerability. This was particularly evident with the introduction of agriculture. Although it allowed for the production of surplus and an increase in population, agriculture also made populations more susceptible to small changes in the environment that would decrease crop production, increase disease as individuals moved closer to one another, and introduced a less diversified diet. Vulnerability was variable, and reactions and adaptations to hazards was a direct result of social and historical traits (Blaikie 1994). In particular, three mechanisms of vulnerability can be studied, including stresses

[43] This, though, does not make it the opposite of resilience. Even if a specific aspect of society is vulnerable, it does not mean that that society is no longer resilient.

to the system, susceptibility to those stresses, and a system's adaptive capacity (Adger 2006; Gallopín 2006). Climate change tends to affect societies already on the threshold of sustainability in a given region, and small changes amplify burdens already in place (Adger 2006, 273). The local populations' relationship with the national political economy resulted in an inability to obtain these much-needed resources (Castro 2012, 34). Although the impetus for tragedy was likely drought and crop failure, it was caused by vulnerabilities in the system, including a failed agrarian policy, an incompetent government, and a shortage of resources at the local level (Castro 2012, 34). The concatenation of all these events resulted in a system failure. Vulnerabilities in the system became apparent after the onset of an outside force.

Archaeologically, studies of sustainability and vulnerability were difficult. Although archaeologists were good at identifying disasters,[44] there were not many studies done to identify the conditions that pushed cultural groups towards vulnerability. One notable exception was Payson Sheets (1999). He looked at the susceptibility of societies in prehistoric Mesoamerica to volcanic eruptions. Specifically, he found a direct correlation between social complexity and vulnerability to eruptions. Large societies with a lot of infrastructure and population centralization were more likely to collapse or undergo marked change after an eruption, while small-scale societies tended to be more resilient and ultimately less vulnerable (Sheets 1999). This may be because, in low population density societies, there was fewer disputes over available resources. Also, smaller-scale societies tend to not be as rigidly controlled as larger societies. This concept was further explored below with a discussion on robusticity. In the wake of a disaster, like a volcanic eruption, there were fewer resources available to quarrel over (Sheets 1999, 54). As well, the interconnected nature of larger cities and controlling hinterlands meant

[44] Anthony Oliver-Smith (1996) identifies that "disasters disrupt routine life, destabilizes social structures and adaptations, and endanger worldviews and systems of meaning."

that a chink in one link of the chain would cause an avalanche of catastrophe down the line (Sheets 1999). Essentially, these groups were less resilient.

3.2.2 Robusticity

Analogous to the concept of resilience is robusticity, which qualifies vulnerability and sustainability and takes it one step further. In archaeology, it can be defined as the purposeful reinforcement of one aspect of sociocultural systems that, in turn, leaves other facets vulnerable (Anderies and Hegmon 2011; Hegmon et al. 2008; Margaret C. Nelson et al. 2006; D. R. Nelson, Adger, and Brown 2007; Margaret C. Nelson et al. 2011; Redman, Nelson, and Kinzig 2009). Sectors of sociocultural systems that were no longer necessary for success and prosperity diminish or were ignored. It was an adaptive mechanism employed in times of affluence as a means of control and conformity. In these instances, it makes sense to discard the seemingly superfluous and redundant modes of production and ways of living. These secondary modes, however, acted as a back-stop in times of rapid change. Therefore, if there was an unforeseen change, there was no longer an alternative mode to rely upon. Because of this, robusticity lessens the resilience of a cultural group.

Under robusticity, there was also a decrease in diversity. This can most often be observed in: cooking technology, subsistence practices, organization of the household, local production, and interregional ties and interactions (Margaret C. Nelson et al. 2006). This was due to an increase in social conformity, which becomes increasingly important as the population increases. During times of prosperity, people gather to central locations. There was also a decrease in innovation. It was inherently risky to take chances and try new things. Most people would prefer to do things the same way with known results, even if a new way would yield, on average, better results but with more unknowns (Hegmon et al. 2008).

Hill et al. (2004) points towards three overarching patterns: material culture, settlement, and bioarcheological. These three themes were analyzed to better understand patterns of robusticity in antiquity. Specifically, settlement patterns pointed towards three lines of evidence that one should be aware of: increasingly defensive locations and construction of sites as immigrants arrive; consolidation into fewer communities around remaining irrigation systems; and contraction of settlements to locations with ease of access to other groups remaining in the region (Hill et al. 2004, 700). In the southern Levant, it was apparent that this consolidation and increasingly defensive locations began in the Early Bronze II and continues into the Early Bronze III, where this robusticity was cemented.

The transition from the Early to the Middle Bronze Age in the ancient Near East had parallels with changes in the American Southwest during pre-contact, from about A.D. 1000-1300, typically referred to as the “Classic” periods. The primary data for the research in the American Southwest comes from the Long-Term Vulnerability and Transformation Project (LTVTP), which compiled archaeological sequences from several subregions within the American Southwest and northern Mexico (Hegmon et al. 2008). This region comprises most of the modern states of Arizona, New Mexico, and parts of northern Mexico. It covers a region of nearly 1 million km^2, compared to an area of around 100,000 km^2 for the southern Levant and 75,000 km^2 for the northern Levant.

In particular, three subregions within the American Southwest provided parallels for the ancient Near East during the Early to Middle Bronze Age Transition. The Mimbres Classic (A.D. 1100-1130) in the Mimbres Valley of modern New Mexico concluded with the restructuring of settlement patterns and changes in material culture (Hegmon 2002; Hegmon et al. 2008; Margaret Cecile Nelson 1999). In the Mesa Verde region in modern Colorado, the Late Pueblo

III (A.D. 1200-1300) ended with large-scale abandonment of the region and depopulation (Glowacki 2006; Hegmon et al. 2008; Varien et al. 2007). The final area was the Hohokam Classic (A.D. 1150-1450) in the Phoenix Basin of modern Arizona that concluded with another population decline that was not as well understood (Abbott 2003; Hill et al. 2004). For each of these periods and regions, the overarching theme of change and resilience was apparent. How each reacted to that change, however, was very different.

The Mimbres region was settled by small scale farmers. The region experienced a fairly steady population growth that started around 550 B.C. and continued to the Classic Period. The Mimbres Classic Period was characterized by consolidating people in fairly large villages (Margaret C. Nelson et al. 2011). When faced with a climatic change as well as subsistence and social stresses during the early 12th century, the Mimbres reorganized their settlements and changed their material culture (Hegmon et al. 2008). There was, however, little evidence for severe health problems or warfare. They either stayed in the region but shifted from villages to small dispersed hamlets or returned quickly after (Margaret C. Nelson et al. 2011). The end of this period was typified by the disappearance of the Classic pottery. Of the three groups under consideration, the Mimbres transformation was the lease severe, likely because they were the most flexible and least rigid.

The Hohokam, on the other hand, were highly invested in irrigation which caused them to be vulnerable fluctuations in rainfall but locked them into one particular location (Hegmon et al. 2008). This was also a relatively isolated region. This territoriality created some evidence for violence in the region. As conditions worsened, people stayed put. In some cases, they endured terrible health conditions for generations until the social and physical infrastructure fell apart. The people may have literally felt trapped, thinking that there may have been no other way to change and no place to go. They had entrenched themselves too much in the one area and were unable and unwilling to move.

In the Mesa Verde region, before settlement disruptions, people moved and packed into the central part of the region and developed rigid forms of organization (Varien et al. 2007). There was considerable warfare in the Mesa Verde region during the 13th century. There was a constant threat of warfare and violence (Kohler et al. 2007). There were, however, few health problems in the region. As conditions worsened, almost everyone left the region and established new ways of life. At the end of the 13th century, thousands of people abandoned the Mesa Verde region and moved to the northern Rio Grande and developed a very different material culture, different household organizations and styles, and different subsistence patterns (Hegmon et al. 2008).

Of these three different adaptations to changes in environmental and cultural conditions, the one that most closely parallels the Early Bronze IV was the Mimbres. The end of the Classic Mimbres (c. A.D. 1130) was once considered a collapse but was now more likely to be characterized as resilience and regional reorganization (Hegmon et al. 2008, 316). Parts of the region were completely depopulated, but the majority moved from villages to smaller, scattered settlements that were predominantly self-contained. In some cases, the depopulation was temporary, lasting only a generation or two before larger settlements reformed.

3.3 CONCLUSION

This chapter explored the relationship between settlement location and social change. The location of settlements in the archaeological record was dependent upon several factors, including ancient issues of climate, political spheres of influence, economic systems, and subsistence patterns.

Specifically, two different modes of looking at settlement location were explored. First was the functional approach, looking at the physical environment itself. How did the environment change during the Early Bronze Age, and how did populations respond to it? Theories to look at this interaction draw heavily from biology and geography, scientific fields with a primary emphasis on the material remains. It was a good means through which to analyze settlement patterns, land use, and environmental degradation and changes. This theoretical perspective was explored more in the chapters four and five. However, for a more nuanced explanation for social change, other theoretical perspectives were necessary. Employing ideas of resilience and robusticity, a new model for understanding the change from the Early Bronze II-III to the Early Bronze IV was proposed.

4 SETTLEMENT LOCATIONS: SOCIOCULTURAL IMPLICATIONS OF MOVEMENT

By analyzing patterns of ancient settlements, it is possible to recreate ancient movement and choices regarding where to settle. Settlement patterns are indicative of land use patterns and potential environmental conditions, both natural and anthropogenic. As a result, changes in ancient settlement patterns can be an indicator of shifts in sociocultural thought.

Often, the first step in settlement studies is usually archaeological survey. Archaeologists look for and provide a preliminary assessment of archaeological sites. During this process, sites are located and sometimes artifacts collected.[45] Indeed, identification and characterization of ancient settlements is primarily derived from such surveys. From the classic study of the Virú Valley in Peru (Willey 1953) to the surveys of the Diyala Plain (Robert McCormick Adams 1965), the use of surveys to understand regional interrelations and sociopolitical organizations in the ancient world has restructured scholarly understandings of the archaeological record. Originally utilized as a tool for prospecting for large, monumental sites, archaeological survey has evolved into a field of scientific inquiry with far-reaching capabilities. When these surveys are reevaluated or applied to new research questions, however, certain updates need to be made to maintain a connection to the relevant analyses. New data, methods, and approaches can and usually do lead to revised results of previous studies or even completely new interpretations.

Surveying is important for several reasons. In years past, archaeologists concentrated on the big, easy-to-spot sites. For example, in early ancient Near Eastern archaeology, major tells were recorded and analyzed (Robert McCormick Adams 1965; Banning 2002; R. J. Braidwood 1937). However, utilizing this method tended to ignore the smaller, more ephemeral sites,

[45] For a full list of surveys utilized and sites looked at in this dissertation, see Chapter 1.

although these sites are just as important in understanding the past. Since smaller sites are usually not as easy to find and require more specialized methods to uncover, advanced survey methods are requisite in the discovery of these small sites. In the case of Early Bronze IV studies, this methodological innovation was particularly important, as the majority of the sites for the EB IV are smaller (because large, tell-based settlement systems were largely abandoned during that period).

Another reason archaeological survey is important is that it allows for an emphasis on regional studies. Many archaeologists seek to understand settlement patterns, the distribution of sites across the landscape of a specific region. For such researchers, it is imperative to put a site in its larger context. It is no longer sufficient to understand the minutia of just one site. Instead, that site needs to be understood as just one component of a larger whole. Because regional archaeology involves large expanses of land, survey methods are critical to the efficient location and interpretation of many sites within a region.

Although a very powerful tool, there are several drawbacks to archaeological surveys. Regional projects cover wide areas of land, sometimes as large as a modern country, but it is virtually impossible to find the resources (including labor and money) to cover such large expanses. Therefore, samples of the total survey region must be used, rather than investigating the whole area. Of course, sampling sites inevitably misses those that are not within the sampled area. This is less of a problem with the surveys conducted by the Israeli and Jordanian governments, however, as the goal was to survey these countries in their entirety. Although these surveys did still miss some sites and not recover all remains, they utilized much higher resolution than most other surveys of the region. Based on these survey, it is possible to look at settlements and settlement locations in a more nuanced way, including an analysis the movements of people across the landscape.

Before delving into the data and analysis, a couple of caveats need to be identified and discussed. The EB II-III in the Levant was sometimes divided into sub-periods in the survey data. The surveys captured data at different temporal resolutions, dividing the data into and EB II and an EB III or by clumping them when data were insufficient to split the periods apart. Another thing to keep in mind was that one of the telltale markers of the EB III is the imported Red-Black Burnished Ware (RBBW, also known as Khirbet Kerak Ware).[46] Sometimes this is the sole differentiation between EB II and III and was rather problematic. As a result, it was important to look at the data closely in order to fully identify further nuances, where possible.

This chapter looks at settlement patterns only as they can be derived from archaeological surveys. It makes some general observations for the entire Levantine region, including possible paths, routes, and the resilience of settlements, carefully exploring two case studies, that of the Negev and the Central Hill country. First, however, it looks at some history of methodology in settlement analyses in the ancient Near East.

4.1 General Observations: Moving Across the Landscape

Landscapes of movement are best used to describe the changes in the Early Bronze IV landscape in general terms. Specifically, a heavy influence on the environment is the primary focus of this dissertation. However, these environmental shifts forced changes in the movement of peoples, from their agricultural practices to pastoralism, from everyday activities to larger, ritualistic ones.

[46] One of the problems with this approach is that RBBW is an import that does not appear at the same time in all places. It was imported from the Transcaucasia and slowly went south (Batiuk 2013)

As populations move across terrains, they generate a new, interconnected landscape of meanings that had not previously existed. These features create a landscape of movement and structure life. Pathways and trails were in diverse niches that were physically restricted. Individuals created spaces and places by moving through the landscape, by envisioning relationships between places, and by creating connections between daily routines and movement (McCorriston 2013; Ristvet 2014). As such, "landscapes of movement" not only encapsulate physical paths across the landscape but also meaning inscribed and implications movement, in general, had on a population. This was particularly important when discussing both seasonal, short-term movements by pastoral-nomadic groups as well as the large-scale movements by migrant populations and refugees.

Based on recent studies (Galiatsatos et al. 2009; Ristvet 2014; Wilkinson et al. 2012; 2014) many settlements on the fringe in northern Mesopotamia were located at pivotal points between agriculturally productive areas and the grazing lands of the semi-arid steppe. This was significant because fringe settlements were "economic bottlenecks" that allowed local communities to prosper by controlling surpluses in each mode of the economic zones (Earle and Kristiansen 2010b, 243). Lauren Ristvet (2014) looks at the significance of pastoralism and subsequent rise of "gateway cities" during the third millennium B.C., like Ebla and Mari. These cities were located on the margins of agriculture where an integrated pastoral and agricultural economy can be observed (Margueron 1996; Matthiae 1980). Ristvet looks at how movement, memory, and tradition were essential in the creation of Near East authority, and how rituals were used through these three concepts to cement political landscapes (Ristvet 2014, 2). Urban centers and kingdoms attempted to maintain power over their territories and restrict and controlled movement (Ristvet 2014, 36). This can be seen at Tell Beydar, where extensive excavations uncovered a radial pattern of streets that restricted passage into the city, forcing movement towards the palace, which created a sense of control (Lebeau and Suleiman 2007). At the smallest scale, access to rooms within the palace was restricted (Ristvet 2014, 58). At a larger scale, pilgrimages provided a powerful metaphor of control across larger polities. Ristvet specifically spotlights Ebla, where elites participated in a coronation ceremony that involved ritualized travel to specific cult centers in the surrounding countryside. It was a ritualized path to unite those in the palace with those in the city of Ebla and finally connecting with those in the surrounding kingdom (Ristvet 2014, 68).

Based on the distribution of sites and settlement areas, there was both an increase in the number of sites and total occupied area for the EB IV from the EB II-III. Site size, on average, decreases (Figure 4.1). Both patterns reflect the previous literature and interpretations of the Early Bronze IV, where the major tell system was abandoned. This coincided with an increase in the number of smaller settlements, some of them temporary campsites. An observed decrease in the average site area of sites in the southern Levant occurred as previously large settlements of the EB II-III were either entirely or partially abandoned. Interestingly, there was a pattern, when it was possible to differentiate between EB II and EB III settlements, of larger site area in the EB II than in the EB III. Again, this has been suggested in previous studies (Broshi and Gophna 1984; 1986).

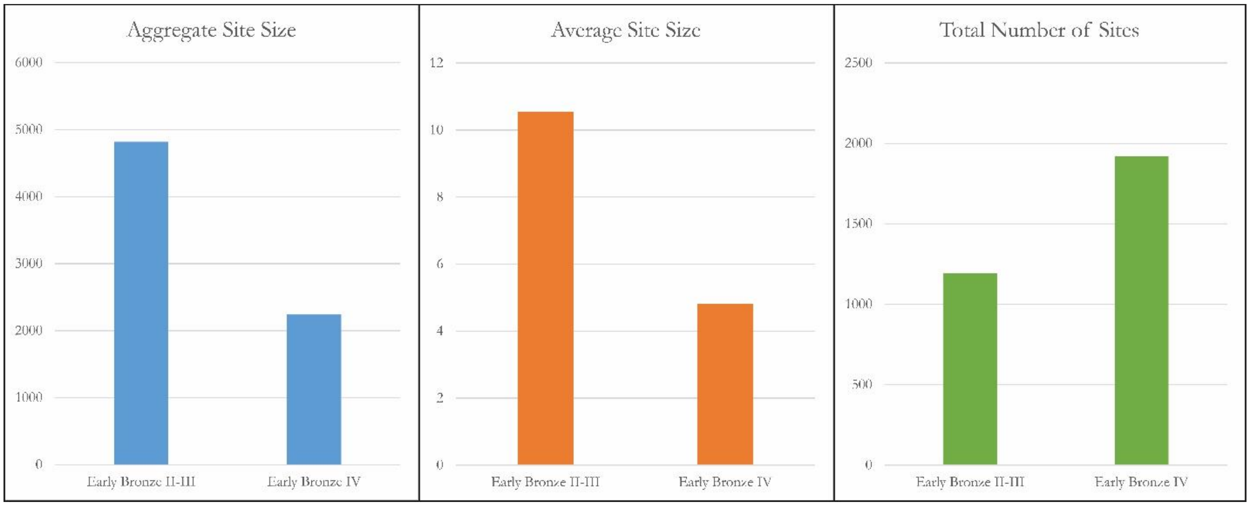

Figure 4.1: Aggregate site size, average site size, and total number of sites for the Early Bronze II-III and Early Bronze IV for the entirety of the Levant.

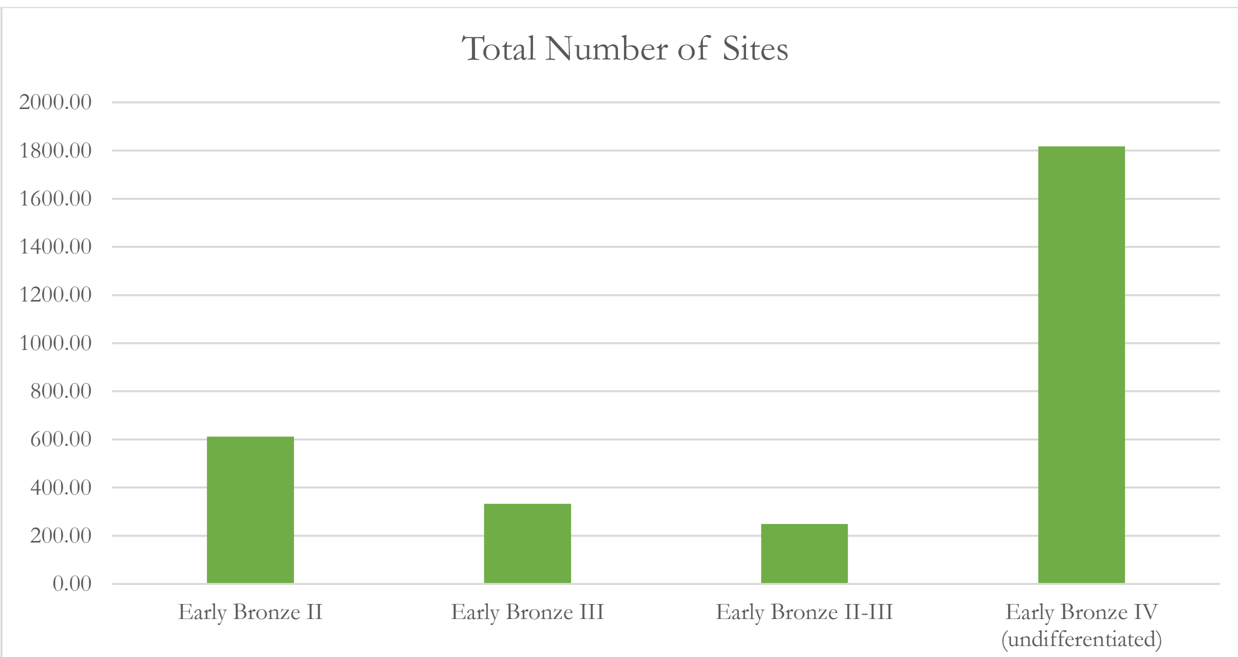

Figure 4.2: Total number of sites per subperiod of the Early Bronze Age for the entirety of the Levant.

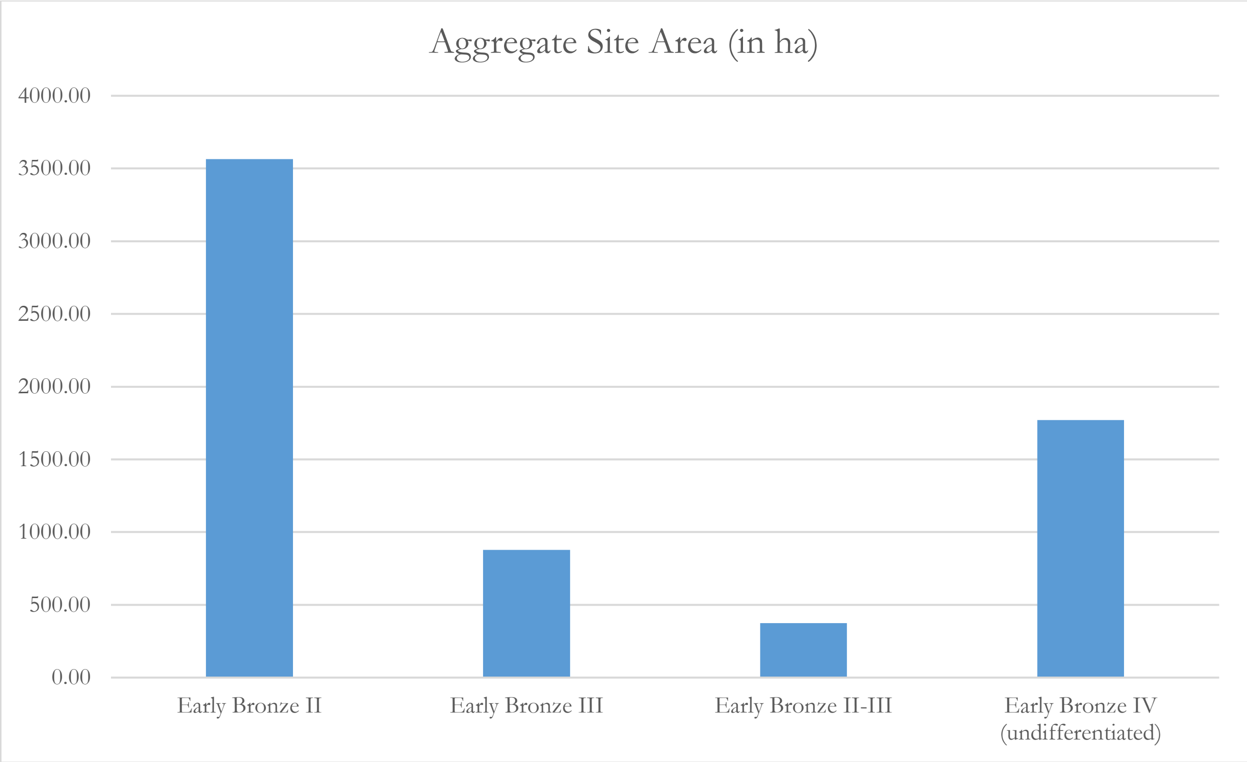

Figure 4.3: Aggregate site area per subperiod of the Early Bronze Age for the entirety of the Levant.

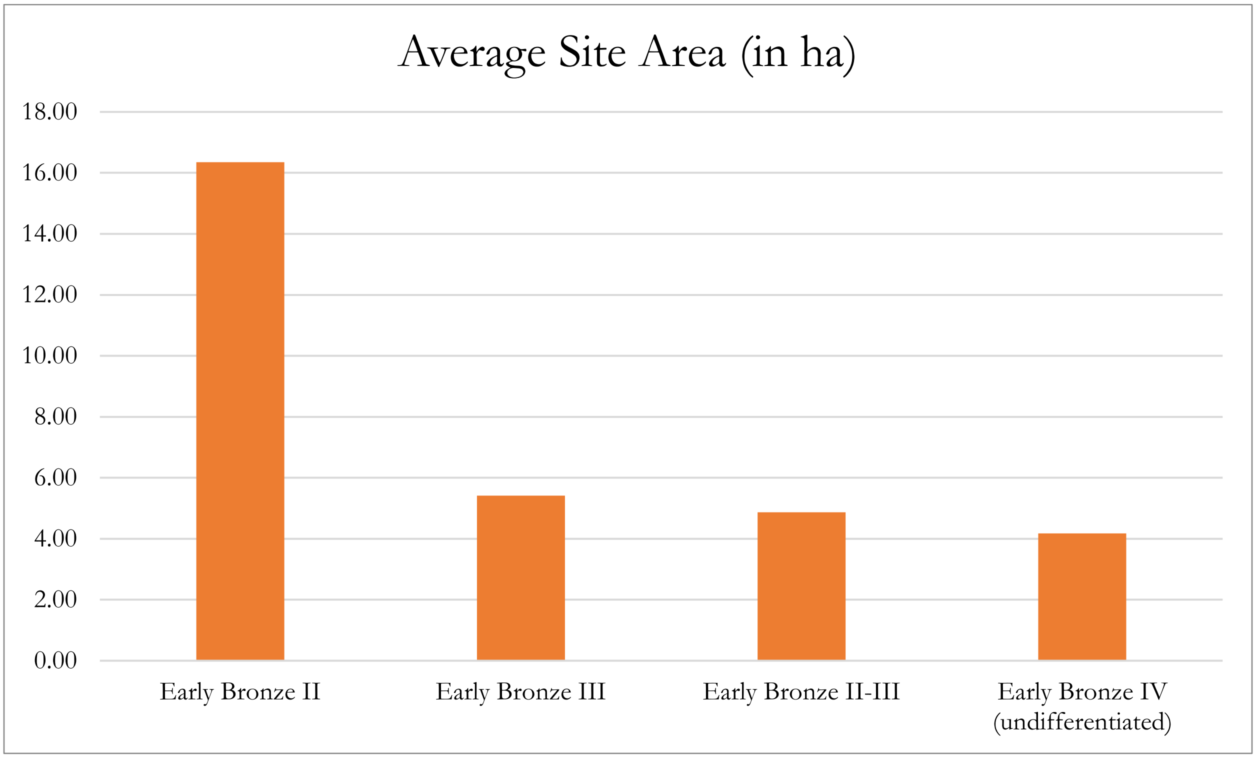

Figure 4.4: Average site area per subperiod of the Early Bronze Age for the entirety of the Levant.

An increase in the overall occupied area and the total number of sites in the southern Levant transpired that was not expected. The EB IV was posited to be a time of collapse and disruptions, with fewer sites and less occupied area to be expected. This, though, does not appear to be the case for the total occupied area. There were several different possible explanations for this. First, this increase in the overall occupied area may be because the EB IV was significantly longer than the other EBA and MBA sub-phases. Based on current radiocarbon analysis of EB IV assemblages, the EB IV was posited to be around 500 years long instead of the previously thought 200 to 200 years, whereas the EB III was only 350 years and the MB I was 200 years. To normalize this, I divided the total area and sites occupied by the years of each period to come up with sites per year and area per year. Even after accounting for the longer period, the EB IV still had more sites and area than the previous EB III but had fewer sites and less area than the MB I. This helps put it in perspective a bit, but at the same time, numbers were still significantly higher than previously observed. This does starkly show a definite decrease in the number of sites and occupied area for the EB III through MB I, with the EB II and MB II representing the highest number of both once normalized. It does not, however, account for intra-settlement density of these periods. It was likely that the settlement density[47] was not as high during the EB II-III and later MB II.

Second, this increase could be indicative of something that goes against all previous explanations and was the least likely, namely that a large influx of population into the region during the EB IV happened. If every site was occupied at the same time, this could mean that the EB IV was a period of increased productivity. Instead of a time of “collapse,” the EB IV could instead be a time in which groups experimented with different modes of living with an increased

[47] This theory is reflected in the “hollow-city” ideas of urbanism in the ancient Near East (Genz 2012; Ristvet 2014).

population. This would be the perfect backdrop from which the later major cities of the MBA emerged. However, the idea that every site of the EB IV was occupied for 500 years was difficult to accept because, outside of the number of settlements, there was no other evidence for this. In fact, other evidence points towards sites that were occupied on a seasonal basis (Kochavi 2009) or only occupied for part of the period (D’Andrea 2014; Richard 2010).

The third explanation was the one that was the most likely, namely. The increase in total sites may be representative of a different cultural system, incorporating different modes of production including pastoralism, agriculture, cottage industry, and trade. Control of resources could be at the community level, wherein a localized settlement controls a group of pastoral nomads as well as a population of agriculturalists, thereby satisfying the needs of the entire community.[48] There would be one larger settlement that controlled multiple smaller settlements, many of which were not occupied for the entirety of the year or were intermittently occupied throughout the EB IV.

Looking at Ebla in the northern Levant, as an example, it was in an agriculturally marginal area and pastoral resources were necessary. Ebla was a gateway city that controlled the vertical mobility of pastoral-nomads. The Ebla texts even mention the importance of wool and the textile industry in the EB IVA. By expanding settlements into previously unoccupied areas, polities of the EB IV were able to capitalize on pastoral economies. Expanding into these areas also restricted the area for independent nomadic groups to establish and maintain independence. The entirety of the implications for a pastoral nomadic economy at Ebla is explored in Chapter 7.

[48] I am using community here as a word for a collective of people with a single goal in mind, not in the archaeological theory sense. For further literature on community archaeology, see: Anderson 2006; Bergstrand et al. 2014; Faust 2000; Gerritsen 2001; Jongman, Braak, and Tongeren 1995; Kolb and Snead 1997; Lysons, Hill, and Clark 2008; Peterson and Drennan 2005; Potter and Yodder 2008; Porter 2007; 2013; Schachner 2008; Snead 2008; Varien and Potter 2008.

Figure 4.5: All Early Bronze II site locations in the Levant. Map by author.

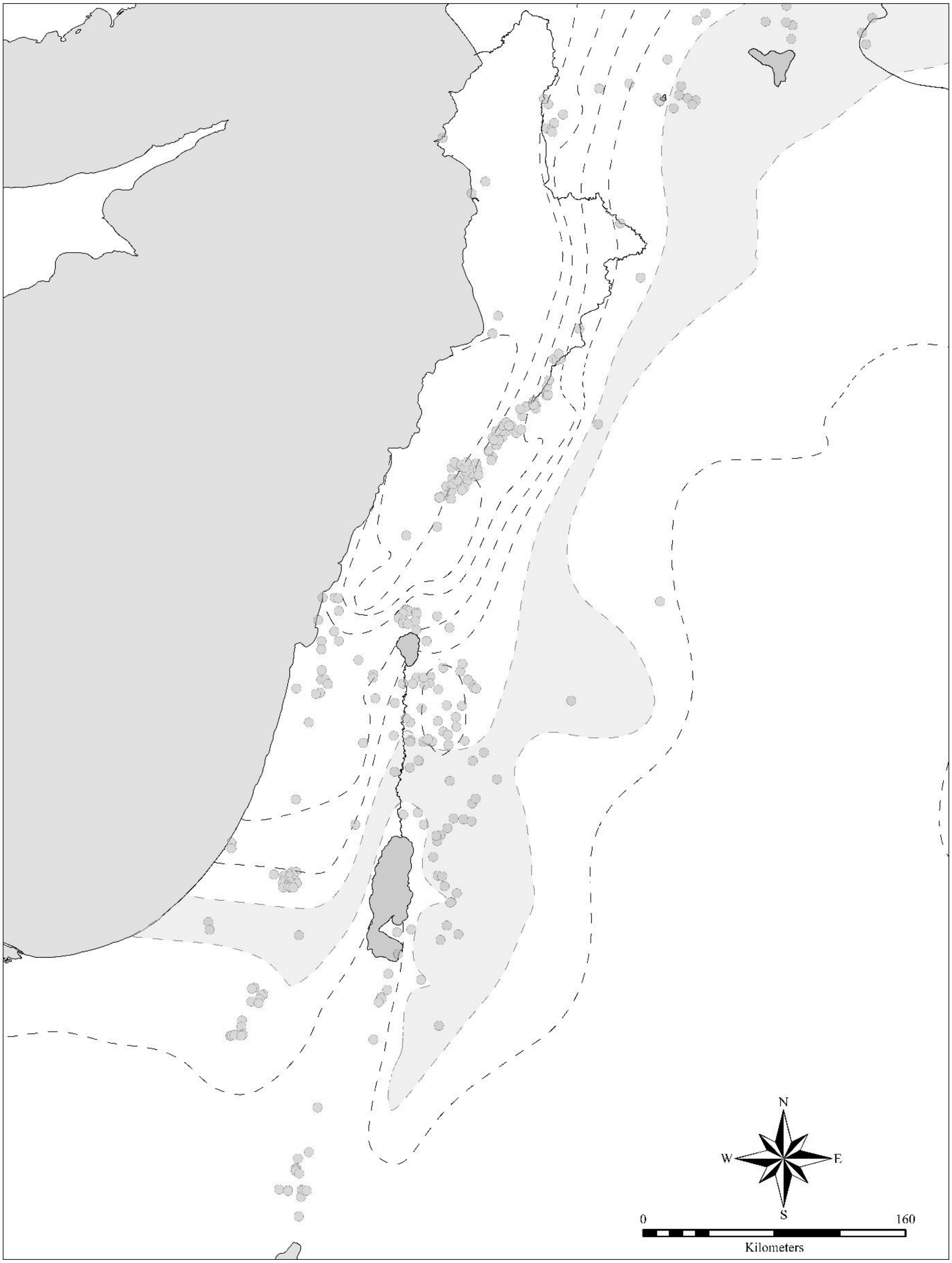

Figure 4.6: All Early Bronze III site locations in the Levant. Map by author.

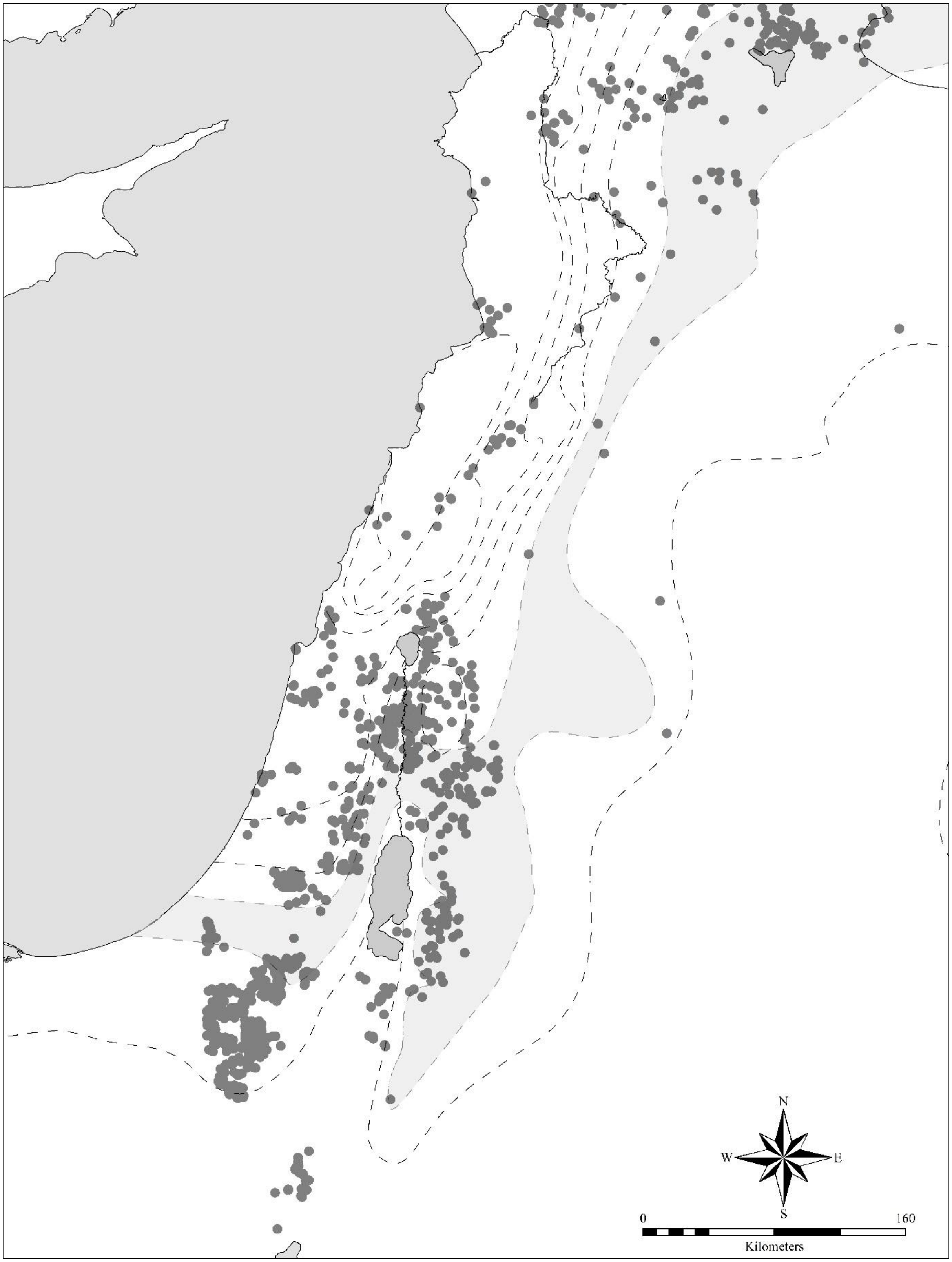

Figure 4.7: All Early Bronze IV site locations in the Levant. Map by author.

Figure 4.8: Early Bronze IV sites with occupations and sites with burials and/or cemeteries. Map by author.

When analyzing the maps, they elucidate the same pattern that the graphs above show. There was a definite increase in the number of sites during the EB IV, especially when compared to the periods immediately preceding and following it (*Figure 4.5*, *Figure 4.6*, *Figure 4.7*). There was, however, a spatial component to this. Concerning burials, they seem to be located in the same general areas that populations lived (Figure 4.8). There was no real significant discrepancy. The only particularly noteworthy factor was that there was a significant decrease in the number of burials during the EB III and the MB III. Other than that, the other periods seem proportionally similar.

4.2 General Observations: Resilience

The best place to see the role of robusticity and resilience in the Early and Middle Bronze Age Near East was in the utilization of the zone of uncertainty. New data can shed light on this liminal zone. Some of the results, though, reflect conclusions already made by previous scholars but utilize new data and methodologies.

4.2.1 Site Area and Numbers

Looking at all the sites in the study area (

Table *4.1*, Table 4.2, and Table 4.3), from the northern and southern Levant, the largest average site size and total area occupied was during the Early Bronze II, with a decrease after that in both size and area, though with a notable exception of a spike in total site EB IV. When the total number of sites was considered, there was a huge spike in the EB IV, even when accounting for the substantially longer 500 years of occupation. The rest of the periods were rather cyclical: there was a decrease in the number of sites from the EB II to EB III, an increase from EB III to EB IV, and a decrease from EB IV to MB I.

Table 4.1: Aggregate site area and average site size per period for the entirety of the Levant.

Period	**Aggregate Site Area (ha)**	**Average Site Size (ha)**	**Total Sites**
Early Bronze II	3564.1	16.3	612
Early Bronze III	877.9	5.4	324
Early Bronze IV	1770.8	4.2	1815
Middle Bronze I	697.9	4.3	482

Table 4.2: Total number of sites per sub-phase in the Early Bronze Age for the entirety of the Levant, complete breakdown.

Period	**Total Number of Sites**
Early Bronze I	853
Early Bronze II	612
Early Bronze III	333
Early Bronze IV (TOTAL)[49]	1920
Early Bronze IVA	42
Early Bronze IVB	53
Early Bronze IVC	7

Table 4.3: Total number of sites per period, EB II-III and EB IV only, for the entirety of the Levant.

Period	**Total Number of Sites**
Early Bronze II-III	1194
Early Bronze IV	1920
Grand Total	3114

These patterns fit well within a resilience and robusticity model. There was an expansion of sites during the Early Bronze II. During this period, there was the rapid establishment of a new, denser population. This would typically result in an influx in population, with an increase in the number of sites and total occupied area. This can be observed in the Early Bronze II settlement patterns of the Levant. During the Early Bronze III, energy in the form of established cities and settlements, as well as a highly integrated agricultural system and specialization at the

[49] This represents the total number of sites that contain an EB IV occupation, including the sub-phases. However, every study did not split the EB IV up into sub-phases so the total number is higher than the aggregate of the EB IVA, IVB, and IVC added together.

individual city level, was stored and slowly accumulated. It was during this phase that societal norms and patterns of subsistence and specialization were entrenched. Typically, this was where robusticity comes into play. Governing groups, in attempt by governing bodies to control the population consciously or otherwise, congregated into larger settlements. This resulted in fewer sites, but still a significant aggregate site area. It was during the release phase of the resilience cycle, the Early Bronze IV, that things became slightly more unpredictable. No two societies reacted the same to the release phase. But what does occur was reorganization or a total collapse. As social groups became entrenched, they became vulnerable. Those vulnerabilities were exploited in some way, whether that was through a change in climate, a change in governing bodies, or a change in trade routes. Because cultural groups had become entrenched, they could not adapt in the same way. Therefore, drastic changes could be expected. During the Early Bronze IV, this resulted in the abandonment of larger settlement areas and the establishment of smaller sites in the landscape. This may be indicative of cottage industries, wherein each village was self-sufficient and the need for trade was much less pronounced.

4.2.2 Environmental Observations

The resilience of cities and sites during the Early Bronze Age were also influenced by outside factors, including environmental and climatic issues. There are some interesting, general environmental data that can be explored. There was an increase in the average elevation of sites during the EB III. This might be reflective of patterns already established by Avraham Faust and Yosef Ashkenazy (2007; 2009), who observe that there was a drastic decline in settlements along the coast during the Early Bronze III, which they link to an increase in precipitation during the Early Bronze III. This increase in precipitation exacerbated already problematic drainage problems along the Levantine coast (Faust and Ashkenazy 2007, 43). This allowed for more swampy conditions to form on the coastal plain, including an increase in disease. It also increased the salinity of the surrounding agricultural fields and decreased growing productivity. If this was the case, then an increase in the average elevation of sites during the EB III was expected as people moved further inland into higher elevations. There was a subsequent increase in the number of sites in the more mountainous regions of the Levant. Interestingly, the lowest average elevation was during the Middle Bronze II. This was probably indicative of an increase in settlements on the coastal plain and the agriculturally fertile valleys as can be seen in Susan Cohen's (2002) study on the reintroduction of settlements during the MBA.

An interesting pattern emerged when looking at average annual rainfall and temperature per period (Table 4.4). The EB III sites were, on average, located in regions that were colder and wetter than the EB II. EB IV sites were warmer and drier than both. Then it continued to get warmer, but wetter, on average for sites in the MB I and MB II. The differences in average annual temperature, on first observation, do not appear to be very significant. The range was, at its greatest, 1.1°F.[50]

Looking at rainfall, however, there was a high degree of variability.[51] The Early Bronze IV was the period with the lowest average rainfall for sites based on the available data. The spread from the lowest to the highest was rather significant, at over 180 mm of rainfall per year. From period to period, the location of settlements changed in relation to the average annual rainfall.

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[50] Again, these patterns reflect what has already observed for the EB IV. There was an increase in the number of sites in the Negev, an arid region, and the Central Hill Country, a semiarid zone.
[51] Rainfall data was acquired from the Food and Agricultural Organization of the United Nations (http://www.fao.org/economic/ess/environment/en/). This study uses modern data as an approximation for ancient data.

Table 4.4: Average annual rainfall (in mm) and temperature (in F) for sites in each subperiod for the entirety of the Levant.

Period	**Average Annual Rainfall (in mm)**	**Average Annual Temperature (in F)**
Early Bronze II	381.9	65.2
Early Bronze III	428.5	64.9
Early Bronze IV	310.4	65.4
Middle Bronze I	411.3	65.6

These changes, however, still placed the sites within the minimums necessary for dry farming of wheat and barley. The average rainfall, though, of EB IV sites was outside the optimal zone to grow wheat and barley long term, but not to such a degree that it was impossible. Since these differences in environmental factors were significant, but on their own not necessarily meaningful, the data were also split up based on the three zones: poor for agriculture (areas receiving less than 200 mm of rainfall per year), the zone of uncertainty (areas receiving between 200 and 300 mm of rainfall per year), and the refugia (areas receiving over 300 mm of rainfall per year).

The EB IV was marked by a drastic shift in overall rainfall patterns. On the long-term average, it stayed relatively consistent from the EBA. On a year-to-year basis, it was not as stable. The frequency and intensity of droughts were more pronounced during this period, even though rainfall itself on a large-scale average remained relatively the same. This put a large amount of stress on local populations, as they had to predict and plan for changes from year to year.

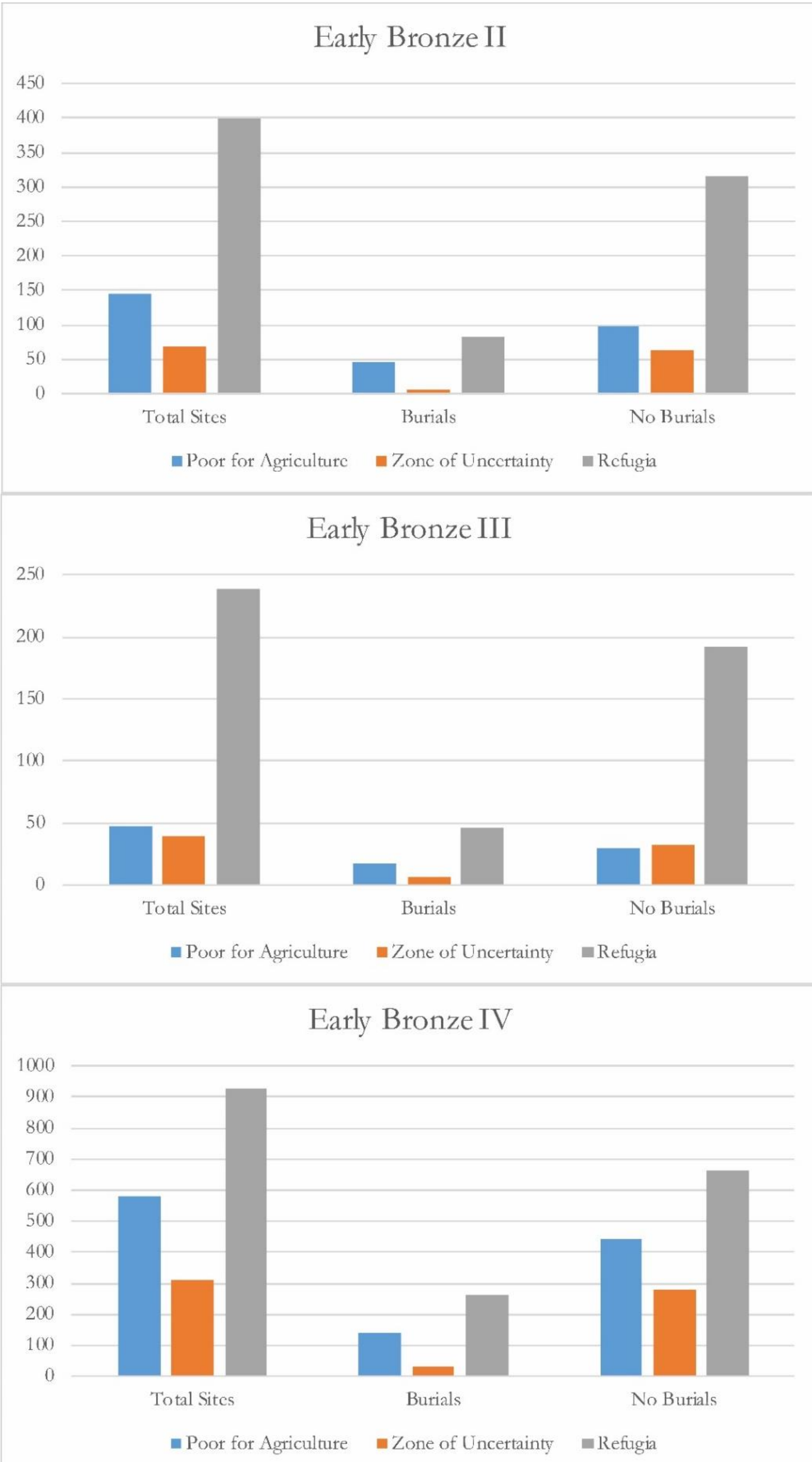

Figure 4.9: Number of sites per zone, divided up by total sites, cemeteries (including sites with singular burials), and sites with no burials.

4.2.3 Sites by Type, Function, and Region

Another way to analyze the data was to split the data up by all sites, sites with burials (i.e., cemeteries), and sites with no burials (Figure 4.9). Some interesting patterns can be observed per zone when they were split up by all sites; sites with burials; and sites with no burials. Over 50% of all burials per period were in the refugia. For sites that have no burials, over 50% of these were also in the refugia, except for the Early Bronze IV. All periods had the majority of their sites in the refugia: 65% for the EB II, 73% for the EB III, and 51% for the EB IV. Except for the EB IV, when barely over 50% of the sites were in the refugia, all were well above what???.

There was a larger discrepancy between the number of sites in the zone of uncertainty per period than in the refugia. The majority of people wanted to live where agriculture was rather predictable, so settling in the refugia makes functional sense. Although having the potential for high degrees of productivity, settling in the zone of uncertainty was more difficult and fraught with insecurity if there were consecutive years of drought or increased temperature. For burials, all periods except the EB IV had burials in the single digits in the zone of uncertainty. The EB IV featured the largest percentage of total sites in the zone of uncertainty, with 17% of the sites falling in this zone.

For the area were dry farming was improbable, beneath the 200 mm isohyet, there were more sites than in the zone of uncertainty, except for during the Early Bronze IV. The EB IV contained the most sites in the region that were difficult to perform agriculture, with 32% of all sites. The second period with the most sites in this region was during the Early Bronze II, with 23%. As far as burials were concerned, there were more burials in the area that was highly arid than there was in the zone of uncertainty.

Figure 4.10: Aggregate site area, average site area, total number of sites by subperiod of the Early Bronze Age and environmental region for the entirety of the Levant.

After this, the total number of sites in each of the zones were compared by total area occupied, average site size, and the total number of sites (Figure 4.10). There was a spike in aggregate site area for the Early Bronze II in the arid regions where agriculture was difficult, but it appeared to be because of an outlier. When this outlier was removed, the aggregate site area reflected the patterns that could be observed for the area that was poor for agriculture. Most of the sites and occupied area were in the refugia for all periods. For the zone of uncertainty, the highest occupied area was during the Early Bronze IV with 233 ha. During the EB IV, the largest site size in the arid region where agriculture was difficult was 7 ha, whereas the smallest was in the zone of uncertainty. This was only of two periods where this was the case, with all other periods under consideration with the largest average site size in the refugia. During the MB II, almost all the site area and the site numbers were in the refugia.

The final part was to compare data based on environmental factors like the elevation of each site, average annual rainfall, and average temperature (Figure 4.11). Rainfall was a little more predictable since the data was already split into the different zones by rainfall. But within the three regions, there was a high degree of variability, especially in the refugia. In the area that was poor for agriculture, during the EB IV, the average rainfall was 153 mm. In this area, the lowest average rainfall was during the EB III, with an average of 104 mm of annual rainfall. For sites in all periods in the zone of uncertainty, which was defined as the area that receives an average annual rainfall between 200 and 300 mm, the annual average rainfall was between 243 and 262 mm. In the refugia, or all areas that received more than 300 mm of annual rainfall, the EB IV had the lowest average rainfall at 431 mm.

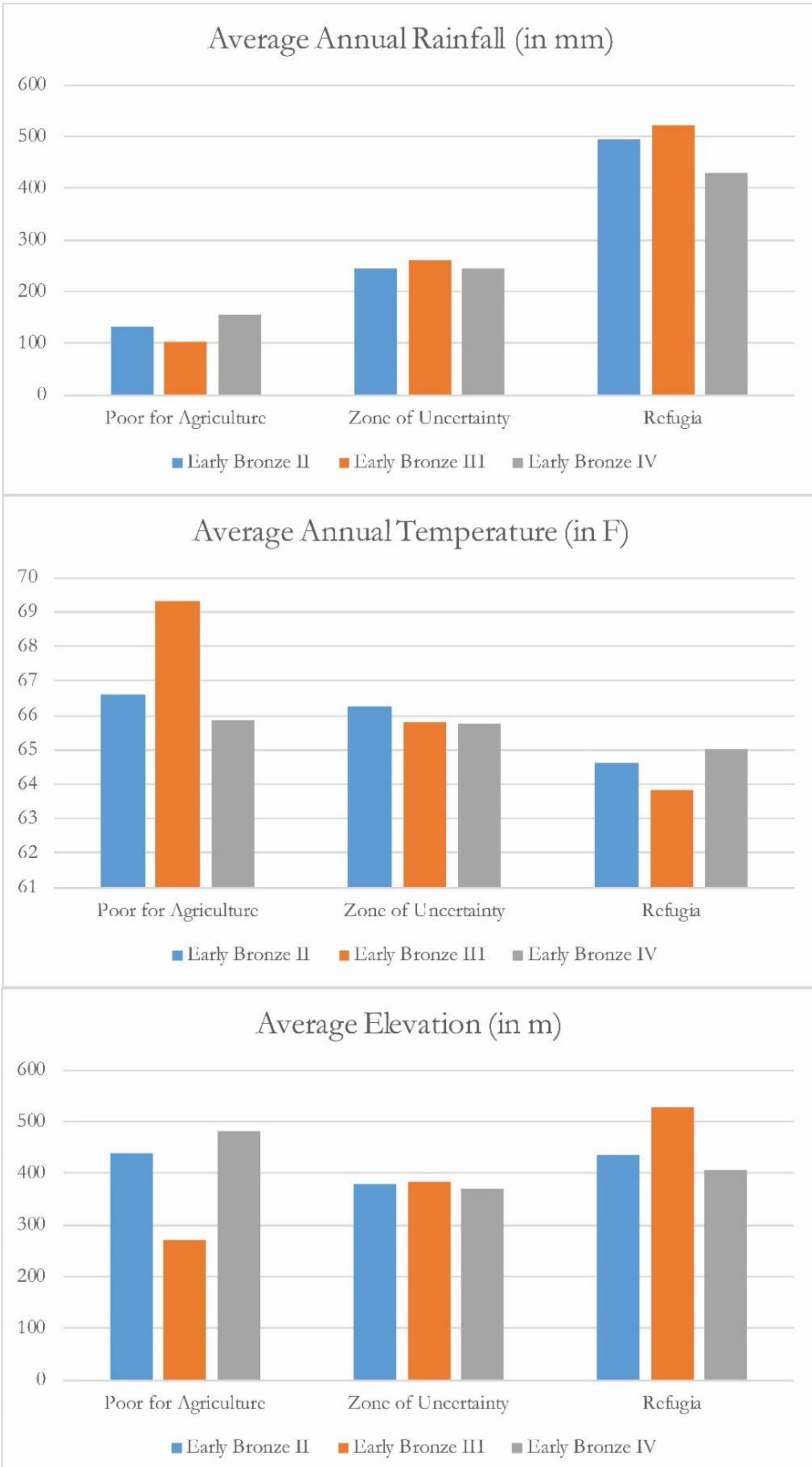

Figure 4.11: Average elevation (m ASL), average annual rainfall (mm), and average annual temperature (°F) by subperiod of the Early Bronze Age and environmental region for the entirety of the Levant.

The final comparison was the sites per period against average annual temperature. The biggest spread in temperature in any period was the Early Bronze III. The highest average temperature for all periods fell within region that received less than 200 mm of annual rainfall, except during the MB I but this was by less than 0.2°F. But all of the averages per period were between 63.8°F and 69.3°F.

All these factors painted a picture of the Early Bronze IV as a part of the resilience Mobius. The zone of uncertainty was necessary for the survival of the EB IV, though after the fact it was widely abandoned. When all of the factors were compared, rainfall zones seemed to be the biggest determining factor for occupation per period. The zone of uncertainty increased in importance during the Early Bronze Age and reached its pinnacle during the Early Bronze IV. The integration of this zone into the new settlement pattern increased resilience and allowed for a rather quick restructuring of communities to survive the climatic and political upheaval that the Early Bronze IV represents.

4.3 Case Study: The Negev

The Negev is a rock desert and semidesert area of southern Israel. It covers more than half of modern Israel, some 13,000 km^2. The region becomes more arid moving south and east from the Mediterranean Sea. The northern Negev is within the dry-farming zone, with roughly 300 mm of rainfall per year. The western Negev is still within this zone with 200 mm of rainfall per year. It drops off drastically after this point. The area around Eilat is severely arid, with around 50mm of rainfall annually. The Negev and the adjoining Sinai and Aravah are the hottest and driest of the regions with settlements in this study (Figure 4.12 and Figure 4.13). In the Negev and Sinai approximately 1500 sites were surveyed including dwellings, burial fields, cisterns, and agricultural implements (Haiman 1992, 93), 181 of which in the western Negev contain EBA remains (Haiman 1992, 93).

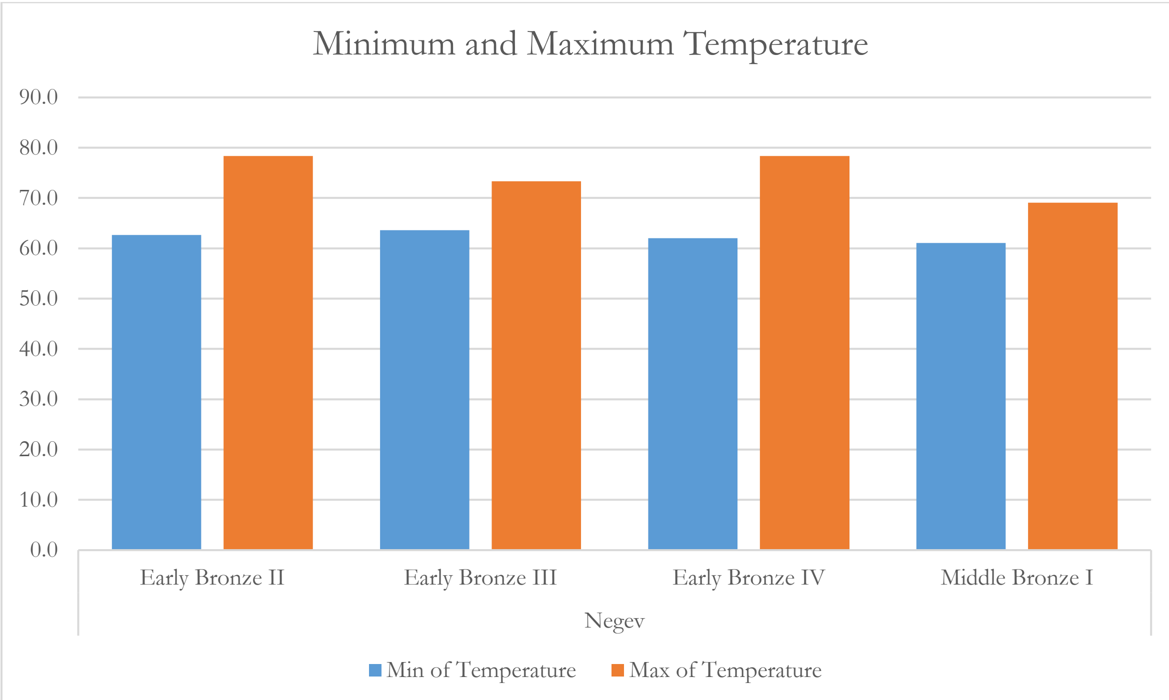

Figure 4.12: Minimum and Maximum temperature (°F) of sites in the Negev per subperiod.

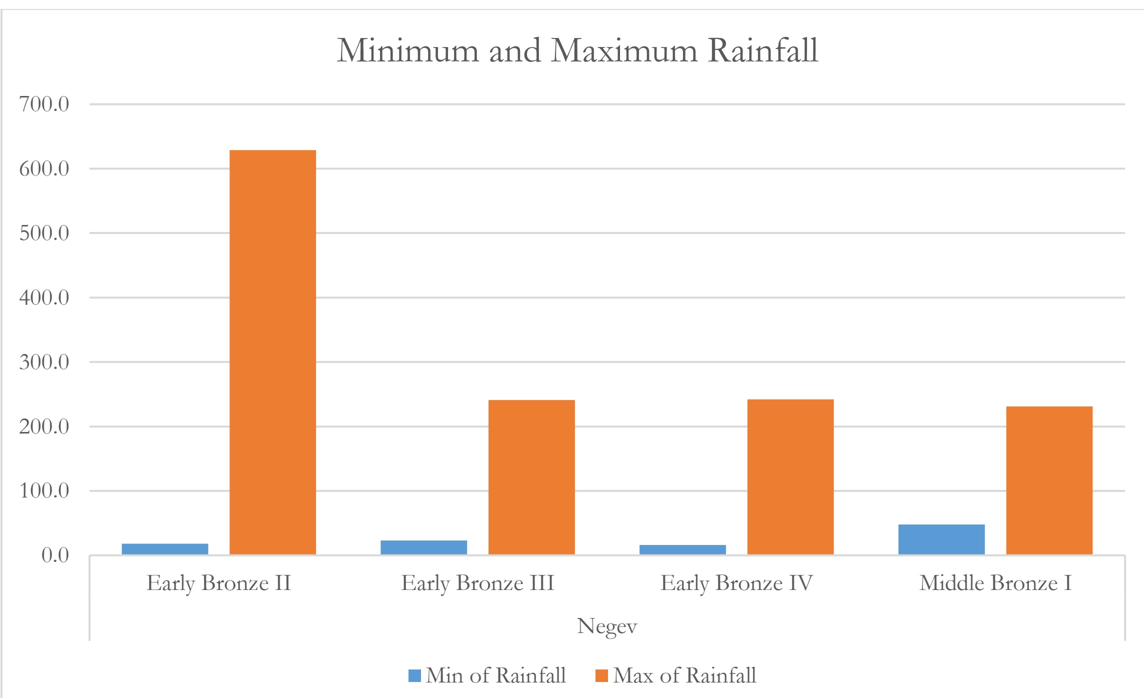

Figure 4.13: Minimum and Maximum rainfall (mm) of sites in the Negev per sub-period.

One problem with analyzing the Negev is that many earlier studies paint this region as a landscape of pastoral nomads. This conclusion is heavily based on ethnographic analogy, especially since modern Bedouin live in this region today.[52] This, however, does not take into consideration the inherent differences between ancient and modern societies. Analogy is a valid approach, but many studies do not delve deeper. Reliance has also been placed on the understanding that people of the Negev were pastoral nomads.

Current theories on the occupation of the Negev during the EB IV see settlements patterns as not reflecting a pastoral interlude during the otherwise urban EBA and MBA but rather dependent on the increase in the copper trade from the Wadi Faynan. The transition of the EB III to the EB IV now correlates to the 6th Dynasty of Egypt, during the Old Kingdom, whereas before it was postulated to correspond to the beginning of the First Intermediate Period.

Several studies were done in the Negev, including on the trajectory of the relationship between pastoral and sedentary populations. Steve Rosen (1992) noticed a north to south shift in agriculturally oriented settlements over time, which reflects a change in the demographics of the Negev. Rudolph Cohen (1992) looked at the central Negev during the EB IV. He classified the Central Negev settlements into four categories: central settlements (0.3-2 ha), large settlements (0.2 ha), small settlements, and temporary encampments. There were only a dozen or so permanent settlements in the Negev during this period, in contrast to the hundreds of smaller, seasonal occupations.

Finkelstein et al. (2018) looked at the trajectory of EBA sites in the Negev. There was a high degree of continuity in the occupation of sites during the EBA through to the middle of the EB IV. This could roughly be broken down into two phases. In the first phase, which

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[52] For further information on this, see: (Avni 1992; Eldar, Nir, and Nahlieli 1992; S. A. Rosen 2011).

corresponded to the EB I-EB III and the late Predynastic through the 4th dynasty of Egypt, there were a large number of settlements centered around Arad in the Beersheba plain. The second phase roughly corresponded to the end of the Old Kingdom of Egypt. Small sites in the Negev highlands continued during this phase, in contradiction to other sites in the southern Levant. This increase in sites was likely due to the copper industry out of Wadi Faynan in Jordan. Arad was completely deserted by this time, and the copper industry was likely controlled by smaller polities and sites and was not as centralized.

Figure 4.14: Small site above Yeruham Dam in the Western Negev. Consists of a few small buildings. Photo by author (taken 8/21/2016).

There were also several what might possibly be temporary sites located in the Negev (Figure 4.14). These sites were significantly smaller and contain few buildings. There was less evidence for the copper trade, but there were more accouterments associated with animal husbandry, like pens, and agriculture, like sickle blades (Haiman 2009, 40).

One theory as to why these sites emerged in the Negev, both the probable permanent and temporary settlements, was to support the copper trade. Mordechai Haiman (2009) suggested a three-tiered system of occupation in the Negev. First, there was centralized control of the production that also pushed for copper mining in commercial quantities. He suggested that control may have been centralized at Khirbet Iskander, but the distance from Iskander to the Feynan mines was relatively long and over rough terrain. The second was that the permanent settlements were for specialized copper production. He postulated that this population was not as concerned with food production since it was a highly specialized site. The third level was in response to the copper trade and developed along the peripheries of the site and along the trade routes. He proposed that it was likely a Bedouin type community, where they were paid labor and pastoral nomads on the side. These sites could only support about 200 individuals in total (Haiman 1992, 101).

Two of the main sites Haiman looked at were ‘Ein Ziq and Har Yeruham. ‘Ein Ziq was one of the largest sites in the Negev during the EB IV at about 2 ha. It appeared that the site was predominantly used for the copper industry, with copper ingots and chips found in the rooms at the site. There were also stone tools that could be part of copper cold hammering. Another site in the Negev, Har Yeruham, also included a number of stone tools, copper chips, a dozen or so ingots, and ingot pieces. A large portion of the EB IV site was an industrial site with around 30 installations and storage rooms (Haiman 1996, 18).

The Negev sites, as part of the copper trade, especially during the EB IV was further corroborated by limited evidence for pastoralism or agriculture. Although several of the sites were located near a water source and were within the dry farming area, the majority were outside this zone. Since there were so many artifacts associated with a copper industry instead, it was likely that the sites in the Negev were centered around the copper trade.

Figure 4.15: The northern Aravah. Photo by author (taken 3/2/2019).

Figure 4.16: The eastern Negev from Route 227 in Israel, also known as The Scorpions' Pass. Photo by author (taken 8/6/2016).

In order to analyze the evidence for copper trade with new data, sites in the Negev and Aravah region of the southern Levant were mapped (Figure 4.15 and Figure 4.16). In total there 649 EB IV sites in this region, as compared to the 32 for the EB III and 39 for the MB I. Of these, there were only 6 that were larger than 2 ha in size. They seem to form a linear pattern across the landscape that was a potential trade route through the Negev. The six sites had a small hinterland around them and tend to cluster together. A number of these sites also had tools associated with copper production in addition to copper ingots and chips. This was consistent with what was proposed by Haiman and was supported by the new survey data (Figure 4.17).

There were sites that were located further to the south that still need to be considered. They had a lesser degree of copper accoutrements and were outside the dry-farming zone. These sites, however, clustered around one central, slightly larger site. These larger sites tended to have more rooms than the surrounding sites, with the smaller sites containing only one to five rooms or buildings, with the larger around ten. These were in the center of Kernel Density Estimates (KDE) hotspots. These sites tended to be located within 10 km of water sources, like intermittent wadis. About 80% of them were located within 5 km of a water source (Figure 4.18). There were only a few exceptions, and those were to the furthest south around modern Eilat and Aqaba on the Red Sea. Therefore, it was likely that for at least part of the year, during the wetter winter season, these sites sustained some basic agriculture. This may have been used to support the northern Negev copper trade. There was also a copper source to the south in Timnah, but there was no evidence it was in operation prior to the Iron Age. There was no real evidence for metalworking or copper at these sites. There were no ingots, no copper chips, and no hammer stones for cold working. Most of the finds were pottery, lithics, burials, and domestic architecture.

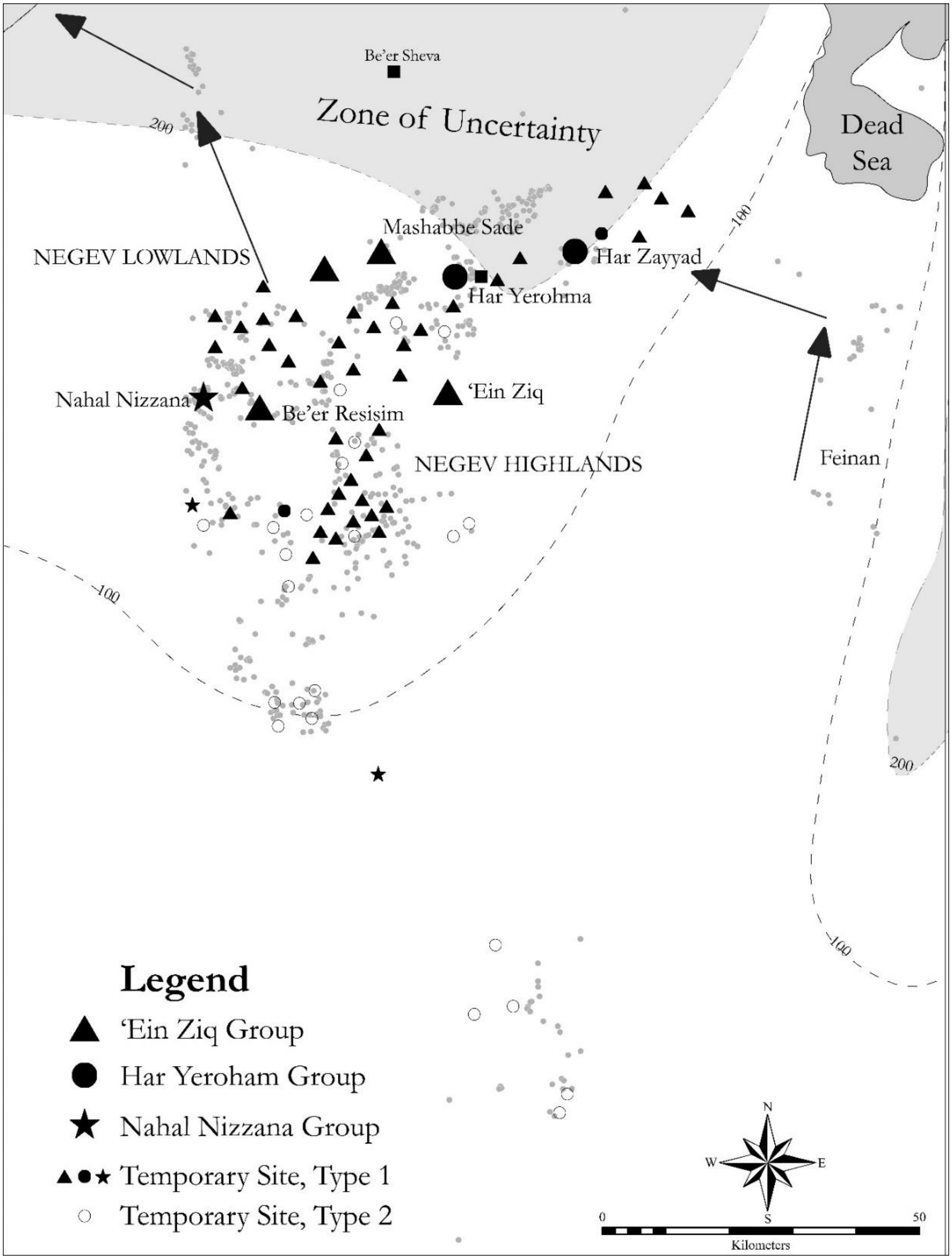


Figure 4.17: Possible route from Wadi Faynan through the Aravah and Negev to the Mediterranean Sea along with major sites in the Negev. Map by author adapted from Haiman (1992; 1996; 2009).


Figure 4.18: Intermittent wadi, now a reservoir. Yeruham Dam Recreation Area in the western Negev. Photo by author (taken 8/21/2016).

4.4 Case Study: The Central Hill country

The Central Hill country of the southern Levant is bounded by the Jezreel Valley in the north and the Beersheba Valley in the south. For the Early Bronze Age, there are around 160 sites present in the region (Table 4.5).[53] This region was most heavily occupied during the EB IV and the Iron Age. Otherwise, it was mostly devoid of identifiable settlements. However, some observed patterns indicate a high degree of continuity between the entirety of the Bronze and Iron Ages in the Hill Country.

[53] Based on surveys by the Israel Antiquities Authority and by independent researchers (Dagan 2006; Finkelstein, Lederman, and Bunimovitz 1997; Palumbo 1990; Zertal 2004)

Table 4.5: Distribution of settlements, area of settlements, and number of cemeteries in the Central Hill country for the Early Bronze Age and Middle Bronze Age sites.

	EB I	***EB II-III***	***EB IV***	***MB I-II***
Number of Occupations	39	29	43	146
Area of Occupations	61.9	54.28	52.04	136.91
Number of Burials	5	1	21	9

4.4.1 Diachronic Discontinuity

The occupational data was interesting for the Central Hill country during the Early Bronze IV. In a region of 2,550 km^2, a gap of 550 km^2 in occupation, representing about 20% of the total area, was rather conspicuous. There was no explicit, environmental reason for such a gap to occur at this location, however. The land was not particularly hilly, nor was it lacking in resources. Indeed, during the EB II-III and MB I-II, the area was occupied, so it was likely not inhospitable during the EB IV. Also, this was not due to a skew in the data, even though the gap was located in the boundary area between the two survey zones. Therefore, social factors are the best explanation for the sole presence of burials and sherd scatters during the EB IV. Two different theories on this separation are presented below, although they must be preliminary in nature, since the exact reason for this north-south divide in the Central Hill country cannot be fully elucidated due to insufficient data.

First, the gap may represent a boundary zone between the northern and southern spheres of the survey area. Tel el Farah (North) is the largest site in the northern part of the survey area,[54] and Khirbet Jib'it (5 ha) and Sinjil (3.1 ha) in the south. Khirbet Jib'it also has two other small sites in the immediate vicinity, whereas Sinjil includes a cemetery. These larger sites may

[54] Early reports of Tel el-Farah (North) either do not mention an EB IV occupation or explicitly mention there is not one (Chambon 1993; de Vaux 1962), but the survey of the Manasseh region has 5% of the pottery recovered in survey dated to the EB IV (Zertal 2004).

represent two local, centralized polities, with one in the northern district of what would be considered Manasseh in the Iron Age, and one in the south of Iron Age Ephraim. Therefore, these may be two separate political and/or economic units that had a buffer zone separating them. Despite this possibility, the material culture was relatively uniform with no distinctive pieces emerging in either area. Since the area between was still utilized for burials during the period, and only one cemetery was present in the region with the remainder consisting of clusters of individual tombs, it can be argued that the distinction between the two regions was not predicated on conflict at the border. Rather, it was indicative of an amicable relationship between the north and south and may imply that the individuals identified themselves similarly. Perhaps the division was mostly for economic purposes.

Some of the larger sites in the Central Hill country, including Dhahr Mirzbaneh, appeared to contain permanent settlements during the EB IV. The total settled area was not significantly smaller during this period as compared to the EB II-III, and there is no evidence for either a population leaving the region or dying off. Predicated on previous theories of the Early Bronze IV, this shift in the population could be explained by a change towards pastoral nomadism. The interrelationship between pastoralists and agriculturalists has been extensively explored in the past (Barfield 1993; Cribb 2004; Irons and Dyson-Hudson 1972; LaBianca 1997; Potts 2014). There was no purely agricultural or purely pastoral group in antiquity. Rather, societies and cultures tended to fall along a spectrum between the two that changed with the shifts in environmental, social, economic, and political conditions. Therefore, with a shift towards the pastoralist end of the spectrum, it is possible that the land between the more permanent settlements was utilized by pastoral groups, and the burials of the “in-between” region may be of pastoralists while settled populations utilized burials and cemeteries closer to settled sites. Heavy interaction between the northern and southern spheres resulted in similar material culture, as well as the gap between.

This conclusion is partially corroborated at the site of Dhahr Mirzbaneh in the southern part of the survey region, where a cluster of burials was located around the site. Dhahr Mirzbaneh is located near ‘Ein Samiya in the desert fringes of the Central Hill country (Finkelstein 1991). It is bordered on three sides by steep wadis and is above a relatively fertile area. Interestingly, this is also one of the few sites in the region with a possible fortification and was only occupied during the EB IV. The proliferation of cemeteries (approximately 300 shaft tombs in 3 separate concentrations) located in close proximity to the settlements and the possible fortification suggests that this was a permanent-to-semi-permanent settlement in the Central Hill country. Furthermore, two EB IV phases were identified at the site. The earlier phase was more permanent and covered a larger area. The second, later phase revealed a more ephemeral occupation, possibly a campsite. Despite this, the site was only about 0.5 ha in size and is the sixteenth largest EB IV site in the area, out of 43 total.

The above explanations account for the divergence of the population in the Early Bronze IV, but they do not account for any diachronic change in landscape use. When the location of settlements and burials for the entirety of the Early and Middle Bronze ages were compared, a fuller picture of this “urbanism” can be painted. In the northern and southern parts of the survey region, there was no radical changes in settlement locations from the EBA through the end of the MBA. Many of the same sites were occupied for the entirety of the period, and many of the same environmental niches were exploited. In the central part of the study region, though, a difference can be observed. Interestingly, the burial locations for the Early Bronze IV conform to the same locations as the EB II-III and MB I-II sites. Again, a couple of theories may account for this correspondence between periods.

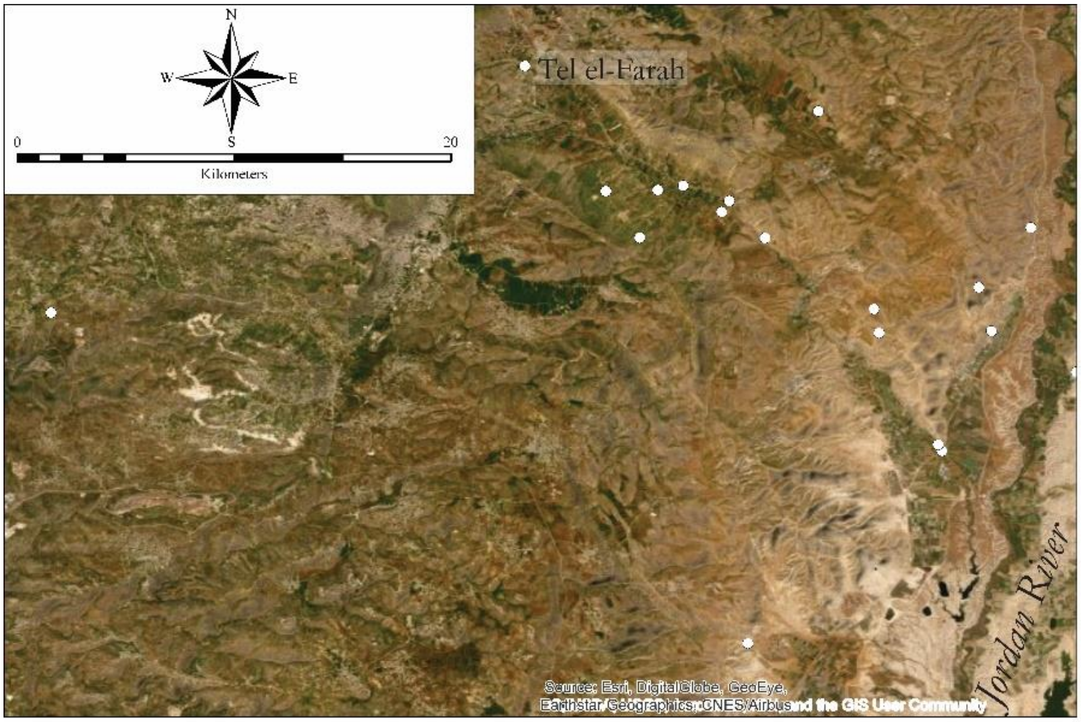
First, "social memory" may explain part of this phenomenon. Cultures and groups remember the landscape in certain ways, conceive of and value it differently at different moments (Brashier 2011; Birksted 2000; Schwartz 2007). Societies also manipulate memory at times of turmoil and change in order to put those changes into context (Alcock 2002). Since the EB IV represents a time when a radically different economic infrastructure was in place, groups utilized the location of the earlier EB II-III sites for burials in order to forge a stronger connection to the past. Then, when the socioeconomic makeup of the region shifted again in the Middle Bronze I-II, the population possibly attempted to impress control on their surrounding landscape by occupying sites that had: (a) first been settled during the EB II-III and then were (b) reused as cemeteries during the EB IV. This would account for the proximity of the settlements from the first and second "urban" periods and the burials of the EB IV.

Second, the reason may lie in the fact that the theories proposed above account for the 20 km gap between occupations during the EB IV. Since the region between the northern and southern spheres of the study area had no evidence of permanent settlements in the EB IV but a heavy concentration of burials, while during other periods it did have occupations, the EB II-III and MB I-II occupations would, logically, be located closest to the burials.

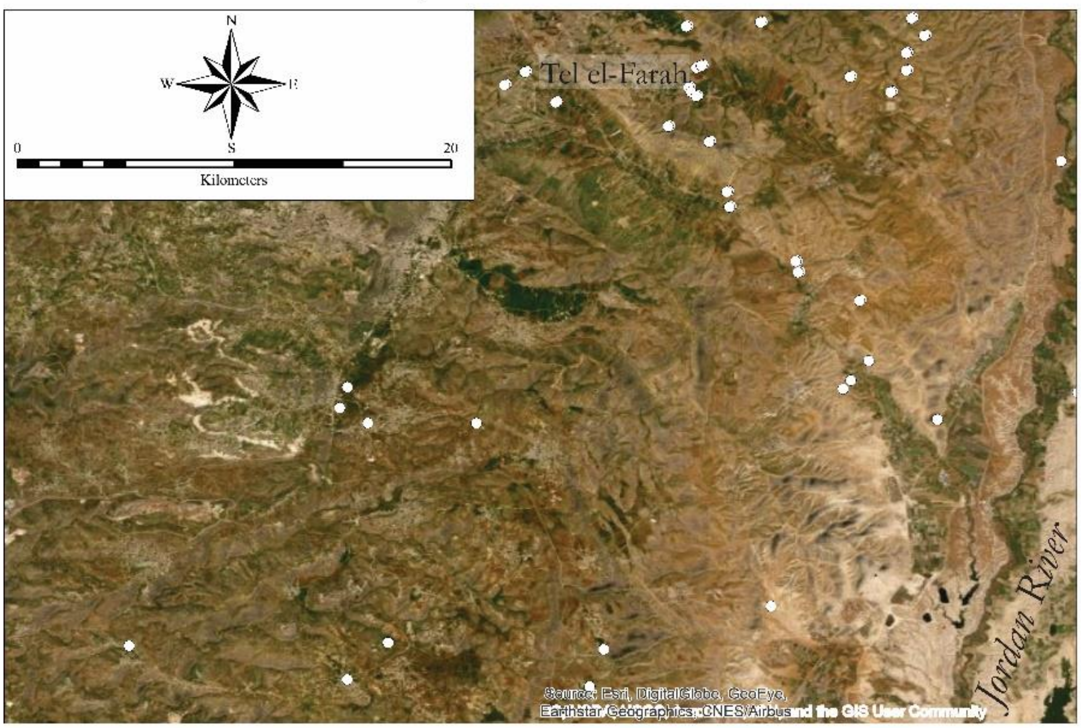
In the northern part of the survey area, a linear distribution of sites can be observed (Figure 4.19). This pattern represents continuity from the EB II-III through the MB I-II, including the EB IV, along the Wadi Farah (Figure 4.20). As previously discussed, the Wadi Farah represents part of the road that stretched from Socoh to the Jordan River through the Central Hill country. This path, though, was identifiable in the Iron Age, first when the capital of the northern kingdom of Israel was located at Tirzah (Tell el-Farah North), and then continued later on when the capital was moved to Samaria. The region was occupied as early as the Chalcolithic, but the pattern along the wadi appears first in the Early Bronze II.

Wadi Farah itself is roughly 37 km long, flowing roughly southeast from Tel el-Farah to the Jordan River. It is not steep, and it contains a relatively stable flow of water. Today, agriculture centers on palm orchards and green pasturelands (Zertal 2004, 24). The wadi sits on a natural geological fault that links the west with the eastern southern Levant. Sites along the wadi were the largest and most densely occupied throughout time.

The most prominent site in the area was Tell el-Farah (North). It was an 18 ha site in the Iron Age, when it can be securely identified as Tirzah. However, it was likely closer to 8 ha during the Bronze Age (Zertal 2004). This tell site that is located in a fertile valley in the Central Hill country at the head of Wadi Farah, and, subsequently, the wadi was an easy route through the Central Hill country into the Jordan Valley. It also commanded the junction between paths through the ancient southern Levant, traversing both latitudinally and longitudinally. The mound at Tell el-Farah (North) was first excavated by Roland de Vaux over four seasons between 1946 and 1960. The majority of the research done on the mound centers on the Iron Age layers, but the earlier periods were also represented (de Miroschedji 1993). Based on de Vaux’s excavations, the Early Bronze II represented the first fortification of the site, with little interruption of the site for the remainder of the Early Bronze Age. During the Middle Bronze Age, the site was extended beyond the previous size, and the population boomed by the end of the MB II.



Early Bronze II-III



Early Bronze IV

Figure 4.19: Site location for the EB II-III and EB IV in the Central Hill country, highlighting the difference in the distribution of occupations during each period.

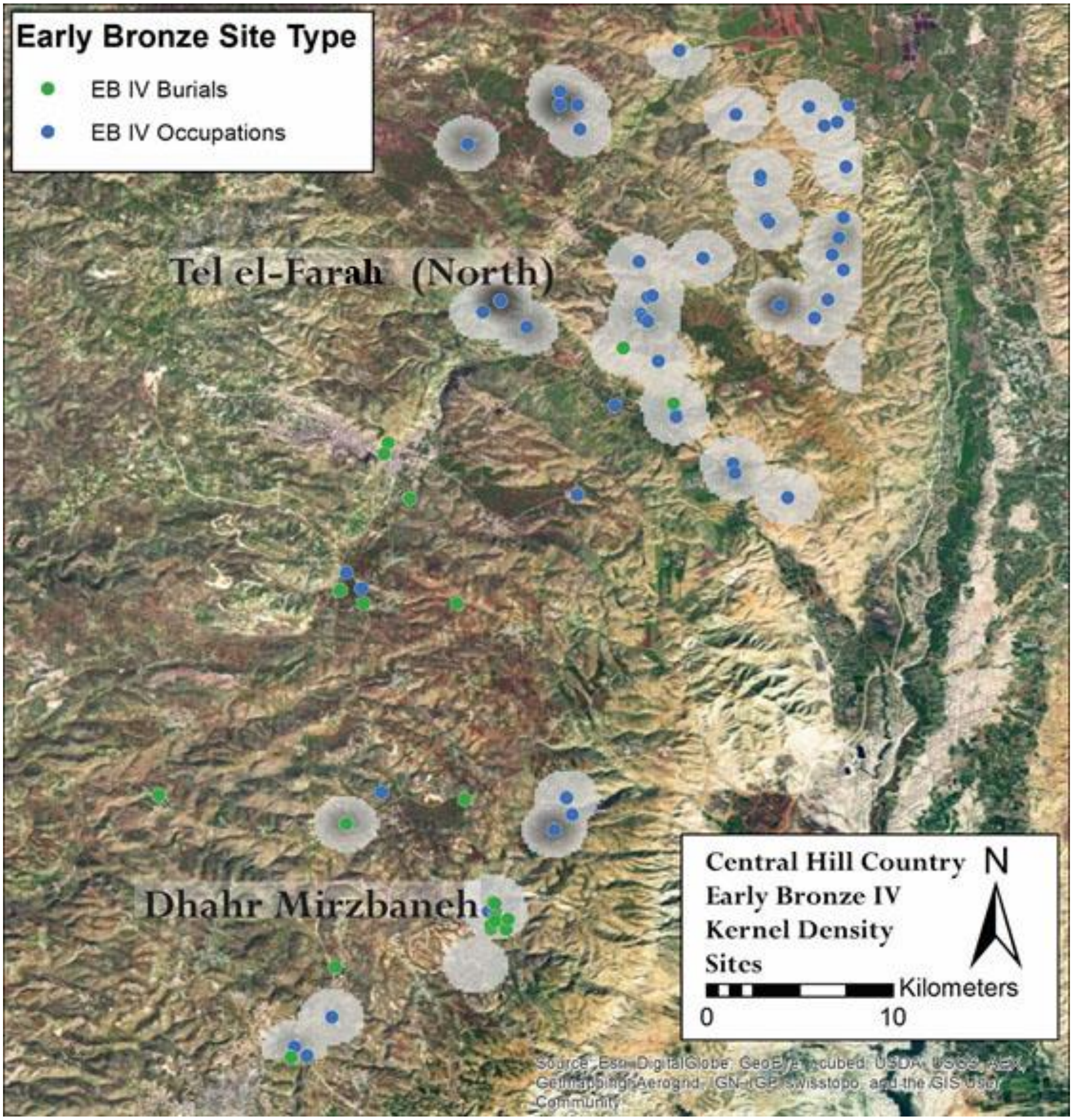


Figure 4.20: Kernel Density Estimates for the EB IV with burials and occupations overlaid, showing the gap in the settled area during the EB IV, but not a gap in burials.

Therefore, with Tell el-Farah (North) at the entrance to the wadi bed and a number of possible fortified sites along the wadi walls, the settlement pattern from the EB II-III through the MB I-II may represent a continuous use of this pathway through the Central Hill country throughout the EBA and MBA. Use of this path would allow for trade to continue during the EB

IV, despite disruption of international trade in other areas. The regional developments in ceramics observed by D’Andrea (2012a) and Dever (1995), representing a more ruralized economic system, work with this theory. Pottery suggests that the subregions of the southern Levant were still in contact during the EB IV and not completely isolated. Trade on a regional, rather than international scale, may have occurred regularly during the EB IV and required the utilization of the old pathways in and out of the Jordan Valley from the earlier “urban” EB II-III.

The sites along the wadi that were occupied during the EB IV also allowed for a commanding view of the wadi entrance and along the two valley walls. The EB IV sites were located in strategic positions, allowing for control of the pathway even during this period of supposed “collapse.” This suggests a level of control and coordination that is not commonly found in descriptions of the EB IV. It could also point to a means of communication between the varying regions that have not yet been explored. Nonetheless, at present sufficient evidence to claim that any degree of regional trade occurred along this corridor during the Early Bronze IV is not available, and the above discussion is currently speculative.

A purely functional explanation may also account for the location of sites along the wadi during the EBA and MBA. The Wadi Farah represented one of the most fertile areas of the study region, containing a relatively constant water source that would allow for irrigation agriculture and soil suitable for growing (Zertal 1988; 2004). Since a number of the Early Bronze IV sites were located directly in the wadi valley, they may have utilized such resources. Individuals remained in the valley during the EB IV because it represented one of the best agricultural areas of the Central Hill country. The sites along the valley walls, though, cannot be explained in this way. Utilization of the wadi as a roadway during the EB IV would explain the sites along the valley’s slopes better than a primary focus on agricultural land use.

Although there does appear to be a continuous use of the wadi throughout the EBA and MBA, after the Middle Bronze Age began, a number of new sites were established along the valley, filling in the gaps between those of the EBA. This "filling in," though, was a pattern that can be observed for the entirety of the southern Levant, and the instance was not uncommon.

4.5 CONCLUSION

The location of settlements in the southern Levant was dependent upon a number of characteristics, including climatic factors, political spheres of influence, economic systems, and subsistence patterns. From a purely functional point of view, the best explanation for settlement locations is based on niche theory. The locales that individuals and groups occupied was constrained by the physical and social environment, as well as the economic choices made during each period. Therefore, in urban periods, when agriculture was the primary mode of subsistence, the prime areas to occupy were limited to arable regions in a pattern that would allow each urban center enough controlled land to sustain the agricultural demands of the population. If large-scale trade of agricultural commodities was part of the economic system, then large, centralized settlements, and subsequently the area controlled, would grow larger to meet this demand. During the EB II-III and MB I-II with their large, central sites, the fertile valleys of the inland southern Levant, like the Shephelah and the Jezreel, were heavily occupied. During the EB IV, when pastoralism was the primary focus, this niche no longer represented the best means of survival. Instead, to support pastoralism, populations dispersed and occupied more marginal regions. This explanation fits the observable data well.

The "collapse" that some have pointed to as the modus of change in the Levant during the EBA is more accurately characterized as the release phase of the resilience cycle, based on the settlement data. It began in the EB II and did not end until the beginning of the MB II. The true fluorescence was in the EB II. The decline through the EB III into the EB IV was gradual, not abrupt, and the subsequent recovery was also gradual. Overall, change in these periods is most readily explained through models of resilience, robusticity, and vulnerability. As the population increased up to the EB II, social conditions required conformity. This is reflected in reduced diversity in material culture and modes of existence. It is also suggested in the reduced number of sites but larger average site area, as populations congregated into fewer but larger settlements.

The increasing rigidity, however, left the system vulnerable overall. Because emphasis was placed on fewer subsistence patterns and fewer modes of production, flexibility and innovation diminished. Therefore, when change occurred, like a shift in the controlling central authority for a particular site or city, environmental changes, or variation in trade demands, rapid adaptive change was essential. Entire social structures may by reorganized in response. This seems to be the case in the EB IV.

5 ENVIRONMENTAL RECONSTRUCTION

The end of the Early Bronze IV, as it shifted into the Middle Bronze I, was gradual and represented a relatively continuous modification rather than an abrupt break in the sequence (S. L. Cohen 2009). These settlement shifts were explored in the previous chapter. The reasons behind them, however, was more complex. Many previous theories on the EB IV point towards its coincidence with a major climatological event that transpired around 2200 B.C. Two theories have dominated discussions on the cause of the EB IV, including environmental determinism and anthropogenic degradation. This chapter utilizes proxy indicators to determine the intensity of paleoclimatic variations and determine the severity, length, and spatial extent of this event. Later chapters look at if the environment was a possible contributor to cultural shifts and changing patterns of settlement across the EBA and MBA landscape in northern Mesopotamia, the northern Levant, and the southern Levant. In this case, it appears that changes in settlement patterns at the end of the EBA was not due solely to climate change but rather a failure of cultural and political systems to adapt. Climate escalated rather than causes shifts in the socioeconomic structure of the Early Bronze IV (Riehl 2017).

Pushed back into the fore of anthropological and archaeological discourse due to modern debates on environmental impacts to cultural and social shifts, new theoretical and methodological approaches to analyzing the environment further nuanced previously exploited environmentally deterministic models. This was particularly evident in analyses of the Early Bronze IV (2500-2000 B.C.) in the ancient Near East (Butzer 1982; Burke 2017; Issar and Zohar 2007; A. M. Rosen 2007; Weiss 2000a; Riehl 2012). After an environmental change was first proposed by a team from Tell Leilan in the Khabur River basin for changes in the northern Jazira (Weiss et al. 1993), climatic change was a primary impetus of the supposed “collapse” of urban systems at this time in the ancient Near East. Described as a period of hyper aridity several proxy indicators provide evidence for a climatic episode at 4.2 kya BP. Recent studies incorporating high-resolution AMS radiocarbon dates from secure strata, especially from sites in the southern Levant, indicate that the EB IV began at c. 2500 B.C. instead of c. 2300 or 2200 B.C. as once proposed. This now means that the two events no longer temporally correspond and thus it cannot serve as a catalyst for the end of the Early Bronze II-III tell-based settlement systems that can no longer be attributed to a high-arid period. However, a climatic episode would still affect the population of the ancient Near East and needs to be explored.

5.1 CAVEATS TO PREVIOUSLY PUBLISHED DATA

The Levant was a particularly interesting place to study for climatological changes, especially as it relates to agricultural practices. The high degree of variance in elevation in such a small geographic area means this area was particularly sensitive to shifts within the climate. In addition, there has been a decent amount of study on paleoethnobotany and faunal remains from the region. Finally, there have been a lot of palaeoclimatological investigations and studies done in the region and there was a large sets of proxy data to make inferences on the changes in environmental conditions.

Multiple caveats must be made when using published data as primary source material. First and foremost, it was not always possible to know how materials were excavated, how surveys were conducted, and the conditions under which researchers acquired data. There was always a difference between what was published and what happened. It was equally problematic that once a site was excavated, once a core has been taken, or once data has been collected, the reports that have been published were often the only accessible means of preserving information. Archaeology and geography are a science that can never be repeated.

However, some new interpretations can be made by comparing palaeoclimatological data with archaeological site data. This does require a high degree of trust on previously published data. With regards to using previous studies on faunal and floral remains, this study adopts an absence/presence means of accounting for remains discovered at a site. Different scholars collect at different intensities, especially with regards to faunal and flora data, and therefore having more remains recovered from a particular site does not always correlate to more of that species at the site in antiquity. Each study must be analyzed for veracity and looked at individually before attempting to combine it into a cohesive whole.

With environmental data, there was also a dearth of information. Recovery methods were not ubiquitous across the Levant, and not all sites were excavated with the intent of recovering faunal and floral remains. Therefore, there are a larger number of sites and settlements surveyed than there were archaeobotanical data to analyze. In the region, the majority of data comes from large tells instead of rural settlements. Therefore, there was a bias towards large urban settlements.

There were also chronological problems when comparing various lines of inquiry, as different types of proxy data have different temporal resolutions. The prevalence of radiocarbon dating for dating various organic materials makes it difficult to precisely pinpoint when certain events occurred. The temporal resolution tends to be coarse. Radiocarbon dates were probabilistic, with a $\pm 2\sigma$ date with between 50 and 200 -year variability. This date range can be significantly reduced and made more precise when multiple samples can be taken from a single or interconnected context and using Bayesian statistics, providing dates with 10 to 50-year variability (Bronk Ramsey 2005; Höflmayer et al. 2014; Regev, Miroschedji, and Boaretto 2012). Each sample type has its varying conditions that must be accounted for and uncertainties that must be addressed. It was still very important to carry out these studies, but equally important to know the caveats that must be made with the data and the uncertainties that were inherent within it.

5.2 PROXY STACK RECONSTRUCTION

Holocene climate changes were predicated on several different sources. They tend to be less severe and frequent than those during the Pleistocene but still have greatly affected human activities across the globe. Of particular interest was the so-called 4.2 kya BP event that occurred at roughly 2200 B.C. A number of lines of evidence can be explored to analyze these shifts and changes in the environment, all proxy indicators of change. This section specifically looks at the evidence derived from speleothems, sea levels, and sediments. The following sections looks more closely at two lines of evidence that were typically uncovered at archaeological sites and have also been analyzed for the southern Levant in particular. These were palynology and macrofauna. For a map of where all of the samples and studies coalesced in this dissertation were taken from, see Figure 5.1 and Figure 5.2.

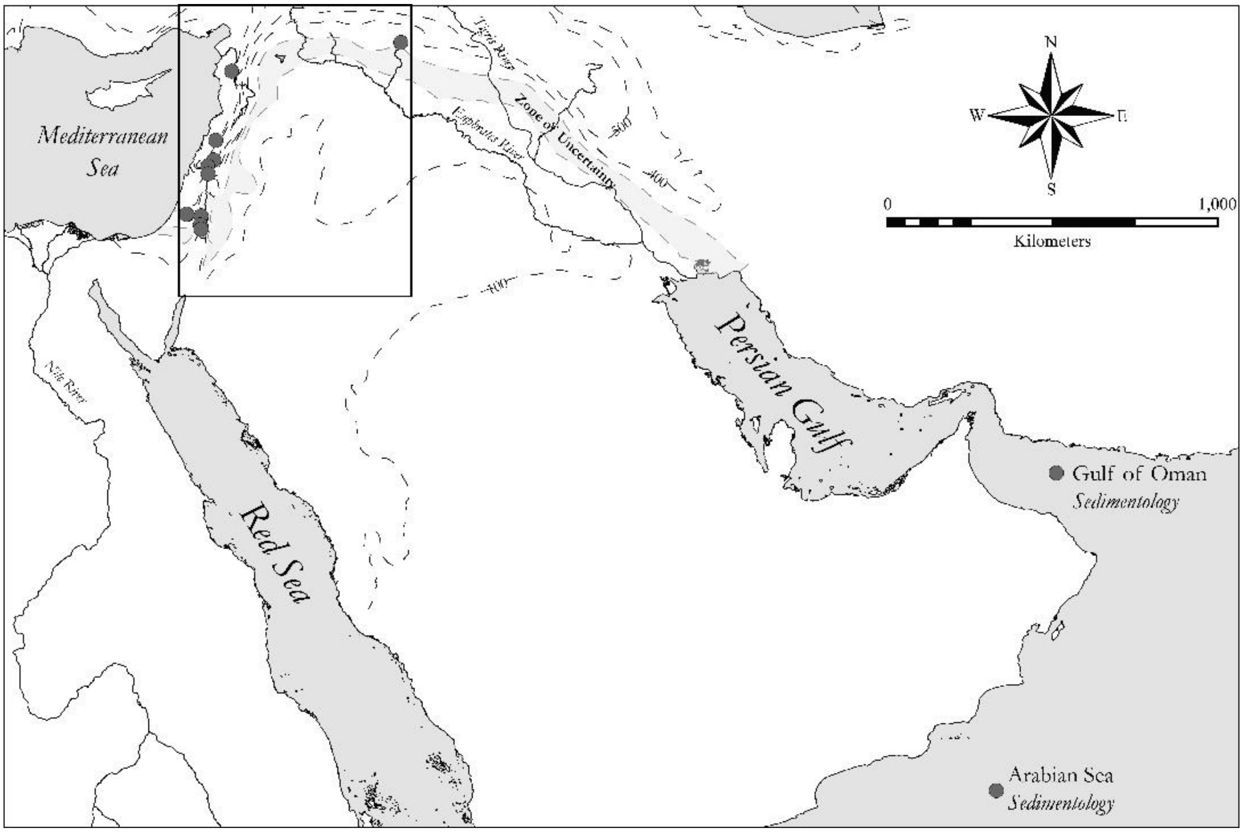


Figure 5.1: Location of all proxydata samples utilized in this study. Figure 5.2 has the zoomed-in version of the Levantine and adjacent region's samples. Map by author.

Two areas of dry farming agriculture and the effects climate could have on them was explored. The environment in northern Mesopotamia, specifically the upper Khabur and Balikh river systems, as well as inland areas of the southern Levant, provide the perfect climate for dry farming sustainability in times of good rainfall (Wilkinson and Tucker 1995a). In the southern Levant, the dry farming region was relatively narrow, spanning the coastal plain with increased aridity to the south and east. The evidence for climate change during the end of the Early Bronze Age from several environmentally sensitive indicators, including speleothems, sea levels, palynology, macrobotany, and soils was explored. The proxy paleoclimatic data was amassed and each, in turn, explained, giving the evidence that a major event occurred at the end of the third millennium B.C.

Figure 5.2: Location of Levantine and adjacent region’s proxydata samples utilized in this study. Map by author.

5.2.1 Speleothems

Speleothems were cave formations that were created by water leaking through the soil above and dripping to form stalactites and stalagmites (Bar-Matthews and Ayalon 2011). Speleothems preserve mineral composition in the water when it was deposited and thus can inform on the environment at that point in time. Most commonly, this information within the ancient Near East was derived from Soreq Cave in Israel, a karstic cave, which contains a continuous record of past climate from 25,000 to 1,000 years ago. Today, the cave was located in a semi-arid area that lies within the 500 mm isohyet, the majority of which falls during the winter rainy season.

For Soreq Cave, 20 fossil speleothems, from 60-200 mm in diameter, were taken, composed of both stalagmites and stalactites (Bar-Matthews and Ayalon 2011; Bar-Matthews, Ayalon, and Kaufman 1997; Bar-Matthews et al. 1999). Cave features were cut perpendicular to their length, exposing various layers of accumulation. The laminae, which looks similar to tree rings, were tested every millimeter and measurements of $\delta^{18}O$ and $\delta^{13}C$ isotopes were taken. These samples were then dated predominantly with ^{230}TH-U, or Thorium-Uranium, dating techniques.[55]

The concentration of different isotopes, specifically $\delta^{18}O$ and $\delta^{13}C$, in the water when it was deposited were left behind in calcite formations, and different concentrations indicate rainfall intensity and duration in addition to the water temperature when it was deposited. Measuring variations of these two isotopes therefore can be utilized as proxy indicators of changes in annual rainfall and increased temperature.[56] In particular, there was evidence for an

[55] This type of dating is utilized predominantly on calcium carbonate materials like speleothems and corals. It is a radiometric dating technique based on the decay of ^{234}U to ^{230}Th, which is measured through mass spectrometry. This method can measure ages from about 1000 to 400,000 ya (Nanson et al. 1991).

[56] A decrease of 1% in $\delta^{18}O$ values in the speleothem corresponds to roughly an increase of 200 mm of annual rainfall (Bar-Matthews and Ayalon 2011, 167). Based on analyses of the Soreq Cave speleothems, an inverse

increase of up to 1.0% of $\delta^{18}O$ between 4.1 and 4.0 kya BP that indicates a decrease in precipitation and may be associated with the 4.2 kya BP event.

5.2.2 Lake Levels

Water levels in various lakes located within the ancient Near East have changed over time. In times of drought and possible aridity, the levels decrease appreciably, to such a degree that they can be measured. In Israel, the best evidence for lake levels was derived from hydro-climatological data around the Dead Sea. The Dead Sea was a terminal hypersaline with one of the largest water and sediment drainages in the Levant (Figure 5.3). The area of the Jordan Valley in which it sits receives less than 75 mm of rain annually, and therefore any observable changes in lake-level were mostly due to changes in precipitation in the catchment zone. The Dead Sea was sensitive to slight variations in mean annual rainfall and has fluctuated from 370 m to 434 m below lake level during the Holocene (Bookman (Ken-Tor) et al. 2004; Enzel et al. 2003; Migowski et al. 2006). By comparing modern patterns of lake-level variations to exposed ancient Holocene levels, it was possible to determine fluctuations in precipitation throughout time.

Figure 5.3: Dead Sea from the Chalcolithic Temple at Ein Gedi. Photo by author (taken 8/22/2016)

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relationship exists between $\delta^{18}O$ and rainfall (Bar-Matthews, Ayalon, and Kaufman 1997; Bar-Matthews et al. 1999; Orland et al. 2012).

Sediments from Ein Feshkah spring on the western bank of the Dead Sea were removed from 58 continuous 10 cm long blocks of wet sediment from the current surface down 40 cm, representing a 5.85 m long profile (Migowski et al. 2006). At Ze'elim terraces, also on the western bank of the Dead Sea, 11 composite profiles and 39 radiocarbon dates were recovered, reflecting 6500 years of environmental history. The longest core, though, was recovered from Ein Gedi, at 21 m long. Based on these profiles and cores, lake levels appear to start falling around 2200-2100 B.C., continuing for around 300 years, documented by deposition of gypsum laminae and crusts within the Ein Gedi core (Migowski et al. 2006). This possibly indicates an arid period (Bookman (Ken-Tor) et al. 2004; Migowski et al. 2006). This slight shift occurs in what was a wetter period from around 3300-1500 B.C. (Migowski et al. 2006). According to one study, a significant drop in sea levels occurred beginning around 2200 B.C. and continued for another 900 years (Enzel et al. 2003).

5.2.3 Sediments

Several properties of sediments make them a good medium in which past climatic episodes were preserved. These include windblown particulates preserved in sediments, amount of erosion, and paleomagnetic studies on lacustrine sediments to determine the degree of disturbance. There were some problems, though, with applying conclusions based on sediment studies across large areas and were best when utilized to represent the immediate vicinity from which samples were taken.

Windblown particulates preserved in sediment samples can indicate a period of widespread aridification. This can be observed through windblown dust recovered from sea cores in the Gulf of Oman and the Arabian Sea (Cullen et al. 2000; D. Kaniewski et al. 2008). Dated to the end of the third millennium B.C., a layer of increased windblown particulates was recovered in each of these cores. Another dust layer was observed at Tell Leilan in the “abandoned” stratum, possibly indicating an increase in aridification (Courty 1998; Courty and Weiss 1997). This, though, was not a widespread phenomenon. Based on lake-cores obtained from Lake Mirabad in the Zagros, there was no evidence of a climatic episode correlated to the late third millennium (Stevens et al. 2006).

In the upper Khabur basin of northwestern Syria, one study by Katleen Deckers and Simone Riehl (2007) compared a number of sediment deposits in various drainages of the Khabur. Around 70 fluvial exposures were studied, and 5,000 sediment samples were taken for further analyses. Based on thermoluminescence screening of 72 recovered sherds from preliminary surveys, further areas were identified for study, particularly in the perennial Wadi Jaghjagh and intermittent wadis Jarrah and Khanzir. At around 4.5 kya BP, it appears that the Wadi Jaghjagh changed course or, more likely, was extensively irrigated to provide water for expanding agricultural fields of northern Jazira. Later in the late third millennium B.C., an increase in fine-grained sediment deposition might relate to drier climatic conditions (Deckers and Riehl 2007, 346).

Paleomagnetic analyses were done predominantly around Birkat Ram in the Golan. The same cores recovered in 1999 and utilized for palynological studies were also used here. Magnetic susceptibility was measured with a Bartington MS2E in steps of 1mm (Schwab et al. 2004). In total, 288 samples were taken from 7.1 m of the core and dated based on two AMS radiocarbon samples. Although there does appear to be a spike in the relative paleo-intensity at around the 4.2 kya BP event, which would indicate an increased disturbance of sediments, the dating of these cores was problematic due to only two radiocarbon dates upon which to base 3,000 years of history (Frank, Schwab, and Negendank 2003).

5.3 MACROBOTANY

Macrobotanical remains can be utilized to reconstruct ancient environments, ancient foodways, and cooking methods, among others (Parker Pearson 2003). The majority of macrobotanical remains found at archaeological sites were charred and burnt, but there was a high degree that were waterlogged, mineralized, desiccated, or preserved as impressions on pottery. Charred seeds and wood charcoal can lead to an understanding of ancient land use. In particular, greater charcoal and lower charred seed values can be interpreted as a wooded environment, while the inverse may indicate a preference for dung over charcoal fuel.

The study of human interactions with macrobotanical remains was classified as paleoethnobotany. Paleoethnobotany was "the analysis and interpretation of the direct interrelationships between humans and plants for whatever purpose as manifested in the archaeological record" (Ford 1981, 286). A particularly interesting component that seems often to be lacking within the archaeological literature was the presence and absence of weeds and other non-food items. These were particularly important in understanding the palaeoclimatological conditions in the ancient Near East, and their absence makes it hard to reconstruct some of these conditions. It was more so than just cultivated plants in the record, and plants used for food purposes can only give a small insight into the climatological conditions in the past.

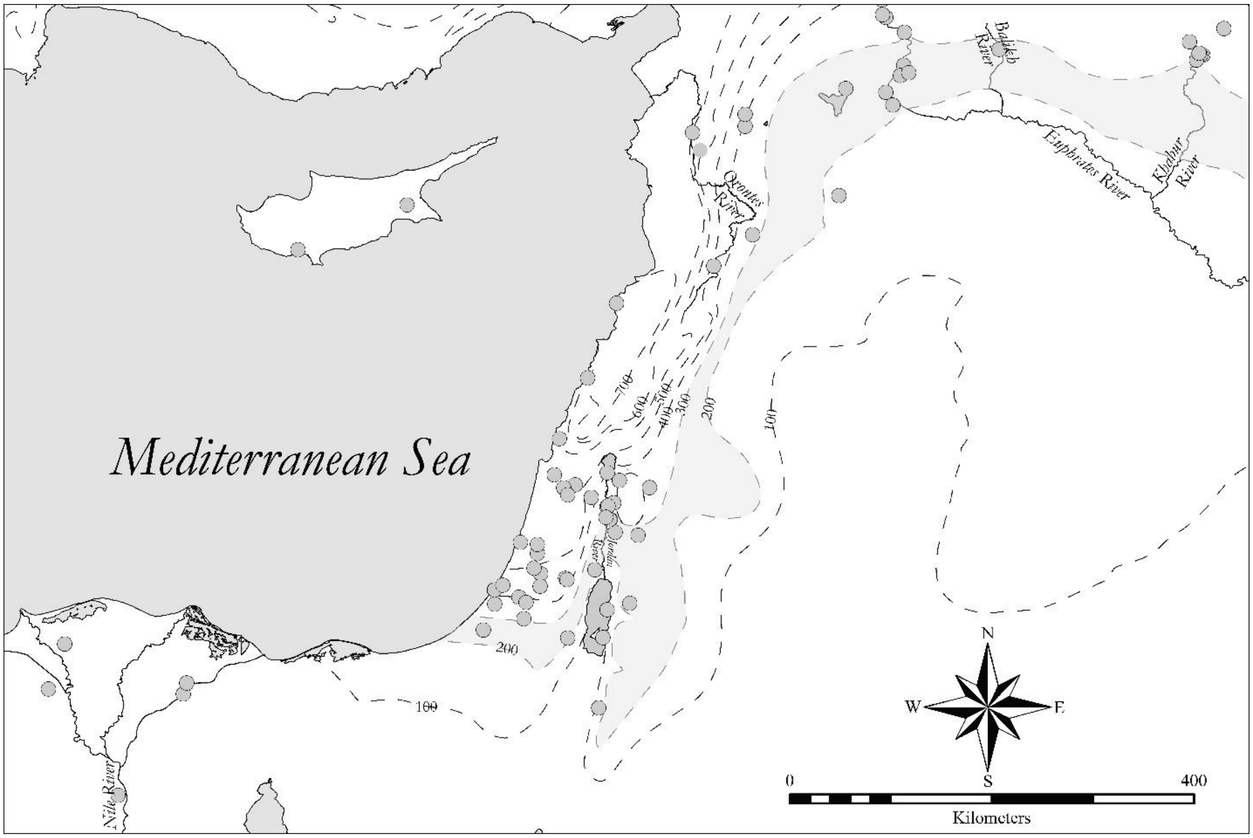


Figure 5.4: Early Bronze Age sites with macrobotanical remains. Map by author.

Besides excavation reports and syntheses studies, the majority of the raw data for macrobotanical remains came from the Archaeobotanical Database of Eastern and Near Eastern Sites (ADEMNES). This was a database established by the Institute of Archaeological Science at the University of Tubingen and contains data for 533 archaeological sites, mostly coalesced from publications. ADEMNES has available for download a database of sites that have faunal and floral remains in excavated contexts. It also has the strata by site in which these samples were recovered. In this way, it was possible to determine an absence/presence for cultigens and animal remains by period. There were also spatial data, so it was possible to plot all of the sites with macrobotanical remains (Figure 5.4). This part of the dissertation addresses how those remains relate directly to environmental concerns. How they relate to agricultural practices and settlement patterns was looked at separately.

5.3.1 Cereals: Wheat and Barley

Plants can only grow within a narrow environmental niche. By looking at these niches, it was possible to determine if certain areas were viable for agriculture and horticulture. It was also possible to extrapolate past environmental conditions based on the location of plant and seed remains uncovered in archaeological contexts. For cereals like emmer wheat (*Triticum dicoccoides*), einkorn wheat (*Triticum monococcum*), and barley (*Hordeum vulgare*), an elevation between 0 and 3000 meters above sea level was ideal. Also, average annual temperatures need to fall between 40- and 86-degrees Fahrenheit. This was where the similarities between these two cereal crops end. For wheat, average annual precipitation needs to fall between 375 and 875 millimeters. Barley was slightly more drought-resistant and can survive with slightly less rainfall at 325 mm of annual rainfall. These were ideal conditions and can be varied slightly based on agricultural practices and the use of fallow years. These practices would decrease the annual precipitation needed to between 200 and 300 mm per year. There were also some discrepancies in when wheat and barley would be harvested. Wheat was typically harvested in June and July, whereas barley was harvested slightly earlier in May and June. Both seem to be planted sometime between October and December.

One study by JoAnna Klinge and Patricia Fall (2010) looks at these ratios at five different Bronze Age sites in Cyprus (Politiko-*Troullia*), the Rift Valley of Jordan (Tell Abu en-Ni'aj and Tell el-Hayyat), and the Jabbul Plain between the Euphrates River and the modern city of Aleppo in Syria (Umm el-Marra and Tell es-Sweyhat). Of particular interest to the current study was the difference between the two sites in Jordan. At both sites, non-random samples were taken of sediments that showed evidence of charred remains. These soils were floated and analyzed for botanical remains. Tell Abu en-Ni'aj contained the highest concentration of seed remains of all the analyzed sites, whereas Tell el-Hayyat contained the most wood charcoal.[57] Cultural explanations for these distinctions cannot be predicated on different environmental niches, as both were located in close proximity to one another. Rather, the difference was temporal. Tell Abu en-Ni'aj was occupied at the beginning of the EB IV and abandoned halfway through the period. Tell el-Hayyat, on the other hand, was a terminal EB IV site that was established in the latter half of the EB IV and occupied through into the MBA. The increase in seed numbers and likely dung fuel at Tell Abu en-Ni'aj suggests a higher integration of an agropastoralist economy whereas the increase in tree cover indicated for Tell el-Hayyat suggests a possible resurgence in orchards during the terminal EB IV. Ultimately, this example does not highlight evidence for the transition between the EB III and EB IV but rather shifts within the EB IV itself.

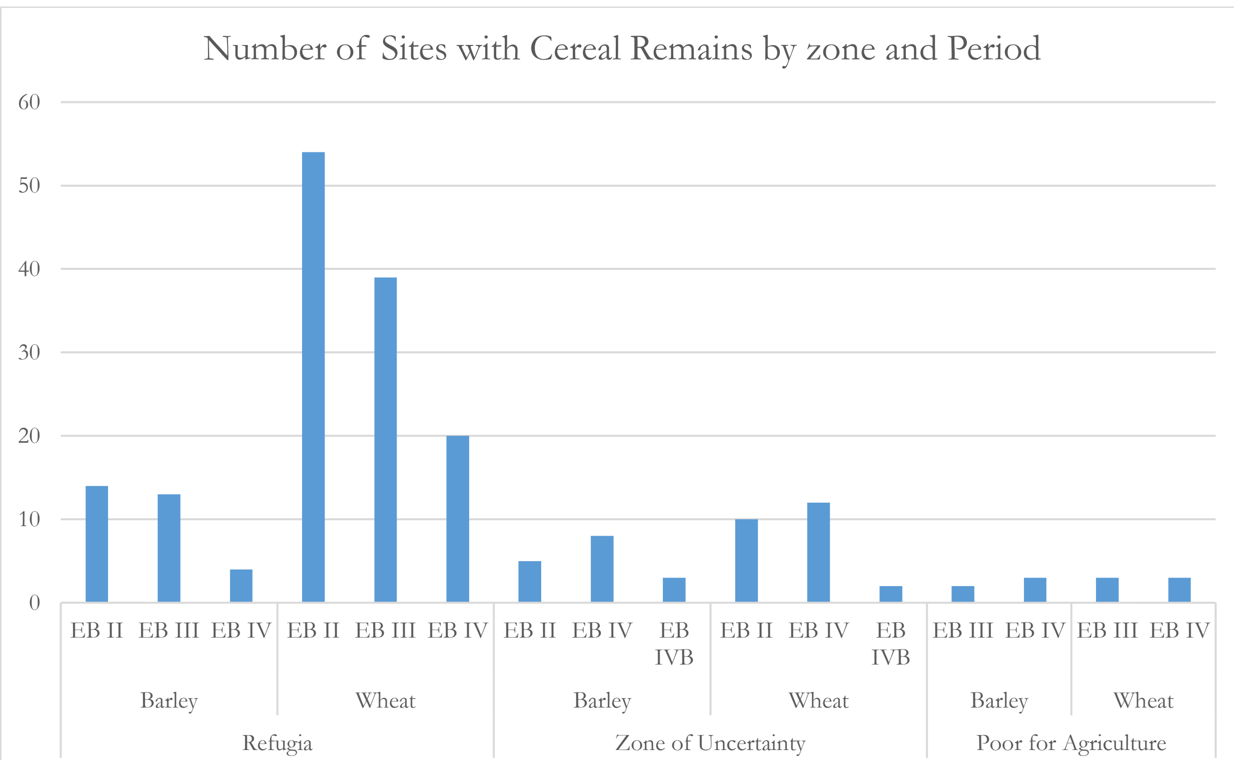


Figure 5.5: The number of sites with cereal remains, split up by rainfall zones as well as period.

[57] Whereas individuals at Tell el-Hayyat utilized a mixture of both wood charcoal and dung fuel, those at Tell Abu en-Ni'aj used dung almost exclusively.

When comparing the location of grains from the EB II-III into the EB IV, there was not a significant difference (Figure 5.5). Some things can be observed, however. First, there were more sites with cereal grain remains discovered in all three rainfall zones[58] during the EB II-III than in the EB IV, except for the zone of uncertainty. In this zone, there were more sites in the EB IV. This, however, does not indicate much in the ways of environment and has larger implications for agricultural practices. If there was a shift in the environment, one would expect to potentially see an increase only in the instances of barley in the region with less rainfall, as barley was a little more drought tolerant. However, the increase was in both barley and wheat and therefore was likely not due to environmental conditions rather conscious choices and placement of settlements.

5.3.2 Fruits: Olives, Grapes, and Figs

Horticulture involves agriculture that was pointed towards fruits, vegetables, nuts, and ornamental plants (Zohary 1995). It entails anything that was not the large scale growing of cereals, grains, and legumes. Typically, it was at a smaller scale than agriculture and typically relies on a number of different crops and was not monocropping. This was not universal, though. Right now, emphasis was placed on olive, grape, and fig remains recovered at archaeological sites.

Olive (*Olea europaea*) was one of the most important fruits of the ancient Mediterranean and represents one of the cornerstones of ancient horticulture (Zohary and Hopf 1988). It was, arguably, the most important fruit tree in the ancient Near East (Salavert 2008). In Hebrew, it was "zayit" (זית), in ancient Egyptian "zet or "tzet," and in Akkadian "serdu" (ZI.IR.DUM or GIŠ.GI.DÌM). Olive oil was mentioned in addition to olive fruits and trees. It was a very important

[58] These are the refugia (>300 mm of annual rainfall), the zonezone of uncertainty (200-300 mm of annual rainfall), and areas that are poor for agriculture (<200 mm of annual rainfall).

export from the Levant and even listed in lists of traded goods from Levantine city-states (Heimpel 2003). In the archaeological record, most of the olive remains were carbonized remains of kernels and burnt olive wood.

Olives only grow in a Mediterranean climate and produce fruits five to six years after first planted (Liphschitz et al. 1991). However, olive trees had a long-life span, living several centuries. Olive was likely first domesticated in the Jordan Valley, between the Sea of Galilee and the Dead Sea (Bar-Yosef and Kislev 1989). This, however, may not be the case as early evidence also comes from across the Levant and into Mesopotamia (David Kaniewski et al. 2012). Wild olives were likely used first, starting in the Paleolithic and Neolithic (Liphschitz 1986). The first definitive remains of domesticated olives come from Israel and Jordan during the Chalcolithic (Salavert 2008). The first evidence for olive oil production was south of Haifa, with thousands of crushed olive stones and pulp during the Late Neolithic (Galili et al. 1997).

During the Chalcolithic and Early Bronze Age, there was an increased density of olive trees, as shown in the palynological cores discussed later in this chapter, including from the Dead Sea, the Sea of Galilee, the Huleh Basin, and Birkat Ram. There was also evidence from macrofaunal remains, with olive tree charcoal fragments increasing from 20-30% during the Chalcolithic to 40-60% during the EBA based on samples recovered from 47 sites in Israel (Liphschitz et al. 1991). During this period, olive oil was a very expensive commodity in Mesopotamia and Egypt, costing five times as much as wine and over twice as much as seed oils (David Kaniewski et al. 2012).

Grapevine (*Vitis vinifera*) was another important Mediterranean fruit in the ancient world (Zohary 1995). Grapes provided fresh fruit, raisins that were easy for storage, and the building blocks for wine. Wine became a very important export of the ancient Mediterranean during the

Bronze Age onwards. Jericho, Lachish, and Arad in Israel in addition to Numeira, Bab edh-Dhra, and Tell es-Sa'idiyeh had archaeological remains of grape present in EBA levels (Zohary and Hopf 1988).

There was also written evidence for the use of grapes starting during the Sumerian period (GIŠ.KIN.GEŠTIN), which corresponded with the archaeological evidence of domesticated grapes as early as the 4th millennium B.C. The first concrete written evidence for wine production in Mesopotamia, however, came from the site of Mari during the 19th century B.C. at the palace of Zimri-Lim. The climatological conditions at the site were inadequate for grape horticulture, but there was written evidence for the delivery of wine to the palace from the upper Euphrates (Heimpel 2003, 162). There were also records of wine being served at royal banquets and as expenditures for Babylonian troops and their leaders (Heimpel 2003, 102).

It appears that fig (*Ficus carica*) was domesticated in the ancient near East around 6,500 years ago, starting sometime in the early Neolithic (Denham 2007; Zohary 1995). In comparison to olive trees, figs were a relatively fast-growing fruit crop and were available for harvesting within three to four years after planting. Figs were indigenous to a typical Mediterranean environment, occupying similar niches as olive and grapevines. It appeared that both fresh figs in the summer months along with dried figs in later months were utilized. The largest quantity of fig tree remains were seeds. However, there were some whole, dry figs recovered from archaeological contacts. For the Early Bronze Age, the majority of finds are limited to the Dead Sea basin and include sites like Jericho and Bab edh-Dhra.

There was some textual evidence for figs in Mesopotamia and Egypt (*tittu* in Akkadian, GIŠ.PEŠ in Sumerian). Based on cuneiform texts it appears that fig horticulture was practiced in Mesopotamia as early as the late third millennium B.C.E. In Egypt, evidence comes from tomb paintings in Beni Hasan of fig harvests, dating to the 12th dynasty, about 1900 B.C.E, the earliest evidence, however, comes from the Third Dynasty and dated to about 2750 B.C.E.

Olive and grape horticulture was even more restrictive in terms of environmental niches than cereal remains (Greene 1995; Salavert 2008; Zohary 1995; 1995). Both tend to grow between 0 and 800 m above sea level. Olives need an average annual temperature between 40- and 80-degrees F. Grapes require a slightly tighter range, at 55 to 70 degrees F. For olives, average annual precipitation needs to be between 400 and 800 millimeters per year. Grapes require a little bit more precipitation with 625 to 900 millimeters per year required. Grapes need an average of 700 mm of rainfall between October and March. Therefore, they do so well in a Mediterranean environment.

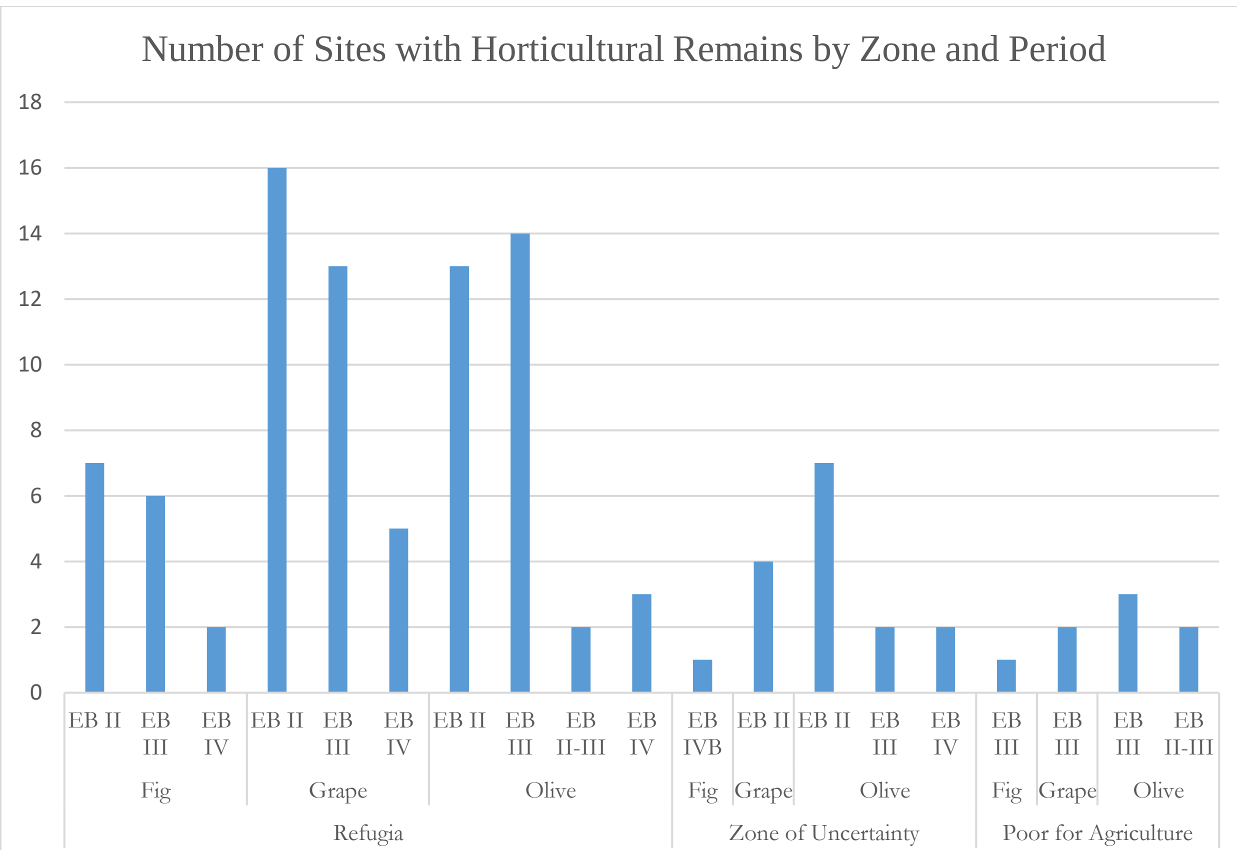


Figure 5.6: The number of sites with horticultural remains, split up by rainfall zones as well as period.

There was a drastic decrease in the number of sites that contain horticultural remains from the EB II-III to the EB IV across all species (Figure 5.6).[59] This could be indicative of an increase in aridity, as these plants require more water and lower temperature overall than barley and wheat. The number of overall remains was relatively small, though, and these patterns may be more a result of the nature of the data. EB II-III sites tend to be larger sites with a longer history of excavation. They were more likely to have been excavated more extensively and macrobotanical remains recovered. This pattern was repeated in the cereal remains recovered, even though it was not as stark as it was for horticulture.

5.4 PALYNOLOGY

Palynology was the study of subfossil pollen grains and spores that were typically uncovered in sediments (Dimbleby 1985; Kadosh et al. 2004; MacDonald 2003). It was typically associated with the reconstruction of past vegetation and climates. Palynological studies can inform a number of different analyses, including the relationship between humans and vegetation in addition to the reconstruction of ancient environmental conditions (Gremmen and Bottema 1991, 106).

Areas that receive less than 300 mm of annual rainfall seldom preserve pollen (Bottema 1997). Places with high concentrations of limestone were also unlikely to preserve pollen, as they drain too quickly. Pollen recovered from cores and archaeological sites was a result of the total pollen deposited in antiquity minus the pollen that was lost over the years either due to unfavorable soil conditions or to other taphonomic processes. In favorable conditions, this was not too much of a problem in past reconstructions since, theoretically, present pollen recovered should represent past conditions. However, if the destruction of pollen remains in a given area

[59] Raw data for the macrobotanical remains can be found in Appendix C.

was too great then any interpretations based on remaining pollen could be fraught with problems. Unfortunately, the reconstruction of past environmental conditions for a very specified locale can be difficult because reconstructions were based on arbitrary decisions.[60]

5.4.1 Evidence

Plants have a narrow environmental niche in which they can grow, dependent on temperature, soil type, rainfall and/or irrigation, and several other climatic requirements and by looking at ancient, preserved pollen spores, past climate can be reconstructed (MacDonald 2003). An increase of cultivars like olive in comparison to other trees can be utilized to determine anthropogenic alterations to the landscape. Interpreting these results also relies on an understanding of pollen precipitation, which reflects a number of different factors including pollen production of plants, dispersal radius, deposition types, and preservation (Davies and Fall 2001).

Palynological studies were particularly powerful in understanding ancient environmental patterns but do have some limitations. Small-scale changes can be missed (Edwards and MacDonald 365). This includes small scale at both the spatial and temporal levels. For example, if the population of a single site decides to change patterns of resource procurement, or forest clearance, or any other anthropogenic transformations to plant life in the immediate area, this was not be significant enough to change the regional palynological record. This also includes small scale at the temporal level. For example, if the entire population in a region does not grow certain agricultural goods for a season or two and then returns to their previous patterns, this is also invisible in the palynological record. Part of the problem with these fine-grained changes results from how the core was dated, namely by utilizing radiocarbon dating. Although it was

[60] Although these decisions are based on theoretical and predictive modeling ideals, they are still widely different based on the data input.

possible to limit sample thickness and intervals, the cores recovered and analyzed from the Levant were not that fine-grained (Langgut et al. 2014). Pollen studies were, however, exceptional at showing long term changes across larger regions (MacDonald 2003). A few caveats about using pollen need to be addressed. First, pollen has a limited temporal resolution. Trees with a long lifespan could potentially survive and persist and drier conditions, conditions that could impact agricultural crops that were more reliant upon surface moisture retention. Therefore, using tree pollen as a proxy indicator for environmental changes on a small scale necessary to analyze agricultural shifts needs to be taken with reservations (Bryant and Hall 1993).

Based on the pollen studies, there was very little to indicate that there was a vast change in the environment during the Early Bronze Age. That was not to say, however, that everything was status quo throughout the entire period. There were some fluctuations in the ratios of AP to NAP that does indicate some more regionally localized changes. This however was not throughout the entirety of the ancient Near East, just more localized. Interestingly, there were some indications of changes in olive production throughout the EBA that were not directly related to environmental changes. This indicated that it was most likely due to changes in human patterns of production.

Figure 5.7: Location of pollen samples taken in the Levant. Map by author.

In the southern Levant, palynological studies come predominantly from four areas, the Sea of Galilee, the northern Golan, the Dead Sea in the Jordan Valley, and east of the Jordan (Figure 5.7). A core was taken from the Sea of Galilee in 2010 to better understand the paleoclimate of the upper Judean Highlands (Langgut, Finkelstein, and Litt 2013; Langgut, Adams, and Finkelstein 2016). An 18 m core was extracted from the lake to do high-resolution pollen sampling and intense radiocarbon dating. The authors had seen that previous studies did not contain a fine chronological resolution and wanted to look at transitional periods in Levantine history. The first study was on the transition from the LBA to the Iron Age, the second focused on the EBA. On the 18 m core, the Bronze and Iron Ages represent the area from 458.8-1006.6 cm region. This core was sampled at 10 cm intervals, representing 56 samples. Six radiocarbon dates were taken. The researchers looked at the ratios of Mediterranean trees and cultivated olive trees (arboreal) versus herbs and dwarf shrubs (non-arboreal) to determine AP/NAP ratios. These ratios can help determine ancient rainfall and environmental conditions. If there were low values for the Mediterranean and olive trees and high values for the herbs and shrubs, then it was potentially an indicator that there was a dryer climate during that period of time. AP/NAP values can also be indicative of other patterns outside of precipitation. During periods of abandonment, land that had been previously allocated for agriculture was reclaimed by shrubby and woody vegetation. This would change the AP/NAP values, even if there were no other indications of climate change. The switch from the evidence of olive pollen to pine during the EB IV was an example of this phenomenon. Based on textual and archaeological evidence, olive production shifted to the northern Levant, which would have resulted in the abandonment of at least some of the orchards in the south. This would have allowed for the introduction of pine without it necessarily being a change in environmental conditions.

Minimum tree values were documented at roughly 2300 B.C., 2000-1800 B.C., 1200-1100 B.C., and 700 B.C. (Langgut, Finkelstein, and Litt 2013, 155). Maximum tree values were recorded between 3150-2900 B.C. and 1350-100 B.C.

In the Sea of Galilee cores, the sequence begins at about 3150 B.C., or during the EB IB. This was when the highest percentage of arboreal vegetation was recorded, likely indicating a humid phase. This period also saw an increase in olive production (Langgut, Finkelstein, and Litt 2013, 158). During the EB II-III there was a slight increase in the percentage of arboreal vegetation overall. Olive pollen, on the other hand, was more variable. There was an increase in olive c. 2900-2650 B.C., but a decrease from c. 2650-2500 B.C. This was likely due to anthropogenic reasons rather than environmental. This decrease in the southern Levant was commensurate with a rise in olive production in the northern Levant. This will be fully discussed in the next section. This pattern continues during the EB IV, indicating no significant change in moisture in the catchment zone from the EB III to EB IV. There was a short, drier period around 2300 B.C. quickly followed by an increase in Mediterranean tree pollen at 2200 B.C., which decreased again around 2000 B.C. (Langgut, Finkelstein, and Litt 2013; Langgut, Adams, and Finkelstein 2016).


Figure 5.8: Birkat Ram looking east. Photo by author (taken 8/13/2014)

In the northern Golan, Birkat Ram was a crater lake that has a relatively small catchment zone of roughly 1.5 km^2. A total of three cores, one gravity and two single-piston cores, were taken from the bottom of this lake in 1999 that amounted to a 543 cm long composite core. These cores were then divided into 140 layers to be analyzed, with an emphasis on sedimentology, AMS radiocarbon dating, and palynology. They recorded the climate history of the region from the Chalcolithic (c. 4500 B.C.) to modern times, dated based on 18 radiocarbon dates from water plant remains and wood charcoal. Palynology itself was measured based on changes in AP/NAP ratios, or arboreal to nonarboreal pollen. This study shows that there was a relatively uninterrupted human impact on the landscape until the Middle Bronze Age. Of direct relevance to the Early Bronze IV, no high-arid period was detected in the pollen record for the Golan (Neumann, Kagan, et al. 2007; Neumann, Schölzel, et al. 2007; Schwab et al. 2004).

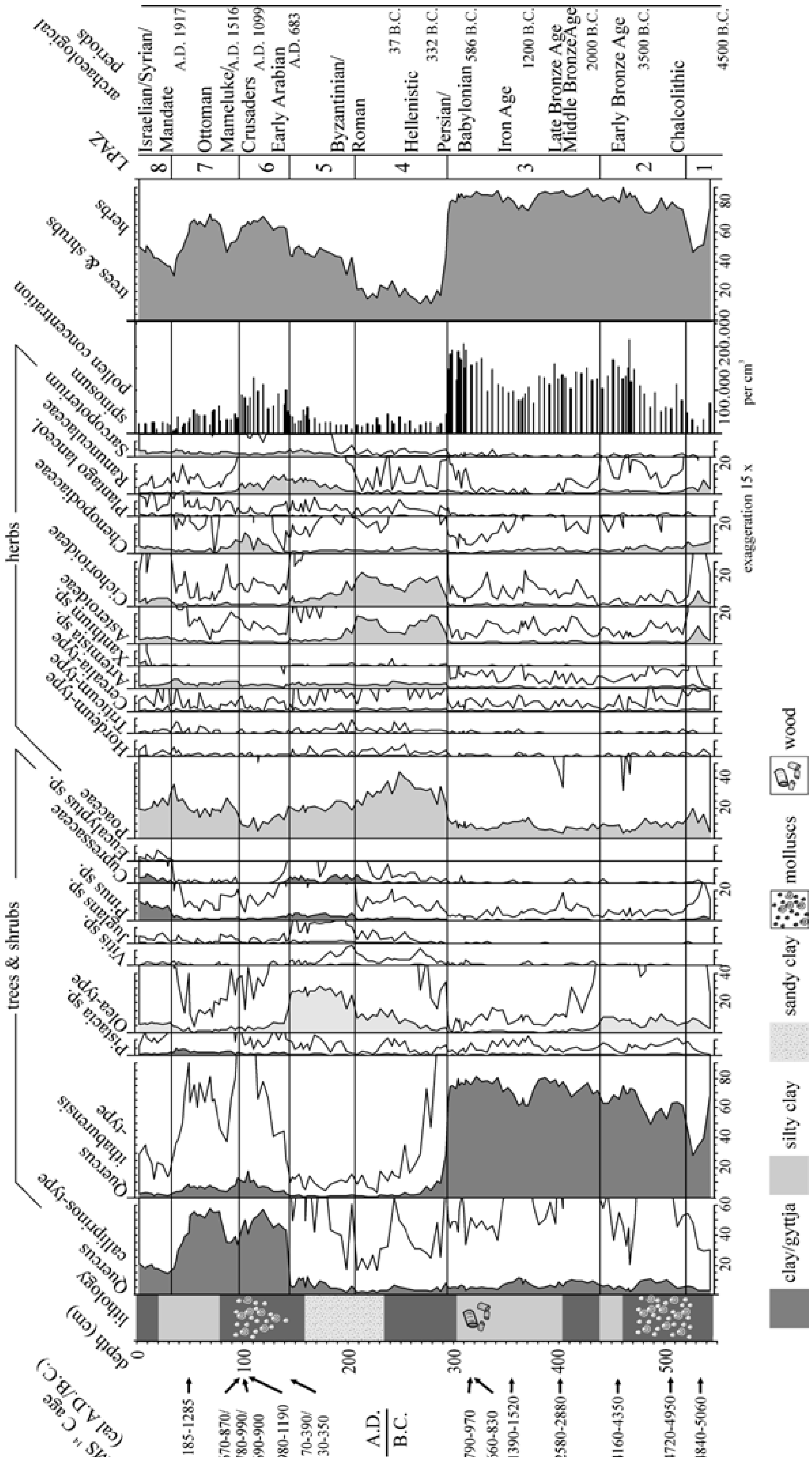


Figure 5.9: Birkat Ram; Simplified pollen diagram with local pollen assemblage zones (LPAZ) and archaeological periods from Birkat Ram (Neumann, Schölzel, et al. 2007).

Palynological examinations of Lake Huleh were conducted in the Golan. The Jordan River and a few smaller streams fed the lake as well as the marshy areas of the Huleh Valley from the north and drained back into the Jordan River in the south (van Zeist, Baruch, and Bottema 2009, 29). The lake itself was larger pre-1950 but shrank considerably in size due to drainage operations. The Huleh Valley was around 25 km long and on average 7 km wide. It was bordered to the west by limestone and dolomite mountains of the Upper Galilee, and on the east by the basalt fields of the Golan Heights. The area was generally semi-humid and represents a Mediterranean climate zone with warm, dry summers and cool, wet winters. A 16 m core was extracted from Lake Huleh in 1987. The core was taken with a hand operated Dachnowsky piston sampler. In the lab, sediment samples were taken at 5-10 cm intervals for palynological analyses and used AP/NAP ratios to determine the humidity and general climate of the area during each zone studied. The temporal resolution was coarse and was only good enough to speak broadly about the EBA in the region, so no further specifics can be provided.

Figure 5.10: View of the Dead Sea looking east from Ein Gedi spring. Photo by author (taken 8/21/ 2016)

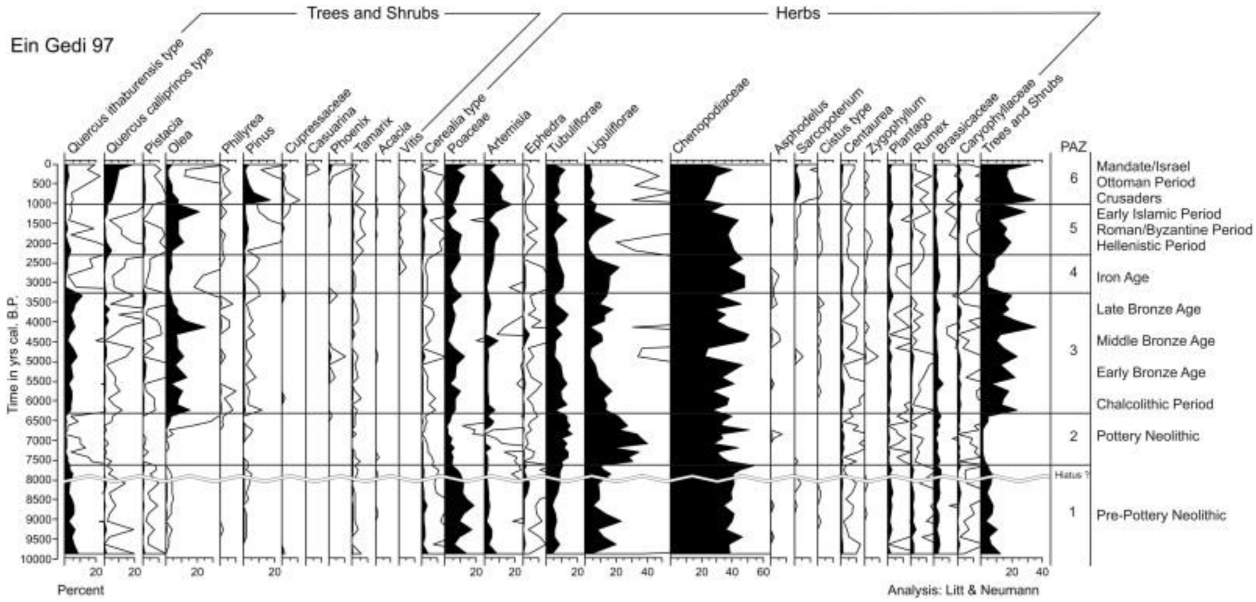


Figure 5.11: Simplified pollen diagram from the Dead Sea shore near Ein Gedi Spa (Litt et al. 2012, Fig. 3)

In particular, three areas of the Dead Sea were cored for pollen studies: Ein Feshkha, Ein Gedi, and Ze'elim Gully. These three coring areas represent catchments for sediments and pollens that originated predominantly from the west, in particular the Judean Mountains, the northern Negev, and the Judean Desert with some pollen fallout from the east in modern Jordan (Neumann, Kagan, et al. 2007, 1485). This assessment was based on analyses of modern pollen spread in the Dead Sea, where pollen fallout comes mostly from the west (Neumann et al. 2010). The Ein Feshkha core was missing the Chalcolithic and Early Bronze Age, likely due to erosion in antiquity, so it can only inform us concerning the period directly after the EB IV. The pollen record from Ein Gedi was taken from a 21 m sediment core, representing around 10,000 years of history based on twenty radiocarbon dates on terrestrial organics (Litt et al. 2012, 20; Zielhofer and Weninger 2013). In total 58 samples, each representing around 150-200 years, were taken from the core.

The Ze'elim Gully drains the southern Judean Highlands into the Dead Sea, located southwest of the lake. The palynological record documents c. 2500-500 B.C. for a catchment zone of roughly 200 km^2 of winter precipitation (Langgut et al. 2014, 281). Several 50cm wall profiles were taken. This study used the chronology established by Neumann et al. (2007) as a baseline but with a higher resolution of palynology samples. Samples were taken at about 5 cm intervals, representing 60 samples. Also, 10 radiocarbon dates were taken from 3 separate strata. This study employed five primary pollen groups: (1) Mediterranean trees like pine and oak, (2) cultivated plants like olive and cereals, (3) ruderal weeds that were indicators of secondary anthropogenic activities, (4) semi-desert and desert elements like chenopods, and (5) open land indicators like herbs and dwarf shrubs. There was evidence for the EB IV in this core that corresponds with the previously mentioned pollen profiles. There was a medium percentage of Mediterranean trees from the Judean highlands during the EB IV, representing a sub-humid climate. There was a slight drying trend towards the end of the period, beginning around c. 2000 B.C. There was also a rise in olive values at the end of the period, which was likely anthropogenic because there was not a similar increase in other humid related pollen.

There were two sources in the modern country of Jordan from which palynological evidence was recovered. One was the Wadi al-Wala, which runs next to Khirbet Iskander and was a tributary that divides the Madaba and Dhiban plateaus. The area receives around 200-150 mm of annual rainfall (Cordova 2008, 445). In ancient times it was a permanent stream. The other site was the Wadi ash-Shallalah, which was a tributary of the Yarmouk River and bisects the Irbid Plateau near modern-day Amman, Jordan (Cordova 2008, 447). The primary goal of research at these two sites was alluvial and geoarchaeological research, with the palynology as a secondary aim. The pollen assemblages were acquired from alluvial deposits during low-flood periods, corresponding to the lowest levels of paleosols recovered (Cordova 2008, 445). The resolution was coarse here, corresponding to only era-level analyses. Conclusions can be made for the Early Bronze Age as a whole, but not for the EB IV specifically. However, it does fit the general pattern of olive to deciduous forest pollen as observed in other sources.

When these sources from the southern Levant were combined, a more complete picture of the nature of the Early Bronze IV climate in the southern Levant can be made. There was little evidence for a drier episode at the end of the EB IV in most samples. There was also a peak in *Olea europaea*, or olive trees, during the latter half of the EB IV (c. 2200-2000 B.C.), possibly indicating an expansion of olive horticulture in the Judean highlands, a phenomenon that was fully discussed in the next section (Kagan et al. 2015).[61] Because this was the only tree pollen to increase, it may be inferred that the increase was anthropogenic rather than natural (Langgut et al. 2014). According to this study, at the end of the EB IV, olive decreases as pine increases. This may be indicative of an abandonment of orchards since pine was one of the first invader species in disturbed areas (Langgut et al. 2014; 2015).[62]

Figure 5.12: View of the Ghab Valley looking southeast from Jebel an-Nusayriyah. Photo by author (taken 06/20/2010)

[61] This aspect will be further addressed in chapter 5.
[62] Again, this will be looked at further in chapter 5.

Heading further north into the Orontes River Valley, there appears to be no significant anthropogenic influence on the environment during this period. In the Bekaa Valley of Lebanon, a 540 cm core, taken with a Russian corer, was extracted from the Aammiq wetland (Hajar, Khater, and Cheddadi 2008). During the Early Bronze Age, there was evidence that marshland soils were disturbed, as were soils on the mountains to the east of the valley. The pollen indicates little climatological change. Another core was taken in the Ghab Valley of modern Syria (Figure 5.12). A 6 m lacustrine sediment core was analyzed in 1 cm thick samples taken every 5-10 cm. In direct contrast to the remainder of the ancient Near East, where there appears to be an increase in humidity and a rise in lake levels during this period a decrease in both were observed here. This was evident in an increase in *Typha*, *Sanguisorba*¸ *Ranunculus*, *Halaoragis*, and *Thalictrum*, all flowering marshland plants (Yasuda, Kitagawa, and Nakagawa 2000). This indicates the Orontes River Valley still contained viable farmland and may have experienced an expansion of its wetlands.

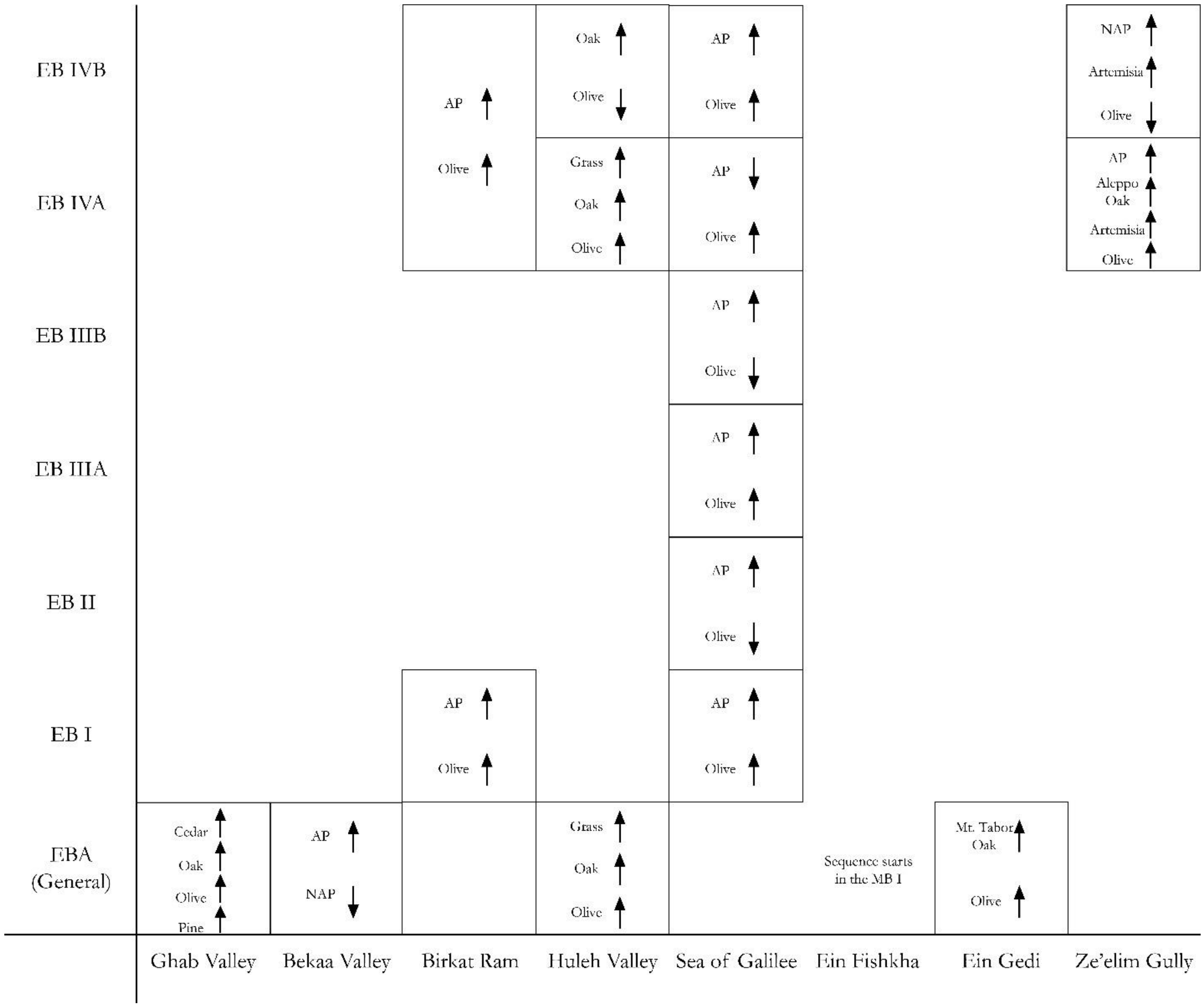


Figure 5.13: Summary of AP (arboreal pollen) and NAP (nonarboreal pollen) charts for the Early Bronze Age with relative increases or decreases from one period to the next in pollen by type and/or species. Graphic by author.

Looking further afield, pollen evidence preserved in northern Mesopotamia points to neither a sudden onset nor a long arid period at the end of the Early Bronze Age (Bottema 1997). This was even true in the Jazira, including the Balikh Valley, where a set of cores were taken with a Dachnowsky sampler with a capacity of 25 cm (Gremmen and Bottema 1991, 106). A total of 13 surface samples and cores up to 430 cm were taken throughout the northern Jazira and compared. With data spanning the late Holocene, it was posited that the modern conditions of the

Jazira began at least 6,000 years ago and there was no significant change since (Bottema 1997). For a summary of all the charts, see Figure 5.13.

5.4.2 Tree Species

This section looks at the location of other tree pollen as it relates to modern tree patterns in the Levantine region. Modern data was acquired from the Food and Agricultural Organization of the United Nations and was freely available for download.[63] While it encompasses all of the data for the entire Mediterranean world, it was cut down for this study to specifically look at the Levantine region. In each of the maps, the points represent a concentration of trees as noted in census data. They do not indicate single instances of trees, but rather groves and larger concentrations within a small given area of 1 square kilometer (Figure 5.14).

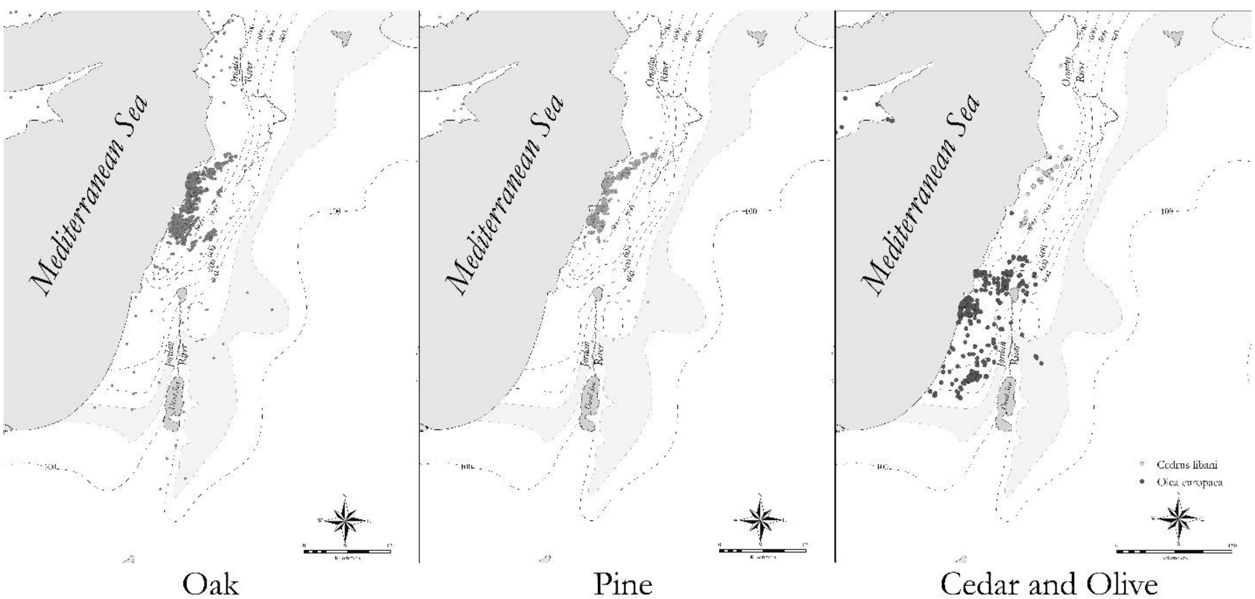


Figure 5.14: Modern locations of pine, oak, cedar, and olive trees in the Levant. Map by author.

The location of modern examples of tree locations was not necessarily an indication of ancient locations, but it serves a good proxy indicator for where it may have been possible to grow certain arboreal species if something like modern climatic conditions prevailed. It also

[63] http://www.fao.org/forestry/en/

appears that there was a very high degree of overlap between modern locations and ancient locations. The two most well-known, and often utilized, arboreal species were cedar of Lebanon and olive trees. The location of cedars was restricted predominantly to modern-day Lebanon in the highlands, exclusively above the 700 mm annual rainfall line. Olives appear to be more restricted to southern Lebanon, parts of southwestern Syria, Israel, West Bank/Palestine, and some examples in modern-day Jordan. All the examples were located in areas that receive over 200 mm of water annually, with the majority well within the 400 mm per year range. This was likely a representation of modern horticultural practice.

The highlands in and around Jerusalem were known for their olive production, as well as the other highland regions controlled within the area during the Iron Age, based on textual evidence (Eitam and Shomroni 1987; Galili et al. 1997). The majority of olive production centered in highland zones, with a few examples on coastal plains and in the valleys (Salavert 2008). The highest concentration was in the Judean hills, the Mount Carmel region, and in the Galilee.

As was noted and in various articles, there was an increase in olive pollen outside of other environmental factors starting in the Chalcolithic (Liphschitz et al. 1991). The most prominent increases occurred during the first phase of the Early Bronze Age (A. M. Rosen 2007). This was indicative of a larger increase in olive production, most likely anthropogenic in origin. This increase stabilized throughout the EBA but changes into the EB IV. During the EB IV, the concentration of olive production as indicated by olive pollen in the palynological record, there was a higher concentration of olive in the north as opposed to the south. As can be seen in the Dead Sea cores, there was a decrease in olive pollen during the later periods of the EB IVB. This, however, coincided with an increase in olive pollen in northern parts of the study region, especially in the Sea of Galilee region and the northern Levant. This was probably indicative of a shift to the north in the production and centralization of olive horticulture (Figure 5.15).

How this relates specifically to the settlement locations were explored in later chapters of this dissertation, but it does seem to track with previous studies on the settlement locations (Dornemann 1999; Kennedy 2015b). During the EB IV, there was an increase in site numbers in the northern Levant and sites increased in size. This was in direct correlation with a decrease in overall site size in the southern Levant. This may be an indicator of a more standardized means of control in the northern Levant as compared to the southern Levant. It was not necessarily indicative of a population shift to the north, as there was still a large population center in the southern Levant. However, there were indications that, at least on the western side of the Jordan Valley, there were fewer large settlements. It was, therefore, likely that the production of olive oil and olives themselves centered on the areas of control in the Levant during this period.

There was a high degree of overlap between pine forests and oak forests in Lebanon, especially in the area above 700 millimeters of annual rainfall. Oak and pine forests were in similar areas to cedars of Lebanon but were in some distinctive areas as well. They do, again, occur in the highlands, as most arboreal species do in the region. This was because those were the areas that receive the most rainfall. Interestingly, there was a higher concentration of oak in the Levant than there was of pine in the Levant. Pine trees were mostly found in Lebanon and north, with a few examples in the Jordan River Valley as well as east of the valley in modern-day Jordan. However, this was not the case with oak. There were larger concentrations of oak in the southern Levant as well. However, the majority of them do tend to be in the northern Levant.

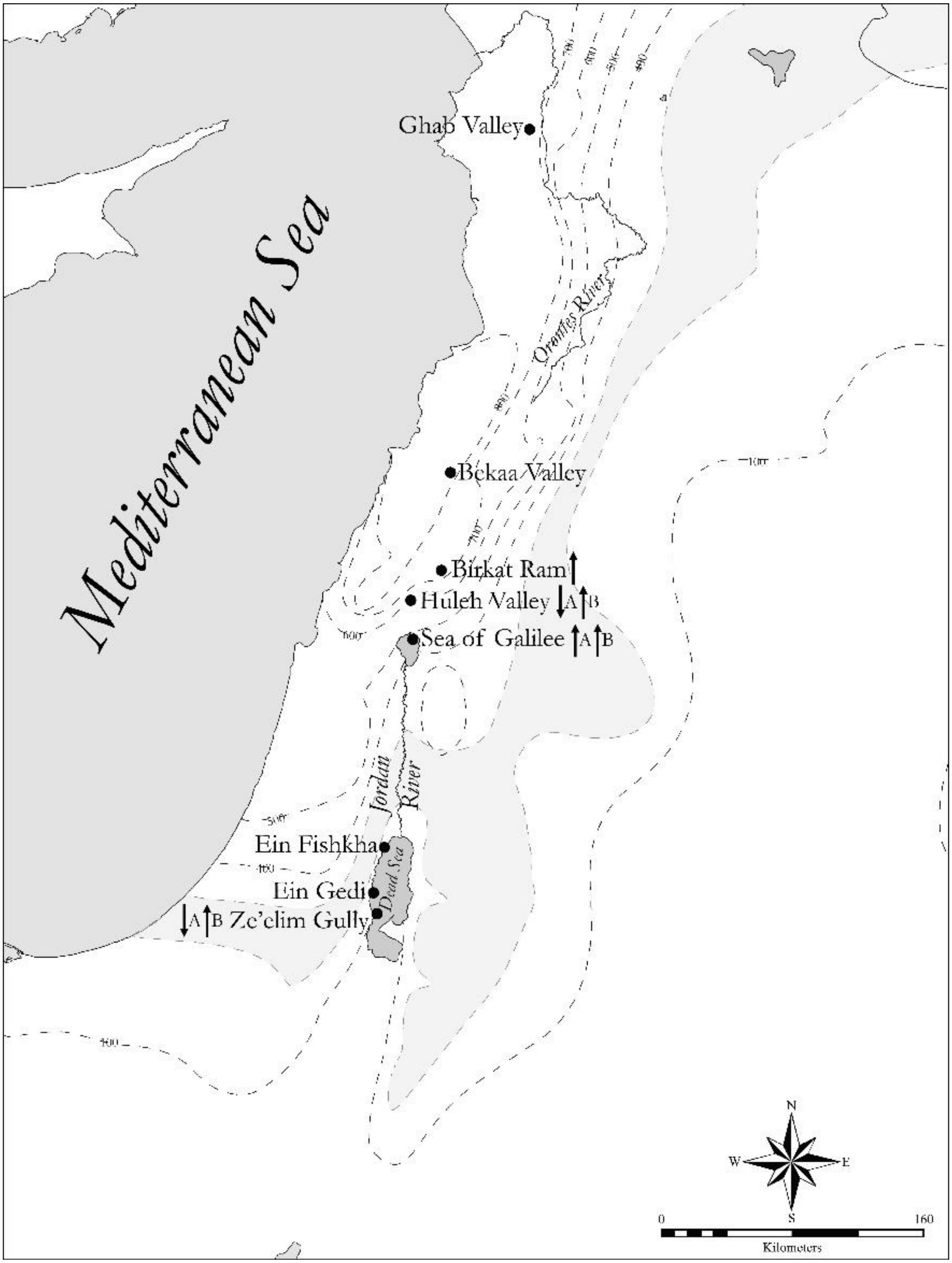


Figure 5.15: Location of pollen core samples taken. Sites with evidence for olive pollen in the EB IV were indicated with an arrow if it was an increase or decrease from previous periods. Periodization was split into EB IVA and EB IVB if available. Map by author.

This was similar, again, with what can be gleaned from the archaeology and palynological record. There was an indication that, when olive pollen concentrations decrease, there was a corresponding increase in oak and pine. The two seem to be linked to a certain degree in the palynological record. As noted above, this decrease in olive was likely due to an abandonment of the olive groves rather than a change in the environment. When the olive groves were no longer being tended, the surrounding oak and pine forests reclaimed the land without active human intervention.

5.5 Constructing the Proxy Paleoclimate Stack

Paleoclimatic proxy data indicates that a fairly widespread high-arid period occurred across all regions of the ancient Near East with the timing of this episode set fairly concretely at around 2200 B.C., with some fluctuations from west to east and north to south (Dunseth, Finkelstein, and Shahack-Gross 2018; Finkelstein 1992). A succession of environmental problems, starting with the onset of aridity, which would cause sites in the marginal zones to dry out quicker, forcing populations to move to more agriculturally secure areas, and with the population influx causing sites to reach carrying capacity and therefore more population movement (Weiss 2017b). These crises occurred one after another over 300 years, first affecting semi-arid regions like northern Mesopotamia, specifically the Jazira region that includes northeastern Syria, northwestern Iraq, and parts of Turkey, and the interior Levant, the “zone of uncertainty,” that was already at the rainfall threshold for dry farming within the 200 mm isohyet and pushed them into aridity (Roberts et al. 2011, 152). The regions most susceptible to drought and varying climate were first impacted by the precipitation decrease, with wetter climes along the Mediterranean coast relatively protected until later, into the beginning of the second millennium

B.C. The Orontes and Euphrates River valleys, with access to the two rivers, were relatively unaffected.

The timing of this episode was suspect. The relative and absolute chronologies were not well-matched, and there was little temporal control for many of the proxy data sets. They may not have occurred at the same time across all regions, and they also may not correlate to the collapse of the EB IV. Recent evidence based on AMS radiocarbon dates from the southern Levant pushed the supposed EB IV "collapse" back to c. 2500 B.C., essentially removing the 4.2 kya BP event as a catalyst for social change between the EB III and EB IV. Because the 4.2 kya BP event now occurs in the middle of the EB IV, analyses on early and terminal EB IV sites need to be evaluated.

The archaeological manifestation of the EB IV represents a stark contrast to the EB III and MB I-II, with a shift in economic focus. Agriculture was a major component of the EB III economy,[64] as was sheep herding, predominantly those seemingly run by local elites (McCorriston 1997; A. Porter 2011). When EB II-III cities were mostly abandoned, people did not just disappear. Since there was no evident increase in mortality, it appears that populations moved. There was some evidence for an increase in settlement size at a few sites in the Orontes Valley,[65] and so a mass movement possibly occurred, a topic explored further in this work. It was likely that, after the disappearance of the elite and urban control, a community-managed economy provided the best opportunity for survival and prosperity. An agropastoral economy with the household as the basic economic unit represents then only a shift rather than wholesale

[64] The few Akkadian records from EB III cities records the importance of cereal grains.
[65] There is evidence from the sites of Qatna (Morandi Bonacossi 2007), Acharneh (E. N. Cooper 2006b; Fortin 2006), Qarqur (Casana, Herrmann, and Fogel 2008; Dornemann 1999; 2003; 2012; Karoll 2011), and in the Amuq Plain (Welton 2014; 2018; Wilkinson and Casana 2005) of an increase in population, settlement size, and number of settlements.

change. Individuals were already used to a household control of goods, and the EB IV represented a downsizing of this concept. Agropastoralism was a viable choice since it already fit within the ecological niche in which a part of the population participated.

The evidence for a widespread, environmental change within the ancient Near East during this time was a complex question. The proxy stack including speleothems, sea levels, sedimentology and soils, macrobotany, and palynology sheds light on the environmental conditions of the ancient Levant during the Early Bronze Age. There does seem to be some indication that in northern Mesopotamia a more drastic difference existed. This can also be observed in other proxy data from across the world. However, the Levant was less drastically affected. Based on the macrobotanical and palynological remains, there was not a period of widespread, high aridity. It does appear, though, that there were some changes from north to south that were anthropogenic in origin.

This chapter highlights some of the environmental data that was present for the entirety of the ancient Near East, and the world, as it pertains to environmental reconstructions. It was, however, relatively devoid of any explicit anthropological and archaeological data, outside of some anecdotes to help highlight the anthropogenic changes that can be observed in the record. What remains ambiguous was what types of cultural factors, both internal and external, played a part in the changes during the Early Bronze Age. This predominantly set up the necessary background to better understand the agricultural, horticultural, and trade relations in the ancient Levant during the EBA. The following chapters explicitly look at these questions, as they relate to the environmental data that was presented here.

5.6 CONCLUSION

This chapter presents the evidence for climatic fluctuations in the ancient Near East as it relates to the 4.2kya BP event and the end of the Early Bronze IV. This was based on evidence from speleothems, lake levels, sedimentology, macrobotanical remains, and palynology. Based on the various lines of evidence, the proxystack adds up to a muddled picture of the climate in the Early and Middle Bronze Age of the Levant. For a summary of the data utilized and the types of change it portrays in the climatological record, see Table 5.1. Based on ancient lake levels and speleothem studies in the southern Levant, there was a possible decrease in precipitation throughout the EBA, with an apex at 2200 B.C. Looking at sediment cores taken further afield in the Gulf of Oman and the Arabian Sea further corroborated this decrease in precipitation. Except for the speleothems studied at Soreq Cave in modern Israel, these pieces of evidence appear at a low spatial resolution. Windblown sediments cover a large area, and the drainage system that feeds into the Dead Sea was almost around 1500 km^2 (Garfunkel and Ben-Avraham 1996).

Table 5.1: Summary of all the proxydata and sample locations used in this study.

Site/Location	Evidence	Type of Change
Ein Feshkha	Lake Levels	Decrease in Precipitation
Ein Gedi	Lake Levels	Decrease in Precipitation
Ze'elim Gully	Lake Levels	Decrease in Precipitation
Bekaa	Palynology	Increase in Precipitation
Birkat Ram	Palynology	Increase in Precipitation
Ein Feshkha	Palynology	Indeterminate
Ein Gedi	Palynology	Increase in Precipitation
Ghab	Palynology	Increase in Precipitation
Huleh Valley	Palynology	Increase in Precipitation
Sea of Galilee	Palynology	No Change
Ze'elim Gully	Palynology	Increase then a Decrease in Precipitation
Arabian Sea	Sediments	Increase in Wind Blown Dust
Birkat Ram	Sediments	Indeterminate
Gulf of Oman	Sediments	Increase in Wind Blown Dust
Khabur Basin	Sediments	Decrease in Precipitation
Soreq Cave	Speleothems	Decrease in Precipitation

The evidence from the palynology was much more complex and tells a different story. Based on the samples taken from the Dead Sea region (Ein Feshkha, Ein Gedi, and Ze'elim Gully), there were changes in the precipitation and climatic conditions. The Early Bronze I-III were the wettest periods of the EBA, with the highest ratios of arboreal pollen percentages. Although there was a slight decrease in these ratios during the EB IV, it was still moderate and not significantly different. Evidence for a dry episode does not appear until at least 2000 B.C., which was at the transition from the EB IV to the MB I and would not affect the change in settlement patterns evidenced at the beginning of the EB IV (Langgut, Finkelstein, and Litt 2013, 231).

A few general comments can be made overall based on this data. There does appear to be a north to south divide, where samples from the southern Levant revealed a relatively small degree of change throughout the EBA while those in the north and to the east evidenced more change in the environment. However, parsing out the exact timing or nature of the changes was more problematic. The spatial and temporal resolutions do not allow for a fine-grained reconstruction. The data was also contradictory across space and proxy indicators.

Likely, the shift in climate exacerbated an already fragile system, which can be analyzed by means of resilience theory. In the case of the Early Bronze Age, there was no apparent collapse. Resources, in the form of agricultural products in the farming regions and wool in the steppe were exploited during the EB II, resulting in the rapid growth of settlements and a tiered settlement hierarchy. During the conservation phase, people consolidated and hinterlands around sites were abandoned as the population moved to the major tells and settlements. Some small communities remained, but the majority of people were concentrated in cities. This system was inherently fragile and eventually released ("collapsed" in traditional terms) during the first half of the EB IV as people moved away from major sites of the EB III.[66] The transition from the release to reorganization phases likely corresponds to the climatic episode. At this time populations reorganized during the latter half of the EB IV into new communities that would then be ideally placed to take control during the Middle Bronze Age.

The following chapter explores what this data and analyses means for ancient agriculture. The macrobotanical and pollen remains explored in this chapter were reapplied to study how the changes in olive grove locations and the types of agricultural and horticultural produce. It also explores how climate might have affected these different economic and subsistence ventures in the Levant.

[66] The exact reason for this will be explored further in my dissertation.

6 Ingrained in the Landscape: Agriculture and Horticulture in the Levant

This chapter explores the interplay among the environment, political control of agriculture, and the consequences of excessive reliance on one mode of existence as it relates to agriculture and horticulture. Environmental reconstructions allow for a more nuanced understanding of the sociopolitical atmosphere and agricultural endeavors of the Early Bronze Age. Grains were first domesticated in the marginal regions of the ancient Near East, along the steppes of the mountain regions (L. S. Braidwood et al. 1983). According to archaeological evidence, rye was the first grain domesticated at the site of Abu Hureyra in northern Syria about 13000 years ago (Moore, Hillman, and Legge 2000). It did not take long for barley and wheat to also be domesticated, around 11000 years ago (Zohary 1995).

One consequence of the domestication of grains and introduction of agriculture was the development of a means of controlling a secure food source (Manning 2005). Agriculture, for the first time, allowed for a surplus on a large scale (McCorriston and Hole 1991). With such a large amount of caloric capacity produced in a relatively short time and space, every member of the society did not need to be focused on food procurement and preparation (C. Clark and Haswell 1970; Sibhatu and Qaim 2017). There was a division of labor between the pastoralists, hunters, and growers, each controlling a segment of society that was interconnected with the others (Scott 2018). At first, this created a sense of resilience, allowing each segment of society to act independently (Robert McC. Adams 1978; Lamine 2015; Lin 2011). Later, though, this became a problem, as heavy reliance on one mode of existence meant that the diet was no longer as diversified, all aspects of society were controlled by a centralized authority, and individuals were gathered into smaller and smaller sectors.

As populations became more and more reliant on domesticated grains, the diet became rigid and inflexible. This inflexibility left few alternatives to grain and domesticated meat for food and calories (Robert McC. Adams 1978; Scott 2018; Thalmann 2007). The ability of the system to absorb sudden changes was severely affected, as most groups focused heavily upon one or two main grain staples, ignoring the others. The society was restricted to a relatively narrow ecological niche. If anything happened to that niche, the system could collapse. Although beneficial in the short term, the reliance on a limited number of grains allowed for the sustained growth of larger and larger populations, it had a major flaw. If something happened to the primary food supply, like a climactic episode that made growing grain difficult or the destruction of the sector of society in charge of agriculture and horticulture, the rest of the population would suffer (Weiss 2000b). It could result in multiple, unfavorable scenarios including death, the abandonment of settlements, and a complete restructuring of society.

In such a restricted society, levels of control were less diversified (D'Andrea 2014). Therefore, if there were to be a shift in the upper echelons and the political landscape, the change would adversely affect all the various sectors of society and make it harder for the group to adjust. Even though there were certain sectors of society that hunted, fished, grew grapes and olives, and performed specialized forms of pastoralism, they were not a full part of society (Nichols 2004). Pastoralism for wool and agriculture were economic sectors of society which were highly controlled by the upper echelons. But this was not necessarily the case with other parts of society, which were not fully integrated like agriculture and pastoralism.

6.1 CONTROL OF AGRICULTURE

Controlling a steady, relatively reliable food supply was particularly important in the development of the ancient Near East (Maisels 1993). Agriculture was often seen as the catalyst for statehood and a centralized government in the ancient world (Childe 1950). Besides the problems inherent in agriculture, putting individuals close together in settlements had other, unforeseen consequences. According to James Scott (2018, 31), there were three consequences to the formation of the state. (1) Diseases spread at an extraordinary rate as individuals, crops, and livestock were forced closer and closer together. These close quarters increased the frequency of epidemics and created new diseases. (2) Mass deforestation occurred as more and more arboreal resources were used, including for building construction and fuel. This deforestation increased flooding and siltation. (3) Increased and repeated use of land for agriculture also increased salinization of the soil and due to overworking the soil even led to the inability to use land that was formerly arable, which decreased crop yields. With populations living closer and closer together, some problems appeared, like higher mortality than present among hunter and gatherer societies (Riehl 2008). However, this was made up for with a higher birth rate, where families had multiple children though the majority would not make it into adulthood (Armelagos, Goodman, and Jacobs 1991). With this increase in both surplus food and population, control was necessary. This control was concentrated in select members of the population, forming a class system with the everyday workers towards the bottom and controlling elites at the top.

Elites within the society were reliant upon surpluses to survive. They controlled the agricultural process indirectly, owning the fields and modes of production without actively farming themselves (Maisels 1993). Because elites managed the process, they controlled the goods themselves. They used what they needed for their own personal survival and caloric intake then used the remainder to accumulate more power. Elites used these surplus goods and materials as a means to pay their households, to give as gifts to foreign dignitaries, to use as a means of control (van Koppen 2001). In order to have a surplus, powerful households needed many individuals under their control. To support these additional individuals, the elites had to have and control a surplus. This generated a cycle of continual control, where both the generation and the maintenance of wealth was dependent on sustainable, reliable agriculture.

The population gathered in cores because transportation was so expensive, and it was more economically feasible to live in close quarters. This, however, created specific niches not only for growing resources but for suitable places to live, which in turn created vulnerabilities for the system. If even one subset of society collapsed, there was no other part to take up the slack. The robusticity of the system caused adaptations to be difficult when situations changed. It was still possible to acquire goods through trade, however, at large scales. The control of trade required to survive long durations of time was at the upper echelons of society. In addition, if trade networks collapsed or shifted, then the economic goods that each individual city desired would have to be locally produced. This state of affairs led to collapse within various economic and subsistence sectors. This leads to the question, however, of what came first. Did the collapse lead to changes in the economic and subsistence factors, or did those changes lead to collapse?

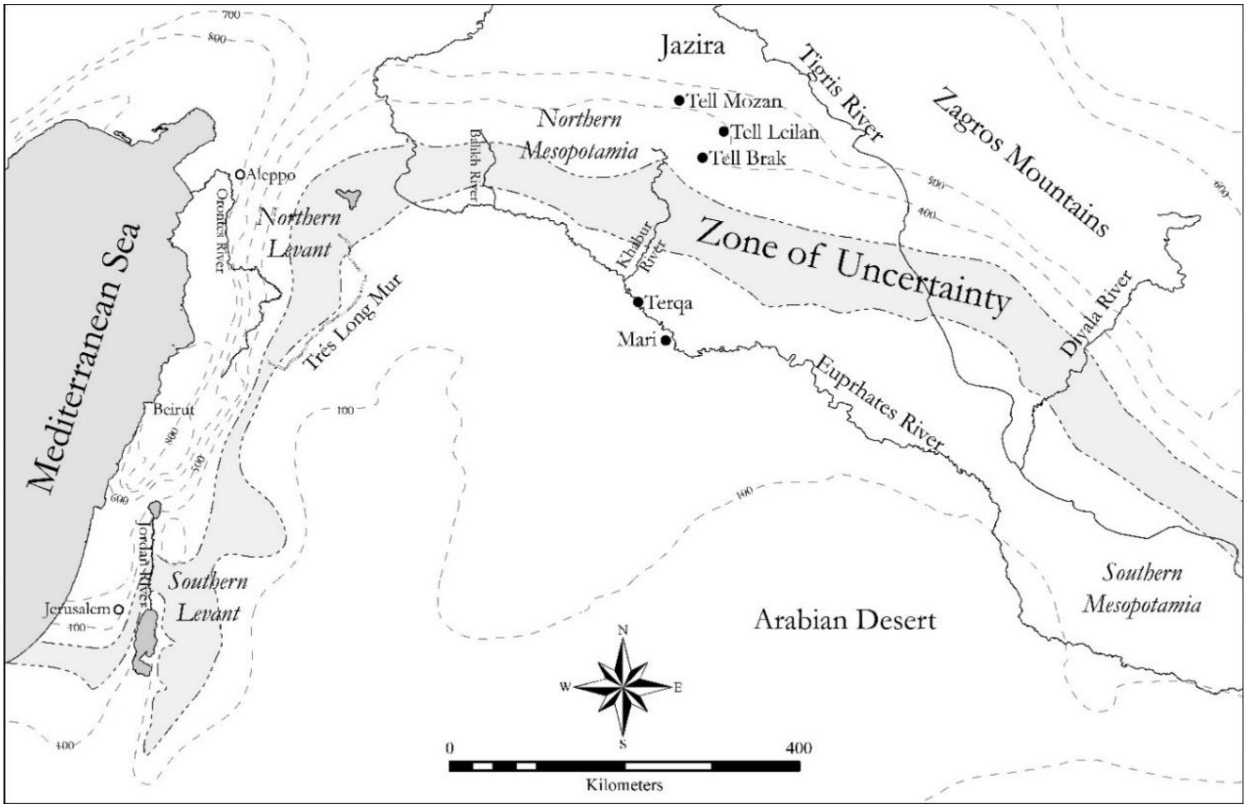


Figure 6.1: Regions in the ancient Near East, including the Middle Euphrates with Mari and northern Mesopotamia with the Jazira. Map by author.

Political upheaval and social collapse seem to mostly go hand in hand. By the third millennium B.C., agriculture was well established in the ancient Near East and the Levant. Cereals like barley and wheat, legumes like peas, lentils, and chickpeas, flax, and horticultural products like olives, figs, grapes, pomegranates, and dates were found at various sites around the region. To explore the ideas of robusticity in the ancient Near East and its potential to create systemic upheaval, some case studies are explored. Ample written and archaeological data to analyze this question are available from northern Mesopotamia, specifically in the Early Bronze Age Jazira and Middle Bronze Age Middle Euphrates around the city of Mari (Figure 6.1).

6.1.1 The Jazira

The Jazira is located between the Tigris and Euphrates River in southeastern Turkey, northern Syria, and northwestern Iraq. The northern part of this region lies within the dry-farming zone, with a mean annual rainfall of 350-500 mm; the southern part is just beyond this zone, with a mean annual rainfall of 200-350 mm (Wilkinson 1994). The drainage in the Jazira is based mainly on temporary wadis to the Tigris and Euphrates and a couple of larger streams, the largest of which are the Balkh and the Khabur rivers in Syria (Wilkinson 1990, 87).

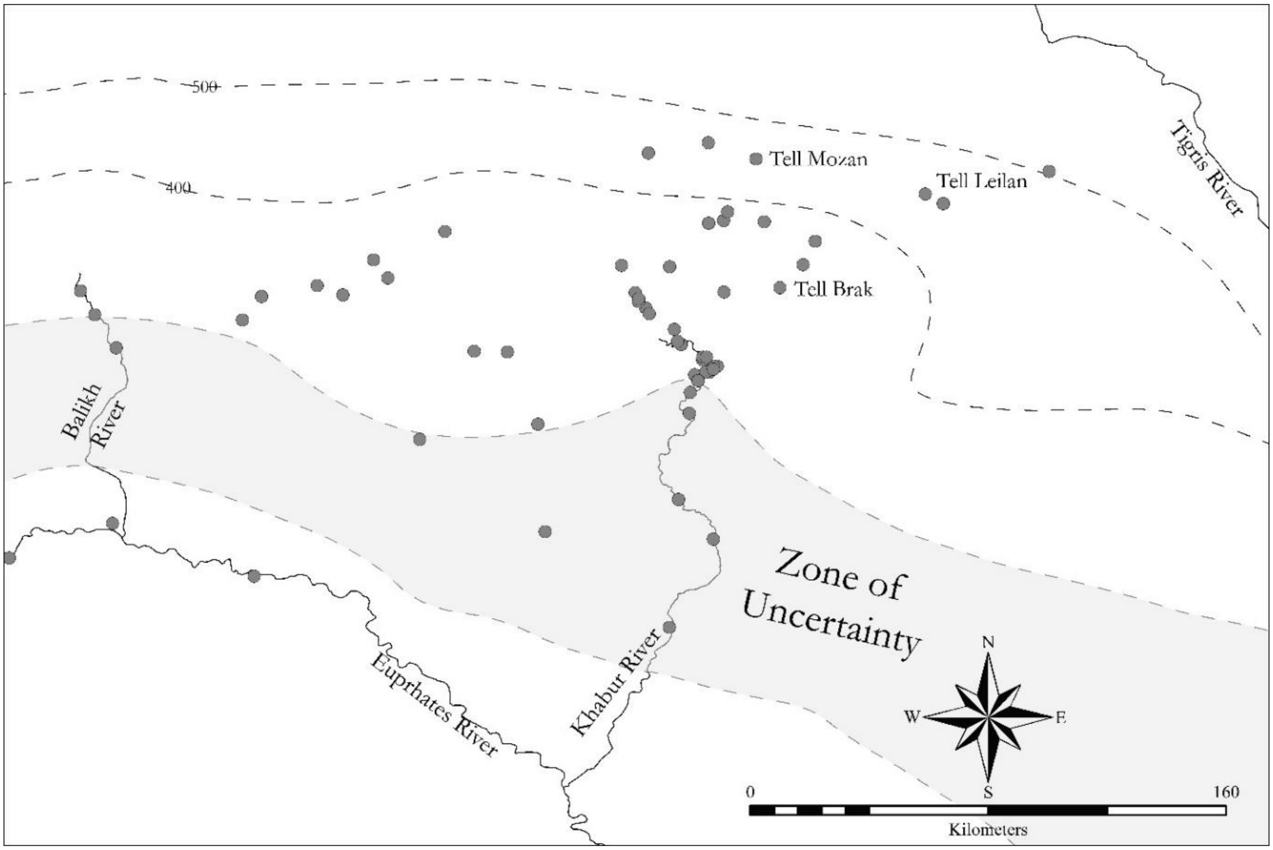


Figure 6.2: Northern Jazira sites with Early Bronze Age sites. Map by author.

In the northern part of the Jazira, archaeological sites are easily distinguishable in the landscape. The sites are mainly tells that peak over the landscape from 50 cm to 30 m high. During the third millennium B.C., large parts of this area were intensely occupied. This period has been the most intensively studied by surveys and archaeologists in general (Schwartz 1994; Stein and Wattenmaker 1990; Ur 2004; Weiss 1983; Weiss et al. 1993; Wilkinson 1994; Wilkinson, Peltenburg, et al. 2007; Wilkinson and Tucker 1995a), due to very distinct settlement patterns that emerged during the third millennium B.C. The sudden growth of three major tells, Tell Leilan, Tell Mozan, and Tell Brak (Figure 6.2), to 75 to 100 hectares indelibly altered the Khabur region of the Jazira into an urban landscape managed by three territories of approximately 25 km around each tell (Weiss et al. 1993, 998). This was in contrast to the massive Bronze Age settlements of Lower Mesopotamia, which could achieve more than 400 hectares in area. Early Bronze Age settlements' size, population, and patterning were reliant upon the productivity and exchange system in which the settlements operated. Based on these parameters, it was possible to recreate ancient farming techniques and strategies, and to model ancient settlement systems.

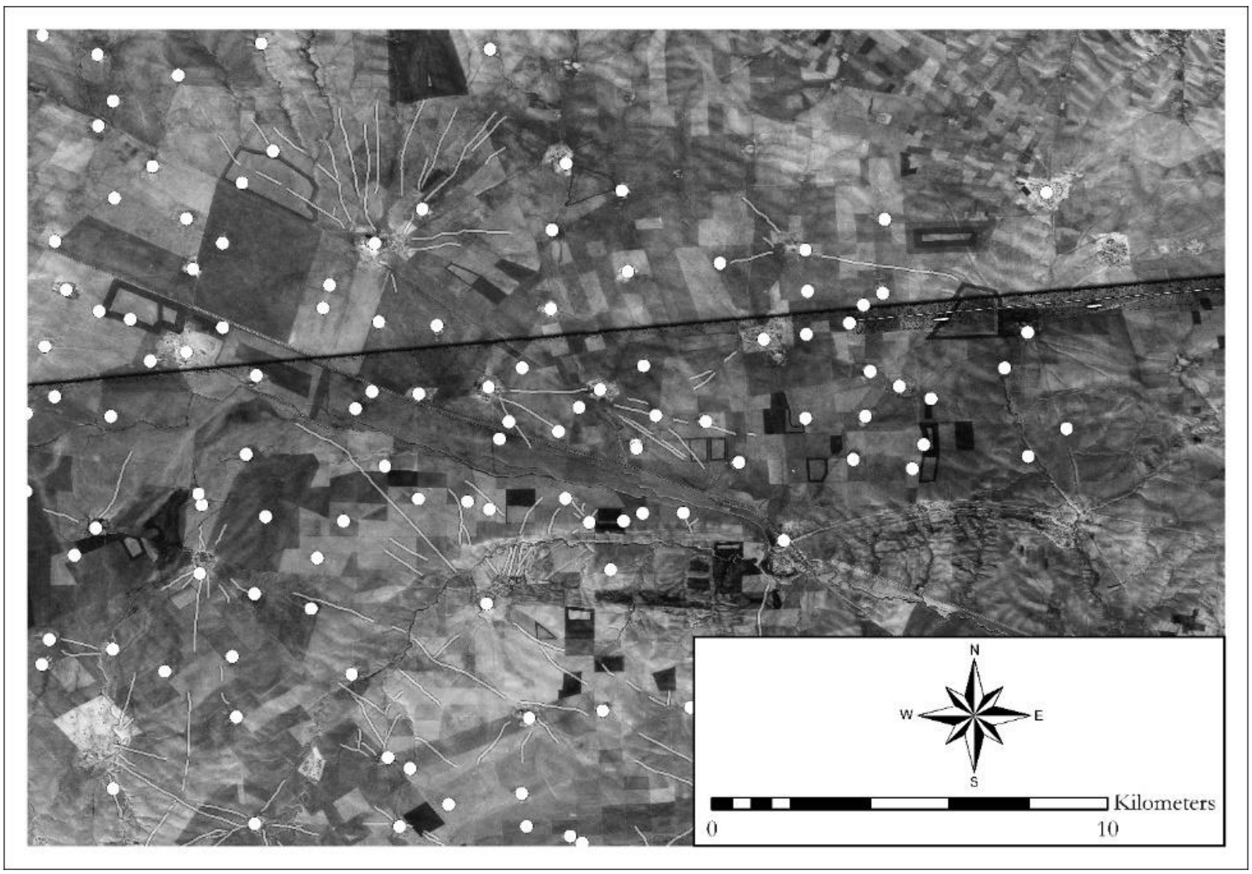


Figure 6.3: Sites from Tony Wilkinson and D.J. Tucker's (1995a) survey of the northern Jazira of Iraq with Early Bronze Age sites and Hollow Ways highlighted (CORONA Satellite Image 1102-1025, taken 12/11/2967). Map by author.

One way to delineate the extents of the agricultural areas of these settlement systems was to use “hollow ways,” the ancient paths that run across Northern Mesopotamia that were identified as linear depressions on the landscape (Figure 6.3). Tony Wilkinson created a model of settlement hierarchy based on surveys done in the region and using linear hollows. These hollows were formed by the repeated foot traffic of humans and animals around agricultural fields and were observable on satellite imagery (Ur 2004). The linear hollows may represent the boundaries of fields; in ancient times it was inefficient to walk across agricultural fields, so the hollow ways most likely represent the paths individuals walked through the fields in antiquity, and where the paths end was where people dispersed, since they were now beyond the boundaries of the field. Most of the broad, relatively shallow hollow ways radiate from Bronze Age tells (Wilkinson and Tucker 1995b, 24). The main impressions of the hollow ways usually extended only some 2-3 km from the central tell, but many appear to lead directly to other tells in the area and join up with hollow ways surrounding another tell. If the size of the hollow way was dependent on the amount of traffic using them, it should be possible to use these hollows to determine which sites in a region were most important, and which sites were satellites to others (Wilkinson 1994). Sherd scatters can also help to determine ancient field limits, because refuse was used as fertilizer and thus broken pottery found its way into the fields (Wilkinson 1994).

The hollow ways resulted in a closed system of settlement, with restrictions based on the size of the settlement, available labor, and mean crop yield (Wilkinson 1994, 495). In theory, if a settlement was part of a closed system and there was a fixed agricultural radius, then there were a set number of individuals who could be sustained at each site. This also implies that at some point a critical point was reached and it was necessary to either increase the site’s territory or its production. Using these restrictions, it is possible to estimate a territorial radius for the major sites of the Jazira using the distribution of offsite pottery sherd scatters and radial “hollows,” or ancient roadways that link Bronze Age tells of Northern Mesopotamia. Once a territory reaches a critical point based on the above restrictions, it must either increase in size or productivity or fall to the wayside (Wilkinson 1994). Using this estimation, and including a fallow year, a 5 km catchment can support around 2500 people. To help maintain the system, a three-tiered settlement hierarchy was optimal (at least in the region).

Different settlement patterns emerge based on the available resources and the control that can be exerted. In the ancient Near East, this resulted in a hierarchical system of settlements, with a larger tell as the center unit, and smaller tells surrounding it as the supplementary and secondary centers of resource procurement. As settlements and cities expand, the need for resources, like workforce and food, increases at the same rate. If a system expands beyond its means, or its income (i.e., intake) falls below the needs of the system, the system has the potential to effectively implode and fall apart. In the Jazira, the stratified settlement pattern probably emerged as a response to expanding agricultural land (Wilkinson and Tucker 1995a). This transition, which occurred from the Chalcolithic to the Early Bronze Age, resulted in a more durable form of economy. If one part of the system should fail, or if one tell was unable to produce enough food for the population that lived there, another part could supplement the shortcomings and potentially stave off disaster.

By the middle of the third millennium B.C., the three-tier hierarchy, comprising the main center, secondary centers, and satellites, was established with the central, main settlement overshadowing the surrounding neighborhood in size and influence (Wilkinson 1994, 491). By the later part of the millennium, the main tells reached or approached their apex. The central tell grew exponentially in size, while secondary sites also flourished. At the same time, the smaller, unassociated settlements began to thin out and decline. The hollow ways between the existing tells became clearer, and site interaction presumably increased. The main tell was surrounded at 9-12 km intervals by secondary sites, which were in turn surrounded at 3-5 km intervals by satellite settlements (Wilkinson and Tucker 1995b, 81). This resulted in a vertically integrated system, where the main tell extracted agricultural surplus from the surrounding secondary and tertiary settlements (Stein and Wattenmaker 1990).

In the Jazira, several third millennium B.C. cuneiform texts point towards a government-run, urban-based system of agriculture controlled by palaces and temples (Eidem, Finkel, and Bonechi 2001; Eidem and Warburton 1996; D. Oates, Oates, and McDonald 2001). Land was tended by dependents of the central palace or was leased out for a certain portion of the harvest (Schwartz 1994, 19). No irrigation was required. Rather, the amount of annual rainfall was sufficient to water the crops. This resulted in a rather unstable system. If rainfall were inadequate for even one year, the entire system could collapse. The best way to offset the potentially volatile agricultural system was to introduce a fallow year, during which a portion of one year's rain was held over in the soil to help increase the following year's soil moisture content (Wilkinson 2000b; Wilkinson and Tucker 1995b). This farming region, if treated properly, can produce an adequate amount of crops to support rather large settlement systems (Wilkinson 1994; Wilkinson and Tucker 1995b). By the time states emerge in the Jazira during the third millennium B.C., specialized forms of agriculture appear with evidence indicating more intensive farming and some separation between plowed and worked fields and pastureland. Shortly after, during the terminal part of the third millennium, the satellite tells began to disappear, with cultivatable land absorbed into the largest tells (Wilkinson and Tucker 1995b, 57). Radial hollow ways were most likely still in use. It was during this time that Mari, to the south of this entire system, began to gain importance in the Middle Euphrates and formed a kingdom that would rival Babylon until 1761 B.C.

6.1.2 Mari

Whereas the northern Jazira relied on dry farming for its agricultural production, the Middle Euphrates region fell below the 200 mm isohyet and required a different strategy. On the Middle Euphrates, irrigation farming was the norm. Irrigated farming and dry farming require different restrictions and therefore give rise to slightly different forms of settlement patterns. There was one big site, the city of Mari (Figure 6.5) that controlled most of the land. In turn, three smaller, subordinate sites, each with a regional governor, contributed to the economy at Mari. These subsidiary sites in turn had smaller sites surrounding them. As exhibited in textual records recovered from the site of Mari dating to the Bronze Age,[67] the palace was the main controller of farmland, which was worked by the local population. Farmland was granted by the royal household for non-royal families and individuals to work, in exchange for a portion of their annual yields.

During the twelve centuries of its existence, Mari remained the most important city in northern Syria in the Middle Euphrates River region (Margueron 1991, 81). The establishment of a city here was rather perplexing. The soil was inadequate, irrigation was essential, and large canals vital for the dispersion of water must be dug, and because the land that Mari was built upon was above the level of the nearby Euphrates, the irrigation canals had to be dug deep into the earth to work adequately (Fleming 2004a, 6; Lafont 2000). The volatility and unpredictability of the Euphrates flooding created an ever-present danger to the agricultural system. So why build there in the first place? The answer might lie in the location of a transport canal, right next to the

[67] The majority of the data for Mari comes from the Middle Bronze Age; however, there are some Early Bronze Age records as well.

city, which secured the Euphrates river junction with the Khabur plain (Margueron 1991, 91). Mari was also established on the side of the river that had fewer tributaries, facilitating travel caravans between Lower and Northern Mesopotamia (Margueron 1991).

Mari was composed of at least two distinct populations, based on textual evidence: pastoralists who lived a mainly nomadic lifestyle, and farmers who lived in permanent settlements (Fleming 2004b). The "town" of Mari represented the collectivity of individuals who resided there or those attached to it. The town of Mari was a crucial manifestation of the shared political identity (Fleming 2004b, 210). The Mari archives also make mention of the settlement systems of the region, although the exact role and exploitation of the system were never explicitly mentioned (Lafont 2000, 139).

The territory of Mari during the second millennium B.C. encompassed the area between modern Deir ez-Zor and Abu Kemal on the Euphrates, or just north of the confluence of the Khabur and the Euphrates and to the south about where the Euphrates enters Iraq (Figure 6.4). In this region, the Euphrates flows down a valley that was about 40 m below the surrounding plateau with a width that varies between <1-15 km (Lafont 2000, 130). The land was located in the valley carved by time and the Euphrates, with a number of artificially constructed waterways dug throughout the valley to act as irrigation canals and ditches (van Koppen 2001). At Mari, an irrigation canal was cut, 4 km long, in the terrace to provide water to the site (Lafont 2000; Margueron 1991; Weiss 1991).

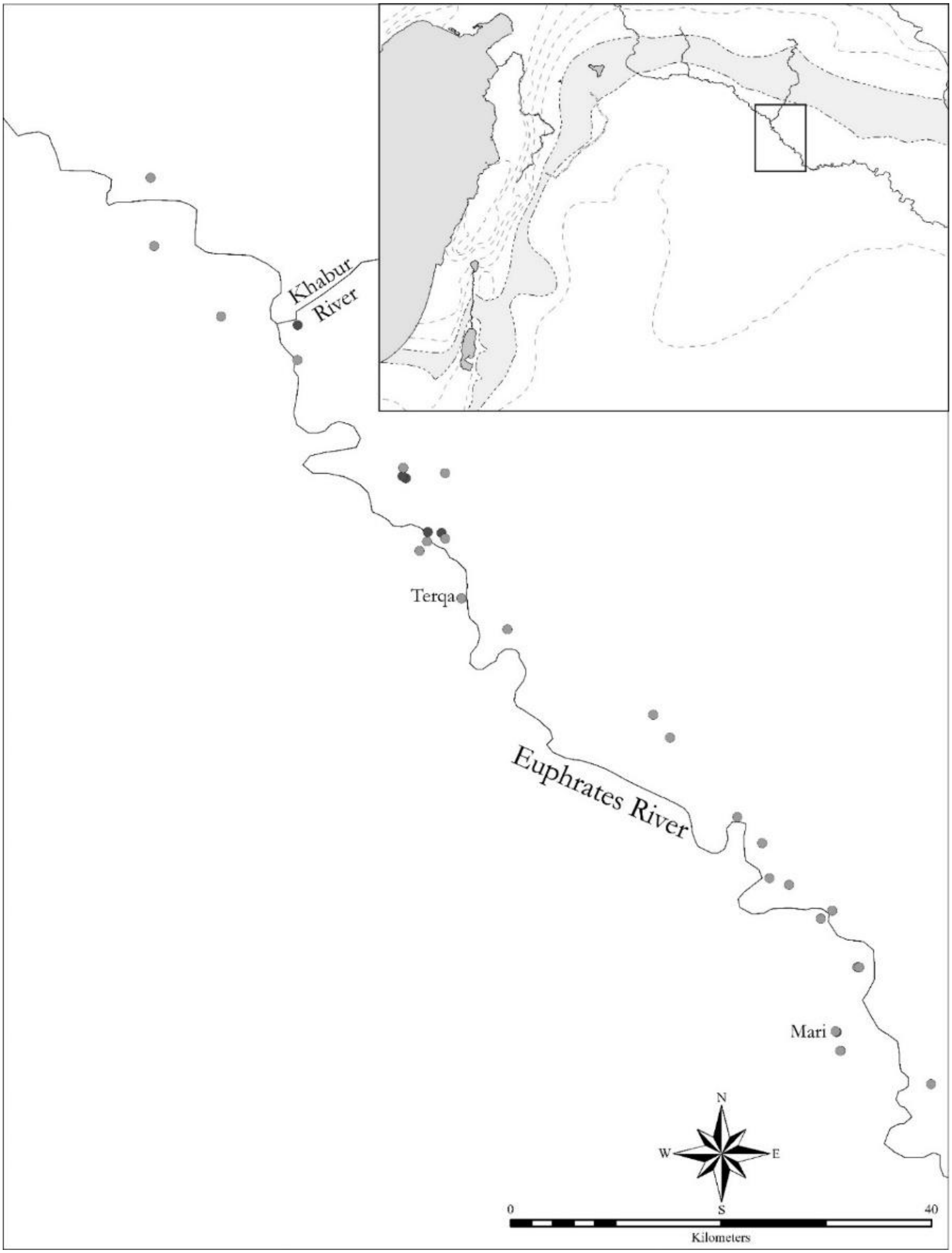


Figure 6.4: Early Bronze Age sites in the Middle Euphrates River near the site of Mari. Points derived from a survey carried out by Bernard Geyer and Jean-Yves Monchambert (2003). Map by author.

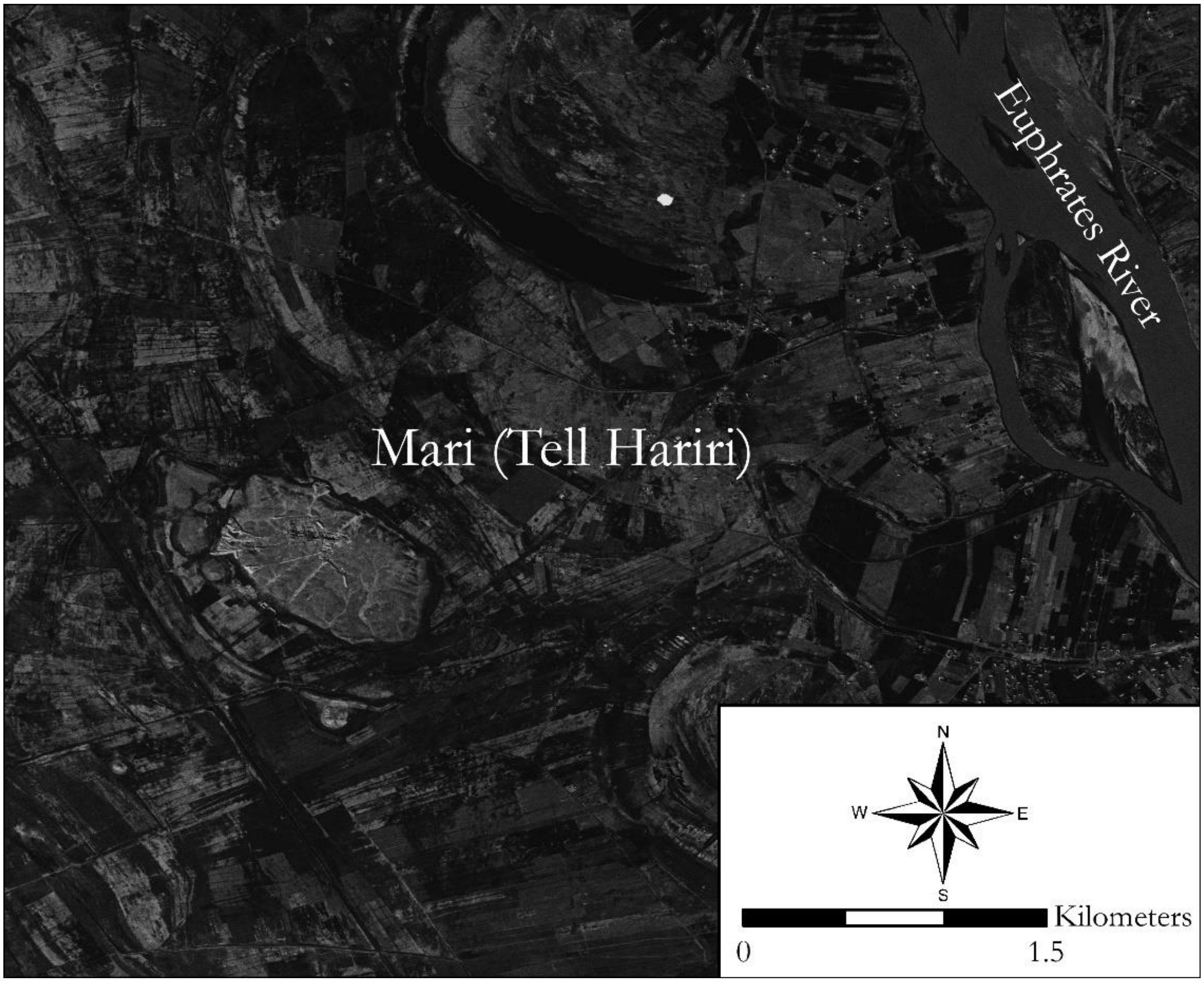


Figure 6.5: Mari in relation to the Euphrates River (CORONA Satellite Image 1105-1025, taken 11/05/2968). Map by author.

Mari consisted of four major districts that contained most of the territory, centered on four tells: Terqa, Saggaratum, Qattunan, and Mari itself. This incorporated the land adjacent to the Euphrates and parts of the Khabur, an area which was lined with agricultural land and permanent settlements (Heimpel 2003, 29). The site of Mari comprises around 170 hectares and rises about 14 m off the surrounding landscape, making it the largest site in the Middle Euphrates during the Bronze Age (Figure 6.5). For all the importance of this region, the sites were still small in comparison to the major tells of Lower Mesopotamia. On the Lower Euphrates and

Tigris, the substantial Bronze Age urban centers can reach areas of more than 400 hectares. In contrast, the largest site in the Middle Euphrates region, Mari, sits at a little over 100 hectares, followed by a sharp decline at Terqa, the second largest site in the area, which has an area of 9 hectares. These site sizes were consistent with the remainder of Northern Mesopotamian sites.

Terqa, the second largest town in the kingdom of Mari, had a special role in the settlement system and in the kingdom itself. Terqa itself was older than Mari, founded around 3200 B.C. (Chavalas 1996, 92) compared to Mari around 2850 B.C. (Margueron 1991, 81). Mari dominated Terqa once the city of Mari was established (Margueron 1991, 91). The objective of Terqa's founding was like Mari, namely the control of access to the Khabur River and, by extension, kingdoms located in the Jazira. Terqa was founded near the confluence of the Euphrates and Khabur Rivers, built strategically to control the route of trade between northern Syria, Lower Mesopotamia, and the Khabur plain (Margueron 1991, 91). When a transport canal was constructed near Mari, the primary control point changed and domination of the region shifted to Mari.

The lands of Mari exhibited a three-tiered land exploitation organization. The royal palace directly controlled cultivation areas of around 18-30 hectares, with a teams of 10-15 individuals working the land (Lafont 2000, 139). Tenures were granted to royal, civil, and military servants in smaller plots than those allotted for the royal household, with a certain portion of the agricultural yield going to the king (Lafont 2000, 140). The remaining land controlled by the palace was rented to others, including regular laborers and elites, and not cultivated directly by the palace. The temple, however, was never mentioned as controlling any part of the agricultural process, an omission which was distinct from other parts of Ancient

Mesopotamia, like Nippur and Sippar, where the temple acted as a major economic unit (De Graef 2002; E. Stone 1981; 1987).

Table 6.1: Governor letters from Mari, Terqa, Saggaratum, and Qattunan on grains controlled by the palace, both in surface area of farmland and grain output (Lafont 2000; Margueron 1996; van Koppen 2001).

Text Reference	**Surface (ikû)**	**Surface (ha)**	**Še Output (gur)**	**Še Output (kg)**
ARM 23 426:1-2	812.7	292.57	904.9	67584.13
ARM 23 426:5-6	77	27.72	134.3	9896.04
ARM 23 426:8-9	330	118.80	233	6296.40
ARM 23 464:1-2	37809	13611.24	357241	26991088.92
ARM 23 591:10-12	17	6.12	128	9681.84
ARM 23 591:1-3	488	175.68	2421	181653.12
ARM 23 591:4-6	224.5	80.82	1188.5	90437.58
ARM 23 591:7-9	39	14.04	228.5	17479.80
ARM 24 2:1-2	47	16.92	827.4	62790.12
ARM 24 2:7-9	535	192.60	6570	499219.20
ARM 24 3:5-6	433	155.88	3446.5	262969.56
ARM 24 3:7-8	474	170.64	2830	215859.60
Average	3440.516667	1238.59	31346.09167	2367913.03

The letters from the governors of these territories refer to the organization of institutional agriculture (Table 6.1). The royal archives recovered, which include the governor's letters, highlighted the events of one century during the second millennium B.C., during the Old Babylonian period. In particular, the reign of one king was prominent: Zimri-Lim, who only reigned for roughly 12 years. The most studied time of Mari history is the time of Zimri-Lim during the mid-second millennium B.C. (Dalley 1984; Fleming 2004a; 2009; Heimpel 2003; Lafont 2000; Margueron 1991; 1992; Parrot 1956; J. M. Sasson 1998; van Koppen 2001).

The textual evidence from Mari contains extraordinary documentation of agricultural practices used during the second millennium B.C. and links, in many cases, the Middle Euphrates Valley to areas in Northern Mesopotamia (Lafont 2000, 129). Administrative texts recovered from the royal palace at Mari discuss the agriculture of the region. These texts were one-sided, encompassing only the palace's interests and not those of the entire region. They represent the assets managed by the royal household (van Koppen 2001, 454). Royal land coexisted with non-institutional land, or the land of the "muškenum," i.e. the middle class (van Koppen 2001, 459). Land not owned by the palace was often of lesser quality and subordinate to larger, royal fields. The size of fields owned by a person reflected their social standing within the city-state system: the larger the field, the more influential the person. Essentially, the more land a person could irrigate and control, the more that person could control the agricultural production process, and therefore gain more influence in general in a society dependent on the production of grain from year to year to survive.

6.2 NO PAIN, NO GRAIN: AGRICULTURE IN THE LEVANT

Unlike northern Mesopotamia, there were no written records for the Early and Middle Bronze Age relating to agricultural practices in the southern Levant. It was not possible in this study to recreate ancient agricultural lands and patterns in the same ways as northern Mesopotamia and instead it must be done by proxy indicators and educated conjecture. By looking at macrobotanical remains of agricultural and horticultural practices, in addition to looking at zones that were ideal for agricultural practices, it is possible to make some inferences on the utilization of the landscape.[68]

Small shifts in rainfall, on the scale of even 50 mm per year in marginal agricultural zones like the zone of uncertainty, could make a difference between having an extra year of crops and potential famine (Figure 6.8 and Figure 6.9). Some of these smaller-scale fluctuations were not

[68] Some basics on grain domestication and basic characteristics associated with it include (Zohary et al. 2012: 22): (1) Selection towards erect plants, synchronous tilling, and uniform ripening; (2) Increase of seed production by addition of fertile florets and/or increase in the size of the inflorescence or the number of ears or panicles produced per individual plant; (3) Decrease of awns, of glumes' thickness, and investment of grains (from hulled to naked grains)

necessarily detectable in the proxy stack. Therefore, tracking macrobotanical remains, as much as possible, was necessary to determine agricultural zones for this study. Accounting for the small-scale oscillations is imperative to understanding agricultural potentials for any part of the ancient Levant. The most commonly utilized attempt at estimating agricultural potential is analyzing annual rainfall in each region.[69] For example, if an area received more than 200 mm of annual rainfall (minimum for barley), or 200 mm (minimum rainfall for wheat), it has been assumed to be an area for which subsistence farming was possible without irrigation. Areas that receive above 300 mm annually were usually considered areas of secure agriculture in this study. This could be potentially misleading though. These averages have the potential to mask highly variable changes that could have occurred in each region. It was typical for certain areas within the southern Levant to receive, on average, somewhere above 300 mm of rainfall per year on average. This therefore masks the fact that rainfall could be anywhere between 200 and 400 mm per year, resulting in very different agricultural productivity. This was less of a problem for small-scale subsistence farmers, who utilized a wider variety of agricultural and pastoral goods. It became a problem, however, for larger villages, which contained a higher degree of segmentation and specialization. In these larger villages, most of the population did not participate in resource procurement activities. Such systems were less liable and able to absorb changes, even if those changes were relatively small.

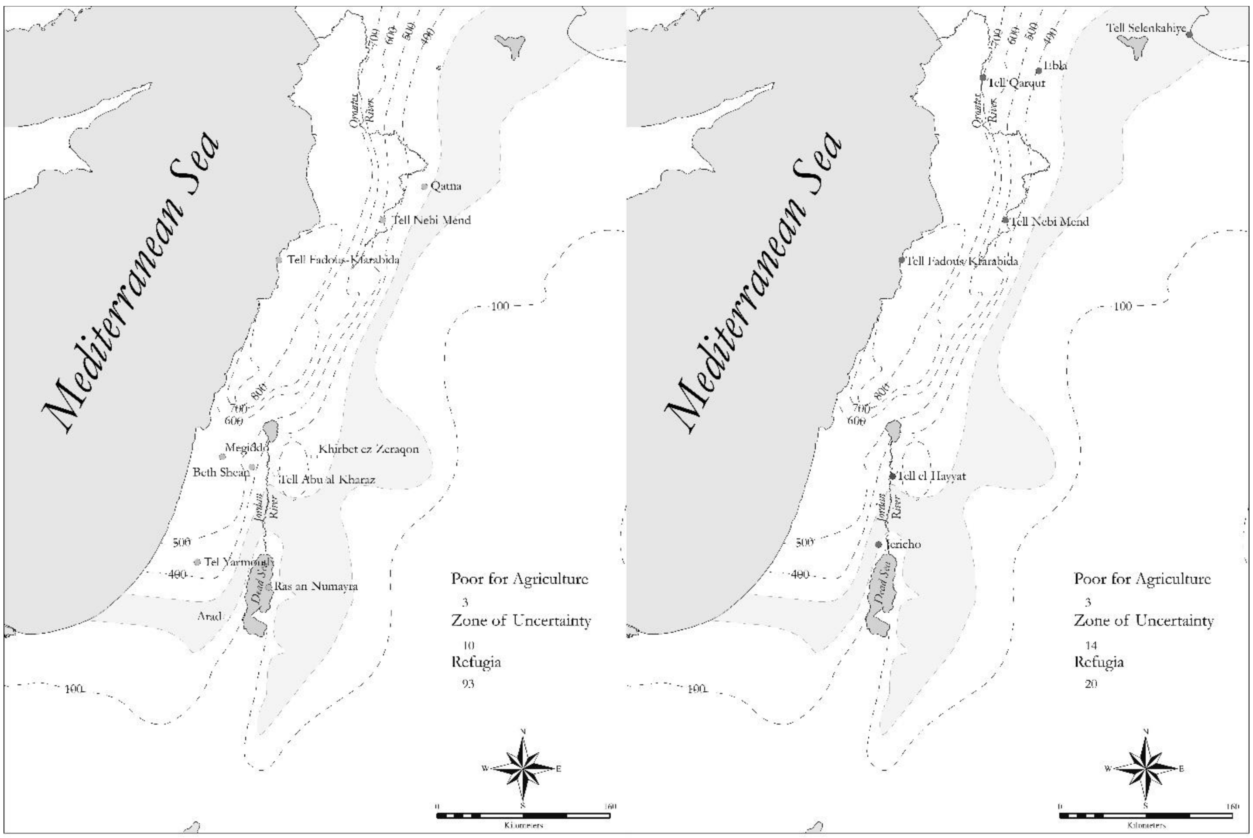
[69] Even more problematic is that scholars tend to utilize modern rainfall zones. This is necessitated by the availability of data, and even this study uses them. It, however, is a caveat that needs to be kept in mind and limits the types and depths of interpretations that can be made.

Table 6.2: Environmental requirements for winter and spring wheat, and barley.

	Elevation (m ASL)	**Slope**	**Average Annual Temperature (F)**	**Average Annual Precipitation (mm)**	**Planting Months**	**Harvest Months**
Spring Wheat	0-3000	0-5	40-86	375-875	March-April	July-Aug
Winter Wheat	0-3000	0-5	40-86	375-875	Oct-Dec	June-July
Spring Barley	0-3000	0-5	40-86	325-875	March-April	May-June
Winter Barley	0-3000	0-5	40-86	325-875	Oct-Dec	May-June

Cereals grow best when planted on open ground, and typically had a complete life cycle of one year. Some basic environmental requirements must be met in order to grow cereals (Table 6.2). Wheat and barley grow best below 3000 meters above sea level (m ASL) on land that has less than a 5% slope. They both need an average annual temperature somewhere between 40 and 86 °F. This, however, is where the similarities end. The ideal zone for rainfall for wheat is between 375 and 875 mm of annual rainfall, whereas barley can viably grow on less, with 325 mm being the minimum for ideal growth. As noted previously, it was possible to grow agriculture within the zone of uncertainty, which was the 200-300 mm isohyet. This was not the ideal zone and could not absorb multiple bad years, but if rainfall remained constant agriculture was possible. The most optimal areas for growing agriculture that meets all of the requirements in Table 6.2 is zone 1, with conditions getting progressively less ideal until reaching zone 5. Grains tend to be relatively high in nutrition, with complex carbohydrates in addition to plant-based proteins (Sibhatu and Qaim 2017; Zohary and Hopf 1988). They also were relatively stable and can produce large yields on comparatively small parcels of land (Harlan and Zohary

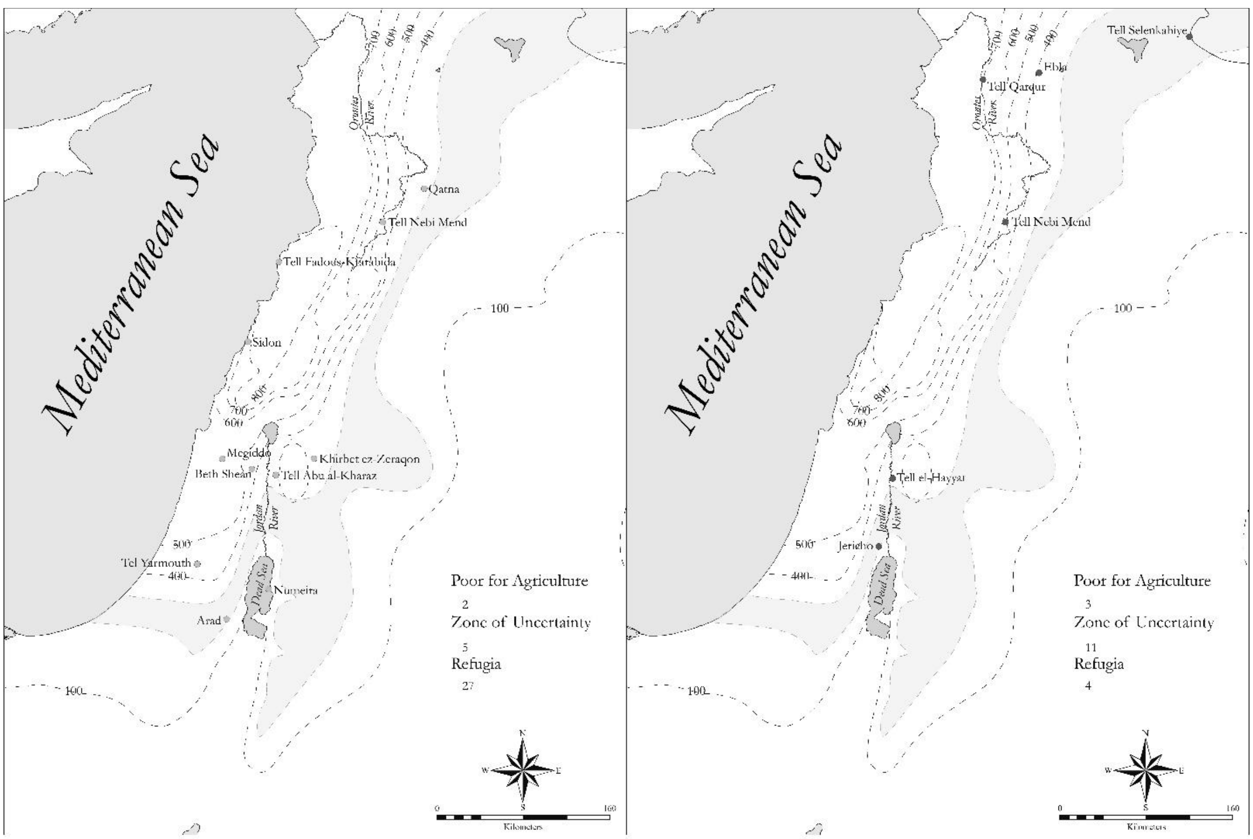
1966; Zohary 1969; Zohary and Hopf 1988). Einkorn wheat shows a prevalence in areas with relatively cool climates (Zohary and Hopf 1988), and is completely absent from Israel and Jordan. Emmer wheat was most prevalent in areas that were hotter and dryer than Einkorn wheat's distribution. Finally, barley was the most drought-resistant, able to withstand drier climes than both types of wheat.



Early Bronze II-III Early Bronze IV

Figure 6.6: Sites with wheat remains uncovered during archaeological excavations dating to the Early Bronze Age. Map by author.

The areas in which cereal remains have been found in the southern Levant remain relatively stable during the entirety of the Early Bronze Age. There was not much variation in areas of the Levant being utilized for this type of production from one period to the next, outside of what can already be observed in settlement patterns. For wheat, only a couple of very rudimentary conclusions can be made because there were only a few sites with wheat remains dated to the EBA from which to draw conclusions. For general patterns, the major regions were similar for wheat remains from the EB II-III to the EB IV. However, more sites date to the EB II-III with wheat remains. This could reflect the higher intensity of EB II-III archaeological sites that have been excavated. EB IV sites tended to be found during archaeological surveys and were not as intensely excavated. There was an increase in the number of sites with floral remains for the EB IV located in the zone of uncertainty, especially when looking at the percentage of sites in each zone. In the EB IV, 37.8% of all wheat remains were found in the zone of uncertainty compared to the EB II-III, where 9.4% of remains were in this area. This would suggest a heavier reliance on the zone of uncertainty during the EB IV for agricultural practices than the immediately previous period.



Early Bronze II-III Early Bronze IV

Figure 6.7: Sites with barley remains uncovered during archaeological excavations dating to the Early Bronze Age. Map by author.

There was a slight increase in the ratio of EB IV sites with barley (Figure 6.7). The same primary areas were still utilized, but there was, again, a shift in the zones utilized. During the EB IV, most of the remains come from the zone of uncertainty (61.1%). In the Early Bronze II-III the zone of uncertainty was overwhelmingly the refugia with the highest percentage of sites (79.4%). This also suggests that, in the southern Levant, there was a higher utilization of the zone of uncertainty for agriculture than in previous periods. This contrasts with northern Mesopotamia, where it was the increased exploitation of the zone of uncertainty during the Early Bronze Age before the EB IV that allowed cities to grow upwards of 100+ ha.

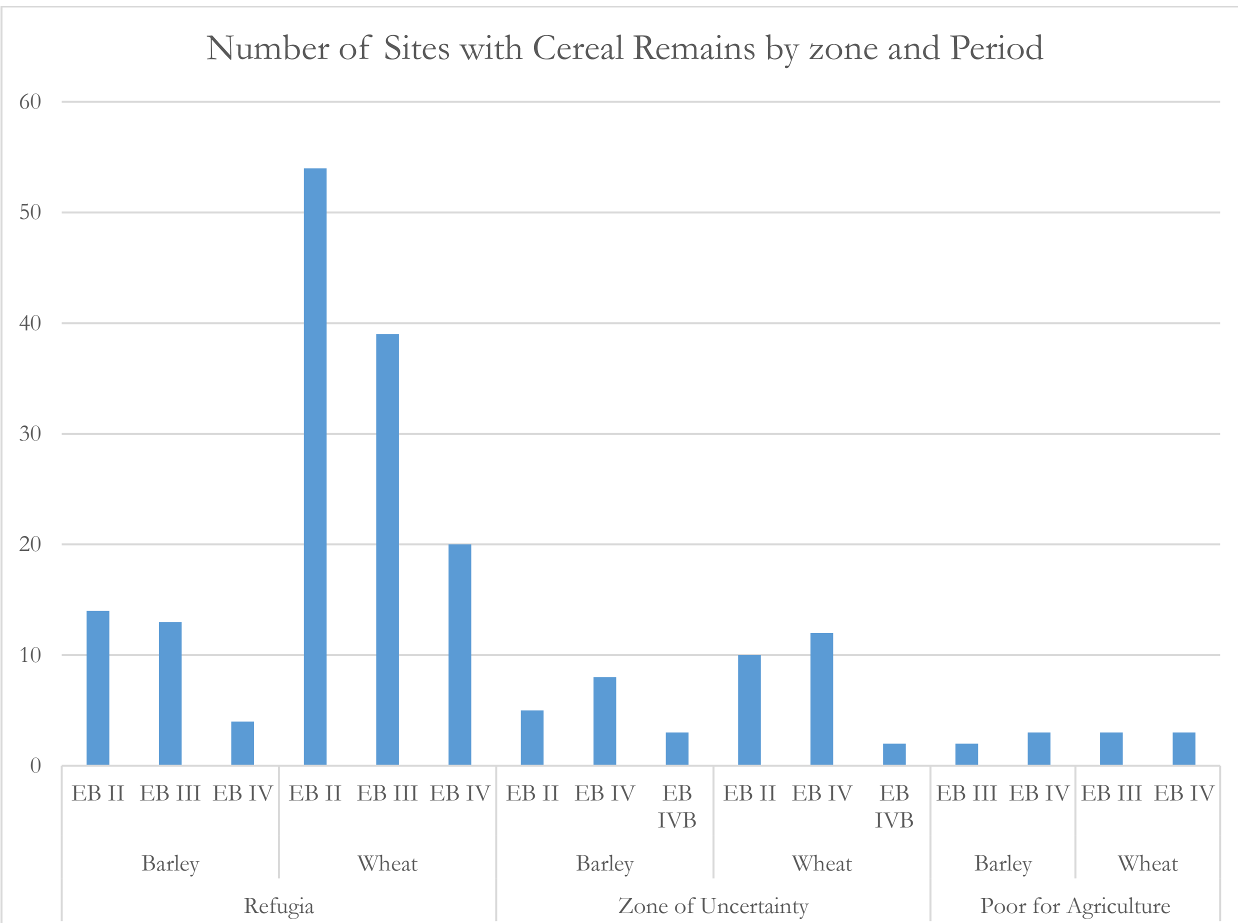


Figure 6.8: Number of sites with cereal remains by rainfall zone and archaeological period for the entire Levant.

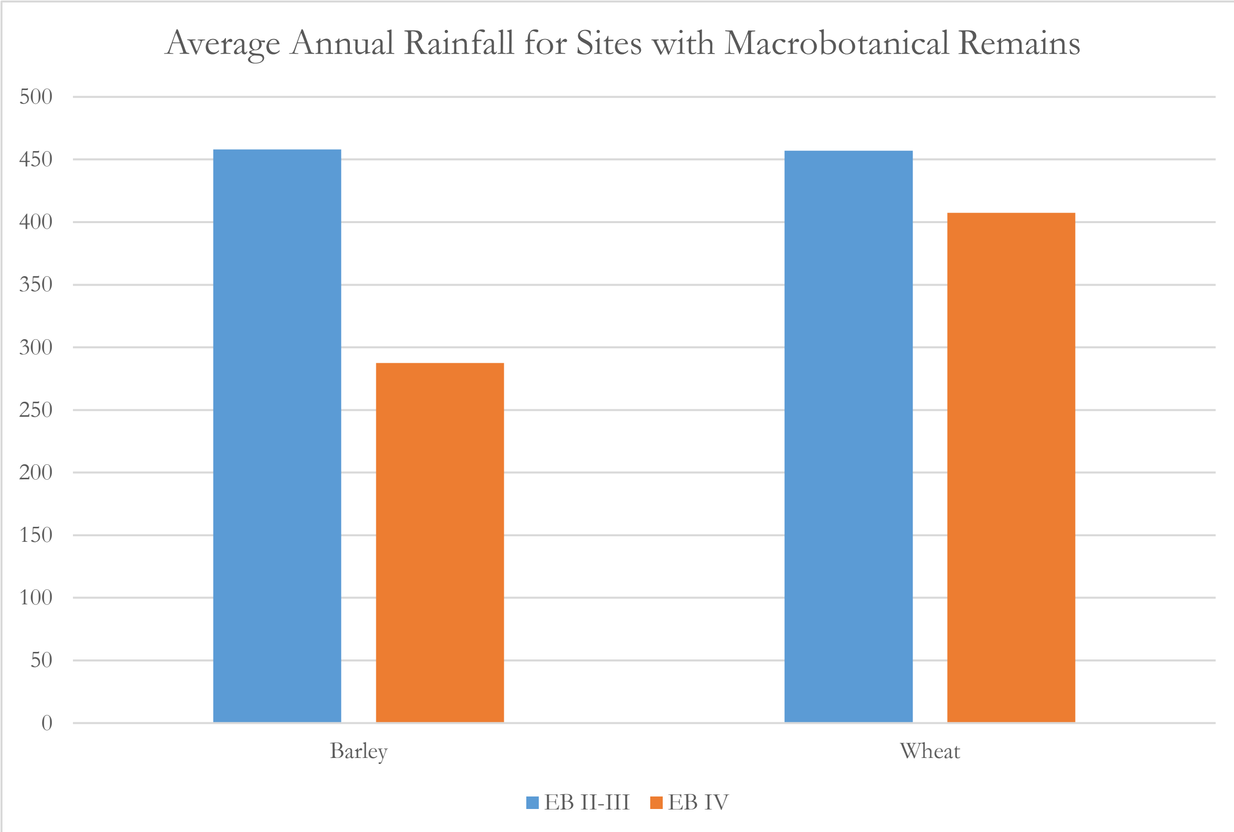


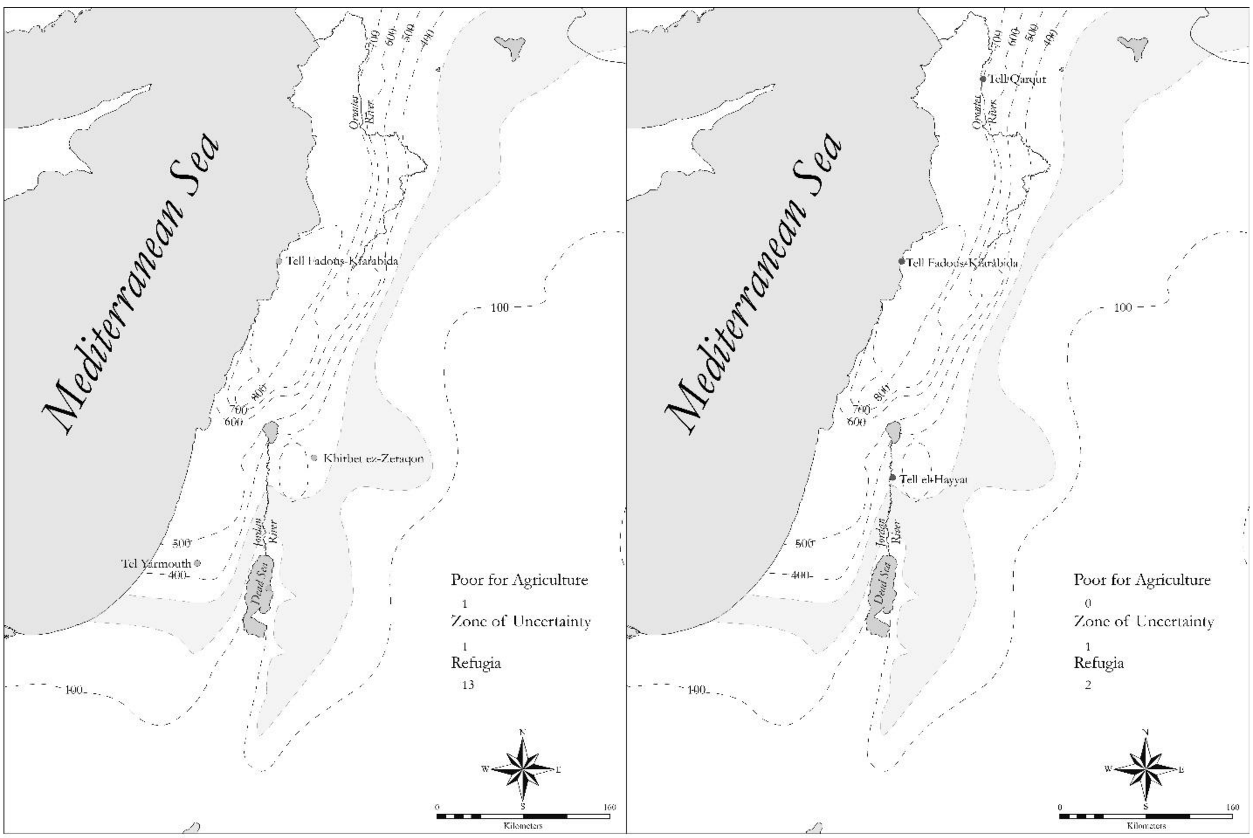
Figure 6.9: Average annual rainfall (mm) for sites with macrobotanical remains of barley and wheat by period for the entire Levant.

6.3 OIL AND WINE: HORTICULTURE IN THE LEVANT

Olive oil and wine were two of the most important exports in the Levant (McGovern 2003; Salavert 2008). With the addition of figs to grapes and olives, fruits were an important component of the economy. From immediate consumption for caloric value as well as for secondary products, fruits represent important cultivars in the ancient world. Olive and grape cultivation started first, with fig production a bit later during the EBA with the first intensification of growing. These three fruits were those most often associated with horticulture in the Mediterranean world. They also had a much narrower niche for growing than wheat and barley and require significantly higher average annual precipitation, with a minimum of 400 mm per year for olives and 625 mm for grapes (Table 6.3).

Table 6.3: Environmental requirements for olive and grape.

	Elevation (m ASL)	**Slope**	**Average Annual Temperature (F)**	**Average Annual Precipitation (mm)**	**Other Notes**
Olive	0-800	5-10	40-80	400-800	Dormancy April-June with average 50 temp Soil is calcareous
Grape	0-800	5-10	55-70	625-900	Needs Oct-March rainfall of 700mm Prefers a southerly aspect



Early Bronze II-III Early Bronze IV

Figure 6.10: Sites with fig remains uncovered during archaeological excavations dating to the Early Bronze Age. Map by author.

Figs were a relatively fast-growing fruit crop, with production starting 3-4 years after initial planting (Zohary 1995). Fig pips were excavated at archaeological sites dating to the

Neolithic, around 10000 years ago, but fig production does not appear to have intensified until the EBA (Denham 2007; Kislev, Hartmann, and Bar-Yosef 2006). Cuneiform texts record that in Mesopotamia growing figs dated back to the late third millennium B.C. (Postgate 1987).

There were very few fig remains recovered in archaeological excavations. During the EB II-III, there were a total of 15 fig fragments recovered for the Levant. This was in stark contrast to the EB IV, where only 3 fig fragments were in excavated contexts. It was hard to discern any patterns from this paucity of evidence, besides that there were fig remains for the entirety of the Levant in all zones except for the arid regions that receive less than 200 mm of annual rainfall during the Early Bronze IV (Figure 6.10).

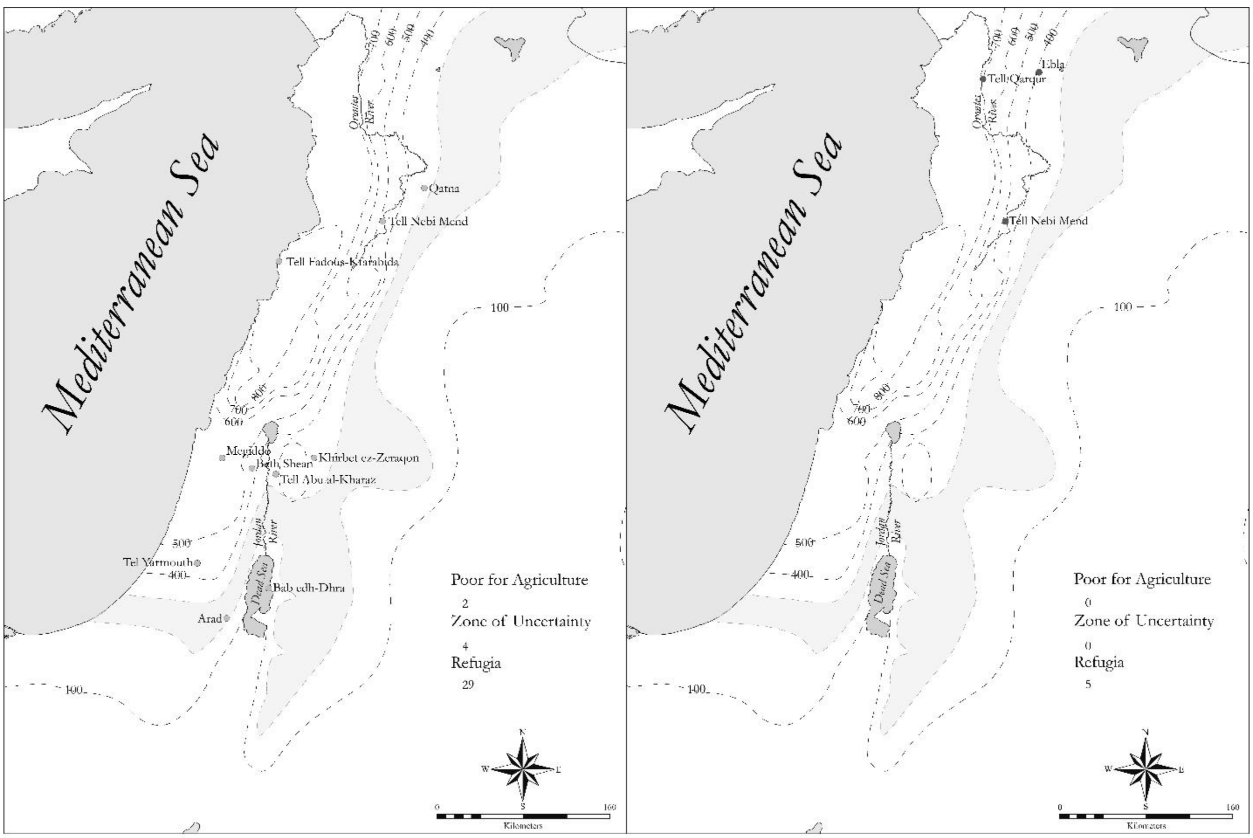


Figure 6.11: Sites with grape remains uncovered during archaeological excavations dating to the Early Bronze Age. Map by author.

Starting in the Early Bronze Age,[70] grapes became an important fruit in the Mediterranean world. The fruits were rich in sugars and calories, were easily storable for long periods in the form of raisins, and produced wine. They were a highly versatile fruit. Grapes were also a quick-growing plant, being able to produce enough fruit for harvest within 3 years of planting.

The clearest evidence for grape cultivation comes from Jordan and the Central Hill country, where no grapes are present today. They were likely introduced as cultivars in those regions during the third millennium B.C. (Zohary 1995, 156). The overwhelming majority of sites with grape pips and charred wood for the Early Bronze Age were in the refugia. This distribution is to be expected, as grapes require a higher degree of moisture to produce fruit and reach maturity than cereals like wheat and barley. There was a very stark difference between the distribution of sites with grape remains for the EB II-III and EB IV. Again, this may be an artifact of more intense excavations of Early Bronze tell sites versus smaller EB IV sites. The disparity is also likely because EB IV sites were in areas that were not as desirable for grape cultivation. It is interesting to note that not a single EB IV site in the southern Levant contained any grape remains. This might be due to less intensive excavations at EB IV sites in the southern Levant. It might also, however, correspond with the northward shift of olive cultivation. Oil and wine production were linked, and therefore a shift in one might account for a shift in the other.

Olive was arguably the most important fruit of the Mediterranean world (Salavert 2008). It was the center of wealth for many peoples of the ancient Near East, providing not only a major caloric value with olive fruit itself, but also the secondary product of olive oil that was likely more important. Olive oil was used not only for consumption but also for oil lamps and ointments. As such, it was a versatile, highly desirable commodity (Heltzer 1987). Olive, as

[70] There is evidence for the cultivation of grapes during the Chalcolithic at only one site, Tell Shuna North in the Jordan Valley (Cartwright 2002).

compared to figs and grapes, is a relatively slow-growing tree and cannot be harvested until 5-6 years after initial planting (Zohary 1995). The primary benefit of olive production was that if trees were properly managed, they can keep providing fruit for over one hundred years. There were, again, fewer instances of olives found in archaeological sites from the EB IV than the EB II-III (Figure 6.12). Again, it must be acknowledged that this might be due to differing intensities of excavations and surveys.

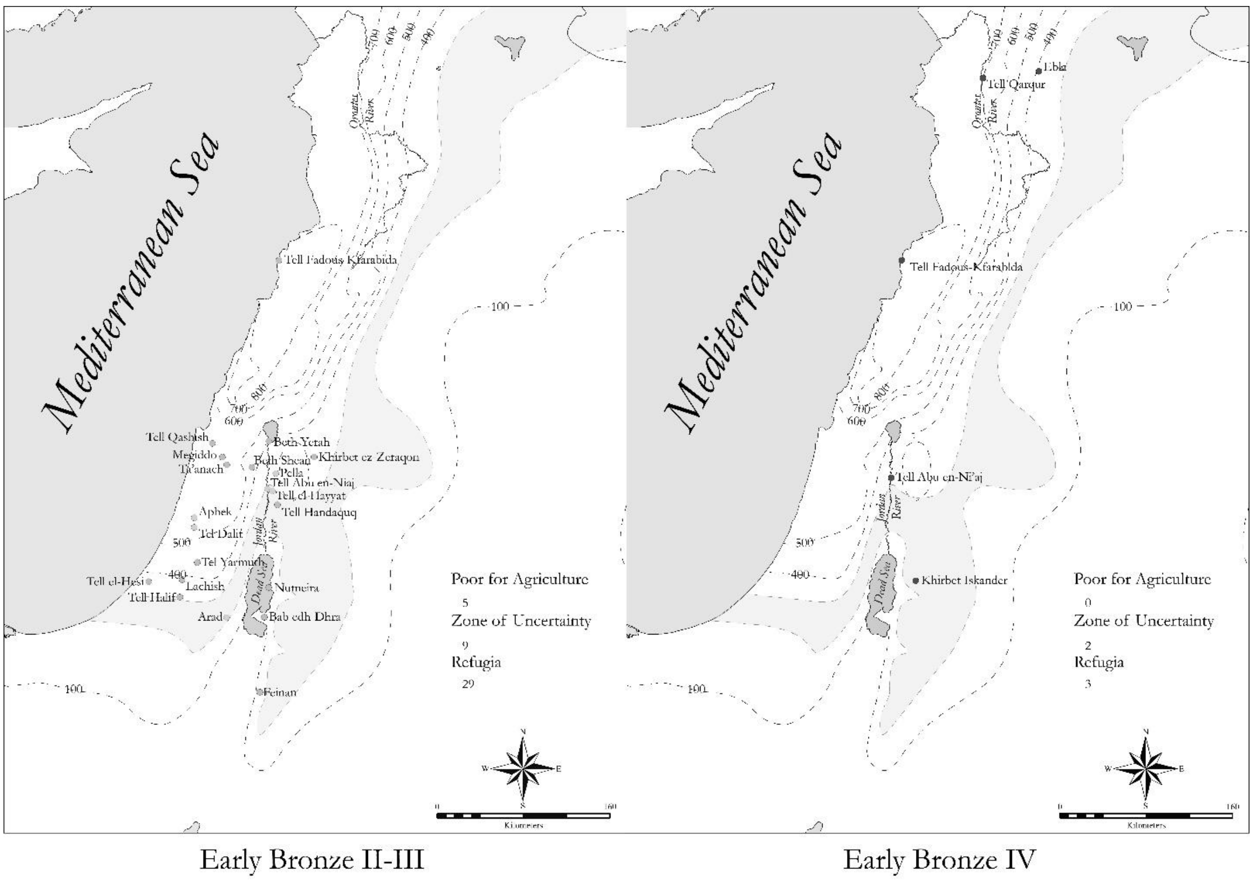


Figure 6.12: Sites with olive remains uncovered during archaeological excavations dating to the Early Bronze Age. Map by author.

6.4 CONCLUSION

Agricultural and horticultural practices are, and were, highly dependent on the environment. Even the advent of agriculture in the ancient Near East has been portrayed as the direct result of climatological and environmental changes (L. S. Braidwood et al. 1983; Childe 1971; Maisels

1993). In one theory, a dry spell during the Neolithic can be pointed to as a significant flashpoint of change for agricultural development (Asouti 2013; Childe 1971). During this period, people were forced into smaller and smaller ecological niches where cultigens were still present and available for gathering. Because of this population pressure, local populations overstrained available resources and thus various other means of food procurement were necessary. One of these developments led to the manipulation of ancient grains into agricultural goods. Conversely, another theory proposes that a natural increase in grasslands and the availability of grains was the main motivator for agricultural production (McCorriston and Hole 1991). During the Holocene, the number and quantity of cereals increased in their naturally occurring niches. This increased seasonality and the ability to cultivate these plants more intensely.

Once agriculture developed, environmental conditions continued to play an important role in its further development and sustainability. Responses to declining environmental conditions, as have been proposed for the EB IV, varied by region. The agricultural sector was slow to respond because large-scale, elite landowners continued to profit, at least initially, from a downturn in agricultural productivity. This was because small landowners would be unable to support themselves and sell their land and labor back to an elite landowner for profit. Initially, this would increase the wealth of elites within a region.[71]

Agriculture and its management were not restricted to the upper echelons of society. One problem with EB IV responses to problems with and the management of agriculture was tied to

[71] Elites were also able to stockpile agricultural goods that forestalled immediate crises due to environmental factors. Previous means of stockpiling and redistributing goods in times of crisis were well established within the region. Large cities and central repositories created a surplus that could be redistributed in drought periods. However, this type of system was unsustainable as the stockpiles would be depleted and elites were unable to adapt over the long-term as production slowed on average due to the high fluctuations of annual rainfall. This system was entrenched and inflexible, not allowing for such high variability. Local elites had difficulty recognizing and responding to these patterns.

the location of settlements themselves. The EB IV landscape can be broken up into two primary agricultural regions: hilly regions and lowlands. The coastal plain and alluvial valleys of the Levant were characterized by heavy, clay-rich soils that contain large amounts of organic matter. Despite a potentially high degree of variability in annual rainfall, the alluvial plains and valleys are crisscrossed with wadi systems that regularly flood their drainages. This geographic situation allowed the deposition of organic loams onto fields and some higher degree of sustainability and reliability in agricultural practices.

As was illustrated in Chapter 4, there was a stark increase in the number of sites in the highlands of the southern Levant, specifically the Judean and Samarian hills up into the Galilee and the Golan in the EB IV. Although this region was firmly within the refugia as far as rainfall was concerned, it was only suitable for small-scale dry farming. Most of the region is characterized by steep slopes and dense forests, and although it was possible to clear forests, there is no indication in the palynological or macrobotanical record that this occurred. However, the region was also well suited to small-scale agricultural ventures within the intermittent wadi systems and small clearings in the forests. On a small scale, it was possible to sustain agriculture. This is likely why there was an increase in the number of archaeological sites present in the highlands during the EB IV as compared to earlier periods. In contrast, this area was well suited to horticulture, specifically the cultivation of olives and grapes. Although there is palynological and macrobotoanical evidence for the use of olive and grapes in this region during the EB IV, there is not much to suggest outside this proxy data that these products were being cultivated during the EB IV for long distance trade or for long-term storage.

There was a decrease in the number of fruit remains from the archaeological sites of the EB II-III to the EB IV, and a difference between the northern and southern Levant during this period as concerns horticulture—more sites in the northern Levant reveal evidence of olive cultivation during the EB IV than in the southern Levant. This was flipped during the earlier period, when the bulk of olive horticulture had been in the southern Levant. If later Iron Age patterns can be drawn upon for comparison,[72] olive oil production for the Mediterranean world was occurring in the Judean Highlands. This is not a new theory, but has been commented on before by other scholars (Riehl and Shai 2015; A. M. Rosen 2007). The evidence amassed in this study supports these previous assertions. In addition, the Golan highlands were particularly well suited to olive production and viticulture. The dense forests and steep slopes of the region were well suited to these crops. It also falls within a relatively high annual rainfall procurement system.

There was a shift to the north for olive oil production during the late EB IV and it remained in the northern Levant into the MBA. This pattern also seems to be repeated with grape production, but there is less evidence for viticulture. This may reflect a pattern of northward shift of what could be considered more "luxury" goods, products that were not necessary for day to day survival but large-scale export. This shift north was also paralleled in changes in wool production and pastoral activities, with a marked increase in the northern Levant as evidenced by textural evidence.

[72] There is written documentation that olive oil production in the Judean Highlands was very important during the Iron Age (Buitron-Oliver and Herscher 1997; Eitam and Shomroni 1987; Faust 2011).

7 Where There's a Wool, There's a Way: Pastoralism and the Wool Economy

Agricultural and pastoral endeavors in the ancient Near East, especially the Levant, were highly integrated and not separate modes of subsistence. Pastoral economy was centered around the rearing and herding of sheep and goats. Sheep have been part of the village economy since the 7th millennium B.C. (McCorriston 1997). After this point in time, sheep husbandry represented a large part of the economy. Sheep and goats were the first ungulates domesticated during the Pre-Pottery Neolithic (Arbuckle and Atici 2013; Arbuckle and Hammer 2018; Breniquet 2014; Flannery 1969; Hole 1996; Ingold 1996; Legge 1996). The domestication of animals was the result of several processes affected by the environmental, biological, and social factors that were otherwise unprecedented. Human interactions and their relationship with domesticated animals can sometimes be considered specialized form of symbiosis (Uerpmann 1996, 227).

The domestication of sheep and goats in tandem made sense for the subsistence patterns and fit into the environmental zones of the ancient southern Levant. Sheep and goats were complementary pastoral animals since they could tolerate different types of climes. Sheep endured cold and wet conditions, while goats were hardy in the face of heat and drought (Breniquet and Michel 2014; Zawadzki 2014). Niche theory could potentially explain this phenomenon, where intersecting niches allow the two species to coexist.

Animal herding, and the subsequent rise of the wool textile industry, was a good complement to agricultural activities, as both can be done at the same time by the same population (Cavalli-Sforza 1996; Garrard, Colledge, and Martin 1996). Sheepherding did not require prime agricultural land and did not require as many individuals to be involved. Because of this, the differentiation of labor could occur at multiple different scales. It could be conducted at the household level as some members of the household could perform agriculture while others raised sheep (McCorriston 1997, 525). It could be done at the community level, where certain households were devoted to sheep rearing and others to agriculture, each sharing and trading their wares. It could also be done at the state-level, where estates and the upper echelons controlled sheep and agriculture and hired or enslaved individuals to work for them (Peyronel 2014). State-level control and elite oversight was the prevailing circumstance during the Early and Middle Bronze Age in the ancient Near East. Temples and palaces controlled the textile workshops and, presumably, the wool-bearing sheep herds (McCorriston 1997, 528).

Whereas agricultural endeavors required individuals to gather into one central location, pastoralism required huge tracts of land. This was because animals require more land to roam and graze than just agricultural land. According to some studies in the northern Jazira, there were animal paths through the fields and manuring spreads (Pfälzner 2012; Ur 2003; Wilkinson 1990; 1993; 1994; Wilkinson and Tucker 1995b). The two sectors were interconnected, but the requirements for pastoralism made it a little harder to control.

For the ancient Near East, the most prestigious good to emerge from animal husbandry was the large industry surrounding the wool industry and textiles. The earliest evidence for woolen textiles comes from Egypt in the 4^{th} millennium B.C. (Barber 1997). The faunal, textual, and iconographic evidence seems to support this date (McCorriston 1997, 520). According to texts in Sumerian, Akkadian, and Eblaite, from the Akkadian Empire and Ebla, textiles and wool played a pivotal role in the economy and exchange networks in the 3^{rd} to 2^{nd} millennium B.C. Before the introduction of industrialized wool production, sheep were most likely hand plucked once per year as their coats shed. This was like alpaca and angora goats today (Strand 2014).

Textiles are a perishable good. Very few textiles were preserved from antiquity except for under very specific conditions.[73] That means that other indicators of ancient weaving practices must be utilized. Multiple proxy indicators can be utilized as sources to understand ancient wool industry: faunal remains, tools associated with the wool industry like spindle whorls and loom weights, texts, and iconography. Archaeozoology and faunal remains at archaeological sites were a particularly powerful proxy indicator (Breniquet 2014). Just the presence or absence of sheep and goat bones, however, does not indicate that they were utilized for wool (Breniquet 2014; McCorriston 1997).

By analyzing the makeup of the sheep and goat herds, specifically the age and sex breakdown, it is possible to create some hypotheses on what was the primary good exploited from the herd. Sheep and goats were utilized for their meat, but also for milk, hides, and in the case of sheep, wool. There are models for determining how the sheep herd was utilized. For example, sheep herds that were predominantly female with a couple of males were likely for milk (Evershed et al. 2008). Herds that were mostly young sheep were most likely reared for meat. Sheep herds that were most closely related to natural patterns, with little unnatural, human influence, were most likely for wool purposes (Strand 2014).

There was also a limit to how many animals could be sustainably maintained in any given region, based on environmental and nutritional limitations (Hobbs and Swift 1985). Algorithms for estimating modern densities of herbivores were based on looking at animal diets and the landscape's nutritional quality (Hobbs and Swift 1985, 814). One such model estimates that the carrying capacity (animal days/ha) is MAX (kg/ha) / INTAKE (kg/animal/day) (Hobbs and Swift 1985, 814). This straightforward equation, when applied to bighorn sheep, the closest living

[73] Arid deserts, like Egypt (Barber 1997; McCorriston 1997) dry craves, and oxidization caused by contact with copper are some of the few instances where textiles are preserved.

relatives of ancient sheep, in Texas and Wyoming resulted in roughly 1.6-3.0 bighorns per hectare or 160-300 animals per km^2. This was the maximum number of animals that can be sustained with no major human interference. Based on modern ethnographic accounts and alternate analyses of bighorn sheep practices, each sheep used an average of 2-3 hectares per animal. These models to analyze the purpose of sheep herding were based both on modern observations of sheep herds (Paterson 2008) and from ancient texts on sheep herd demographics (Abrahami 2014; Biga 2014; Breniquet 2014; Charvát 2014; De Graef 2014; Firth and Nosch 2012; Strand 2014).

7.1 HERDING PRACTICES AND SUSTAINABILITY OF WOOL ECONOMY

Human herding of sheep and goats began when they were first domesticated around 9000 years ago. The domestication of sheep and goats, and animal husbandry in general, was at least in part a response to the invention of agriculture. After the development of agriculture, groups began to settle down in one location (Manning 2005). After generations of living in one spot, they likely depleted immediate resources for meat and other protein sources around newly developed centers (Pedrosa et al. 2005). This necessitated a new means to procure animal goods, first and foremost for caloric intake. It is likely that the domestication of sheep and goat was the careful consideration and study of wild sheep and goat herds[74] and the management of wild herds instead of a direct result of hunting practices.

Scholars to first explore the development of animal husbandry in the ancient Near East suggested that sheep and goat were first domesticated in the Zagros steppe (L. S. Braidwood et al. 1983; Stevens et al. 2006). This corresponds to the same region as the development of the first agriculture in the ancient Near East. Sheep and goat were hunted in the steppe zones of the

[74] It is interesting to note that all the earliest domesticated species, namely sheep, goat, cattle, and dog, were social species and scavengers, making domestication easier (Flannery 1969).

mountainous regions before their domestication, as was evidenced by zooarchaeological remains excavated in the region (L. S. Braidwood et al. 1983). As noted above, after the introduction of a relatively sedentary aspect of society as result of agriculture, coupled with the surplus of food produced at agricultural centers that was possible due to the high yield of early cereal domesticates, allowed for the development of animal husbandry and domestication. Although a simplification of the entire process, these were the highlights of the origins of animal husbandry in the ancient Near East.

Figure 7.1: Modern goat and sheepherding at Jerash, Jordan. Photo by author (taken 2/20/2019).

Animal husbandry was just one part of the entire process. Pastoralism developed after the domestication of sheep and goats in the ancient Near East. Pastoralism was tightly connected to agricultural practices. Previous ideas of a purely pastoral economy, especially when talking about the EBA, proved to be a fallacy with no modern equivalent or any standing history (Rowton 1974). From a purely functional perspective, a purely nomadic society would be at a severe disadvantage. Pastoralists had a difficult time creating a surplus. The “surplus” of an animal herd, by necessity, was continually mobile and needed. Herds were continually relocated from place to place (Honeychurch 2014; D. K. Wright 2019). The "surplus" still needed to be fed and maintained and was not as passive a process as providing for extra grain in an agricultural field.

After the introduction of pastoralism and animal husbandry, they were always part of a larger society. Animal husbandry was incorporated at all levels of society and was full integrated into the different modes of production. During parts of the EBA and MBA, it was heavily integrated into the palace and temple economies and represented only a single, although very lucrative, aspect of society (Biga 2014). At certain points of history, it was apparent that populations in the ancient Near East, from those in the cities during the urban periods to those at the local, village level during the more dispersed periods, integrated animal husbandry and pastoralism, were heavily reliant on sheep and goats for both subsistence and trade purposes. This was no different for the Early Bronze IV.

7.2 SOUTHERN LEVANTINE FAUNAL ASSEMBLAGES

Some general observations can be made about animal husbandry during the EB IV. Changes in the pastoral economy of the EB IV, partially in response to shifts in agricultural endeavors, the environment, and sociopolitical changes, were reflective of greater transformations. These conclusions are based on the state of the faunal assemblage in the southern Levant. There was very little direct evidence of textiles,[75] and there were no texts to corroborate the industry. The closest site with texts, textiles, and artifacts is Ebla and it represents a very different sociopolitical climate than the southern Levant for the EB VI. Analyzing wool in the southern Levant requires utilizing proxy indicators like faunal remains, spindle whorls, loom weights, and

[7575] The glaring exception to this rule is the Nahal Mishmar cache along the Dead Sea near Ein Gedi, but this dates to the Chalcolithic (Bar-Adon 1980; Moorey 1988; Ussishkin 1971).

other non-perishable items. Unfortunately, there are few fully excavated EB IV sites with faunal assemblages in the region. This is mostly an artifact of the nature of the EB IV sites, that they are mostly small, ephemeral sites located in the frontier, and that the majority have been discovered during survey projects. Small number of animal remains have been recovered during the systematic and salvage surveys of the southern Levant (Finkelstein, Lederman, and Bunimovitz 1997), but not enough to make statistical comparisons or draw any definitive conclusions beyond the presence or absence of animals at sites, let alone the presence or absence of sheep or goats (Banning 2002).

There are a few clear exceptions, where there was a full-scale excavation of an EB IV site an integrated faunal study. Be’er Resisim in the central Negev is a single-occupation site dated to the EB IV. William Dever (2014) oversaw excavations of the site in 1978, 1979, and 1980. The site contained almost 100 structures with open spaces between. The majority of the domestic debris was deposited in the open-air spaces, including everyday detritus like pottery sherds and worked tools, as well as the animal remains that likely represent the leftovers of meals (Dever 1985b; S. A. Rosen et al. 2006).

The faunal assemblage from Be’er Resisim consisted of both wild and domesticated animals (Hakker-Orion 2014). The majority of the finds are the bones and teeth of small to medium-sized mammals, including sheep and goats, ibex, hare, and birds. Of the 807 fragments recovered, 243 were unidentifiable. No Minimum of Number of Individuals (MNI) was calculated for the site, so it is hard to estimate how many animals the inhabitants controlled. However, some general conclusions can be drawn from the small faunal collection from the site. The majority of the faunal remains, by far, were sheep and goat. Ovicaprines represented 93% of the assemblage. Based on this breakdown, sheep and goat were an important part of at least the local diet of the inhabitants of Be’er Resisim. There was sheep and goat husbandry as evidenced by the large amounts of their remains at the site, but there was also an agricultural component based on floral remains and hunting still persisted. Based on this, the assemblage of animal remains from Be’er Resisim represents a mixed economy. Unfortunately, there were not enough diagnostic evidence, including bone epiphyses and sex indicators, to determine the demographic breakdown of the herds and to draw conclusions on the primary utilization of the herd. However, sheep and goats were an important part of the local economy.

Another site in the Negev could provide more evidence for the importance of animal husbandry and pastoral activities in the southern Levant during the Early Bronze IV. At the site of Rogem Be’erotayim in the western Negev, archaeologists performed test excavations (Saidel et al. 2006). The site was first discovered by archaeologists during the Israel Antiquities Authority’s survey of the region on Map 156. The material culture uncovered indicated inhabitants occupied the site during the EB IB and the EB IV (Saidel et al. 2006). The settlement was on a low hilltop overlooking the nahal below. The site consisted of a few structures, an animal pen, and a relatively large midden that measured 7 x 15 m. Archaeologists retrieved most of the recovered animal remains due to a sieving program. In total, 1414 faunal remains were recovered; however, only 170 were identifiable. The majority (160 bones) were ovicaprines. Although the remains were scant, those that could be aged pointed towards a mature sheep herd with older ovicaprines. This evidence would indicate an exploitation of the animals for secondary products like dairy and wool. There were not enough sex indicators recovered to signify if the herd were overall male or female, which would point towards a preference for either milk or wool exploitation. Further evidence that the animals were not primarily utilized for meat was the very low frequency of butcher and cut marks on the bones. Of the 1414 remains excavated, only 6 contained evidence for butchering (Saidel et al. 2006).

These two are the best case-studies and most complete collections of southern Levantine faunal remains that can be securely dated to the EB IV. Based on these two studies, a few cursory conclusions can be reached. There does not seem to be one universal for explaining animal remains in the southern Levant. Even the Negev contains a large degree of variance from site to site. However, it is obvious that there was an exploitation of sheep and goats for secondary products at some of these sites. That is not to say that there was not opportunistic use of mature animals for meat or plucking young animals before they were slaughtered. Without much in the ways of the actual textiles or proxy indicators like loom weights or spindles, it is hard to reconstruct the ancient wool practices in the southern Levant. However, animal husbandry and pastoralism was present and sheep and goats were an important component of the society and presumably the economy during the EB IV. The evidence for pastoralism and the integration of animal husbandry into society is more diverse and available in the northern Levant, where both texts and proxy indicators like spindle whorls were excavated at EB IV sites.

There are other indicators, and some remains recovered albeit in small amounts, that could shed further light on the nature of pastoralism and the wool industry of the southern Levant during the Early Bronze IV. Proxy indicators for wool production tend to be small artifacts and were sometimes hard to analyze as a group when looking at survey data. Surveys tend to only collect a sampling from the surface of tells and archaeological sites, and the likelihood of recovering such small artifacts were smaller than the larger remains like architecture, ceramics, and installations. Looking only at notes from surveys, there were eight sites in the Early Bronze Age that mention finding spindle whorls or loom weights, all of them in the northern Negev. One of these sites could be dated to the EB IV, three to the EB II-III, and the remaining four were only dated to the EBA in general. Based on this scant evidence, not much can be said on wool production in the Levant outside of it likely occurred, and the northern Negev might have been a locus of this industry. Interestingly the evidence comes from two adjoining squares surveyed for the Israel Antiquities Authority, Maps 162 and 163. They were, however, excavated by different people at different times. There was too little evidence to say anything else. This probably represents only a small sliver of the total possible data for the southern Levant on wool production and further study in the future needs to be done to further flesh this out.

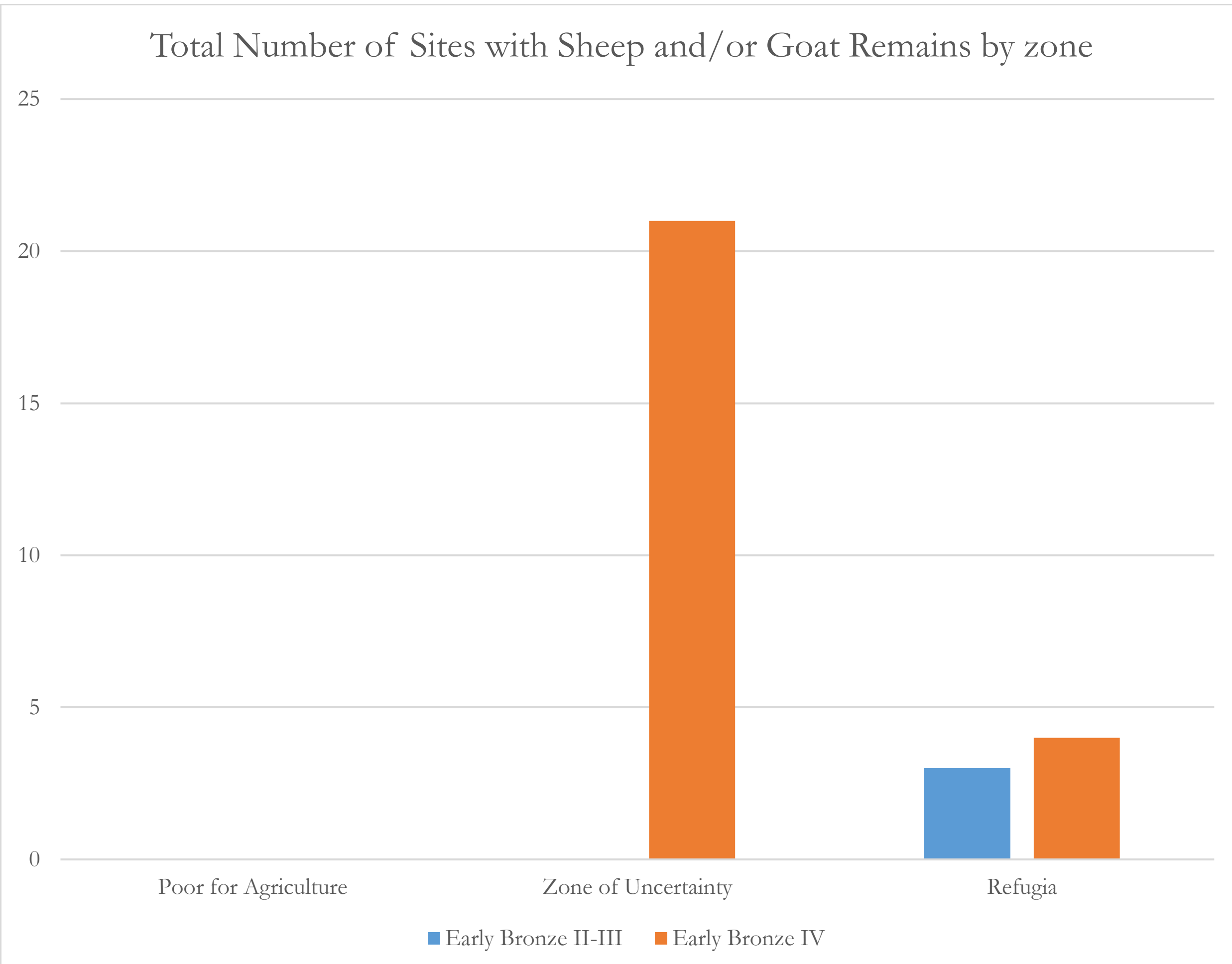


Figure 7.2: Total Number of sites with sheep and/or goat remains from the Early Bronze Age by zone for the entire Levant.

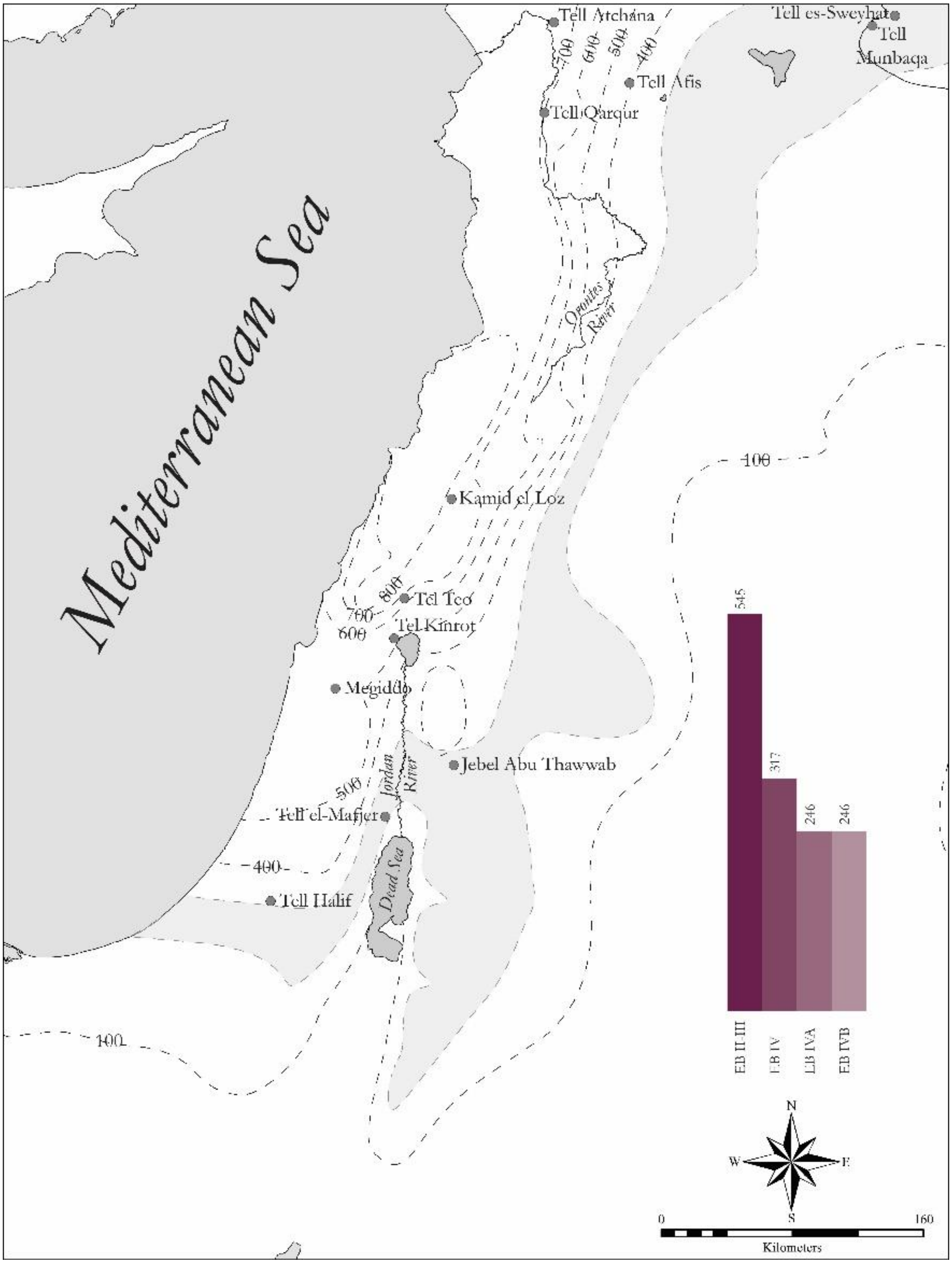


Figure 7.3: Average annual rainfall (mm) for sites with faunal remains for the Early Bronze Age. Map by author.

Another proxy indicator for wool production came from faunal remains. Bones were a bit larger and tend to be recovered more in surveys. Sites with recorded amounts of sheep and goat remains were also relatively small, but larger than those with spindle whorls. Due to the small numbers of bones recovered at most sites in the southern Levant, it was hard to make any definitive assertions about what the primary utilization was of sheep and goats, whether it was for meat, milk, or wool. It was likely, based on knowledge of the small, cottage industry of the EB IV that sheep were utilized for all three purposes. There were three sites with recorded sheep and goat remains in the southern Levant for the EB II-III and 18 total for the EB IV.

Environmental conditions were also an important contributing factor to understanding the ancient sheep and goat rearing. When looking at average annual rainfall for sites located within the Levant that had sheep and goat remains, there was a decrease from the EB II-III to the EB IV. The average rainfall for sites that date to the EB IV was firmly within the zone of uncertainty, at nearly 200 mm of annual rainfall (Figure 7.3). This was well within the environmental niche for sheep and goats to survive. The most interesting thing, though, was that the average for states with EB II-III occupations was 545 mm of annual rainfall, which was significantly higher than that of the succeeding period.

Looking at the average annual temperature of sites with sheep and goat remains revealed a fascinating pattern. The areas the sites with ungulate remains for the EB IV were, on average, 2° F cooler than those from the EB II-III (Figure 7.4). This was in direct conflict with all other patterns for sites observed in the region. On average, sites in the EB IV tended to be in areas that were warmer annually. There was a decrease in annual average rainfall and an increase in temperature, which might represent the occupation of areas that were deemed “less desirable.” The slightly cooler locations of sites with faunal remains could be a sampling bias because there were so few sites on which to base this conclusion. If it reflected an actual pattern it does have interesting implications. Sheep typically required slightly cooler temperatures than goats to survive. The switch from a warmer to a cooler area could represent a heavier reliance on sheep than goats for the EB IV. This might imply a heavier reliance on wool and wool industry. Although it was possible to create textiles from goat hair, it was easier from sheep wool. Sheep were the preferred animal for textile production.

Most of the sites with domesticated ungulate remains come from the zone of uncertainty. This contrasts with site locations for sites with cereal and fruit remains, sites that presumably practiced agriculture. Based on limited evidence, the zone of uncertainty was heavily exploited for sheep and goat production. This was in keeping with what was described at Ebla, where were the liminal zone surrounding the city itself was used for animal herding and husbandry. This would also match the archaeological artifact evidence uncovered in the northern Negev with artifacts relating to textile manufacture and most of the faunal remains found for the EB IV, both that were within the zone of uncertainty.

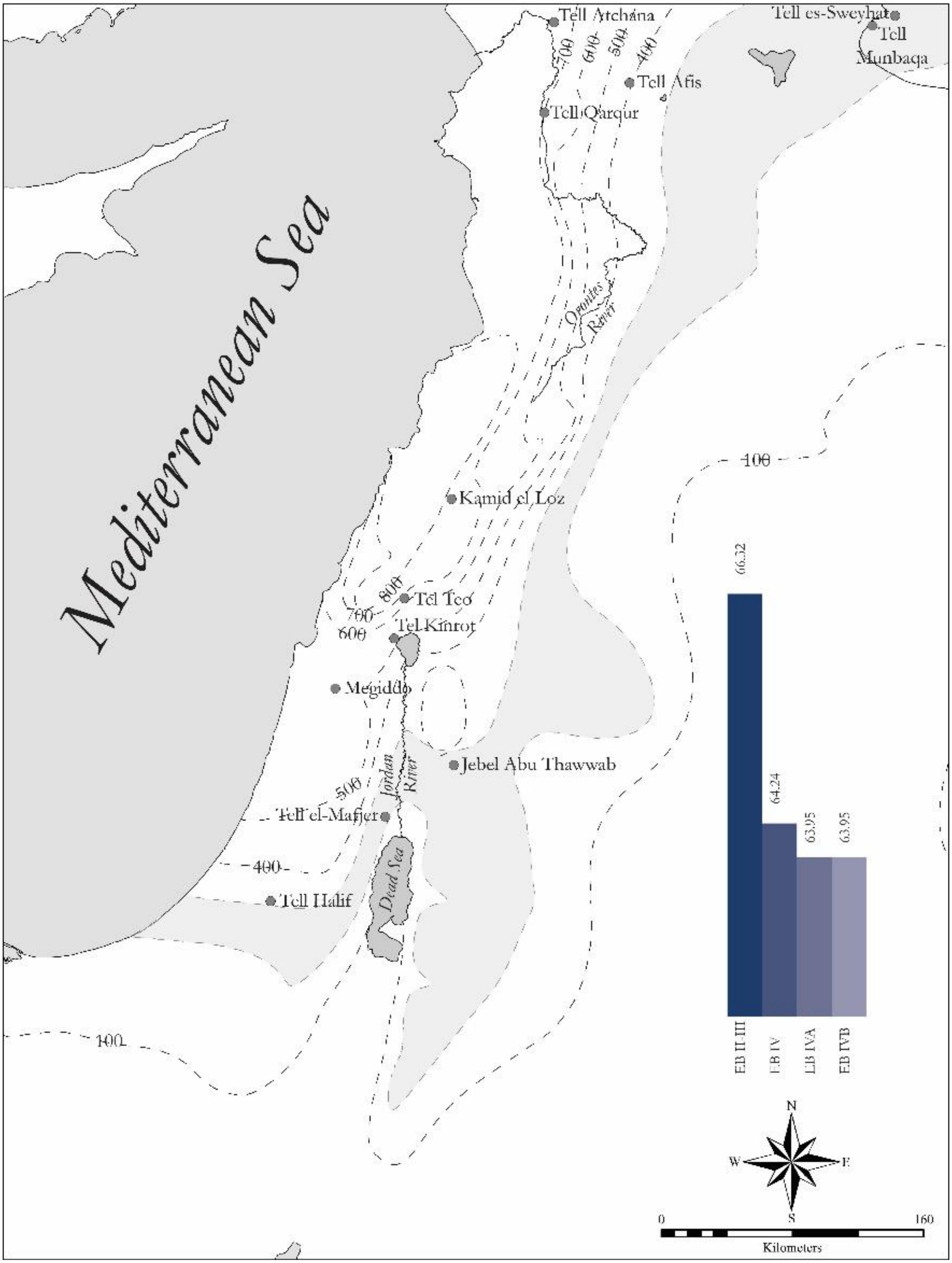


Figure 7.4: Average annual temperature (°F) for sites with faunal remains for the Early Bronze Age. Map by author.

7.3 COMBINING TEXTS AND ARCHAEOLOGY: TEXTILES AT EBLA

Multiple sources can be used to analyze ancient wool and textile production. In the greater ancient Near East, this includes the added benefit of written documentation of rearing sheep, wool and textile trade and tribute, and herd management, among others (Biga 2014). Most of these texts come from Mesopotamia, both northern and southern, and date to the EBA and MBA. At the sites that contain texts on ancient herding and textiles,[76] it was possible to reconstruct wool practices, at least as they were written about. Wool was not just a raw material but was also a product. One sheep equals about 375-750 g of wool that can be prepared for spinning, and 1 kg of wool equals about 16000 m of yarn (Breniquet 2014). Wool was usually sold as raw material and not necessarily as a finished garment or textiles.

One site where it is possible to reconstruct ancient wool practices and sheep herding patterns is at the site of Mari in northern Mesopotamia, located in the middle Euphrates River valley. There were a limited number of texts recovered from the site of Mari, dating to the MBA and Old Babylonian Period, which detail textile production and herd control. Mari controlled a large part of the middle Euphrates valley during the Early and Middle Bronze Age and received textiles and wool as tribute from local, supporting governances (Dalley 1984). The texts that were uncovered for this period talk about textile technology, including wool processing, textile manufacture, among others. It also includes the importance of textiles in the administration of human resources in the palace, cultic scheduling, among other activities. Although this is later than the studied EB IV in this dissertation, Mari represents a very important niche that was

[76] This includes the sites of Ebla (Biga 2014; Peyronel 2014), Nabada (Sallaberger and Ur 2004), Mari (Durand 1992; 2009; Heimpel 2003), Akkad (Foster 2014), Eshnunna (Breniquet 2014; Yuhong 1994), Umma/Lagash (J. Cooper 1983; Sallaberger 2014; Steinkeller 1987), and Ur (Firth and Nosch 2012; Sallaberger 2014).

exploited during the EB IV. It was a site that controlled the local frontier, the area between agriculturalists and pastoralists. Mari was located in an ideal place to exploit the most resources.

Fringe settlements, including the site of Mari, were located at pivotal points between agriculturally productive areas and the grazing lands of the semi-arid steppe (Ristvet 2014; Galiatsatos et al. 2009; Wilkinson et al. 2012; 2014, 20). Fringe settlements were "economic bottlenecks" that allowed local communities to prosper by controlling surpluses in each mode of the economic zones (Earle and Kristiansen 2010a, 243). Lauren Ristvet (2014) looked at the significance of pastoralism and subsequent rise of "gateway cities" during the third millennium B.C., like Ebla and Mari. These cities were located on the margins of agriculture where an integrated pastoral and agricultural economy can be observed (Margueron 1996; Matthiae 1978). Ristvet looks at how movement and tradition were essential in the creation of authority in the Near East, and how ritual was used through these concepts to cement political landscapes and control (Ristvet 2014, 2). Urban centers and kingdoms attempted to maintain power over their territories and restricted and controlled movement (Ristvet 2014, 36). This can be seen at Tell Beydar, where extensive excavations have uncovered a radial pattern of streets that restricted passage into the city and within, forcing movement towards the palace, that created a sense of control (Lebeau and Suleiman 2007). At the smallest scale, access to rooms within the palace was restricted (Ristvet 2014, 58). Large scale pilgrimages provided a powerful metaphor of control across larger polities. She specifically focuses on Ebla, where elites participated in a coronation ceremony that involved ritualized travel to specific cult centers in the surrounding countryside. It was a ritualized path to unite those in the palace with those in the city of Ebla and finally connecting with those in the surrounding kingdom (Ristvet 2014, 68).

The cities that contained texts highlight an interesting pattern for wool and herding practices. The majority of animal husbandry during the EBA and MBA in Mesopotamia was geared towards wool and textile production (Firth and Nosch 2012). That was not to say that there was not opportunistic utilization of meat from the herds, but that the primary goal of herding was for the secondary products. Possibly an artifact of having written documentation from only elite households and palace archives, most pastoral activities and sheep husbandry appears to have been controlled at the highest levels of society (Breniquet and Michel 2014; Firth and Nosch 2012). There was very little indication that individual households controlled their flocks but could oversee a subset of the royal herds, earning a portion of the wool as their payment. It was put forth as a very important commodity, one that was mentioned on par with other luxury textiles.

The archetype for integrating texts and wool studies in the EBA Levant was the site of Ebla. Ebla was in the northern Levant and is currently about 55 km southwest of Aleppo. There was a distinct pattern around the site of Ebla (Ristvet 2014). The site was excavated from 1964 to 2010 and there was a large corpus of written materials discovered in Palace G that dates to the first half of the EB IV (c.2500-2300 B.C.). The Palace G archives of Mardikh IIB1/EB IVA cover around 40 years, specifically the last 5 years of king Irkab-damu and 25 years of his successor, Išar-damu. These documents also shed light on international trade and diplomacy outside of the kingdom of Ebla, including conflicts with Mari on the Euphrates River and close ties with polities in the Jazira, including Nagar (modern Tell Brak). Ebla was the largest site in the region, by a very large margin, reaching almost 60 ha. This makes it the fifth-largest site in the entire database, not just in the northern Levant.

The area directly around Ebla was very good for agriculture and falls within the refugia zone. Its immediate hinterlands do as well. The zone of uncertainty starts 20 km to the east of the site. Ebla could have utilized the zone of uncertainty to increase the production of wool and associated materials. This was described in the Ebla texts, so it was likely to be the case.

Figure 7.5: Ebla Palace G, where the majority of the texts were discovered. Photo by author (taken 6/18/2010).

By combining archaeology and the texts, it was possible to reconstruct some of the ancient textile industry. Most textiles at Ebla were sheep wool, even though there was evidence for flax for certain textiles. In the texts, there were mentions of large numbers of flocks that were controlled and overseen by the central authority. The palace at Ebla was the primary control of sheep and goats, and the goods derived from them. Ebla and its immediate hinterlands were part of a larger textile production conglomeration. The surrounding, second-tier sites, like Tell Afis and Tell Tuqan, also had associated materials for textile production.[77]

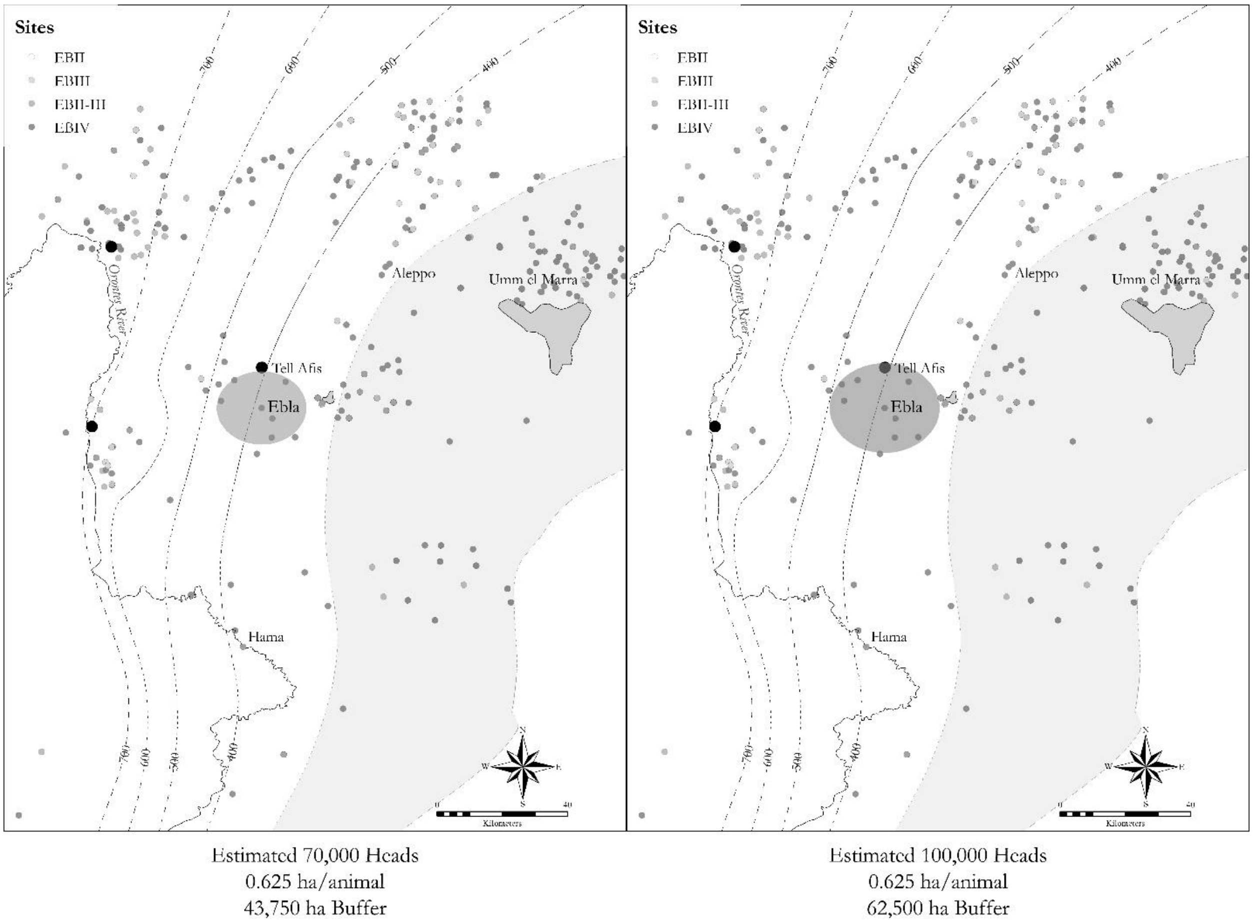


Figure 7.6: Estimated area needed around Ebla for sheep herding per month controlled by the royal household. Map by author.

At Ebla, textile production as an industry was a cornerstone of the economy (Andersson et al. 2010). Based on written records, textile production and all processes correlated with and controlled by the palace administration. Textile workers were part of the royal household and were in workshops within the palace. Textile production and work were carried out by both men

[77] Unfortunately, there is little comprehensive data for this region. Syria never performed a systematic, state-sponsored, countrywide survey like is done and some of the southern Levantine countries. This means that the data available is for specific research questions, which might not be as translatable to one of large-scale wool production and control in the region.

and women. However, men were predominantly in overseer, official, and scribal positions in the textile workshops.

The transport of clothes and wool as payment was recorded in tablets dated by month. The Monthly Account of Textiles (MAT) shows the different levels of redistribution of wool (Archi 1993; Biga 2014; Peyronel 2014). The minister or vizier at Ebla was the highest-ranked administrator in the Ebla royal household and oversaw trade and the army. As such, his name appears on most of the MAT. He was the person with the second greatest power in the city-state after the king and like the kingship it was typically a hereditary title.[78] In total three ministers can be identified: Arrukum, Ibrium, and Ibbi-Zikir.

Table 7.1: Animal and wool use estimates from Ebla for the EBA, under the viziers Arrukum and Ibbi-Zikir (Archi 1993; Andersson et al. 2010).

	Arrukum	**Ibbi-Zikir**
Estimate of Palace Controlled Heads	70000	100000
Estimated Territory (0.625 ha/animal/month)	43750	62500
Estimated Territory (0.333 ha/animal/month)	23333	33333
Time to Pluck Animals (hours)	58333	83333
Time to Pluck Animals (days)	2430.5	3472.2
Amount of Wool Produced (0.80 kg wool/sheep)	56000	80000

According to the texts, individuals were paid every month. Ebla also sent textiles as ceremonial gifts to their closest allies, and in return received wine, animals, and other similar items that were unavailable at Ebla (Archi 1993). One of Ebla's most important commodities was wool and textiles. After the wool was plucked it was weighed. This weighing was

[78] When the Ebla texts were first translated, these ministers were mistaken as the names of the king since they played such a prominent role in the tablets. Since they oversaw trade their names would have been on the majority of the trade tablets.

documented in the early third millennium B.C. texts and sealings. Different types of wool were attested, from fine quality to lesser qualities. The wool was also likely dyed, with white, black, and a dark-red attested for sure but maybe also yellow and other colors (Peyronel 2010).

About 60 monthly accounts of delivery of textiles can be attributed to the minister Arrukum. In total, there were around 500 tablets that discuss the payment of clothes and wool products in monthly documents. Due to the plethora of texts attributed to these ministers, it was possible to reconstruct the number of heads of sheep and goat controlled by the royal household (Table 7.1). During the ministry of Arrukum there were an estimated 70000 heads controlled by the royal household, based on the MAT (Archi 1993). During the ministry of Ibbi-Zikir, this increased to 100000 sheep and goats (Biga 2014). Based on the knowledge of grazing patterns of modern bighorn sheep, which were closely related to ancient sheep these animals require between 0.333 and 0.625 ha per animal per month for grazing (Hobbs and Swift 1985). Based on these estimates, the royal herds would require between 23333 and 62500 ha, or roughly the size of the city of Milwaukee up to the size of Chicago, for monthly grazing.

To put the number of animals into further perspective, the amount of time it would take to pluck the animals and the amount of wool it would produce can be estimated. Based on a plucking time of roughly 50 minutes for one person to pluck one animal, and estimated 58333-83333-man hours, or 2430-3472 days, would be needed for an individual to pluck the entire herd. In addition, with an estimated 0.80 kg of wool per animal (Strand 2014), these animals would produce roughly 56000-80000 kg of wool. This number would likely be a bit lower, as not every sheep would produce wool and accounting for lambs. Accounting for 3638 kg of wool that was paid to the workers as their lot (Archi 1993), that would still account for a significant amount of wool that could be produced into textiles or used in trade and tribute.

Besides texts, other proxy indicators can be utilized at the site of Ebla to estimate the type of textile production practice. Including spindle whorls, loom weights, needles, beaters, and spindles, a total of 139 textile tools dating to the EBA and MBA were recovered from Ebla (Andersson et al. 2010, 161). Not all come from a clear archaeological context, with some recovered in ancient fill, but they do come from levels dating to each period of occupation at the site including the EB IV. In Palace G, 27 spindle whorls were recovered, indicating that there was a high degree of textile production during the EB IVA. Most of the spindles found were lightweight and stone. This indicates that they were used to spin thinner fibers. Spindles of all sizes were found at Ebla, however, so there was a rather strong textile production sphere. Interestingly, the lack of loom weights and a case that the horizontal ground loom was predominantly used, similar to those found in Mesopotamia.

Two bronze spindle whorls discovered in a ceremonial context, in the sacred area for Ishtar and may point towards an ideological and religious aspect to spinning and weaving practices (Peyronel 2007). These spindles would not have been used for production, but symbolic purposes. In addition to these spindle whorls, the only textiles recovered from the site come from non-household or workshop surfaces. One MB II tomb, P.8680 under the Southern Palace in Area FF, contained some fragments of textile remains on human bones. The textiles were found on the pelvis of a child, a small adult upper arm, and a skull fragment. The textile remains were so fragmentary that they were next to impossible to ascertain possible manufacturing techniques. They might also be plant fibers, as they were parallel instead of twisted. These two examples, coupled with texts recovered from Palace G, imply that textiles held not only an economic function but also were part of the symbolic and ideological system of beliefs (Peyronel 2007): "Technological choices of the production seem to be intersected with ideological aspects of textiles reflected by the visual appearance of clothes and garments, as indicated by the garments that reflect the status and roles of people" (Peyronel 2014, 134).

7.4 CONCLUSION

It was important to consider all aspects of wool production when trying to recreate ancient practices. However, it was difficult to synthesize these materials together as recovery methods and specialists were different for each type of material. In addition, the few textile remains themselves make it hard to fully understand the finished product. Based on texts from the EBA, wool was an important component of the third millennium B.C. economy and represented an extremely important commodity in the regional economy. Regions and the inhabitants who lived there were affected by how goods were processed and moved. Once cities were established, they were involved in systems of trade that were not always reliant upon the presence of a centralized political regime (M. L. Smith 2013). This was reflected in the landscape, especially when looking at the trade of copper and wool.

David Schloen (2017) recently proposed that the disappearance of "walled" settlements in the southern Levant of the EB II-III was a direct response to the increased wool demand in the northern Levant. He suggests that it was not only an integration into the immediate hinterlands around Ebla that resulted in a wool production sphere, but also an increase in the number of sites in the Central Hill country. This fits with the data available for the southern Levant from survey data. There was an increase in pastoral sites, a decrease in the overall site area, and an increase in the number of sites. It was possible that the sites in the southern Levant, occurring in liminal zones and within trade distance of the northern Levantine centers like Ebla, would be utilized in a system of trade for wool and textiles. Areas that had formerly been utilized for olive and grape production, like the Central hill Country, were no longer utilized and made way for an increase in animal husbandry.

Another possible explanation for this shift in the southern Levant was the problem of robusticity in the tell system of the EB II-III. Cities became too rigid and entrenched in robusticity, relying predominantly on one mode of production, namely wheat and cereal agriculture. Other agricultural goods and even pastoralism to a certain degree were ignored and not fully integrated. They were too heavily reliant upon small sectors of society and not interconnected enough, with a couple of exceptions. This would also account for an increase in other resource procurement strategies for the EB IV southern Levant, like wool and textile production.

8 DISCUSSION AND CONCLUSION: LIVING THROUGH A VULNERABLE SYSTEM

This dissertation has sought to analyze the Early Bronze IV from a landscape and environmental perspective (Chapter 4), incorporating settlement data (Chapter 5), ancient agricultural practices (Chapter 6), and animal husbandry (Chapter 7). It represents one of the first attempts at looking at the Levant as a whole.[79] Based on the analysis of available data, shifts in settlement history concerning regional settlement patterns were a direct result of both environmental conditions and choices by individual societies with regards to resource procurement. This study is therefore different from any previous studies on the EB IV in that it looks at the entirety of the southern Levant, ignoring modern boundaries, and incorporates the most settlement data. In addition, it looks at the EB IV from a landscape perspective, focusing on multiple modes of subsistence and trade.[80]

One problem with analyzing archaeological data from the Early Bronze IV has arisen from the presentation of the data itself. Many studies overstated the degree of change during this phase. Total collapse and breakdown of urbanization were said to have occurred across Mesopotamia, Anatolia, the Levant, Old Kingdom Egypt, the Cycladic cultures of the Aegean, and other cultures around the Mediterranean.[81] The crux of this argument was centered on Tell Leilan and sites across northern Mesopotamia. According to Weiss (2012), the onset of aridity forced dry-farming urban centers of Upper Mesopotamia to be abandoned across the board, and the total number of settlements in the south increased while northern people, mostly from the Khabur basin, fled to better climates. Unfortunately for this explanation, many of the sites in

[79] This study ignores modern national boundaries, which are arbitrary markers. For a full discussion of the evidence used, see Chapter 1.
[80] For a full discussion of the history of scholarship and how it directly relates to this study, see Chapter 2.
[81] For a full breakdown of literature on collapse in the late third millennium B.C. see Chapter 3.

northern Mesopotamia were occupied continuously through the Akkadian “collapse,” a fact which directly contradicts this theory.

8.1 Robusticity Revisited

Multiple theoretical frameworks were employed in this dissertation, but all center on changes in the environment and landscape as the principal modes of analysis. Settlement patterns and means of procuring resources within these settlement systems were the primary foci of discussion. After a drastic change occurred in the EB IV that precipitated population movement, a dissonance occurred in settlement patterns between the EB II-III. As systems were entrenched in the EB II-III, change had to occur in the EB IV.

In the Early Bronze Age, the idea of “resilience” was seen through material culture, and broad social make-up of populations did not evidently change during the Early Bronze IV. This period represented a break in previously established systems and was a time when urbanism was disrupted. The environment did not determine the nature of settlements and political situations. It did, however, limit the choices individuals could make.

The primary emphasis of this study was niches, the specific environmental and cultural conditions under which these changes occurred. Niches limit the choices that individuals and cultures can make. There is a limited environmental and geographical range in which agriculture and pastoralism can occur. By understanding and tracking these various niches, it is possible to provide possible narratives of change. A thorough understanding of the relationship between environment niches and available agricultural and pastoral choices is particularly important when the environmental niche did not change over past time periods. One example in this study was the decrease in the presence of olive in the southern Levant during the second half of the EB IV. The environmental niche did not change, as was evident from the palynological record. Even though there was a decrease in the amount of olive pollen preserved, there was not a corresponding decrease in tree pollen that falls within the same general environmental niche. Therefore, alternative explanations for changing settlement patterns during the EB IV need to be explored.

The dynamic between the environment and individual choices relates directly to explanations of resilience. There was a clear line of continuity between the EBA and the MBA. As part of the adaptation to a new system, a niche was exploited, either by the influx of a new population or by an existing population utilizing the landscape in a different capacity than previously exhibited.[82] This began in the EB II, when there was an expansion in the number and aggregate area of sites. Shortly after, there was a gradual decline in the total number of sites into the EB III, as it appears smaller sites were abandoned for the larger, central tells in the productive valleys in the refugia and an expansion into the zone of uncertainty.[83]

As the EB III progressed, cities became larger and larger, eventually reaching carrying capacity. These cities overexploited the surrounding landscape and the agricultural productivity plateaued. In addition, the cities and settlements were highly specialized. There were individual settlements and groups that were mostly concerned with pastoralism, with agriculture, with trade of specific items. This trade was mostly controlled at the upper levels of society. However, because each group was highly specialized, the groups and indeed the entire system were left vulnerable to changes. If one part of the cycle were disrupted, the entire system became unstable and would be forced to either change or die. With the notable exceptions of Ebla and Khirbet

[82] Chapter 4 has a full discussion on settlement location and expansion during the Early Bronze Age.
[83] The environment remained relatively stable at this point in time, making the zone of uncertainty a lucrative area for agricultural and pastoral activities.

Iskander, such disruptions resulted in the cities being abandoned, and more settlements being established around the previous cities with a more equalized system of production.

Both internal and external factors influenced local populations and the cities of the EB II-III. The environment is a major contributing factor, as has been explored in Chapter 5. Although not as catastrophic or widespread as previously espoused, shifts in environmental conditions did occur during the late third millennium B.C. that affected local populations. The zone of uncertainty, which people had pushed into during the early third millennium B.C., was particularly susceptible to even minute changes. These changes threw the system off, since a number of the cities that were established in this zone during the EB II-III were no longer able to generate agricultural surpluses.

There were also socioeconomic shifts that occurred during this period. The Negev copper trade changed during the EB IV. The previous Mediterranean polities that were established during the EBA were no longer demanding copper on the same scale or with the same intensity as before, forcing the system to change. Copper was still a large part of the Negev system, as was discussed in Chapter 4, but it was no longer being controlled as tightly by a centralized authority like Arad. Instead, it appears that most of the copper trade was controlled by smaller, individual groups during the EB IV with down-the-line trade instead of caravans.

Olive production also changed during the EB IV. Although it is unknown if there was a lot of olive oil production during the EBA due to a paucity in olive presses and other associated oil production accoutrements in the archaeological record, the olive tree pollen and fruit pit evidence suggests that olives were at least part of the local caloric intake. During the Early Bronze Age, there were a lot of olive trees planted and cultivated in the hill country and around the Dead Sea. During the later parts of the EB IV, evidence for olive trees indicates that olives shifted north towards the Bekaa and Ghab Valleys of the inland northern Levant. This was potentially another failure in the southern Levantine EBA system.

All these factors paint a picture of the Early Bronze IV as a part of the resilience Mobius. The zone of uncertainty was necessary for the survival of the EB IV, even though after the fact it was widely abandoned. When all the factors were compared, rainfall zones seem to be the biggest determining factor of occupation per period. The zone of uncertainty increased in importance during the Early Bronze Age and reached its pinnacle during the Early Bronze IV. The integration of this zone into the general society increased the resilience and allowed for a rather quick restructuring of society to survive the climatic and political upheaval that represents the Early Bronze IV. Afterward, it seems that this zone no longer was a viable option and was largely abandoned by the Middle Bronze II.

8.2 Spatial Patterns and Site Differentiation

A few general patterns can be observed for EBA site locations and societal differentiation. Urbanism and the expansion of settlement size started in the EB II. As the population increased, social conformity was necessary. Increased social conformity resulted in less diversity in material culture and modes of existence and an increase in site area and the number of sites. As a result of this decreased diversity and modes of existence, society became rigid and was unable to absorb potential change. The system was left vulnerable because the concentration had been placed on fewer subsistence patterns and fewer modes of production. Flexibility and innovation were essentially removed. As the system proved successful, as it was during the EB II, societies and individuals became further entrenched. This was necessary to control populations in large systems. However, this rigidity can cause fissures in society that, if exploited, lead to its destruction. This results in fewer sites with roughly the same area, like in the EB III. When the population was consolidated into a smaller number of settlements, they were easier to control. Fewer, larger sites allowed for more direct control.

Therefore, when a major change occurs, like a shift in the controlling power, a change in the environment, a change in trade demands, and other such forces, rapid adaptive change must occur to survive. Even one of these changes could force shifts in local populations. During the EB III, more than one major change occurred at the same time, pushing an already vulnerable society over the edge. The use of the zone of uncertainty was a direct choice of the people in the EB III, exploiting the previously underutilized zone.. The zone of uncertainty was a productive niche to exploit if rainfall was optimal. For the zone to be properly exploited and integrated, there also needed to be a secondary mode of production and resource procurement to offset the inherent risk in utilizing this area. This zone was overutilized during the EB II-III, causing rapid growth while at the same time increasing potential vulnerability. With a centralized, controlled system, it was able to, on a year-to-year basis, absorb the risk. However, if rainfall significantly diminished, trade patterns changed, or resources were drastically reduced, this backstop would no longer be enough. As resources were more heavily controlled and culled from the zone of uncertainty and the various goods and resources it could provide were heavily exploited, other means of acquiring them fell to the wayside or were eliminated. This dependence on the use of the zone of uncertainty made the system even more vulnerable and susceptible to sharp changes.

Based on recent publications, in northern Mesopotamia urbanization in the Khabur drainage basin was long-standing, reaching back to the fourth and fifth millennia B.C. The environmentally marginal steppe, especially the zone of uncertainty, was not exploited until the third millennium B.C. The landscape during this time was extraordinarily active, with rapid growth and collapse of settlements. The environmentally marginal areas were occupied, and there was greater interconnectivity across the region. Three- or four-tiered settlement hierarchy was apparent by the mid-third millennium B.C., with some restructuring every few centuries. Large, planned public buildings were common. An elite class emerged, as did written texts, a good indicator of complex society as a means of preserving aspects of a culture.

This expansion of settlements into the zone of uncertainty was possible because of the increased utilization of the zone of uncertainty during the Early Bronze Age. In this climatologically marginal area, agriculture was much riskier. As previously mentioned, the zone of uncertainty was the land that was between 200-300 mm of annual rainfall. There was a high risk of crop failure, and thus the region was mostly utilized for animal husbandry. The zone of uncertainty was exploited by elites and wealthier residents since they were able to absorb the risks inherent in this landscape.[84] The potential for increased wealth and huge profits was great, but so was the possibility of considerable loss. Ebla was an exemplar of elites utilizing the zone of uncertainty. Ebla was the dominant city in northwest Syria during the third millennium B.C. and was known best for sheep husbandry. According to texts found at Ebla in the Palace G archive, dated to the EB IVA, textile production was an important economic staple of the Eblaite kingdom and accounted for a large majority of its wealth. By adopting and incorporating strategies of mobility, inhabitants in this area were able to support larger herds in this zone due to its diversity (Wilkinson et al. 2014, 84). This incorporation allowed for sites in northern Mesopotamia and the northern Levant to grow exponentially in size. As mentioned above, there were some limitations in the nucleation of the sites, specifically in the Jazira. These sites, though, were larger than any previously recorded and rival those of later occupations. Herds were

[84] During the Early Bronze Age, most of the wealth and control was located on the central tells and there was a system of surplus and redistribution at the upper levels of society that allowed for the absorption of risk. This was demonstrated in chapters 6 and 7.

controlled predominantly by the state and elites, which allowed those controlling the herds to garner a high degree of wealth. The exploitation of the frontier regions in turn led to increased exploitation of the zone of uncertainty throughout the Early Bronze Age. The utilization, though, of the zone may have been the cause of the eventual decline in settlements in northern Mesopotamia during the EB IV.

In the southern Levant, there was a marked difference. The zone of uncertainty was much smaller in the southern Levant. It was not the vast, underexploited area that it was in northern Mesopotamia. This is likely why the sites of the southern Levant did not reach the size of Ebla or the northern Jazira polities during the EB II-III. The different ecological niches were closer together with fewer delineations between them. There was also more land suitable for horticulture in the southern Levant. Wilkinson et al. (2014, 90) suggest that the decrease in the number of walled settlements in the southern Levant was due to a decrease in agricultural surplus with the climate change and the lack of an underused zone.

The zone of uncertainty was a productive niche to exploit, as long as rainfall was optimal and trade for products like metal and textiles was good. For the zone to be properly exploited and integrated, there also needed to be a wealthy elite to backstop the inherent risk in utilizing this area. Although the wealthy were able to, on a year to year basis, absorb the risk, if rainfall significantly diminished, trade patterns changed, or resources were drastically reduced, this backstop would no longer be sufficient. As the wealthy began to rely more and more on the zone of uncertainty and the various goods and resources it could provide, the population of the settlements focused exclusively on a specific, small set of resources and ignored others. This would then make the use of the zone of uncertainty even more vulnerable and susceptible to sharp changes.

In the end, resilience of the society was dependent mostly on the zone of uncertainty. Although during the Early Bronze IV populations still tended to occupy areas that were good for wheat and barley agriculture, there were some marked differences in the utilization of these niches. There was a larger focus on the zone of uncertainty during the Early Bronze IV, as well as on areas that were poor for agriculture. Sites in the arid regions where agriculture was difficult were most highly concentrated in the Negev region during the Early Bronze IV. This increased density was likely due to a higher concentration on the copper industry and movement out of the Faynan region of Jordan, down through the Jordan Valley, then across the Negev to the Mediterranean Sea. The exact dating of this copper trade, however, is still difficult. The precise dating of Early and Late EB IV occupations in the southern Levant remains highly problematic.

There was a high degree of continuity in the occupation of sites in the Negev during the EBA through to the middle of the EB IV. This period of continuity can roughly be broken down into two phases. In the first phase, which corresponds to the EB I-EB III and the late Predynastic through the 4^{th} dynasty of Egypt, there were many settlements centered around Arad in the Beersheba plain. Phase 2 roughly corresponds to the end of the Old Kingdom of Egypt, corresponding to the EB III. Small sites in the Negev highlands continued during this phase, in contradiction to other sites in the southern Levant, which seem to have disappeared. This increase in sites in the Negev was likely due to the copper industry out of Wadi Faynan. Arad was completely deserted by this time, and the copper industry was likely controlled by smaller polities and sites and was not as centralized as it had been earlier.

8.3 FINAL THOUGHTS

The end of the Early Bronze Age was once considered a collapse but can more likely be characterized as resilience and regional organization. Although there were major shifts at every level of society, these shifts were mostly in terms of how society and trade was organized and overseen and not in the types of activities. This includes resource procurement and trade goods. Agriculture continued, just at a different scale. There was no longer a central repository and surplus for a region controlled by one city, rather each individual village and settlement regulated their own means of production. There was still some hierarchy, as can be evidenced by the larger settlements and cities still occupied during the EB IV like Ebla in the northern Levant and Khirbet Iskander in the southern Levant, as well as the settlement system proposed by Haiman (1992; 1996; 2009) for the Negev copper trade. However, the primary modes of production were controlled at the individual settlement level in the southern Levant.

8.4 FUTURE DIRECTIONS

Several limitations became apparent while writing this dissertation. There was a deficiency in published data that separates the Early Bronze IV into any separate categories. Rather, most works lump the entire EB IV together as a single period. This was due, in part, to a lack in a clear chronology for the ceramic assemblage as well as a problem with survey archaeology. Previous survey archaeologists were expected to be a master of all periods, but there were obvious strengths for each surveyor. Most of the surveyors who worked in the Levantine regions in this study did not specialize in the EB IV, and thus it is possible that some survey data were missed or interpreted differently based on the surveyor’s expertise. There was also a problem with combining all the different surveys. Each survey was conducted by a different person, for different purposes, with different degrees of accuracy and specificity. This makes combining all of them relatively challenging.

These restrictions do not diminish the contributions this study can make in Levantine studies. This dissertation provides important groundwork for future work establishing an absolute chronology for the EB IV as well as positioning it in the greater Near Eastern cultural milieu. This study can lay the groundwork for more large-scale studies that do not rely on a single survey to draw conclusions and can encourage more scholars to look at the entire cultural phenomenon without relying on modern national or regional boundaries.

Finally, the next step is to organize the entire database amassed for this dissertation in order to study collapse and resilience in the entirety of the southern Levant during different periods. The Early Bronze IV was not the only period of “collapse” and change in the Levant. These changes occur at every major transition between periods, from the Middle to the Late Bronze Age, from the Late Bronze Age to the Iron Age, etc. The aim of this study is to provide a jumping-off point for standardization of models of archaeological data for collapse and resilience. This study also provides a means for broad comparisons of the dynamic relationship between environment, subsistence, and settlement in the past.

Appendix A: Major Early Bronze IV Sites

Bab edh-Dhra

Figure A.0.1: EBA ceramics from Bab edh-Dhra, Museum at the Lowest Point on Earth. Photo by author (taken 2/5/2019)

Bab ed-Dhra is located near the Dead Sea on the Kerak plateau and is rough 4 ha in size. The site was first excavated by Paul Lapp for the American Schools of Oriental Research in 1965 and 1967 and later by the Expedition of the Dead Sea Plain again for ASOR in 1975, 1977, 1979, and 1981 (Chesson 1999; Rast and Schaub 1978; 1980; Schaub and Rast 1989).

The site mostly consists of Early Bronze Age occupation. The fortified settlement was destroyed at the end of the EB IIIB, but there does not seem to be any break in occupation from the EB IV. The excavators tried to break the EB IV ceramics into different phases but Marta D'Andrea puts the ceramics in a late EB IV phase but does not discount a possible early EB IV occupation (D’Andrea 2014, 158). The available C14 dates, though, do point towards a later occupation but, again, not impossible there was an earlier one.

One of the exceptional features of Bab Edh-Dhra is its cemetery. The EB IB through EB III charnel houses are the most famous, but there are several shaft tombs associated with the EB IV (Schaub and Rast 1989, 473). These tombs uncovered a large number of vessels. The tombs themselves were framed with stone slabs, showing a continuation in the EBA traditions. The shafts themselves were stone lined and filled in with a stone filling. There was a large amount of energy devoted to the construction of these tombs (Schaub and Rast 1989, 548).

KHIRBET AL-BATRAWY

Figure A.0.2: Khirbet al-Batrawy viewed from the north. Photo by author (taken 3/2/2019).

Khirbet al-Batrawy is a 4 ha site located along the Upper Wadi az-Zarqa northeast of modern Amman. It was a major fortified town during the EB II-III and was at a strategic crossroads between the desert and the steppe with the Jordan Valley (Nigro et al. 2010). The placement of the site was well suited for protection and defense with steep, rocky cliffs on the entire perimeter except a small saddle in the northern side of the tell. The site was uncovered first during a survey and systematically excavated by Sapienza University of Rome directed by Lorenzo Nigro since 2005. During the EB IV the settlement was a bourgeoning rural fillable. This was after a brief gap in occupation after the EB III and the destruction of the walled settlement (Nigro 2006a).

The EB IV occupation was relatively important at the site. It was abandoned after the EB IVB, so the two phases of the Batrawy village was directly under the topsoil. The EB IVB was a village, the EB IVA was described as a campsite with groups of huts (Nigro 2013). A group of houses dated to the EB IVB appears to have been built during a single phase of construction and was likely short lived (Nigro 2013).

BE'ER RESISIM

Figure A.0.3: View of central Negev from Shivta, 12.86 km NE of Be'er Resisim. Photo by author (taken 8/8/2016).

Be'er Resisim was first discovered in the 1950s on accident located on a small outlook of the Wadi Nissana in the central Negev. Systematic excavations were carried out in 1978-1980 by William Dever and Rudolph Cohen as part of the Central Negev Highlands Project and survey (R. Cohen and Dever 1978; 1979; 1981). The site is 1 ha in size and more than 80 domestic structures were found during the excavations. Some off site structures are associated with the site, including around 20 cairns. The site contains a number of interesting finds, including shells from the Red Sea, stone cups, molds, copper daggers and other metal objects, and copper ingots (Dever 2014).

TELL BEIT MIRSIM

Tell Beit Mirsim is a relatively small site at 3 ha located in the southern Shephelah near the southern hill country. It was excavated by William F. Albright for four seasons, in 1926, 1928, 1930, and 1932 (Albright 1938). The site was not fortified during the EB IV, the fortifications were built immediately after during the MBA. The EB IV is represented by two strata at the site, Stratum I and Stratum H. There is a thick ash layer between these two strata. Marta D'Andrea (2014, 83) puts this in the late EB IV based on the ceramic assemblage. There is no absolute chronology for Tell Beit Mirsim.

The cemetery at Tell Beit Mirsim was excavated later in the 1920s. Most of the tombs were found empty. Only one tomb contained primary EB IV materials, but another six are dated to the EB IV based on the typology of the tombs (Greenberg 1993).

EIN ZIQ

Figure A.0.4: From Mitzpah Ramon looking north, 20.3 km SW of Ein Ziq. Photo by author (taken 8/6/2016)

Ein Ziq is a large site for the Negev at about 2 ha in size. It is located relatively close to a water source and is about 10 km southeast of the modern settlement of Sede Boqer. The site contains about 200 oval structures and was occupied during the EB IV and then abandoned, except for a small number of Nabatean tombs.

The material remains from Ein Ziq point towards an EB IV period of occupation. There are over 10,000 flint pieces recovered, tens of copper ingots, copper chips, fine grinding stones, small hammer stones, and a large repertoire of ceramics, not all of which are local (Haiman 1992). There are also a large number of C14 and OSL samples taken from inside the structures and dated. Seven C14 samples, collected from different contexts in different areas of the site, were run and date to roughly 2450-2200 B.C.E (Dunseth et al. 2017, 6).

DHAHR MIRZBANEH

Dhahr Mirzbaneh is a small site at 0.8 ha located in the Central Hill Country along the Wadi Samiya. It was discovered on a rocky outcrop and was probed in 1987 by Israel Finkelstein (1991). There is a wall surrounding the site with a large, rectangular, stone structure dating to the

Early Bronze IV. There was also an EB IV cemetery discovered near the settlement with 3 tomb clusters that included around 610 tombs (P. W. Lapp 1966). The pottery is coarsely made but was likely done on the slow-wheel.

EBLA

Figure A.0.5: Ebla viewed through the gateway. Photo by author (taken 6/18/2010).

In 1964, the University of Rome began excavations at Tell Mardikh, a large site located about 55 km southwest of Aleppo. It was selected after a series of brief surface surveys because it had been brought to the attention of the Syrian government in previous years due to illegal excavations performed on the tell and its uncharacteristically large size. In 1968, the damaged bust of a royal statue was uncovered, with a cuneiform inscription mentioning the king of Ebla. This was the first indications that Tell Mardikh might be ancient Ebla, already known from the Mari texts in addition to other extant sources. After the discovery of the royal archives in Palace G in 1974 there was no doubt as the identification of the ancient citadel. The royal archives predominantly date to Mardikh IIB1, or the EB IVA, which ended with a burning of the royal palace and number of other spots on the site, most likely attributable to Naram-Sin of Akkad (Matthiae 1981) and followed by the building of an Archaic Palace in Mardikh IIB2, or EB IVB.

Occupational History

There are clear breaks between the occupational phases from Mardikh IIB1 to IIB2 and then into Mardikh IIIA, although some degree of continuity is present (Mazzoni and Felli 2007). These changes are most likely the result of destructions by outside invaders, first in Mardikh IIB1 by Naram-Sin of Akkad and later in Mardikh IIB2 by later, subsequent conquests into the Ur III period (Matthiae 1981; 2010).

Mardikh IIB1 represents the first great urbanization of Ebla. The state archives, constituting of around 15000 tablets, spanning roughly three generations, and discovered in Palace G, sheds some light on the nature and character of the occupation at the site. It is obvious from these documentations, if not from the palace itself, that there was an elite class at the site run by a king or EN. A large city square or courtyard was established and most likely served as a means of unifying and organizing a number of different buildings at the site. The end of the period is marked by destruction. Palace G was burnt down and abandoned, as were other parts of the site. There are two possible suspects for this event: Sargon of Akkad and his grandson, Naram-Sin. Both kings claim to be "king of the four regions, of the upper and lower sea," meaning they were rulers of the known universe, from the Persian Gulf to the Mediterranean Sea. Both kings also state that they conquered the kingdom of Ebla. It is likely the deed of Naram-Sin, partially because the time line fits better if the reign of Naram-Sin corresponds to the end of the EB IVA, and partially because it fits the evidence better (Matthiae 1981).

Although Palace G was destroyed and not rebuilt, the evidence from the lower town indicates that there was not a widespread interruption in occupation across the site. There were changes in the monumental architecture—from the Royal Palace G to Archaic Palace P, for example—and in the material culture. The limits of the occupation appear to be the same from one period to the next, although some gaps are evidenced that are probably due to the destruction of the site. Another level of destruction signifies the end of Mardikh IIB2, with a thick layer of packed ash between this and the later Mardikh IIIA phase (Matthiae 1981).

Foundations of buildings built during Mardikh IIIA rest squarely on the ash layer at the end of Mardikh IIB2. Also, Temple D, first established during Mardikh IIB2, was expanded upon and adapted into a later MBA temple during Mardikh IIIA-B. There is a clear break, though, in the material culture, even if the site was continually occupied from the EB IV into the MB I. This implies that whoever it was that brought an end to Mardikh IIB2 also started to rebuild right away.

HAZOR

Figure A.0.6: From the top of Hazor looking west. Photo by author (taken 8/13/2014)

Tell el-Waqqas, ancient Hazor, is located in the Hulehh Valley of modern Israel. It is roughly elliptical in shape and was 80 ha at its largest. John Garstang first dug a test probe in 1928 and has been systematically excavated on and off since 1955 (Amnon 2013). The site was fortified during the EB III but there appears to be a period of abandonment after, and was likely resettled late in the EB IV (D'Andrea 2014). The EB IV was first detected at Hazor by Yigal Yadin with materials found in secondary contexts in Area A. In 1998 an EB IV settlement area was discovered at the site in Area A (Ben-Tor 2006). This was the first discovery of EB IV in primary contexts at the site. However, evidence is relatively scarce at Hazor for the EB IV.

TALL AL-HAMMAM

Figure A.0.7: View of Tall al-Hammam from the south. Photo by author (taken 3/2/2019)

Tall al-Hammam is a site in the southern Jordan valley about 12 km east of the Jordan River near the King Hussein/Allenby Bridge crossing (Prag 1991). The site sites at the crossroads of several trade routes in antiquity through the region. It measures 36 ha in size at its largest settlement and was occupied from the Chalcolithic through the MBA (Collins, Kobs, and Luddeni 2015). There is an upper city that rises 30-35 m above the lower town.

The tall did not decrease in size during the EB IV and appears to have retained its urban, city-state stature (Collins, Kobs, and Luddeni 2015, 115). There are some differences in architecture from the EB III to the EB IV, but it is all gradual and there are no drastic changes at the site from one period to the next. At least one gateway of the EB III was blocked during the EB IV, which indicates that the walls were probably still in use during this period.

TELL IKTANU

Figure A.0.8: View of Tell Iktanu from the south. Photo by author (taken 3/2/2019).

Tell Iktanu is located in the southeastern Jordan Valley and is 18 ha in size. The site as excavated sin the 1960s, 1980s, and 1990s by Kay Prag. The site was predominantly occupied in the EB IB and EB IV, with some evidence for the Iron Age (Prag 1991; 2009). There is no occupation known for the EB II-III. Two phases of EB IV occupation were uncovered at the site and there was a period of destruction between the two. There was a short occupation gap between these two phases and was completely abandoned after the EB IV (Prag 1991). The two phases of occupation also represent different types of ceramics from the different ceramic families explored by Marta D'Andrea (2014).

KHIRBET ISKANDER

Figure A.0.9: Wadi al-Wala looking east towards Khirbet Iskander. Photo by author (taken 3/2/2019).

Khirbet Iskander is located on the central Transjordanian Plateau, at a major crossing point of the Wadi el-Wala along the main north-south trade route. Today it is 24 km south of modern Madaba and right off the King's Highway (Richard 2010, 5). The EB IV occupation is particularly important at the site. Khirbet Iskander was a fortified, sedentary town during the EB IV, one of very few (Richard 1990; 1997; 2010). The considerable remains are well preserved. There are also multiple phases of occupation for the EB IV, allowing for some periodization. The site contains materials for the entire EBA.

The EB III site was fortified and brought to an end by violent destruction (Richard 1997). The fortifications seem to have been reutilized during the EB IV. The fortifications are similar to those that were uncovered at Bab edh-Dhra. The site itself is typically described as “urban-like” with the fortifications, a likely storeroom in Area B, and a gateway in Area C (Richard 2010, 2). It also appears that the settlement was permanent with multiple phases of architecture like rectangular houses and domestic trappings like taboons, food preparation equipment, and large amounts of pottery (Richard and Boraas 1988, 109).

Three different stratigraphic phases of Area C based on ceramics is present at the site. Phase 1 is described as “transitional EB III/IV” pottery by the excavators (Richard and Long 2004). The ceramics are poorly made and coarse. The Phase 2 pottery is made on the slow wheel. Phase 3 contains ceramics with features that are present in both the EB IV and the MBA (D’Andrea 2014). These phases are for the entirety of the EB IV.

JERICHO

Figure A.0.10: Jordan Valley looking east from modern Jericho. Photo by author (taken 11/7/2018).

Tell es-Sultan, more commonly referred to by its biblical name Jericho, is located in the south western Jordan Valley and is 3 ha in size. The site has a long history of excavation starting in 1868. Most famously, the site was excavated on behalf of the British School of Archaeology in

Jerusalem, the Palestine Exploration Fund, and the British Academy in 1952-1958 under the direction of Kathleen Kenyon (1952; 1960a; 1960b; 1976; 1981). In recent years excavations were renewed by an Italian-Palestinian expedition of the Sapienza University of Rome and of the Department of Antiquities of Palestine from 1997-2000 and in 2009. The excavations are still ongoing.

Figure A.0.11: Looking west from the top of Tell es-Sultan. Photo by author (taken 11/7/2018).

The tell has a very long occupation, beginning in the Pre-Pottery Neolithic A through the Byzantine period. The site is particularly important to understanding very early occupation in the Levant during the Neolithic. The Early Bronze IV has been uncovered all over the site by most of the expeditions. The EB IV occupation began after a small period of occupational gap after the destruction of the site at the end of the EB III (Nigro et al. 2010). Then there were two phases of EB IV occupation. During Sultan IIId1 the ceramics were handmade with common vessels only. During Sultan IIId2 the slow wheel was reintroduced for ceramic manufacturing (Nigro 2006b).

Cemetery

Jericho is well known for its EB IV cemetery. It is located north of the tell wand was first excavated by Garstang but it was under Kenyon that it was systematically excavated (Kenyon 1976). Hundreds of shaft tombs were uncovered which Kenyon divided into seven types based on burial, shaft and chamber shape, and grave goods. These types are: “Dagger Type” with a single crouched burial equipped with a dagger or beads or a pin, the “Pottery Type” for burials with pottery vessels, the “Square-Shaft Type” that are square shafts and crouched burials with vessels and on occasion a dagger, the “Bead Type” that are coarsely made containing disarticulated burials with beads and small items of coper, the “Outside Type” with large changers and shafts with disarticulated burials and pottery among other artifacts, the “Composite Type” contains features from the other types and does not fit one well, and the “Multiple Burial Type” which contains three burials and there is only one tomb of this type (Kenyon 1960a; 1960b; 1976).

MEGIDDO

Figure A.0.12: View of Jezreel Valley from top of Megiddo, looking west. Photo by author (taken 7/23/2011).

Megiddo or Tell el-Mutesellim, contains a long and extensive history. It has been excavated considerably since 1903 by a number of different expeditions: the first from 1903-1905 by a German team; in 1925 by the Oriental Institute of the University of Chicago; in the 1960s by Hebrew University; and a recent endeavor by Tel Aviv University and The George Washington University (Finkelstein, Ussishkin, and Halpern 2000). It is a prominent feature in the Jezreel, raising 50m above the surrounding area and covering around 6ha (Aharoni 1993b). It is positioned to control the access into the Jezreel from the Sharon. Phases of occupation span the Pre-Pottery Neolithic to modern times.

The Early Bronze IV data came predominantly from the 32 tombs discovered along the eastern slope of the tell. More EB IV materials were retrieved from cultic areas and the renewed excavations collected materials from the tell's surface or secondary contexts. In recent years some reevaluations of previous materials from a potential foundation deposit full of Early Bronze IV ceramics (M. J. Adams 2017, 506).

JEBEL QA'AQIR

Jebel Qa'aqir is a site located in the southern Shephelah/northern Negev and was excavated by William Dever in 1967-1968 and 1971. The EB IV is the dominant occupational phase but with some evidence for earlier and later materials (Dever 2014). The settlement is mostly comprised of caves and tumuli. The site was enclosed by a demarcation wall (R. Cohen and Dever 1979, 131–32). As well, a kiln with a large amount of EB IV pottery was uncovered. Dever suggested that the EB IV ceramics date to the late part of the period (Gitin 1975).

TEL QASHISH

Tel Qashish is located along the northern bank of the Kishon River in the Jezreel valley. It is in close proximity to Tel Yoqne'am, which was likely the major site in the region upon which Tel Qashish would be dependent (Ben-Tor, Bonfil, and Zuckerman 2003). It is a relatively step tell with 4.3 ha encompassed on the summit. It was first excavated by Garstang in the 1920s with two trial trenches who predominantly found Early Bronze Age remains. Later excavations and surveys also uncovered MBA, LBA, Iron Age, and Persian occupations, but the latest two were destroyed during the 1948 war by modern activities.

Tel Qashish was continually occupied from the Early Bronze Age to the Late Bronze Age, including potentially a brief interlude in the Early Bronze IV. Stratum XI at Tel Qashish represents an unfortified period at the site with smaller buildings and relatively ambiguous ceramics. It falls between the easily distinguishable EB III and MB I strata, and therefore may represent an ephemeral EB IV settlement at the site (Ben-Tor, Bonfil, and Zuckerman 2003, 182). This phase is on a different plan than previous strata and contains roughly a half meter of accumulated debris between it and the previous Stratum XIIA.

TELL QIRI

Tell Qiri is located in the Jezreel Plain along the slopes of Mount Carmel near where the mountain meets the valley. It was excavated from 1975-1977 as part of the Yoqne'am regional project in an attempt to understand the site before it was completely destroyed under modern architecture. The site has been heavily disturbed in modern times due to construction efforts. It contains periods of occupation ranging from the Neolithic through the Ottoman, including the Early Bronze I and Middle Bronze I-II. The Early Bronze I was represented only in mixed contexts, mixed in with earlier ceramics. The material remains for the MB II at Tell Qiri are very disjointed. It appears that it was unfortified during this period and was restricted to the eastern part of the site (Ben-Tor and Portugali 1987).

AL-RAWDA

al-Rawda is an archaeological site 80 km east of Hama in the Syrian steppe. The project was co-directed by Corinne Castel and Nazir Awad and was conducted by the French Centre National de la Recherche Scientifique and the Syrian Directorate-General of Antiquities and Museums starting in 2002. The site receives falls outside the 200 mm isohyet and receives relatively little rainfall (Barge, Castel, and Brochier 2014; Corinne Castel 2008; 2010; 2011; Corrine Castel and Peltenburg 2007; Gondet and Castel 2004).

The site of al-Rawda was founded around 2400 B.C. and was abandoned a few centuries later (Barge, Castel, and Brochier 2014, 173). al-Rawda contained urban features, including monumental fortifications, planned spatial organizations, and specialized structures. There is a rampart that surrounds the town that is 1.2 km long (Corinne Castel 2008, 302). Within a 10 km^2 area of the site there are the remains of roughly 40 EB IV traces.

Another important feature associated with al-Rawda is the Tres Long Mur, the very long wall, that ran for over 220 km and passes within 10 km east of the site (Geyer et al. 2010). It also, interestingly, follows the 200 mm isohyet relatively close. There are no material remains associated with the wall, but due to association with other sites such as X, Y, Z and remains it is likely the Early Bronze IV (Barge, Castel, and Brochier 2014, 181).

KHIRBET AL-UMBASHI

Khirbet al-Umbashi is a fairly large site located in southern Syria along the steppes. The site was excavated 1991-1996 by a Syro-French expedition. It was fortified during the EB II-III and a large cemetery during the latter part of the 3rd millennium B.C. with over 1000 megalithic tombs (Braemer 1994). The EB IV occupation was concentrated in the southwestern part of the town and was likely a village during this period. It consists of six clusters of basalt dwellings constructed in adjoining circular rooms. It was unfortified but relatively large during the EB IV. Unfortunately, the majority of the materials discovered at the site were from the surface so creating a diachronic settlement development during the EB IV at the site is problematic (Braemer 1994; Braemer, Echallier, and Taraqji 1993; 1996). The site does appear to be composed of a sedentary population during the EB IV. One of the lead archaeologists, F. Braemer, suggests that Khirbet al-Umbashi became larger and thrived during the EBA due to its location at the intersection of sedentarism and pastoralism. Specifically, there was a collaboration between the sedentary community and groups of pastoralists.

TELL EL-‘UMEIRI

Figure A.0.13: Tell el-'Umeiri. Photo by author (taken 3/2/2019).

Tell el-‘Umeiri is located northeast of modern Madaba and is 4 ha in size. It was first discovered in 1976 and excavated by teams from Andrews University. The site was occupied from the EBA through the Islamic period. EB IV occupation was only discovered in one area of the site and in a couple of soundings. It was directly over the EB III phase of occupation (Geraty 1985). Two phases of occupation were discovered in Area D of the site (Geraty 1997). The earlier phase was put at the beginning of the EB IV; the later phases was dated to end of the EB IV.

APPENDIX B: METHODOLOGY

The methodology employed in this dissertation is a mix of both traditional and innovative approaches. Because the data is mostly derived from already published surveys and excavations, a number of different techniques were required to, first, integrate all of the information into one database and impose some form of standardization, second to import it into GIS, and finally to analyze the data in order to determine the environmental and cultural changes that occurred during the Early Bronze IV. This was done in order to analyze perceived changes in the settlement record. This appendix will begin by looking at the history of technology use in archaeological studies, then explain the various methods used in this dissertation. First, there is the acquisition of data using Python. Second, there is database management and how the database was formed. Finally, it will explore the various Geographic Information Systems (GIS) methods utilized within this dissertation.

TECHNOLOGICAL APPROACHES TO LANDSCAPE

A number of studies on the physical manifestation of human occupation across the landscape relies heavily upon technological advances and their integration in archaeology (e.g. McCoy and Ladefoged 2009; Wheatley and Gillings 2002). Archaeologists utilize digital technology to facilitate interpretations of highly complicated interspatial relationships, including statistics, remote sensing, location modeling, and spatial patterning. The first technological advancement used in landscape studies was the map. In places like the Middle East, which have been extensively mapped through different periods of history, a map can preserve the location of sites and features that have since been lost, provide the location of specific geological types and information on the natural environment, or provide a means to analyze and compare information that was deemed important across time.

The use of aerial photography in archaeology, also, proved to be useful once it was available (Ur 2005). This was particularly true in the Near East with aerial photography missions after World War I. Shortly after, satellite technology advanced enough to collect data from the area. No satellite mission was undertaken with the intent of helping archaeology, but, as a fortuitous side effect, both NASA and foreign space agencies released satellite images that archaeologists were able to utilize in their research. For the Middle East, the release of the CORONA data was particularly helpful. In 1995, thousands of images captured during the Cold War era for espionage purposes were declassified and have been slowly made available for widespread use (Casana and Cothren 2013). These panchromatic images have some of the best spatial resolution available for the Near East that is freely available (1-2 m resolution) and was captured before the extensive use of the mechanical plow in that region, meaning some of the smaller, more ephemeral sites that have since been destroyed are still readily visible on the imagery (Casana and Cothren 2008).

Of importance to many of landscape studies is Geographic Information Systems (GIS)[85]. GIS was first utilized in the United States in response to a need to reduce the cost of public archaeological projects in relation to Cultural Resource Management (CRM)[86]. With such a heavy emphasis by archaeologists on the spatial distribution of cultural materials across a site and of sites across a landscape, further uses of GIS became apparent. In particular, Conolly and Lake (2006, 2) identify five types of questions that are well suited for GIS: location (all sites and

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[85] GIS is a rather difficult term to define. At its most broad, it is “an information system that is designed to work with data referenced by spatial or geographic coordinates” (Star and Estes 1991) This is rather broad and does not incorporate everything that could be included in GIS. For the purposes of this study, GIS will be used to denote a set of spatial tools that can facilitate in the analyses of spatial organizations and patternings of features across the landscape (Wheatley and Gillings 2002, 8). Specifically, it will refer to the tool set available through ESRI and ArcGIS.

[86] A number of states hired archaeologists to generate predictive models to identify cultural sensitive areas in the state (Kvamme 1983; Kvamme and Kohler 1988). One of the more successful models was developed for the Minnesota Department of Transportation (http://www.dot.state.mn.us/mnmodel/).

material remains across the landscape); condition trend (specific category of material remains across the landscape); routing (recreation and analysis of roads and pathways); pattern (relationship of material remains across the landscape); and modeling (predictive and descriptive,[87] what are the conditions of the location of the material remains).

This study predominantly focuses on locational analyses, with the incorporation of explanative modeling[88]. One of the earliest attempts at this was performed by Hodder and Orton (1979). The authors address correspondences between late Iron Age coins and Roman road systems in southern England utilizing three different catchment zones, specifically 2mm, 5mm, and 10mm from the road. By doing this, they were able to determine that there was a significant association between coins and roads, which indicated that the Roman roads were built along the same path as earlier, Iron Age roads. Due to its early date, this study was done without the utilization of computers and was done by hand with paper maps. A later study by Douglas Kellogg (1987) also looked at the spatial distribution of cultural materials, in this case shell middens, without computers. A total of 190 sites were identified during a walk-over survey and their location recorded. A random sample that simulated a hypothetical site distribution was also generated, and 183 of the 190 random locations were also visited and analyzed. Using the Smirnov two sample test, these random locations were compared with the data derived from the survey. Throughout the course of this study, Kellogg demonstrated shell middens were located

[87] The main difference between predictive and descriptive modeling is in their final purpose. Both model the setting of sites and culturally sensitive materials, attempt to determine environmental components associated with these materials, and then statistically test their veracity. This is where explanative modeling ends. Predictive modeling then applies these parameters to unexplored regions (Kvamme 1999). The third type of modeling, agent-based modeling, allows for determining the behavior of cultural agents on the socionatural landscape. Each agent is given a life span, vision, ability to move, food requirements, and consumption and storage to mimic what real people living on the landscape might have needed. Although a useful method, it is not going to be applied here.
[88] There are three main reasons why archaeological site modeling works: as most anthropology courses teach us, human activities are patterned and it is no less so in regards to the natural environment; we can determine how people interacted with the environment by looking artifacts and features; GIS is a powerful way to analyze this (Kvamme 2006).

near mudflats where the soft-shell clams were found, sites were located close to fresh water, and sites faced south and east. Although not necessary to rely on GIS (Kvamme 1999), time necessary to do these calculations and error are both greatly reduced. Additionally, more complicated statistical analyses can be performed.

GIS has not always been applied to explore an archaeology of “place.” Places imply that the spatial organization of artifacts and sites is dependent on individuals and what is preserved in the archaeological record is partially the product of intentional and accidental consequence by those individuals (Wheatley and Gillings 2002). Specifically, three problems can be found in utilizing GIS: explanations tend to focus exclusively on environmental reasons; it implies that there is a one to one correlation between settlements and the environment; it tends to ignore the space between settlements (Wheatley 2004). The current study acknowledges that these are potential shortcomings and will push the explanations derived from GIS data further than a functional, environmental interpretation.[89] Further implications GIS has had on archaeology will be explored with the methodology utilized in this project.

DATASET ACQUISITIONS

The data for this dissertation was acquired through various methods, all from published sources. The various sources themselves are discussed in Chapter 1. The numerous books and hard copy format surveys were digitized first by converting them into PDFs. Then using open source Python libraries to read the converted digital files were analyzed to determine logical patterns.

[89] For example, a study by Vince Gaffney, Zoran Stančič, and H. Watson (1995) looked at how GIS modeling could be utilized to determine cognitive environments through viewshed analyses. Essentially, it is possible to determine the land that is viewable from any one spot including a site, and that would then constitute what a person in antiquity could perceive. This has since been done multiple times (Ellis 2004; Gillings and Wheatley 2001; Jochim 1976; Jones 2010; Lake, Woodman, and Mithen 1998; Llobera 1996; 2010; McCoy and Ladefoged 2009; Stancic and Kvamme 1999; Winter-Livneh, Svoray, and Gilead 2010).

Specifically, the Python library BeautifulSoup[90] was used. Once the regular patterns were uncovered, the data was converted into Comma-Separated-Value (CSV) table, readable by most spreadsheet programs, including Microsoft Excel. From there it was easty to integrate the data into the larger database.

For data published by the Israel Antiquities Authority (IAA) and Department of Antiquities in Jordan (DAJ) online, a different set of skills was needed. In order to quire this data in a quick, efficient manner, the webpages were accessed using open source Python programming tools and a method called "web scraping." This required a basic knowledge of tools like Python, HTTP, HTML, and CSS.

Web-scraping is a multistep process. First, to obtain the raw data, a web page is accessed in the usual way, by making an HTTP request and downloading the web page data file.[91] When accessing a web page with a typical web browser, the browser will download the web page as a file upon each visit to a page, and then immediately display it. However, it is also possible to quickly access and save hundreds of web pages at a time using Python and the requests library to mimic a web browser. In this situation it is necessary to automate the same process as a web browser. First, an HTTP request must be made. Second, the HTML file is received from the server. Finally, it is saved to a computer.

In order to extract useful data from any downloaded web page, the basic structure needs to be examined and elucidated. Hypertext Markup Language (HTML) is a standardized system to display web pages[92] downloaded from the internet. Typically, a web browser will handle this

[90] Beautiful Soup is a Python library hat is utilized to pull data from HTML and XML files. It is a toolkit to extract information from documents and is a fairly simple code package to utilize.
[91] It is important to note that a web page is just a normal text file that a web server will send to a computer; exactly how it is accessed and used is up to each individual.
[92] It is a mixture of human-readable content dispersed within "hypertext markup" tags, which instructs the computer how to format display each piece of content (like paragraphs, tables, images, headers, etc.).

automatically. All the content the page author intended to display is rendered inside the browser and shown to the user. By parsing and processing HTML with open-source tools like BeautifulSoup instead of a web browser it is possible to find and extract only the important information buried within the HTML file, discarding superfluous formatting and display markup. Fortunately, both the IAA and DAJ use basic HTML to display their data online with an easily parsable background database.

To scrape data from the IAA and DAJ websites, it was necessary to first discern a pattern for the webpage Uniform Resrouce Locators (URLs) and be able to guess and check which archaeological sites the web server might have on file in its database. After inspecting the HTML from each website, it is possible to identify a given site with an internal "Site ID" number. This is a unique, otherwise meaningless number assigned by the web server for each excavation site it stores in its database. Archaeological site data is accessible using a predictable URL scheme, with an "id=." parameter. Changing this parameter will yield new data for a new excavation site.

Using a scripting language like Python, it is possible to guess-and-check numbers for this id parameter, from 1 to about 18000. Every possible number cannot be expected to refer to excavation data. However, it only takes about an hour to test about ten thousand possibilities, so a "brute force" approach was applied to check everything. The program was written in Python editing environment. It works with and relies on the requests and BeautifulSoup libraries. It uses requests to send a Hypertext Transfer Protocol (HTTP) request to each given URL and returns and HTML string that can be saved to the computer using Python. All of the Python scripts utilized in data collection and parsing are housed on GitHub.[93]

[93] https://github.com/Abkaroll

For the IAA, each excavation site has all its information stored on a single page, with a single predictable URL. Each site has its own unique ID, and the Site IDs start counting upwards from 1. Not every site ID refers to a valid page, but the majority do. All are publicly accessible. These pages can be saved for later analysis and data extraction.

The DAJ website data uses a similar "Site ID" scheme, but stores data for each excavation site spread across multiple pages with slightly different URLs. The pattern is still predictable, and each excavation site has up to six data pages with potentially interesting content. Just like with the IAA site, it is easy to predict and change the ID number, and it does not take very much effort to try every possible Site ID, so this study attempted everything between 1-10,000. The following are examples for the web pages utilized for a single site, site "1234".

- http://www.megajordan.org/Reports/SiteGeneral?gid=1234
- http://www.megajordan.org/Reports/SiteSignificance?gid=1234
- http://www.megajordan.org/Reports/SiteSiteElements?gid=1234
- http://www.megajordan.org/Reports/SiteAdministration?gid=1234
- http://www.megajordan.org/Reports/SiteMonitoringEvents?gid=1234
- http://www.megajordan.org/Reports/SiteReferences?gid=1234

It was necessary to also program a delay between each call to a website so that the script did not overwhelm the website since multiple pages were scraped. The IAA website was simple, so it took less than 24 hours to download everything they served out publicly. MegaJordan's servers were much more complex and took longer. The script would detect that the servers were no longer responsive and would pause for a few seconds after making an unsuccessful request. To limit the load on the server, an "exponential back-off" scheme was used, where successive un-served requests steadily increase the wait before another attempt. The first unsuccessful request triggers a two-second delay, the second failure triggers a four-second delay, the third triggers an eight-second delay, and so on. This mimics the behavior of a human user and gives the servers enough time to handle other web traffic as well as the web scraping activity. Because of this, the DAJ data took two weeks to download everything.

The next step was to write a new script to parse interesting data out of the saved HTML. The BeautifulSoup library was used again to extract specific data and fields out of various tables and paragraphs displayed in the HTML, separating interesting data from unimportant markup, and providing it in a structured, manipulability format.

Finally, the extracted data was put into a Comma-Separated Values (CSV) file. CSV is a simple data file format that can be easily read by Python and Microsoft Excel or Access. It is an easy way to store tabular data in a text file. In order to do this, the Pandas[94] software library was utilized for data manipulation and analysis in Python. A data frame, similar to an Excel spreadsheet and a CSV table, is the primary output for Pandas and makes it the perfect parsing software for this project. After the data was put into a CSV file, it can be opened in Excel and at that point it is just basic manipulation.

DATABASE CREATION

The number of various datasets utilized in this project requires a strong database capable of handling the data as well as an ability to integrate into GIS. Database management, with a few notable exceptions, [95] is largely ignored or not commented on in archaeological research. There are no generally agreed upon guidelines for archaeological research databases, and even the variables and the ontology required to define those variables is lacking and done on an impromptu basis. Although these are real issues that do need to be addressed at some point, this project does not aim to generate a master ontology and methodology, but rather one that can be

[94] Pandas provides features like the "R" language, which may be more familiar to many academics.
[95] For example, see the following studies (Arctur and Zeiler 2005; Bachad et al. 2013; Brampton and Mosher 2001; Fayyad, Piatetsky-Shapiro, and Smyth 1996; K. B. Shaw, Chung, and Cobb 2004; M. E. Smith et al. 2012).

applied in the immediate circumstance. The "site" is the primary unit of analyses,[96] with 13 variables defined per archaeological site (Table B.1).

Table B.1: List of variables in the site database.

Variables
Modern name
Ancient name
Coordinates (easting and northing)
Site size
Region
Geologic formation
Site type
Site function
Burial type
Period of occupation
Reference for site
General notes

Preliminary analyses on a small subset of the data utilized Microsoft Excel to determine if the current project was feasible. With the integration of more variables in addition to a larger number of sites and surveys, Excel proved to not be powerful enough to handle the information. Therefore, a new platform was required. Relational and graph databases were assessed for integration, both with various pros and cons.

Relational databases are traditionally constructed in structured query language (SQL), which is the basis for Microsoft Access and commercial programs like Oracle,[97] MySQL,[98]

[96] Although the notion of "site" is problematic in landscape archaeology, this study will still utilize it. The defined "site" might be a modern arbitrary construct (Dunnell 1992; Dunnell and Dancey 1983; Banning 2002), but it is a way to start framing arguments. Site type and function will be articulated, where possible, to attempt to nuance the concept. With a study incorporating such a large area and many different surveys, there is no easy way to disregard the concept. Instead, I acknowledge the problem and attempt to minimize inherent assumptions about what is a site, specifically through defining multiple types of sites and not just using "site" as a broad, all-encompassing concept for everything from small, sherd scatters to ancient Ebla.
[97] https://www.oracle.com/database/
[98] https://www.mysql.com/

MariaDB,[99],or SPARQL.[100] In these databases, multiple tables are accessible through a similar column of IDs, or the primary category. SQL allows the data to be queried in a relatively simple manner and to display the relationships between the different points. Basic SQL was needed to parse data in ArcGIS

Microsoft Access appears to be the best suited to handle the datasets. This project primarily utilized ArcGIS, which can import from and export to Microsoft Excel. Microsoft Access allows for export into Excel format, but is more hardy and allows for a greater range of data to be captured and analyzed. Accurate records of the settlement surveys and data captured from them needs to be curated, and Microsoft Access is a database with enough features to analyze the data set and can be integrated into a GIS environment.

In addition, Microsoft Access allows for the development of queries to further subdivide the data and make it easier to display. It also allows the formation of forms, which can be reutilized for display purposes. Finally, it is also a relatively easy digital database to use. It can be interfaced with a front-end program for display on the internet, if ever the database should be released for public consumption. It is relatively easy for anyone else to utilize the data in this format, should it be shared.

Database Integration

Once the primary data was acquired and regularized in a database, it was integrated into a Geographic Information Systems (GIS) environment. GIS data can be split into two different types: vector and raster. Vectors are objects that can be represented by points, polygons, and lines. In the case of archaeological investigations, this would include sites as points, site area, territories, geomorphological type areas, and country outlines as polygons, and roads, pathways,

[99] https://mariadb.com/
[100] http://www.w3.org/TR/rdf-sparql-query/

rivers, and highways as lines. The other type, raster, stores data in pixels. Each pixel contains an attribute and a location. For example, in a Digital Elevation Model (DEM), each pixel of a raster represents the elevation for the area the pixel encompasses.

The sites, in a point vector file, represent the primary raw data for the study. The raw forms were manipulated in ArcGIS 10.8 in several different ways to determine if there is any spatial patterning between the different types of sites and sites during the different periods. The first goal was to obtain the settlement data for the Early and Middle Bronze Age. To do this, many published surveys as well as the data available through government agencies in the Middle East were utilized, specifically Jordan and Israel. In the northern Levant, the primary source of data was from individual surveys instigated predominantly by scholars in the field.

Another problem this study must address is utilizing old surveys in new studies, which can be fraught with difficulties. Original research questions that lead to a specific methodology may not match up with new research goals, inconsistencies in data collection and presentation make it hard to compare data sets, and modern destruction of archaeological features visible even 10 years ago makes this data challenging. That is not to say that using old surveys is inappropriate, like in areas that are no longer safe for travel. It just requires extra attention and care to make the data comparable.

Along with research agendas, surveys have been undertaken by government agencies to record all culturally sensitive material. This is helpful particularly when new developments and construction projects are undertaken by the government, who then has a list and location of all sites to avoid during construction. Of interest to the current study are surveys undertaken by the Israel Antiquities Authority (IAA) and the Department of Antiquities in Jordan (DAJ). Both governments have made their survey data available online, although in text and not GIS format.

In this way, surveys have been conducted that identify site locations but do not necessarily have theoretical questions underpinning those surveys.

DATA MANIPULATION

One benefit of using GIS is that it allows for a high degree of data manipulation to allow for more nuanced landscape and spatial analyses. In this study, several different methods, easily employed through ArcGIS, were utilized. These methods will be explained in the following sections. Furthermore, the raw data maps from the FAO were combined with those from the USGS to create maps of modern maximal usage for agriculture, livestock rearing, and forestry.

GIS and Statistics

Kernel Density Estimates (KDE) is a raster dataset that is derived from a point file and measures the density of point features. In this type of analysis, the density is highest at the epicenter of each point and the probability of a site diminishes as it moves from that center. The value of each cell in the raster is reached by adding the values of the kernel surfaces that overlay that cell. Therefore, the higher the number in the cell, the more "probable" it is to contain a site. This method is used to help "fill in" the data, in that it shows a probability of where the cluster of the sites should be if all were observed. It allows for density estimates by allocating probability and fall off for each point, highlighting "hot spots" of activity across the landscape.

Average Nearest Neighbor measures the clustering or dispersion of points across the landscape (Hodder and Orton 1979). It measures the distance between each feature and its nearest neighbor's location, then averages all these values and measures it against an expected, random sample to determine if the data set is random, clustered, or dispersed. In ArcGIS, this type of analysis returns five values. The observed mean distance, expected mean distance, and nearest neighbor index show how clustered, if at all, the data is. A value of 1 for the nearest neighbor index indicates a random sample, a value less than 1 indicates a clustered sample, and a value greater than 1 indicates a dispersed sample. The z-score and p-value designate the significance of the clustering. The p-value is a probability. It is the probability that the points put into the Nearest Neighbor analysis are clustered. The smaller the p-value, the smaller the probability that the perceived spatial pattern is random. The z-score is based on standard deviations. For example, if a z-score is returned of +3, the result is within 3 standard deviations. The z-score can be either positive or negative, and the pattern is thought to be statistically significant the higher the z-score is. Z-scores far from 0, positive or negative, with very small p-values are in the tails of a normal distribution and implies it is unlikely the perceived spatial pattern is truly random.

Archaeological survey and landscape studies are uniquely placed to analyze the dispersion or clustering of sites. Distances between sites can easily be measured through Nearest Neighbor methods, but in order to look at the multiscalar nature of many of these settlement patterns, a slightly more advanced statistical analysis needs to be performed. This multiscalar settlement pattern can be indicative of sociopolitical relations between various sites (Harrower and D'Andrea 2014; Renfrew 1975). One way to do this is to perform cluster analysis with Ripley's K, which is integrated now into ArcGIS (Bevan and Conolly 2009; Bevan and Wilson 2013; Crema, Bevan, and Lake 2010; Duncan and Schwarz 2014). What this analysis does is count the number of sites within a given radius of each site in the data base, successively increasing that radius at a stipulated distance for a specified number of times. In essence, it is like a bullseye, with ever larger circles of catchment zones around a site. The function then compares this to a random sampling to determine the amount of clustering or dispersion (Bailey and Gatrell 1995).

Studies on demography generally use archaeological surveys as an indirect measure of population (Banning 2002, 32; Dewar 1991; Schreiber and Kintigh 1996). Using site size as an indicator of population is possible based on a couple of assumptions. First, the size of a population and the size of a site are directly related. Almost always the largest site in a region had the largest population while the smallest site in the region had the smallest population. Second, a fixed number of individuals per area can be ascertained within similar societies, where similar settlement patterning and architecture can be demonstrated. In the case of Broshi and Gophna (1984; 1986), a number of 200 individuals per hectare was utilized based on studies done on modern, ethnographic correlates in the Middle East (C. Kramer 1979), as well as on estimates done in other regions of the ancient Near East (Robert McCormick Adams 1981; Marfoe 1980; Shiloh 1980). The present study preserves the assessment of Broshi and Gophna.

A few problems emerge when using aggregate site size for a given period as an estimate for population (Wilkinson 1999). If a site is in an alluvial plain, there is a potential that the accumulation of sediment around the site may reduce its visibility. Also, there is an assumption that all sites with material culture indicative of a specific period were occupied all at once. It is possible in these cases that a population is being measured more than once, if it is moving from site to site during the period. In the present study, which looks primarily at total population as a comparative feature to demonstrate the reoccupation of the southern Levant during the Middle Bronze Age, these problems are admissible. The study does not attempt to determine the population a specific region could support, nor does it seek to explain why individuals were moving from one region to another. The entire data set is subject to the same inconsistencies and potential problems and, by acknowledging this, the study can move forward as a comparative and descriptive model.

GIS Modeling Parameters

Spatial modeling can also be utilized to analyze and understand ecological and environmental niches. It can also predict and describe the types of landscapes people utilized in antiquity. There are three main reasons why archaeological site modeling works: human activities and the natural environment are patterned; we can determine how people interacted with the environment by looking for artifacts and features; and GIS is a powerful way to analyze this interaction (Kvamme 2006, 6). Narrowing the social environment, by querying for specific site types within the whole or by looking for sites associated with specific subsistence patterns, will allow the model to be a better predictor. It is not, though, enough to make a model; that model needs to be tested and performance statistics calculated so that (1) it can be evaluated to determine how powerful it is and (2) it can be quantitatively compared to other models (Kvamme 2006, 16; Gibson et al. 2002, 175).

APPENDIX C: MACROBOTANICAL AND FAUNAL REMAINS

The Archaeobotanical Database of Eastern and Near Eastern Sites (ADEMNES) is a database established by the Institute of Archaeological Science at the University of Tubingen and contains data for 533 archaeological sites, mostly coalesced from publications. ADEMNES has available for download a database of sites that have faunal and floral remains in excavated context. It also has the strata by site in which these samples were recovered. In this way, it is possible to determine an absence/presence for cultigens and animal remains by period.

MACROBOTANICAL REMAINS

Site	*Local Phase*	*Phase*	*Common Name*	*Taxon*	*Family*
Abu Salabikh	AS-P2	EB II-III	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Abu Salabikh	AS-P2	EB II-III	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Abu Salabikh	AS-P2	EB II-III	Barley	Hordeum distichum/vulgare rachis	Poaceae
Abu Salabikh	AS-P2	EB II-III	Barley	Hordeum distichum/vulgare grain	Poaceae
Abu Salabikh	AS-P3	EB II-III	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Abu Salabikh	AS-P3	EB II-III	Barley	Hordeum distichum/vulgare rachis	Poaceae
Abu Salabikh	AS-P3	EB II-III	Barley	Hordeum distichum/vulgare grain	Poaceae
Abu Thawwab		EBI	Olive	Olea europaea	Oleaceae
'Afula	AF_EB	EB IA	Wheat	Triticum species free threshing wheat tetraploid grains	Poaceae
Arad	A_IV	EB IB	Olive	Olea europaea L.	Oleaceae
Arad		EB IB-II	Olive	Olea europaea	Oleaceae
Arad	A_I	EB II	Wheat	Triticum dicoccum grains	Poaceae
Arad	A_I	EB II	Grape	Vitis vinifera L. pips	Vitaceae
Arad	A_II	EB II	Wheat	Triticum dicoccum grains	Poaceae
Arad	A_II	EB II	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Arad	A_II	EB II	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Arad	A_II	EB II	Wheat	Triticum monococcum grains (2g)	Poaceae
Arad	A_II	EB II	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Arad	A_II	EB II	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Arad	A_II	EB II	Barley	Hordeum distichum grain (hulled)	Poaceae
Arad	A_II	EB II	Grape	Vitis vinifera L. fruits	Vitaceae
Arad	A_II	EB II	Grape	Vitis vinifera L. pips	Vitaceae
Arad	A_II	EB II	Grape	Vitis vinfera L. wood	Vitaceae
Arad	A_II	EB II	Olive	Olea europapaea L.	Oleaceae
Arad	A_II	EB II	Olive	Olea europapaea L. wood	Oleaceae
Arad	A_III	EB II	Wheat	Triticum dicoccum grains	Poaceae
Arad	A_III	EB II	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Arad	A_III	EB II	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae
Arad	A_III	EB II	Barley	Hordeum distichum grain (hulled)	Poaceae
Arad	A_III	EB II	Olive	Olea europapaea L.	Oleaceae
Arad	A_III-II	EB II	Wheat	Triticum dicoccum grains	Poaceae
Arad	A_III-II	EB II	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Arad	A_III-II	EB II	Barley	Hordeum distichum grain (hulled)	Poaceae
Arad	A_III-II	EB II	Olive	Olea europapaea L.	Oleaceae
Arad	A_III-II	EB II	Olive	Olea europapaea L. wood	Oleaceae
Ashkelon-Afridar		EB I	Olive	Olea europapaea	Oleaceae
Ashkelon-Afridar Marina		EB I	Olive	Olea europapaea	Oleaceae
Bab edh-Dhra		EB III	Olive	Olea europapaea	Oleaceae
Bab'edh Dhra	BDRA-C	EB I	Grape	Vitis vinifera L. pips	Vitaceae
Bab'edh Dhra	BDRA-T	EBA	Wheat	Triticum dicoccum grains	Poaceae
Bab'edh Dhra	BDRA-T	EBA	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Bab'edh Dhra	BDRA-T	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Bab'edh Dhra	BDRA-T	EBA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Bab'edh Dhra	BDRA-T	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Bab'edh Dhra	BDRA-T	EBA	Grape	Vitis vinifera L. fruits	Vitaceae
Bab'edh Dhra	BDRA-T	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Bab'edh Dhra	BDRA-T	EBA	Olive	Olea europapaea L.	Oleaceae
Bab'edh Dhra	BDRA-T	EBA	Fig	Ficus carica L.	Moracea e
Beth Shean	BS_EBIB	EB IB	Wheat	Triticum dicoccum grains	Poaceae
Beth Shean	BS_EBIB	EB IB	Wheat	Triticum dicoccum glume bases	Poaceae
Beth Shean	BS_EBIB	EB IB	Wheat	Triticum dicoccum spikelet forks	Poaceae
Beth Shean	BS_EBIB	EB IB	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Beth Shean	BS_EBIB	EB IB	Barley	Hordeum distichum rachis	Poaceae
Beth Shean	BS_EBIB	EB IB	Barley	Hordeum distichum grain (hulled)	Poaceae
Beth Shean	BS_EBIB	EB IB	Grape	Vitis vinifera L. pips	Vitaceae
Beth Shean	BS_EBIB	EB IB	Olive	Olea europaea L.	Oleaceae
Beth Shean	BS_EBIB	EB IB	Fig	Ficus carica L.	Moracea e
Beth Shean	BS_EBIII	EB III	Wheat	Triticum dicoccum grains	Poaceae
Beth Shean	BS_EBIII	EB III	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Beth Shean	BS_EBIII	EB III	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Beth Shean	BS_EBIII	EB III	Grape	Vitis vinifera L. pips	Vitaceae
Beth Shean	BS_EBIII	EB III	Olive	Olea europaea L.	Oleaceae
Beth Yerah		EB III	Olive	Olea europaea	Oleaceae
City of David	CD_EBAI	EB I	Olive	Olea europaea L.	Oleaceae
Ebla	EBL_EBA_IVA	EB IV	Wheat	Triticum dicoccum grains	Poaceae
Ebla	EBL_EBA_IVA	EB IV	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Ebla	EBL_EBA_IVA	EB IV	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Ebla	EBL_EBA_IVA	EB IV	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Ebla	EBL_EBA_IVA	EB IV	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Ebla	EBL_EBA_IVA	EB IV	Rye	Secale cereale grains	Poaceae
Ebla	EBL_EBA_IVA	EB IV	Grape	Vitis vinifera L. fruits	Vitaceae
Ebla	EBL_EBA_IVA	EB IV	Grape	Vitis vinifera L. pips	Vitaceae
Ebla	EBL_EBA_IVA	EB IV	Olive	Olea europaea L.	Oleaceae
En Besor	EBES	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
En Besor	EBES	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Feinan 16		EB II-III	Olive	Olea europaea	Oleaceae
Feinan 9		EB II-III	Olive	Olea europaea	Oleaceae
Jericho	J-EBA_MBA	EB IV	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Jericho	J-EBA_MBA	EB IV	Wheat	Triticum dicoccum grains	Poaceae
Jericho	J-EBA_MBA	EB IV	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Jericho	J-EBA_MBA	EB IV	Barley	Hordeum distichum/vulgare grain	Poaceae
Jericho	J-EBA_MBA	EB IV	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Jericho	J-EBA_MBA	EB IV	Barley	Hordeum distichum grain (hulled)	Poaceae
Jericho	J-EBA	EBA	Wheat	Triticum monococcum/dicoccum grains	Poaceae

Site	*Local Phase*	*Phase*	*Common Name*	*Taxon*	*Family*
Jericho	J-EBA	EBA	Wheat	Triticum dicoccum grains	Poaceae
Jericho	J-EBA	EBA	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Jericho	J-EBA	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Jericho	J-EBA	EBA	Barley	Hordeum distichum/vulgare grain	Poaceae
Jericho	J-EBA	EBA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Jericho	J-EBA	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Jericho	J-EBA	EBA	Grape	Vitis vinifera L. fruits	Vitaceae
Jericho	J-EBA	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Jericho	J-EBA	EBA	Fig	Ficus carica L.	Moracea e
Jerusalem		EB I-II	Olive	Olea europaea	Oleaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum dicoccum grains	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum dicoccum glume bases	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum dicoccum grains (1g)	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum dicoccum spikelet fork terminal	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum monococcum glume bases	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum monococcum grains (1g)	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum monococcum grains (2g)	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Wheat	Triticum species indeterminate fr thr/gl wheat rachis	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Barley	Hordeum distichum/vulgare rachis	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Grape	Vitis vinifera L. fruits	Vitaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Grape	Vitis vinifera L. pips	Vitaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Khirbet ez-Zeraqon	HEZ_LC	EB II	Grape	Vitis vinfera L. stalks	Vitaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Olive	Olea europaea L.	Oleaceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Fig	Ficus carica L., uncarbonized	Moraceae
Khirbet ez-Zeraqon	HEZ_LC	EB II	Fig	Ficus carica L.	Moraceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Wheat	Triticum dicoccum grains	Poaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Wheat	Triticum dicoccum glume bases	Poaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Wheat	Triticum dicoccum spikelet fork terminal	Poaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Barley	Hordeum distichum/vulgare rachis	Poaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Grape	Vitis vinifera L. fruits	Vitaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Grape	Vitis vinifera L. pips	Vitaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Grape	Vitis vinfera L. stalks	Vitaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Olive	Olea europaea L.	Oleaceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Fig	Ficus carica L., uncarbonized	Moraceae
Khirbet ez-Zeraqon	HEZ_UC	EB II	Fig	Ficus carica L.	Moraceae
	Khirbet ez-Zeraqon	EB II-III	Olive	Olea europaea	Oleaceae
Khirbet Iskander	HII_EBA	EB IV	Olive	Olea europaea L.	Oleaceae
Lachish		EB II-III	Olive	Olea europaea	Oleaceae
Lachish	LH_EB	EBA	Wheat	Triticum dicoccum grains	Poaceae
Lachish	LH_EB	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Lachish	LH_EB	EBA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Lachish	LH_EB	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Lachish	LH_EB	EBA	Olive	Olea europaea L.	Oleaceae
Megiddo	MEG_EBI	EB I	Wheat	Triticum dicoccum grains	Poaceae
Megiddo	MEG_EBI	EB I	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Megiddo		EB I	Olive	Olea europaea	Oleaceae
Megiddo	MEG_EBIB	EB IB	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Megiddo	MEG_EBIB	EB IB	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Megiddo	MEG_EBIB	EB IB	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Megiddo	MEG_EBIB	EB IB	Olive	Olea europaea L.	Oleaceae
Megiddo	MEG_EII	EB II	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Megiddo	MEG_EII	EB II	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Megiddo	MEG_EII	EB II	Grape	Vitis vinifera L. pips	Vitaceae
Megiddo	MEG_EII	EB II	Olive	Olea europaea L.	Oleaceae
Megiddo	MEG_EBIII	EB III	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Megiddo	MEG_EBIII	EB III	Wheat	Triticum dicoccum grains	Poaceae
Megiddo	MEG_EBIII	EB III	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Megiddo	MEG_EBIII	EB III	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Megiddo	MEG_EBIII	EB III	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Megiddo	MEG_EBIII	EB III	Grape	Vitis vinifera L. pips	Vitaceae
Megiddo	MEG_EBIII	EB III	Olive	Olea europaea L.	Oleaceae
Megiddo		EB III	Olive	Olea europaea	Oleaceae
Numeira	NU	EB III	Wheat	Triticum dicoccum grains	Poaceae
Numeira	NU	EB III	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Numeira	NU	EB III	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Numeira	NU	EB III	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae
Numeira	NU	EB III	Barley	Hordeum distichum grain (hulled)	Poaceae
Numeira	NU	EB III	Grape	Vitis vinifera L. fruits	Vitaceae
Numeira	NU	EB III	Grape	Vitis vinifera L. pips	Vitaceae
Numeira	NU	EB III	Olive	Olea europaea L.	Oleaceae
Numeira	NU	EB III	Fig	Ficus carica L.	Moracea e
Numeira		EB III	Olive	Olea europaea	Oleaceae
Pella		EB I	Olive	Olea europaea	Oleaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Wheat	Triticum dicoccum grains	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Wheat	Triticum dicoccum glume bases	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Ras an-Numayra	RAN_EBA_IB	EB IB	Wheat	Triticum species indeterminate glume wheat grains	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Wheat	Triticum monococcum glume bases	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Barley	Hordeum distichum/vulgare grain	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Barley	Hordeum distichum rachis	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Barley	Hordeum vulgare rachis	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Barley	Hordeum vulgare vulgare rachis	Poaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Grape	Vitis vinifera fruit skin fragment	Vitaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Grape	Vitis vinifera L. fruits	Vitaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Grape	Vitis vinifera L. pips	Vitaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Grape	Vitis vinifera L. peduncles	Vitaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Olive	Olea europaea L.	Oleaceae
Ras an-Numayra	RAN_EBA_IB	EB IB	Fig	Ficus carica L.	Moraceae
Ta'anach		Bronze Age	Olive	Olea europaea	Oleaceae
Ta'anach		EB III	Olive	Olea europaea	Oleaceae
Tel Beth Yerah	TBY_EBI	EB I	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tel Beth Yerah	TBY_EBI	EB I	Grape	Vitis vinifera L. pips	Vitaceae
Tel Beth Yerah	TBY_EBI	EB I	Olive	Olea europaea L.	Oleaceae
Tel Beth Yerah	TBY_EBII	EB II	Olive	Olea europaea L.	Oleaceae
Tel Dalit	TD	EB II	Olive	Olea europaea L.	Oleaceae
Tel Dalit	TD	EB II	Olive	Olea europaea L. wood	Oleaceae
Tel Dalit		EB II	Olive	Olea europaea	Oleaceae
Tel Kabri		EB I-II	Olive	Olea europaea	Oleaceae
Tel Miqne/Ekron		Bronze Age	Fig	Ficus carica	Moraceae
Tel Miqne/Ekron		Bronze Age	Barley	Hordeum	Poaceae
Tel Miqne/Ekron		Bronze Age	Wheat	Triticum turgidum subsp. dicoccum	Poaceae
Tel Miqne/Ekron		Bronze Age	Wheat	Triticum turgidum subsp. parvicoccum	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tel Miqne/Ekron		Bronze Age	Wheat	Vitis vinifera	Vitaceae
Tel Yarmouth	TYAR_PP	EB I	Wheat	Triticum dicoccum grains	Poaceae
Tel Yarmouth	TYAR_PP	EB I	Wheat	Triticum dicoccum glume bases	Poaceae
Tel Yarmouth	TYAR_PP	EB I	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tel Yarmouth	TYAR_PP	EB I	Barley	Hordeum distichum/vulgare grain	Poaceae
Tel Yarmouth	TYAR_PP	EB I	Olive	Olea europaea L.	Oleaceae
Tel Yarmouth	TYAR_EBA_II	EB II	Wheat	Triticum dicoccum grains	Poaceae
Tel Yarmouth	TYAR_EBA_II	EB II	Wheat	Triticum dicoccum glume bases	Poaceae
Tel Yarmouth	TYAR_EBA_II	EB II	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tel Yarmouth	TYAR_EBA_II	EB II	Barley	Hordeum distichum/vulgare grain	Poaceae
Tel Yarmouth	TYAR_EBA_II	EB II	Grape	Vitis vinifera L. fruits	Vitaceae
Tel Yarmouth	TYAR_EBA_II	EB II	Grape	Vitis vinifera L. pips	Vitaceae
Tel Yarmouth	TYAR_EBA_II	EB II	Grape	Vitis vinifera L. peduncles	Vitaceae
Tel Yarmouth	TYAR_EBA_II	EB II	Olive	Olea europaea L.	Oleaceae
Tel Yarmouth	TYAR_EBA_II	EB II	Fig	Ficus carica L.	Moraceae
Tel Yarmouth	TYAR_EBA_IIC	EB II	Wheat	Triticum dicoccum grains	Poaceae
Tel Yarmouth	TYAR_EBA_IIC	EB II	Wheat	Triticum dicoccum glume bases	Poaceae
Tel Yarmouth	TYAR_EBA_IIC	EB II	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tel Yarmouth	TYAR_EBA_IIC	EB II	Barley	Hordeum distichum/vulgare grain	Poaceae
Tel Yarmouth	TYAR_EBA_IIC	EB II	Grape	Vitis vinifera L. fruits	Vitaceae
Tel Yarmouth	TYAR_EBA_IIC	EB II	Grape	Vitis vinifera L. pips	Vitaceae
Tel Yarmouth	TYAR_EBA_IIC	EB II	Grape	Vitis vinifera L. peduncles	Vitaceae
Tel Yarmouth	TYAR_EBA_IIC	EB II	Olive	Olea europaea L.	Oleaceae
Tel Yarmouth	TYAR_EBA_IIC	EB II	Fig	Ficus carica L.	Moraceae
Tel Yarmouth	TYAR_EBA_IIIB	EB III	Wheat	Triticum dicoccum grains	Poaceae
Tel Yarmouth	TYAR_EBA_IIIB	EB III	Wheat	Triticum dicoccum glume bases	Poaceae
Tel Yarmouth	TYAR_EBA_IIIB	EB III	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tel Yarmouth	TYAR_EBA_IIIB	EB III	Barley	Hordeum distichum/vulgare grain	Poaceae
Tel Yarmouth	TYAR_EBA_IIIB	EB III	Grape	Vitis vinifera L. fruits	Vitaceae
Tel Yarmouth	TYAR_EBA_IIIB	EB III	Grape	Vitis vinifera L. pips	Vitaceae
Tel Yarmouth	TYAR_EBA_IIIB	EB III	Grape	Vitis vinifera L. peduncles	Vitaceae
Tel Yarmouth	TYAR_EBA_IIIB	EB III	Olive	Olea europaea L.	Oleaceae
Tel Yarmouth	TYAR_EBA_IIIC	EB III	Wheat	Triticum dicoccum grains	Poaceae
Tel Yarmouth	TYAR_EBA_IIIC	EB III	Wheat	Triticum dicoccum glume bases	Poaceae
Tel Yarmouth	TYAR_EBA_IIIC	EB III	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tel Yarmouth	TYAR_EBA_IIIC	EB III	Barley	Hordeum distichum/vulgare grain	Poaceae
Tel Yarmouth	TYAR_EBA_IIIC	EB III	Grape	Vitis vinifera L. pips	Vitaceae
Tel Yarmouth	TYAR_EBA_IIIC	EB III	Grape	Vitis vinifera L. peduncles	Vitaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tel Yarmouth	TYAR_EBA_IIIC	EB III	Olive	Olea europaea L.	Oleaceae
Tel Yarmouth	TYAR_EBA_IIIC	EB III	Fig	Ficus carica L.	Moraceae
Tel Yarmuth		EB III	Olive	Olea europaea	Oleaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum dicoccum grains	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum dicoccum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum monococcum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum monococcum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum monococcum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum monococcum grains (2g)	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Wheat	Triticum species indeterminate fr thr/gl wheat rachis	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Barley	Hordeum distichum/vulgare rachis	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Barley	Hordeum distichum/vulgare grain (naked)	Poaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Grape	Vitis vinifera L. fruits	Vitaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Grape	Vitis vinifera L. pips	Vitaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Olive	Olea europaea L.	Oleaceae
Tell Abu al-Kharaz	TAK_EB1B	EB IB	Fig	Ficus carica L.	Moraceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Wheat	Triticum monococcum/dicoccum grains	Poaceae

Site	*Local Phase*	*Phase*	*Common Name*	*Taxon*	*Family*
Tell Abu al-Kharaz	TAK_EB2B	EB II	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Wheat	Triticum dicoccum grains	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Wheat	Triticum dicoccum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Wheat	Triticum monococcum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Wheat	Triticum monococcum grains (2g)	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Abu al-Kharaz	TAK_EB2B	EB II	Barley	Hordeum distichum/vulgare grain (naked)	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum dicoccum grains	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum dicoccum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum dicoccum spikelet fork terminal	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum monococcum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum monococcum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Grape	Vitis vinifera L. fruits	Vitaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Grape	Vitis vinifera L. pips	Vitaceae
Tell Abu al-Kharaz	TAK_EB2C	EB II	Olive	Olea europaea L.	Oleaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
	Tell Abu al-Kharaz	EB II	Olive	Olea europaea	Oleaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Wheat	Triticum dicoccum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Wheat	Triticum monococcum glume bases	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Wheat	Triticum monococcum spikelet forks	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Wheat	Triticum monococcum grains (2g)	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Barley	Hordeum distichum/vulgare grain (naked)	Poaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell Abu al-Kharaz	TAK_EBTRANS	EBA	Fig	Ficus carica L.	Moraceae
Tell Abu en-Ni'aj		EB IV	Olive	Olea europaea	Oleaceae
Tell Afis	TAF-EBA	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell Afis	TAF-EBA	EBA	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Afis	TAF-EBA	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell Afis	TAF-EBA	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Afis	TAF-EBA	EBA	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae
Tell Afis	TAF-EBA	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell Afis	TAF-EBA	EBA	Olive	Olea europaea L.	Oleaceae
Tell al-Raqa'i	TAR-2	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell al-Raqa'i	TAR-2	EBA	Wheat	Triticum species indeterminate glume wheat spikelet forks	Poaceae
Tell al-Raqa'i	TAR-2	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell al-Raqa'i	TAR-2	EBA	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell al-Raqa'i	TAR-2	EBA	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tell al-Raqa'i	TAR-2	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell al-Raqa'i	TAR-2	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell al-Raqa'i	TAR-2	EBA	Barley	Hordeum vulgare rachis	Poaceae
Tell al-Raqa'i	TAR-2	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell al-Raqa'i	TAR-3	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Wheat	Triticum species indeterminate glume wheat spikelet forks	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat rachis	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Barley	Hordeum vulgare rachis	Poaceae
Tell al-Raqa'i	TAR-3	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell al-Raqa'i	TAR-4	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell al-Raqa'i	TAR-4	EBA	Wheat	Triticum species indeterminate glume wheat spikelet forks	Poaceae
Tell al-Raqa'i	TAR-4	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell al-Raqa'i	TAR-4	EBA	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell al-Raqa'i	TAR-4	EBA	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell al-Raqa'i	TAR-4	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell al-Raqa'i	TAR-4	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell al-Raqa'i	TAR-4	EBA	Barley	Hordeum vulgare rachis	Poaceae
Tell al-Raqa'i	TAR-5_7	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell al-Raqa'i	TAR-5_7	EBA	Wheat	Triticum species indeterminate glume wheat spikelet forks	Poaceae
Tell al-Raqa'i	TAR-5_7	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell al-Raqa'i	TAR-5_7	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell al-Raqa'i	TAR-5_7	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell al-Raqa'i	TAR-5_7	EBA	Barley	Hordeum vulgare rachis	Poaceae
Tell al-Rawda	RAW	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tell al-Rawda	RAW	EBA	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Tell al-Rawda	RAW	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell al-Rawda	RAW	EBA	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell al-Rawda	RAW	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell al-Rawda	RAW	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell al-Rawda	RAW	EBA	Barley	Hordeum distichum rachis	Poaceae
Tell al-Rawda	RAW	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell al-Rawda	RAW	EBA	Olive	Olea europaea L.	Oleaceae
Tell Aphek		EB II	Olive	Olea europaea	Oleaceae
Tell el-Fara'in	TEF-III	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell el-Fara'in	TEF-III	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell el-Fara'in	TEF-III	EBA	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell el-Fara'in	TEF-III	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell el-Fara'in	TEF-III	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat rachis	Poaceae
Tell el-Fara'in	TEF-III	EBA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell el-Fara'in	TEF-III	EBA	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae
Tell el-Fara'in	TEF-III	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell el-Fara'in	TEF-III	EBA	Fig	Ficus carica L.	Moracea e
Tell el-Fara'in	TEF-IV	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell el-Fara'in	TEF-IV	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell el-Fara'in	TEF-IV	EBA	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell el-Fara'in	TEF-IV	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell el-Fara'in	TEF-IV	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat rachis	Poaceae
Tell el-Fara'in	TEF-IV	EBA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell el-Fara'in	TEF-IV	EBA	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae
Tell el-Fara'in	TEF-IV	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell el-Fara'in	TEF-IV	EBA	Fig	Ficus carica L.	Moracea e
Tell el-Handaquq	TEH	EB I-II	Wheat	Triticum dicoccum grains	Poaceae
Tell el-Handaquq	TEH	EB I-II	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Tell el-Handaquq	TEH	EB I-II	Barley	Hordeum vulgare vulgare grain	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tell el-Handaquq	TEH	EB I-II	Barley	Hordeum vulgare vulgare rachis	Poaceae
Tell el-Handaquq	TEH	EB I-II	Fig	Ficus carica L.	Moraceae
Tell el-Hayyat	TEHAY_LEBA_IV	EB IVB	Wheat	Triticum dicoccum grains	Poaceae
Tell el-Hayyat	TEHAY_LEBA_IV	EB IVB	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell el-Hayyat	TEHAY_LEBA_IV	EB IVB	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell el-Hayyat	TEHAY_LEBA_IV	EB IVB	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell el-Hayyat	TEHAY_LEBA_IV	EB IVB	Barley	Hordeum distichum/vulgare grain (naked)	Poaceae
Tell el-Hayyat	TEHAY_LEBA_IV	EB IVB	Fig	Ficus carica L.	Moraceae
Tell el-Hayyat	TEHAY_EBA	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell el-Hayyat	TEHAY_EBA	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell el-Hayyat	TEHAY_EBA	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell el-Hayyat	TEHAY_EBA	EBA	Olive	Olea europaea L.	Oleaceae
Tell el-Hesi		EB III	Olive	Olea europaea	Oleaceae
Tell Erani		EB I	Olive	Olea europaea	Oleaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum species indeterminate glume wheat spikelet forks	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum dicoccum grains	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum dicoccum glume bases	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum monococcum glume bases	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum monococcum spikelet forks	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Grape	Vitis vinifera L. pips	Vitaceae
Tell Esh-Shuna	TES_EB1E	EB IA	Olive	Olea europaea L.	Oleaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum species indeterminate glume wheat spikelet forks	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum dicoccum grains	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum dicoccum glume bases	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum monococcum glume bases	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum monococcum spikelet forks	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Grape	Vitis vinifera L. pips	Vitaceae
Tell Esh-Shuna	TES_EB1L	EB IB	Olive	Olea europaea L.	Oleaceae
Tell es-Sa'idiyeh		EB II	Olive	Olea europaea	Oleaceae
Tell es-Sa'idiyeh	TESA	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell es-Sa'idiyeh	TESA	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat rachis	Poaceae
Tell es-Sa'idiyeh	TESA	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell es-Sa'idiyeh	TESA	EBA	Olive	Olea europaea L.	Oleaceae
Tell es-Sa'idiyeh	TESA	EBA	Olive	Olea europaea L. wood	Oleaceae
Tell es-Sa'idiyeh	TESA	EBA	Fig	Ficus carica L.	Moraceae
Tell es-Sa'idiyeh	TESA	EBA	Fig	Ficus carica L. wood	Moraceae
Tell es-Sa'idiyeh	TESA	EBA	Fig	Ficus sycomorus wood	Moraceae
Tell es-Sweyhat	SWE_M	EBA	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell es-Sweyhat	SWE_M	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell es-Sweyhat	SWE_M	EBA	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell es-Sweyhat	SWE_M	EBA	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell es-Sweyhat	SWE_M	EBA	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell es-Sweyhat	SWE_M	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae

Site	*Local Phase*	*Phase*	*Common Name*	*Taxon*	*Family*
Tell es-Sweyhat	SWE_M	EBA	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell es-Sweyhat	SWE_M	EBA	Rye	Secale cereale grains	Poaceae
Tell es-Sweyhat	SWE_Z	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Fadous-Kfarabida	TFA_C_EBA_I	EB I	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_C_EBA_I	EB I	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_C_EBA_I	EB I	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Fadous-Kfarabida	TFA_C_EBA_I	EB I	Grape	Vitis vinifera L. pips	Vitaceae
Tell Fadous-Kfarabida	TFA_C_EBA_I	EB I	Grape	Vitis vinfera L. stalks	Vitaceae
Tell Fadous-Kfarabida	TFA_C_EBA_I	EB I	Olive	Olea europaea L.	Oleaceae
Tell Fadous-Kfarabida	TFA_C_EBA_I	EB I	Fig	Ficus carica L.	Moracea e
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Wheat	Triticum species free threshing wheat hexaploid rachis	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Wheat	Triticum dicoccum grains	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Barley	Hordeum distichum/vulgare rachis	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Barley	Hordeum distichum rachis	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Grape	Vitis vinfera L. stalks	Vitaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Olive	Olea europaea L.	Oleaceae
Tell Fadous-Kfarabida	TFA_EBA_II	EB II	Fig	Ficus carica L.	Moracea e
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Wheat	Triticum dicoccoides spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Wheat	Triticum dicoccum grains	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Wheat	Triticum monococcum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae

Site	*Local Phase*	*Phase*	*Common Name*	*Taxon*	*Family*
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Barley	Hordeum distichum/vulgare rachis	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Grape	Vitis vinifera L. pips	Vitaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Grape	Vitis vinfera L. stalks	Vitaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Olive	Olea europaea L.	Oleaceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Fig	Ficus carica L., mineralized	Moraceae
Tell Fadous-Kfarabida	TFA_EBA_III	EB III	Fig	Ficus carica L.	Moraceae
Tell Fadous-Kfarabida	TFA_EBA_III_lo	EB III	Wheat	Triticum dicoccum grains	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III_lo	EB III	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III_lo	EB III	Barley	Hordeum distichum/vulgare rachis	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III_lo	EB III	Grape	Vitis vinifera L. pips	Vitaceae
Tell Fadous-Kfarabida	TFA_EBA_III_lo	EB III	Olive	Olea europaea L.	Oleaceae
Tell Fadous-Kfarabida	TFA_EBA_III_mi	EB III	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III_mi	EB III	Olive	Olea europaea L.	Oleaceae
Tell Fadous-Kfarabida	TFA_EBA_III_mi	EB III	Fig	Ficus carica L., mineralized	Moraceae
Tell Fadous-Kfarabida	TFA_EBA_III_mi	EB III	Fig	Ficus carica L.	Moraceae
Tell Fadous-Kfarabida	TFA_EBA_III_up	EB III	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_III_up	EB III	Grape	Vitis vinfera L. stalks	Vitaceae
Tell Fadous-Kfarabida	TFA_EBA_III_up	EB III	Olive	Olea europaea L.	Oleaceae
Tell Fadous-Kfarabida	TFA_EBA_III_up	EB III	Fig	Ficus carica L.	Moraceae
Tell Fadous-Kfarabida	TFA_EBA_IV	EB IV	Wheat	Triticum dicoccoides spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_IV	EB IV	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_IV	EB IV	Olive	Olea europaea L.	Oleaceae
Tell Fadous-Kfarabida	TFA_EBA_IV	EB IV	Fig	Ficus carica L.	Moraceae
Tell Fadous-Kfarabida	TFA_EBA_V	EBA	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_V	EBA	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Fadous-Kfarabida	TFA_EBA_V	EBA	Grape	Vitis vinifera L. pips	Vitaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tell Fadous-Kfarabida	TFA_EBA_V	EBA	Olive	Olea europaea L.	Oleaceae
Tell Fadous-Kfarabida	TFA_EBA_V	EBA	Fig	Ficus carica L.	Moraceae
Tell Gezer		EBA	Olive	Olea europaea	Oleaceae
Tell Gezer	TGE	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Gezer	TGE	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell Gezer	TGE	EBA	Olive	Olea europaea L.	Oleaceae
Tell Gezer	TGE	EBA	Fig	Ficus carica L.	Moraceae
Tell Halif		EB I	Olive	Olea europaea	Oleaceae
Tell Halif		EB III	Olive	Olea europaea	Oleaceae
Tell Halif	THF_EBA	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Hammam et-Turkman	HET_EBA	EBA	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Tell Hammam et-Turkman	HET_EBA	EBA	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Hammam et-Turkman	HET_EBA	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell Hammam et-Turkman	HET_EBA	EBA	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell Hammam et-Turkman	HET_EBA	EBA	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Hammam et-Turkman	HET_EBA	EBA	Barley	Hordeum distichum rachis	Poaceae
Tell Hammam et-Turkman	HET_EBA	EBA	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Hammam et-Turkman	HET_EBA	EBA	Grape	Vitis vinifera L. pips	Vitaceae
	Tell Handaquq North	EB II	Olive	Olea europaea	Oleaceae
	Tell Handaquq South	EB III	Olive	Olea europaea	Oleaceae
Tell Ibrahim Awad	TIA-B	EBA	Wheat	Triticum dicoccum glume bases	Poaceae
Tell Ibrahim Awad	TIA-B	EBA	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Ibrahim Awad	TIA-B	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Ibrahim Awad	TIA-B	EBA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Ibrahim Awad	TIA-B	EBA	Barley	Hordeum vulgare rachis	Poaceae
Tell Ibrahim Awad	TIA-ED	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell Ibrahim Awad	TIA-ED	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell Ibrahim Awad	TIA-ED	EBA	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Ibrahim Awad	TIA-ED	EBA	Wheat	Triticum dicoccum spikelet fork terminal	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tell Ibrahim Awad	TIA-ED	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Ibrahim Awad	TIA-ED	EBA	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Ibrahim Awad	TIA-ED	EBA	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae
Tell Ibrahim Awad	TIA-ED	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Wheat	Triticum dicoccum grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Wheat	Triticum species indeterminate glume wheat grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Barley	Hordeum distichum rachis	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_III	EB III	Grape	Vitis vinifera L. pips	Vitaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Wheat	Triticum dicoccum grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Wheat	Triticum species free threshing wheat hexaploid grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Wheat	Triticum species indeterminate glume wheat grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Barley	Hordeum distichum rachis	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Grape	Vitis vinifera L. pips	Vitaceae
Tell Nebi Mend (Kadesh)	TNM_EBA_IV	EB IV	Grape	Vitis vinfera L. stalks	Vitaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum monococcum/dicoccum glume bases	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum monococcum/dicoccum grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum dicoccum grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum dicoccum glume bases	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum monococcum glume bases	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum monococcum spikelet forks	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat rachis	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Barley	Hordeum distichum/vulgare rachis	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Barley	Hordeum distichum rachis	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Tell Nebi Mend (Kadesh)	TNM_EBA	EBA	Grape	Vitis vinifera L. pips	Vitaceae
Tell Qara Quzaq	TQQ_III	EB III	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Qara Quzaq	TQQ_III	EB III	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Qara Quzaq	TQQ_IV	EB IV	Wheat	Triticum dicoccum grains	Poaceae
Tell Qara Quzaq	TQQ_IV	EB IV	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Qara Quzaq	TQQ_IV	EB IV	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Qara Quzaq	TQQ_IV	EB IV	Grape	Vitis vinifera L. pips	Vitaceae
Tell Qara Quzaq	TQQ_IV	EB IV	Fig	Ficus carica L.	Moracea e
Tell Qaramel	TQA	Bronz e Age	Barley	Hordeum vulgare vulgare grain (hulled)	Poaceae
Tell Qarqur	TQR_EB_IV	EB IV	Wheat	Triticum species indeterminate glume wheat spikelet forks	Poaceae
Tell Qarqur	TQR_EB_IV	EB IV	Wheat	Triticum dicoccum grains	Poaceae
Tell Qarqur	TQR_EB_IV	EB IV	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tell Qarqur	TQR_EB_IV	EB IV	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell Qarqur	TQR_EB_IV	EB IV	Wheat	Triticum monococcum grains (1g)	Poaceae
Tell Qarqur	TQR_EB_IV	EB IV	Wheat	Triticum species indeterminate fr thr/gl wheat rachis	Poaceae
Tell Qarqur	TQR_EB_IV	EB IV	Barley	Hordeum distichum/vulgare grain	Poaceae
Tell Qarqur	TQR_EB_IV	EB IV	Grape	Vitis vinifera L. pips	Vitaceae
Tell Qarqur	TQR_EB_IV	EB IV	Olive	Olea europaea L.	Oleaceae
Tell Qarqur	TQR_EB_IV	EB IV	Fig	Ficus carica L.	Moracea e
Tell Qashish		EB III	Olive	Olea europaea	Oleaceae
Tell Qashish	TQASH	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Tell Qashish	TQASH	EBA	Olive	Olea europaea L.	Oleaceae
Tell Selenkahiye	SLK-CTA	EB IV	Wheat	Triticum dicoccum grains	Poaceae
Tell Selenkahiye	SLK-CTA	EB IV	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Selenkahiye	SLK-CTA	EB IV	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Selenkahiye	SLK-CTA	EB IV	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell Selenkahiye	SLK-CTA	EB IV	Barley	Hordeum distichum/vulgare rachis	Poaceae
Tell Selenkahiye	SLK-CTA	EB IV	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Selenkahiye	SLK-NH	EB IV	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Selenkahiye	SLK-NH	EB IV	Barley	Hordeum distichum/vulgare rachis	Poaceae
Tell Selenkahiye	SLK-NH	EB IV	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Selenkahiye	SLK-STA	EB IV	Wheat	Triticum dicoccum grains	Poaceae
Tell Selenkahiye	SLK-STA	EB IV	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Selenkahiye	SLK-STA	EB IV	Barley	Hordeum distichum/vulgare rachis	Poaceae
Tell Selenkahiye	SLK-STA	EB IV	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Selenkahiye	SLK-TWR	EB IV	Wheat	Triticum dicoccum grains	Poaceae
Tell Selenkahiye	SLK-TWR	EB IV	Wheat	Triticum dicoccum glume bases	Poaceae
Tell Selenkahiye	SLK-TWR	EB IV	Wheat	Triticum dicoccum spikelet forks	Poaceae
Tell Selenkahiye	SLK-TWR	EB IV	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell Selenkahiye	SLK-TWR	EB IV	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae

Site	Local Phase	Phase	Common Name	Taxon	Family
Tell Selenkahiye	SLK-TWR	EB IV	Barley	Hordeum distichum/vulgare rachis	Poaceae
Tell Selenkahiye	SLK-TWR	EB IV	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Shiukh Fawqani	TSF_BA1	EB I	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell Shiukh Fawqani	TSF_BA1	EB I	Wheat	Triticum dicoccum grains	Poaceae
Tell Shiukh Fawqani	TSF_BA1	EB I	Wheat	Triticum species indeterminate free threshing wheat rachis	Poaceae
Tell Shiukh Fawqani	TSF_BA1	EB I	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Shiukh Fawqani	TSF_BA1	EB I	Wheat	Triticum monococcum grains (1/2g)	Poaceae
Tell Shiukh Fawqani	TSF_BA1	EB I	Barley	Hordeum distichum rachis	Poaceae
Tell Shiukh Fawqani	TSF_BA1	EB I	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Shiukh Fawqani	TSF_BA2	EB I	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Tell Shiukh Fawqani	TSF_BA2	EB I	Wheat	Triticum dicoccum grains	Poaceae
Tell Shiukh Fawqani	TSF_BA2	EB I	Wheat	Triticum species indeterminate free threshing wheat grains	Poaceae
Tell Shiukh Fawqani	TSF_BA2	EB I	Barley	Hordeum distichum rachis	Poaceae
Tell Shiukh Fawqani	TSF_BA2	EB I	Barley	Hordeum distichum grain (hulled)	Poaceae
Tell Shiukh Fawqani	TSF_BA4	EB I	Barley	Hordeum distichum rachis	Poaceae
Tell Shiukh Fawqani	TSF_BA4	EB I	Barley	Hordeum distichum grain (hulled)	Poaceae
Umm el-Marra	UEM_V-IV	EBA	Wheat	Triticum species indeterminate glume wheat glume bases	Poaceae
Umm el-Marra	UEM_V-IV	EBA	Wheat	Triticum monococcum/dicoccum spikelet forks	Poaceae
Umm el-Marra	UEM_V-IV	EBA	Wheat	Triticum species indeterminate fr thr/gl wheat grains	Poaceae
Umm el-Marra	UEM_V-IV	EBA	Barley	Hordeum distichum/vulgare rachis	Poaceae
Umm el-Marra	UEM_V-IV	EBA	Barley	Hordeum distichum/vulgare grain (hulled)	Poaceae
Umm el-Marra	UEM_V-IV	EBA	Grape	Vitis vinifera L. fruits	Vitaceae
Umm el-Marra	UEM_V-IV	EBA	Fig	Ficus carica L.	Moracea e

Faunal Remains

	Scientific Name	Common Name	Domesticated/ Wild	Phase
Jebel Abu Thawwab	Bos spec.	Cattle	D / W	EBA
Jebel Abu Thawwab	Canis spec.	Dog	D / W	EBA
Jebel Abu Thawwab	Capra spec.	Goat	D / W	EBA
Jebel Abu Thawwab	Cervidae indetermined	Deer	W	EBA
Jebel Abu Thawwab	Equus spec.	Equid	D / W	EBA
Jebel Abu Thawwab	Gazella spec.	Gazelle	W	EBA
Jebel Abu Thawwab	Mammals indetermined large	Large Mammal	D / W	EBA
Jebel Abu Thawwab	Mammals indetermined medium	Medium Mammal	D / W	EBA
Jebel Abu Thawwab	Mammals indetermined small	Small mammal	D / W	EBA
Jebel Abu Thawwab	Ovis spec. / Capra spec.	Sheep/Goat	D / W	EBA
Jebel Abu Thawwab	Ruminantia indetermined small	Grazing Animal	D / W	EBA
Jebel Abu Thawwab	Bos spec.	Cattle	D / W	EBA
Jebel Abu Thawwab	Mammals indetermined large	Large Mammal	D / W	EBA
Jebel Abu Thawwab	Mammals indetermined medium	Medium Mammal	D / W	EBA
Jebel Abu Thawwab	Ovis spec. / Capra spec.	Sheep/Goat	D / W	EBA
Jebel Abu Thawwab	Ruminantia indetermined small	Grazing Animal	D / W	EBA
Megiddo	Aves indetermined	Bird	D / W	EB I
Megiddo	Carnivora indetermined large	Carnivore mammal	D / W	EB I
Megiddo	Dama mesopotamica	Fallow Deer	W	EB I
Megiddo	Gazella gazella / Gazella dorcas	Mountain Gazelle	W	EB I
Megiddo	Indetermined	Unknown	D / W	EB I
Megiddo	Mammals indetermined large	Large Mammal	D / W	EB I
Megiddo	Mammals indetermined medium	Medium Mammal	D / W	EB I
Megiddo	Mammals indetermined small	Small mammal	D / W	EB I
Megiddo	Mus musculus	House Mouse	W	EB I
Megiddo	Rodentia indetermined	Rodent	W	EB I
Megiddo	Bos taurus	Cattle	D	EB I
Megiddo	Capra hircus	Goat	D	EB I
Megiddo	Ovis aries	Sheep	D	EB I
Megiddo	Ovis aries / Capra hircus	Sheep/Goat	D	EB I
Megiddo	Sus domesticus	Pig	D	EB I

	Scientific Name	*Common Name*	*Domesticated/ Wild*	*Phase*
Megiddo	Anura indetermined	Frog	W	EB IB
Megiddo	Aves indetermined	Bird	D / W	EB IB
Megiddo	Brachiura indetermined	Fish	W	EB IB
Megiddo	Canis familiaris	Dog	D	EB IB
Megiddo	Carnivora indetermined large	Carnivore mammal	D / W	EB IB
Megiddo	Dama mesopotamica	Fallow Deer	W	EB IB
Megiddo	Gazella gazella / Gazella dorcas	Mountain Gazelle	W	EB IB
Megiddo	Indetermined	Unknown	D / W	EB IB
Megiddo	Mammals indetermined large	Large Mammal	D / W	EB IB
Megiddo	Mammals indetermined medium	Medium Mammal	D / W	EB IB
Megiddo	Mammals indetermined small	Small mammal	D / W	EB IB
Megiddo	Panthera leo	Lion	W	EB IB
Megiddo	Rodentia indetermined	Rodent	W	EB IB
Megiddo	Serpentes indetermined	Snake	W	EB IB
Megiddo	Testudinata indetermined (all turtles)	Turtle	W	EB IB
Megiddo	Vulpes vulpes	Red Fox	W	EB IB
Megiddo	Bos taurus	Cattle	D	EB IB
Megiddo	Capra hircus	Goat	D	EB IB
Megiddo	Equus asinus	Ass	D	EB IB
Megiddo	Ovis aries	Sheep	D	EB IB
Megiddo	Ovis aries / Capra hircus	Sheep/Goat	D	EB IB
Megiddo	Sus domesticus	Pig	D	EB IB
Megiddo	Aves indetermined	Bird	D / W	EB III
Megiddo	Dama mesopotamica	Fallow Deer	W	EB III
Megiddo	Gazella gazella / Gazella dorcas	Mountain Gazelle	W	EB III
Megiddo	Indetermined	Unknown	D / W	EB III
Megiddo	Mammals indetermined large	Large Mammal	D / W	EB III
Megiddo	Mammals indetermined medium	Medium Mammal	D / W	EB III
Megiddo	Mammals indetermined small	Small mammal	D / W	EB III
Megiddo	Rodentia indetermined	Rodent	W	EB III
Megiddo	Struthio camelus	Common Ostrich	W	EB III
Megiddo	Testudinata indetermined (all turtles)	Turtle	W	EB III
Megiddo	Bos taurus	Cattle	D	EB III
Megiddo	Canis familiaris	Dog	D	EB III
Megiddo	Capra hircus	Goat	D	EB III
Megiddo	Equus asinus	Ass	D	EB III
Megiddo	Ovis aries	Sheep	D	EB III
Megiddo	Ovis aries / Capra hircus	Sheep/Goat	D	EB III
Megiddo	Sus domesticus	Pig	D	EB III
Megiddo	Aves indetermined	Bird	D / W	EBA
Megiddo	Capra hircus	Goat	D	EBA

	Scientific Name	*Common Name*	*Domesticated/ Wild*	*Phase*
Megiddo	Ovis aries	Sheep	D	EBA
Megiddo	Ovis aries / Capra hircus	Sheep/Goat	D	EBA
Tel Kinrot	Aves indetermined	Bird	D / W	EBA
Tel Kinrot	Dama mesopotamica	Fallow Deer	W	EBA
Tel Kinrot	Mollusca indetermined	Mollusc	W	EBA
Tel Kinrot	Bos taurus	Cattle	D	EBA
Tel Kinrot	Canis familiaris	Dog	D	EBA
Tel Kinrot	Equus asinus	Ass	D	EBA
Tel Kinrot	Ovis aries / Capra hircus	Sheep/Goat	D	EBA
Tel Kinrot	Sus domesticus	Pig	D	EBA
Tel Te'o	Bos taurus	Cattle	D	EBA
Tel Te'o	Capra hircus	Goat	D	EBA
Tel Te'o	Gazella gazella	Mountain Gazelle	W	EBA
Tel Te'o	Ovis aries / Capra hircus	Sheep/Goat	D	EBA
Tel Te'o	Rodentia indetermined	Rodent	W	EBA
Tel Te'o	Sus domesticus / Sus scrofa	Pig	D / W	EBA
Tell Afis	Aves indetermined	Bird	D / W	EB IV
Tell Afis	Cheloniidae indetermined	Sea Turtle	W	EB IV
Tell Afis	Equus hemionus	Onager	W	EB IV
Tell Afis	Equus spec.	Equid	D / W	EB IV
Tell Afis	Equus asinus / Equus hemionus	Equid	D / W	EB IV
Tell Afis	Gastropoda indetermined	Land Snail	W	EB IV
Tell Afis	Gazella spec.	Gazelle	W	EB IV
Tell Afis	Helicidae indetermined	Land Snail	W	EB IV
Tell Afis	Leporidae indetermined	Rabbits	W	EB IV
Tell Afis	Mustela nivalis	Least Weasel	W	EB IV
Tell Afis	Ovis cf. ammon	Mountain Sheep	W	EB IV
Tell Afis	Phyllonotus trunculus (Murex trunculus, Heraplex trunculus)	Sea Snail	W	EB IV
Tell Afis	Spalax leucodon	Lesser Mole-Rat	W	EB IV
Tell Afis	Sus scrofa	Wild Boar	W	EB IV
Tell Afis	Unionidae indetermined	Mussel	W	EB IV
Tell Afis	Unio spec.	Mussel	W	EB IV
Tell Afis	Unio tigridis	Mussel	W	EB IV
Tell Afis	Bos taurus	Cattle	D	EB IV
Tell Afis	Canis familiaris	Dog	D	EB IV
Tell Afis	Capra hircus	Goat	D	EB IV
Tell Afis	Equus asinus	Ass	D	EB IV
Tell Afis	Equus caballus	Horse	D	EB IV
Tell Afis	Ovis aries	Sheep	D	EB IV
Tell Afis	Ovis aries / Capra hircus	Sheep/Goat	D	EB IV
Tell Afis	Sus domesticus	Pig	D	EB IV

	Scientific Name	Common Name	Domesticated/ Wild	Phase
Tell es-Sweyhat	Artioydactyla indetermined small	Even-toed Ungulates	D/W	EB IV
Tell es-Sweyhat	Capreolus capreolus	Roe Deer	W	EB IV
Tell es-Sweyhat	Indetermined size dog to wild boar	Medium Mammal	D / W	EB IV
Tell es-Sweyhat	Indetermined size red deer to cattle	Large Mammal	D / W	EB IV
Tell es-Sweyhat	Lepus europaeus	European Hare	W	EB IV
Tell es-Sweyhat	Bos taurus	Cattle	D	EB IV
Tell es-Sweyhat	Capra hircus	Goat	D	EB IV
Tell es-Sweyhat	Equus caballus / Equus asinus / MULE	Mule	D	EB IV
Tell es-Sweyhat	Ovis aries	Sheep	D	EB IV
Tell es-Sweyhat	Ovis aries / Capra hircus	Sheep/Goat	D	EB IV
Tell es-Sweyhat	Artioydactyla indetermined small	Even-toed Ungulates	D/W	EB IV
Tell es-Sweyhat	Capreolus spec. / Gazella spec.	Roe Deer	w	EB IV
Tell es-Sweyhat	Indetermined size dog to wild boar	Medium Mammal	D / W	EB IV
Tell es-Sweyhat	Indetermined size red deer to cattle	Large Mammal	D / W	EB IV
Tell es-Sweyhat	Rodentia indetermined small	Rodent	W	EB IV
Tell es-Sweyhat	Bos taurus	Cattle	D	EB IV
Tell es-Sweyhat	Ovis aries	Sheep	D	EB IV
Tell es-Sweyhat	Ovis aries / Capra hircus	Sheep/Goat	D	EB IV
Tell es-Sweyhat	Artioydactyla indetermined small	Even-toed Ungulates	D/W	EB IVA
Tell es-Sweyhat	Capreolus capreolus	Roe Deer	W	EB IVA
Tell es-Sweyhat	Indetermined size dog to wild boar	Medium Mammal	D / W	EB IVA
Tell es-Sweyhat	Indetermined size red deer to cattle	Large Mammal	D / W	EB IVA
Tell es-Sweyhat	Bos taurus	Cattle	D	EB IVA
Tell es-Sweyhat	Capra hircus	Goat	D	EB IVA
Tell es-Sweyhat	Equus caballus / Equus asinus / MULE	Mule	D	EB IVA
Tell es-Sweyhat	Ovis aries	Sheep	D	EB IVA
Tell es-Sweyhat	Ovis aries / Capra hircus	Sheep/Goat	D	EB IVA

	Scientific Name	Common Name	Domesticated/ Wild	Phase
Tell es-Sweyhat	Artioydactyla indetermined small	Even-toed Ungulates	D/W	EB IVB
Tell es-Sweyhat	Asio otis	Long-eared Owl	w	EB IVB
Tell es-Sweyhat	Aves indetermined	Bird	D / W	EB IVB
Tell es-Sweyhat	Bird of prey indetermined (Falconiformes, Accipitriformes, Strigiformes)	Bird of prey	w	EB IVB
Tell es-Sweyhat	Capreolus capreolus	Roe Deer	W	EB IVB
Tell es-Sweyhat	Capreolus spec. / Gazella spec.	Roe Deer	w	EB IVB
Tell es-Sweyhat	Cervidae indetermined large / ovicaprids (Ovis aries, Capra hircus)	Deer	D / W	EB IVB
Tell es-Sweyhat	Cervidae indetermined small / ovicaprids (Ovis aries, Capra hircus)	Deer	D / W	EB IVB
Tell es-Sweyhat	Cervus / Dama	Fallow Deer	W	EB IVB
Tell es-Sweyhat	Dama spec. / Gazella spec.	Fallow Deer	w	EB IVB
Tell es-Sweyhat	Gazella spec.	Gazelle	W	EB IVB
Tell es-Sweyhat	Indetermined size dog to wild boar	Medium Mammal	D / W	EB IVB
Tell es-Sweyhat	Indetermined size red deer to cattle	Large Mammal	D / W	EB IVB
Tell es-Sweyhat	Indetermined size rabbit to dog	Small mammal	D / W	EB IVB
Tell es-Sweyhat	Lepus europaeus	European Hare	W	EB IVB
Tell es-Sweyhat	Rodentia indetermined small	Rodent	W	EB IVB
Tell es-Sweyhat	Unio crassus	River Mussel	W	EB IVB
Tell es-Sweyhat	Bos taurus	Cattle	D	EB IVB
Tell es-Sweyhat	Canis familiaris	Dog	D	EB IVB
Tell es-Sweyhat	Capra hircus	Goat	D	EB IVB
Tell es-Sweyhat	Equus caballus / Equus asinus / MULE	Mule	D	EB IVB
Tell es-Sweyhat	Gallus domesticus	Chicken	D	EB IVB
Tell es-Sweyhat	Ovis aries	Sheep	D	EB IVB
Tell es-Sweyhat	Ovis aries / Capra hircus	Sheep/Goat	D	EB IVB
Tell es-Sweyhat	Sus domesticus	Pig	D	EB IVB
Tell Halif	Alcelaphus buselaphus	Hartebeest	W	EB IA
Tell Halif	Aves indetermined	Bird	D / W	EB IA
Tell Halif	Bos primigenius	Auroch	W	EB IA

	Scientific Name	Common Name	Domesticated/ Wild	Phase
Tell Halif	Equus ferus	Wild Horse	W	EB IA
Tell Halif	Felis silvestris	Wildcat	W	EB IA
Tell Halif	Gazella spec.	Gazelle	W	EB IA
Tell Halif	Sus scrofa	Wild Boar	W	EB IA
Tell Halif	Bos taurus	Cattle	D	EB IA
Tell Halif	Canis familiaris	Dog	D	EB IA
Tell Halif	Capra hircus	Goat	D	EB IA
Tell Halif	Equus asinus / Equus caballus	Equid	D	EB IA
Tell Halif	Ovis aries	Sheep	D	EB IA
Tell Halif	Ovis aries / Capra hircus	Sheep/Goat	D	EB IA
Tell Halif	Sus domesticus	Pig	D	EB IA
Tell Halif	Alcelaphus buselaphus	Hartebeest	W	EB IB
Tell Halif	Aves indetermined	Bird	D / W	EB IB
Tell Halif	Bos primigenius	Auroch	W	EB IB
Tell Halif	Canis aureus	Golden Jackal	W	EB IB
Tell Halif	Capra nubiana	Nubian Ibex	W	EB IB
Tell Halif	Gazella spec.	Gazelle	W	EB IB
Tell Halif	Rodentia indetermined	Rodent	W	EB IB
Tell Halif	Bos taurus	Cattle	D	EB IB
Tell Halif	Canis familiaris	Dog	D	EB IB
Tell Halif	Capra hircus	Goat	D	EB IB
Tell Halif	Equus asinus / Equus caballus	Equid	D	EB IB
Tell Halif	Ovis aries	Sheep	D	EB IB
Tell Halif	Ovis aries / Capra hircus	Sheep/Goat	D	EB IB
Tell Halif	Sus domesticus	Pig	D	EB IB
Tell Halif	Alcelaphus buselaphus	Hartebeest	W	EB IB
Tell Halif	Aves indetermined	Bird	D / W	EB IB
Tell Halif	Bos primigenius	Auroch	W	EB IB
Tell Halif	Capreolus capreolus	Roe Deer	W	EB IB
Tell Halif	Capra nubiana	Nubian Ibex	W	EB IB
Tell Halif	Equus ferus	Wild Horse	W	EB IB
Tell Halif	Felis silvestris	Wildcat	W	EB IB
Tell Halif	Gazella spec.	Gazelle	W	EB IB
Tell Halif	Lepus capensis	Cape Hare	W	EB IB
Tell Halif	Pisces indetermined	Fish	W	EB IB
Tell Halif	Rodentia indetermined	Rodent	W	EB IB
Tell Halif	Sus scrofa	Wild Boar	W	EB IB
Tell Halif	Testudinata indetermined (all turtles)	Turtle	W	EB IB
Tell Halif	Vulpes vulpes	Red Fox	W	EB IB
Tell Halif	Bos taurus	Cattle	D	EB IB
Tell Halif	Canis familiaris	Dog	D	EB IB

	Scientific Name	Common Name	Domesticated/ Wild	Phase
Tell Halif	Capra hircus	Goat	D	EB IB
Tell Halif	Equus asinus / Equus caballus	Equid	D	EB IB
Tell Halif	Ovis aries	Sheep	D	EB IB
Tell Halif	Ovis aries / Capra hircus	Sheep/Goat	D	EB IB
Tell Halif	Sus domesticus	Pig	D	EB IB
Tell Munbaqa	Anser albifrons	Greater white-fronted goose	W	EB IV
Tell Munbaqa	Nassarius gibbosulus, Linnaeus, 1758 (Arcularia gibbosula Linneaus 1758 veraltet)	Sea Snail	W	EB IV
Tell Munbaqa	Aves indetermined	Bird	D / W	EB IV
Tell Munbaqa	Barbus spec.	Fish	W	EB IV
Tell Munbaqa	Bufo viridis	European Green Toad	W	EB IV
Tell Munbaqa	Buliminus alepensis	Moolusc	W	EB IV
Tell Munbaqa	Corvus frugilegus	Rook	W	EB IV
Tell Munbaqa	Dentalium spec.	Mollusc	W	EB IV
Tell Munbaqa	Erinaceus concolor	Southern white-breasted hedgehog	W	EB IV
Tell Munbaqa	Felis catus	Cat	D	EB IV
Tell Munbaqa	Glycymeris violacescens (Glycymeris insubrica)	Mollusc	W	EB IV
Tell Munbaqa	Mammals indetermined large	Large Mammal	D / W	EB IV
Tell Munbaqa	Melanopsis praemorsa	Freshwater Snail	W	EB IV
Tell Munbaqa	Meriones tristrami	Tistram's Jird	W	EB IV
Tell Munbaqa	Nesokia indica	Short-tailed Bandicoot Rat	W	EB IV
Tell Munbaqa	Silurus triostegus (Parasilurus triostegus)	Tigris Catfish	W	EB IV
Tell Munbaqa	Struthio camelus	Common Ostrich	W	EB IV
Tell Munbaqa	Tadorna ferruginea	Ruddy Shelduck	W	EB IV
Tell Munbaqa	Tatera indica	Indian Gerbil	W	EB IV
Tell Munbaqa	Testudo graeca	Greek Tortoise	W	EB IV
Tell Munbaqa	Unio tigridis	Mussel	W	EB IV
Tell Munbaqa	Xeropicta krynickii	Land Snail	W	EB IV
Tell Munbaqa	Capra hircus	Goat	D	EB IV

	Scientific Name	*Common Name*	*Domesticated/ Wild*	*Phase*
Tell Munbaqa	Equus ferus	Wild Horse	W	EB IV
Tell Munbaqa	Equus hemionus	Onager	W	EB IV
Tell Munbaqa	Ovis aries	Sheep	D	EB IV
Tell Munbaqa	Bos primigenius	Auroch	W	EB IV
Tell Munbaqa	Dama mesopotamica	Fallow Deer	W	EB IV
Tell Munbaqa	Elephas cf. maximus	Asian Elephant	W	EB IV
Tell Munbaqa	Gazella subgutturosa	Goitered Gazelle	W	EB IV
Tell Munbaqa	Lepus capensis	Cape Hare	W	EB IV
Tell Munbaqa	Vulpes vulpes	Red Fox	W	EB IV
Tell Munbaqa	Bos taurus	Cattle	D	EB IV
Tell Munbaqa	Canis familiaris	Dog	D	EB IV
Tell Munbaqa	Equus spec.	Equid	D / W	EB IV
Tell Munbaqa	Ovis aries / Capra hircus	Sheep/Goat	D	EB IV
Tell Munbaqa	Sus domesticus	Pig	D	EB IV
Tell Qarqur	Aves indetermined	Bird	D / W	EB IV
Tell Qarqur	Brachiura indetermined	Fish	W	EB IV
Tell Qarqur	Canidae indetermined	Dog	D / W	EB IV
Tell Qarqur	Cervidae indetermined	Deer	W	EB IV
Tell Qarqur	Indetermined	Unknown	D / W	EB IV
Tell Qarqur	Mammals indetermined large	Large Mammal	D / W	EB IV
Tell Qarqur	Mammals indetermined medium	Medium Mammal	D / W	EB IV
Tell Qarqur	Mammals indetermined small	Small mammal	D / W	EB IV
Tell Qarqur	Pisces indetermined	Fish	W	EB IV
Tell Qarqur	Reptilia indetermined	Reptile	W	EB IV
Tell Qarqur	Rodentia indetermined	Rodent	W	EB IV
Tell Qarqur	Bos taurus	Cattle	D	EB IV
Tell Qarqur	Ovis aries / Capra hircus	Sheep/Goat	D	EB IV
Tell Qarqur	Sus domesticus	Pig	D	EB IV

GAZETTEER OF ARCHAEOLOGICAL SITES

Overview

The following is a list of the archaeological sites utilized in this study, including Survey ID, Modern Name, Ancient Name, Easting and Northing (WGS 1984), Environmental Niche, and the reference for the site. The Survey IDs are derived from the surveys utilized in this study and naming conventions are different depending on the survey. Each ID starts with an abbreviation for the survey. For the Antiquities Survey of Israel (ASI; http://www.antiquities.org.il/survey/new/) the abbreviation is followed by the Map Number, then the site number. For example, Tel Hazor's ID number is ASI18-19, meaning it is from the Antiquities Survey of Israel, Map 18, site number 19 of the survey. The same naming conventions holds for the West Bank (WB; (Greenberg and Keinan 2009). The remainder of the site IDs are based only on the abbreviations of surveys and the site numbers in those surveys. This includes: Beqaa Survey (BS; (Marfoe 1979); Bibliography of Surveys in Syria and Lebanon (BSL; (Lehmann 2002); Ghab Regional Survey (GRS; (Graff 2006); the Archaeology of the Israelite Settlement (IS; (Finkelstein 1988); Jabbul Plain Survey (JP; (Schwartz et al. 2000; Yukich 2013); the Menbij Region (Men; Copeland 1985); Manasseh Hill Country (MHC; (Zertal 2004); MegaJordan (MJ; http://www.megajordan.org/); and The River Qoueiq region (QV; (Matthers 1978; 1981a).

Sites

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI5-66	El-Kabiri, South		35.15	33.01	Refugia	Frankel and Getzov 2012
ASI5-112	esh Sheikh Dawud		35.15	32.99	Refugia	Frankel and Getzov 2012
ASI5-159	The Nahal Bet Ha-'Emeq Aqueducts		35.18	32.97	Refugia	Frankel and Getzov 2012

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI5-190	Nahal Bet Ha-'Emeq 4		35.18	32.97	Refugia	Frankel and Getzov 2012
ASI5-211	Abu Sinan, West		35.17	32.96	Refugia	Frankel and Getzov 2012
ASI15-36	Wadi el-Amirah		35.68	33.05	Refugia	Hartal 2014
ASI15-40	Deir Sras		35.68	33.05	Refugia	Hartal 2014
ASI15-46	Qadiriyah (South-West) 1		35.73	33.04	Refugia	Hartal 2014
ASI15-55	Wadi el-Qadiriyah		35.73	33.03	Refugia	Hartal 2014
ASI15/1-14	Avital Junction (South)		35.79	33.09	Refugia	Hartal 2014
ASI15/1-41	Height Spot 708 Horbat (Northeast)		35.76	33.04	Refugia	Hartal 2014
ASI18-19	Tel Hazor		35.57	33.02	Refugia	Stepansky 2012
ASI18-21	Ard Qibliya		35.58	33.02	Refugia	Stepansky 2012
ASI18/1-7	Wadi el-'Araghrah (South)		35.73	33.02	Refugia	Hartal and Yigal 2012
ASI18/1-21	Qanat Abu Dalyeh		35.65	33.00	Refugia	Hartal and Yigal 2012
ASI18/1-41	ed-Dura		35.66	32.99	Refugia	Hartal and Yigal 2012
ASI18/1-42	ed-Dura (East)		35.67	32.99	Refugia	Hartal and Yigal 2012
ASI18/1-50	Suweihiyya		35.67	32.98	Refugia	Hartal and Yigal 2012
ASI18/1-53	Shukeyf (East)		35.69	32.98	Refugia	Hartal and Yigal 2012
ASI18/1-100	Khirbet Zum'îra (North East)		35.69	32.95	Refugia	Hartal and Yigal 2012
ASI18/1-118	Height Spot 405 Horbat (West)		35.72	32.94	Refugia	Hartal and Yigal 2012
ASI18/2-77	Sahra (North)		35.78	32.96	Refugia	Yigal and Hartal 2012
ASI20-4	Tel Da'okh		35.12	32.87	Refugia	Lehmann and Peilstöcker 2012
ASI20-25	Horbat 'Uza (Horbat 'Uza)		35.15	32.91	Refugia	Lehmann and Peilstöcker 2012
ASI20-30	Horbat 'Uza (Tombs)		35.15	32.91	Refugia	Lehmann and Peilstöcker 2012
ASI20-35	el-Judeidah southwest		35.15	32.92	Refugia	Lehmann and Peilstöcker 2012
ASI20-70	Tel Bira (Tel Yas'ur)		35.17	32.90	Refugia	Lehmann and Peilstöcker 2012
ASI22-56	Nahal Siyah		34.97	32.80	Refugia	Olami et al. 2003
ASI22-66	Horbat Qastra		34.97	32.79	Refugia	Olami et al. 2003
ASI24-34	Horbat Zefat 'Adi		35.16	32.82	Refugia	Olami and Gal 2003
ASI24-127	'En Yivqa'		35.17	32.76	Refugia	Olami and Gal 2003
ASI28-16	Tel Yoqne'am		35.11	32.66	Refugia	Raban 1982
ASI28-33	Horbat Zeror		35.14	32.69	Refugia	Raban 1982
ASI30-141	El Fureidis (M) (S) (east)		34.96	32.60	Refugia	Olami et al. 2005
ASI30-142	Horbat TAwwāsim (southeast)		34.96	32.60	Refugia	Olami et al. 2005
ASI30-143	El Fureidis (M) (S)		34.96	32.60	Refugia	Olami et al. 2005

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI32-124	(Abu 'Arqub (M		35.16	32.59	Refugia	Raban 1982
ASI36/1-7	es-Salabe (South West)		35.71	32.92	Refugia	Hartal and Yigal 2012
ASI36/1-94	Mitham Leviah		35.69	32.85	Refugia	Hartal and Yigal 2012
ASI36/2-91	Khirbet er-Ramliyat (East)		35.81	32.89	Refugia	Hartal and Yigal 2012
ASI36/2-123	Buyut Abu Riqqa (West)		35.75	32.87	Refugia	Hartal and Yigal 2012
ASI40-2	el-Mabara (Southwest)		35.70	32.84	Refugia	Hartal and Yigal 2012
ASI40-15	el-Khashish		35.67	32.83	Refugia	Hartal and Yigal 2012
ASI40-18	Mesil Kharub		35.70	32.81	Refugia	Hartal and Yigal 2012
ASI40-22	Tell Abu Madwwar (Northwest)		35.73	32.83	Refugia	Hartal and Yigal 2012
ASI40-31	Upper Mesil Kharub		35.70	32.78	Refugia	Hartal and Yigal 2012
ASI40-33	Lower Mesil Kharub		35.70	32.82	Refugia	Hartal and Yigal 2012
ASI40-51	Nab'a et-Tu'eine Enclosure		35.69	32.81	Refugia	Hartal and Yigal 2012
ASI40-89	Tell Soreg		35.69	32.78	Refugia	Hartal and Yigal 2012
ASI40/1-14	Tell ed-Dhahab		35.83	32.84	Refugia	Hartal and Yigal 2012
ASI41-12	Ilaniyya		35.40	32.75	Refugia	Gal 1998
ASI41-13	Tel Gat Hefer		35.32	32.74	Refugia	Gal 1998
ASI41-47	En Shehor		35.41	32.71	Refugia	Gal 1998
ASI41-48	Bir et Tira (M)		35.33	32.70	Refugia	Gal 1998
ASI41-52	Nahal Qeshet		35.41	32.71	Refugia	Gal 1998
ASI44-11	Tlel (East) 1		35.69	32.75	Refugia	Hartal and Yigal 2012
ASI44-46	Sa'ed (1)		35.73	32.74	Refugia	Hartal and Yigal 2012
ASI44-54	Maqam Breja' (West)		35.68	32.73	Refugia	Hartal and Yigal 2012
ASI44-60	Khirbet 'Ayun		35.67	32.72	Refugia	Hartal and Yigal 2012
ASI44-65	el-'Ayadah		35.68	32.72	Refugia	Hartal and Yigal 2012
ASI44-75	Hammat Gader		35.66	32.69	Refugia	Hartal and Yigal 2012
ASI45-1	Tel Qishayon		35.39	32.66	Refugia	Gal 1998
ASI45-4	Horbat Tevet		35.33	32.64	Refugia	Gal 1998
ASI45-7	Horbat Zafzafot		35.39	32.64	Refugia	Gal 1998
ASI45-10	En ha-More (north)		35.34	32.63	Refugia	Gal 1998
ASI45-14	Tel 'Agol		35.37	32.63	Refugia	Gal 1998
ASI45-19	Giv'at ha-More		35.33	32.62	Refugia	Gal 1998
ASI46-20	Horbat Ukkal		35.51	32.64	Refugia	Gal 1991
ASI46-21	Horbat Ukkal		35.50	32.64	Refugia	Gal 1991

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI46-55	'En Be'era		35.50	32.61	Refugia	Gal 1991
ASI46-62	Ahuzzat Shoshanna		35.52	32.59	Refugia	Gal 1991
ASI46-65	Khirbet Yebla (s)		35.47	32.58	Refugia	Gal 1991
ASI47-4	Gesher 1		35.55	32.62	Refugia	Tzori and Shemesh 2015
ASI47-11	Khirbet Mazrut 1		35.54	32.61	Refugia	Tzori and Shemesh 2015
ASI47-19	Tel Zen (East)		35.56	32.61	Refugia	Tzori and Shemesh 2015
ASI48-68	Hotem Ha-Karmel		34.94	32.53	Refugia	Olami et al. 2005
ASI48-89	Tel Burga		34.97	32.52	Refugia	Olami et al. 2005
ASI49-24	Rujm el Bahta (M)		35.05	32.57	Refugia	Gadot and Tepper 2009
ASI49-27	Nahal Raz		35.07	32.57	Refugia	Gadot and Tepper 2009
ASI49-30	Nahal Tanninim		35.07	32.57	Refugia	Gadot and Tepper 2009
ASI49-35	Nahal Tanninim		35.08	32.57	Refugia	Gadot and Tepper 2009
ASI49-52	El Widyan		35.06	32.56	Refugia	Gadot and Tepper 2009
ASI49-56	Nahal Tanninim		35.06	32.56	Refugia	Gadot and Tepper 2009
ASI49-57	Khirbet el Kalba (M)		35.07	32.56	Refugia	Gadot and Tepper 2009
ASI49-59	Khirbat el Kalba (M) (east)		35.07	32.56	Refugia	Gadot and Tepper 2009
ASI49-60	Nahal Tanninim		35.07	32.56	Refugia	Gadot and Tepper 2009
ASI49-64	Even Yizhaq (Gal'ed) (north)		35.08	32.56	Refugia	Gadot and Tepper 2009
ASI49-89	Tel Hazirim		35.02	32.55	Refugia	Gadot and Tepper 2009
ASI49-107	Qabr el Faras		35.08	32.56	Refugia	Gadot and Tepper 2009
ASI49-108	Khirbat Abu Hajwa (M)		35.08	32.55	Refugia	Gadot and Tepper 2009
ASI49-111	Nahal Sibkhi		35.09	32.55	Refugia	Gadot and Tepper 2009
ASI49-148	Nahal 'Ada		35.05	32.53	Refugia	Gadot and Tepper 2009
ASI49-207	Kefar Glickson		35.01	32.51	Refugia	Gadot and Tepper 2009
ASI49-226	Nahal 'Iron		35.07	3200	Refugia	Gadot and Tepper 2009
ASI66-25	Horbat Migda' (1)		35.46	32.46	Refugia	Kohn-Tavor 2012
ASI66-29	Horbat Terumot		35.49	32.44	Refugia	Kohn-Tavor 2012
ASI66-30	Horbat Nofar		35.49	32.44	Refugia	Kohn-Tavor 2012
ASI66-34	Moshav Rehov		35.49	32.45	Refugia	Kohn-Tavor 2012
ASI66-35	Horbat Rehov West		35.49	32.46	Refugia	Kohn-Tavor 2012
ASI66-36	Horbat Parva (1)		35.49	32.46	Refugia	Kohn-Tavor 2012
ASI66-39	Sede Eliyahu-pool(2)		35.50	32.44	Refugia	Kohn-Tavor 2012
ASI66-42	Rehov, Tombs		35.50	32.45	Refugia	Kohn-Tavor 2012

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI66-49	'En Ha-Naziv (2)		35.51	32.47	Refugia	Kohn-Tavor 2012
ASI66-51	Qanat el Ja'ar		35.51	32.48	Refugia	Kohn-Tavor 2012
ASI66-55	Horbat Menorah		35.52	32.42	Refugia	Kohn-Tavor 2012
ASI66-56	Tirat Zevi		35.53	32.42	Refugia	Kohn-Tavor 2012
ASI66-59	'En Pdoot south		35.53	32.43	Refugia	Kohn-Tavor 2012
ASI66-60	'En Pdoot west		35.52	32.43	Refugia	Kohn-Tavor 2012
ASI66-63	Horbat Ro'e		35.52	32.44	Refugia	Kohn-Tavor 2012
ASI67-75	Horbat Malluah		35.56	32.44	Refugia	Kohn-Tavor 2012
ASI67-77	Horbat Hasut		35.56	32.46	Refugia	Kohn-Tavor 2012
ASI67-78	Horbat Masad		35.56	32.46	Refugia	Kohn-Tavor 2012
ASI67-79	Horbat Daveka		35.56	32.46	Zone of Uncertainty	Kohn-Tavor 2012
ASI67-80	Horbat Qataf		35.56	32.46	Refugia	Kohn-Tavor 2012
ASI67-82	Horbat Artal		35.56	32.46	Zone of Uncertainty	Kohn-Tavor 2012
ASI67-83	Horbat Karpas		35.56	32.47	Zone of Uncertainty	Kohn-Tavor 2012
ASI67-84	Horbat Karpas north		35.56	32.47	Zone of Uncertainty	Kohn-Tavor 2012
ASI67-88	Horbat Hatzvim		35.56	32.47	Refugia	Kohn-Tavor 2012
ASI67-90	Horbat Peha South		35.55	32.48	Refugia	Kohn-Tavor 2012
ASI67-92	Horbat Nimrod		35.55	32.48	Refugia	Kohn-Tavor 2012
ASI67-107	Horbat Malqet		35.54	32.40	Zone of Uncertainty	Kohn-Tavor 2012
ASI70-3	Sdeh Dov		34.78	32.11	Refugia	Ayalon and Gophna 2015
ASI70-11	Givat Bet HaMitbahayim		34.78	32.09	Refugia	Ayalon and Gophna 2015
ASI70-22	Sarona		34.78	32.07	Refugia	Ayalon and Gophna 2015
ASI71-5	Delek gas station		34.79	32.11	Refugia	Ayalon and Gophna 2015
ASI71-16	Ramat Ha-Hayal		34.83	32.11	Refugia	Ayalon and Gophna 2015
ASI71-26	Eretz Israel Museum, Tel Aviv		34.80	32.10	Refugia	Ayalon and Gophna 2015
ASI71-38	Pinkas SHorbat, Tel Aviv		34.79	32.09	Refugia	Ayalon and Gophna 2015
ASI71-65	Begin RHorbat, Tel Aviv		34.79	32.07	Refugia	Ayalon and Gophna 2015
ASI71-66	Sarona		34.79	32.07	Refugia	Ayalon and Gophna 2015
ASI72-7	Bat Yam 5		34.75	32.01	Refugia	Barda 2013
ASI76-17	Tel Hamid (Lower Terrace)		34.89	31.91	Refugia	Paz et al. 2014

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI77-82	Jaljulye (1)		34.95	32.15	Refugia	Beit-Arieh and Ayalon 2014
ASI77-128	Khirbet Miriam		34.97	32.14	Refugia	Beit-Arieh and Ayalon 2014
ASI77-200	Nahal Qana 4a		34.93	32.14	Refugia	Beit-Arieh and Ayalon 2014
ASI82-107	Nahal Modi'im (East)		35.00	31.94	Refugia	Shavit 2013
ASI82-533	Horbat Nekhes (South/1)		34.96	31.88	Refugia	Shavit 2013
ASI82-689	Nahal Ayalon (North/1)		35.00	31.87	Refugia	Shavit 2013
ASI82-712	En Yarad (South/2)		34.93	31.86	Refugia	Shavit 2013
ASI83/1-60	[155]		35.17	31.86	Refugia	Finklestein et al. 1993
ASI83/1-61	[156]		35.18	31.85	Refugia	Finklestein et al. 1993
ASI83/2-10	Beitūn [82]		35.24	31.92	Refugia	Finklestein et al. 1993
ASI83/2-22	[94]		35.26	31.94	Refugia	Finklestein et al. 1993
ASI83/2-23	Muntar [95]		35.26	31.94	Refugia	Finklestein et al. 1993
ASI83/2-89	Khirbet Marjama [231]		35.29	31.86	Refugia	Finklestein et al. 1993
ASI83/2-91	[233]		35.29	31.85	Refugia	Finklestein et al. 1993
ASI83/2-103	[245]		35.30	31.86	Refugia	Finklestein et al. 1993
ASI83/2-105	Jebel Tumur [247]		35.30	31.88	Refugia	Finklestein et al. 1993
ASI83/2-106	[248]		35.30	31.88	Refugia	Finklestein et al. 1993
ASI83/2-117	[259]		35.31	31.88	Refugia	Finklestein et al. 1993
ASI83/2-118	[260]		35.31	31.89	Refugia	Finklestein et al. 1993
ASI85-14	Benaya		34.74	31.84	Refugia	Barda and Zbenovich 2012
ASI85-65	Gan Yavne		34.70	31.78	Refugia	Barda and Zbenovich 2012
ASI98-25	Khirbet er Resm (S)		34.85	31.58	Refugia	Dagan 1992
ASI98-29	Nahal Lakhish		34.85	31.57	Refugia	Dagan 1992
ASI98-165	Nahal Lakhish		34.87	31.56	Refugia	Dagan 1992
ASI98-272	Nahal Adorayim		34.89	31.53	Refugia	Dagan 1992
ASI98-312	Tell Deir Kharuf (M)		34.87	31.51	Refugia	Dagan 1992
ASI101-55	el-Jib [315]		35.18	31.85	Refugia	Finkelstein et al. 1993
ASI101-139	[78]		35.17	31.78	Refugia	Finkelstein et al. 1993
ASI102-91	Khirbet Ras Abu Ma'ruf (M)		35.24	31.82	Refugia	Kloner 2001
ASI102-93	Wadi el Khalaf		35.25	31.82	Refugia	Kloner 2001
ASI102-354	Augusta Victoria Hospital		35.25	31.79	Refugia	Kloner 2001
ASI102-362	Et Tur (M)		35.25	31.78	Refugia	Kloner 2001
ASI102-522	[439]		35.25	31.77	Refugia	Kloner 2001

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI102-535	Anata [452]		35.26	31.81	Refugia	Kloner 2001
ASI102-597	Bir Sumeima [514]		35.29	31.84	Refugia	Kloner 2001
ASI102-599	el-Hadaba [516]		35.28	31.85	Refugia	Kloner 2001
ASI102-615	[532]		35.30	31.84	Refugia	Kloner 2001
ASI102-622	Jurat Musa [539]		35.31	31.83	Refugia	Kloner 2001
ASI102-627	[544]		35.31	31.85	Refugia	Kloner 2001
ASI105-39	Khirbet er Ras (M)		35.18	31.75	Refugia	Kloner 2001
ASI109-26	Horbat Bet 'Elem [1]		34.95	31.58	Refugia	Dagan 2006
ASI109-39	Khirbet Shibirqa (M) [1]		34.96	31.58	Refugia	Dagan 2006
ASI109-110	Giv'at Ga'ada [1]		34.94	31.57	Refugia	Dagan 2006
ASI109-123	Idna (M) [7]		34.97	31.57	Refugia	Dagan 2006
ASI109-180	Nahal Lakhish [135]		34.91	31.56	Refugia	Dagan 2006
ASI109-210	Khirbet er Ras (M) [1]		34.96	31.56	Refugia	Dagan 2006
ASI109-219	Dhahr Khallat el Ghamīqa (M) [3]		34.96	31.56	Refugia	Dagan 2006
ASI109-224	Wadi el Far'a [1]		34.99	31.56	Refugia	Dagan 2006
ASI109-244	Khirbet et Tabla (M)		34.91	31.55	Refugia	Dagan 2006
ASI109-271	Horbat Boser [5]		34.93	31.55	Refugia	Dagan 2006
ASI109-276	Rasm ed Duwwar (M) [1]		34.94	31.55	Refugia	Dagan 2006
ASI109-294	Jebel Sālih [1]		34.97	31.55	Refugia	Dagan 2006
ASI109-317	Nahal Lakhish [175]		34.90	31.54	Refugia	Dagan 2006
ASI109-341	Khirbet el Ham'(S)		34.96	31.54	Refugia	Dagan 2006
ASI109-356	Khallat Beit Maqdūm (M)		34.97	31.54	Refugia	Dagan 2006
ASI109-388	Nahal Lakhish [196]		34.94	31.53	Refugia	Dagan 2006
ASI109-390	Qasr Firjis (M) [1]		34.95	31.53	Refugia	Dagan 2006
ASI109-391	Nahal Lakhish [197]		34.94	31.53	Refugia	Dagan 2006
ASI109-392	Nahal Lakhish [198]		34.94	31.53	Refugia	Dagan 2006
ASI109-394	Nahal Lakhish [200]		34.94	31.53	Refugia	Dagan 2006
ASI109-396	Khirbet Firjis (M); Khirbet Firj'(M ' List) [1]		34.95	31.53	Refugia	Dagan 2006
ASI109-399	Khirbet er Rasm (M) [1]		34.97	31.53	Refugia	Dagan 2006
ASI109-409	Jebel es Sa'di [3]		34.97	31.53	Refugia	Dagan 2006
ASI109-410	Jebel es Sa'di [4]		34.97	31.53	Refugia	Dagan 2006
ASI109-416	Khirbet Humsa [2]		34.98	31.53	Refugia	Dagan 2006
ASI109-434	Giv'at 'Uqzar [5]		34.90	31.52	Refugia	Dagan 2006

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI109-443	Shi'b Raiyin (M) [1]		34.91	31.52	Refugia	Dagan 2006
ASI109-464	Khirbet Beit Bāʿir [4]		34.94	31.52	Refugia	Dagan 2006
ASI109-466	Khirbet Beit Bāʿir [6]		34.94	31.53	Refugia	Dagan 2006
ASI109-467	Sheqef [6]		34.94	31.53	Refugia	Dagan 2006
ASI109-470	Sheqef [9]		34.95	31.52	Refugia	Dagan 2006
ASI109-472	Jebel el Qa'aqir [2]		34.95	31.52	Refugia	Dagan 2006
ASI109-473	Jebel el Qa'aqir [3]		34.95	31.52	Refugia	Dagan 2006
ASI109-475	Jebel el Qa'aqir [5]		34.95	31.52	Refugia	Dagan 2006
ASI109-476	Jebel el Qa'aqir [6]		34.96	31.53	Refugia	Dagan 2006
ASI109-484	Jebel el Qa'aqir [1]		34.96	31.52	Refugia	Dagan 2006
ASI109-485	Jebel el Qa'aqir [8]		34.96	31.52	Refugia	Dagan 2006
ASI109-486	Jebel el Qa'aqir [9]		34.96	31.52	Refugia	Dagan 2006
ASI109-488	Jebel el Qa'aqir [11]		34.96	31.53	Refugia	Dagan 2006
ASI109-489	Jebel el Qa'aqir [10]		34.96	31.52	Refugia	Dagan 2006
ASI109-493	Khirbet Deir Sāmit [2]		34.98	31.53	Refugia	Dagan 2006
ASI109-500	Jebel es Sa'di [7]		34.98	31.53	Refugia	Dagan 2006
ASI109-502	Jebel es Sa'di [8]		34.98	31.53	Refugia	Dagan 2006
ASI109-510	Wadi el Hammam [7]		34.99	31.53	Refugia	Dagan 2006
ASI109-526	Horbat Hazzan [1]		34.91	31.52	Refugia	Dagan 2006
ASI109-534	Nahal Adorayim [74]		34.91	31.51	Refugia	Dagan 2006
ASI109-536	Khirbet er Riya [2]		34.92	31.51	Refugia	Dagan 2006
ASI109-541	Horbat Mayish		34.93	31.52	Refugia	Dagan 2006
ASI109-543	Khallat Abu Sharār (M)		34.93	31.51	Refugia	Dagan 2006
ASI109-549	Har Nahal [3]		34.94	31.51	Refugia	Dagan 2006
ASI109-550	Sheqef [15]		34.94	31.51	Refugia	Dagan 2006
ASI109-553	Khirbet Beit 'Awwā [4]		34.95	31.52	Refugia	Dagan 2006
ASI109-556	Khirbet Beit 'Awwā [7]		34.95	31.51	Refugia	Dagan 2006
ASI109-558	Khirbet Beit 'Awwā [9]		34.95	31.52	Refugia	Dagan 2006
ASI109-559	Khirbet Beit 'Awwā [10]		34.95	31.52	Refugia	Dagan 2006
ASI109-560	Khirbet Beit 'Awwā [11]		34.95	31.52	Refugia	Dagan 2006
ASI109-561	Khirbet Beit 'Awwā [12]		34.95	31.51	Refugia	Dagan 2006
ASI109-562	Khirbet Beit 'Awwā [13]		34.95	31.51	Refugia	Dagan 2006
ASI109-563	Khirbet Beit 'Awwā [14]		34.96	31.51	Refugia	Dagan 2006

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI109-565	Khirbet Beit 'Awwā [16]		34.95	31.51	Refugia	Dagan 2006
ASI109-571	Wadi es Simiya [1]		34.97	31.52	Refugia	Dagan 2006
ASI109-572	Khirbet Beit 'Awwā [18]		34.96	31.51	Refugia	Dagan 2006
ASI109-575	Khirbet Beit 'Awwā [22]		34.96	31.51	Refugia	Dagan 2006
ASI109-576	Jebel el Qa'aqir [13]		34.96	31.52	Refugia	Dagan 2006
ASI109-577	Jebel el Qa'aqir [14]		34.96	31.52	Refugia	Dagan 2006
ASI109-578	Jebel el Qa'aqir [15]		34.96	31.52	Refugia	Dagan 2006
ASI109-579	Wadi es Simiya [3]		34.97	31.52	Refugia	Dagan 2006
ASI109-583	Wadi Ahmad [1]		34.97	31.51	Refugia	Dagan 2006
ASI109-588	Wadi Ahmad [4]		34.97	31.51	Refugia	Dagan 2006
ASI109-592	Wadi Inzar [1]		34.98	31.52	Refugia	Dagan 2006
ASI109-597	Wadi Ahmad [7]		34.98	31.52	Refugia	Dagan 2006
ASI109-603	Urqān 'Awad (M)		35.00	31.51	Refugia	Dagan 2006
ASI109-605	Wadi Inzar [4]		34.99	31.51	Refugia	Dagan 2006
ASI109-629	Nahal Adorayim [88]		34.91	31.50	Refugia	Dagan 2006
ASI109-630	Khirbet er Ráiá (S) [1]		34.92	31.51	Refugia	Dagan 2006
ASI109-641	Sheqef [17]		34.93	31.51	Refugia	Dagan 2006
ASI109-654	Khirbet el Meh' (S)		34.95	31.51	Refugia	Dagan 2006
ASI109-662	Khirbet Beit 'Awwā [35]		34.95	31.50	Refugia	Dagan 2006
ASI109-663	Rujm el Muntara (M) [1]		34.97	31.51	Refugia	Dagan 2006
ASI109-664	Rujm el Qas'a (M ' Map)		34.96	31.51	Refugia	Dagan 2006
ASI109-665	Rujm el Qas'a [3]		34.96	31.51	Refugia	Dagan 2006
ASI109-666	Rujm el Qas'a [5]		34.96	31.51	Refugia	Dagan 2006
ASI109-667	Rujm el Muntara (M) [2]		34.96	31.51	Refugia	Dagan 2006
ASI109-668	Wadi Umm Hadwa [1]		34.96	31.50	Refugia	Dagan 2006
ASI109-669	Wadi Umm Hadwa [8]		34.97	31.50	Refugia	Dagan 2006
ASI109-670	Rujm el Muntara (M) [4]		34.96	31.51	Refugia	Dagan 2006
ASI109-671	Rujm el Qas'a [9]		34.96	31.51	Refugia	Dagan 2006
ASI109-676	Wadi Ahmad [9]		34.98	31.51	Refugia	Dagan 2006
ASI109-679	Wadi es Simiya [8]		34.98	31.50	Refugia	Dagan 2006
ASI109-687	Wadi Ahmad [15]		34.98	31.51	Refugia	Dagan 2006
ASI109-692	Wadi Ahmad [33]		34.98	31.51	Refugia	Dagan 2006
ASI109-698	Wadi Ahmad [24]		34.99	31.51	Refugia	Dagan 2006

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI109-699	Wadi Ahmad [25]		35.00	31.50	Refugia	Dagan 2006
ASI109-701	Wadi Ahmad [27]		34.99	31.50	Refugia	Dagan 2006
ASI109-703	Wadi Ahmad [29]		35.00	31.51	Refugia	Dagan 2006
ASI109-704	Wadi Inzar [8]		35.00	31.51	Refugia	Dagan 2006
ASI109-706	Wadi Inzar [14]		35.00	31.51	Refugia	Dagan 2006
ASI109-707	Rasm el Barazat (M)		34.89	31.49	Refugia	Dagan 2006
ASI109-719	Nahal Duma [13]		34.91	31.50	Refugia	Dagan 2006
ASI109-720	Nahal Adorayim [96]		34.91	31.49	Refugia	Dagan 2006
ASI109-721	Nahal Duma [14]		34.91	31.49	Refugia	Dagan 2006
ASI109-730	Nahal Adorayim [103]		34.92	31.49	Refugia	Dagan 2006
ASI109-735	Khirbet 'Eitūn et Tahta (M)		34.92	31.49	Refugia	Dagan 2006
ASI109-739	Nahal Adorayim [109]		34.93	31.50	Refugia	Dagan 2006
ASI109-750	Rasm Khallat en Najasa (M)		34.94	31.50	Refugia	Dagan 2006
ASI109-754	Nahal Adorayim [124]		34.95	31.50	Refugia	Dagan 2006
ASI109-756	Nahal Adorayim [125]		34.94	31.49	Refugia	Dagan 2006
ASI109-760	Wadi Khursa [1]		34.96	31.50	Refugia	Dagan 2006
ASI109-762	Jebel Duweimar [2]		34.95	31.50	Refugia	Dagan 2006
ASI109-763	Jebel Duweimar [3]		34.95	31.50	Refugia	Dagan 2006
ASI109-764	Wadi Khursa [2]		34.96	31.49	Refugia	Dagan 2006
ASI109-766	Wadi Khurāsh [2]		34.95	31.49	Refugia	Dagan 2006
ASI109-767	Wadi Khurāsh [3]		34.95	31.50	Refugia	Dagan 2006
ASI109-769	Wadi Khursa [6]		34.96	31.50	Refugia	Dagan 2006
ASI109-775	Wadi Umm Hadwa [14]		34.96	31.50	Refugia	Dagan 2006
ASI109-777	Wadi Umm Hadwa [16]		34.96	31.50	Refugia	Dagan 2006
ASI109-782	Wadi Umm Hadwa [20]		34.97	31.50	Refugia	Dagan 2006
ASI109-783	Wadi Umm Hadwa [21]		34.97	31.50	Refugia	Dagan 2006
ASI109-805	Wadi Umm Hadwa [35]		34.99	31.50	Refugia	Dagan 2006
ASI109-807	Wadi Umm Hadwa [36]		34.99	31.50	Refugia	Dagan 2006
ASI109-813	Wadi Umm Hadwa [44]		34.99	31.49	Refugia	Dagan 2006
ASI125-1	Nahal Besor		34.48	31.30	Zone of Uncertainty	Gazit 1996
ASI125-32	Nahal Besor		34.48	31.29	Zone of Uncertainty	Gazit 1996

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI125-38	Nahal Besor		34.49	31.30	Zone of Uncertainty	Gazit 1996
ASI125-41	Nahal Besor		34.49	31.30	Zone of Uncertainty	Gazit 1996
ASI125-52	Nahal Besor		34.49	31.29	Zone of Uncertainty	Gazit 1996
ASI125-66	Nahal Besor		34.49	31.28	Zone of Uncertainty	Gazit 1996
ASI125-71	Nahal Besor		34.49	31.28	Zone of Uncertainty	Gazit 1996
ASI125-72	Nahal Besor		34.49	31.27	Zone of Uncertainty	Gazit 1996
ASI125-82	Nahal Besor		34.50	31.28	Zone of Uncertainty	Gazit 1996
ASI125-103	Nahal Besor		34.49	31.27	Zone of Uncertainty	Gazit 1996
ASI125-159	Nahal Besor		34.50	31.25	Zone of Uncertainty	Gazit 1996
ASI125-175	Nahal Besor		34.50	31.24	Zone of Uncertainty	Gazit 1996
ASI129-6	Ze'elim [6]		34.48	31.21	Zone of Uncertainty	Gazit 2012
ASI129-33	Be'er Ze'elim [5]		34.53	31.21	Zone of Uncertainty	Gazit 2012
ASI129-48	Ze'elim [34]		34.48	31.20	Poor for Agriculture	Gazit 2012
ASI129-96	Ze'elim [78]		34.48	31.19	Poor for Agriculture	Gazit 2012
ASI129-101	Ze'elim [83]		34.49	31.20	Poor for Agriculture	Gazit 2012
ASI129-144	Ze'elim [116]		34.49	31.19	Poor for Agriculture	Gazit 2012
ASI129-177	Ze'elim [141]		34.50	31.18	Poor for Agriculture	Gazit 2012
ASI129-291	Ze'elim [256]		34.57	31.16	Poor for Agriculture	Gazit 2012
ASI129-348	Ze'elim [311]		34.48	31.14	Poor for Agriculture	Gazit 2012

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI143-5	Khirbat Mashash		34.96	31.21	Zone of Uncertainty	Eldad-Nir 2015
ASI160-10	Nahal Sekher 6		34.81	31.10	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-30	Nahal Zahal 8		34.84	31.09	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-33	Nahal Zahal 11		34.84	31.09	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-34	Nahal Zahal 12		34.85	31.09	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-50	Nahal Hed 11		34.82	31.08	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-51	Nahal Sekher 15		34.83	31.08	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-54	Nahal Sekher 17		34.83	31.08	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-56	Nahal Sekher 19		34.83	31.08	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-57	Nahal Sekher 20		34.84	31.08	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-62	Nahal Zahal 14		34.86	31.08	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-67	Nahal Hed 13		34.82	31.07	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-70	Nahal Hed 16		34.83	31.08	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-71	Nahal Hed 17		34.83	31.07	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-92	Nahal Mingar 6		34.90	31.06	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-105	Nahal Sekher 34		34.85	31.06	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-106	Nahal Sekher 35		34.85	31.06	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-108	Nahal Sekher 36		34.84	31.05	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI160-115	Nahal Sekher 42		34.86	31.05	Poor for Agriculture	Eldad-Nir and Doryan 2014

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI160-120	Nahal Mingar 13		34.87	31.06	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-121	Nahal Mingar 14		34.87	31.05	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-133	Nahal Mingar 16		34.88	31.05	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-137	Nahal Mingar 18		34.89	31.05	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-140	Nahal Mingar 20		34.89	31.06	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-141	Nahal Mingar 21		34.89	31.05	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-156	Har Zavo`a 6		34.87	31.04	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-165	Nahal Mingar 28		34.88	31.05	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-167	Nahal Mingar 30		34.88	31.04	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-168	Nahal Mingar 31		34.88	31.04	Zone of Uncertainty	Eldad-Nir and Doryan 2014
ASI160-170	Nahal `Elem 2		34.89	31.05	Poor for Agriculture	Eldad-Nir and Doryan 2014
ASI163-7	Nahal Revivim 7		34.78	31.04	Poor for Agriculture	Baumgarten 2013
ASI163-10	Nahal Revivim 10		34.76	31.02	Poor for Agriculture	Baumgarten 2013
ASI163-11	Nahal Revivim 11		34.76	31.02	Poor for Agriculture	Baumgarten 2013
ASI163-12	Nahal Revivim 12		34.76	31.02	Poor for Agriculture	Baumgarten 2013
ASI163-22	Be'er Mashabim 1		34.76	31.02	Poor for Agriculture	Baumgarten 2013
ASI163-23	Be'er Mashabim 2		34.77	31.02	Poor for Agriculture	Baumgarten 2013
ASI163-29	Mashabei Sadeh 1		34.76	31.01	Poor for Agriculture	Baumgarten 2013
ASI163-44	Nahal Heman 6		34.78	30.98	Poor for Agriculture	Baumgarten 2013

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI163-45	Nahal Heman 7		34.78	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-46	Nahal Heman 8		34.79	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-47	Nahal Heman 9		34.79	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-48	Nahal Heman 10		34.79	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-49	Nahal Heman 11		34.79	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-50	Nahal Heman 12		34.79	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-51	Nahal Heman 13		34.79	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-53	Nahal Heman 14		34.79	30.99	Poor for Agriculture	Baumgarten 2013
ASI163-54	Nahal Heman 15		34.79	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-55	Nahal Heman 16		34.79	30.99	Poor for Agriculture	Baumgarten 2013
ASI163-56	Nahal Heman 17		34.79	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-57	Nahal Heman 18		34.79	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-72	Nahal Heman 21		34.78	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-75	Nahal Heman 24		34.78	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-76	Nahal Heman 25		34.78	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-78	Nahal Heman 27		34.78	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-80	Nahal Heman 29		34.78	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-81	Nahal Heman 30		34.78	30.98	Poor for Agriculture	Baumgarten 2013
ASI163-82	Nahal Heman 31		34.78	30.97	Poor for Agriculture	Baumgarten 2013

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI163-83	Nahal Heman 32		34.78	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-84	Nahal Heman 33		34.78	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-97	Nahal Be'er Hayil 24		34.75	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-98	Nahal Be'er Hayil 26		34.75	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-99	Nahal Be'er Hayil 26		34.75	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-100	Nahal Be'er Hayil 27		34.76	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-102	Nahal Be'er Hayil 29		34.76	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-103	Nahal Be'er Hayil 30		34.76	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-105	Nahal Be'er Hayil 32		34.76	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-106	Nahal Be'er Hayil 33		34.76	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-107	Nahal Be'er Hayil 34		34.76	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-108	Nahal Be'er Hayil 35		34.77	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-109	Nahal Be'er Hayil 36		34.77	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-110	Nahal Be'er Hayil 37		34.77	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-111	Nahal Be'er Hayil 38		34.76	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-112	Nahal Be'er Hayil 39		34.77	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-114	Nahal Be'er Hayil 41		34.77	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-115	Nahal Be'er Hayil 42		34.77	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-116	Nahal Be'er Hayil 43		34.78	30.97	Poor for Agriculture	Baumgarten 2013

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI163-117	Nahal Heman 34		34.78	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-118	Nahal Heman 35		34.78	30.97	Poor for Agriculture	Baumgarten 2013
ASI163-119	Nahal Heman 36		34.79	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-120	Nahal Heman 37		34.79	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-121	Nahal Heman 38		34.79	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-122	Nahal Heman 39		34.79	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-124	Nahal Besor 8		34.73	30.95	Poor for Agriculture	Baumgarten 2013
ASI163-127	Nahal Besor 11		34.73	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-130	Nahal Besor 14		34.73	30.95	Poor for Agriculture	Baumgarten 2013
ASI163-131	Nahal Besor 15		34.74	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-132	Nahal Besor 16		34.74	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-133	Nahal Besor 17		34.74	30.95	Poor for Agriculture	Baumgarten 2013
ASI163-135	Nahal Besor 19		34.74	30.95	Poor for Agriculture	Baumgarten 2013
ASI163-136	Nahal Besor 20		34.74	30.95	Poor for Agriculture	Baumgarten 2013
ASI163-137	Nahal Besor 21		34.74	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-138	Nahal Besor 22		34.74	31.03	Poor for Agriculture	Baumgarten 2013
ASI163-139	Nahal Besor 23		34.74	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-140	Nahal Besor 24		34.74	30.95	Poor for Agriculture	Baumgarten 2013
ASI163-143	Nahal Besor 27		34.75	30.95	Poor for Agriculture	Baumgarten 2013

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI163-148	Nahal Be'er Hayil 48		34.77	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-150	Nahal Be'er Hayil 50		34.77	30.96	Poor for Agriculture	Baumgarten 2013
ASI163-151	Nahal Be'er Hayil 51		34.78	30.96	Poor for Agriculture	Baumgarten 2013
ASI164-24	Har Zavoa' (8)		34.85	31.02	Poor for Agriculture	Sion 2014
ASI164-50	Har Qasqassim (1)		34.86	31.01	Poor for Agriculture	Sion 2014
ASI164-51	Har Qasqassim (2)		34.86	31.01	Poor for Agriculture	Sion 2014
ASI164-53	Har Qasqassim (4)		34.86	31.01	Poor for Agriculture	Sion 2014
ASI164-65	Har Qasqassim (8)		34.87	31.00	Zone of Uncertainty	Sion 2014
ASI164-66	Har Qasqassim (9)		34.88	31.00	Poor for Agriculture	Sion 2014
ASI164-67	Har Qasqassim (10)		34.88	31.00	Zone of Uncertainty	Sion 2014
ASI164-89	Har Qasqassim (20)		34.87	30.99	Zone of Uncertainty	Sion 2014
ASI164-93	Har Yeruham (6)		34.88	30.99	Poor for Agriculture	Sion 2014
ASI164-94	Har Yeruham (7)		34.89	30.99	Poor for Agriculture	Sion 2014
ASI164-108	Telalim (13)		34.80	30.98	Poor for Agriculture	Sion 2014
ASI164-118	Har Yeruham (8)		34.88	30.98	Poor for Agriculture	Sion 2014
ASI164-122	Har Yeruham (12)		34.88	30.98	Poor for Agriculture	Sion 2014
ASI164-123	Har Yeruham (13)		34.88	30.98	Poor for Agriculture	Sion 2014
ASI164-126	Har Yeruham (16)		34.88	30.98	Zone of Uncertainty	Sion 2014
ASI164-127	Har Yeruham (17)		34.88	30.98	Zone of Uncertainty	Sion 2014

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI164-128	Har Yeruham (18)		34.88	30.98	Zone of Uncertainty	Sion 2014
ASI164-130	Har Yeruham (20)		34.89	30.98	Poor for Agriculture	Sion 2014
ASI164-131	Har Yeruham (21)		34.89	30.98	Poor for Agriculture	Sion 2014
ASI164-132	Har Yeruham (22)		34.89	30.98	Poor for Agriculture	Sion 2014
ASI164-133	Har Yeruham (23)		34.89	30.98	Poor for Agriculture	Sion 2014
ASI164-134	Har Yeruham (24)		34.89	30.98	Poor for Agriculture	Sion 2014
ASI164-135	Har Yeruham (25)		34.89	30.98	Poor for Agriculture	Sion 2014
ASI164-136	Har Yeruham (26)		34.89	30.99	Poor for Agriculture	Sion 2014
ASI164-137	Har Yeruham (27)		34.89	30.99	Poor for Agriculture	Sion 2014
ASI164-138	Har Yeruham (28)		34.89	30.98	Poor for Agriculture	Sion 2014
ASI164-139	Har Yeruham (29)		34.89	30.98	Poor for Agriculture	Sion 2014
ASI164-140	Har Yeruham (30)		34.89	30.99	Poor for Agriculture	Sion 2014
ASI164-143	Nahal Haiman (1)		34.80	30.97	Poor for Agriculture	Sion 2014
ASI164-160	Har Yeruham (35)		34.87	30.98	Zone of Uncertainty	Sion 2014
ASI164-175	Nahal Haiman (14)		34.79	30.96	Poor for Agriculture	Sion 2014
ASI164-194	Har Yeruham (58)		34.89	30.96	Poor for Agriculture	Sion 2014
ASI164-209	Har Yeruham (63)		34.87	30.95	Zone of Uncertainty	Sion 2014
ASI164-211	Har Yeruham (65)		34.88	30.95	Poor for Agriculture	Sion 2014
ASI164-212	Har Yeruham (66)		34.88	30.96	Poor for Agriculture	Sion 2014

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI165-1	Givat Abha 1		34.56	30.94	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-13	Plum Road, Har Keren 4		34.51	30.93	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-27	Nahal Leban 9		34.49	30.92	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-29	Nahal Leban 11		34.51	30.93	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-33	Nahal Leban 15		34.52	30.93	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-35	Nahal Leban 17		34.54	30.92	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-36	Nahal Leban 18		34.54	30.93	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-38	Nahal Leban 20		34.54	30.92	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-39	Nahal Leban 21		34.54	30.93	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-40	Nahal Leban 22		34.54	30.93	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-41	Nahal Leban 23		34.54	30.93	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-42	Nahal Sidra 1		34.56	30.93	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-60	Nahal Sidra 13		34.54	30.92	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-69	Nahal Leban 26		34.54	30.91	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-95	Nahal Leban 32		34.56	30.90	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-96	Nahal Leban 33		34.56	30.90	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-98	Nahal Leban 35		34.56	30.90	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-107	Nahal Leban 44		34.57	30.90	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-134	Nahal Leban 66		34.57	30.89	Poor for Agriculture	Baumgarten and Shemesh 2015

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI165-174	Nahal Ruth 9		34.52	30.87	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-175	Nahal Ruth 10		34.52	30.87	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-179	Nahal Ruth 14		34.51	30.86	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-180	Nahal Ruth 15				Refugia	Baumgarten and Shemesh 2015
ASI165-181	Nahal Ruth 16		34.52	30.86	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-182	Nahal Raviv 14		34.53	30.86	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-183	Nahal Raviv 15		34.55	30.86	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-184	Nahal Raviv 16		34.56	30.86	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI165-186	Nahal Sifon 17		34.58	30.87	Poor for Agriculture	Baumgarten and Shemesh 2015
ASI166-5	Holot Shunera (southeast)		34.61	30.94	Poor for Agriculture	Baumgarten 2004
ASI166-14	Holot Shunera (southeast)		34.61	30.94	Poor for Agriculture	Baumgarten 2004
ASI166-18	Holot Shunera (southeast)		34.62	30.94	Poor for Agriculture	Baumgarten 2004
ASI166-26	Mishlat Shivta (northwest)		34.61	30.93	Poor for Agriculture	Baumgarten 2004
ASI166-36	Nahal Sidra		34.59	30.92	Poor for Agriculture	Baumgarten 2004
ASI166-37	Nahal Sidra		34.59	30.92	Poor for Agriculture	Baumgarten 2004
ASI166-40	Mizpe Shivta (southwest)		34.60	30.91	Poor for Agriculture	Baumgarten 2004
ASI166-48	Sede Paqqu'a		34.65	30.91	Poor for Agriculture	Baumgarten 2004
ASI166-113	Ketef Shivta		34.67	30.90	Poor for Agriculture	Baumgarten 2004
ASI166-148	Nahal Mesura		34.69	30.89	Poor for Agriculture	Baumgarten 2004

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI166-238	Nahal Mesura		34.69	30.87	Poor for Agriculture	Baumgarten 2004
ASI166-274	Nahal Derorim		34.68	30.86	Poor for Agriculture	Baumgarten 2004
ASI166-276	Nahal Derorim		34.68	30.86	Poor for Agriculture	Baumgarten 2004
ASI166-278	Nahal Derorim		34.69	30.86	Poor for Agriculture	Baumgarten 2004
ASI167-5	Nahal Zalzal		34.74	30.95	Poor for Agriculture	Cohen 1985
ASI167-19	Nahal Besor		34.73	30.94	Poor for Agriculture	Cohen 1985
ASI167-20	Nahal Zalzal		34.73	30.94	Poor for Agriculture	Cohen 1985
ASI167-44	Nahal Besor		34.71	30.92	Poor for Agriculture	Cohen 1985
ASI167-55	Nahal Besor		34.72	30.90	Poor for Agriculture	Cohen 1985
ASI167-66	Atar Nahal Boqer		34.79	30.91	Poor for Agriculture	Cohen 1985
ASI167-74	Nahal Boqer		34.78	30.90	Poor for Agriculture	Cohen 1985
ASI167-84	Har Haluqim		34.79	30.89	Poor for Agriculture	Cohen 1985
ASI167-99	Har Boqer		34.72	30.87	Poor for Agriculture	Cohen 1985
ASI168-1	Ramat Boqer		34.82	30.94	Zone of Uncertainty	Cohen 1981
ASI168-2	Nahal Boqer		34.84	30.94	Zone of Uncertainty	Cohen 1981
ASI168-11	Nahal Boqer		34.81	30.94	Poor for Agriculture	Cohen 1981
ASI168-15	Har Halukim		34.83	30.94	Poor for Agriculture	Cohen 1981
ASI168-22	Har Halukim		34.85	30.94	Zone of Uncertainty	Cohen 1981
ASI168-23	Har Halukim		34.85	30.93	Zone of Uncertainty	Cohen 1981

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI168-29	Nahal Revivim		34.87	30.94	Poor for Agriculture	Cohen 1981
ASI168-43	Har Halukim		34.84	30.92	Zone of Uncertainty	Cohen 1981
ASI168-44	Har Halukim		34.84	30.91	Poor for Agriculture	Cohen 1981
ASI168-50	Nahal 'Ahdir		34.88	30.92	Poor for Agriculture	Cohen 1981
ASI168-51	Nahalb 'Ahdir		34.88	30.92	Poor for Agriculture	Cohen 1981
ASI168-52	Horvat 'Ahdir		34.88	30.92	Poor for Agriculture	Cohen 1981
ASI168-53	Nahal 'Ahdir		34.88	30.92	Poor for Agriculture	Cohen 1981
ASI168-54	Nahal 'Ahdir		34.88	30.92	Zone of Uncertainty	Cohen 1981
ASI168-59	Har Halukim		34.83	30.91	Zone of Uncertainty	Cohen 1981
ASI168-68	Nahal 'Ahdir		34.87	30.91	Poor for Agriculture	Cohen 1981
ASI168-70	Nahal 'Ahdir		34.87	30.91	Poor for Agriculture	Cohen 1981
ASI168-72	Nahal 'Ahdir		34.88	30.91	Poor for Agriculture	Cohen 1981
ASI168-78	Nahal 'Ahdir		34.89	30.91	Zone of Uncertainty	Cohen 1981
ASI168-88	Hatira		34.86	30.90	Poor for Agriculture	Cohen 1981
ASI168-89	Nahal 'Ahdir		34.88	30.90	Zone of Uncertainty	Cohen 1981
ASI168-91	Nahal 'Ahdir		34.89	30.90	Zone of Uncertainty	Cohen 1981
ASI168-94	Har Halukim		34.79	30.89	Poor for Agriculture	Cohen 1981
ASI168-105	Nahal Hazaz		34.85	30.89	Poor for Agriculture	Cohen 1981
ASI168-115	Nahal Haro'a		34.84	30.88	Poor for Agriculture	Cohen 1981

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI168-119	Harei Hatira		34.85	30.88	Poor for Agriculture	Cohen 1981
ASI168-127	Harei Hatira		34.87	30.87	Poor for Agriculture	Cohen 1981
ASI168-135	Nahal Darokh		34.86	30.87	Poor for Agriculture	Cohen 1981
ASI169-1	Ramat Ruth 1		34.51	30.86	Poor for Agriculture	Baumgarten in progress
ASI169-4	Ramat Ruth 4		34.53	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-5	Nahal Raviv 1		34.54	30.86	Poor for Agriculture	Baumgarten in progress
ASI169-6	Nahal Raviv 2		34.54	30.86	Poor for Agriculture	Baumgarten in progress
ASI169-7	Nahal Raviv 3		34.54	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-9	Nahal Raviv 5		34.54	30.86	Poor for Agriculture	Baumgarten in progress
ASI169-12	Nahal Raviv 8		34.54	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-13	Nahal Raviv 9		34.55	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-14	Nahal Raviv 10		34.55	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-15	Nahal Raviv 11		34.54	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-16	Nahal Raviv 12		34.54	30.86	Poor for Agriculture	Baumgarten in progress
ASI169-17	Nahal Raviv 13		34.54	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-18	Nahal Raviv 14		34.54	30.86	Poor for Agriculture	Baumgarten in progress
ASI169-19	Nahal Raviv 15		34.54	30.86	Poor for Agriculture	Baumgarten in progress
ASI169-21	Har Raviv 1		34.55	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-22	Har Raviv 2		34.55	30.86	Poor for Agriculture	Baumgarten in progress

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI169-24	Har Raviv 4		34.55	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-25	Har Raviv 5		34.56	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-26	Har Raviv 6		34.56	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-28	Nahal Raviv 17		34.55	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-33	Nahal Raviv 18		34.55	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-35	Nahal Raviv 20		34.55	30.84	Poor for Agriculture	Baumgarten in progress
ASI169-36	Har Raviv 10		34.55	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-37	Har Raviv 9		34.56	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-38	Har Raviv 12		34.56	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-39	Har Raviv 11		34.56	30.85	Poor for Agriculture	Baumgarten in progress
ASI169-40	Har Raviv 13		34.55	30.84	Poor for Agriculture	Baumgarten in progress
ASI169-47	Nahal Ruth 8		34.51	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-48	Nahal Ruth 10		34.51	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-50	Ramat Ruth 6		34.54	30.83	Poor for Agriculture	Baumgarten in progress
ASI169-55	Nahal Nizzana 3		34.49	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-56	Nahal Ruth 11		34.50	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-57	Nahal Ruth 12		34.50	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-59	Nahal Ruth 14		34.51	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-63	Ramat Ruth 9		34.55	30.82	Poor for Agriculture	Baumgarten in progress

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI169-64	Ramat Ruth 10		34.55	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-65	Ramat Ruth 11		34.55	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-66	Ramat Ruth 12		34.55	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-67	Ramat Ruth 13		34.55	30.82	Poor for Agriculture	Baumgarten in progress
ASI169-68	Har Ruth 1		34.57	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-69	Nahal Nizzana 4		34.49	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-70	Nahal Nizzana 5		34.49	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-71	Nahal Nizzana 6		34.49	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-72	Nahal Nizzana 7		34.50	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-73	Nahal Nizzana 8		34.48	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-74	Nahal Nizzana 9		34.50	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-75	Nahal Ruth 18		34.51	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-77	Nahal Ruth 20		34.51	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-78	Nahal Ruth 21		34.51	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-79	Nahal Ruth 22		34.51	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-83	Nahal Ruth 26		34.53	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-84	Nahal Ruth 27		34.53	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-85	Nahal Ruth 28		34.53	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-86	Ramat Ruth 14		34.54	30.81	Poor for Agriculture	Baumgarten in progress

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI169-88	Har Ruth 3		34.57	30.81	Poor for Agriculture	Baumgarten in progress
ASI169-90	Nahal Nizzana 10		34.50	30.80	Poor for Agriculture	Baumgarten in progress
ASI169-92	Nahal Nizzana 12		34.49	30.80	Poor for Agriculture	Baumgarten in progress
ASI169-95	Nahal Nizzana 15		34.50	30.80	Poor for Agriculture	Baumgarten in progress
ASI169-96	Nahal Nizzana 16		34.51	30.80	Poor for Agriculture	Baumgarten in progress
ASI169-98	Har Ruth 5		34.57	30.80	Poor for Agriculture	Baumgarten in progress
ASI169-99	Har Ruth 6		34.58	30.80	Poor for Agriculture	Baumgarten in progress
ASI169-100	Har Ruth 7		34.58	30.80	Poor for Agriculture	Baumgarten in progress
ASI169-101	Har Ruth 8		34.57	30.80	Poor for Agriculture	Baumgarten in progress
ASI169-102	Nahal Nizzana 18		34.50	30.79	Poor for Agriculture	Baumgarten in progress
ASI169-103	Nahal Nizzana 19		34.50	30.79	Poor for Agriculture	Baumgarten in progress
ASI169-105	Nahal Nizzana 21		34.51	30.79	Poor for Agriculture	Baumgarten in progress
ASI169-107	Nahal Nizzana 23		34.51	30.78	Poor for Agriculture	Baumgarten in progress
ASI169-108	Nahal Nizzana 24		34.52	30.78	Poor for Agriculture	Baumgarten in progress
ASI169-111	Nahal Resisim 1		34.56	30.78	Poor for Agriculture	Baumgarten in progress
ASI169-112	Nahal Ezuz 1		34.48	30.77	Poor for Agriculture	Baumgarten in progress
ASI169-114	Nahal Ezuz 3		34.49	30.77	Poor for Agriculture	Baumgarten in progress
ASI169-116	Nahal Ezuz 5		34.49	30.77	Poor for Agriculture	Baumgarten in progress
ASI169-121	Horbat Be'er Resisim		34.58	30.77	Poor for Agriculture	Baumgarten in progress

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI170-6	Har Nezer 2		34.68	30.86	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-7	Har Nezer 3		34.68	30.86	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-22	Nahal Zipporim 1		34.68	30.84	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-25	Giv'ot Kevuda 1		34.63	30.83	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-26	Nahal Lavan 1		34.65	30.83	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-28	Nahal Lavan 3		34.66	30.83	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-31	Nahal Zipporim 2		34.67	30.84	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-33	Nahal Zipporim 4		34.67	30.84	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-35	Nahal Zipporim 6		34.68	30.84	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-36	Nahal Zipporim 7		34.69	30.84	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-37	Giv'ot Kevuda 2		34.61	30.83	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-42	Giv'ot Kevuda 7		34.64	30.83	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-45	Nahal Lavan 7		34.66	30.83	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-47	Nahal Lavan 9		34.66	30.83	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-61	Nahal Lavan 21		34.68	30.82	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-62	Nahal Lavan 22		34.68	30.82	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-70	Har Lavan 2		34.68	30.81	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-74	Nahal Lavan South 6		34.66	30.81	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-75	Nahal Lavan South 7		34.66	30.80	Poor for Agriculture	Baumgarten and Shemesh 2014

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI170-76	Nahal Lavan South 8		34.67	30.80	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-78	Har Lavan 3		34.68	30.80	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-80	Nahal Kevuda South 5		34.61	30.79	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-87	Nahal Kevuda South 12		34.63	30.79	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-93	Nahal Kevuda South 18		34.64	30.79	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-115	Nahal Kevuda South 30		34.61	30.79	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-118	Nahal Kevuda South 33		34.62	30.78	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-122	Nahal Kevuda South 37		34.63	30.78	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI170-139	Ramat Matred West 1		34.63	30.78	Poor for Agriculture	Baumgarten and Shemesh 2014
ASI173-12	Yeruham Ridge 4		34.99	31.11	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-14	Yeruham Ridge 6		34.99	31.11	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-15	Yeruham Ridge 7		34.99	31.11	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-16	Yeruham Ridge 8		35.00	31.11	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-18	Yeruham Ridge 10		35.00	31.11	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-19	Nahal Sekher 1		34.92	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-25	Yetnan Tributary 3		34.97	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-26	Yeruham Ridge 11		34.97	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-28	Yeruham Ridge 13		34.97	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-31	Yeruham Ridge 14		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI173-32	Yetnan Tributary 5		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-34	Yeruham Ridge 15		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-35	Yetnan Tributary 6		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-36	Yeruham Ridge 17		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-37	Yeruham Ridge 18		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-38	Telem Tributary		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-40	Yeruham Ridge 20		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-41	Yeruham Ridge 21		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-42	Yeruham Ridge 22		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-43	Aro'er Tributary		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-44	Yeruham Ridge 23		34.98	31.10	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-48	Nahal Sekher 5		34.92	31.09	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-53	Nahal Sekher 10		34.96	31.09	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-54	Nahal Sekher 11		34.95	31.09	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-59	Between the Wadis 5		34.97	31.09	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-60	Aro'er Tributary 3		34.97	31.09	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-61	Aro'er Tributary 4		34.97	31.09	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-62	Yeruham Ridge 25		34.97	31.09	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-63	Khirbet Halma		34.97	31.09	Zone of Uncertainty	Eldad-Nir and Traubman 2015

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI173-68	Nahal Sekher 12		34.91	31.08	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-72	Nahal Sekher 16		34.93	31.08	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-74	Nahal Sekher 17		34.94	31.08	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-75	Mount Otzem 2		34.94	31.08	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-77	Nahal Sekher 18		34.94	31.08	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-84	Between the Wadis 7		34.96	31.09	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-89	Aro'er Tributary 9		34.97	31.08	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-94	Mount Tzavoa 2		34.90	31.07	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-99	Mount Tzavoa 7		34.90	31.07	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-106	Mount Otzem 12		34.93	31.07	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-108	Mount Otzem 14		34.94	31.08	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-111	Mount Otzem 17		34.94	31.07	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-112	Mount Otzem 18		34.95	31.07	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-116	Mount Otzem 22		34.96	31.08	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-119	Mount Otzem 25		34.97	31.08	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-120	Aro'er Tributary 10		34.98	31.07	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-128	Mount Otzem 29		34.93	31.06	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-136	Nahal Otzem 6		34.97	31.06	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-137	Nahal 'Aro'er 12		34.97	31.07	Zone of Uncertainty	Eldad-Nir and Traubman 2015

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI173-145	Nahal Mangar 4		34.93	31.05	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-146	Nahal Mangar 5		34.93	31.06	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-147	Nahal Mangar 6		34.93	31.05	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-149	Nahal Mangar 8		34.94	31.05	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-152	Nahal Otzem 9		34.95	31.06	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-153	Nahal Mangar 9		34.95	31.05	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-154	Nahal Mangar 10		34.95	31.05	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-155	Nahal Mangar 11		34.95	31.05	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI173-163	Nahal Mangar 19		34.94	31.04	Zone of Uncertainty	Eldad-Nir and Traubman 2015
ASI178-6	Nahal Mamshit 4		35.03	31.03	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-7	Nahal Mamshit 5		35.03	31.03	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-9	Nahal Mamshit 7		35.03	31.02	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-11	Nahal Mamshit 9		35.03	31.02	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-13	Nahal Mamshit 11		35.04	31.02	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-14	Nahal Mamshit 12		35.03	31.03	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-22	Nahal Mamshit 14		35.01	31.02	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-24	Nahal Mamshit 16		35.03	31.02	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-25	Nahal Mamshit 17		35.03	31.02	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-26	Nahal Mamshit 18		35.03	31.02	Zone of Uncertainty	Eldar-Nir and Shemesh 2015

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI178-29	Nahal Mamshit 21		35.03	31.02	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-30	Nahal Mamshit 22		35.05	31.02	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-32	Nahal Mamshit 24		35.06	31.02	Poor for Agriculture	Eldar-Nir and Shemesh 2015
ASI178-35	Nahal Mamshit 27		35.07	31.02	Poor for Agriculture	Eldar-Nir and Shemesh 2015
ASI178-43	Nahal Mamshit 31		35.06	31.01	Poor for Agriculture	Eldar-Nir and Shemesh 2015
ASI178-47	Ha-Makhtesh Ha-Gadol 3		35.02	31.00	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-52	Nahal Mamshit 34		35.01	31.00	Zone of Uncertainty	Eldar-Nir and Shemesh 2015
ASI178-54	Nahal Mamshit 36		35.06	31.00	Poor for Agriculture	Eldar-Nir and Shemesh 2015
ASI178-67	Ha-Makhtesh Ha-Gadol 12		35.02	30.97	Poor for Agriculture	Eldar-Nir and Shemesh 2015
ASI178-77	Ha-Makhtesh Ha-Gadol 20		35.02	30.95	Poor for Agriculture	Eldar-Nir and Shemesh 2015
ASI194-1	Nahal Be'erotayim 1		34.49	30.76	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-6	Nahal Be'erotayim 6		34.48	30.77	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-8	Nahal Be'erotayim 8		34.49	30.76	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-37	Nahal Be'erotayim 33		34.49	30.75	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-40	Nahal Be'erotayim 36		34.49	30.75	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-46	Nahal Be'erotayim 41		34.50	30.75	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-55	Nahal 'Ezuz 8		34.51	30.74	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-74	Giv'at Heret 7		34.48	30.74	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-75	Giv'at Heret 8		34.48	30.73	Poor for Agriculture	Nahlieli and Shemesh 2014

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI194-85	Nahal Be'erotayim 47		34.50	30.74	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-97	Nahal 'Ezuz 30		34.52	30.73	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-104	Nahal Hursha 8		34.52	30.73	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-107	Nahal Hursha 11		34.52	30.73	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-111	Giv'at Keder 3		34.49	30.73	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-124	Nahal Hursha 13		34.52	30.72	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-128	Nahal Hursha 17		34.52	30.73	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-130	Nahal Hursha 19		34.52	30.73	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-142	Har 'Ezuz 5		34.51	30.72	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-161	Har 'Ezuz 10		34.50	30.71	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-178	Nahal Hursha 30		34.53	30.71	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-179	Nahal Hursha 31		34.53	30.71	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-236	Nahal Mitnan 3		34.51	30.69	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI194-237	Nahal Mitnan 4		34.51	30.69	Poor for Agriculture	Nahlieli and Shemesh 2014
ASI196-2	ramat Matred		34.69	30.76	Poor for Agriculture	Lender 1990
ASI196-80	Nahal 'Avedat		34.73	30.76	Poor for Agriculture	Lender 1990
ASI196-99	Nahal Zena'		34.74	30.75	Poor for Agriculture	Lender 1990
ASI196-108	Har Eldad		34.77	30.76	Poor for Agriculture	Lender 1990
ASI196-143	Nahal 'Avedat		34.72	30.75	Poor for Agriculture	Lender 1990

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI196-157	Nahal Zena'		34.74	30.74	Poor for Agriculture	Lender 1990
ASI196-163	Nahal Zena'		34.75	30.75	Poor for Agriculture	Lender 1990
ASI196-165	Nahal Zena'		34.75	30.75	Poor for Agriculture	Lender 1990
ASI196-190	Nahal 'Avedat		34.69	30.73	Poor for Agriculture	Lender 1990
ASI196-222	Nahal Zena'		34.76	30.74	Poor for Agriculture	Lender 1990
ASI196-228	Rekhes Nafha		34.78	30.74	Poor for Agriculture	Lender 1990
ASI196-241	Nahal 'Avedat		34.69	30.73	Poor for Agriculture	Lender 1990
ASI196-242	Nahal 'Avedat		34.70	30.73	Poor for Agriculture	Lender 1990
ASI196-293	Nahal 'Avedat		34.70	30.72	Poor for Agriculture	Lender 1990
ASI196-326	Nahal Yeter		34.70	30.71	Poor for Agriculture	Lender 1990
ASI196-344	Rekhes Nafha		34.78	30.71	Poor for Agriculture	Lender 1990
ASI196-346	Rekhes Nafha		34.78	30.71	Poor for Agriculture	Lender 1990
ASI196-357	Nahal Yeter		34.71	30.70	Poor for Agriculture	Lender 1990
ASI196-381	Har Nafha		34.75	30.70	Poor for Agriculture	Lender 1990
ASI196-385	Har Nafha		34.76	30.70	Poor for Agriculture	Lender 1990
ASI196-396	Rekhes Nafha		34.78	30.70	Poor for Agriculture	Lender 1990
ASI196-405	Nahal Yeter		34.69	30.69	Poor for Agriculture	Lender 1990
ASI196-409	Nahal Yeter		34.70	30.69	Poor for Agriculture	Lender 1990
ASI196-491	Nahal 'Arikha		34.77	30.68	Poor for Agriculture	Lender 1990

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI198-5	Jebel et-Tiwal		34.48	30.68	Poor for Agriculture	Haiman 1986
ASI198-14	Nahal Mitnan		34.51	30.68	Poor for Agriculture	Haiman 1986
ASI198-31	Nahal Horsha		34.54	30.67	Poor for Agriculture	Haiman 1986
ASI198-89	Wadi el-Halufi		34.52	30.66	Poor for Agriculture	Haiman 1986
ASI198-93	Nahal Horsha		34.53	30.66	Poor for Agriculture	Haiman 1986
ASI198-102	Nahal Horsha		34.55	30.67	Poor for Agriculture	Haiman 1986
ASI198-114	Nahal Sirpad		34.57	30.67	Poor for Agriculture	Haiman 1986
ASI198-120	Nahal Sirpad		34.58	30.67	Poor for Agriculture	Haiman 1986
ASI198-148	Nahal Horsha		34.54	30.66	Poor for Agriculture	Haiman 1986
ASI198-150	Nahal Horsha		34.54	30.66	Poor for Agriculture	Haiman 1986
ASI198-153	Nahal Horsha		34.55	30.65	Poor for Agriculture	Haiman 1986
ASI198-162	Nahal Sirpad		34.57	30.66	Poor for Agriculture	Haiman 1986
ASI198-191	Nahal Horsha		34.54	30.65	Poor for Agriculture	Haiman 1986
ASI198-217	Wadi el-'Asli		34.52	30.63	Poor for Agriculture	Haiman 1986
ASI198-238	Nahal Horsha		34.53	30.64	Poor for Agriculture	Haiman 1986
ASI198-244	Nahal Horsha		34.55	30.64	Poor for Agriculture	Haiman 1986
ASI198-266	Nahal Horsha		34.53	30.63	Poor for Agriculture	Haiman 1986
ASI198-289	Nahal Sirpad		34.58	30.63	Poor for Agriculture	Haiman 1986
ASI198-290	Nahal Sirpad		34.58	30.63	Poor for Agriculture	Haiman 1986

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI198-349	Wadi Umm Hashim		34.49	30.60	Poor for Agriculture	Haiman 1986
ASI198-378	'Ein Qedeis		34.51	30.59	Poor for Agriculture	Haiman 1986
ASI200-1	Nahal Ela		34.69	30.68	Poor for Agriculture	Haiman 1991
ASI200-23	Nahal Yeter		34.73	30.68	Poor for Agriculture	Haiman 1991
ASI200-28	Nahal ?in		34.75	30.67	Poor for Agriculture	Haiman 1991
ASI200-29	Nahal ?in		34.75	30.67	Poor for Agriculture	Haiman 1991
ASI200-30	Nahal ?in		34.76	30.67	Poor for Agriculture	Haiman 1991
ASI200-36	Nahal Arikha		34.78	30.67	Poor for Agriculture	Haiman 1991
ASI200-43	Nahal Arikha		34.78	30.68	Poor for Agriculture	Haiman 1991
ASI200-79	Nahal Yeter		34.74	30.67	Poor for Agriculture	Haiman 1991
ASI200-94	Nahal Nizzana		34.69	30.66	Poor for Agriculture	Haiman 1991
ASI200-108	Nahal Zin		34.76	30.66	Poor for Agriculture	Haiman 1991
ASI200-123	Nahal Ela		34.72	30.65	Poor for Agriculture	Haiman 1991
ASI200-139	Har Arikha		34.78	30.65	Poor for Agriculture	Haiman 1991
ASI200-149	Nahal Yeter		34.73	30.64	Poor for Agriculture	Haiman 1991
ASI200-156	Nahal Zin		34.76	30.64	Poor for Agriculture	Haiman 1991
ASI200-161	Nahal Zin		34.76	30.64	Poor for Agriculture	Haiman 1991
ASI200-163	Nahal Zin		34.77	30.64	Poor for Agriculture	Haiman 1991
ASI200-167	Nahal Zin		34.79	30.64	Poor for Agriculture	Haiman 1991

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI200-176	Nahal Nizzana		34.71	30.63	Poor for Agriculture	Haiman 1991
ASI200-178	Nahal Yeter		34.73	30.63	Poor for Agriculture	Haiman 1991
ASI200-191	Nahal Zin		34.76	30.63	Poor for Agriculture	Haiman 1991
ASI200-192	Nahal Zin		34.76	30.63	Poor for Agriculture	Haiman 1991
ASI200-205	Nahal Zin		34.77	30.63	Poor for Agriculture	Haiman 1991
ASI200-206	Nahal Zin		34.78	30.63	Poor for Agriculture	Haiman 1991
ASI200-225	Nahal Zin		34.75	30.62	Poor for Agriculture	Haiman 1991
ASI200-226	Nahal Zin		34.75	30.62	Poor for Agriculture	Haiman 1991
ASI200-228	Nahal Zin		34.75	30.62	Poor for Agriculture	Haiman 1991
ASI200-244	Nahal Zin		34.78	30.62	Poor for Agriculture	Haiman 1991
ASI200-249	Nahal Zin		34.79	30.62	Poor for Agriculture	Haiman 1991
ASI200-254	Har Hemet		34.70	30.61	Poor for Agriculture	Haiman 1991
ASI200-256	Har Hemet		34.72	30.61	Poor for Agriculture	Haiman 1991
ASI200-259	Har Hemet		34.73	30.61	Poor for Agriculture	Haiman 1991
ASI200-263	Nahal Zin		34.73	30.61	Poor for Agriculture	Haiman 1991
ASI200-264	Nahal Zin		34.74	30.61	Poor for Agriculture	Haiman 1991
ASI200-266	Nahal Zin		34.74	30.62	Poor for Agriculture	Haiman 1991
ASI200-282	Har Hemet		34.71	30.60	Poor for Agriculture	Haiman 1991
ASI200-294	Nahal Zin		34.72	30.60	Poor for Agriculture	Haiman 1991

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI200-299	Nahal Zin		34.73	30.60	Poor for Agriculture	Haiman 1991
ASI200-300	Har Hemet		34.73	30.61	Poor for Agriculture	Haiman 1991
ASI200-301	Nahal Zin		34.73	30.61	Poor for Agriculture	Haiman 1991
ASI200-303	Nahal Zin		34.73	30.61	Poor for Agriculture	Haiman 1991
ASI200-332	Nahal Nizzana		34.71	30.59	Poor for Agriculture	Haiman 1991
ASI200-335	Nahal Nizzana		34.71	30.59	Poor for Agriculture	Haiman 1991
ASI200-339	Nahal Zin		34.72	30.60	Poor for Agriculture	Haiman 1991
ASI200-351	Har Zin		34.76	30.59	Poor for Agriculture	Haiman 1991
ASI201-7	Harei Ruchot 3		34.84	30.67	Poor for Agriculture	Rosen and Karni 2016
ASI201-15	Mishor HaRuchot 8		34.86	30.67	Poor for Agriculture	Rosen and Karni 2016
ASI201-26	Nahal Aricha 4		34.80	30.66	Poor for Agriculture	Rosen and Karni 2016
ASI201-27	Nahal Aricha 5		34.79	30.66	Poor for Agriculture	Rosen and Karni 2016
ASI201-33	Harei Ruchot 6		34.82	30.67	Poor for Agriculture	Rosen and Karni 2016
ASI201-106	North Mitzpeh 3		34.80	30.63	Poor for Agriculture	Rosen and Karni 2016
ASI201-168	Biq'at Mishchor 19		34.89	30.62	Poor for Agriculture	Rosen and Karni 2016
ASI201-168	Biq'at Mishchor 20		34.89	30.62	Poor for Agriculture	Rosen and Karni 2016
ASI201-197	Camel Site		34.79	30.61	Poor for Agriculture	Rosen and Karni 2016
ASI201-202	Matzok Mitzpeh 3		34.80	30.60	Poor for Agriculture	Rosen and Karni 2016
ASI201-204	Matzok Mitzpeh 5		34.81	30.60	Poor for Agriculture	Rosen and Karni 2016

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI203-71	Nahal Heman 20		34.78	30.97	Poor for Agriculture	Haiman 1999
ASI203-85	Nahal Nizzana		34.66	30.56	Poor for Agriculture	Haiman 1999
ASI203-86	Nahal Nizzana		34.65	30.55	Poor for Agriculture	Haiman 1999
ASI203-124	Nahal 'Aqrav		34.62	30.54	Poor for Agriculture	Haiman 1999
ASI203-125	Nahal 'Aqrav		34.62	30.54	Poor for Agriculture	Haiman 1999
ASI203-132	Nahal Nizzana		34.65	30.54	Poor for Agriculture	Haiman 1999
ASI203-133	Nahal Nizzana		34.64	30.54	Poor for Agriculture	Haiman 1999
ASI203-141	Nahal Nizzana		34.66	30.54	Poor for Agriculture	Haiman 1999
ASI203-159	Nahal 'Aqrav		34.62	30.53	Poor for Agriculture	Haiman 1999
ASI203-175	Nahal Horsha		34.59	30.52	Poor for Agriculture	Haiman 1999
ASI203-186	Nahal Elot		34.61	30.52	Poor for Agriculture	Haiman 1999
ASI203-191	Nahal Elot		34.62	30.52	Poor for Agriculture	Haiman 1999
ASI203-194	Nahal Elot		34.62	30.52	Poor for Agriculture	Haiman 1999
ASI204-40	Ma'ale Ramon		34.74	30.58	Poor for Agriculture	Rosen 1994
ASI204-58	Nahal Ramon		34.79	30.59	Poor for Agriculture	Rosen 1994
ASI204-71	Nahal Ramon		34.72	30.58	Poor for Agriculture	Rosen 1994
ASI204-83	Nahal Ramon		34.77	30.57	Poor for Agriculture	Rosen 1994
ASI204-86	Nahal Ramon		34.77	30.58	Poor for Agriculture	Rosen 1994
ASI204-95	Nahal Ramon		34.79	30.58	Poor for Agriculture	Rosen 1994

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI204-102	Nahal Ramon		34.71	30.56	Poor for Agriculture	Rosen 1994
ASI204-112	Nahal Ramon		34.72	30.57	Poor for Agriculture	Rosen 1994
ASI204-151	Nahal Ramon		34.72	30.55	Poor for Agriculture	Rosen 1994
ASI204-166	Nahal Ramon		34.77	30.56	Poor for Agriculture	Rosen 1994
ASI204-186	Nahal Ramon		34.69	30.54	Poor for Agriculture	Rosen 1994
ASI204-195	Nahal Ramon		34.71	30.54	Poor for Agriculture	Rosen 1994
ASI204-255	Nahal 'Oded		34.70	30.50	Poor for Agriculture	Rosen 1994
ASI204-262	Nahal 'Oded		34.73	30.51	Poor for Agriculture	Rosen 1994
ASI204-267	Nahal Neqarot		34.75	30.50	Poor for Agriculture	Rosen 1994
ASI206-2	Har Harif 2		34.56	30.49	Poor for Agriculture	Avni and Shemesh 2015
ASI206-3	Har Harif 3		34.56	30.49	Poor for Agriculture	Avni and Shemesh 2015
ASI206-5	Har Harif 5		34.56	30.50	Poor for Agriculture	Avni and Shemesh 2015
ASI206-41	Nahal Alonim		34.58	30.48	Poor for Agriculture	Avni and Shemesh 2015
ASI206-60	Nahal Elias 1		34.55	30.45	Poor for Agriculture	Avni and Shemesh 2015
ASI206-73	Mountain Cave 3		34.56	30.44	Poor for Agriculture	Avni and Shemesh 2015
ASI206-75	Nahal Elias 10		34.57	30.44	Poor for Agriculture	Avni and Shemesh 2015
ASI206-76	Nahal Elias 11		34.57	30.44	Poor for Agriculture	Avni and Shemesh 2015
ASI206-78	Nahal Elias 13		34.57	30.44	Poor for Agriculture	Avni and Shemesh 2015
ASI206-84	Mountain Cave 4		34.54	30.43	Poor for Agriculture	Avni and Shemesh 2015

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI206-85	Mountain Cave 5		34.55	30.43	Poor for Agriculture	Avni and Shemesh 2015
ASI206-87	Mountain Cave 7		34.56	30.43	Poor for Agriculture	Avni and Shemesh 2015
ASI206-93	Mountain Cave 13		34.55	30.42	Poor for Agriculture	Avni and Shemesh 2015
ASI206-103	Ain Cave 3		34.55	30.41	Poor for Agriculture	Avni and Shemesh 2015
ASI206-107	Wadi Maghareh 2		34.56	30.41	Poor for Agriculture	Avni and Shemesh 2015
ASI206-114	Mountain Cave 23		34.58	30.41	Poor for Agriculture	Avni and Shemesh 2015
ASI207-41	Nahal Eliav 5		34.63	30.48	Poor for Agriculture	Avni and Shemesh 2015
ASI207-68	Upper Lutz		34.65	30.47	Poor for Agriculture	Avni and Shemesh 2015
ASI207-70	Upper Lutz 8		34.66	30.46	Poor for Agriculture	Avni and Shemesh 2015
ASI207-74	NG 1005		34.66	30.46	Poor for Agriculture	Avni and Shemesh 2015
ASI207-75	Upper Lutz 10		34.66	30.47	Poor for Agriculture	Avni and Shemesh 2015
ASI207-77	Lutz Ridge 10		34.67	30.47	Poor for Agriculture	Avni and Shemesh 2015
ASI207-94	Upper Lutz 16		34.65	30.46	Poor for Agriculture	Avni and Shemesh 2015
ASI225-10	Har Batur		34.60	30.40	Poor for Agriculture	Avni 1992
ASI225-18	Har Batur		34.63	30.41	Poor for Agriculture	Avni 1992
ASI225-39	Nahal Batur		34.59	30.39	Poor for Agriculture	Avni 1992
ASI225-42	Nahal Batur		34.60	30.39	Poor for Agriculture	Avni 1992
ASI225-45	Nahal Batur		34.61	30.39	Poor for Agriculture	Avni 1992
ASI225-53	Biq'at Hissun		34.65	30.40	Poor for Agriculture	Avni 1992

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI225-55	Biq'at Hissun		34.66	30.40	Poor for Agriculture	Avni 1992
ASI225-71	Har Nes		34.61	30.38	Poor for Agriculture	Avni 1992
ASI225-88	Nahal Yafruq		34.67	30.38	Poor for Agriculture	Avni 1992
ASI225-93	Nahal Yafruq		34.68	30.39	Poor for Agriculture	Avni 1992
ASI225-103	Har Nes		34.61	30.38	Poor for Agriculture	Avni 1992
ASI225-106	Har Nes		34.62	30.37	Poor for Agriculture	Avni 1992
ASI225-113	Biq'at Hissun		34.63	30.38	Poor for Agriculture	Avni 1992
ASI225-120	Nahal Yafruq		34.65	30.38	Poor for Agriculture	Avni 1992
ASI225-124	Nahal Yafruq		34.65	30.38	Poor for Agriculture	Avni 1992
ASI225-126	Nahal Yafruq		34.67	30.38	Poor for Agriculture	Avni 1992
ASI225-130	Har Nes		34.60	30.36	Poor for Agriculture	Avni 1992
ASI225-132	Har Nes		34.61	30.37	Poor for Agriculture	Avni 1992
ASI225-133	Har Nes		34.61	30.37	Poor for Agriculture	Avni 1992
ASI225-141	Har Saggi		34.63	30.36	Poor for Agriculture	Avni 1992
ASI225-148	Har Saggi		34.67	30.36	Poor for Agriculture	Avni 1992
ASI225-150	Nahal Beroqa		34.67	30.37	Poor for Agriculture	Avni 1992
ASI225-160	Wadi Guraiya		34.60	30.36	Poor for Agriculture	Avni 1992
ASI225-165	Har Nes		34.61	30.36	Poor for Agriculture	Avni 1992
ASI225-169	Har Nes		34.61	30.36	Poor for Agriculture	Avni 1992

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI225-175	Har Saggi		34.65	30.36	Poor for Agriculture	Avni 1992
ASI225-178	Har Saggi		34.66	30.36	Poor for Agriculture	Avni 1992
ASI225-180	Har Saggi		34.67	30.36	Poor for Agriculture	Avni 1992
ASI225-181	Har Saggi		34.67	30.36	Poor for Agriculture	Avni 1992
ASI225-183	Har Saggi		34.67	30.36	Poor for Agriculture	Avni 1992
ASI225-187	Har Saggi		34.67	30.36	Poor for Agriculture	Avni 1992
ASI225-220	Nahal Saggi		34.68	30.35	Poor for Agriculture	Avni 1992
ASI225-223	Har Saggi		34.68	30.35	Poor for Agriculture	Avni 1992
ASI225-231	Wadi Guraiya		34.65	30.34	Poor for Agriculture	Avni 1992
ASI225-234	Har Saggi		34.66	30.34	Poor for Agriculture	Avni 1992
ASI225-239	Nahal Saggi		34.68	30.34	Poor for Agriculture	Avni 1992
ASI225-242	Nahal Saggi		34.68	30.34	Poor for Agriculture	Avni 1992
ASI255-2	Nahal Shaharut 3		35.01	29.92	Poor for Agriculture	Rothenberg 2014
ASI255-6	Ma'ale Shaharut 3		35.01	29.91	Poor for Agriculture	Rothenberg 2014
ASI255-19	Nahal Yotvata 2		35.02	29.88	Poor for Agriculture	Rothenberg 2014
ASI255-20	En Yotvata 3		35.04	29.88	Poor for Agriculture	Rothenberg 2014
ASI257-2	Nahal Milhan 7		34.93	29.83	Poor for Agriculture	Rothenberg 2014
ASI257-5	Be'er Meteq		34.93	29.83	Poor for Agriculture	Rothenberg 2014
ASI257-6	Nahal Odem 1		35.00	29.84	Poor for Agriculture	Rothenberg 2014

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI257-7	Nahal Milhan 8		34.92	29.83	Poor for Agriculture	Rothenberg 2014
ASI257-21	Mount Sasgon 1		35.00	29.80	Poor for Agriculture	Rothenberg 2014
ASI257-62	Steppe Sodom Map; Ma'ale Zurim 3		35.32	31.00	Poor for Agriculture	Rothenberg 2014
ASI257-67	Steppe Sodom Map; Mezad Tamar		35.35	30.99	Poor for Agriculture	Rothenberg 2014
ASI257-99	Har Saharor Map; Biq'at Uvda		34.98	30.01	Poor for Agriculture	Rothenberg 2014
ASI257-100	Har Saharor Map; Biq'at Uvda northeast 2		34.98	29.98	Poor for Agriculture	Rothenberg 2014
ASI257-103	Har Saharor Map; Biq'at Uvda Northeast 2		34.98	29.98	Poor for Agriculture	Rothenberg 2014
ASI257-104	Har Saharor Map; Biq'at Uvda East		34.98	29.96	Poor for Agriculture	Rothenberg 2014
ASI257-105	Har Ayit Map; Biq'at Shizafon		35.04	30.04	Poor for Agriculture	Rothenberg 2014
ASI257-106	Uvda Hill		34.97	29.95	Poor for Agriculture	Rothenberg 2014
ASI257-107	Uvda Hill map; Biq'at Uvda East 2		34.97	29.95	Poor for Agriculture	Rothenberg 2014
ASI257-108	Uvda Hill Map; Biq'at Uvda East 3		34.97	29.95	Poor for Agriculture	Rothenberg 2014
ASI257-109	Uvda Hill Map; Biq'at Uvda East 1		34.96	29.94	Poor for Agriculture	Rothenberg 2014
ASI257-110	Uvda Hill Map; Biq'at Uvda 3		34.97	29.94	Poor for Agriculture	Rothenberg 2014
ASI257-112	Uvda Hill Map; Nahal Shaharut 2		34.99	29.93	Poor for Agriculture	Rothenberg 2014
ASI257-116	Biq'at Sayyarim Map; Biq'at Sayyarim 2		34.85	29.82	Poor for Agriculture	Rothenberg 2014
ASI258-2	Mount Argaman East 3		35.01	29.85	Poor for Agriculture	Rothenberg 2014
ASI258-4	Mount Argaman East 2		35.02	29.84	Poor for Agriculture	Rothenberg 2014
ASI258-11	Samar 1		35.02	29.83	Poor for Agriculture	Rothenberg 2014

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
ASI258-12	Ma'aleh Yotvata 1		35.03	29.83	Poor for Agriculture	Rothenberg 2014
ASI258-16	Nahal Timna 16		35.00	29.79	Poor for Agriculture	Rothenberg 2014
ASI262-5	Nahal Shrifi/Wadi Abu-Alalik		34.87	29.62	Poor for Agriculture	Rothenberg 2014
AS-9	Dana Hoyuk		36.29	36.43	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-11	Pasakoy		36.24	36.37	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-12	Acarkoy		36.45	36.56	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-15	Koyuncuhoyuk		36.39	36.50	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-31	Wasfe, Tell		36.48	36.47	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-52	Akpinar Hoyuk		36.53	36.43	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-52	Akpinar Hoyuk		36.53	36.43	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-58	Jindaris, Tell		36.69	36.39	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-58	Jindaris, Tell		36.69	36.39	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-59	Bab Lit, Tell		36.83	36.48	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-60	Turundah, Tell		36.88	36.50	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-61	Mahmutliye, Tell		36.81	36.48	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-62	Ain Dara, Tell		36.85	36.46	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-62	Ain Dara, Tell		36.85	36.46	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-63	Shaik 'Abd al-Rahman, Tell		36.77	36.45	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-63	Shaik 'Abd al-Rahman, Tell		36.77	36.45	Refugia	Braidwood 1937; Casana and Wilkinson 2005

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
AS-66	Qirbah (Quraibah), Tell		36.74	36.42	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-67	Hamo, Tell		36.77	36.42	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-72	Jalhamah, Tell		36.77	36.36	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-76	Misir, Tell		36.33	36.28	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-84	Uzunarab (BozHoyuk), Tell		36.30	36.24	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-84	Uzunarab (BozHoyuk), Tell		36.30	36.24	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-86	Karatepe		36.36	36.35	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-86	Karatepe		36.36	36.35	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-99	Hasunasagi, Tell		36.43	36.32	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-99	Hasunasagi, Tell		36.43	36.32	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-105	Tutlu Hoyuk		36.41	36.30	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-108	Uctepe		36.51	36.30	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-126	Ta'yinat, Tell		36.38	36.25	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-134	Halak Tepe		36.33	36.23	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-134	Halak Tepe		36.33	36.23	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-138	Saluq, Tell		36.41	36.23	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-153	Jiji, Tell		36.66	36.34	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-155	Tabarat al-Dawiyyah		36.70	36.34	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-156	Masstepe or Masstepe, Tell		36.52	36.33	Refugia	Braidwood 1937; Casana and Wilkinson 2005

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
AS-166	Putoglu		36.53	36.29	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-177	Dhahab, Tell		36.58	36.26	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-180	Hijar, Tell		36.32	36.30	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-182	Tabarat al-Akrad (Tell el-Hayey)		36.41	36.24	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-195	Atci Tepe		36.46	36.53	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-215	Sekizevler (Asgundur)		36.52	36.57	Refugia	Braidwood 1937; Casana and Wilkinson 2005
AS-231	Ahmet Sahbaz Cifligi		36.41	36.29	Refugia	Braidwood 1937; Casana and Wilkinson 2005
QV-79-1	Aajar, Tell		37.03	36.49	Refugia	Matthers 1978
QV-79-2	Aarane, Tell		37.35	36.12	Zone of Uncertainty	Matthers 1978
QV-79-3	'Azaz, Tell		37.04	36.59	Refugia	Matthers 1978
QV-79-4	Botnan, Tell		37.54	36.40	Zone of Uncertainty	Matthers 1978
QV-79-5	Erine (El Areime)		37.00	36.30	Refugia	Matthers 1978
QV-79-6	Fafine, Tell		37.24	36.35	Refugia	Matthers 1978
QV-79-7	Hailane, Tell		37.21	36.28	Refugia	Matthers 1978
QV-79-8	Ibbol, Tell		37.19	36.59	Refugia	Matthers 1978
QV-79-9	Jijane, Tell		37.34	36.41	Refugia	Matthers 1978
QV-79-10	Kaffine, Tell		37.06	36.47	Refugia	Matthers 1978
QV-79-11	Karmine, Tell		37.04	36.41	Refugia	Matthers 1978
QV-79-12	Kassiha, Tell		37.17	36.46	Refugia	Matthers 1978
QV-79-13	Khibi, Tell		37.01	36.42	Refugia	Matthers 1978
QV-79-14	Malad, Tell		37.23	36.45	Refugia	Matthers 1978
QV-79-15	el Malek, Tell		37.05	36.46	Refugia	Matthers 1978
QV-79-16	Meksour, Tell		37.46	36.24	Zone of Uncertainty	Matthers 1978
QV-79-17	Qaramel, Tell		37.28	36.38	Refugia	Matthers 1978
QV-79-18	Qoubessine, Tell		37.56	36.43	Refugia	Matthers 1978
QV-79-19	Rahhal, Tell		37.39	36.34	Refugia	Matthers 1978

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
QV-79-20	Sourane, Tell		37.37	36.26	Zone of Uncertainty	Matthers 1978
QV-79-21	Soussiane, Tell		37.44	36.43	Refugia	Matthers 1978
QV-79-22	Yel Baba (Tell Sheikh Ri'ah)		37.17	36.60	Refugia	Matthers 1978
GRS-1	Tell Qarqur (Kebir)	Qarqar	36.33	35.74	Refugia	Graff 2006
GRS-8	Tell Eneb		36.43	35.73	Refugia	Graff 2006
GRS-10	Tell Qastoun Kebir		36.39	35.69	Refugia	Graff 2006
GRS-11	Tell Qastoun Sehrir		36.38	35.69	Refugia	Graff 2006
GRS-13	Tell Wasit		36.34	35.66	Refugia	Graff 2006
GRS-35	Tell Qleidin		36.38	35.61	Refugia	Graff 2006
GRS-37	Tell Mabtuhah North		36.37	35.62	Refugia	Graff 2006
GRS-39	Tell Chleill #2		36.33	35.63	Refugia	Graff 2006
GRS-45	Aamqiye South		36.39	35.58	Refugia	Graff 2006
GRS-59	Tell Arnaba		36.46	35.70	Refugia	Graff 2006
GRS-74	Tell et Tell		36.33	35.82	Refugia	Graff 2006
GRS01-91	Near Duweir Akrad		36.26	35.73	Refugia	Graff 2006
QV-81-1	Aajar, Tell		37.03	36.49	Refugia	Matthers 1981
QV-81-2	Aar, Tell		37.40	36.58	Refugia	Matthers 1981
QV-81-4	Aazaz		37.04	36.59	Refugia	Matthers 1981
QV-81-5	Ahmar, Tell		37.42	36.63	Refugia	Matthers 1981
QV-81-7	Ain Fuwwar		37.24	36.59	Refugia	Matthers 1981
QV-81-8	Akhtareine, Tell		37.34	36.51	Refugia	Matthers 1981
QV-81-9	Archaq, Tell		37.27	36.52	Refugia	Matthers 1981
QV-81-10	Bahouerte, Tell		37.31	36.58	Refugia	Matthers 1981
QV-81-12	Banat, Tell		37.20	36.52	Refugia	Matthers 1981
QV-81-13	Bararhite, Tell		37.22	36.64	Refugia	Matthers 1981
QV-81-14	Battal Chimali, Tell		37.35	36.65	Refugia	Matthers 1981
QV-81-15	Berne, Tell		37.01	36.03	Refugia	Matthers 1981
QV-81-17	El Cadi, Tell		37.42	36.62	Refugia	Matthers 1981
QV-81-18	Chair, Tell		37.34	36.62	Refugia	Matthers 1981
QV-81-19	Dabiq, Tell		37.27	36.54	Refugia	Matthers 1981
QV-81-20	Douabiq		37.27	36.57	Refugia	Matthers 1981
QV-81-21	Fafine, Tell		37.24	36.35	Refugia	Matthers 1981
QV-81-22	Hailane, Tell		37.22	36.29	Refugia	Matthers 1981

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
QV-81-23	Haourane, Tell		37.03	36.02	Refugia	Matthers 1981
QV-81-24	Haouar enn Nahr		37.25	36.51	Refugia	Matthers 1981
QV-81-26	Ja'adiyeh, Tell		37.18	36.63	Refugia	Matthers 1981
QV-81-27	el-Jijane, Tell		37.34	36.41	Refugia	Matthers 1981
QV-81-28	Kadrich, Tell		37.34	36.58	Refugia	Matthers 1981
QV-81-30	Karmine, Tell		37.06	36.47	Refugia	Matthers 1981
QV-81-31	Kassihe, Tell		37.17	36.47	Refugia	Matthers 1981
QV-81-32	Khibi, Tell		37.01	36.43	Refugia	Matthers 1981
QV-81-33	Maled, Tell		37.23	36.45	Refugia	Matthers 1981
QV-81-34	Mouslemiye, Tell		37.20	36.31	Refugia	Matthers 1981
QV-81-35	Nef, Tell		37.29	36.42	Refugia	Matthers 1981
QV-81-36	Nourbol, Tell		37.00	36.38	Refugia	Matthers 1981
QV-81-37	Qara Keupru		37.26	36.64	Refugia	Matthers 1981
QV-81-39	Qaramel, Tell		37.28	36.38	Refugia	Matthers 1981
QV-81-40	Qol Srouj		37.26	36.42	Refugia	Matthers 1981
QV-81-41	Rail, Tell		37.27	36.60	Refugia	Matthers 1981
QV-81-42	Ramousse, Tell		37.13	36.16	Zone of Uncertainty	Matthers 1981
QV-81-43	Rifa'at, Tell		37.09	36.47	Refugia	Matthers 1981
QV-81-44	Sfeir, Tell		37.42	36.61	Refugia	Matthers 1981
QV-81-46	Sourane (Aazaz), Tell		37.21	36.57	Refugia	Matthers 1981
QV-81-48	Tourhleu		37.22	36.61	Refugia	Matthers 1981
QV-81-49	Yel Baba (Sheik Ri'ah)		37.17	36.60	Refugia	Matthers 1981
QV-81-51	Botnan, Tell		37.54	36.40	Zone of Uncertainty	Matthers 1981
QV-81-52	Maksour, Tell		37.45	36.24	Zone of Uncertainty	Matthers 1981
QV-81-56	Soussiane, Tell		37.45	36.44	Refugia	Matthers 1981
BSL-31	'Atij, Tall		40.88	36.43	Refugia	Lehman 2002
BSL-35	Mashnaqa		40.79	36.29	Zone of Uncertainty	Lehman 2002
BSL-37	Raqaʾi, Tall ar-		40.86	36.43	Refugia	Lehman 2002
BSL-41	Abd, Tall al-		38.14	36.23	Zone of Uncertainty	Lehman 2002
BSL-43	Kaffina, Tall		37.04	36.42	Refugia	Lehman 2002

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
BSL-45	Tawi		38.12	36.19	Zone of Uncertainty	Lehman 2002
BSL-49	Umbashi, Khirbat al-		36.97	33.06	Poor for Agriculture	Lehman 2002
BSL-50	Habuba Kabira		38.07	36.18	Zone of Uncertainty	Lehman 2002
BSL-51	Baghuz		40.96	34.46	Poor for Agriculture	Lehman 2002
BSL-54	Muzan, Tall	Urkesh	40.99	37.06	Refugia	Lehman 2002
BSL-57	Afis, Tall		36.80	35.90	Refugia	Lehman 2002
BSL-60	Ahmar, Tall	Til Barsip	38.11	36.67	Refugia	Lehman 2002
BSL-63	Rifa't, Tall		37.09	36.47	Refugia	Lehman 2002
BSL-64	Mardikh, Tell	Ebla	36.80	35.79	Refugia	Lehman 2002
BSL-67	Hammam at-Turkman, Tall	Zalpa	39.06	36.49	Zone of Uncertainty	Lehman 2002
BSL-68	Hamidiya, Tall al-	Nilabshinni	41.17	36.81	Refugia	Lehman 2002
BSL-69	Barri, Tall	Kahat	41.14	36.74	Refugia	Lehman 2002
BSL-70	Jarablus Tahtani		38.01	36.78	Refugia	Lehman 2002
BSL-73	Munbaqa, Tall		38.14	36.23	Zone of Uncertainty	Lehman 2002
BSL-74	Muhammad Dhiyab		41.56	36.92	Refugia	Lehman 2002
BSL-77	Qitar, Tall al-		38.16	36.38	Zone of Uncertainty	Lehman 2002
BSL-83	Bdayri, Tall		40.82	36.39	Zone of Uncertainty	Lehman 2002
BSL-84	Rujm al-Hiri		35.80	32.91	Refugia	Lehman 2002
BSL-103	Jamus, Tall		36.13	34.67	Refugia	Lehman 2002
BSL-104	Zallaqiyat, az-		36.60	35.28	Refugia	Lehman 2002
BSL-116	Bsayssa, Tall		36.03	34.66	Refugia	Lehman 2002
BSL-117	Laha, Tall		35.96	34.69	Refugia	Lehman 2002
BSL-123	Siyanu, Tall		36.01	35.36	Refugia	Lehman 2002
BSL-129	Judayda, Tall		40.86	36.42	Zone of Uncertainty	Lehman 2002
BSL-130	Ma'rrat Hirmil		36.55	35.54	Refugia	Lehman 2002
BSL-132	'Ayn Hassan		37.22	36.06	Zone of Uncertainty	Lehman 2002

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
BSL-134	Sha'ayrat		36.94	34.49	Zone of Uncertainty	Lehman 2002
BSL-135	Khiyarat Danun		36.25	33.32	Refugia	Lehman 2002
BSL-136	Mumassahin, al-		36.66	33.87	Poor for Agriculture	Lehman 2002
BSL-141	Wadi al-Laymun		35.47	33.53	Refugia	Lehman 2002
BSL-142	Salankahiya, Tall		38.05	36.10	Zone of Uncertainty	Lehman 2002
BSL-146	Masin, Tall		36.71	35.31	Refugia	Lehman 2002
BSL-148	Dafa'a, Tall		36.73	35.18	Refugia	Lehman 2002
BSL-149	Dnaybi		37.02	34.96	Zone of Uncertainty	Lehman 2002
BSL-152	Rad Shaqra, Tall		40.83	36.46	Zone of Uncertainty	Lehman 2002
BSL-154	Dayr Sras		35.68	33.04	Refugia	Lehman 2002
BSL-155	Dabiq, Tall		37.26	36.53	Refugia	Lehman 2002
BSL-156	Duwaybiq		37.27	36.56	Refugia	Lehman 2002
BSL-158	Ansari		37.14	36.18	Refugia	Lehman 2002
BSL-161	Munbata, Tall		37.53	35.76	Zone of Uncertainty	Lehman 2002
BSL-164	Lawiya		35.69	32.84	Refugia	Lehman 2002
BSL-166	Halawa		38.10	36.12	Zone of Uncertainty	Lehman 2002
BSL-171	Qara Quzaq		38.20	36.63	Refugia	Lehman 2002
BSL-174	Sarj, Tall		35.69	32.77	Refugia	Lehman 2002
BSL-176	'Arqa, Tall	Irqata	36.03	34.53	Refugia	Lehman 2002
BSL-178	Tuqan, Tall		36.95	35.82	Refugia	Lehman 2002
BSL-179	Hizzin, Tall		36.10	33.96	Refugia	Lehman 2002
BSL-180	Mastuma, Tall		36.63	35.87	Refugia	Lehman 2002
BSL-185	Mishrifa, Tall	Qatna	36.86	34.84	Refugia	Lehman 2002
BSL-188	Hims		36.72	34.73	Refugia	Lehman 2002
BSL-190	'Ashara, Tall al-	Terqa	40.57	34.92	Poor for Agriculture	Lehman 2002
BSL-193	Banat, Tall al-		38.29	36.44	Zone of Uncertainty	Lehman 2002

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
BSL-194	Umm al-Marra		37.68	36.15	Zone of Uncertainty	Lehman 2002
BSL-195	Rumayla		38.21	36.30	Zone of Uncertainty	Lehman 2002
BSL-197	Juwayf		38.22	36.26	Zone of Uncertainty	Lehman 2002
BSL-198	Baydar, Tall		40.59	36.74	Refugia	Lehman 2002
BSL-208	Bna'ful		35.41	33.48	Refugia	Lehman 2002
BSL-214	Wadi Batra		35.66	32.90	Refugia	Lehman 2002
BSL-220	Qubbat Qar'a		35.72	32.92	Refugia	Lehman 2002
BSL-248	Aleppo	Yamhad	37.15	36.19	Refugia	Lehman 2002
BSL-258	Akhtarina, Tall		37.33	36.51	Refugia	Lehman 2002
BSL-275	'Ayn Tall		37.16	36.25	Refugia	Lehman 2002
BSL-278	Baalbek		36.20	34.00	Refugia	Lehman 2002
BSL-287	Sukas, Tall		35.93	35.30	Refugia	Lehman 2002
BSL-288	Kamid al-Lawz, Tall		35.82	33.62	Refugia	Lehman 2002
BSL-289	Byblos		35.65	34.12	Refugia	Lehman 2002
BSL-290	Bi'a, Tall	Tuttul	39.05	35.95	Poor for Agriculture	Lehman 2002
BSL-293	Malad, Tall		37.23	36.44	Refugia	Lehman 2002
BSL-294	Brak, Tall		41.07	36.67	Refugia	Lehman 2002
BSL-295	Hadidi, Tall	Azu	38.13	36.26	Zone of Uncertainty	Lehman 2002
BSL-309	Palmyra		38.28	34.56	Poor for Agriculture	Lehman 2002
BSL-311	Fakkariya, Tall	Washshukanni	40.05	36.84	Refugia	Lehman 2002
BSL-318	Hawar an-Nahr		37.24	36.50	Refugia	Lehman 2002
BSL-319	Kazal, Tall		35.99	34.71	Refugia	Lehman 2002
BSL-325	Hama	Hama	36.75	35.14	Refugia	Lehman 2002
BSL-334	Maskana	Emar	38.08	36.02	Zone of Uncertainty	Lehman 2002
BSL-344	Haylan, Tall		37.20	36.29	Refugia	Lehman 2002
BSL-345	Nabi Mand, Tall an-	Kadesh	36.52	34.56	Refugia	Lehman 2002
BSL-347	Jarablus		38.01	36.83	Refugia	Lehman 2002
IS-20	Khirbet er Rafid		35.28	32.05	Refugia	Finkelstein 1988; Kallai 1972:169

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
JP-001	Tall al-Ahmadiyya		37.69	36.17	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-002	al-Kayariyya		37.71	36.20	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-003	N/A		37.71	36.21	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-004	Tall al-Kayariyya		37.72	36.20	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-005	Tall Abu Susa		37.72	36.18	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-006	Tall Najjara		37.54	36.24	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-007	Tall Lala		37.76	36.16	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-009	N/A		37.69	36.22	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-011	Tall Ma'az		37.79	36.20	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-013	Za'raya		37.79	36.23	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-023	Tall Humayma		37.64	36.19	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-024	Humayma Kabir		37.64	36.17	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-029	Tall Zubayda		37.67	36.10	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-031	Umm al-Marra		37.69	36.13	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-032	Tall Khassaf		37.69	36.13	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-034	Tall Dayr Hafir		37.70	36.16	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-035	Tall Nasr Allah		37.62	36.21	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-036	Tall Bijan		37.63	36.25	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-041	Abu Jabbar Kabir		37.64	36.31	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
JP-045	al-Kayta		37.68	36.30	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-047	Khirbat Kiyar		37.66	36.33	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-048	al-Birqadar		37.67	36.35	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-050	Tubara		37.65	36.11	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-052	Tall Ayyub West		37.61	36.12	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-053	Rasm al-'Abd North		37.60	36.14	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-057	Tall Sab'in		37.52	36.12	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-059	Tall al-'Asimiyya East		37.57	36.11	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-060	Tall al-'Asimiyya North		37.57	36.11	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-063	Tall Ahmar		37.58	36.13	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-068	al-Jabbul		37.52	36.08	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-070	N/A		37.50	36.09	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-073	Kwayris al-Sharqiyya		37.54	36.17	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-075	Arbid Kabir		37.56	36.19	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-076	Tall Shirba		37.56	36.22	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-078	N/A		37.58	36.23	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-083	al-Birij		37.54	36.28	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-086	Birat al-Bab		37.53	36.32	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-090	Mazra'at al-Lala		37.77	36.14	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
JP-091	Rasm Malih		37.80	36.16	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-092	Tall Jubb al-Abyad		37.81	36.17	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-095	N/A		37.77	36.17	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-098	Tall Musa		37.84	36.11	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-101	Tall Mahdum		37.88	36.10	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-110	Tall Tutun		37.97	36.14	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-113	N/A		37.85	36.09	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-115	Tall Hasan		37.85	36.06	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-122	N/A		37.81	36.11	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-123	Khirbat Umm Mansura		37.82	36.06	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-130	Rasm al-'Abbud		37.61	36.20	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
JP-132	Rasm al-Kama		37.66	36.24	Zone of Uncertainty	Schwartz et al. 2000, Yukich 2013
BS-009	Khallet el Khazen VI		35.57	33.42	Refugia	Marfoe 1978
BS-012	Tell ez-Zeitoun		35.74	33.47	Refugia	Marfoe 1978
BS-050	Tell Kamid el-Loz (II)		35.82	33.62	Refugia	Marfoe 1978
BS-052	Tell Haql el Khirbe I		35.76	33.63	Refugia	Marfoe 1978
BS-170	Tell Deir Zenoun I		35.92	33.75	Refugia	Marfoe 1978
BS-173	Tell Serhoun		35.94	33.79	Refugia	Marfoe 1978
BS-206	Tell Ain Cherif		36.02	33.89	Refugia	Marfoe 1978
BS-231	Tell Hachbai		36.05	33.95	Refugia	Marfoe 1978
BS-233	Tell Ghassil		36.07	33.92	Refugia	Marfoe 1978
BS-200	Britel I		36.15	33.93	Refugia	Marfoe 1978
BS-291	Baalbek		36.20	34.00	Refugia	Marfoe 1978
BS-292	Haouch Tell Safiye		36.14	34.02	Refugia	Marfoe 1978

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
BS-293	Tell Aaddous		36.15	34.03	Refugia	Marfoe 1978
BS-322	Tell el Ayyun		36.27	34.16	Refugia	Marfoe 1978
Men-012	Tell Hudhud		37.28	35.21	Zone of Uncertainty	Moore 1985
Men-095	Tell Hledjak		37.39	35.36	Zone of Uncertainty	Copeland 1985
Men-094	Tell Tellik		37.38	35.40	Zone of Uncertainty	Copeland 1985
Men-073	Qara Qozaq		37.49	35.26	Zone of Uncertainty	Copeland 1985
Men-101	Tell Khamis		37.48	35.30	Zone of Uncertainty	Copeland 1985
Men-096	Jerablous Tahtani		37.29	35.41	Zone of Uncertainty	Copeland 1985
Men-109	Qanat		37.25	35.41	Zone of Uncertainty	Copeland 1985
Men-110	Aamarne II		37.29	35.37	Zone of Uncertainty	Copeland 1985
Men-076	Tell Dadate		37.20	35.26	Zone of Uncertainty	Copeland 1985
Men-043	Tell Koundariye		37.17	35.37	Zone of Uncertainty	Copeland 1985
Men-052	Tell el-Hajar		36.98	35.25	Refugia	Copeland 1985
Men-082	Tell Misraab		36.92	35.34	Refugia	Copeland 1985
WB17-21/22/1	Khirbet Yannun		35.24	3200	Refugia	Zertal and Mirkam 2000, Site 42
WB17-20/25/1	Bir Ḥasan		35.23	32.45	Refugia	Gophna and Porat 1972, Site 17
WB18-20/05/1	Khirbet Abu Ghannam		35.32	32.45	Refugia	Gophna and Porat 1972, Site 21; Zertal 1992, Site 51; Sion 2001, Site 29
WB17-20/93/1	Khirbet Za'tara		35.31	32.43	Refugia	Gophna and Porat 1972, Site 29; Zertal 1992, Site 56
WB19-20/41/4	Wadi Qa'un 2		35.47	32.41	Refugia	Zertal 2005, Site 7
WB19-20/01/1	el-Beyaẓ A		35.42	32.41	Refugia	Zertal 1996, Site 25

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB19-20/41/3	Khirbet Qa'un 2		35.47	32.41	Refugia	Zertal 2005, Site 5
WB19-20/41/6	The Cemetery of Qa'un		35.47	32.41	Refugia	Zertal 2005, Site 4
WB19-20/41/1	Tell Qa'un		35.47	32.41	Refugia	Zertal 2005, Site 3
WB19-20/31/2	Wadi Qa'un 1		35.46	32.40	Refugia	Zertal 2005, Site 1
WB19-20/51/1	Khallaiyel Madkhul 1		35.48	32.40	Refugia	Zertal 2005, Site 9
WB19-20/20/1	Khallet Abu Ghaliyan		35.45	32.39	Refugia	Zertal 2005, Site 14
WB19-19/39/1	Khallet el-Malih		35.46	32.39	Refugia	Zertal 2005, Site 20
WB18-19/49/1	er-Rahwe		35.37	32.39	Refugia	Zertal 1996, Site 7
WB18-19/58/1	Mraḥ Ra'yan		35.38	32.38	Refugia	Zertal 1996, Site 37
WB18-19/48/1	Khallet Ṭaleb		35.37	32.38	Refugia	Zertal 1996, Site 11
WB19-19/68/1	Kardale		35.49	32.38	Refugia	Zertal 1996, Site 64
WB19-19/28/1	Khallet el-Kebara		35.45	32.38	Refugia	Zertal 1996, Site 62
WB19-19/67/1	Wadi el-Hamme		35.49	32.37	Refugia	Zertal 1996, Site 66
WB18-19/47/2	Khirbet Ḥamdun		35.37	32.37	Refugia	Zertal 1996, Site 17
WB18-19/57/1	Khirbet Qrud		35.38	32.37	Refugia	Zertal 1996, Site 18
WB18-19/06/1	en-Nkheilat		35.32	32.36	Refugia	Zertal 1996, Site 21
WB19-19/75/2	Jebel Khimyar		35.51	32.35	Refugia	Zertal 1996, Site 75
WB19-19/34/1	Khirbet Mhallal		35.46	32.35	Refugia	Zertal 1996, Site 78
WB19-19/34/2	Iraq el-Mardom		35.46	32.34	Refugia	Zertal 1996, Site 77

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB19-19/74/2	Khirbet Umm Ghazal		35.50	32.34	Refugia	Gophna and Porat 1972, Site 71; Zertal 1996, Site 82
WB19-19/72/1	Tell el-Ḥulu		35.51	32.33	Refugia	Gophna and Porat 1972, Site 86; Zertal 1996, Site 96
WB19-19/42/1	Khirbet el-Mite		35.47	32.33	Refugia	Zertal 1996, Site 90
WB19-19/42/2	el-Bird		35.47	32.32	Refugia	Zertal 1996, Site 91
WB19-19/71/1	Tabqet el-Ḥilwe		35.50	32.32	Refugia	Zertal 1996, Site 232
WB19-19/70/1	Re'us eṭ-Ṭabaq		35.50	32.31	Refugia	Zertal 1996, Site 234
WB19-19/10/1	Khirbet Yarza A		35.44	32.31	Refugia	Zertal 1996, Site 106
WB18-19/80/1	Khallet Abu Slaḥ		35.41	32.31	Refugia	Zertal 1996, Site 56
WB19-18/79/1	E.P. 118		35.50	32.30	Refugia	Zertal 1996, Site 235
WB19-18/79/1	Khirbet es-Samra		35.50	32.29	Refugia	Zertal 1996, Site 129
WB18-18/98/1	en-Naqqar B		35.41	32.29	Refugia	Zertal 1996, Site 120
WB18-18/88/1	en-Naqqar A		35.41	32.29	Refugia	Zertal 1996, Site 119
WB19-18/78/1	Ra'us el-Kuwa'		35.50	32.29	Refugia	Zertal 1996, Site 238
WB18-18/28/2	Tel el-Far'a N		35.34	32.29	Refugia	Zertal 1996, Site 151
WB19-18/47/1	Khirbet Yusef		35.47	32.28	Refugia	Zertal 1996, Site 117
WB18-18/17/1	el-'Ajjam		35.33	32.28	Refugia	Zertal 1996, Site 146
WB18-18/87/2	el-Khanuq		35.41	32.28	Refugia	Zertal 1996, Site 123
WB19-18/67/2	es-Samra Enclosure		35.49	32.28	Refugia	Zertal 1996, Site 128
WB18-18/87/3	Bir ej-Jwar		35.41	32.28	Refugia	Zertal 1996, Site 125

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB18-18/36/2	Khirbet esh-Sheikh Smeiṭ B		35.35	32.27	Refugia	Zertal 1996, Site 155
WB18-18/75/1	Qabr 'Abush		35.40	32.26	Refugia	Zertal 1996, Site 147
WB18-18/94/1	el-Khelayel		35.42	32.26	Refugia	Zertal 1996, Site 148
WB20-18/34/1	Khirbet Wadi Sadd el-Balqawi		35.56	32.25	Zone of Uncertainty	Zertal 2005, Site 41
WB19-18/02/1	Wadi el-'Aris		35.42	32.24	Refugia	Zertal 1996, Site 175
WB19-18/02/1	Bab en-Naqb		35.42	32.23	Refugia	Gophna and Porat 1972, Site 159; Zertal 1996, Site 180
WB19-17/29/2	Tel Abu Rumh		35.45	32.21	Refugia	Zertal 1996, Site 190
WB19-17/28/1	Khirbet Maraḥ el-'Inab		35.45	32.20	Refugia	Gophna and Porat 1972, Site 174; Zertal 1996, Site 191
WB19-17/57/1	Khirbet ej-Jofe		35.48	32.19	Refugia	Zertal 1996, Site 213
WB19-17/54/1	Shunet el-Masna'ah		35.48	32.17	Zone of Uncertainty	Zertal 2005, Site 77
WB19-17/43/2	Mantaket Wadi Zeit		35.47	32.16	Zone of Uncertainty	Zertal 2005, Site 80
WB17-17/53/3	N/A		35.26	32.16	Refugia	Finkelstein et al. 1997: 693
WB19-17/43/1	Khallet el-Fuleh		35.47	32.15	Zone of Uncertainty	Zertal 2005, Site 81
WB17-17/42/2	N/A		35.26	32.15	Refugia	Finkelstein et al. 1997: 686
WB19-17/82/2	Tell el-Bedha 1		35.51	32.14	Zone of Uncertainty	Zertal 2005, Site 71
WB18-17/01/1	N/A		35.32	32.14	Refugia	Finkelstein et al. 1997: 804
WB-	Wadi Khallat el-'Arus		35.27	32.14	Refugia	Sion 2001, Site 327
WB17-17/51/1	N/A		35.27	32.14	Refugia	Finkelstein et al. 1997: 689
WB19-16/13/1	'Urqan er-Rub		35.44	32.06	Zone of Uncertainty	Hovers and Bar-Yosef 1987: 80-83; Zertal 2005, Site 195

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB17-16/61/1	Khirbet er-Rafid		35.28	32.05	Refugia	Kallai 1972, Site 42; Finkelstein et al. 1997: 642-643
WB16-16/61/2	N/A		35.17	32.05	Refugia	Finkelstein et al. 1997: 465
WB18-16/51/1	Khirbet er-Rahaya		35.37	32.05	Refugia	Finkelstein et al. 1997: 791-793
WB17-16/50/1	Sinjil		35.26	32.03	Refugia	Kallai 1972, Site 43; Finkelstein et al. 1997: 633
WB18-15/49/1	Khirbet Jib'it		35.36	32.03	Refugia	Finkelstein et al. 1997: 751-753
WB18-15/15/3	Dhahr Mirzbaneh		35.34	32.00	Refugia	Finkelstein et al. 1997: 736-740
WB18-15/15/4	N/A		35.34	32.00	Refugia	Finkelstein et al. 1997: 741
WB18-15/15/5	N/A		35.34	31.99	Refugia	Finkelstein et al. 1997: 741-742
WB18-15/25/1	Water Line - 'Ein Samiya		35.34	31.99	Refugia	Finkelstein et al. 1997: 745
WB18-15/14/2	N/A		35.34	31.99	Refugia	Finkelstein et al. 1997: 732
WB18-15/14/1	'Ein Samiya		35.33	31.99	Refugia	Finkelstein et al. 1997: 731
WB18-15/24/3	N/A		35.34	31.98	Refugia	Finkelstein et al. 1997: 745
WB-	Wadi el-'Auja		35.38	31.97	Refugia	Spanier 1995: 79
WB18-15/12/1	N/A		35.33	31.97	Refugia	Finkelstein et al. 1997: 730-731
WB17-15/42/1	N/A		35.26	31.97	Refugia	Finkelstein et al. 1997: 572
WB17-14/49/2	Muntar		35.26	31.94	Refugia	Finkelstein 1993, Site 95; Finkelstein et al. 1997: 532-533
WB17-14/49/1	N/A		35.26	31.94	Refugia	Finkelstein 1993, Site 94; Finkelstein et al. 1997: 531-532
WB17-14/28/1	Beitin		35.24	31.93	Refugia	Finkelstein 1993, Site 82; Finkelstein et al. 1997: 518
WB17-14/27/1	N/A		35.24	31.92	Refugia	Finkelstein 1993, Site 78; Finkelstein et al. 1997: 516

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WBII/1	Niẓẓanit Cave		35.32	31.89	Refugia	Hirschfeld and Riklin 2002, Site II/1
WB17-14/94/1	N/A		35.31	31.89	Refugia	Feldstein et al. 1993, Site 260
WB17-14/83/1	Jebel Tu'mur		35.30	31.88	Refugia	Feldstein et al. 1993, Site 247
WB17-14/83/2	N/A		35.30	31.88	Refugia	Feldstein et al. 1993, Site 248
WB17-14/93/1	Mikhmas		35.31	31.88	Refugia	Feldstein et al. 1993, Site 259
WB17-14/81/1	N/A		35.30	31.86	Refugia	Feldstein et al. 1993, Site 245
WB17-14/11/2	Spot Height 759		35.22	31.86	Refugia	Feldstein et al. 1993, Site 180
WB16-14/60/1	N/A		35.17	31.86	Refugia	Feldstein et al. 1993, Site 155
WB17-14/70/1	Khirbet Marjama		35.29	31.86	Refugia	Feldstein et al. 1993, Site 231
WB16-14/60/2	N/A		35.18	31.85	Refugia	Feldstein et al. 1993, Site 156
WB17-14/70/3	N/A		35.29	31.85	Refugia	Feldstein et al. 1993, Site 233
WB17-13/79/4	el-Hadaba		35.28	31.85	Refugia	Dinur and Feig 1993, Site 16
WB17-13/99/2	Megharat el-Jai		35.31	31.85	Refugia	Dinur and Feig 1993, Site 544
WB16-13/79/1	Gibeon		35.18	31.85	Refugia	Feldstein et al. 1993, Site 315; Fischer et al. 1996, Site 56
WB17-13/79/2	Bir Sumeima		35.29	31.84	Refugia	Dinur and Feig 1993, Site 514
WB17-13/88/2	N/A		35.30	31.84	Refugia	Dinur and Feig 1993, Site 532
WB17-13/97/2	Jurat Musa		35.31	31.83	Refugia	Dinur and Feig 1993, Site 539
WB17-13/36/3	Wadi Zimra		35.25	31.82	Refugia	Kloner 2001, Site [102] 88
WB17-13/36/7	Khirbet Ras Abu Ma'ruf		35.24	31.82	Refugia	Kloner 2001, Site [102] 91

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB17-13/45/3	'Anata		35.26	31.81	Refugia	Dinur and Feig 1993, Site 452
WB17-13/32/9	Augusta Victoria Hospital		35.25	31.79	Refugia	Kloner 2001, Site [102] 354
WB17-13/32/15	Eṭ Ṭur		35.25	31.78	Refugia	Kloner 2001, Site [102] 362
WB17-13/70/3	Khirbet Abu Ḥuweilan		35.29	31.77	Refugia	Dinur and Feig 1993, Site 502
WB18-12/39/1	'Arqub el Jimal		35.35	31.76	Zone of Uncertainty	Patrich 1994a, Site 7
WB18-12/26/2	Har Monṭar		35.34	31.73	Refugia	Patrich 1994a, Site 44
WB17-11/79/1	Spot Height 483 m, W and N		35.29	31.67	Refugia	Hirschfeld 1985, Site 6
WB16-11/38/2	Faghur S		35.14	31.66	Refugia	Ofer 1993, Site 296, T30
WB17-11/98/1	Spot Height 398 m		35.31	31.66	Zone of Uncertainty	Hirschfeld 1985, Site 15
WB16-11/37/1	Rujm es-Sabit		35.14	31.65	Refugia	Kochavi 1972, Site 54; Ofer 1993, Site 286
WB16-11/47/2	Sabit E		35.15	31.65	Refugia	Ofer 1993, Site 287, T29
WB17-11/77/4	Spot Height 510 m, N-W		35.29	31.65	Refugia	Hirschfeld 1985, Site 25
WB17-11/77/3	Trig. Point 445-N		35.29	31.65	Refugia	Hirschfeld 1985, Site 24
WB17-11/67/2	Spot Height 492 m and N-W		35.28	31.65	Refugia	Hirschfeld 1985, Site 21
WB17-11/76/1	Trig. Point 445-N, S-W		35.29	31.64	Refugia	Hirschfeld 1985, Site 36
WB17-11/75/2	Spot Height 465 m, S and W		35.29	31.63	Zone of Uncertainty	Hirschfeld 1985, Site 49
WB17-11/75/1	Spot Height 440 m, E and S		35.29	31.63	Zone of Uncertainty	Hirschfeld 1985, Site 48
WB17-11/24/1	Trig. Point 622-B		35.23	31.62	Refugia	Hirschfeld 1985, Site 55
WB16-11/44/3	Beit Fajjar S		35.15	31.62	Refugia	Ofer 1993, Site T26

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB16-11/04/2	Kufin		35.11	31.62	Refugia	Kochavi 1972, Site 66; Ofer 1993, Site 258, T24
WB17-11/13/1	Khirbet el-Minya		35.22	31.62	Refugia	Bar-Adon 1972, Site 140k; Hirschfeld 1985, Site 59
WB17-11/13/2	Khirbet el-Minya		35.22	31.62	Refugia	Bar-Adon 1972, Site 140j; Hirschfeld 1985, Site 60
WB17-11/12/3	Spot Height 775 m and N-W		35.22	31.61	Refugia	Bar-Adon 1972, Site 144a; Hirschfeld 1985, Site 78
WB17-11/02/2	Spot Height 811 m and N-E		35.22	31.61	Refugia	Bar-Adon 1972, Site 144b; Hirschfeld 1985, Site 75
WB17-11/62/1	Spot Height 493 m, N-W		35.28	31.60	Refugia	Hirschfeld 1985, Site 85
WB17-11/11/1	Spot Height 734 m, N-W		35.23	31.60	Refugia	Bar-Adon 1972, Site 147a; Hirschfeld 1985, Site 91
WB16-11/41/1	Masall esh-Sheikh Ibrahim		35.15	31.60	Refugia	Kochavi 1972, Site 90; Ofer 1993, Site 230, T23
WB17-11/11/2	Spot Height 734 m and S-W		35.23	31.60	Refugia	Bar-Adon 1972, Site 147b; Hirschfeld 1985, Site 92
WB17-11/91/1	Spot Height 242 m, E		35.31	31.60	Zone of Uncertainty	Hirschfeld 1985, Site 106
WB17-11/91/2	Spot Height 288 m, N		35.31	31.60	Zone of Uncertainty	Hirschfeld 1985, Site 107
WB17-11/81/1	Spot Height 330 m and N-W		35.30	31.60	Zone of Uncertainty	Hirschfeld 1985, Site 105
WB17-11/01/3	Spot Height 821 (SE)		35.22	31.60	Refugia	Hirschfeld 1985, Site 89
WB17-11/11/3	N/A		35.23	31.60	Refugia	Bar-Adon 1972, Site 147c; Hirschfeld 1985, Site 93
WB17-11/61/1	Nahal 'Amos		35.28	31.59	Zone of Uncertainty	Hirschfeld 1985, Site 104
WB17-11/00/2	Spot Height 807 m, S-E		35.21	31.59	Refugia	Hirschfeld 1985, Site 109
WB17-11/40/2	Khirbet Deir 'Alla		35.25	31.59	Refugia	Bar-Adon 1972, Site 151a; Hirschfeld 1985, Site 119
WB17-11/40/1	Khirbet Deir 'Alla		35.26	31.58	Refugia	Bar-Adon 1972, Site 151e; Hirschfeld 1985, Site 118
WB17-11/10/1	Khirbet Umm ez-Zuweitine		35.23	31.58	Refugia	Bar-Adon 1972, Site 154a; Hirschfeld 1985, Site 113

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB16-11/30/2	Si'ir W		35.14	31.58	Refugia	Kochavi 1972, Site 99; Ofer 1993, Site 220
WB17-11/90/1	Spot Height 267 m		35.31	31.58	Zone of Uncertainty	Hirschfeld 1985, Site 122
WB14-10/69/1	Khirbet Shebrakah		34.96	31.58	Refugia	Dagan 2006a, Site 39
WB14-10/68/3	Idna [7]		34.97	31.57	Refugia	Dagan 2006a, Site 123
WB14-10/67/5	Dhahr Khallat el Ghamiqa [3]		34.96	31.56	Refugia	Dagan 2006a, Site 219
WB14-10/97/4	Wadi el Far'a [1]		34.99	31.56	Refugia	Dagan 2006a, Site 224
WB14-10/46/1	Rasm ed Duwwar [1]		34.94	31.55	Refugia	Dagan 2006a, Site 276
WB14-10/76/1	Jebel Ṣaliḥ [1]		34.97	31.55	Refugia	Dagan 2006a, Site 294
WB14-10/55/2	Khirbet Rasm el Ḥammam		34.96	31.54	Refugia	Kochavi 1972, Site 126; Dagan 2006a, Site 341
WB14-10/75/5	Khallat Beit Maqdum		34.97	31.54	Refugia	Dagan 2006a, Site 356
WB14-10/44/1	Khallat 'Ashbur		34.94	31.53	Refugia	Dagan 2006b, Site 388
WB14-10/64/3	Khirbet er Rasm		34.97	31.53	Refugia	Dagan 2006b, Site 399
WB14-10/44/4	Nahal Lakhish		34.94	31.53	Refugia	Dagan 2006b, Site 391
WB14-10/74/5	Jebel es Sa'di		34.97	31.53	Refugia	Dagan 2006b, Site 409
WB14-10/64/1	Khirbet el-Qom		34.96	31.53	Refugia	Kochavi 1972, Site 135; Dagan 2006b, Site 398
WB14-10/54/2	Khirbet Firjas		34.95	31.53	Refugia	Dagan 2006b, Site 396
WB14-10/54/1	Khirbet Firjas		34.95	31.53	Refugia	Dagan 2006b, Site 396
WB14-10/84/7	Khirbet Humsa		34.98	31.53	Refugia	Dagan 2006b, Site 416
WB14-10/44/1	Qaṣr Firjas		34.95	31.53	Refugia	Kochavi 1972, Site 134; Dagan 2006b, Site 390

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB14-10/84/2	Khirbet Humsa		34.98	31.53	Refugia	Dagan 2006b, Site 416
WB14-10/74/6	Jebel es Sa'di		34.97	31.53	Refugia	Dagan 2006b, Site 410
WB14-10/53/5	Jebel el-Qa'aqir		34.96	31.53	Refugia	Dagan 2006b, Site 476
WB14-10/83/3	Jebel es Sa'di		34.98	31.53	Refugia	Dagan 2006b, Site 500
WB14-10/83/5	Jebel es Sa'di		34.98	31.53	Refugia	Dagan 2006b, Site 502
WB14-10/43/8	Sheqef		34.94	31.53	Refugia	Dagan 2006b, Site 467
WB14-10/93/2	Wadi el Hammam		34.99	31.53	Refugia	Dagan 2006b, Site 510
WB14-10/63/9	Jebel el-Qa'aqir		34.96	31.53	Refugia	Dagan 2006b, Site 488
WB14-10/73/2	Khirbet Deir Samit		34.98	31.53	Refugia	Dagan 2006b, Site 493
WB14-10/83/4	Khirbet Deir Samit		34.98	31.52	Refugia	Dagan 2006b, Site 501
WB14-10/53/2	Jebel el-Qa'aqir		34.95	31.52	Refugia	Dagan 2006b, Site 473
WB14-10/83/1	Wadi el Hammam		34.99	31.52	Refugia	Dagan 2006b, Site 498
WB14-10/63/7	Jebel el-Qa'aqir		34.96	31.52	Refugia	Dagan 2006b, Site 486
WB14-10/53/4	Jebel el-Qa'aqir		34.95	31.52	Refugia	Dagan 2006b, Site 475
WB14-10/63/10	Jebel el-Qa'aqir		34.96	31.52	Refugia	Dagan 2006b, Site 489
WB14-10/43/4	Khirbet Beit Ba'ir		34.94	31.52	Refugia	Dagan 2006b, Site 464
WB14-10/63/3	Jebel el-Qa'aqir		34.96	31.52	Refugia	Dagan 2006b, Site 484
WB14-10/53/1	Jebel el-Qa'aqir		34.95	31.52	Refugia	Dagan 2006b, Site 472
WB14-10/63/5	Jebel el-Qa'aqir		34.96	31.52	Refugia	Dagan 2006b, Site 485

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB14-10/43/11	Sheqef		34.95	31.52	Refugia	Dagan 2006b, Site 470
WB14-10/52/4	Khirbet Beit Awwa		34.95	31.52	Refugia	Dagan 2006b, Site 559
WB14-10/82/6	Wadi Ahmad		34.98	31.52	Refugia	Dagan 2006b, Site 597
WB14-10/42/9	Khirbet Beit Awwa		34.95	31.52	Refugia	Dagan 2006b, Site 553
WB14-10/62/10	Jebel el-Qa'aqir		34.96	31.52	Refugia	Dagan 2006b, Site 578
WB14-10/62/1	Wadi es Simiya		34.97	31.52	Refugia	Dagan 2006b, Site 571
WB14-10/52/5	Khirbet Beit Awwa		34.95	31.52	Refugia	Dagan 2006b, Site 560
WB14-10/62/8	Jebel el-Qa'aqir		34.96	31.52	Refugia	Dagan 2006b, Site 576
WB14-10/62/9	Jebel el-Qa'aqir		34.96	31.52	Refugia	Dagan 2006b, Site 577
WB14-10/52/3	Khirbet Beit Awwa		34.95	31.52	Refugia	Dagan 2006b, Site 558
WB14-10/82/1	Wadi Inzar		34.98	31.52	Refugia	Dagan 2006b, Site 592
WB14-10/62/11	Wadi es Simiya		34.97	31.52	Refugia	Dagan 2006b, Site 579
WB14-10/92/3	Wadi Inzar		34.99	31.52	Refugia	Dagan 2006b, Site 605
WB14-10/52/6	Khirbet Beit Awwa		34.95	31.51	Refugia	Dagan 2006b, Site 561
WB14-10/62/2	Khirbet Beit Awwa		34.96	31.51	Refugia	Dagan 2006b, Site 572
WB14-10/72/7	Wadi Ahmad		34.97	31.51	Refugia	Dagan 2006b, Site 588
WB14-10/62/7	Khirbet Beit 'Awwa		34.96	31.51	Refugia	Dagan 2006b, Site 575
WB14-10/52/7	Khirbet Beit Awwa		34.95	31.51	Refugia	Dagan 2006b, Site 562
WB14-10/52/8	Khirbet Beit Awwa		34.96	31.51	Refugia	Dagan 2006b, Site 563

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB14-10/52/10	Khirbet Beit Awwa		34.95	31.51	Refugia	Dagan 2006b, Site 565
WB14-10/52/1	Khirbet Beit Awwa		34.95	31.51	Refugia	Dagan 2006b, Site 556
WB14-10/72/2	Wadi Ahmad		34.97	31.51	Refugia	Dagan 2006b, Site 583
WB14-10/81/10	Wadi Ahmad		34.98	31.51	Refugia	Dagan 2006b, Site 692
WB14-10/91/12	Wadi Inzar		35.00	31.51	Refugia	Dagan 2006b, Site 704
WB14-10/61/20	Rujm el Muntara		34.96	31.51	Refugia	Dagan 2006b, Site 670
WB14-10/61/22	Rujm el Qas'a		34.96	31.51	Refugia	Dagan 2006b, Site 671
WB14-10/61/8	Rujm el Muntara		34.97	31.51	Refugia	Dagan 2006b, Site 667
WB14-10/91/14	N/A		35.00	31.51	Refugia	Dagan 2006b, Site 706
WB14-10/61/1	Rujm el Muntara		34.97	31.51	Refugia	Dagan 2006b, Site 663
WB14-10/61/7	Rujm el Muntara		34.97	31.51	Refugia	Dagan 2006b, Site 663
WB14-10/81/5	Wadi Ahmad		34.98	31.51	Refugia	Dagan 2006b, Site 687
WB14-10/61/6	Rujm el Qas'a		34.96	31.51	Refugia	Dagan 2006b, Site 666
WB14-10/91/6	Wadi Ahmad		34.99	31.51	Refugia	Dagan 2006b, Site 698
WB14-10/71/4	Ras Jebel 'Urqan Shaytin		34.98	31.51	Refugia	Dagan 2006b, Site 676
WB14-10/51/11	Ras Khallat es Sa'idi		34.95	31.51	Refugia	Dagan 2006b, Site 654
WB14-10/61/1	Rujm el Qaṣ'a		34.96	31.51	Refugia	Kochavi 1972, Site 153; Dagan 2006b, Site 664
WB14-10/91/11	Wadi Ahmad		35.00	31.51	Refugia	Dagan 2006b, Site 703
WB14-10/91/7	Wadi Ahmad		35.00	31.50	Refugia	Dagan 2006b, Site 699

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB14-10/61/21	Rujm el Qas'a		34.96	31.50	Refugia	Dagan 2006b, Site 665
WB14-10/61/10	Wadi Umm Hadwa		34.97	31.50	Refugia	Dagan 2006b, Site 668
WB14-10/61/12	Wadi Umm Hadwa		34.96	31.50	Refugia	Dagan 2006b, Site 668
WB14-10/61/11	Wadi Umm Hadwa		34.97	31.50	Refugia	Dagan 2006b, Site 668
WB14-10/61/9	Wadi Umm Hadwa		34.96	31.50	Refugia	Dagan 2006b, Site 668
WB14-10/61/14	Wadi Umm Hadwa		34.96	31.50	Refugia	Dagan 2006b, Site 668
WB14-10/61/17	Qasr Hashish		34.97	31.50	Refugia	Dagan 2006b, Site 669
WB14-10/91/9	Wadi Ahmad		34.99	31.50	Refugia	Dagan 2006b, Site 701
WB14-10/71/8	Wadi es Simiya		34.98	31.50	Refugia	Dagan 2006b, Site 679
WB15-10/01/1	esh-Sheikh Ahmad al 'Abd		35.00	31.50	Refugia	Dagan n.d.
WB14-10/51/17	Khirbet Beit 'Awwa		34.95	31.50	Refugia	Dagan 2006b, Site 662
WB14-10/61/15	Wadi Umm Hadwa		34.96	31.50	Refugia	Dagan 2006b, Site 668
WB14-10/61/13	Wadi Umm Hadwa		34.96	31.50	Refugia	Dagan 2006b, Site 668
WB14-10/90/3	Wadi Umm Hadwa		34.99	31.50	Refugia	Dagan 2006b, Site 805
WB14-10/50/1	Wadi Khursa		34.96	31.50	Refugia	Dagan 2006b, Site 760
WB14-10/60/15	Wadi Umm Hadwa		34.97	31.50	Refugia	Dagan 2006b, Site 782
WB14-10/60/8	Rujm el Baqa' esh Shamaliya		34.96	31.50	Refugia	Dagan 2006b, Site 775
WB14-10/60/10	Wadi Umm Hadwa		34.96	31.50	Refugia	Dagan 2006b, Site 777
WB14-10/50/8	Wadi Khurash		34.95	31.50	Refugia	Dagan 2006b, Site 767

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB14-10/50/3	Jebel Duweimar		34.95	31.50	Refugia	Dagan 2006b, Site 762
WB14-10/90/5	Wadi Umm Hadwa		34.99	31.50	Refugia	Dagan 2006b, Site 807
WB14-10/50/4	Jebel Duweimar		34.95	31.50	Refugia	Dagan 2006b, Site 763
WB14-10/40/5	Nahal Adorayim		34.95	31.50	Refugia	Dagan 2006b, Site 754
WB14-10/70/1	Wadi Umm Hadwa		34.97	31.50	Refugia	Dagan 2006b, Site 783
WB14-10/60/2	Wadi Khursa		34.96	31.50	Refugia	Dagan 2006b, Site 769
WB14-10/50/7	Wadi Khurash		34.95	31.49	Refugia	Dagan 2006b, Site 766
WB14-10/90/11	Wadi Umm Hadwa		34.99	31.49	Refugia	Dagan 2006b, Site 813
WB14-10/50/5	Wadi Khursa		34.96	31.49	Refugia	Dagan 2006b, Site 764
WB15-09/59/1	el-Fawwar N		35.06	31.48	Refugia	Ofer 1993, Site 160
WB15-09/84/1	Yatta		35.09	31.45	Refugia	Ofer 1993, Site 93
WB15-09/13/2	Rabud		35.02	31.43	Refugia	Kochavi 1972, Site 215; Ofer 1993, Site T17
WB16-09/22/1	Khirbet el-Karmil W		35.13	31.42	Refugia	Kochavi 1972, Site 222; Ofer 1993, Site 72
WB15-09/12/2	Rabud S		35.01	31.42	Refugia	Ofer 1993, Site T11
WB16-09/32/2	Khirbet el-Karmil		35.14	31.42	Refugia	Kochavi 1972, Site 223; Ofer 1993, Site T14
WB14-09/70/1	edh-Dhahiriya		34.97	31.41	Refugia	Ofer 1993, Site 28; Dagan n.d.
WB14-08/39/2	'Unab el-Kabir E		34.93	31.40	Refugia	Ofer 1993, Site 22, T2
WB35200	Khirbet Tell el-Ḥulu		35.50	32.33	Refugia	-
WB10906/0	Wadi el-'Aris		35.42	32.24	Refugia	-

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB4267/0	Dhahr Mirzbaneh		35.34	32.00	Refugia	Finkelstein 1990a; Finkelstein 1991; Bloch-Smith 2004.
WB-	Water Line - 'Ein Samiya		35.34	31.99	Refugia	-
WB13078/0	'Ein Samiya		35.33	31.99	Refugia	Yeivin 1971a; Dever 1972b; Dever 1975b; Noy 1976; Elizur 1994; Zissu 2001a; Zissu 2001b; A. Mazar 1995; Bloch-Smith 2004; *HA* 27 (1968): 19; *HA* 36 (1970): 11-12; *HA* 37 (1971): 23.
WB2930/0	Bethel		35.24	31.93	Refugia	Könen 2003; *HA* 67-68 (1978): 75.
WB7774/0	Makkuk Cave		35.34	31.90	Refugia	ESI 7-8 (1990): 117.
WB-	Niẓẓanit Cave		35.32	31.89	Refugia	Hirschfeld and Riklin 2002: 6.
WB26963/0	'Atarot Airport (east)		35.23	31.86	Refugia	-
WB-	Giv'at Ze'ev		35.17	31.86	Refugia	Dadon 1997c.
WB12381/0	Megharat el-Jai		35.31	31.85	Refugia	Eshel 1999; Eshel and Zissu 1999; *HA-ESI* 110 (1999): 56*-57*.
WB2712/0	Gibeon		35.18	31.85	Refugia	Pringle 1983; Eshel 1987; *HA* 69-71 (1979): 82.
WB2952/0	Naḥal Zimri		35.25	31.82	Refugia	Gibson 1982b; Gibson and Edelstein 1985: 145; *ESI* 4 (1986): 80-82; *ESI* 10 (1992): 125-127.
WB4234/0	Khirbet Ras Abu Ma'aruf		35.24	31.82	Refugia	Gorin-Rosen 1999; Rapuano 1999; Seligman 1994; Seligman 1995; Seligman 1999; *ESI* 12 (1994): 52-54 (East A).
WB4234/0	Wadi el-Khalaf		35.25	31.82	Refugia	ESI 16 (1997): 99.
WB-	Ma'ale Adummim		35.30	31.77	Refugia	ESI 16 (1997): 141.
WB31633/0	Ma'ale Adummim, Site 06		35.29	31.77	Refugia	Baruch 1997a.
WB8037/0	El'azar		35.14	31.66	Refugia	ESI 9 (1991): 158-159, 159-160.
WB8066/0	Efrata		35.15	31.65	Refugia	Gonen 1981; Gonen 2001.
WB23755/0	Khirbet el-Qom		34.96	31.53	Refugia	Dever 1969-1970; Dever 1971c; Holladay 1971a; Holladay 1971b; Geraty 1975; *HA* 25 (1968): 26-28; *HA* 28-29 (1969): 36-38; *HA* 39 (1971): 24-25.
WB7685/0	Jebel el-Qa'aqir		34.96	31.52	Refugia	Dever 1969; Dever 1971a; Dever 1972a; Gitin 1975; Dever 1981; Smith 1982; *HA* 25 (1968): 26-28; *HA* 39 (1971): 26.

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
WB-	Khirbet Beit 'Awwa		34.94	31.51	Refugia	HA-ESI 119 (2007) (Online).
WB2476/0	Khirbet el-Karmil		35.14	31.42	Refugia	Dever 1975a.
WB1463/0	Khirbet 'Unab el-Kabir		34.93	31.39	Refugia	Magen et al. 2003.
WB-	Meẓadot Yehuda B		35.10	31.36	Refugia	Batz 2006a; Batz 2007: 18-20; *HA-ESI* 115 (2003): 61*-63*.
MJ-2575	JADIS: 2314011		35.88	31.85	Refugia	megajordan.org
MJ-2577	Zgey		35.92	32.39	Refugia	megajordan.org
MJ-2656	Iraq el Amir		35.75	31.91	Zone of Uncertainty	megajordan.org
MJ-2657	Yajuz (north)		35.92	32.03	Refugia	megajordan.org
MJ-2660	Khirbet en Nawafleh		35.49	30.33	Poor for Agriculture	megajordan.org
MJ-2677	Tell 'Umeiri		35.89	31.87	Refugia	megajordan.org
MJ-2681	Tall Al-Husun		35.88	32.49	Refugia	megajordan.org
MJ-2682	Amman Citadel		35.94	31.95	Zone of Uncertainty	megajordan.org
MJ-2683	Jawa (al Mafraq)		37.00	32.34	Poor for Agriculture	megajordan.org
MJ-2689	Tell Nimrin		35.62	31.90	Poor for Agriculture	megajordan.org
MJ-2691	el Hammam		35.67	31.84	Poor for Agriculture	megajordan.org
MJ-2706	Lajjun		35.86	31.24	Zone of Uncertainty	megajordan.org
MJ-2711	el Berketein		35.89	32.30	Refugia	megajordan.org
MJ-2724	Rujm el Beidar		35.93	32.00	Refugia	megajordan.org
MJ-2738	Al-Qasr		35.78	31.36	Zone of Uncertainty	megajordan.org
MJ-2755	Tall en Nakheel south		35.59	32.22	Zone of Uncertainty	megajordan.org
MJ-2756	Tall en Nakheel north		35.59	32.22	Zone of Uncertainty	megajordan.org
MJ-2762	Quweilbeh		35.87	32.68	Refugia	megajordan.org
MJ-2777	Ain al Tapaqa		35.63	32.65	Refugia	megajordan.org
MJ-2778	Ayateh		35.79	32.49	Refugia	megajordan.org
MJ-2804	Tall Mughayir		35.93	32.61	Refugia	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-2811	Tal Irbid		35.85	32.56	Refugia	megajordan.org
MJ-2821	al Meedan		35.86	32.59	Refugia	megajordan.org
MJ-2832	Tal al Mealaqah		35.92	32.60	Refugia	megajordan.org
MJ-2835	Yareeha al Shamaliyah		35.94	32.53	Refugia	megajordan.org
MJ-2838	Khirbet Majed		35.93	32.66	Refugia	megajordan.org
MJ-2857	Dhahr Albad		35.66	32.48	Refugia	megajordan.org
MJ-2866	Khirbet Meryameen		35.64	32.43	Refugia	megajordan.org
MJ-2898	Tell er Rayy (north)		35.61	32.61	Refugia	megajordan.org
MJ-2903	Abu en-Ni'aj (south)		35.57	32.41	Zone of Uncertainty	megajordan.org
MJ-2976	Khirbet Iskandar		35.77	31.56	Zone of Uncertainty	megajordan.org
MJ-3390	Umm el-Basatin		35.88	31.83	Refugia	megajordan.org
MJ-3900	Hamra Ifdan		3.00	ASI1-10	Poor for Agriculture	megajordan.org
MJ-3911	JADIS: 1800022		10.00	ASI2-35	Poor for Agriculture	megajordan.org
MJ-3913	JADIS: 1800027		15.00	ASI2-47	Poor for Agriculture	megajordan.org
MJ-3941	JADIS: 1802001		18.00	ASI2-69	Poor for Agriculture	megajordan.org
MJ-4046	JADIS: 1902008		25.00	ASI2-134	Poor for Agriculture	megajordan.org
MJ-4061	JADIS: 1903010		31.00	ASI5-29	Poor for Agriculture	megajordan.org
MJ-4069	JADIS: 1903024		36.00	ASI5-86	Poor for Agriculture	megajordan.org
MJ-4070	JADIS: 1903025		37.00	ASI5-112	Poor for Agriculture	megajordan.org
MJ-4073	JADIS: 1903032		40.00	ASI5-157	Poor for Agriculture	megajordan.org
MJ-4078	JADIS: 1903042		45.00	ASI5-183	Poor for Agriculture	megajordan.org
MJ-4083	JADIS: 1903052		48.00	ASI5-204	Poor for Agriculture	megajordan.org
MJ-4343	Qataret es-Samra South		68.00	ASI15-29	Zone of Uncertainty	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-4422	Rababeh		90.00	ASI18-4	Refugia	megajordan.org
MJ-4481	Bab edh-Dhra		35.52	31.25	Poor for Agriculture	megajordan.org
MJ-4564	Qabr Afandi		120.00	ASI18-159	Poor for Agriculture	megajordan.org
MJ-4571	Rawweseh		122.00	ASI18-164	Poor for Agriculture	megajordan.org
MJ-4572	Sukneh		123.00	ASI18-165	Poor for Agriculture	megajordan.org
MJ-4586	Umm Hamad el-Gharbi		130.00	ASI18-218	Zone of Uncertainty	megajordan.org
MJ-4592	Arqadat		132.00	ASI18-229	Zone of Uncertainty	megajordan.org
MJ-4593	Msattarah		134.00	ASI18-233	Zone of Uncertainty	megajordan.org
MJ-4594	Ze'aze'iyyeh		136.00	ASI18-236	Zone of Uncertainty	megajordan.org
MJ-4598	Hemmeh West		139.00	ASI18-266	Zone of Uncertainty	megajordan.org
MJ-4618	Buweib		147.00	ASI18-338	Zone of Uncertainty	megajordan.org
MJ-4640	Sardub 01		154.00	ASI18/1-7	Refugia	megajordan.org
MJ-4650	Maqbarat es-Sleikhat		35.60	32.33	Zone of Uncertainty	megajordan.org
MJ-4658	Tell Abu Alubah		35.59	32.42	Refugia	megajordan.org
MJ-4664	Hammeh 06		160.00	ASI18/1-19	Refugia	megajordan.org
MJ-4665	Hammeh 07		161.00	ASI18/1-21	Refugia	megajordan.org
MJ-4667	Hammeh 12		162.00	ASI18/1-23	Refugia	megajordan.org
MJ-4668	Hammeh 13		165.00	ASI18/1-28	Refugia	megajordan.org
MJ-4671	Hammeh 22/23		166.00	ASI18/1-29	Refugia	megajordan.org
MJ-4684	Hammeh (Tombs)		167.00	ASI18/1-31	Refugia	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-4703	Salim el-Usef site e		173.00	ASI18/1-41	Refugia	megajordan.org
MJ-4715	Sheikeh Shehab		175.00	ASI18/1-43	Refugia	megajordan.org
MJ-4933	Umm el-Sedeirah		209.00	ASI18/1-120	Refugia	megajordan.org
MJ-4946	JADIS: 2105010		213.00	ASI18/2-3	Refugia	megajordan.org
MJ-5004	Birjes		35.71	31.25	Refugia	megajordan.org
MJ-5025	JADIS: 2107063		261.00	ASI20-30	Refugia	megajordan.org
MJ-5093	Mshayyadeh		272.00	ASI22-24	Poor for Agriculture	megajordan.org
MJ-5113	JADIS: 2114039		275.00	ASI22-56	Poor for Agriculture	megajordan.org
MJ-5247	Jelmet esh-Shariyeh		316.00	ASI26-20	Refugia	megajordan.org
MJ-5200	Ghauweit		317.00	ASI26-21	Refugia	megajordan.org
MJ-5274	Al-Kharj		322.00	ASI26-53	Refugia	megajordan.org
MJ-5356	Umm el-Ghozlan		342.00	ASI27-101	Refugia	megajordan.org
MJ-5523	Dhat Ras		373.00	ASI28-69	Refugia	megajordan.org
MJ-5555	JADIS: 2206005		385.00	ASI29-19	Zone of Uncertainty	megajordan.org
MJ-5605	Muharakat North		408.00	ASI29-94	Refugia	megajordan.org
MJ-5606	Muharakat South		412.00	ASI29-104	Refugia	megajordan.org
MJ-5623	JADIS: 2208018		419.00	ASI30-40	Zone of Uncertainty	megajordan.org
MJ-5630	Umm el-Habaj		427.00	ASI30-137	Refugia	megajordan.org
MJ-5631	Hmaymat		431.00	ASI30-145	Refugia	megajordan.org
MJ-5632	Khari'		436.00	ASI31-27	Refugia	megajordan.org
MJ-5651	Umm el-Qleib		440.00	ASI31-58	Refugia	megajordan.org
MJ-5664	JADIS: 2209042		447.00	ASI31-85	Poor for Agriculture	megajordan.org
MJ-5668	JADIS: 2209048		450.00	ASI31-92	Poor for Agriculture	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-5709	Qurn el-Kibsch		35.76	31.78	Refugia	megajordan.org
MJ-5730	JADIS: 2213092		469.00	ASI31-129	Zone of Uncertainty	megajordan.org
MJ-5731	JADIS: 2213093		472.00	ASI31-132	Refugia	megajordan.org
MJ-5743	JADIS: 2214017		477.00	ASI31-141	Refugia	megajordan.org
MJ-5773	JADIS: 2214077		495.00	ASI32-7	Refugia	megajordan.org
MJ-5790	Khabyeh		501.00	ASI32-40	Refugia	megajordan.org
MJ-5792	Juret el-Khazneh		503.00	ASI32-47	Zone of Uncertainty	megajordan.org
MJ-5848	Mehna		524.00	ASI32-132	Refugia	megajordan.org
MJ-5880	Harqala		35.82	32.40	Refugia	megajordan.org
MJ-5906	Hassan		538.00	ASI33-3	Refugia	megajordan.org
MJ-5966	Dabulya		547.00	ASI36/1-7	Refugia	megajordan.org
MJ-6139	Tla'el-'Ali		582.00	ASI36/1-104	Refugia	megajordan.org
MJ-6569	Amman/Sport City		680.00	ASI40-51	Refugia	megajordan.org
MJ-6578	Asaret Merj es-Sana'		681.00	ASI40-59	Refugia	megajordan.org
MJ-6581	Teleil		682.00	ASI40-60	Refugia	megajordan.org
MJ-6584	Mumani		683.00	ASI40-73	Refugia	megajordan.org
MJ-6605	Safsafa		696.00	ASI40-114	Refugia	megajordan.org
MJ-6624	Meshobesh		708.00	ASI40/1-23	Refugia	megajordan.org
MJ-6663	Faqqas		722.00	ASI41-9	Zone of Uncertainty	megajordan.org
MJ-6731	Zeiraqun		735.00	ASI41-53	Refugia	megajordan.org
MJ-6735	Qanaza'		737.00	ASI41-64	Refugia	megajordan.org
MJ-6753	Adasiye		745.00	ASI44-5	Refugia	megajordan.org
MJ-6973	Jabal el-Taj		847.00	ASI49-101	Zone of Uncertainty	megajordan.org
MJ-6977	Reseifeh		36.02	32.02	Zone of Uncertainty	megajordan.org

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MJ-7070	Gharisa		866.00	ASI49-198	Zone of Uncertainty	megajordan.org
MJ-7161	Wad'ah		36.05	32.15	Zone of Uncertainty	megajordan.org
MJ-7163	Arqub Ibn Haddad		869.00	ASI49-222	Zone of Uncertainty	megajordan.org
MJ-7165	Maqam en-Nabi Hadad		870.00	ASI49-226	Zone of Uncertainty	megajordan.org
MJ-7168	Hawaya		871.00	ASI49-227	Zone of Uncertainty	megajordan.org
MJ-7169	Momghareh		872.00	ASI49-229	Zone of Uncertainty	megajordan.org
MJ-7170	Sakhara		873.00	ASI49-274	Zone of Uncertainty	megajordan.org
MJ-7171	an-Nimra		874.00	ASI49-299	Zone of Uncertainty	megajordan.org
MJ-7239	Mu'amariyeh		892.00	ASI53-100	Zone of Uncertainty	megajordan.org
MJ-7403	Beitrawi		979.00	ASI66-59	Zone of Uncertainty	megajordan.org
MJ-7411	Khirbet al-Batrawy		36.07	32.09	Zone of Uncertainty	megajordan.org
MJ-7465	JADIS: 2517050		983.00	ASI66-69	Zone of Uncertainty	megajordan.org
MJ-8564	JADIS: 1800024		1112.00	ASI77-147	Poor for Agriculture	megajordan.org
MJ-8717	Hamra		1137.00	ASI80-80	Poor for Agriculture	megajordan.org
MJ-8718	JADIS: 1900013		1140.00	ASI80-105	Poor for Agriculture	megajordan.org
MJ-8748	Khanazir		1152.00	ASI82-83	Poor for Agriculture	megajordan.org
MJ-8750	JADIS: 1903003		1156.00	ASI82-181	Poor for Agriculture	megajordan.org
MJ-8752	JADIS: 1903007		1157.00	ASI82-248	Poor for Agriculture	megajordan.org
MJ-8753	JADIS: 1903008		1160.00	ASI82-349	Poor for Agriculture	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-8758	JADIS: 1903022		1164.00	ASI82-409	Poor for Agriculture	megajordan.org
MJ-8761	JADIS: 1903029		1167.00	ASI82-468	Poor for Agriculture	megajordan.org
MJ-8767	JADIS: 1903043		1174.00	ASI82-634	Poor for Agriculture	megajordan.org
MJ-8769	JADIS: 1903045		1176.00	ASI82-660	Poor for Agriculture	megajordan.org
MJ-8779	JADIS: 1903065		1181.00	ASI82-694	Poor for Agriculture	megajordan.org
MJ-8781	JADIS: 1903070		1184.00	ASI82-700	Poor for Agriculture	megajordan.org
MJ-8791	JADIS: 1903087		1187.00	ASI82-712	Poor for Agriculture	megajordan.org
MJ-9096	Mhith		1216.00	ASI83/2-17	Zone of Uncertainty	megajordan.org
MJ-9124	Zeituneh		1218.00	ASI83/2-21	Refugia	megajordan.org
MJ-9129	Ausara		1220.00	ASI83/2-23	Refugia	megajordan.org
MJ-9239	Jaret Hussein		1233.00	ASI83/2-93	Refugia	megajordan.org
MJ-9350	Dhra'		1251.00	ASI83/12-34	Poor for Agriculture	megajordan.org
MJ-9487	Umm Hamad el-Sharqi		1281.00	ASI85-65	Zone of Uncertainty	megajordan.org
MJ-9489	Tiwal esh Sharqi		1291.00	ASI88-42	Zone of Uncertainty	megajordan.org
MJ-9505	Qtaret abd el-Halim en-Nimir		1295.00	ASI88-51	Zone of Uncertainty	megajordan.org
MJ-9508	Rabi'		1296.00	ASI88-55	Zone of Uncertainty	megajordan.org
MJ-9512	Tell Ammata		35.62	32.24	Zone of Uncertainty	megajordan.org
MJ-9513	Handaquq		35.60	32.30	Zone of Uncertainty	megajordan.org
MJ-9524	Handaquq		1303.00	ASI88-137	Zone of Uncertainty	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-9535	Beweib		35.59	32.24	Zone of Uncertainty	megajordan.org
MJ-9536	Kharabeh		1307.00	ASI88-162	Zone of Uncertainty	megajordan.org
MJ-9537	Saidiyeh (Village)		1309.00	ASI91-31	Zone of Uncertainty	megajordan.org
MJ-9543	Tell Abu Habil (north)		35.58	32.37	Zone of Uncertainty	megajordan.org
MJ-9550	Ras Hamid		1315.00	ASI91-59	Refugia	megajordan.org
MJ-9561	Kharaz		1321.00	ASI91-110	Refugia	megajordan.org
MJ-9568	JADIS: 2019055		1324.00	ASI91-127	Refugia	megajordan.org
MJ-9575	Dhahret Umm el-Marar		35.60	32.35	Zone of Uncertainty	megajordan.org
MJ-9580	Abu en-Ni'aj (tombs)		1326.00	ASI91-132	Zone of Uncertainty	megajordan.org
MJ-9583	Tell Abu el Kharaz		35.59	32.40	Refugia	megajordan.org
MJ-9591	Abu es-Salih		1340.00	ASI91-149	Refugia	megajordan.org
MJ-9592	Hayyat		35.58	32.42	Zone of Uncertainty	megajordan.org
MJ-9593	Abu en-Ni'aj (north)		1343.00	ASI91-152	Zone of Uncertainty	megajordan.org
MJ-9595	Ma'ajajeh		1344.00	ASI91-153	Zone of Uncertainty	megajordan.org
MJ-9610	JADIS: 2020044		1350.00	ASI91-174	Refugia	megajordan.org
MJ-9612	JADIS: 2020049		1351.00	ASI91-176	Refugia	megajordan.org
MJ-9621	JADIS: 2020063		1356.00	ASI91-198	Refugia	megajordan.org
MJ-9624	JADIS: 2020066		1357.00	ASI91-199	Refugia	megajordan.org
MJ-9644	JADIS: 2020107		1358.00	ASI98-22	Refugia	megajordan.org
MJ-9691	Saghir		1369.00	ASI98-99	Zone of Uncertainty	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-9875	Mashmil		1388.00	ASI98-280	Refugia	megajordan.org
MJ-10079	Jweir		1428.00	ASI102-354	Refugia	megajordan.org
MJ-10097	JADIS: 2104132		1439.00	ASI102-574	Poor for Agriculture	megajordan.org
MJ-10106	Fqeiqes		1446.00	ASI102-594	Refugia	megajordan.org
MJ-10120	Middin		1461.00	ASI104-17	Refugia	megajordan.org
MJ-10153	Qaryatein		1489.00	ASI109-46	Refugia	megajordan.org
MJ-10154	Thaniyyah		1493.00	ASI109-180	Refugia	megajordan.org
MJ-10163	Ainun		35.68	31.15	Refugia	megajordan.org
MJ-10180	Kharziyyah		1512.00	ASI109-392	Refugia	megajordan.org
MJ-10212	Amra`		1522.00	ASI109-436	Refugia	megajordan.org
MJ-10224	Dafyan		1534.00	ASI109-484	Zone of Uncertainty	megajordan.org
MJ-10252	Murayghat		1548.00	ASI109-536	Refugia	megajordan.org
MJ-10269	Iktanu		1552.00	ASI109-550	Poor for Agriculture	megajordan.org
MJ-10286	Abu Qerf		1560.00	ASI109-562	Poor for Agriculture	megajordan.org
MJ-10358	Salt		1569.00	ASI109-579	Refugia	megajordan.org
MJ-10361	Umm Yanbuta		1572.00	ASI109-589	Refugia	megajordan.org
MJ-10362	Nebi Yusha'		1573.00	ASI109-592	Refugia	megajordan.org
MJ-10379	Umm Tell		1585.00	ASI109-663	Refugia	megajordan.org
MJ-10386	Handaquq South		1589.00	ASI109-667	Zone of Uncertainty	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-10396	Hosh		1597.00	ASI109-686	Refugia	megajordan.org
MJ-10404	Mrabba		1602.00	ASI109-701	Refugia	megajordan.org
MJ-10406	Beida		1603.00	ASI109-703	Refugia	megajordan.org
MJ-10421	Zafit		1606.00	ASI109-707	Refugia	megajordan.org
MJ-10479	Umm el-Ghozlan		1620.00	ASI109-750	Refugia	megajordan.org
MJ-10516	Raheb		1624.00	ASI109-760	Refugia	megajordan.org
MJ-10530	Mdawwara		1625.00	ASI109-762	Refugia	megajordan.org
MJ-10581	Sibya		1638.00	ASI109/5-4	Refugia	megajordan.org
MJ-10594	JADIS: 2121109		1645.00	ASI109/7-7	Refugia	megajordan.org
MJ-10615	Bond		1656.00	ASI112-10	Refugia	megajordan.org
MJ-10634	Sabb		1661.00	ASI112-30	Refugia	megajordan.org
MJ-10962	Aineh		1704.00	ASI121-29	Zone of Uncertainty	megajordan.org
MJ-10983	JADIS: 2205030		1714.00	ASI121-51	Refugia	megajordan.org
MJ-10994	Adir		1725.00	ASI125-27	Refugia	megajordan.org
MJ-11046	Hmeimat (SW)		1742.00	ASI125-71	Refugia	megajordan.org
MJ-11052	Mensahalt		1748.00	ASI125-80	Refugia	megajordan.org
MJ-11055	Misna		35.76	31.28	Refugia	megajordan.org
MJ-11076	Balu' (north)		1751.00	ASI125-88	Refugia	megajordan.org
MJ-11079	JADIS: 2208011		1755.00	ASI125-101	Zone of Uncertainty	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-11112	Ara'ir		1767.00	ASI125-159	Zone of Uncertainty	megajordan.org
MJ-11116	Misar		1770.00	ASI125-174	Refugia	megajordan.org
MJ-11135	JADIS: 2209041		1789.00	ASI125-231	Zone of Uncertainty	megajordan.org
MJ-11150	Iskander		1794.00	ASI125-240	Zone of Uncertainty	megajordan.org
MJ-11150	Iskander		1795.00	ASI125-242	Zone of Uncertainty	megajordan.org
MJ-11150	Iskander		1796.00	ASI125-245	Zone of Uncertainty	megajordan.org
MJ-11150	Iskander		1798.00	ASI129-8	Zone of Uncertainty	megajordan.org
MJ-11150	Iskander		1799.00	ASI129-13	Zone of Uncertainty	megajordan.org
MJ-11150	Iskander		1800.00	ASI129-16	Zone of Uncertainty	megajordan.org
MJ-11151	Dhiban		1802.00	ASI129-18	Zone of Uncertainty	megajordan.org
MJ-11155	Abu Khirqeh		1803.00	ASI129-19	Zone of Uncertainty	megajordan.org
MJ-11193	Teim		1811.00	ASI129-33	Refugia	megajordan.org
MJ-11236	JADIS: 2213095		1824.00	ASI129-86	Refugia	megajordan.org
MJ-11253	Iraq el-Amir		1833.00	ASI129-142	Zone of Uncertainty	megajordan.org
MJ-11276	Bassah		1846.00	ASI129-182	Refugia	megajordan.org
MJ-11307	Amman		1854.00	ASI129-211	Refugia	megajordan.org
MJ-11311	Khandaq		1855.00	ASI129-214	Refugia	megajordan.org
MJ-11321	Qesir		1860.00	ASI129-226	Refugia	megajordan.org
MJ-11328	Sa'igh		1871.00	ASI129-253	Refugia	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-11332	Abu Tineh		1872.00	ASI129-255	Refugia	megajordan.org
MJ-11334	Oreimeh		1874.00	ASI129-258	Refugia	megajordan.org
MJ-11335	Oreimeh		1875.00	ASI129-260	Zone of Uncertainty	megajordan.org
MJ-11364	Hawd Abu Billana		1895.00	ASI129-306	Refugia	megajordan.org
MJ-11585	Jamulta		1944.00	ASI139-2	Refugia	megajordan.org
MJ-11593	Hilyah		1953.00	ASI139-150	Refugia	megajordan.org
MJ-12225	JADIS: 2306040		2024.00	ASI147-115	Refugia	megajordan.org
MJ-12323	Medeineh (north)		35.86	31.32	Zone of Uncertainty	megajordan.org
MJ-12325	JADIS: 2308064		2094.00	ASI159-16	Zone of Uncertainty	megajordan.org
MJ-12393	Umm el-'Amad		2108.00	ASI159-54	Zone of Uncertainty	megajordan.org
MJ-12522	Jabal el-Jofeh		2126.00	ASI160-33	Refugia	megajordan.org
MJ-12546	JADIS: 2317022		2133.00	ASI160-55	Zone of Uncertainty	megajordan.org
MJ-12549	Janu'beh		2141.00	ASI160-91	Zone of Uncertainty	megajordan.org
MJ-12550	Benat		2144.00	ASI160-106	Zone of Uncertainty	megajordan.org
MJ-12556	JADIS: 2318007		2150.00	ASI160-137	Refugia	megajordan.org
MJ-12601	Buhera		2169.00	ASI163-7	Refugia	megajordan.org
MJ-12620	JADIS: 2320013		2176.00	ASI163-20	Refugia	megajordan.org
MJ-12843	Schnellar Camp		2274.00	ASI164-135	Zone of Uncertainty	megajordan.org
MJ-12844	Reseifeh		2275.00	ASI164-136	Zone of Uncertainty	megajordan.org

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MJ-12959	JADIS: 2417012		2279.00	ASI164-140	Zone of Uncertainty	megajordan.org
MJ-12960	Jabal el-`Asi		2281.00	ASI164-150	Zone of Uncertainty	megajordan.org
MJ-13010	JADIS: 2418025		2287.00	ASI164-211	Zone of Uncertainty	megajordan.org
MHC-7	er-Rahweh		35.37	32.39	Refugia	Zertal 2008
MHC-11	Khallet Taleb		35.37	32.38	Refugia	Zertal 2008
MHC-17	Khirbet Hamdun		35.37	32.37	Refugia	Zertal 2008
MHC-21	en-Nkhelat		35.32	32.36	Refugia	Zertal 2008
MHC-25	el-Beyaz (A)		35.42	32.41	Refugia	Zertal 2008
MHC-37	Mrah Rai-yan		35.38	32.38	Refugia	Zertal 2008
MHC-56	Khallet Abu Slah		35.40	32.31	Refugia	Zertal 2008
MHC-62	Khallet el-Kebarah		35.45	32.38	Refugia	Zertal 2008
MHC-64	Kardaleh (Upper)		35.49	32.38	Refugia	Zertal 2008
MHC-66	Wadi el-Hammeh		35.49	32.37	Refugia	Zertal 2008
MHC-75	Jebel Khimyar		35.50	32.35	Refugia	Zertal 2008
MHC-77	Iraq el-Mardom		35.46	32.34	Refugia	Zertal 2008
MHC-78	Khirbet Mhallal		35.46	32.35	Refugia	Zertal 2008
MHC-90	Khirbet el-Meiyiteh		35.47	32.33	Refugia	Zertal 2008
MHC-91	el-Bird	Ras Hamud	35.47	32.32	Refugia	Zertal 2008
MHC-106	Khirbet Yarzah (A)	Khirbet Yerzeh	35.44	32.31	Refugia	Zertal 2008
MHC-117	Khirbet Yusef	Khirbet Umm el-Hosr	35.47	32.28	Refugia	Zertal 2008
MHC-119	en-Naqqar (A)		35.41	32.29	Refugia	Zertal 2008
MHC-120	en-Naqqar (B)		35.41	32.29	Refugia	Zertal 2008
MHC-123	el-Khanuq		35.41	32.28	Refugia	Zertal 2008
MHC-124	Abu Rihan		35.41	32.28	Refugia	Zertal 2008
MHC-125	Bir ej-Jwar		35.41	32.28	Refugia	Zertal 2008
MHC-128	es-Samrah Enclosure		35.49	32.28	Refugia	Zertal 2008
MHC-129	Khirbet es-Samrah	Khirbet es-Somera	35.50	32.29	Refugia	Zertal 2008
MHC-146	el-'Ajjam		35.33	32.28	Refugia	Zertal 2008
MHC-147	Qabr 'Abush		35.40	32.26	Refugia	Zertal 2008
MHC-148	el-Khellaiyel	"The Kurgan"	35.41	32.26	Refugia	Zertal 2008

Survey ID	Modern Name	Ancient Name	Easting	Northing	Environment	Reference
MHC-151	Tel el-Farah	Tell el Farah	35.34	32.29	Refugia	Zertal 2008
MHC-155	Khirbet esh-Sheikh Smett		35.35	32.27	Refugia	Zertal 2008
MHC-175	Wadi el-'Aris		35.42	32.24	Refugia	Zertal 2008
MHC-180	Tel Shibli		35.42	32.23	Refugia	Zertal 2008
MHC-190	Tel Abu Rumh	Tell es-Safra	35.45	32.21	Refugia	Zertal 2008
MHC-191	Mrah el-'Enab	El Buseliyeh	35.45	32.20	Refugia	Zertal 2008
MHC-213	Khirbet ej-Jofeh		35.48	32.19	Refugia	Zertal 2008
MHC-234	Re'us et-Tabaq		35.50	32.31	Refugia	Zertal 2008
MHC-235	EP 118		35.50	32.30	Refugia	Zertal 2008
MHC-238	Ra'us el-Kuw'ah		35.50	32.29	Refugia	Zertal 2008

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