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A New Overview of Late Neolithic Sites in Jordan

Introduction

The Late, or Pottery, Neolithic (*ca.* 6500–5100 BC) is a key period in the archaeology of Jordan. While much research is dedicated to the earliest developments in food production in the Pre-Pottery Neolithic, it was not until the Late Neolithic that agriculture was adopted as the main way of subsistence, at least in those areas of Jordan where rain-fed agriculture is possible (Gibbs and Banning 2013). In what are now steppe and desert areas, pastoralist groups (still also reliant on hunting and perhaps some agriculture) became evident (Rollefson *et al.* 2014), thus forming the basis for the famous distinction between ‘desert and sown’ in later periods.

The Late Neolithic is also of profound interest for studying the effects of changing climate on early farming societies. After a probably favourable Early Neolithic (because it was relatively wet), more arid conditions appear to have started around

6600 BC, with a 200-year-long cold and arid period superimposed on this from around 6250 BC (Alley *et al.* 1997; Rohling and Pälike 2005). While local climate conditions in Jordan at the time are not completely clear, it is likely that these hemisphere-wide-attested changes would have had an impact on vegetation and crop growing conditions. There was no widespread collapse at the time (Gibbs and Banning 2013; Flohr *et al.* 2016), but the question remains as to exactly how people adapted to or coped with the changes.

Notwithstanding the importance of the Late Neolithic to research on the final appearance of agricultural societies and their resilience to climate change, the period remains less well-known than many other periods. While this is partly caused by a research bias, the sites are also less visible: they are often small, covered by colluvium, or have eroded, and diagnostic artefacts can be rare or difficult to recognise (Banning

2015). They are also covered by later occupation, as for example shown at Pella (Bourke *et al.* 1998, 2003).

There have been many surveys in Jordan over the years, and even though the Late Neolithic has rarely been their target, Neolithic material has been identified even if not widely reported. The research presented in this paper, as a first, essential step, brings together the existing information on Late Neolithic sites in Jordan. This will form the basis of more extensive research into this period, amongst other things examining location and the potential for using GIS modelling and remote sensing in the al-Karak area (see Banning *et al.* 2013; Hitchings *et al.* 2016 for its successful use in north Jordan).

The initial research was conducted as part of the Endangered Archaeology in the Middle East and North Africa (EAMENA) project (eamena.org), which uses remote sensing to document the archaeology and condition of archaeological sites in the MENA region in order to help mitigate threats. Because prehistoric sites are often not visible on the imagery, they can be overlooked and we cannot protect sites if we do not know where they are. This research therefore mapped the known Late Neolithic sites using publications in combination with remote sensing.

Methods

The present stage of the research reported here comprised a desk-based study in combination with site visits. The archaeological site databases MEGA-Jordan (MEGA-J, www.megajordan.org), Jordan Antiquities Database and Information System (JADIS, in use until 2002, then superseded by MEGA-J), the Digital Archaeological Atlas of the Holy Land (DAAHL, daahl.ucsd.edu/DAAHL), and the EAMENA database (database.eamena.org) were searched for Late Neolithic sites. As the search outputs also included sites

that were generically Neolithic or Neolithic/ Chalcolithic, the listed sites were carefully checked in the literature and only included on the final list if specific Late Neolithic evidence was reported. The second step was an extensive literature search for Late Neolithic sites, focusing on journals that include preliminary field reports, such as the *Annual of the Department of Antiquities of Jordan*, and checking survey gazetteers, excavation, and other project reports. For each site, characteristics were recorded, such as the site type, the evidence available for the Late Neolithic (and its sub-periods) at the site, the type of research conducted at the site, and the type of remains present.

Because many of the sites had been recorded by surveys conducted prior to the use of handheld GPS, their locations were often unknown or very uncertain. As it is essential to have an exact location, both for the research into site location and GIS modelling, and to be able to protect the sites from development, one of the most time consuming aspects of this research was to check and correct site location. This was achieved by digitising survey maps, remote sensing analysis, finding the site on aerial/satellite imagery (if visible), or following the description in the survey reports and locating its topographic position on that basis. For a number of sites, the location was checked on the ground during site visits in 2018 (Flohr and Finlayson forthcoming) and 2019 (Flohr and Finlayson 2020). Field visits identified Late Neolithic material at a couple of archaeological sites previously not known to include a Late Neolithic component (Flohr and Finlayson 2020).

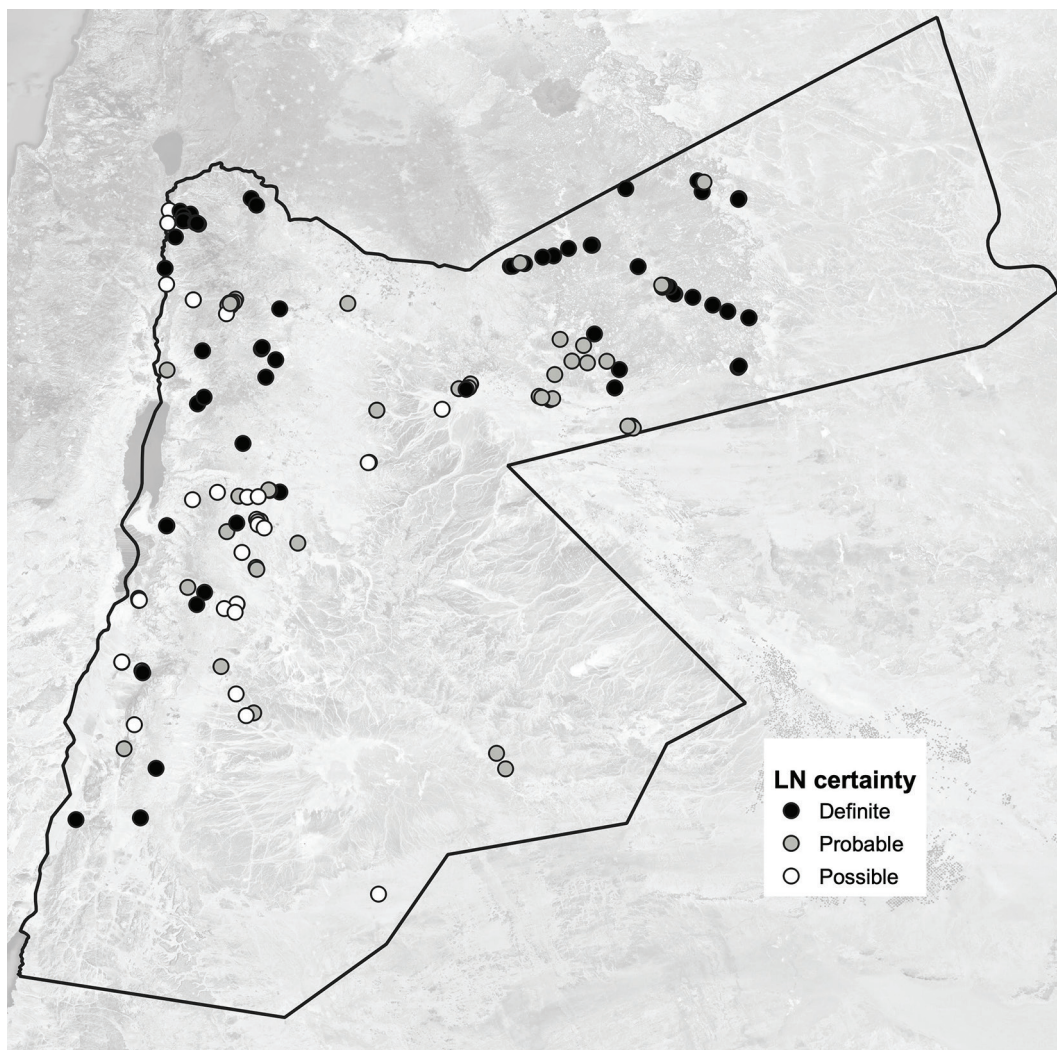
Finally, the sites were studied using remote sensing, and for a more limited number, by site visits, to look at the archaeology more closely and to assess the current condition of the site, including any disturbances and threats. The information on the archaeology, location, and condition was then entered in the EAMENA database

(database.eamena.org) where more information about each of the sites can be found.

Results: A New Map of Late Neolithic Sites in Jordan

The results are presented in FIG. 1, FIG. 2, and TABLE 1. To date (January 2020), ca. 168 Late Neolithic sites were found to have been reported for Jordan, 68 with good evidence (categorised as ‘definite’), 59 with reasonable evidence (‘probable’), and 41

with some evidence (‘possible’). The list is unlikely to be complete, as some information is likely to still lie hidden in the copious literature concerning the archaeology of Jordan. The Eastern Desert sites published by Betts *et al.* (2013) have been included, but not yet studied in detail. In addition, it is to be expected that the list will grow considerably in coming years, as ongoing surveys in the Eastern Desert continue to be published, such as the Jebel Qurma Project



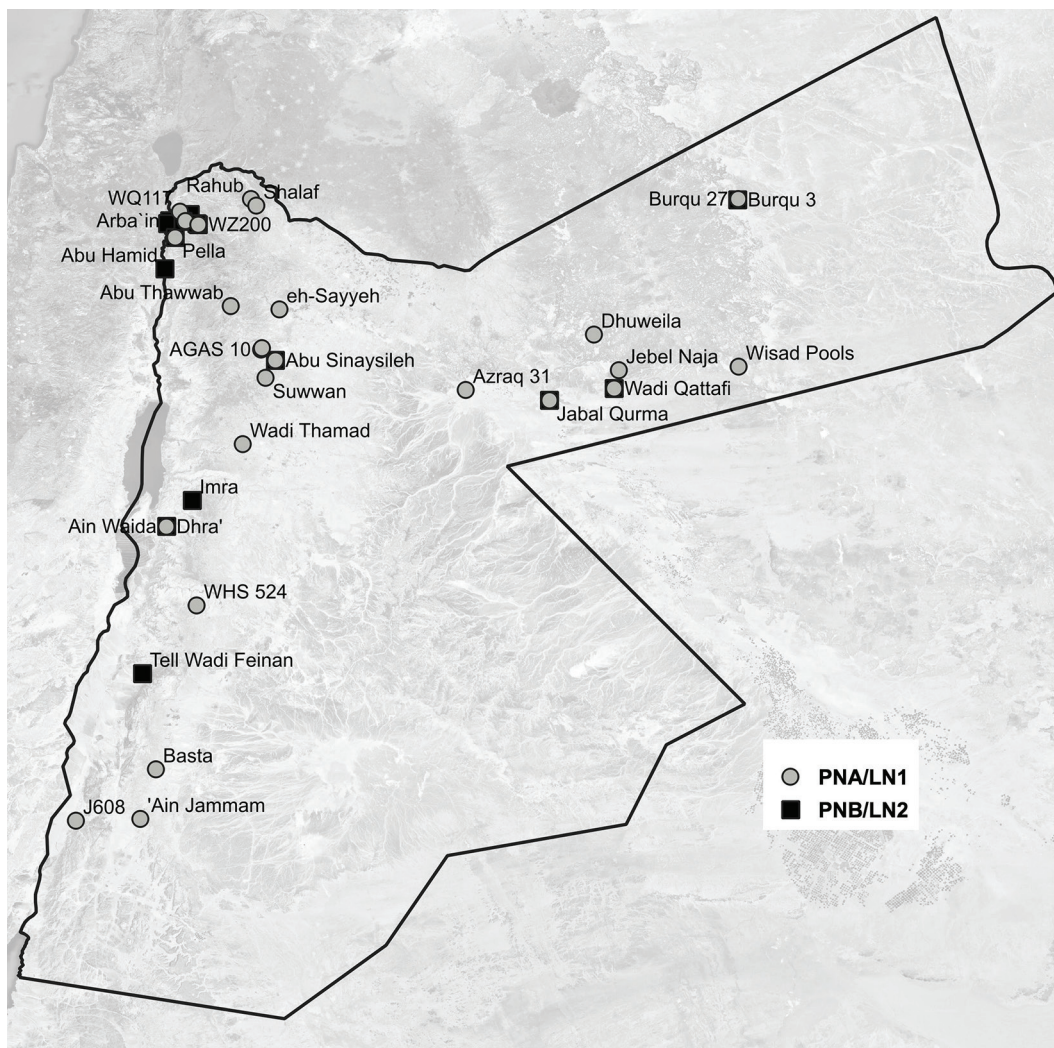
1. Late Neolithic sites in Jordan—black: definite, grey: probable, white: possible. Background: Google Earth satellite imagery.

(Akkermans *et al.* 2014) and the Western Harra Survey project (Chambrade and Smith 2018).

It should be noted that the records in the table are not always exactly comparable as ‘sites’, hence the use of ‘*ca.* 168 sites’ above. In surveys, parts of sites are sometimes recorded separately and later appear to form part of one larger site or site complex, such

as is the case for the Wādī ath-Thamad sites (presented as one record in TABLE 1; Foley and Foley 2008) and potentially for MN 329 and MN 423 (Mortensen *et al.* 2013). In other cases large areas such as Wisād Pools are reported as one record, but these can be vast and should perhaps be considered multiple ‘sites’.

The sites in TABLE 1 and FIG. 1 are only



2. Late Neolithic sites sub-divided by ‘PNA/LN1’ (ca. 6500–5900 BC, Yarmoukian; grey circles) and ‘PNB/LN2’ (roughly 6th millennium BC, including Wādī Rabāḥ; black squares). Not all site names in the Wādī Ziqḷāb and Wādī Quşaybah could be shown.

Table 1 (pages 101–15). Late Neolithic (LN) sites reported in Jordan. Periodisation of cited source is normally adhered to, so that a mixture of PNA/Yarmoukian terminology, etc. is used. Excav. = Excavation, Unk. = Unknown, Negl. = Negligible. Periods: LP = Lower Palaeolithic, MP = Middle Palaeolithic, UP = Upper Palaeolithic, EP = Epipalaeolithic, PPNA = Pre-Pottery Neolithic A, PPNB = Pre-Pottery Neolithic B, PPNC = Pre-Pottery Neolithic C, PNA = Pottery Neolithic A, PNB = Pottery Neolithic B, Ch. = Chalcolithic, BA = Bronze Age, EB = Early Bronze Age, MB = Middle Bronze Age, IA = Iron Age, Hell. = Hellenistic, Nab. = Nabataean, Rom. = Roman, ER = Early Roman, LR = Late Roman, Byz. = Byzantine, Isl. = Islamic, Um. = Umayyad, Ayy. = Ayyubid, Ott. = Ottoman. The periods given include possible occurrences.

those that date, or might date, between 6500 and 5000 BC. While it could be argued that Late Neolithic characteristics can be found beyond that date at some sites (e.g., Bourke 2007 citing Hennesy), the definition chosen here is one of a time period as much as that of specific characteristics—indeed the period shows a considerable diversity between the characteristics of sites. As such, Tulaylāt al-Ghasūl, for example, has been excluded from the table, as radiocarbon dates have shown the earliest ‘Neolithic’ layers to be dated to the first half of the 5th millennium BC. It is likely that with increased research more of the sites in the table will have to be discarded for the same reason; on the other hand, more might be found to be included when lower layers of multi-period sites are investigated. At the other end of the Late Neolithic, it is likely that the list contains sites prior to 6500 BC, as sites reported to be ‘Early Late Neolithic’ in the desert are partly contemporaneous with the PPNC (ca. 6800–6500 BC) in Jordan’s wetter zones (see for example Betts *et al.* 2013). For this reason Jilāt 25 (Garrard *et al.* 1994) was not included, but it is likely other sites

Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
Abu Hamid, تل أبو حامد	Abū Hāmid, تل أبو حامد	9541	0123204	Definite	Excav.	Ceramics, C ₁₄ dates. Wādī Rabāh, ca. 5200 BC and after.	Ch.	35.571338, 32.318369	High	Dollfus and Kafafi 1993; Lovell <i>et al.</i> 2007
Abu Sneseh/Sinaysileh	Abū Sunaysilah	12782	0134443	Definite	Excav.	Ceramics and lithics in excavation. Yarmoukian and Wādī Rabāh.	Late Ch./EBI, MBII, Ayy.	36.033487, 31.936012	High	Kerner 2016; Lehmann <i>et al.</i> 1991
(Qā') Abu Tuleiha/Tulayha West	(Qā') Abū Tulayḥah/West	3277	0135623	Probable	Excav.	Based on typological comparison of architecture plus one C ₁₄ date.	BA	35.941486, 30.459362	High	Fujii 2000, 2001, 2002a, 2003
AGAS 10		6991	0160453	Definite	Survey	Probably an extension of 'Ayn Ghazāl, but with only Yarmoukian.	BA (main)	35.973481, 31.981286	Medium	Simmons and Kafafi 1988

Table 1. Late Neolithic (LN) sites reported in Jordan.

Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
'Ain Ghazal	'Ayn Ghazāl	2710	0117592	Definite	Excav.	Excavated material culture. Yarmoukian.	ppNB, PPNC	35.976967, 31.987097	Definite	Kafafi 1990; Rollefson 1993
'Ain Jammam	'Ayn Jammām	4188	0122122	Definite	Excav.	Excavated material culture. Yarmoukian?/PNA.	ppNB	35.468340, 30.020534	High	Wáheeb and Fino 1997; Rollefson 2005; Gebel 2008
'Ain Waida	'Ayn Waydah	9350	0134424	Definite	Excav.	Excavated material culture; C ₁₄ dates. Very late LN.	Ch.	35.578646, 31.242430	Definite	Kuijt and Chesson 2002
Arba'in, Tall el Arbaein, الأربعين	Arba 'In, Tall al-Arba 'In, تل الأربعين	2854	0160596	Possible	Survey	PNB ceramics, but could be Chalcolithic.	Ch.-modern	35.590910, 32.519196	High	Ibrahim <i>et al.</i> 1976; Kafafi 1993 after Kafafi 1982
Awja 1	al-'Awjā	x	0160583	Possible	Excav., cleaning	Dated by affinities with Abū Tulayḥah West.	None	36.462328, 29.710631	Medium	Fujii 2013
AWS-85		x	0160574	Probable	Survey	Lithics	ppNC	36.847477, 31.834541	Negl.	Rollefson <i>et al.</i> 2001
AWS-86		x	0160575	Probable	Survey	Lithics	None	36.840079, 31.819302	Negl.	Rollefson <i>et al.</i> 2001
AWS-unknown		x	x	Probable	Survey	No information, but in total 4 LN sites were reported for the survey.	Unknown	Unknown	Negl.	Rollefson <i>et al.</i> 2001
AWS-unknown		x	x	Probable	Survey	See above.	Unknown	Unknown	Negl.	Rollefson <i>et al.</i> 2001
Azraq 1, Ain el-Assad	'Ayn al-Asad	2954	0160753	Probable	Survey	Large lithic scatter; LN date not confirmed in excavation.	LP, MP	36.799096, 31.815032	Low	Garrard <i>et al.</i> 1975; Rollefson 1982
Azraq 31		x	0134447	Probable	Survey, Excav.	Lithics Early LN.	LPPNB	36.829366, 31.812347	Low	Garrard <i>et al.</i> 1986, 1988
Basta	Bastiah	9759	0134776	Definite	Excav.	PNA/Yarmoukian rubble layers/squatter occupation, including <i>in situ</i> finds.	ppNB (main), ppNC	35.53354, 30.22763	High	Gebel 2009
Burqu area	Burqu'	2797	0134452	Definite	Survey, Excav.	8 sites reported to contain Late Neolithic material (1, 2, 3, 11, 17, 20, 27, 35).	Multi-period	General area	n/a	Betts <i>et al.</i> 2013

Table 1. Late Neolithic (LN) sites reported in Jordan.

Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
-Burqu 2	Burqu'	2797	0134452	Probable	Survey	Lithics later in LN sequence.	'later'	TBC	n/a	Betts <i>et al.</i> 2013
-Burqu 3	Burqu'	2797	0134452	Definite	Excav.	Lithics, C ¹⁴ date (5900 ±95 cal BC). Lithics indicate occ. also early in LN.	None	37.96721, 32.60644	Low	Betts <i>et al.</i> 2013
-Burqu 27	Burqu'	2797	0134452	Definite	Excav.	Lithics, C ¹⁴ dates (ca. 6300–6000 BC).	Ch.	37.96922, 32.60985	Low	Betts <i>et al.</i> 2013
DAS 75		x	x	Possible	Survey	Lithics	MP, Ch., EB	35.474353, 30.635383	Medium	Findlater 2003 after Finlayson and Baird 1995
Debab	Dhubāb	9690	x	Possible	Survey	Ceramics, but could be Chalcolithic.	Ch.	35.588600, 32.560700		Ibrahim <i>et al.</i> 1976; Kafafi 1993 after Kafafi 1982
Tulul edh-Dhabab:	Tulū' adh-Dhubāb	2709, 2751	0160586					35.68906, 32.18644	High	
-Tell Dhahab East	Tall adh-Dubāb	2751	x	Possible	Survey	LN presence reported	MP?, PPN?, EB, IA, Hell., R.			Gordon and Villiers 1983
-Tell Dhahab Extension West	Tall adh-Dubāb	x	x	Possible	Survey	LN presence reported	LP?, MP, PPN?, Ch.?, later			Gordon and Villiers 1983
Dhira'	adh-Dhira'	9350	0119703	Definite	Excav.	Lithics and ceramics. Jericho IX.	PPNA	35.577504, 31.241374	Definite	Finlayson <i>et al.</i> 2003
Dhuweila	Duwaylah	8192	0134442	Definite	Excav.	Lithics, C ¹⁴ dates. 7 th mill.	PPNB, EB	37.36564, 32.04375	Low	Betts 1998
Tell Fendi, تل فندي	Tall Findī	2729	0160109	Possible	Survey	PNB ceramics in survey, but not confirmed by excavation.	Ch./EBI, Byz. Ayy./Mam.	35.582475, 32.507191	High	Kareem 1989
FJP S111		x	0119222	Probable	Survey	Lithics	Ch.	35.399907, 30.309596	High	Fiema <i>et al.</i> 2008
Ghathyan, 'Ain Ghathyan	Ghathyan, 'Ayn Ghathyan	12542	0160119	Probable	Survey	Reported under Late Neolithic in survey report	Ch.	35.866192, 32.189531	Medium	Gordon and Knauf 1987

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Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
Ghirqa, Ghirga	Gharqah	x	0160125	Probable	Survey	Lithics. Could be Early LN.	PPNB?	37.320270, 31.995679	High	Betts 1987; Rollefson <i>et al.</i> 2014
Ghrubba	Ghurubbah	4567	0134784	Probable	Survey (section)	Ceramics found in section	None	35.579559, 31.893034	Medium	Mellaart 1956, 1962
Gleb Rumman	Qalib ar-Rummān	x	x	Possible	Survey	Possible LN based on ceramics	Rom.	South, Wadi Rumman	n/a	Jobling 1981
Hamad Survey sites:	Ḥamad	x	x	Probable	Survey	Several sites contained Late Neolithic material in the survey by Betts <i>et al.</i>	Multi-period	n/a (large region)	n/a	Betts <i>et al.</i> 2013
-89/1, Jebel ar-Rishat	Jabal ar-Rishāt	x	x	Probable	Survey	Burin Neolithic site, truncation burins	None reported	TBC	n/a	Betts <i>et al.</i> 2013
-88/1005		x	x	Probable	Survey	Concave truncation burins	None reported	TBC	n/a	Betts <i>et al.</i> 2013
-88/1006		x	x	Probable	Survey	Concave truncation burins	None reported	TBC	n/a	Betts <i>et al.</i> 2013
-88/1009		x	x	Probable	Survey	LN lithics, knapping site	PPN	TBC	n/a	Betts <i>et al.</i> 2013
-88/1010		x	x	Probable	Survey	Concave truncation burins	None reported	TBC	n/a	Betts <i>et al.</i> 2013
-88/1011		x	x	Probable	Survey	Concave truncation burins	Unknown	TBC	n/a	Betts <i>et al.</i> 2013
-88/1013		x	x	Probable	Survey	Concave truncation burins	Unknown	TBC	n/a	Betts <i>et al.</i> 2013
-89/7, Tell al-Hibr 2	Tall al-Hibr	x	x	Possible	Survey	Lithics Early LN (PPNC) or LN	PPNC?	TBC	n/a	Betts <i>et al.</i> 2013
-89/8		x	x	Probable	Survey	Structures similar to al-Ghirga, lithics typical of burin Neolithic.	Unknown	TBC	n/a	Betts <i>et al.</i> 2013
Harra Transect Survey I-1	al-Ḥarrah	59933	0134437	Definite	Survey	Lithic(s) diagnostic of LN	Ch. and/or EB	38.01178, 32.11120	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey I-3		59936	0134438	Definite	Survey	Lithic(s) diagnostic of LN	Ch. and/or EB	38.01064, 32.11182	High	Müller-Neuhof in prep.; MEGA-J

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Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
Harra Transect Survey II-1		59980	0134439	Definite	Survey	Lithic(s) diagnostic of LN	Ch. and/or EB, Abb.	3777641, 32.19725	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey II-13		59964	0134440	Definite	Survey	Lithic(s) diagnostic of LN	Ch. and/or EB, Isl.	3792270, 32.13823	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey II-3		59944	0134712	Definite	Survey	Lithic(s) diagnostic of LN	Ch. and/or EB, Byz.	3785998, 32.16442	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey III-2.2		60018	0134713	Definite	Survey	Lithic(s) diagnostic of LN	Ch. and/or EB	3754802, 32.32538	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey III-28		60006	0134714	Definite	Survey	Lithic(s) diagnostic of LN	Ch. and/or EB, 20 th c.	3770139, 32.21097	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey III-29		60008	0134715	Definite	Survey	Lithic(s) diagnostic of LN	Ch./EB, Byz., 20 th c.	3769776, 32.21276	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey III-37		60060	0134716	Definite	Survey	Lithic(s) diagnostic of LN	EP, PPNA, Ch./ EB, Byz.	3767775, 32.24020	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey III-42		60070	0134717	Definite	Survey	Lithic(s) diagnostic of LN	MP, UP, EP, Ch./ EB, Byz., Isl.	3766087, 32.24649	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey III-43		60071	0134441	Definite	Survey	Lithic(s) diagnostic of LN	MP, PPNB, Ch./ EB	3765945, 32.24690	High	Müller-Neuhof in prep.; MEGA-J

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Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
Harra Transect Survey III-46		60078	0134718	Probable	Survey	Lithic(s) diagnostic of LN	Ch./EB, Byz., Isl.	37.65347, 32.24041	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey III-48		60082	0134719	Definite	Survey	Lithic(s) diagnostic of LN	EP, Ch./EB	37.64950, 32.23905	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey III-54		60096	0134720	Probable	Survey	Lithic(s) diagnostic of LN	Ch./EB, Byz.	37.64652, 32.24823	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey IV-11		60126	0134721	Definite	Survey	Lithic(s) diagnostic of LN	EP, PPNA, Ch./EB	37.35734, 32.41515	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey V-1		60146	0134723	Definite	Survey	Lithic(s) diagnostic of LN	EP, PPNA, Ch./EB, Byz., Isl.	37.35218, 32.41507	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey VIII-17		60184	0134724	Definite	Survey	Lithic(s) diagnostic of LN	PPNB, Byz.	37.19481, 32.37035	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey VIII-2		60174	0134725	Definite	Survey	Lithic(s) diagnostic of LN	EP, Ch./EB, LR, Byz., Abb., Ott.	37.01429, 32.32625	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey IX-3		60132	0134722	Definite	Survey	Lithic(s) diagnostic of LN	EP, Ch./EB	37.49638, 32.65164	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey XII-2		60304	0160457	Definite	Survey	Lithic(s) diagnostic of LN	Ch./EB	37.81561, 32.63850	High	Müller-Neuhof in prep.; MEGA-J
Harra Transect Survey XII-7		60314	0160571	Definite	Survey	Lithic(s) diagnostic of LN	Ch./EB, Byz.	37.79800, 32.68416	High	Müller-Neuhof in prep.; MEGA-J

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Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
Harra Transect Survey XII-9		60318	0160572	Probable	Survey	Lithic(s) diagnostic of LN	Ch./EB, Byz.	37.82317, 32.67857	High	Müller-Neuhof in prep.; MEGA-J
Harrat al-Juhayra, JF-0202	Harrat al-Juhayrah	x	0136371	Probable	Excav.	Dated by typology of structures.	None reported	35.80502, 30.65320	High	Fujii 2005
Haud el-Bayad, 'Ain Bahram	Hawd al-Abyad, 'Ayn Bahram	6606	0160121	Probable	Survey	Under Pottery Neolithic in survey report.	Ch., EB, Rom., Byz., Um.	35.86125, 32.17761	Negl.	Gordon and Knauft 1987; MEGA-J
Haud Umm el-Jihash II	Hawd Umm al-Jihash	11362	0160123	Probable	Survey	Under Pottery Neolithic in survey report.	EB, Rom., Byz., Um.	35.83988, 32.17351	Negl.	Gordon and Knauft 1987; MEGA-J
Imra', Amra', ASKP 015	Imri'	10212	0086284	Possible	Survey, visited	Late Neolithic or possibly Early Chalcolithic lithics.	EB-present	35.68591, 31.35075	Definite	Miller 1991; Flohr and Finlayson in prep.
Jabal Kapd Cairns	Jabal Qabid	x	x	Probable	Excav.	Haparsa point in two burial cairns.	Unknown	Unknown	n/a	Abu-Azizeh, 2014
Jabal Qurma area:	Jabal Qurmah			Definite	Survey	Many LN sites reported.	Multi-period	37.17990, 31.76907	n/a; general area	Betts et al. 2013; Akkermans et al. 2014
-QUR-1		60451	0160454	Probable	Survey	Burins, typology of structures.	Unknown	37.13439, 31.78304	High	Akkermans et al. 2014; MEGA-J
-QUR-6		60462	0160455	Probable	Survey	LN type lithics, and typology of structures.	Unknown	37.14573, 31.77812	High	Akkermans et al. 2014; MEGA-J
-QUR-21		8088	x	Probable	Survey	Grouped enclosure associated with LN lithics (e.g., bifacial knife).	Unknown, PPN?	37.19074, 31.77348	High	Akkermans et al. 2014; MEGA-J
-QUR-64		x	x	Probable	Survey	e.g., Nizzanim point, typology of structures.	Unknown	Unknown	n/a	Akkermans et al. 2014; MEGA-J

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-QUR-146		x	x	Probable	Survey	e.g., Haparsa point, typology of structures.	Unknown	Unknown	High	Akkermans <i>et al.</i> 2014; MEGA-J
Jabal Tharwa Ia, WS 12a	Jabal Tharwah	x	0119699	Possible	Survey	Close similarities with circular 'tent' foundations at 'Ayn Ghazāl.	none	37.52148, 31.65864	Medium	Wasse and Rollefson 2005
Jabal Tharwa Ib, WS12b	Jabal Tharwah	x	0119670	Definite	Survey	Lithics	PPN	37.52191, 31.65501	Medium	Wasse and Rollefson 2005
Jabal Tharwa Id, WS12d	Jabal Tharwah	x	0119672	Possible	Survey	1 LN lithic (arrowhead), main occupation EP.	EP (main)	37.51868, 31.65215	Medium	Wasse and Rollefson 2005
Jabal Tharwa Ie, WS12e	Jabal Tharwah	x	0119673	Possible	Survey	1 LN lithic ("Yarmoukian-like" arrowhead), spot-find in rubble.	none	37.51590, 31.65173	Medium	Wasse and Rollefson 2005
Jabal Tharwa If, WS12f	Jabal Tharwah	x	0119674	Possible	Survey	Lithics "suggestive of ... Late Neolithic..."	EP, PPNB, Ch., EB	37.51602, 31.65292	Medium	Wasse and Rollefson 2005
Jabal Tharwa Ig, WS12g, The Village	Jabal Tharwah	x	0119675	Probable	Survey	Lithics	Ch./EB	37.52803, 31.65008	Medium	Wasse and Rollefson 2005
Jabal Tharwa 2, WS13	Jabal Tharwah	x	0119676	Probable	Survey	2 LN lithics	EP, Ch./EB (main), LRom., Byz.	37.50508, 31.65850	Medium	Wasse and Rollefson 2005
Jebel Abu Thawwab	Jabal Abū Thawwāb	11351	0125096	Definite	Excav.	Excavated material culture (ceramics, lithics), Yarmoukian.	EBI	35.84647, 32.16276	High	Gillet and Gillet 1983; Kafafi 1985, 1988, 2001
Jebel Naja	Jabal Najāh	x	0134451	Definite	Excav.	Early/PNA, Lithics, C. ¹⁴ date (6290±100 cal BC).	area: LN-present	37.46987, 31.89489	Low	Betts <i>et al.</i> 2013
JF-010 4, Wādī ar-Ruwayshid ash-Sharqi	Wādī ar-Ruwayshid ash-Sharqi	x	0135907	Possible	Survey	Based on typology of structures.	Ch. and/or EB	35.86802, 30.53871	High	Fujii 2002b

Table 1. Late Neolithic (LN) sites reported in Jordan.

Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
JF-9705, Wadi Abu Safāh	Wādī Abū Safāh	x	0135906	Possible	Survey	Based on typology of structures.	Ch. and/or EB	35.91037, 30.44793	Negl.	Fujii 2002b
Jilat 23	Jīlāt	x	0134448	Probable	Survey, excav.	Concave truncation burins, LN type arrowheads.	None reported	36.42505, 31.50683	Low	Garrard <i>et al.</i> 1987, 1994
Jilat 24	Jīlāt	x	0134449	Probable	Survey, excav.	Lithics similar to Jilat 23.	None reported	36.42006, 31.50559	Low	Garrard <i>et al.</i> 1987, 1994
JKSH F15		64355	x	Probable	Unk.	Unknown (probably lithics, knapping site).	None reported	36.95642, 30.29038	High	MEGA-J after Abu-Azizeh & Tarawneh
JKSH F19		64358	x	Probable	Unk.	Unknown (probably lithics, knapping site).	None reported	36.99418, 30.22540	High	MEGA-J after Abu-Azizeh & Tarawneh
Karak Site Visits site 019	al-Karak	x	0154380	Probable	Visited	Lithics contained 3 concave truncated burins.	Not studied, but present	35.96909, 31.26230	Definite	Flohr and Finlayson in prep.
Karm II, 'Ain el-Karm	'Ayn al-Karm	6604	0160120	Probable	Survey	Mentioned under Pottery Neolithic in survey paper.	Ch., EB, Byz, 20 th C.	35.85016, 32.17516	Negl.	Gordon and Knauf 1987; MEGA-J
Kharaneh 2	al-Kharrānah	7681	0160595	Possible	Survey	1 diagnostic LN lithic	Unknown	36.45620, 31.72500	Negl.	Garrard <i>et al.</i> 1975
Kharaneh 7	al-Kharrānah	7680	0160594	Probable	Survey	"Diagnostic of Pottery Neolithic generally"	Unknown	36.45620, 31.72500	Negl.	Garrard <i>et al.</i> 1975
Khirbet Falah	Khīrbat Falāh		x	Possible	Survey	Ceramics possibly LN	Ch., EB, Byz., Isl., 20 th c.	35.57745, 32.25160	Low	Kafafi 1993 after Kafafi 1982
'LAS 27' (wrong identification)		5615	0133962	Possible	Visited	Lithics appear LN	present, but not studied	35.79002, 31.38160	Definite	Flohr and Finlayson forthcoming
LAS 27, LAS Field #825A		x	0136569	Definite	Survey, visited	26 LN lithics	LP/MP	36.05067, 31.38022	Definite	Clark <i>et al.</i> 2006
LAS 38, LAS Field #646		6873	0133963	Possible	Survey	2 LN lithics	Ch./EB, IA, ER/ Nab., LR/Byz, L.Isl.	36.00847, 31.38942	Low	Clark <i>et al.</i> 2006

Table 1. Late Neolithic (LN) sites reported in Jordan.

Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
LAS 41, LAS Field #647B		12755	0133964	Probable	Survey, visited	4 LN lithics. Not confirmed during site visit.	Multi-period, incl. Ch./EB	36.00374, 31.39192	High	Clark <i>et al.</i> 2006
LAS 59, LAS Field #686		6519	0133965	Probable	Survey	6 LN lithics	Multi-period, incl. Ch., EB	35.87935, 31.36563	High	Clark <i>et al.</i> 2006
LAS 78, LAS Field #231		6503	0133966	Possible	Survey	1 LN lithic	IA, ER/Nab., LR/Byz.	35.91541, 31.36159	Low	Clark <i>et al.</i> 2006
LAS 95, LAS Field #817		12763	0134414	Possible	Survey	2 LN lithics	Ch./EB	35.96049, 31.36346	Low	Clark <i>et al.</i> 2006
LAS 164, LAS Field #801		5555	0134415	Probable	Survey	6 LN lithics	EBIV, ER/Nab.	35.82930, 31.21731	Negl.	Clark <i>et al.</i> 2006
LAS 188, LAS Field #529		6490	0134416	Definite	Survey, visited	40 LN lithics reported	L/MP; U/EP	35.87065, 31.25311	Definite	Clark <i>et al.</i> 2006
LAS 236, LAS Field #643		6854	0134417	Possible	Survey	1 LN lithic reported	Ch./EB, ER/Nab.	35.95350, 31.26883	Low	Clark <i>et al.</i> 2006
LAS 250, LAS Field #644		6855	0134418, 0154382, 0154383	Probable	Survey, visited	9 LN lithics reported. Not confirmed during site visit.	MP, UP, Ch./EB, ER/Nab.	35.95821, 31.25883	Definite	Clark <i>et al.</i> 2006
LAS 259, LAS Field #645		6856	0134419	Possible	Survey	2 LN lithics reported	Multi-period, incl. Ch./EB	35.95979, 31.24652	Medium	Clark <i>et al.</i> 2006
LAS 284, LAS Field #622		12727	0134420	Possible	Survey	2 LN lithics	M/UP; Ch./EB, L.Isl.	35.98538, 31.23265	Low	Clark <i>et al.</i> 2006
LAS 327, LAS Field #28		3312	0134421	Probable	Survey	4 LN lithics	M/UP; Ch./EB, EB, ER/Nab.	36.12584, 31.16934	Low	Clark <i>et al.</i> 2006

Table 1. Late Neolithic (LN) sites reported in Jordan.

Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
LAS 532, LAS Field #828		12688	0136807	Possible	Survey, visited	1 LN lithic reported. Not confirmed during site visit.	Multi-period, main IA-Byz./Um.	35.95145, 31.06770	Definite	Clark <i>et al.</i> 2006
LAS 533, LAS Field #831		6803	0136808	Probable	Survey	3 LN lithics reported.	IA, ER/Nab., L.Isrl.	35.95466, 31.05976	High	Clark <i>et al.</i> 2006
Mahfour al-Ruweishid	Mahfur ar-Ruweyshid	8384	x	Possible	Excav.	Lithics, C ₁₄ date (5016±104 BC) – Chalcol.	Present	TBC	n/a	Betts <i>et al.</i> 2013
MN 329		x	0133882	Definite	Survey, visited	LN ceramics and lithics. Flakes observed on site visit.	PPNA?	35.70838, 31.75387	Definite	Mortensen <i>et al.</i> 2013
MN 423		x	0133883	Definite	Survey, visited	LN ceramics and lithics	Unknown	35.70701, 31.75137	Medium	Mortensen <i>et al.</i> 2013
MN 526		x	0133884	Definite	Survey, visited	LN ceramics and lithics	Rom/Byz.	35.73411, 31.77935	Medium	Mortensen <i>et al.</i> 2013
Pella, Tabaqat Fahh طبة فحل	Tabaqat Fahh	2705	0138858	Definite	Excav.	LN ceramics, lithics, and deposits in lowest layers	Multi-period	35.61421, 32.44938	Definite	Bourke <i>et al.</i> 1998, 2003
Qa' Megalla	Qa' Majallah	x	x	Probable	Survey	Area containing sites with concave truncation burins	PPNB	37.19966, 31.87403	general area	Betts <i>et al.</i> 2013
Qa' Naja West	Qa' Najah	x	x	Probable	Survey	Area containing sites with LN lithics	TBC	37.33620, 31.92288	general area	Betts <i>et al.</i> 2013
Qa' Naja East	Qa' Najah	x	x	Probable	Survey	Area containing sites with LN lithics	TBC	37.41726, 31.92962	general area	Betts <i>et al.</i> 2013
Rahub, Ain Rahub, Tell RaHoob	Rahub, 'Ayn Rāhūb, Tall Rāhūb	part of 2833	0122115	Definite	Excav.	LN material incl. ceramics (Yarmoukian), but might not be in situ	EP (Natufian)	35.93107, 32.61011	High	Muhsen <i>et al.</i> 1988; Kafaf 1989
Rumman (North)	Rumman	11382	0160124	Probable	Survey	Mentioned under Pottery Neolithic in survey report.	Multi-period, incl. Ch., EB	35.83339, 32.16009	Low	Gordon and Knaut 1987; MEGA-J
Ruweishid as-Satih, RS91	Ruweyshid as-Sath	x	x	Probable	Survey	Lithics comparable to Jabal Najah.	Unknown	TBC, E Desert	n/a	Betts <i>et al.</i> 2013

Table 1. Late Neolithic (LN) sites reported in Jordan.

Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
Salihī	aṣ-Ṣāliḥī	11363	x	Possible	Survey	Ceramics possibly LN.	Ch., EB, Hell, R., Byz., Isl.	35.82788, 32.12825	Negl.	Kafafi 1993 after Kafafi 1982
eh-Sayyeh	Ḥusayyah	7174	0134423	Definite	Survey, Excav.	Ceramics, lithics. Main: PPNC-Yarmoukian.	PPNB, PPNC, Ch./EB	36.05021, 32.14889	High	Bartl and Kafafi 2015
SGNAS 21		8561	0134446	Possible	Survey	2 LN sherds, + undiagn. Neolithic lithics.	EB, Nab.	35.39066, 30.67085	Low	MacDonald 1992
SGNAS 29		8560	0134588	Possible	Survey, Visited	1 LN sherd	Ch., Ch./EB	35.39027, 30.67226	High	MacDonald 1992
SGNAS 75+76, Feifa	Fifa	8774	0134444	Definite	Survey, Excav.	46 LN sherds. LN occupational layers found in excavation.	LN/Ch., Ch. Ch./EB	35.46046, 30.93867	High	Schaub 1991; MacDonald 1992
SGNAS 92		4075	0134445	Probable	Survey, visited	4 LN sherds. Could not be confirmed during 2018 visit: either wrong location or site was destroyed.	LN/Ch., Ch.	35.46166, 30.92959	Low	MacDonald 1992; see Flohr and Finlayson forthcoming
SGNAS 95		8763	0160456	Possible	Survey	1 LN sherd	Ch./EB	35.46375, 30.93048	Negl.	MacDonald 1992
esh-Shalaf, الشلالف	ash-Shalāf	60329	0122109	Definite	Excav.	Ceramics and lithics, Yarmoukian.	Rom.	35.95335, 32.58245	Medium	Bienert <i>et al.</i> 1999; Bienert and Vieweger 1999; 2000
SHUBS 100		x	0119657	Definite	Excav.	Cairn with 5 LN points.	None	37.25699, 32.40128	Definite	Richter 2014 (Shubayqa Survey)
Surwwan, Tell Abu Al-Surwwan	Tall Abū aṣ-Ṣurwān	2938	0160452	Definite	Excav.	Ceramics and lithics, Yarmoukian.	PPNB	35.99210, 31.86310	High	al-Nahar 2010
Tell Wādi Feinan	Tall Wādī Finan	x	0122093	Definite	Excav.	Ceramic, lithics, C. dates. Late in the Late Neolithic.	Later field system	35.47774, 30.62717	Definite	Najjar <i>et al.</i> 1990
Um Guweah	Umm Quwa'ah	x	x	Probable	Survey	Late LN based on ceramics analysed by C. Bennett.	Ch., Rom.	South, Wādī Rumman	n/a	Jobling 1981
Um Uqser	Umm Quṣayr	x	x	Probable	Survey	Based on ceramics analysed by C. Bennett.	Rom.	Wādī Rum	n/a	Jobling 1981

Table 1. Late Neolithic (LN) sites reported in Jordan.

Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
Umm el-Basatīn I	Umm al-Basatīn	5818	0160122	Probable	Survey	Mentioned under Pottery Neolithic in survey report.	Ch., unknown	35.84319, 32.17080	Negl.	Gordon and Knauf 1987
Uweinid 9	'Uwaynid	7897	x	Possible	Survey	1x LN Byblos point-like.	PPN?	36.7290, 31.7289	Negl.	Garraard <i>et al.</i> 1975
Wādī al-'Ajīb 35	Wādī al-'Ajīb	x	0133865	Probable	Survey	Lithics	Pal., EP, PPNB, Rom.	36.33480, 32.17134	Low	Betts 1985
Wādī Nukheila Site J608	Wādī Nukhaylah	x	0160447	Definite	Excav.	C ₁₄ date (6294±92 cal BC; charcoal), LN projectile points, flakes.	None	35.19885, 30.01308	Low	Henry <i>et al.</i> 2001
Wādī Qattāfī Mesa-4	Wādī Qattāfī	2958	0134453	Definite	Excav.	LN lithics (Yarmuk, Haparsa points) and C ₁₄ date (PNB).	Multi-period?	37.45053, 31.81840	High	Rowan <i>et al.</i> 2017
Wādī Qattāfī Mesa-7	Wādī Qattāfī	x	0160592	Definite	Excav.	Lithics, C ₁₄ date (PNA).	Multi-period?	37.45053, 31.81840	High	Rowan <i>et al.</i> 2017
Wādī Rājīl VIII-4	Wādī Rājīl	60206	0160589	Definite	Survey	LN diagnostic lithic(s)	EP, Ch., BA, Byz., 20 th c.	37.02466, 32.32716	High	Müller-Neuhof in prep.; MEGA-J
Wādī Rājīl VIII-7	Wādī Rājīl	60204	0160590	Probable	Survey	LN diagnostic lithic(s)	Ch., EB	37.05476, 32.34122	High	Müller-Neuhof in prep.; MEGA-J
Wādī Rājīl VIII-14	Wādī Rājīl	60190	0160577	Definite	Survey	LN diagnostic lithic(s)	None	37.14979, 32.36501	High	Müller-Neuhof in prep.; MEGA-J
Wādī Rājīl VIII-37	Wādī Rājīl	60245	0160587	Definite	Survey	LN diagnostic lithic(s)	EP, PPNA, Ch. EB, LR, Byz., 20 th c.	37.07331, 32.33782	High	Müller-Neuhof in prep.; MEGA-J
Wādī Salāḥīb	Wādī Salāḥīb	x	x	Probable	Survey	Area with burin Neolithic sites and PPNB-LN knapping sites	PPNB	37.27148, 31.93039	general area	Betts <i>et al.</i> 2013
Wādī Shu'ayb, Tell	Tall Wādī Shu'ayb	5144	0134454	Definite	Excav.	PNA ceramics (Yarmoukian and Jericho IX), LN lithics	PPNB, PPNB	35.72772, 31.97349	Definite	Simmons <i>et al.</i> 2001

Table 1. Late Neolithic (LN) sites reported in Jordan.

Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
Wādi Thamad Neolithic site(s), Umm Meshrat	Wādi ath-Thamad, Umm Mashrat	x	0135621, 0134425-28	Definite	Survey, Excav.	Large area of Neolithic occupation with 'sites' WT-40, WT-95, WT-96, WT-97, WT-104, WT-105. PNA lithics and ceramics	EP	35.89630, 31.58613	Definite	Cropper <i>et al.</i> 2003; Foley and Foley 2008
Western Harra Project Site 2772	al-Harrah	x	0160444	Possible	Survey	Burin site typical of LN	Unknown	37.22199, 32.02122	Low	Chambrade and Smith 2019
WHNBS 469		12129	0160157	Possible	Survey	Possibly LN in Wādi al-Ḥasā North Bank Survey	PPN?, Ch.?	35.87210, 30.91390	Low	Clark <i>et al.</i> 1994; MEGA-J
WHNBS 471		6373	0160158	Possible	Survey	Possibly LN in Wādi al-Ḥasā North Bank Survey	PPN?, Ch.?	35.87120, 30.91460	Low	Clark <i>et al.</i> 1994; MEGA-J
WHS 149, Khirbet Hammam	Khirbat Ḥamām	10036	0122272	Probable	Survey, Excav., Visit	8 LN sherds in survey, no evidence in excavation, but may be in other part of site	PPNB, Nab.	35.66608, 30.98416	Definite	MacDonald 1988; Peterson 2003, 2007
WHS 307, Ras al-Siq	Ras as-Siq	5511	0122431	Definite	Survey, Visit	Large concentration of mainly LN sherds.	Nab., Rom., Byz.	35.73626, 30.96361	Definite	MacDonald 1988
WHS 524, Khirbet Darīh II	Khirbat ad-Darīḥ	9994	0122649	Definite	Survey, Excav., Visit	Large concentration of LN sherds, PNA.	None	35.703504, 30.911724	Definite	Bossut <i>et al.</i> 1988; MacDonald 1988; Bossut and Kafafi 2005
WHS 857		5495	0122985	Possible	Survey	Small number of LN sherds.	EB	35.81879, 30.89551	Low	MacDonald 1988
WHS 870		6106	0122998	Possible	Survey	Small number of LN sherds.	Pal., Rom., Isl.	35.86378, 30.88009	Low	MacDonald 1988
Wisad 1	Wisād	2953	0119677	Definite	Survey	LN projectile points and bifacial knife fragments.	None	37.96551, 31.90395	Medium	Wasse and Rollefson 2005
Wisad Pools	Wisād	2953	0119678	Definite	Excav.	W-66 and W-80: Yarmoukian C ₁₄ dates, lithics.	Multi-period	37.97091, 31.90973	High	Rollefson <i>et al.</i> 2013; Rowan <i>et al.</i> 2017

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Name(s)	Alternative name(s)	MEGA-Jordan	EAMENA	LN certainty	Type of research	Evidence for LN	Other periods	Lat., long.	Location certainty	References
WQ117, Wādi Quseiba 117	Wādi Qusaybah	64164	0134430	Definite	Excav.	Ceramics, lithics. Yarmoukian.	None	35.63406, 32.55720	Medium	Banning <i>et al.</i> 2015; Hitchings <i>et al.</i> 2016
WQ335, Wādi Quseiba 335, Jawāfāt Shaban	Wādi Qusaybah, Jawwāfāt Sha'bān	64168	0134429	Definite	Excav.	Ceramics, flakes. Wādi Rabāh. (PNB).	None	35.67708, 32.54503	High	Banning <i>et al.</i> 2015; Hitchings <i>et al.</i> 2016
W5WP Bayda 36	al-Baydā	4326	0134781	Possible	Survey, visit?	No dating evidence in initial survey, but in DAAHL LN is reported.	Nab., Isl.	35.44285, 30.41002	Low	DAAHL; 'Amr and al-Momani, 2001
WT4, Menakh	Manākh	2653	0134435	Definite	Survey	Small amount of LN artefacts.	EP	35.64745, 32.53656	High	Kadowaki <i>et al.</i> 2008
WZ120, Tell Rakan I	Tall Rākān	2652	0134431	Definite	Excav.	Lithics, ceramics. Yarmoukian.	LPPNB, Ch., EB	35.65703, 32.51798	High	Banning and Nejjar 1999; Banning and Gibbs 2010
WZ135, al-Basātin, WZ140	al-Basātin	2649, 10589	0134432	Definite	Excav.	Lithics, ceramics, C., dates. PNB.	EB	35.64702, 32.51676	High	Banning <i>et al.</i> 2005; Kadowaki <i>et al.</i> 2008
WZ148, Uyyun al Hamman	'Uyūn al-Hammān	2650	0134434	Probable	Survey, Excav.?	One possible LN burial with probable LN sherds on top.	EP (main)	35.70456, 32.50724	Medium	Kadowaki <i>et al.</i> 2008
WZ200, Tabqat al-Buma	Tabqat al-Būmah	2651	0125088	Definite	Excav.	PNA/Yarmoukian grave, domestic occupation probably ca. 5900–5000 BC.	EP	35.71093, 32.50287	High	Banning <i>et al.</i> 1996, 2011; Kadowaki <i>et al.</i> 2008
WZ307		x	0134436	Probable	Survey	Shown on map of LN sites, no further info found.	Unknown	35.69862, 32.50880	Low	Banning and Gibbs 2010
WZ310, 'Aqaba, WZ312	al-'Aqabah	2924	0134433	Definite	Excav., Survey	Ceramics, lithics. PNB. WZ312 is secondary redeposition of WZ310.	Ch., EB	35.70550, 32.50660	High	Banning <i>et al.</i> 1996; Kadowaki <i>et al.</i> 2008; Banning and Gibbs 2010

of this period have found their way into the table and need to be separated out in future. Of course, even the Late Neolithic as reported here is an almost 1500-year-long period, and currently the sub-periods of many of the sites are unknown (but see FIG. 2). In any case, the research shows that a substantial number of Late Neolithic sites are already known. While the number may lag behind that of many of the later periods, it confirms that there was no ‘collapse’ or decline during this period anywhere in Jordan.

Preliminary Conclusions about Site

Location

Of the sites/site groups included here, about half are in current desert areas. This most likely reflects the excellent preservation there, although it may also reflect wetter climate conditions in the past. Many, if not most, Neolithic people would have lived and farmed in the zones that currently have higher rainfall and are still farmed and lived in, exposing the sites to more frequent damage and destruction (Flohr and Finlayson forthcoming). In the east-west *wadi* areas, geomorphological processes of colluviation and heavy water erosion are also much more active, covering or eroding many Late Neolithic sites (Banning 2015).

Unsurprisingly, the Late Neolithic sites, at least those with some domestic and/or agricultural/pastoral function, are located close to water sources including perennial or seasonal watercourses and springs (sites with funerary/memorial/ritual functions are not so closely associated with water). Otherwise there is considerable variation in site location, presumably depending on site function. In the Wādī Ziqlāb and Wādī Quṣaybah, it was noted that Late Neolithic sites were often present near *wadi* confluences (Hitchings *et al.* 2016). This is also the case for a number of other sites in the agricultural zone outside this

area, such as al-Ḥusayyah, abu Sunaysilah, ‘Ayn Ghazāl, Wādī Shu‘ayb, and Tall Wādā Faynān, WHS 149 (if indeed LN). The reason for this, presumably, was that these areas tend to be naturally wet and fertile. Along these lines we can see other sites that are not near *wadi* confluences but are placed where good agricultural areas are present, at least nowadays, such as WHS 307, WHS 524, WT-4 (on an alluvial fan), MN 329, MN 423, MN 526, and the Wādī ath-Thamad Neolithic site(s). However, there are also Late Neolithic settlement sites for which it is not directly obvious why the site was located where it was.

Next Steps

This list of Late Neolithic sites is only a starting point, and I invite comments from colleagues: do they know of additional Late Neolithic sites? Or perhaps that some of the sites have now been shown not to be Late Neolithic?

This still preliminary—but even so, substantial—list of sites now allows more formal GIS analyses than the quick observations discussed above. The intention is to define patterns to create a GIS model to find more Late Neolithic sites. This has been achieved in the Wādī Ziqlāb, where such a model is used to find areas where sites could have been preserved, also taking into account Neolithic agency in deciding where to live (Banning *et al.* 2013; Hitchings *et al.* 2016).

It is not possible to use a single model for all of Jordan, or for all site types combined: different landscapes are used in different ways and by different groups. In addition, more targeted field surveys are needed to investigate regional settlement patterns (Gibbs and Banning 2013). Therefore, the next step for my research is to focus on the al-Karak Plateau. This area is located on the interface of different environmental zones, and survey work will examine areas in each of the environmental zones, specifically

targeting areas that are more likely to contain Late Neolithic occupation.

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