Article

Urbanscape, Land Use Change and Centralization in the Region of Uruk, Southern Mesopotamia from the 2nd to 1st Millennium BCE

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Abstract: We produce results that bridge the gap between physical and textual study of the ancient Mesopotamian landscape in the region south and west of the city of Uruk (Biblical Erech, Modern Warka). A brief survey of gazetteers of Mesopotamia, volumes listing place-names drawn from translated and published cuneiform texts from the 2nd and 1st Millennium BCE, are presented. The various gazetteers were reviewed for relevant place-names, and the results were recorded and analyzed. These are described in detail below, as are their implications. The resulting data are then compared to the results of a recently-completed archaeological survey of the same region. The synthesis of textual and archaeological surveys indicates a more exacting methodology to add geographic objectivity to textual results, while connecting physical results to the qualitative detail available within the Uruk textual record. More broadly, we demonstrate how long-term historical records align with archaeological data, delineating state-level and local land use efforts around a major Mesopotamian city. In the 2nd millennium BCE, settlements were generally small but more numerous, but in the 1st Millennium BCE there was a shift towards fewer and larger settlements connected to the city of Uruk. These shifts reflect deliberate central, government policy and local responses.

Keywords: Mesopotamia; watercourses; texts; archaeology; Uruk; settlement; survey

1. Introduction

The Mesopotamian city of Uruk, a primary urban center of the southern Tigris-Euphrates river delta and home of the legendary King Gilgamesh, was a central player in Mesopotamian political economy for thousands of years. The city's rich history stretched from its roots as a possible birthplace of cuneiform writing in the 4th Millennium BCE, to its twilight in the Hellenistic and Parthian Periods in the first centuries CE. Due to the central role of the city throughout Mesopotamian history, Uruk has been the subject of extensive study, both the physical remains of the city, and the extensive written records concerning politics, economics, and religion. Excavations of the city have been conducted for decades, led by the Deutsches Archäologisches Institut (DAI).[1]

A landmark survey of the larger region was performed by Adams [1; 2], and remains a leading resource for contemporary landscape geography in Southeastern Mesopotamia. The same region has seen the discovery of a number of recoverable archives, from temples, administrative buildings, and private individuals, allowing the textual study of the area to run the gamut of economic and cultural subjects, throughout the recorded history of the city. A considerable amount of research into the economy of the city and its surroundings deals deeply with the geography of the city [3, 99-109, 418-436; 4], as real estate and transportation deal practically with the physical intersection of roads, orchards, and canals. Within and around Uruk, canals specifically were an essential part of urban planning, both for the irrigation of orchards and agricultural fields, and for transportation. They also naturally divided the city into districts, starting in the Old Babylonian period, as is partly corroborated by the geophysical survey done in recent years [5; see Fig. 3]. Literary descriptions of Uruk repeatedly refer to its central district of Kulab as being crisscrossed with canals [6, 456].

Both of these fields of study—archaeology[2] and textual analysis[3]—have deep, and in many cases, century-long histories when dealing with Southern Mesopotamia. Both fields have their drawbacks in terms of fully understanding the historical perspective on the region. Putting aside the focus on Uruk at the expense of some surrounding regions, archaeology is often limited to surveying sites and dating ceramic remains. These findings can reveal the probable location of settlements, the frequency and possible size of these settlements, and certain details about the lifestyle of the inhabitants: were these farmers or semi-nomadic herders? Was their agriculture irrigated artificially or naturally? What it cannot reveal, however, is how these settlements fit into the economic life of the region. To examine these questions, the textual record of taxes paid, fields rented, and tithes contributed, is an invaluable resource. It can illuminate the landscape with cultural and historical details in ways that physical remains often cannot.

The textual record, nevertheless, has two main drawbacks. One, records vary in depth and coverage through historical periods, especially when specific types of information—such as geography—are sought. When dealing with the Middle Babylonian and (especially) the Neo-Babylonian period, it is possible to build a network of connections between places through the textual record, including one complex enough to begin to inform the physical understanding of the geography of the time.[4] In other periods, the Neo-Assyrian chief among them, but also the Old Babylonian, the textual record is scarce, especially concerning the urbanscape of Uruk. This scant record does not necessarily mean that the city itself was less populated or in decline during the same period, but at the very least does seem to reflect changes in the administrative culture or the

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[1] Reports are published on a regular basis under a number of series—AUWE (Ausgraben in Uruk-Warka Endberichte) chief among them; see [7], or [8].

[2] Excavation in Mesopotamia began in earnest in the 19th century. Excavations of Uruk specifically began in the early 20th century, and have since been primarily conducted by the German Archaeological Institute. Notable surveys of canals are that of Jacobsen [9] and Wilkinson [10].

[3] After the decipherment of cuneiform, textual study has been a central focus of modern Assyriology, whether research focused on history [11; 12; others), economy [13; 14; others] or geography [15; others].

[4] See descriptions of geography in [16] and [15], textual background in [17, 126-260] and [18], and a paper from which our study took inspiration in [19].

relationship between hinterland and metropole within the greater urbanscape. In this paper, we aim to organize and analyze the textual record of the urbanscape, in order to better understand the varying patterns of land use through various periods in Mesopotamian history. A new archaeological survey of the same area will be consulted, in comparison with the textual results. We hope to deepen understanding of larger land-use patterns in Mesopotamia, and provide a framework for larger, more in-depth research that combines these two sources of archaeological data.

2. Materials and Methods

2.1 Textual description & sources

We conducted a survey of the Akkadian textual record of South-Western Mesopotamia, specifically the region immediately around Uruk, and to the South-West of that city (see Fig. 1). This survey was done be reviewing gazetteers focused on the region during four specific periods (see Table 1): The Old-Babylonian [20], the Middle Babylonian [21], the Neo-Assyrian [22], and the Neo-Babylonian/Achaemenid [23; 24]. These periods were chosen for their relative lack of in-depth textual research of the type we proposed, combined with an extant and accessible textual record. Special attention was paid to 2nd Millennium sources, as what research there is often focused on the textually rich 1st Millennium. As a proxy for the presence of geographic features in the textual record, three types of place-names were singled out. Specifically, names referring to rivers or canals (most often beginning with Nār- or preceded by the determinative ÍD), and those place-names beginning with Kār-, referring to a quay, or possibly the region around one, and Dūr-, referring to a fortified settlement. The names meeting these criteria in each period were collected as one dataset, sorted by type and persistence. This allowed easy tracking of persistent place-names, while following changes in the totals by period. The results of this survey, broken down by period and place-name type, are displayed below in Figure 3.

	Start	End
Old Babylonian	1880	1595
Middle Babylonian	1594	1100
Neo-Assyrian	1000[5]	626
Neo-Babylonian	626	539
Achaemenid	539	330

Table 1: Periods of Mesopotamian[6] history [11; 25]; all dates are BCE

The results of the survey were also used to create a short series of brief "Site Biographies," short descriptions of a place or place-type's history and interaction within the textual record. These were assembled for a select number of prominent canals, and the two forms of settlement in question.

2.2 Archaeological Survey

In parallel, a new archaeological survey of the area in question, to the south and west of Uruk, was recently completed. This survey, performed by a team from Iraq's Al-Qadisiyah University [26] revealed a number of previously undiscovered sites in the floodplain of an ancient watercourse, using a combination of remote sensing—close analysis of satellite, aerial, or drone imagery—and traditional surface survey techniques. These results, too, are analyzed for those sites persisting over multiple periods, in order to derive any features common to these enduring sites—size and location in relation to the watercourse chief among them (see Fig. 4 & 5). As in the textual survey, this analysis was more of an attempt at a proof of concept, rather than an in-depth analysis of a specific area's archaeology or textual history. The results of this survey, and the supporting

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[5] This date refers to the historical period in general; Uruk is mentioned in Neo-Assyrian chronicles only from the mid-8th century BCE.

[6] Dates, especially in the 2nd Millennium BCE, are based on the Middle Chronology [27].

data, methods, etc. were generously provided by the survey team. They were briefly organized and filtered in Excel; the full datasets are appended to this article.

When both of these surveys had been analyzed, the significant, persistent results were collated. Both surveys had similar results, showing a general shift from small-scale settlements, indicated in the archaeological survey by a preponderance of small sites transitioning to a smaller variety of larger sites, and in the textual survey by fewer but more strongly connected toponyms through time. These results, detailed and expanded below, suggest that a rise in centralized authority, especially in the 1st Millennium BCE, resulted in a shift towards fewer, but larger settlements, and more connected to a regional center, Uruk in the case of the region in question.
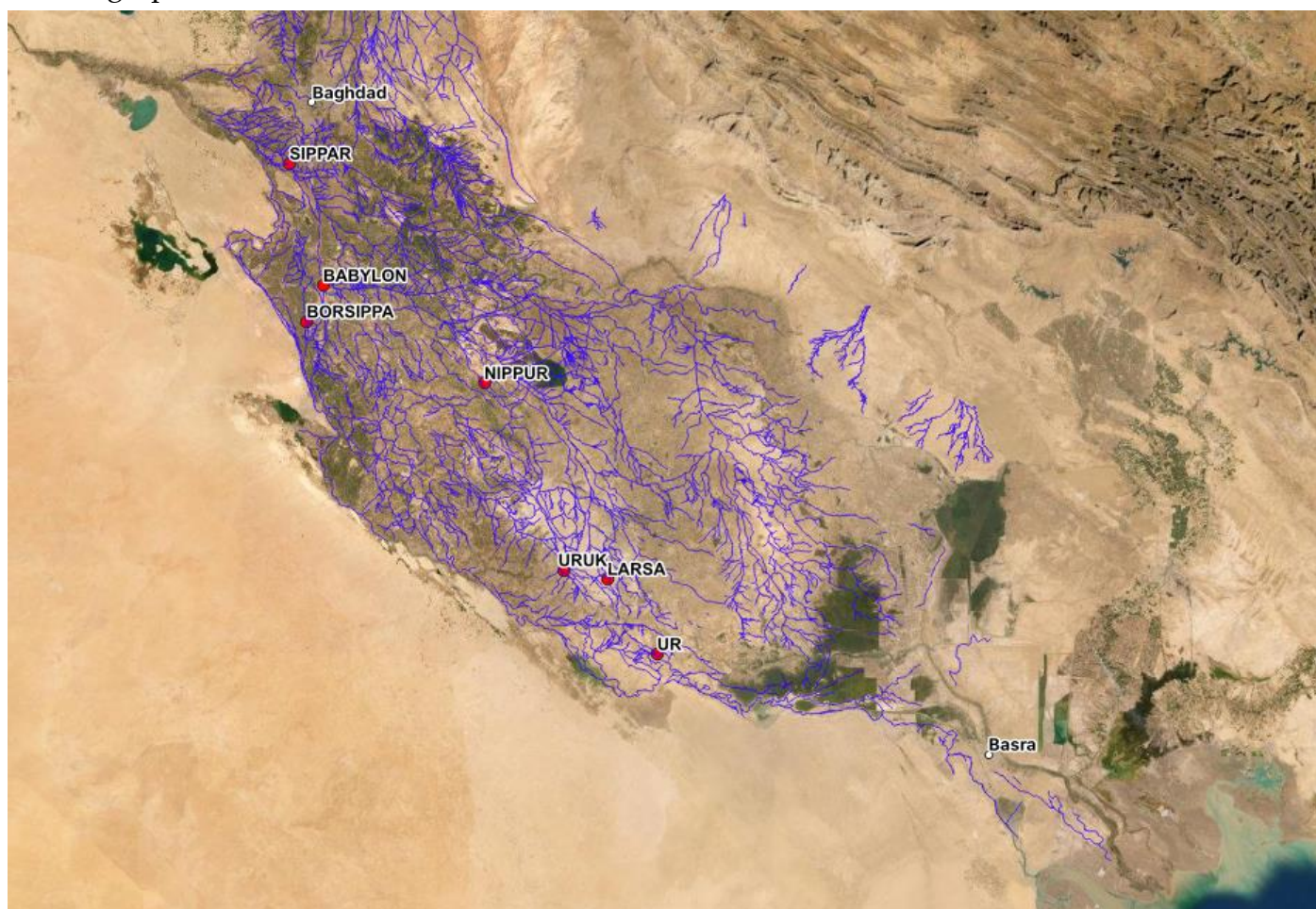
3. Results

3.1 Geographical Context

Figure 1: The Euphrates-Tigris Fluvial Delta. A general map of Ancient Mesopotamia showing purported channels and key sites. Based on data from Esri & Wikidata.
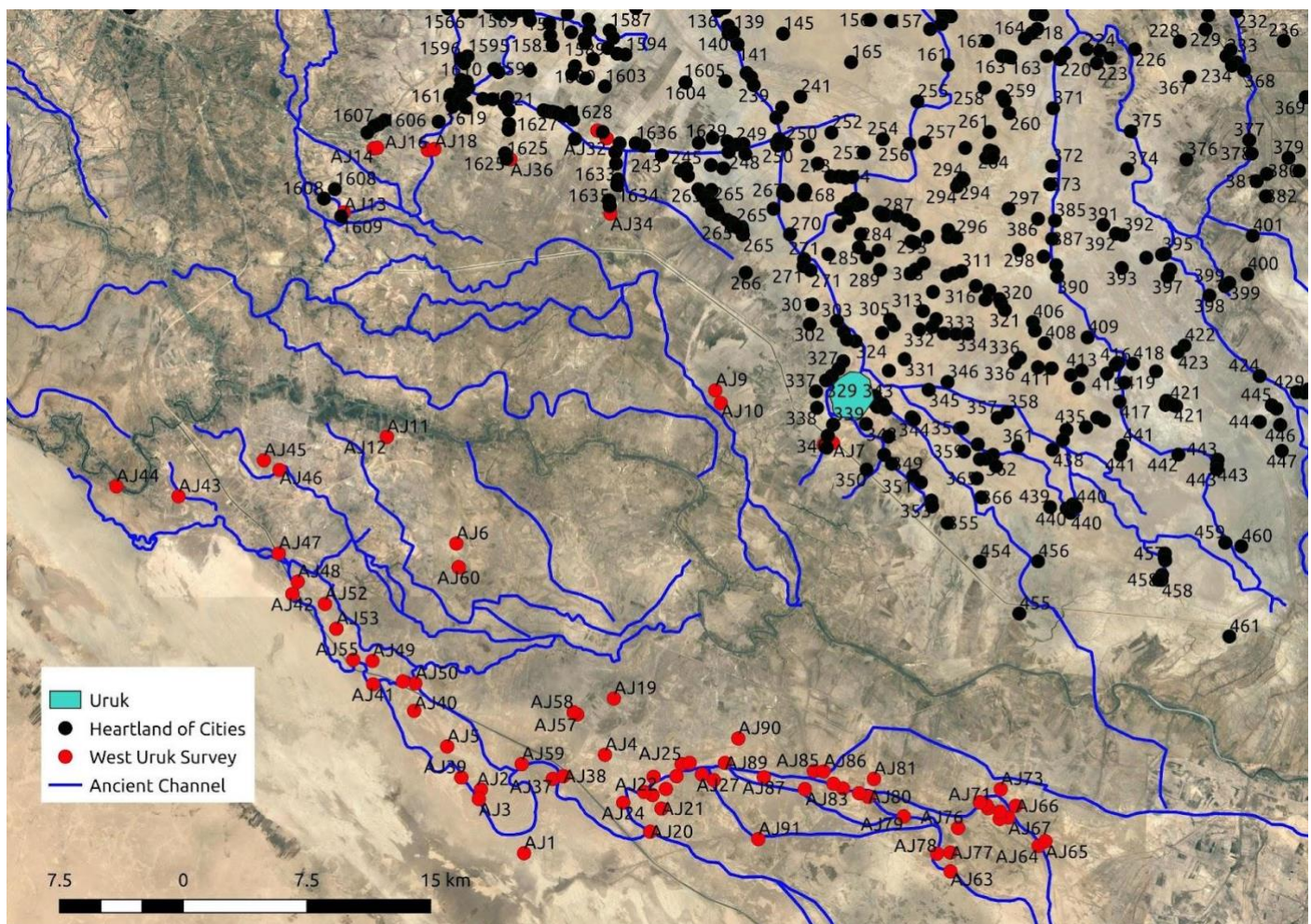
Figure 2: The archaeological surveyed region including the 'Heartland of Cities' sites derived from [1] and [2]; the West Uruk Survey was conducted by al-Qadisiyah University [26].

Following the three feature types specified above through the four periods in question results in a rough but accurate picture of the changes in the economic, administrative, and landscape that are reflected in the textual record. Such places can have trackable features over time: places whose names contain the Kār- prefix are necessarily on the banks of a body of water of some type, most usually a canal sufficiently large enough to allow the passage of a boat requiring docking.[7] Dūr- prefixed place-names are less specific in their placement, but fortification implies a settlement of some importance, as seen in the case of Dūr-Yakīn discussed below. Fortifications, especially those made of mud-bricks that often form mounds, are likely to be visible in a remote sensing or archaeological survey. Finally, canals, or place-names prefixed with the Akkadian term for river, Nār-, are a feature that requires investment in both resources and labor to create and maintain, and are an easily quantifiable sign of investment in intensive agriculture and inter-city communication. Because the vast majority of hydrologic features in Mesopotamia are anthropogenic, this can tentatively be taken as a proxy for the development of the region, the need for built infrastructure beyond the natural rivers, and the ability of the authorities in a given period to marshal the resources needed to construct and maintain large canals and the associated networks of tributaries and distributaries [28; 29].

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[7] See the recent excavation (spring 2022) of the remains of an Urukean boat by the DAI and Iraqi State Antiquities Board: https://www.dainst.org/en/presse/pressemitteilung/-/article-display/L11mBpjClzu5/4845682

In the case of the four periods in question, and the texts that deal with their geography, there are four hydrological features and five fortified settlements that are present in at least two periods, and in many cases three or four (see Fig. 3). The main persistent hydrological features are the Takkīru Canal and the Sumandar or Šumandar Canal. These two canals are mentioned in texts in the Old Babylonian, Middle Babylonian, and then Neo-Babylonian periods, which may bear witness to the decline in large-scale organized settlement in the region in the first centuries of the 1st Millennium BCE, as Takkīru is a more specifically Uruk-focused canal, while the Sumandar, which is also mentioned briefly in the Neo-Assyrian period, is recorded near Borsippa, Babylon, Sippar, and Nippur. In the Old Babylonian period, these two canals, and the contemporaneous course of the Euphrates, are the only watercourses in the data with a connection to the Uruk region. Similarly, no place-names prefixed with Kār- are recorded in this period, and only two place-names prefixed with Dūr-, one of which is persistent to the Middle Babylonian period (Dūr-Sîn-Muballiṭ, discussed below). As will be discussed in depth below, this scant documentation may be evidence of less intense settlement and less centralized authority; it could simply be a by-product of less documentation and fewer extant texts upon which to base the survey.

The Middle Babylonian period is marked by a distinct increase in documented place-names in the specified categories. In addition to the persistent Takkīru and Sumandar canals, two additional canals are first attested during this period that persist until the 1st Millennium, specifically the Nāru-Eššetu ("New Canal"), and the Nār-Šarri ("King's Canal"). These canals are attested alongside five additional non-persistent water features, mostly canals of indeterminate size—that is, it is unclear whether these canals are main, navigable arteries, or smaller channels, intended to irrigate fields and increase the amount of arable land near a given settlement. A similar expansion is seen in the preponderance of the two land-based features. The persistent Kār-Enlil and Kār-Ninurta are first attested during this period, along with six other Kār- prefixed place-names which do not persist beyond the Middle Babylonian period.[8] Dūr-Sîn-Muballiṭ, first attested in the Old Babylonian period, persists to this period. Four more persistent place-names, Dūr-Galzu, Dūr-Kurigalzu, Dūr-Enlil, and Dūr-Nabû, are first attested in this period. Nine additional place-names prefixed with Dūr- are attested in the Middle Babylonian period, and do not persist to later periods.

The Neo-Assyrian period, in the first centuries of the 1st Millennium BCE, is a fallow period in Southeastern Babylon. The early centuries of the 1st Millennium in Mesopotamia are marked by the shift northward of the center of authority with the rise of the Neo-Assyrian Empire, which claimed authority over Southern Mesopotamia, but in practice left the region to its own devices and occasionally invaded. This led to a lack of central investment in southern infrastructure, in contrast to the complexity found in cities of the Assyrian heartland [30]. This shift, and the resulting lack of an effective central authority, can clearly be seen in the textual record. From the nine watercourses documented in the Middle Babylonian period, only the Sumandar canal is attested in the Neo-Assyrian period. Three canals attested in the Middle Babylonian period reappear in the Neo-Babylonian period, but are unmentioned in the Neo-Assyrian sources—this phenomenon is discussed below. There is a distinct rise, however, in mentions of the Euphrates, the natural river that anchors the region. A similar decrease is also seen in the number of Kār- prefixed places, from seven in the Middle Babylonian to three in the Neo-Assyrian. Kār-Enlil persists from the Middle Babylonian period, and two places that persist to the Neo-Babylonian period, Kār-Nabû and Kār-Ninurta, are attested first here. Dūr-prefixed places at first glance defy the pattern of fallow documentation. Dūr-Enlil, Dūr-Kurigalzu, and Dūr-Nabû persist from the Middle Babylonian, while Dūr-Yakīn and Dūr-Ladīnu are first attested in this period, and persist to later periods. In addition to these five, 15 Dūr- prefixed places are attested, but which do not persist to later periods. This stark increase in fortified settlements, alongside a similarly stark decrease in

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[8] Kār-Sukkal, Kār-Sîn, Kār-Ninurta, Kār-Ninsianna, Kār-Ningirsu, and Kār-Nineanna. Determining the specific location of many individual places such as these is challenging, as they are often singularly mentioned in the textual record.

hydrological infrastructure and the places alongside it (Kār-), suggest the disappearance of any centralized authority, which both caused the dereliction of large inter-settlement canals and their associated places, and an increase in the need (or perceived need) for fortifications. This shift in the landscape, and the social and historical changes that probably caused it, are discussed below.

The number of documented places is significantly larger in the Neo-Babylonian period than in previous periods, a difference even more stark when one considers hydrological places specifically. Beyond the persistent Sumandar, the Takkīru, Nāru-Eššetu, and Nār-Šarri reappear in the textual record after not appearing since the Middle-Babylonian period. In addition to these four watercourses, the Neo-Babylonian texts record an additional 50 watercourses in the Uruk area [24]. Dūr-Enlil and Dūr-Galzu persist from the Middle-Babylonian period, as does Dūr-Kurigalzu, which may by this period be co-identified with Dūr-Galzu [23]. Dūr-Yakīn and Dūr-Ladīni persist from the early parts of the millennium, while six additional Dūr-prefixed place-names are present and do not persist to later periods. Kār-Nabû and Kār-Ninurta persist from earlier periods, alongside two period-specific place-names that do not persist.

3.1.1 Hydrological Site Biographies – Takkīru

By the Neo-Babylonian period, the textual record collected by Zadok in RGTC-8 [23] and Ermidoro [31] in her update and expansion of that volume[9] places the Takkīru within a complex and detailed relationship between the city of Uruk and its larger urbanscape. Textual evidence connects it to most of the major canals in the Uruk system—the Ḫarri-kibbi, the "King's Canal" (Nār-Šarri), and the Šaqilattu among them—either directly, through the complex system of locks, or by common contact with specific pieces of real estate. In the Middle Babylonian period, the canal is attested in three texts [32, no. 24 & no. 26; 33, no. 57]. Two of them are *kudurru*s, important texts that record boundaries and grants of land [34, 7, 511-414, 597]. The canal's presence in these texts speaks to its importance in this period. The contemporaneous hydrologic environment surrounding the Takkīru is less complex, but is specifically described as flowing from the "Sippar Canal," or the nearest branch of the Euphrates, roughly 1 km south-west of Uruk, and flowing from there into the city proper [16, 318]. This is in keeping with the Neo-Babylonian understanding of the canal's general course, that is, flowing from the river or a larger canal into the city proper [15, 16]. The canal is also attested once in the Old Babylonian period (*ta-ki-ru-um*), without recorded connections or geographical details [20, 311].

3.1.2 Hydrological Site Biographies - Sumandar

The Sumandar—or Šumandar—Canal, like the Takkīru, exists within a relational network in the Neo-Babylonian period, including locations connected to both the canal, and to a settlement bearing the same name. This settlement is recorded as the location of the "Mouth" [23 275] (most likely a major lock, or Bāb) of a different canal, the Aššuritu, which suggests that the Aššuritu is a distributary of the Sumandar, at least in the Neo-Babylonian period. This recorded junction also provides a possible anchor for remote sensing, as a more substantial built feature is required to join two canals, a feature which is more likely to survive and be identifiable in remote sensing imagery. Unlike the Takkīru, the Sumandar is recorded in other cities farther north, suggesting it runs roughly parallel to the Euphrates, connecting Borsippa, Babylon and Sippar to sites south. Also, unlike the Takkīru, the Sumandar is attested in the Neo-Assyrian period, specifically in two texts [36, Summary Inscriptions 6 & Annals 9] along a similar inter-city course to that discussed above. The detailed relational network in and around Uruk does not seem to be in evidence before the Neo-Babylonian period. In the Middle Babylonian period, four texts attest to the "Sumundar" Canal, both near Uruk [37, 88], and near Borsippa [32, 13].[10] Recently, Gabbay and Abraham [38, 190-191] have suggested that in this period, the canal was oriented more towards the Tigris, and may have in fact brought water to the region from that river. Their work specifically focuses on Nippur, describing a major canal originating on the Tigris, but possibly joining or paralleling the Euphrates south of Nippur. Finally, four Old Babylonian texts attest to the

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[9] These data have been collected and digitized by the MAPA project [24].

[10] In addition to King the tablet E.S.9567 is cited, the storage details of which are recorded in [21, XIV].

"Šumundar" or "Šumudar" Canal, without a larger geographic context, but dated to Hammurabi 8 [39, 59] and Apil-Sin 4 [40, 60], while two more are undated. In short, the Sumandar canal is persistent throughout the periods in question, but seems to have been less tied into a complex network in and around Uruk, and more a regional fixture, bringing water across Mesopotamia and connecting Nippur to the southern cities of Uruk and Larsa, if not connecting them as far north as Babylon and even Sippar.

3.1.3 Site Biographies - Fortified Settlements (Dūr- Places)
Five texts attest to Dūr-Sîn-Muballiṭ in the Old Babylonian period, and three attest to it in the Middle Babylonian. It is notable that Dūr-Sîn-Muballiṭ is the closest settlement of this kind in the Old Babylonian period to Uruk or the settlements near it—Ur, Larsa, or Lagash—and in the Middle Babylonian period, is noted as being near Nippur. In its Old Babylonian attestation, it is noted simply as being "(on the) Hammurabi Canal," [20] a canal with one attestation and little geographic reference, although a related name is attested in cities from Nippur south to Ur. It is notable that Nippur, a city closer to Babylon than to Uruk and Ur, and near the northern boundary of Sumer, is the southernmost presence of a persistent settlement of this type. There are settlements farther south attested in the Old Babylonian period, such as BÀD-TIBIRA[11] near Larsa, but its existence does not seem to persist into later periods.

Dūr-Enlil is a place-name with two iterations, one in the Nippur area, and the other in the Sealand (Māt-Tâmti), and numerous attestations of both. It persists to the Neo-Assyrian period, and the Neo-Babylonian period, where it is described at times as being in Bīt-Yakīn, suggesting it may be of Chaldean origin. Dūr-Galzu also first appears in the Middle Babylonian period is. In the Middle Babylonian period, it is attested in one text [41, 171]; in Bīt-Sîn-Māgir, a region abutting the Sealand, and on the Tabbiltu Canal, a watercourse likewise only attested here, and noted simply as being likewise in the Bīt-Sîn-Māgir district. Dūr-Galzu is not attested in the Neo-Assyrian period, and in the Neo-Babylonian period there is a discussion of whether it is connected to Dūr-Kurigalzu, a settlement in Northern Babylon, near modern-day Baghdad, in contrast to Southern Babylonia in previous periods. It is notable that Dūr-Galzu is unattested in the Neo-Assyrian period, as the Neo-Assyrian period is a flowering of sorts of fortified settlements in Southern Mesopotamia, alongside a notable reduction in canal citation and inter-urban interaction.

This increase is noted particularly in Southern Babylonia, regions in which Assyrian rule was less hegemonic, and Aramean and Chaldean tribes rose in prominence in the Neo-Assyrian period, specifically in their opposition to consolidated Assyrian rule in southern Mesopotamia [42; 11]. These settlements tend to be less connected by administrative texts, and more by chronicles or state records of the order in which a given king's armies arrived at their gates. When those settlements with some connection to Uruk or the regions to its West, and which persist to the Neo-Babylonian period are sought out specifically, only two are found to be fitting: Dūr-Yakīn, in Bīt-Yakīn, and Dūr-Ladīnu, farther north in Bīt-Dakūri, and on the Euphrates. Dūr-Yakīn is attested numerous times as the capital of Bīt-Yakīn, the Chaldean tribe which gave its name to its home in the southern reaches of Mesopotamia, in the Sealand. In the Neo-Babylonian period, it is attested six times, and simply described as "In *Bīt-Yakīni*" [23, 122][12]. It is notable that a city described as the "capital" of Bīt-Yakīn has few if any documented connections to other settlements in the region, or any places in neighboring regions, such as Bīt-Dakūri or Bīt-Amūkāni [3, 103-105]. In the Neo-Assyrian period, however, Bīt-Yakīn played a major role in the beginnings of the centralization of Neo-Babylonian authority. Merodach-Baladan, who claimed the Babylonian throne in defiance of Sargon II, was a "son of *Bīt-Yakīn*", and Dūr-Yakīn was his home city. A battle was fought there between Sargon's troops and Merodach-Baladan's troops, reinforced by Elamite officers and bowmen [42, 36]. This became his final stand, and his defeat at Dūr-Yakīn led to his downfall and a tightening of Assyrian authority in the region. There is also documentary evidence that he

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[11] Place-names of this type are often only known by a logographic name, and a translation into Akkadian or phonetic spelling is unknown. These logograms are often associated with Sumerian, but the connection is not direct enough to assume the source of these place-names.

[12] Zadok uses the German spelling *Jakīn* of these place-names.

exploited the canal system to defensive military ends [Ibid, 25 n111], evidence of which is still visible [1, 333-334]. Based on a reading of the Nabonidus Cylinder, Bagg concludes that Dūr-Yakīn can be located at the modern Tel al-Laḥm [22], the location of the defensive cut detailed by Adams. Others have suggested it may be instead identified with Tel Abū-Ṣālabīḫ [Ibid, 190; 43, 251-255]. Between the possible association with a modern, mapped place, Dūr-Yakīn may yet be identifiable in an archaeological or remote sensing survey.

In the Neo-Assyrian period, Dūr-Ladīnu is also attested numerous times. It is described as a fortified city in Bīt-Dakūri, on the right bank of the Euphrates. It was rebuilt and occupied by Merodach Baladan during his rebellion, until the advance of Sargon's troops forced his evacuation south, to Dūr-Yakīn [42, 51; 11, 201]. It was conquered again by Sennaherib in his first campaign, as described by Fuchs [44, 402]. Zadok identifies it with the modern site of Tulūl al-Ḫālidīja, or Tall-Ḫālid, approximately 10 kilometers from the modern course of the Euphrates [23]. As with Dūr-Yakīn, little to no connection to other places in Bīt-Dakūri, or in neighboring regions, not to mention the nearby city of Uruk itself, is attested. In the Neo-Babylonian period, Dūr-Ladīnu is attested once, and connected in RGTC-8 directly to the Neo-Assyrian iterations discussed here [23, 123].

3.1.4 Site Biographies - Quays (Kār- Places)

One location—Kār-Enlil—persists from the Middle Babylonian[13] to the Neo-Assyrian periods, but as with Dūr-Sîn-Muballiṭ, it is located near Nippur, far from the southern Babylonian Uruk hinterlands. Kār-Ninurta, which is attested twice in the Middle-Babylonian period as being near Larsa, is unattested in the Neo-Assyrian period, but attested again—albeit only once—in the Neo-Babylonian period. Zadok cites the Middle-Babylonian place-name [23, 197] in suggesting the Neo-Babylonian possible location, but neither the Middle Babylonian nor the Neo-Babylonian attestations cite any direct or documented connection to a place or canal. In the absence of a canal, both are inferred to be near Larsa, most probably on the bank of the closest branch of the Euphrates.

In the Neo-Assyrian period, an additional location appears that persists to the Neo-Babylonian period. Kār-Nabû is attested three times in the Neo-Assyrian period, and described as being on the coast of the Persian Gulf, which would place it deep inside Bīt-Yakīn. Specifically, Bagg [22] identifies it as one of eight fortified cities in Bīt-Yakīn, suggesting that by the Neo-Assyrian period, Kār- had grown beyond the strict definition of a "quay" or "landing", and had come to include the neighborhood, quarter, or city that included that specific piece of infrastructure [3, 643-644]. Dalley [45] suggests that Kār- may in fact represent older cities, which evolved out of the agglomeration of settlement around these river harbors, in contrast to more recent fortified constructions, described using Dūr-.

In the case of Uruk, at least, we might note a specific urban development which can be designated as the Kār-place-names of the city. A remote sensing analysis of a 1968 CORONA image of Uruk (Jason Ur, Harvard WorldMap), led by Gordin [46], identified built suburbs immediately outside the city wall at three exit points, each of a large canal that leaves the city to its hinterland. Although it is hard to say if these suburbs are indeed the three Kār- place-names mentioned in Neo-Babylonian sources (Kār-Eanna, Kār-Nanāya and Kār-Ninurta), it can be tentatively suggested that the expansion of the name from a "quay" to an entire harbor district outside the walls is not a difficult development to imagine; especially in light of other central harbors as commercial districts in cities like Sippar [3, 643-44, 646-47].

Generating textual relationships including Kār-Nabû is made slightly more difficult by the prominence of the more northern location which shares its name. However, if it was indeed on the coast during the Neo-Assyrian period, it may be visible in remote sensing, which will be discussed below. In the Neo-Babylonian period, the

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[13] Dalley [45] suggests it may date to the end of the Old Babylonian period.

Bīt-Yakīn iteration is attested once, and directly connected by Zadok [22, 196] to the Neo-Assyrian record, while the northern iteration is attested numerous times, and a third iteration, in Suḫu, is attested twice. This underscores the occasional difficulty in assembling a text-based network, while suggesting that the Neo-Assyrian location was, in fact, persistent into the Neo-Babylonian period.

Beyond canals and quays and fortified cities, the Euphrates itself is the obvious anchor feature that exists throughout the periods under discussion [47; 48; 49]. As discussed by Hritz and Steinkeller, the Euphrates and the Tigris in pre-modern periods are better thought of as a network of streams that break off and unite through time and space. The Western-most stream in the region between Sippar and the Persian Gulf, in the 2nd Millennium BCE, was known as the Araḫtum or Araḫtu. Due to the lack of organized, centrally organized development in the Middle Babylonian and Neo-Assyrian periods in the Uruk area, settlements beyond small ad-hoc villages would need to locate on or very near to the Araḫtu, in order to exploit it for irrigation, and its sediments for fertile agriculture.

3.2 The Archaeological Survey
The results of the textual survey are compared to the results of an archaeological survey completed recently in the same region. This survey, a pedestrian survey guided by remote sensing, was completed by a team from Iraq's al-Qadisiyah University [26]. It revealed a number of sites, the vast majority of which were located along a primary channel, presumably the contemporaneous course of the Euphrates. These sites were located and identified using remote sensing techniques, and dated based on archaeological—primarily ceramic—remains. The earliest remains date to the Uruk period (c. 3500-3000 BCE), while the latest date to the early Islamic period (c. 700-1000 CE). The presence of settlements unseen in surveys such as that of Adams and Nissen [2], provides an archaeological complement to the above textual discussion: settlements along the river, suggesting a lack of canals or other major artificial hydrological infrastructure, and seemingly existing within an inter-urban or "metropolitan" network, as opposed to the urbanscape of a central city.

In total, 91 sites were discovered. Between the Old Babylonian, Middle-Babylonian, and Neo-Babylonian period, the Middle Babylonian period has notably more settlements, with 42 sites, as compared to 21 in the Old-Babylonian and 22 in the Neo-Babylonian. No sites were dated to the Neo-Assyrian period, which does mirror the findings of Adams and others of a distinct drop in settlement in this period, which may indicate a shift to nomadism in the wake of the end of the Bronze Age, as well as the lack of clear political and economic authority indicated by the textual survey. A scant nine sites contained Achaemenid[14] remains, which underscores the shift of settlement to the north and the east, towards the city of Uruk and its numerous artificial water channels, after the wave of construction during the Neo-Babylonian period.

4. Discussion

4.1 The Textual Survey

One noticeable aspect of the naming patterns of fortified places, so determined through the presence of the BÀD logogram or the Akkadian lexeme *Dūr-*, is the shift from divine to more profane naming patterns. In the Old-Babylonian and Middle-Babylonian periods, the majority of the named places consist of BÀD (in OB) or Dūr- (in MB+) appended to the name of a god or a king—the Old Babylonian BÀD.LUGAL[15] or BÀD-UTU, and the Middle Babylonian Dūr-Šarri or Dūr-Enlil, for example. By the Neo-Assyrian period, and more prominently in the Neo-Babylonian period, many new places are present in the written record, with the same descriptors appended to the names of individuals or places—Dūru-ša-Yatiru, Dūr-Rukbi, or Dūru-ša-Bīt-

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[14] The survey differentiates between Neo-Babylonian and Achaemenid remains, in opposition to sources such Adams [2, 55; 3, 40].

[15] Which may refer to either a king or a god.

Dakūri, for example. There is not a noticeable rise or fall in the number of distinct names in the textual record, but a shift in the namesakes away from the divine, and towards the human.

The same pattern does not hold, however, for quays, as determined through the patterns around the use of the particle Kār-. In OB and MB, divine names hold sway as they do for place-names beginning with Dūr- (Kār-Ea or Kār-Šamaš being prominent examples). By the Neo-Babylonian period, however, this pattern had not shifted: Kār-Nabû, Kār-Nanâ, and Kār-Ninurta all being prominent examples. A fourth quay, Kār-Eanna, while technically named for a geographic location, refers directly to the main temple in Uruk.

There are two possible reasons for this disparity. One, a cultural shift of some kind, moving from focus on the divine or the construction of these features by or for temples and religious institutions, to a "private," more secular focus as features are named for builders or owners. This would explain the discrepancy between Dūr- and Kār- in parallel to the investment required to construct a quay [50] and its surrounding structures (as an entire city district), while Dūr- refers to a fortification, a structure less likely to require investment from a temple or administrative source. The preponderance of Dūr- places in the Neo-Assyrian period seems to support this theory, as these places became more common precisely when construction by the central authorities was on a down-swing.

Another likely explanation, however, is a wider documentation of the geographical network in more recent periods. That is, the Old and Middle Babylonian periods were periods in which the likelihood of a text (or more specifically, a *discovered* text) referring to a geographical feature was lower, and so more important features—those named for divinities, in other words—were more likely to be mentioned. In later periods, as the extant textual record expands, many places that may have existed in previous periods, or were similar to places that existed, but were not documented, now rated mention in economic or administrative texts. This would have the appearance of a wider network of geographic features, a consequence of relying on the textual record that is discussed in depth below.

The stark contrasts revealed by the textual survey, specifically the sharp rise of Dūr- settlements in the Middle Babylonian period, and even more so into Neo-Assyrian period, and their subsequent relative decline in the Neo-Babylonian and Achaemenid period, and the wide-ranging increase in documented canals and other pieces of hydrological infrastructure, illustrate changes in the region at large. The increase in Dūr- places, usually taken as fortified settlements, is associated closely with political turmoil and instability in the region during that period. Most famously, the rebel Merodach-Baladan II, discussed above, ruled what territory he succeeded in taking from the city of Dūr-Yakīn, and ultimately fled to Dūr-Ladīnu when Dūr-Yakīn was finally overwhelmed by Sargon's forces.

Dūr- prefixed settlements are often assumed to be fortified settlements, and their discussion in Assyrian documents [51, 74] indicates that they are most likely Chaldean settlements, which seems to indicate that this population maintained a measure of self-segregation, not inhabiting the ancient cities in the region (Uruk, Larsa, Ur, etc.), but building and maintaining their own network of fortified settlements. The preponderance of Dūr- named settlements in the Middle Babylonian suggests that this pattern has roots beyond the Neo-Assyrian, in the wake of the reign of Samsu-Iluna [45; 52]. The disappearance of at least the majority of these settlements by the Neo-Babylonian period, then, would indicate a shift in the relationship between Chaldean and Babylonian or Aramean populations. Their integration may have also hastened along by the destruction of a number of these settlements in the Assyrian invasions of the late 8th and early 7th centuries [42; 10]. The forced resettlements in the wake of the Assyrian invasions [51, 68], and reciprocal resettlement of foreigners in Southern Babylonia have clearly changed the ethnic makeup, and settlement patterns, of the region.

The documented changes in the hydrological system, specifically the lack of documented artificial canals in the Uruk region, and the changes in process to the tracks of the Sumandar canal [38] also bear examination.

The lack of documentation is rendered all the more notable given the breadth and complexity of the documented watercourses in the Neo-Babylonian and Achaemenid periods. While irrigation was a constant need, local, small-scale operations can provide water for agriculture. The lack of major canals is in line with the reduced presence of a regional or "national" authority, as was the state of southern Mesopotamia during the end of the Old Babylonian period, and again during the end of the 2nd and the first centuries of the 1st Millennium BCE. As described by Powell [53], digging a major canal would require the organized labor of hundreds if not thousands of men, in a complex and skilled undertaking. Without a centralized authority, organized labor at this scale was out of reach. In the Neo-Assyrian period, southern Babylonia was marked by shifting tribal alliances and military intercession on the part of Elam and Arabian tribes from farther afield [42, 25], clear evidence of political unrest and instability.

Further alignment of this pattern with the historical record is the role the water systems played in political instability and military conflict. As described by Powell [53] and Brinkman [42], Merodach-Baladan II attempted to defend Dūr-Yakīn by means of a newly dug cut which surrounded the city with water, a strategy that was eventually overcome by Sargon [Ibid; 12, 201] (see [1, 333-334] for an analysis of the archaeological remains of this action). We suggest that this use of water and water systems as a weapon of war, seen later in Sennacherib's destruction of Babylon, indicated a lack of concern with destroying what had become a less crucial piece of the landscape, and action that would not drastically change the value of the land to a prospective occupier or ruler. This is further evidenced by the pride with which the Neo-Babylonian kings rebuilt and then expanded the hydrological system of major southern centers, shifting population centers and expanding the agriculture output of the region in the process.
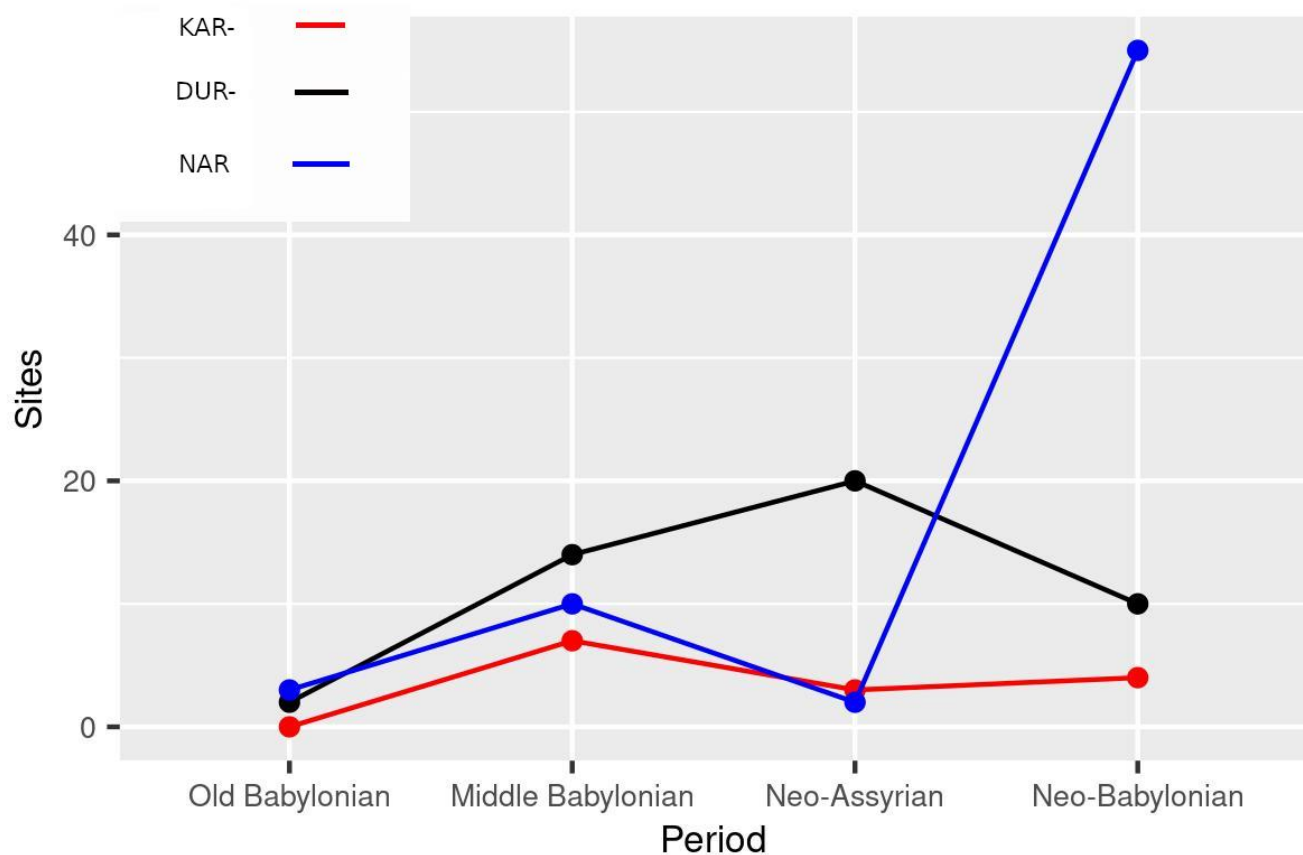

Figure 3: Place-name prevalence by period and type, after data compiled and digitized (Groneberg 1980, Nashef 1982; Bagg 2020, & Zadok 1985).

In short, a textual survey, charting these three types of place-names through four major periods of Mesopotamian history, allows us to follow large historical and social changes side-by-side with patterns in the built environment and land use in the Uruk region. While an increase in documented development is recorded across the board between the Old and Middle Babylonian periods, a stark diversion in the Neo-Assyrian period suggests a cause—or causes—for these patterns. The increase in Dūr- prefixed place-names in the first centuries of the 1st Millennium BCE suggests a connection to the increased influence of the Sealand in Southern Mesopotamia, and illustrates possible self-segregation on their part from the Chaldean and Aramean populations surrounding them. In contrast, the lack of documented canals or other artificial watercourses underscores the lack of centralized authority, and a return to localized agriculture drawing from natural water sources or small-scale, locally organized irrigation infrastructure. These changes, and their reversal with the rise of the Neo-Babylonian empire, are proof in the textual record of the changes wrought in Southern Mesopotamia by the aforementioned rebellions and the Assyrian military response, coupled with state level neglect. The ensuing flowering of hydraulic infrastructure, and the population changes wrought by resettlement efforts under the Neo-Assyrian conquerors, lays the stage for the complex, well-documented Neo-Babylonian period, which despite an abundance of documented geography, has a relative dearth of Kar- and Dūr- place-names.

One aspect of the textual record that must be considered, especially when the sharp increase in documentation in the Neo-Babylonian period is concerned, is the inherently partial nature of the record. All ancient texts originate from a fairly small section of society, and describe a specific, and not necessarily expansive, slice of that society. When this fact is combined with the partial record modern archaeologists have access to, and the role a single text can play in illustrating a given connection, a contraction of the textual record must be understood as possibly a shift in the cultural relationship to writing, or a gap in the archaeological record, and not necessarily a reduction in settled society. In addition, specific, comprehensive archives, concerning the records of a specific political or economic entity and following their various business and interpersonal interests, are known only from the 8th century BCE onwards [54, 8; 42, 113-114], putting the reconstruction of the Old- and Middle-Babylonian periods through textual records at a disadvantage.
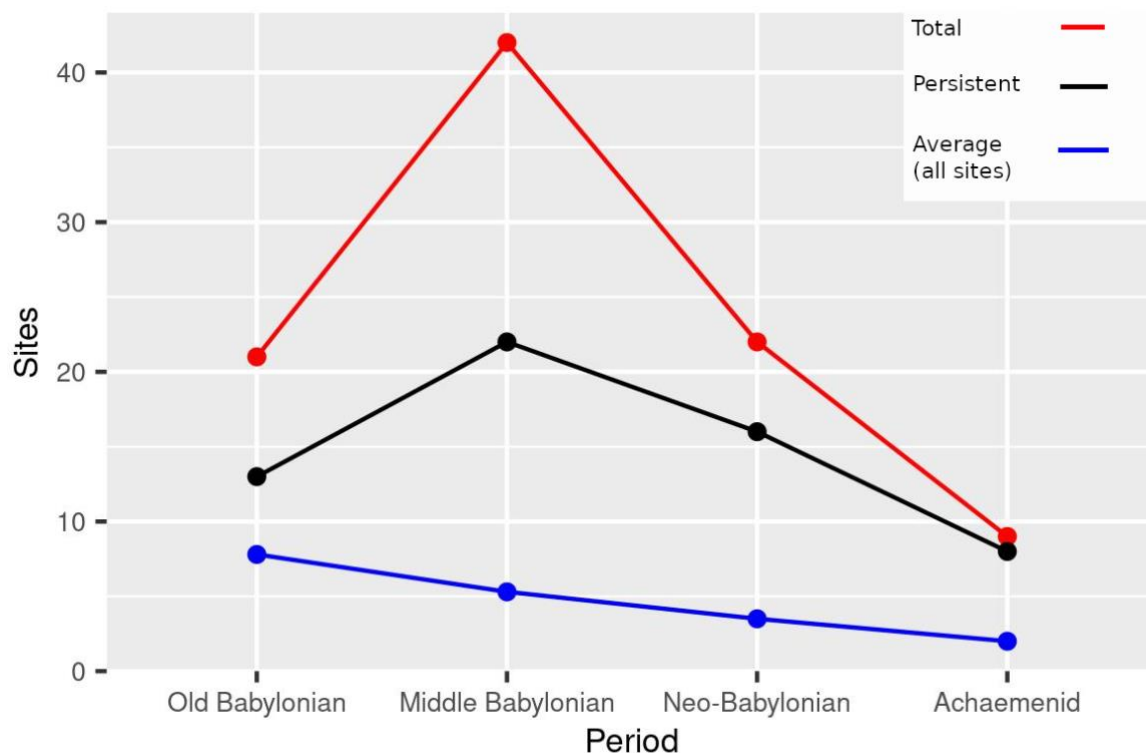

Figure 4: Number of sites surveyed by [26] includes total sites, those sites persisting between more than one site, and the average size in hectares of these sites.
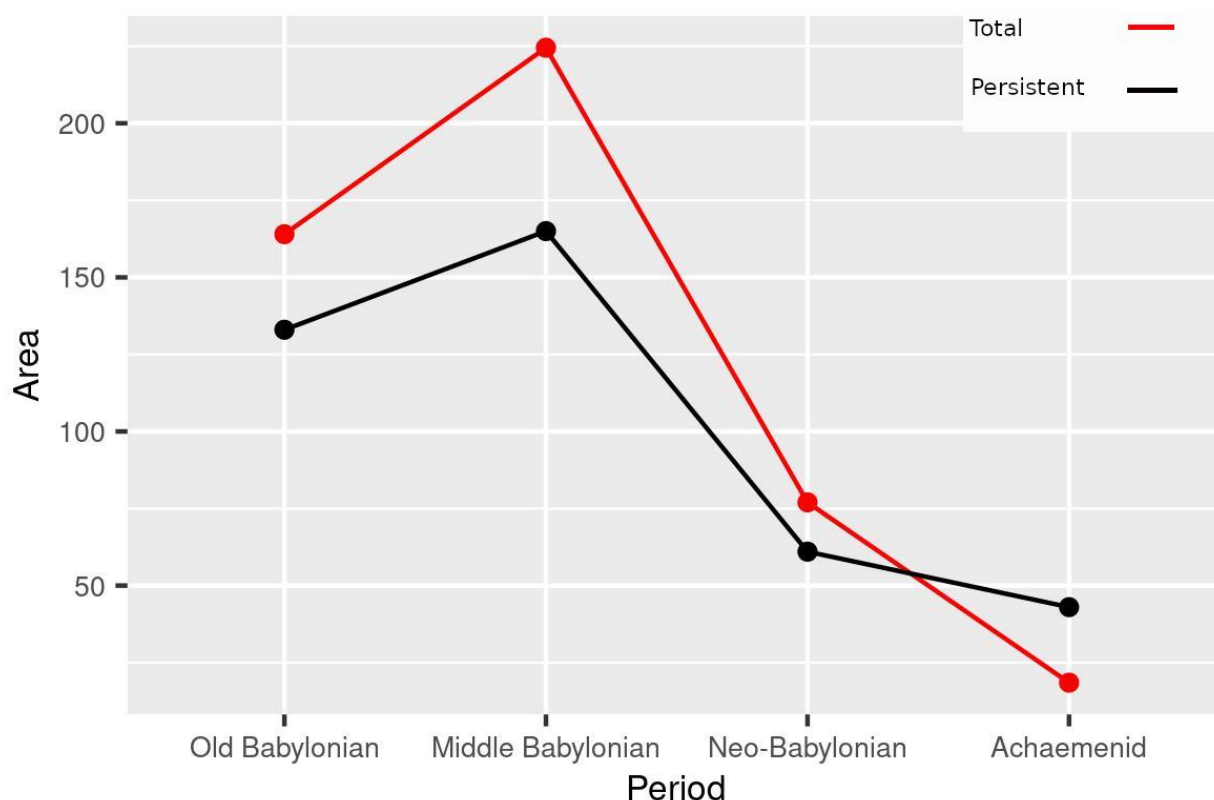
Figure 5: Total occupied area. Shows gross occupied area of all sites in each period, and specifically in those sites persisting between historical periods.

4.2 Synthesis with the Archaeological Survey

These conclusions, drawn from analysis of the textual record, can be strengthened and expanded by comparison with the aforementioned archaeological survey. As the names of certain geographic features are attested in more than one period, there are a certain number of sites uncovered by the survey that contained remains from multiple periods. No remains were found from non-consecutive periods. There are 11[16] sites that contain remains from both the Old Babylonian and Middle-Babylonian periods. Additionally, seven sites[17] contained remains from both the Middle-Babylonian and Neo-Babylonian periods. Five sites[18] contain remains from the Neo-Babylonian and Achaemenid periods only. Two sites—29 and 82—contained remains from the Old-, Middle, and Neo-Babylonian periods, and two different sites—31 and 41—contained remains from the Middle and Neo-Babylonian periods, as well as the Achaemenid periods. Only one site, site 76, contained remains from all four periods in question.[19] These results mirror the findings of the textual survey, in which a minority of place-names are attested through multiple periods, and a minority of these over longer stretches of time. The textual survey does not differentiate between the Neo-Babylonian and Achaemenid periods, as the linguistic and geographic record changed less than the ceramic record [3, 40]. Three sites in the textual record, for example, are possible matches for the seven that contain remains from the Middle and Neo-Babylonian period, while Dūr-Sîn-Muballiṭ, if represented in this survey, is the only named place fitting the 11 sites containing remains from the Old and Middle Babylonian periods.

When these longer-lived sites are cross-referenced with the recorded sizes of each distinct site, further evidence of the lack of high-level control of the survey region, and its gradual depopulation in favor of the

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[16] 2, 6, 7, 11, 26, 36, 38, 78, 79, 80, 81, and 91

[17] 12, 31, 35, 37, 49, 63, and 72

[18] 9, 17, 66, 73, and 90

[19] These results are collected in the supplementary data.

Uruk region to the north and east, emerges. The sites present in the Old-Babylonian and Middle-Babylonian periods are larger, by a significant margin—site 2 is 16 hectares, site 26 is 33 hectares, and site 80 is 23 hectares, for example. In contrast, with the exception of one site (73, 8 hectares), all sites dating to the Neo-Babylonian and Achaemenid are a maximum of 2 hectares. The size of site 73 may be connected to its placement at the junction of two channels. When taken in tandem with the reduction in the number of settlements, the reduction in the size of the settlements is further evidence of a shift to the north and east, supported by a seeming combination of natural changes in the hydrologic landscape, and an increase in centralized governance, able to construct irrigation and other infrastructures that could encourage such a shift.

4.3 Discussion

The synthesis of the textual survey detailed above with the results of the archaeological survey recently completed raises a number of interesting questions. First among them is that of the results'—and the totality of the data's—conformity with wider trends in both data-driven textual research of this region and these periods, and with parallel studies of the ancient Mesopotamian landscape. The gradual rise in settlement through the 2nd Millennium BCE does parallel the results of other surveys, both archaeological and textual. The sharp drop in canal construction in the early 1st Millennium, and the parallel reduction in the complexity of settlement patterns does fit with the current understanding of the region.

Specifically, Adams and Nissen [2, 55] describe a pattern of abandonment and map a reduction in the presence of canals and major works. Likewise, Bagg [22] charts a reduction in the discussion of similar works, forming a textual and physical picture of a decline from the grandeur of previous periods, and a return to small-scale, local economics. Beaulieu [11] and Brinkman [54; 42] both approached this period from a political perspective, noting the influence and increased but separate presence of Chaldean communities, born out in the textual record in the noted increase in Dūr- prefixed place-names. It should be noted that the archaeological survey does not find any pottery specifically from this period, a stark drop from the 42 sites found with Middle Babylonian remains (see Fig. 4). This lack of any indication of settlement during the early 1st Millennium once again points back to the instability endemic in the region during that time.

Finally, the Neo-Babylonian period is one in which the region as a whole expands economically and culturally, with an explosion of canal construction, noted both through physical remains [2, 55+; 16, 232-233] and textually [11, 15-20; 24]. The specific region surveyed shows a stark contraction between the Neo-Babylonian and Achaemenid periods (see Table 1 & Fig. 3), indicative of a shift in settlement over a relatively short period of time to the irrigated and more centrally governed regions in and around the nearby city of Uruk, and a reduction in smaller-scale, more informal settlements.

In the Neo-Babylonian period, important renovations and land management projects were kept on record. The cadastral dossier, for example, is marked by the intertextual notations of state registry officials wrestling with the questionable status of land in and around the city of Uruk, some of which was not yet physically surveyed. Notations make mention of a general old ledger for land parcels kept on a writing board (*lē'i labīri*), alongside individual records of specific land parcels. Cases were legally contested based on duplicated or missing records.

This led to open hostilities between agents of different institutional background working on disputed land, such as in the case of a certain Kīnenāya, who was working his vineyard for the temple when another man came, beat him up and told him that the land was his according to the king's authority. In a letter to the bishop of Eanna (*šatammu*)[20] and royal court representative (*qīpu*), he complains about not being paid [55, 94; 56, 174]. Though vineyards specifically were rare in Babylonia, this dispute is symptomatic of the struggles among different socio-political institutions to control the land. The cadastral dossier, in this respect, reflects a

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[20] See Jursa [3, 264] for explanations of this specific translation of *šatammu.*

pattern of conflicting interests: on the one hand, the temple, and on the other hand, the royal household in Babylon.

This conflict of interests is visible as early as the 8th century, in the actions of Merodach-Baladan II, who diplomatically divided the land almost equally between the two state institutions:

> *AnOr* 9, 1:1-4 (718 BCE)

"overseer of fifty (*rab hanšê*), who in the presence of Marduk-apla-iddina (II), king of Babylon, seized (each) 150 (cubits) of land on the bank of Harru-ša-Marduk-apla-iddina, from the boundary of Bīt-Zu-gunabu. 1,100 (cubits) of the temple (equals) 1,000 (cubits) of the king." [57, 1*]

This cadastral text, datable to the 4th year of Merodach-Baladan II, mentions an otherwise unknown state sponsored hydraulic project near Uruk named after this king. It shows that the royal house may have further utilized this canal to appropriate the land from nearby tribal entities (Bīt-Zu-gunabu). This may have specifically played into the interests of the two larger tribal communities in the area, Bīt-Amūkāni and Bīt-Dakūri, who were linked to the king and his court [11, 198-201; 42, 46-50] By the time of the Neo-Babylonian empire, both groups settled large swaths of land between Babylon and Uruk and their borders fell along the main canals in the Uruk urbanscape: the Takkīru canal flowing into the city from the south-west and the Royal canal entering the city from the north-east.

We believe that many of the hydraulic projects in Babylonia initiated by the Assyrian, Babylonian and Achaemenid regimes were not *only* motivated by the will to develop industrial agriculture, but also, to claim land by settling people and developing crops along their routes. While political, economic and environmental factors were not always explicitly stated in the textual record, they can be reconstructed from cadastral notations and geographical itineraries of those institutional agents who were in charge of the land.

The depth of the analysis allowed by these cadastral texts, while critical to placing both the archaeological and textual surveys in context, does hint at a deeper problem in a textual survey. The wide-ranging archives they are based on are relics of the 8th century and onward. Therefore, the interweaving of textual data described here is simply not possible in earlier periods. Finding connections between canals and settlements, and using these networks to build up a tentative map of the area is most easily done in the Neo-Babylonian and Achaemenid periods. The existence of persistent features, in both the textual and archaeological record, however, does make these conclusions relevant to older periods, and the location of a specific canal in the Neo-Babylonian record, for example, can be used to locate the same named canal in the Middle Babylonian or Old Babylonian period.

5. Conclusions

The textual survey of the Old Babylonian and Middle Babylonian periods as such is a distinctly disconnected one. A survey of these periods assembles a number of recorded place-names, including those persisting to the Neo-Babylonian and Achaemenid period, but without clear connections to a larger network. An archaeological survey of the same region reveals dozens of settlements, including settlements above 20 hectares (sites 26 & 80), ruling out the possibility that the lack of documented connections is the product of a lack of intensive or large-scale settlement. This is in contrast to the rich, multi-layered network generated by an analysis of the textual record of the Neo-Babylonian period [24].

The lack of deep connectivity in the Old- and Middle Babylonian periods, despite archaeological evidence of fairly dense settlement, is most likely a result of political divisions. During these periods, the region in question was divided up into a number of small kingdoms, often consisting of one major metropole and surrounding smaller settlements and agricultural areas. Cities like Uruk, Ur, and Larsa were ruled by separate kings, each

responsible for developing and funding the infrastructure within their own borders. This results in a series of flatter, less complex, parallel networks. Any attempt at inter-city or regional development would have bumped up against the boundaries of neighboring kingdoms. Major infrastructure pieces did exist, such as the Sumandar [38], but the lack of a central authority planning and funding infrastructure meant wider-ranging settlement, and a more broadly settled region. This is reflected in the larger, both in settlement size and number of settlements, survey results of these periods.

By the middle of the first millennium BCE, after the drop in actual settlement in the wake of the Late Bronze Collapse, the southern regions of Mesopotamia, especially the tribal regions around and east of Uruk, began to become a center of opposition to Assyrian hegemony. Over the years, this introduced Elamite, Aramean, and Arabian populations and actors to the region. It also, of course, invited Assyrian invasion, which involved both military action against the region's fortified settlements, and the use of water infrastructure for defensive or offensive purposes by forces on both sides. Eventually, however, the Assyrian empire fell, and the throne in Babylon was seized by Nabopolassar (Nabû-apla-uṣur), beginning the Neo-Babylonian empire. This meant that all of southern and central Mesopotamia, from Babylon and Sippar (north of Babylon on the Euphrates), to Uruk and Ur, was united under one authority. The ascendance of a local king to the Babylonian throne, and the population resettlement practiced by the Assyrians, integrated the region and broke down the divisions between the fortified settlements and the remainder of the population. These basic changes, combined with a top-down land-use policy building and the re-building canals and other infrastructure, drew residents to specific places, in the urbanscapes of major cities and along the now-important intercity canals. Small-scale agriculture, irrigated by locally constructed watercourses, was no longer economically viable or desirable, and without support from the powers that be, certain regions—including the region surveyed here—were left to fallow.

The synthesis of archaeological and textual surveys, then, support a unified understanding of land use in the region in the 1st Millennium. The textual evidence shows population growth and an associated increase in complexity in the Uruk region, and an increased integration with other cities in the region, including Larsa and Ur to the south, and Nippur and Borsippa to the north, just to give a few examples. This integration is a clear sign of increased centralization of authority. The region covered by the pedestrian survey, however, shows an emptying out, as populations presumably move, by choice or by force, towards these more developed urban areas. This emptying out is underscored by a noticeable lack of development in the area, as the survey failed to uncover new canals or development connecting the region north, to Uruk (the closest major city).

To understand why this specific region was not developed in the way other regions were, given the presence of water courses and a history of settlement, including a couple of significant settlements (survey sites 26, 80, and to a lesser extent, 29), the larger context of the region must be considered. The region, to the west and south of Uruk, is on the border of the cultivated region watered by the water systems of Mesopotamia, and the desert that extends west towards Canaan and the Mediterranean. As a border region, it would have been susceptible to raids by nomadic tribes [58, 176] along the edge of a now larger empire. The region could have been seen as a small, difficult area to defend and may have not been worth the investment in renewed infrastructure, and was let fallow.

5.1 Future Focus

These identifications could be narrowed down or strengthened by adding additional data to either side of the comparison. The textual citations can be narrowed down tablet by tablet, adding metadata, context, and dating information to the profile of each geographical feature. This can identify patterns in the dating of each feature, or aid in the location of the given feature by charting its connections to nearby places. Site 73, seemingly a major site in the 1st Millennium BCE, is located at a junction of two watercourses, which suggests it would be a good test site for this kind of triangulation. The archaeological survey can be strengthened by confirming the identity of the channel that is presumed to anchor the survey results, and charting the proximity of sites to

it. This could also aid in the identification of possible Kār-prefixed sites, as they are by necessity on the banks of a channel. A repeat survey focusing on larger sites may reveal the remains of fortifications, which would in turn aid in connecting one or more of the Dūr- names. Finally, more intense archaeological surveys could improve chronological development as well as more precisely identify how settlement patterns changed.

References

1. Adams, R. McC. *Heartland of Cities: Surveys of Ancient Settlement and Land Use on the Central Floodplain of the Euphrates*; University of Chicago Press: Chicago, 1981.
2. Adams, R. McC.; Nissen, H.J. *The Uruk Countryside: The Natural Setting of Urban Societies*; University of Chicago Press: Chicago, 1972; p. 241.
3. Jursa, M. *Aspects of the Economic History of Babylonia in the First Millennium BC*; Dietrich, M., Loretz, O., Neumann, H., Eds.; Ugarit Verlag: Münster, 2010.
4. Janković, B. Aspects of Urukean Agriculture in the First Millennium BC. Ph. D, University of Vienna: Vienna, Austria, 2013.
5. Becker, H.; van Ess, M.; Fassbinder, J. Uruk: Urban Structures in Magnetic and Satellite Images. In *Uruk: First City of the Ancient World*; van Ess, M., Hilgert, M., Salje, B., Crüsemann, N., Eds.; Getty Publications: Los Angeles, 2019; p. 335-341.
6. Mittelmayer, C. Uruk. A. IV. Philologisch. In Mythos Und Literatur. *Reallexikon der Assyriologie und Vorderasiatischen Archäologie* **2016**, *14*, 455–457.
7. Kose, A. *Uruk: Architectur IV*; Boehmer, R.M., Englund, K., Deutsches Archäologisches Institut, Eds.; AUWE-17; Philip von Zabern: Mainz am Rhein, 1988.
8. Gehlken, E. *Spatbabylonische Wirtschaftstexte aus dem Eanna-Archiv*; AUWE-5; Philip von Zabern: Mainz am Rhein, 1990.
9. Jacobsen, T. The Waters of Ur. *Iraq* **1960**, *22*, 174–185.
10. Wilkinson, T.J. *Archaeological Landscapes of the Near East*. University of Arizona Press: Tucson, AZ, 2003.
11. Beaulieu, P.-A. *A History of Babylon, 2200 BC - AD 75*; Wiley Blackwell: Medford, MA, 2018.
12. Postgate, J.N. *Early Mesopotamia: Society and Economy at the Dawn of History*; Paperback.; Routledge: London, New York, 1994.
13. *Approaching the Babylonian Economy: Proceedings of the START Project Symposium Held in Vienna, 1-3 July 2004*; Baker, H.D., Jursa, M., Eds.; Ugarit-Verlag: Münster, 2005.
14. Widell, M. *The Administrative and Economic Ur III Texts from the City of Ur*; Gorgias Press: Piscataway, NJ, 2003.
15. Zadok, R. New Documents about Uruk, Its Countryside and the Sealand. In *Des Polytheismes aux Monotheismes: Melanges d'Assyriologie offerts a Marcel Sigrist*; Zadok, R., Gabbay, U., Pérennès, J.J., Eds.; Peeters: Leuven, Paris, 2020, p. 491-534.
16. Cocquerillat, D. *Palmeraies et Cultures de l'Eanna d'Uruk (559-520)*; ADFU-8; Gebr. Mann Verlag: Berlin, 1968.
17. Joannès, F. *Textes Economiques de la Babylonie Récente*; Etude des Textes de TBER, Cahier n. 6; Editions Recherche sur les civilisations: Paris, 1982.
18. Frahm, E., Jursa, M. *Neo-Babylonian Letters and Contracts from the Eanna Archive*; YOS 21; Yale University Press: New Haven, CT, 2011.
19. Charpin, D. Chroniques bibliographiques. 12. Archives paléo-babyloniennes: les textes et le terrain. *Revue d'assyriologie et d'archéologie orientale* **2009**, *103*, 131–148, doi:10.3917/assy.103.0131.
20. Groneberg, B. *Die Orts- und Gewässernamen der Altbabylonischen Zeit*; RGTC-3; Dr. Ludwig Reichert Verlag: Wiesbaden, 1980.
21. Nashef, K. *Die Orts-Und Gewässernamen Der Mittelbabylonischen Und Mittelassyrischen Zeit*; RGTC-5; Reichert Verlag: Wiesbaden, 1982; p. 372.
22. Bagg, A.M. *Die Orts- und Gewässernamen der Neuassyrischen Zeit, Teil 3: Babylonien, Urartu und die Östlichen Gebiete*; RGTC-7; Reichert Verlag: Wiesbaden, 2020; Vol. 3.
23. Zadok, R. *Geographical Names According to New- and Late-Babylonian Texts*; RGTC-8; Dr. Ludwig Reichert Verlag: Weisbaden, 1985; p. 427.
24. Gordin, S.; Clark, S. Mesopotamian Ancient Place-Names Almanac Gazetteer, Ver. 1.0, 2022; doi:https://doi.org/10.5281/zenodo.6411251.
25. *Oxford History of the Ancient Near East*; Radner, K., Moeller, N., Potts, D.T., Eds.; Oxford University Press: Oxford, UK, 2022; Vol. II.
26. Algabri, A. Settlement Patterns in the West of Uruk during the Second Millennium BC. M.A., University of Al-Qadisiyah: Al-Qadisiyah, Iraq, 2020.
27. Höflmeyer, F. Establishing an Absolute Chronology of the Middle Bronze Age. In *Oxford History of the Ancient Near East*; Radner, K., Potts, D.T., Moeller, N., Eds.; Oxford University Press: Oxford, UK, 2022; Vol. II.
28. Morozova, G.S. A Review of Holocene Avulsions of the Tigris and Euphrates Rivers and Possible Effects on the Evolution of Civilizations in Lower Mesopotamia. *Geoarchaeology* **2005**, *20*, 401–423, doi:10.1002/gea.20057.
29. Jotheri, J.; Allen, M.B.; Wilkinson, T.J. Holocene Avulsions of the Euphrates River in the Najaf Area of Western Mesopotamia: Impacts on Human Settlement Patterns. *Geoarchaeology* **2016**, *31*, 175–193, doi:https://doi.org/10.1002/gea.21548.
30. Wilkinson, T.J.; Wilkinson, E.B.; Ur, J.; Altaweel, M. Landscape and Settlement in the Neo-Assyrian Empire. *Bulletin of the American Schools of Oriental Research* **2005**, *340*, 23–55.

31. Ermidoro, S. New Data on the Babylonian Hydraulic Landscape: An Update to the Repertoire Geographique Des Textes Cuneiformes Vol. 8. *KASKAL* **2016**, *13*, 135–174.

32. King, L.W. *Babylonian Boundary Stones and Memorial Tablets in the British Museum. With an Atlas of Plates*; Trustees of the British Museum: London, UK, 1912.

33. Lutz, H.F. *Selected Sumerian and Babylonian Texts*; Publications of the Babylonian Section; University of Pennsylvania Press: Philadelphia, PA, 1919; Vol. II.

34. Paulus, S. *Die Babylonischen Kudurru-Inschriften von der Kassitischen bis zur Frühneubabylonischen Zeit*; Ugarit-Verlag: Münster, 2014.

35. von Soden, W. *Akkadisches Handwörterbuch unter Benutzung des lexikalischen Nachlas ses von Bruno Meissner (1868-1947) bearbeitet von Wolfram von Soden*; Harrasowitz: Weisbaden, 1959; Vol. 1.

36. Tadmor, H. *The Inscriptions of Tiglath-Pileser III*; Israel Academy of Sciences and Humanities: Jerusalem, 1994.

37. Scheil, V. *Textes élamites-sémitiques, première série*; E. Leroux: Paris, 1900.

38. Abraham, K.; Gabbay, U. Kaštiliašu and the Sumundar Canal: A New Middle Babylonian Royal Inscription. *Zeitschrift fur Assyriologie* **2013**, *103*, 183–195, doi:10le.e15n1A5/bzra-h2a0m13a-n0d00U4r.

39. Ungnad, A. *Vorderasiatische Schriftdenkmäler der Königlichen Museen zu Berlin 8*; Vorderasiatische Schriftdenkmäler der Staatlichen Museen zu Berlin; J. C. Hinrichs: Leipzig, 1909.

40. Thureau-Dangin, F. *Lettres et Contrats de l'Epoque de la Premiere Dynastie Babylonienne*; Textes Cuneiformes des Louvre (TCL); Librarie Orientaliste Paul Geuthner: Paris, 1973.

41. Arnaud, D. Quelques Nouvelles Brices Inscrites de Larsa. *Revue d'Assyriologie et d'Archéologie Orientale* **1972**, *66*, 163–176.

42. Brinkman, J.A. *Prelude to Empire: Babylonian Society and Politics, 747-626 B. C.*; Occasional Publications of the Babylonian Fund; University Museum: Philadelphia, 1984.

43. Hritz, C.; Al-Hawi, N.D.; Al-Sudani, K.J.; Albadran, B.N.; Pournelle, J. Resilient Landscapes: The Evolution of Riparian Landscape Studies in Southern Iraq. In *New Agendas in Remote Sensing and Landscape Archaeology in the Near East. Studies in Honour of Tony J. Wilkinson*; Lawrence, D., Ed.; Archaeopress: Oxford, UK, 2020; pp. 228–267.

44. Fuchs, A. *Die Inschriften Sargons II, Aus Khorsabad*; Cuvillier Verlag: Gottingen, 1994.

45. Dalley, S. The First Sealand Dynasty: Literacy, Economy, and the Likely Location of Dūr-Enlil(ē) in Southern Mesopotamia at the End of the Old Babylonian Period. In *Babylonia under the Sealand and Kassite Dynasties*; Paulus, S., Clayden, T., Eds.; De Gruyter: Berlin; Boston, MA, 2020; pp. 9–27.

46. Gordin, Sh.; Clark, S.; Romach, A. MAPA: A Linked Open Data Gazetteer of the Southern Babylonian Landscape. *IDEAH* **2022**, *Forthcoming*.

47. Hritz, C. Tracing Settlement Patterns and Channel Systems in Southern Mesopotamia Using Remote Sensing. *Journal of Field Archaeology* **2010**, *35*, 184–203.

48. Hritz, C.; Wilkinson, T.J. Using Shuttle Radar Topography to Map Ancient Water Channels in Mesopotamia. *Antiquity* **2006**, *80*, 415–424.

49. Steinkeller, P. New Light on the Hydrology and Topography of Southern Babylonia in the Third Millennium. *Zeitschrift fur Assyriologie und Vorderasiastische Archaeologie* **2001**, *91*, 22–84.

50. Yamada, S. Karus on the frontier of the Neo-Assyrian Empire. *Orient* **2005,** *40*, **56-90.**

51. Frame, G. A "New" Cylinder Inscription of Sargon II of Assyrian from Melid. In *Of God(s), Trees, Kings and Scholars: Neo-Assyrian and Related Studies in Honour of Simo Parpola*; Studia Orientalia; Finnish Oriental Society: Helsinki, 2009; pp. 65–82.

52. al-Hamdani, A. The Settlement and Canal Systems in Lower Southern Mesopotamia During the First Dynasty of the Sealand (1721–1340 BCE). In *Babylonia under the Sealand and Kassite Dynasties*; Paulus, S., Clayden, T., Eds.; De Gruyter: Berlin; Boston, MA, 2020; pp. 28–57.

53. Powell, M.A. Merodach-Baladan at Dur-Jakin: A Note on the Defense of Babylonian Cities. *Journal of Cuneiform Studies* **1982**, *34*, 59–61, doi:10.2307/1359992.

54. Brinkman, J.A. *Political History of Post-Kassite Babylonia 1158-722 B.C*; Analecta Orientalia; Pontificum Institutum Biblicum: Rome, 1968; p. 431.

55. Keiser, C.E. *Letters and Contracts from Erech Written in the Neo-Babylonian Period*; Babylonian Inscriptions in the Collection of James B. Nies; Yale University Press: New Haven, CT, 1918.

56. Levavi, Y. *Administrative Epistolography in the Formative Phase of the Neo-Babylonian Empire*; Zaphon: Münster, 2018.

57. Pohl, P.A. *Neubabylonische Rechtsurkunden aus der Berliner Staatlichen Museen*; Analecta Orientalia; Pontificio Instituto Biblico: Rome, 1934; Vol. 2.

58. Eph'al, I. *The Ancient Arabs: Nomads on the Borders of the Fertile Crescent, 9th-5th Century B.C*; Magnes Press; Brill: Jerusalem; Leiden, 1982.