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New Insights
into the Iron Age
Archaeology
of Edom, Southern Jordan

Volume 2

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7 PATTERNS OF IRON AGE MINING AND SETTLEMENT IN JORDAN'S FAYNAN DISTRICT

The Wadi al-Jariya Survey in Context

Kyle A. Knabb, Ian W. N. Jones, Mohammad Najjar, and Thomas E. Levy

As a part of the University of California at San Diego (UCSD)–Department of Antiquities of Jordan Edom Lowlands Regional Archaeology Project (ELRAP) in 2007, an intensive pedestrian survey was carried out along a 4-km stretch of the northern aspect of the Wadi al-Jariya. This work completed an earlier ELRAP survey of the southern portion of the Wadi al-Jariya aimed at exploring the Iron Age landscape of ancient mining and metallurgy. A total of 96 new sites were recorded in Wadi al-Jariya. The following is a preliminary analysis of the settlement pattern data collected that season. To better characterize the nature of occupation in the research area, sites of all types from all time periods were recorded, ranging from prehistoric through modern periods. In addition, we present the results of a small systematic survey of Wadi Fidan that was carried out in 2004. This survey completed the survey of a previous Jabal Hamrat Fidan/ELRAP survey of Wadi Fidan. Both surveys documented significant Iron Age settlement devoted to metal extraction and processing. This chapter summarizes the settlement pattern data from two catchment areas (the Wadi al-Jariya/Wadi al-Ghuwayba catchment and the Wadi Fidan catchment) and its relationship to the greater Iron Age settlement in the Faynan district and surrounding regions.

Introduction

This chapter presents the cumulative results of four seasons of archaeological surveys conducted by the Jabal Hamrat Fidan (JHF)/Edom Lowlands Regional Archaeological Project from 1998 to 2007 (Figure 7.1), focusing on the Iron Age material. In addition to the previously published data (Levy et al. 2003; Levy et al. 2001), we describe the unpublished results of two additional seasons of archaeological survey. The first,

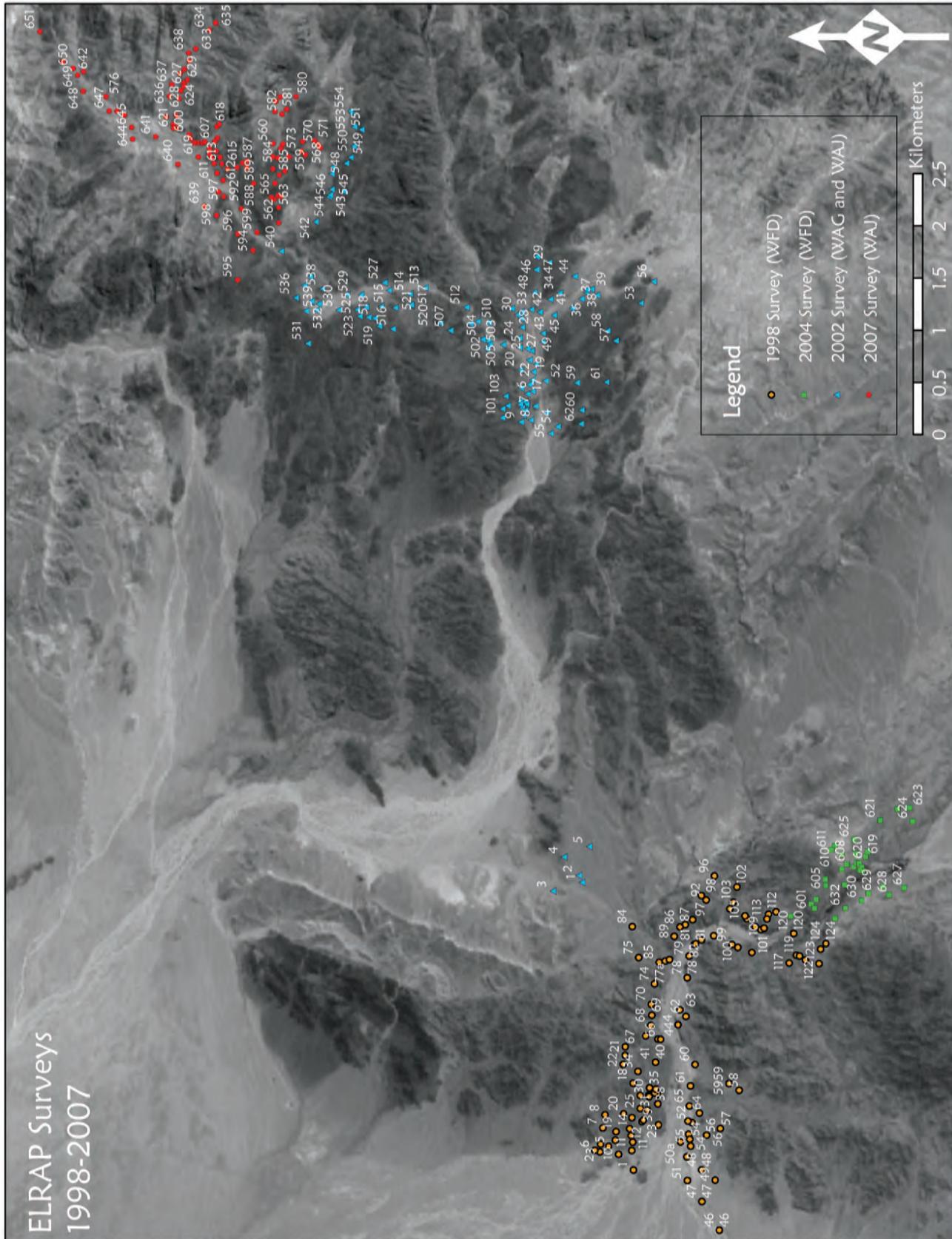
conducted in 2004, is a small survey of Wadi Fidan that focused on an area southeast of the 1998 survey boundaries. The second, conducted in 2007, is a continuation of the 2002 survey of the Wadi al-Jariya and completed the systematic survey of that wadi system.

Methodological Considerations

Most archaeological survey projects in southern Jordan have had as their main objective to record and describe

Opposite: The Wadi al-Jariya upper basin, looking northwest. The dark outcrops of the Burj formation host extensive Iron Age copper mines. In the background are the 'Araba Valley and Hazeva. *Photo E. Ben-Yosef, UC San Diego Levantine Archaeology Laboratory.*

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settlements in the region (Hart 1986, 1989; Hart and Falkner 1985; Lindner 1992; MacDonald 1988, 1992; MacDonald et al. 2004). Most of the surveys conducted have been purposive or extensive, relating to either one time period or to prominent sites on the landscape. Because the emphasis is on the site itself, rather than the site in its landscape and context, interpretations of the data often devolve into evaluative statements about the relative frequency of sites from a particular occupation period (McQuitty 2005). These surveys are biased toward large, highly visible sites with dense scatters of surface ceramics. They also tend to recover a low density of sites compared to intensive pedestrian surveys. This relationship has been empirically tested by Plog et al. (1978), who showed that there is a strong positive correlation between survey intensity—the degree of detail inspected within the survey boundaries—and the density of sites recorded within a survey area. The current project employs methodologies developed elsewhere in the Mediterranean that deal with these issues (Alcock 1993; Bintliff and Sbonias 1999). The boundaries of the ELRAP surveys are relatively small and focus on natural and cultural boundaries, defined by the catchment areas around the wadis (Figure 7.2). Surveyors were spaced no more than 25 to 50 m apart during the surveys.

There are a number of approaches to defining what constitutes a site in an archaeological survey. A common definition of a site uses artifact density or material remains as the main criterion (Plog and Hill 1971). Variations of this approach are common in surveys in Jordan. Off-site survey, on the other hand, treats the landscape as a continuous artifact of human behavior. Proponents of this approach noted the failure of site-based approaches to recover evidence of nonsedentary peoples who leave behind little material evidence (Dunnell 1992; Thomas 1975). The ELRAP research design attempts to incorporate elements of both approaches to defining a site. Thus, when we speak of a site in this chapter, it refers to a distinct spatial clustering of artifacts, ecofacts, structures, and other human-related features.

Theoretical Considerations

One of the key theoretical issues investigated by ELRAP is the role of technology in social evolution. Ancient copper production entails technologies that have a strong archaeological signature, easily detectable through both survey and excavation. Archaeological data collected in the Faynan region, with its rich copper

sources and long history of copper mining and smelting, lends itself to investigation through archaeological production models.

Production is an inherently social activity. Archaeologists have linked craft production to sociopolitical organization through an emphasis on specialization and its connection to the rise of complex societies (Brumfiel 1987, 1998; Costin 2004; Peregrine 1991; Sinopoli 1998). A comprehensive description of the production systems in place during the Iron Age in Faynan, based on the results of archaeological surveys and excavations, is presented in Chapter 11, this volume.

Research Background

As noted above, this chapter focuses on previous surveys conducted by the UCSD ELRAP. The history of archaeological survey and other major archaeological projects conducted in Faynan are detailed in Chapter 5 (this volume).

The UCSD surveys were some of the first full-coverage, systematic surveys conducted in southern Jordan and complement the archaeological surveys carried out in Wadi Faynan (Barker et al. 2007). Three wadi channels have been surveyed since 1998: Wadi Fidan, Wadi al-Ghuwayba, and Wadi al-Jariya. Wadi Fidan and Wadi Faynan are part of the same catchment system, as are Wadi al-Jariya and Wadi al-Ghuwayba. While the recording methods have varied from season to season as we purchased new equipment, the survey methodology and research design have remained consistent.

Description of the Wadis

Wadi Fidan is the lower portion of Wadi Faynan. It begins near the modern Bedouin village of Qurayqira, where the Wadi Faynan cuts through Jabal Hamrat Fidan monzogranite range, forming a narrow gorge. At this narrowing point, there is a perennial spring called 'Ayn Fidan, which gently flows for a few hundred meters along the wadi. From the spring, the wadi continues westward and passes through the Minshar monzogranite for about 2 km until it debouches into the 'J Valley (Figure 7.3). Along this segment of the wadi, patches of Pleistocene conglomerates make up terraces where a number of sites were discovered in 1998. Wadi Fidan constitutes a natural pass in the mountainous region of Jabal Hamrat Fidan and a gateway between the Faynan copper ore district and the plains of the 'Araba to the west.

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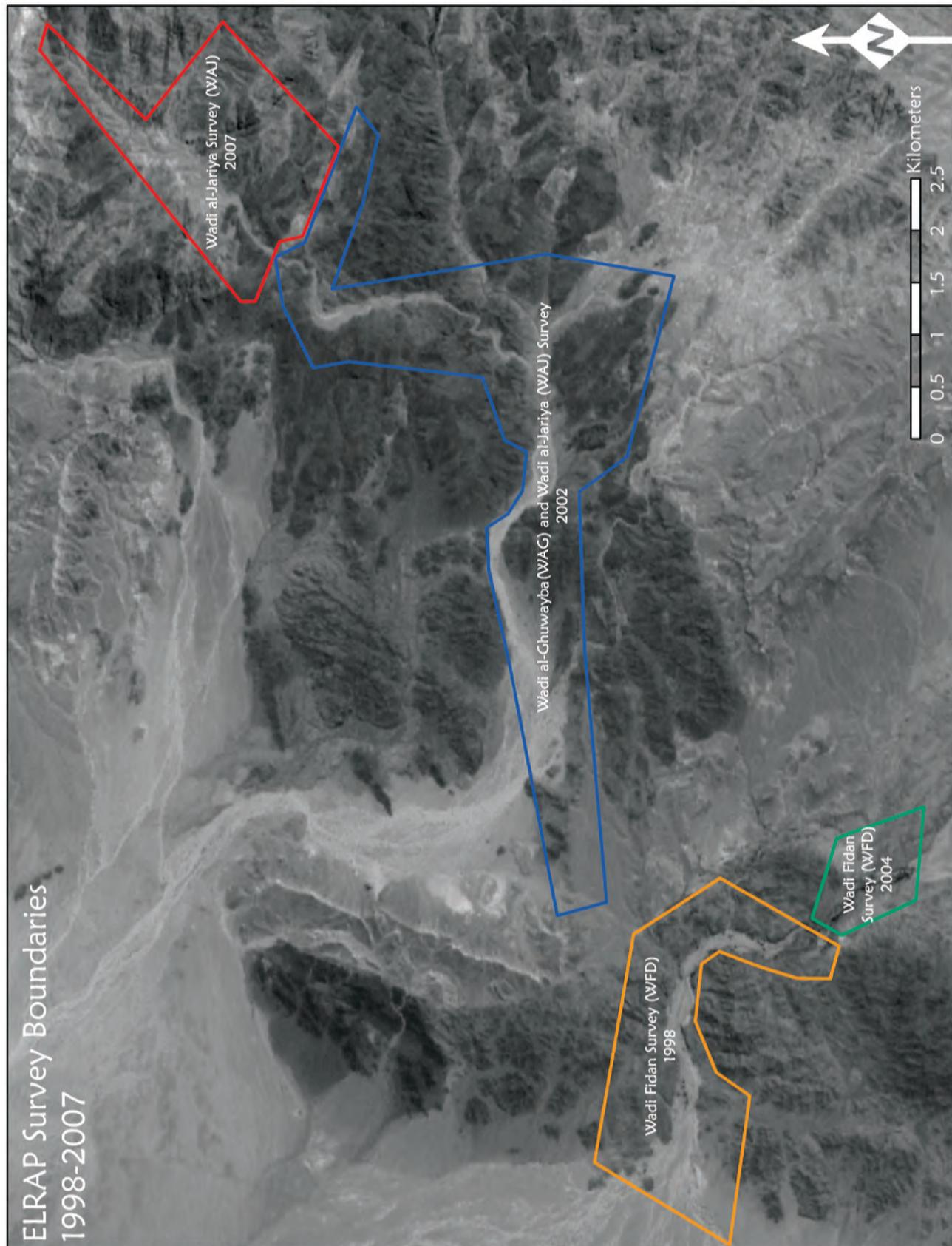


Figure 7.2 Map of the boundaries of all ELRAP surveys conducted from 1998 to 2007. Background image: (C) CNES/SPOT Image 1992-1994.



Figure 7.3 Overview of Wadi Fidan. Wadi 'Araba in the background.



Figure 7.4 Overview of Wadi al-Ghuwayba.

Just a few kilometers northeast of Wadi Fidan, Wadi al-Ghuwayba (also Wadi al-Ghuweiba) was most likely part of the same settlement system during the Iron Age. It flows for 14 km to the west, around the Jabal al-Minshar (the northern extremity of the Jabal Hamrat Fidan), eventually reaching the Wadi 'Araba. To the east, the wadi splits into two smaller drainages, named Wadi Ghuwayba al-Ghani (the wet) and Wadi Ghuwayba al-'Atshana (the thirsty, the dry). The northern drainage cuts through the Hunayk monzogranite mountains on the north bank of the wadi, and Burj dolomite-shale and Salib arkosic sandstone on the south bank of the wadi. The southern drainage cuts through Burj dolomite-shale and fluvatile gravel terraces. To the west, the wadis merge just east of where Wadi al-Jariya debouches into the Wadi al-Ghuwayba. Here, the Wadi al-Ghuwayba passes through the Hunayk monzogranite and Finan granitic formations, Salib arkosic sandstone, Burj dolomite-shale, and occasional terraces of fluvatile gravel. The wadi bed is composed of alluvium and wadi sediments (Figure 7.4). Just before the wadi empties into the Wadi 'Araba, it passes through a formation of Kurnub sandstone and aeolian sand and dunes in the northwestern-most extremities.

Wadi al-Jariya flows south from the Wadi ad-Dahal for 6.5 km until it empties into Wadi al-Ghuwayba approximately 1 km east of Khirbat en-Nahas. In the northernmost sections, the wadi is deeply incised and narrow, and would have served little purpose other than as a road to the plateau, and possibly a local water source (Thmilat al-Jariya, FBRS Site 59; see Chapter 5 [this volume] for description of the site and the ancient road). Here, the wadi flows through the Muwaqqar chalk marl, the Wadi Umm Ghudran



Figure 7.5 Wadi al-Jariya north of Khirbat al-Jariya.

chalk, and other chalky limestone formations (Figure 7.5). Three kilometers northeast of Khirbat al-Jariya, the wadi cuts through the Umm Ishrin sandstone. As the wadi flows south, it continues to pass through Burj dolomite-shale and Salib arkosic sandstone formations that are rich in copper ores, as well as a small area of fluvatile gravel beds. This area is also where the Iron Age copper smelting site Khirbat al-Jariya was established (Ben-Yosef et al. 2010). The southern portion of the wadi passes through the Hunayk monzogranite and some of the Salib arkosic sandstone. Here the wadi is very narrow—only a few meters wide in some places. Approximately 3 km south of Khirbat al-Jariya, the wadi flows into Wadi al-Ghuwayba.

Vegetation in the Wadi al-Jariya is sparse. Because the area receives little water, plant life is restricted to the most arid-adapted plants, such as *Haloxylon* and other small shrubs. The spring at the north end of the wadi produces little more than a trickle, so the wadi

is usually dry. A few secondary small valleys connect to the Wadi al-Jariya from the east. These were also included in the survey area. Like Wadi al-Jariya, they have steep sandstone walls and cut through ore-bearing deposits. The wadi soils are composed of decomposing sandstone and granite. Rough terrain and high relief also contribute to the lack of suitable agricultural land. In short, the lack of water, good soil, and areas of low relief restricted any type of permanent settlement in the region.

Survey Design, Recording Methodology, and Results from Previous Surveys

The main goal of the 1998 survey (Levy et al. 2001) was to provide a broad settlement context for ongoing and future excavations at five archaeological sites: Wadi Fidan 001 (also known as Tel Tifdan), a Pre-Pottery Neolithic B (PPNB) site (Levy et al. 2001; Twiss 2007, 2008); Wadi Fidan 4, an Early Bronze Age (EBA) I village (Adams and Genz 1995); Khirbat Hamra Ifdan, an EBA III to IV copper smelting site; Wadi Fidan 40 (Levy et al. 1999; Levy, Najjar, Muniz, et al. 2005), an Iron Age cemetery; and Khirbat en-Nahas, an Iron Age copper smelting site (Levy et al. 2004; Levy et al. 2008). The lack of systematic settlement surveys in the region was viewed as a hindrance to the interpretation of these sites when the project began in 1997. Thus, the 1998 survey aimed to clarify the regional dynamics of settlement within the study area, and the study presented here continues this goal by focusing on the Iron Age data.

In 1998, project members surveyed a 4.5-km² segment of Wadi Fidan in 10 days. During this time, seven surveyors walked transects at 50-m intervals. The survey boundaries included the area around Khirbat Hamra Ifdan and followed the wadi northwest to where it empties into the Wadi 'Araba (Figure 7.6). In the small area, the surveyors recorded 125 sites, which were defined as "a distinct spatial clustering of artifacts, features, structures, and ecofact[s]" (Levy et al. 2001:173). Based on the results of the survey data, surveyors suggested that Wadi Fidan was a locus of copper smelting in the Early Bronze Age, while in the Iron Age copper production was carried out on a more limited scale.

In 2004, a 15-day archaeological pedestrian survey was carried out in the south section of the Wadi Fidan (data from this survey first published here). The survey began where the 1998 survey left off, to the southeast of

Khirbat Hamra Ifdan, and continued for 250 m south of the 'Ayn Fidan. The objective of this survey was full coverage of 350 m of either side of the Wadi Fidan. Site perimeters were identified first by the most obvious contemporary architectural features, such as the Roman/Byzantine defensive structure at Wadi Fidan District (WFD) 617. If features of multiple periods were present (i.e., an Iron Age structure built over a Paleolithic flint field), then the site perimeter was established based on the largest feature perimeter. If a site contained isolated features (such as single walls or cairns), the site perimeter was established based on geological variables (e.g., a series of decayed limestone mounds). Environmental variables were also noted for each site. Digital photographs were taken of site overviews and important architectural features. Surface finds were sampled for each general site area and specific feature. Site perimeters and feature perimeters were mapped using a total station. Each site was given a general feature number and each feature given a separate feature number. These numbers were attached to each spatial data polygon and to the surface finds. A total of 33 sites were recorded in a 0.13-km² surveyed area (Figure 7.7). These ranged in type from Middle Paleolithic flint fields to modern Bedouin camp sites, with the majority being cairn fields and small clusters. Similar to the other surveys, many sites had multiperiod use.

The 2002 survey of Wadi al-Ghuwayba and Wadi al-Jariya (Levy et al. 2003) covered 12 km² in three weeks and was primarily aimed at contextualizing the Iron Age landscape around Khirbat en-Nahas prior to the first large-scale excavation (see Chapter 2, this volume). The survey team walked transects spaced up to 50 m apart. The survey boundaries included all areas within 250 m of the wadi channels. In total, the surveyors recorded 118 sites: 64 in Wadi al-Ghuwayba and 54 in Wadi al-Jariya (Figure 7.8).

It is important to note that this survey did not cover the upper reaches of both tributaries of Wadi al-Ghuwayba (al-'Atshana and al-Ghani, see above). These areas, particularly the region around the oasis of 'Ain al-Ghuwayba (Ghuweiba), are rich in archaeological sites, many of which were recorded by the Faynan-Busayra Regional Survey (Chapter 6, this volume, The Ras al-Miyah Archaeology Complex). However, significant portions of the region still await a detailed pedestrian survey, the data of which are necessary for comprehensive analysis of the water catchment as a whole.

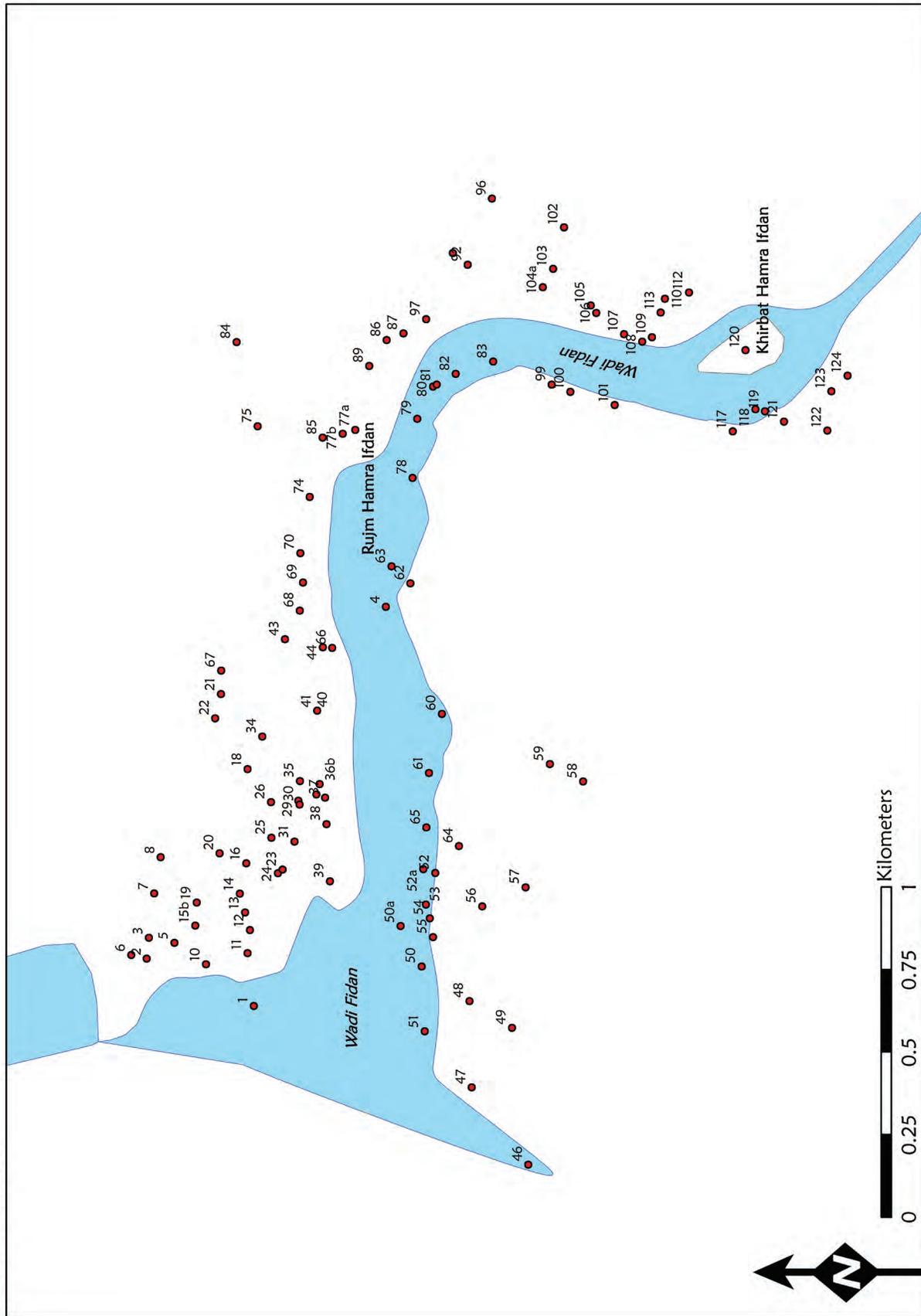


Figure 7.6 Map of all sites recorded during the 1998 Wadi Fidan survey.

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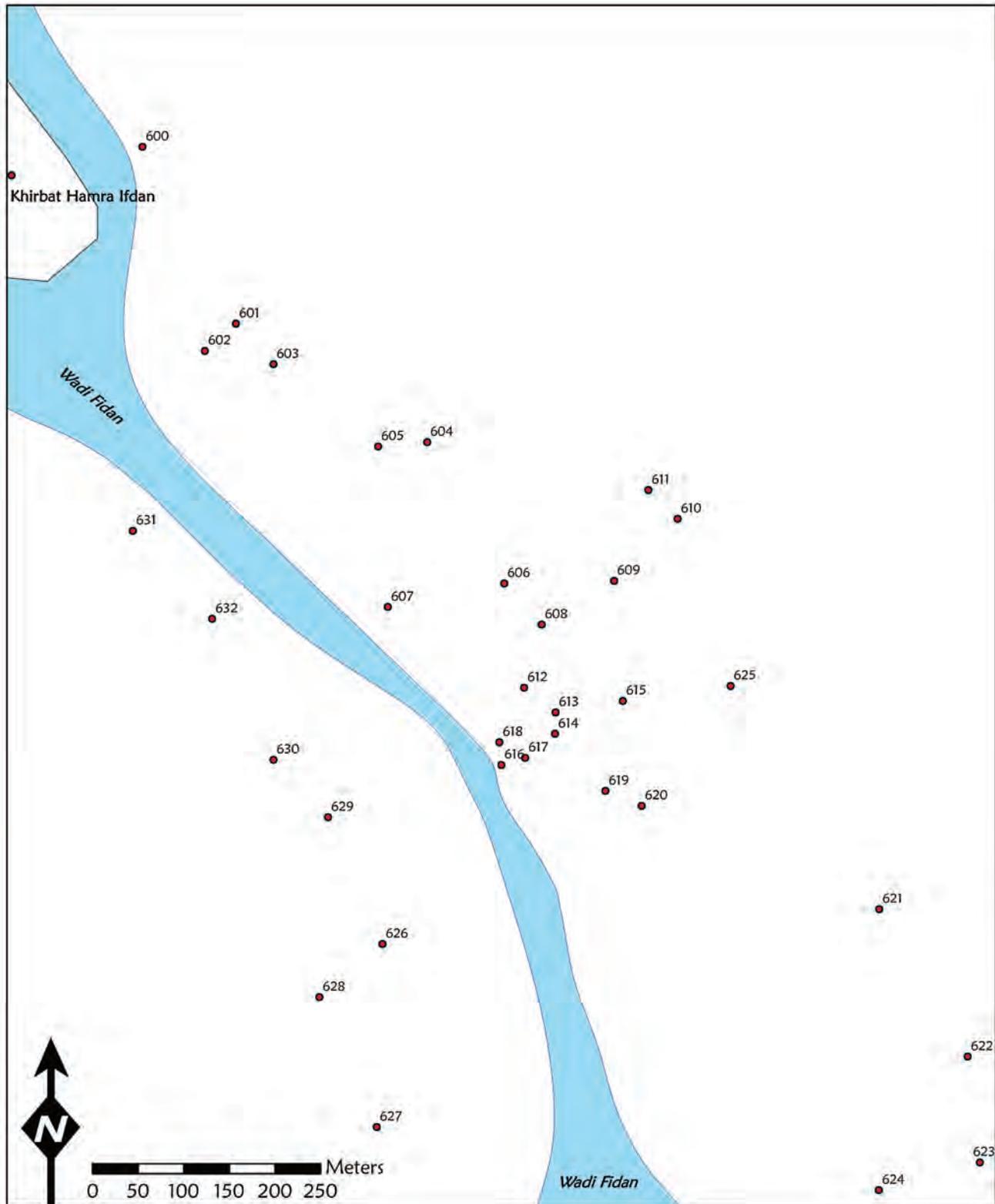


Figure 7.7 Map of all sites recorded during the 2004 Wadi Fidan survey. The 2004 survey area is located to the southeast of Khirbat Hamra Ifdan.

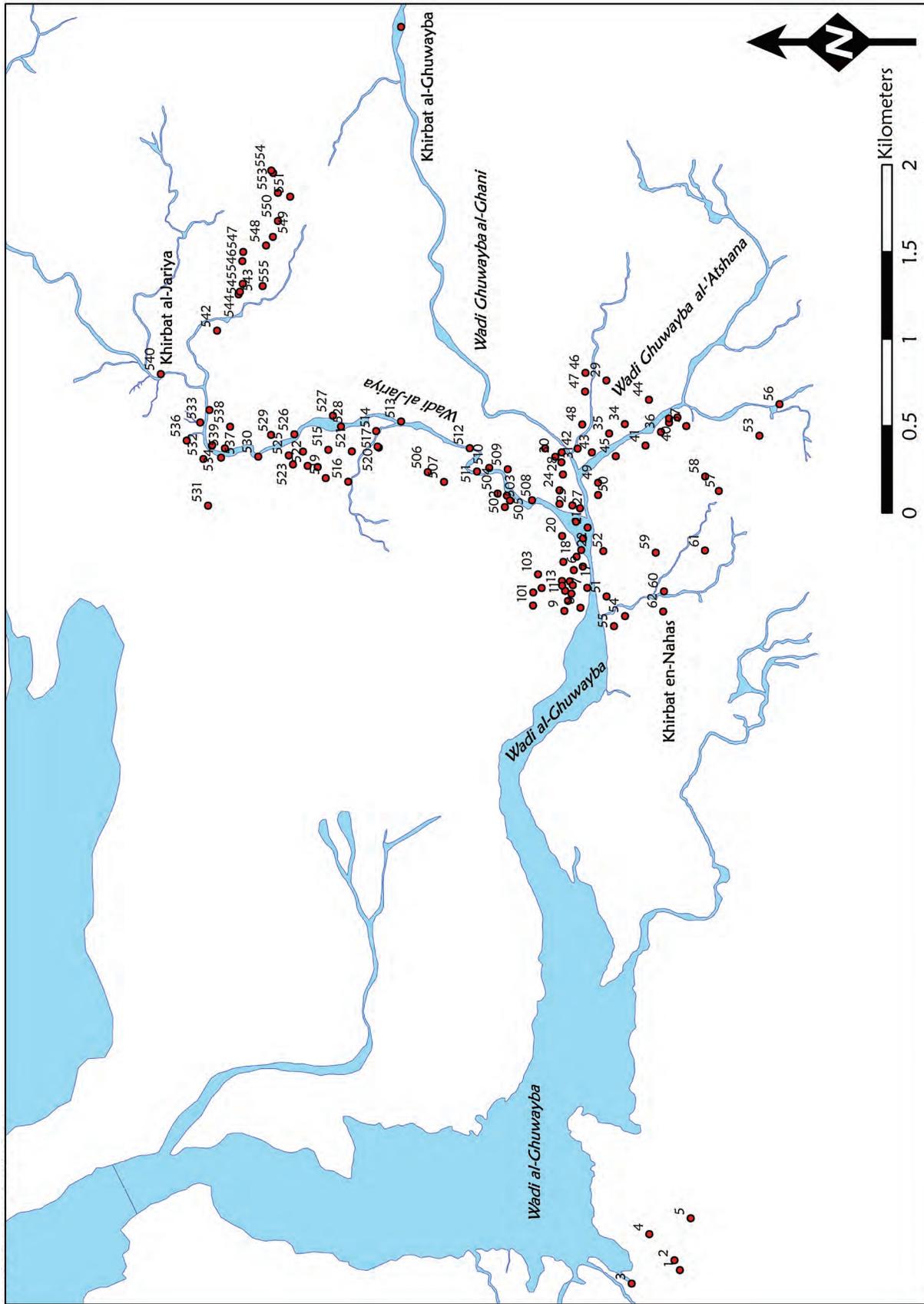


Figure 7.8 Map of all sites recorded during the 2002 Wadi al-Chuwayba and Wadi al-Jariya survey.

The most prominent of the sites in the Wadi al-Ghuwayba/Wadi al-Jariya survey are Khirbat en-Nahas, Khirbat al-Jariya, and Khirbat Nuqayb al-Asaymir. The smelting site of Khirbat en-Nahas forms the centerpiece of the Iron Age study presented in this volume. In addition, Khirbat al-Jariya is a key component of the earliest Iron Age copper production in Faynan (Ben-Yosef et al. 2010). Khirbat Nuqayb al-Asaymir is a Middle Islamic copper smelting site. A wide range of cultural and environmental variables were recorded for each site. Digital photographs were taken at each site and prominent architectural features were recorded using a Total Station. Topographic and architectural maps were made at each of the three major copper smelting sites. These data were then imported into ArcGIS for analysis and storage.

The 2007 survey of the Wadi al-Jariya was conducted over five weeks (data first published here). The total area surveyed was approximately 10 km². A total of 96 new sites were recorded in Wadi al-Jariya and two secondary drainages (Figure 7.9). Surface architecture and artifacts were used to identify sites. Diagnostic artifacts (lithics, pottery, glass) were collected to assign a relative date to the site. We used an Epoch 10 Differential GPS unit to record site locations with an accuracy of several centimeters. The GPS units were also used to map architectural and other features visible on the surface (see, e.g., Figure 7.93b). Digital photographs were taken of each site and of architectural features visible on the surface. Environmental data, the geological setting, and other natural and cultural variables were recorded on a standard form. All these data are linked in a geographic information system (GIS) that was used to create maps of the survey and will be used for further spatial analysis.

Iron Age Metallurgical Sites from Other Surveys

To contextualize the Iron Age finds of the ELRAP surveys, we provide here a short description of major Iron Age copper production sites in the Faynan region. More detailed description and discussion of the Iron Age settlement pattern appears in Chapter 12, this volume.

Umm ez-Zuhur Mines. Umm ez-Zuhur is a mining area located between Wadi Fidan and Wadi al-Ghuwayba (Figure 7.10). This complex was first reported by the Deutsches Bergbau-Museum (DBM) team. The mining area consists of 24 tailings containing Burj dolomite-shale (BDS) mining waste, several galleries

that were exposed through erosion and are now visible in the wadis, and one mine entrance, also exposed by erosion (Hauptmann 2007:130–131; Weisgerber 2006:14). Hauptmann (2007:131) dates the tailings to the Iron Age II. No mines or tailings were recorded during the 1998 and 2004 surveys of Wadi Fidan, and as such, Umm ez-Zuhur probably represents the ore source for the minor Iron Age smelting sites in Wadi Fidan, including Khirbat Hamra Ifdan (WFD 120) and Rujm Hamra Ifdan (WFD 77a). These mines likely supplied ore to Khirbat Hamra Ifdan during the Early Bronze Age.

Barqa al-Hatiya. Barqa al-Hatiya is a small Early Bronze Age and Iron Age smelting site located approximately 5 km south of Wadi Fidan. Of the four houses at the site, three date to the Early Bronze Age, while the last has been dated as Iron Age I (Adams 2003; Fritz 1994; Hauptmann 2007:142). A radiocarbon date for this building, however, places the occupation in the ninth century BCE (Ben-Yosef 2010; Levy et al. 1999). It is possible that the mines in Umm ez-Zuhur also provided the ore for Barqa el-Hetiye, in addition to the smelting sites in Wadi Fidan (Hauptmann 2007:142).

Jabal al-Jariya Pit Mines, Khirbat al-Ghuwayba, and Ras al-Miyah Mines. These sites, visited during the 2007 Faynan-Busayra Regional Survey (FBRS), are presented in detail in the chapter by Ben-Yosef et al. (this volume; see also Chapter 11). Of particular interest for the current discussion is the Jabal al-Jariya pit mine field, which was dated to the Iron Age primarily based on its location near the smelting centers of Khirbat en-Nahas and Khirbat al-Jariya; it is likely that these mines represent one of the most important Iron Age ore sources in Faynan (Ben-Yosef et al. 2009). Preliminary optically stimulated luminescence (OSL) dating of one of the pit mines sampled in 2009 confirms an Iron Age date (Ben-Yosef 2010).

Ras an-Naqb. Ras an-Naqb is a primarily Early Bronze Age II/III site approximately 4 km southeast of Khirbat en-Nahas. One slag mound at the site, containing around 100 tons of smelting debris, has been dated to the Iron Age II based on associated pottery and the slag itself. Hauptmann (2007:123) suggests that this slag mound was probably the result of Iron Age recycling of Early Bronze Age II/III slag to extract the remaining metal.

Khirbat Faynan. Although the surface of Khirbat Faynan is dominated by Byzantine period architectural

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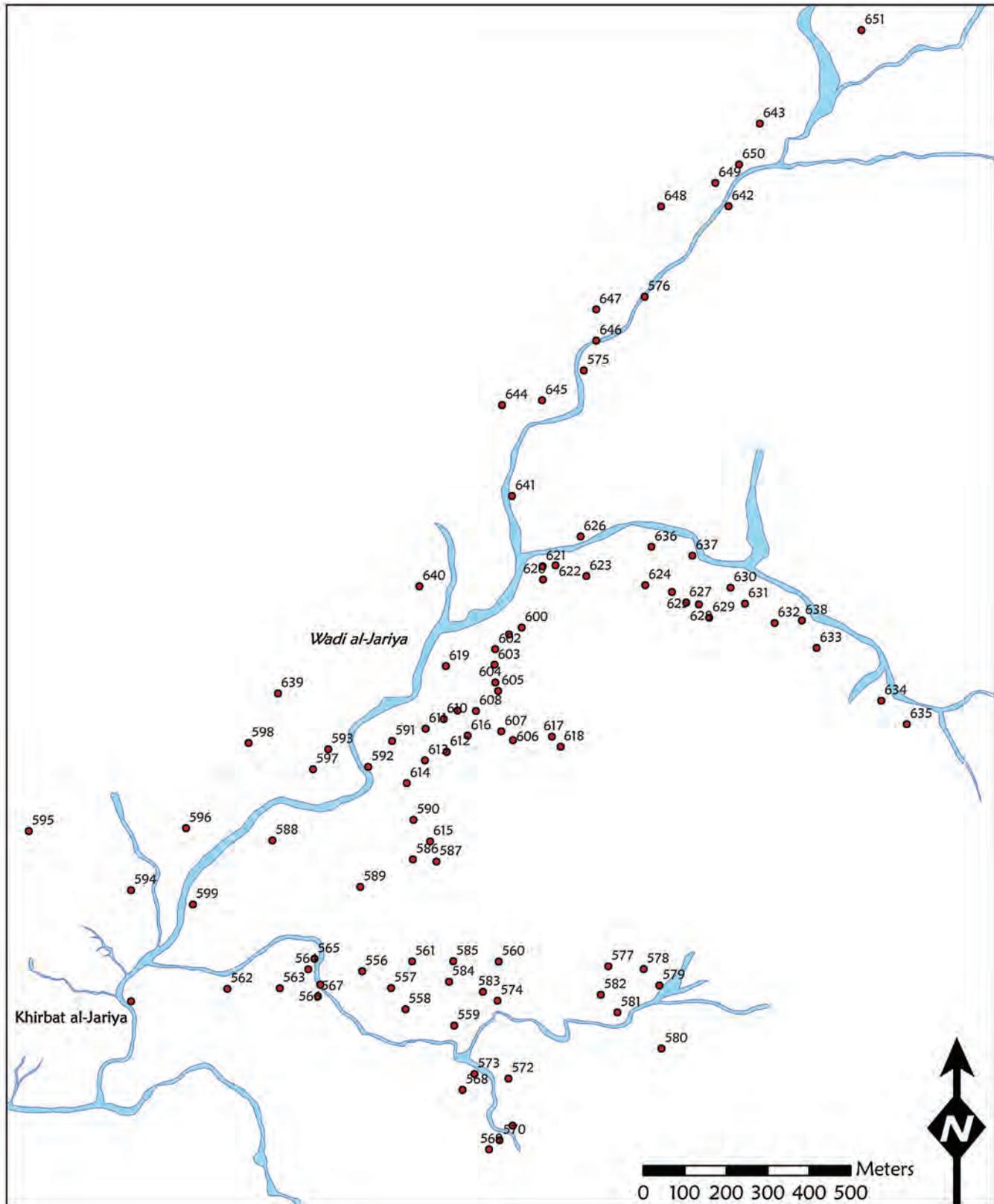


Figure 7.9 Map of all sites recorded during the 2007 Wadi al-Jariya survey.

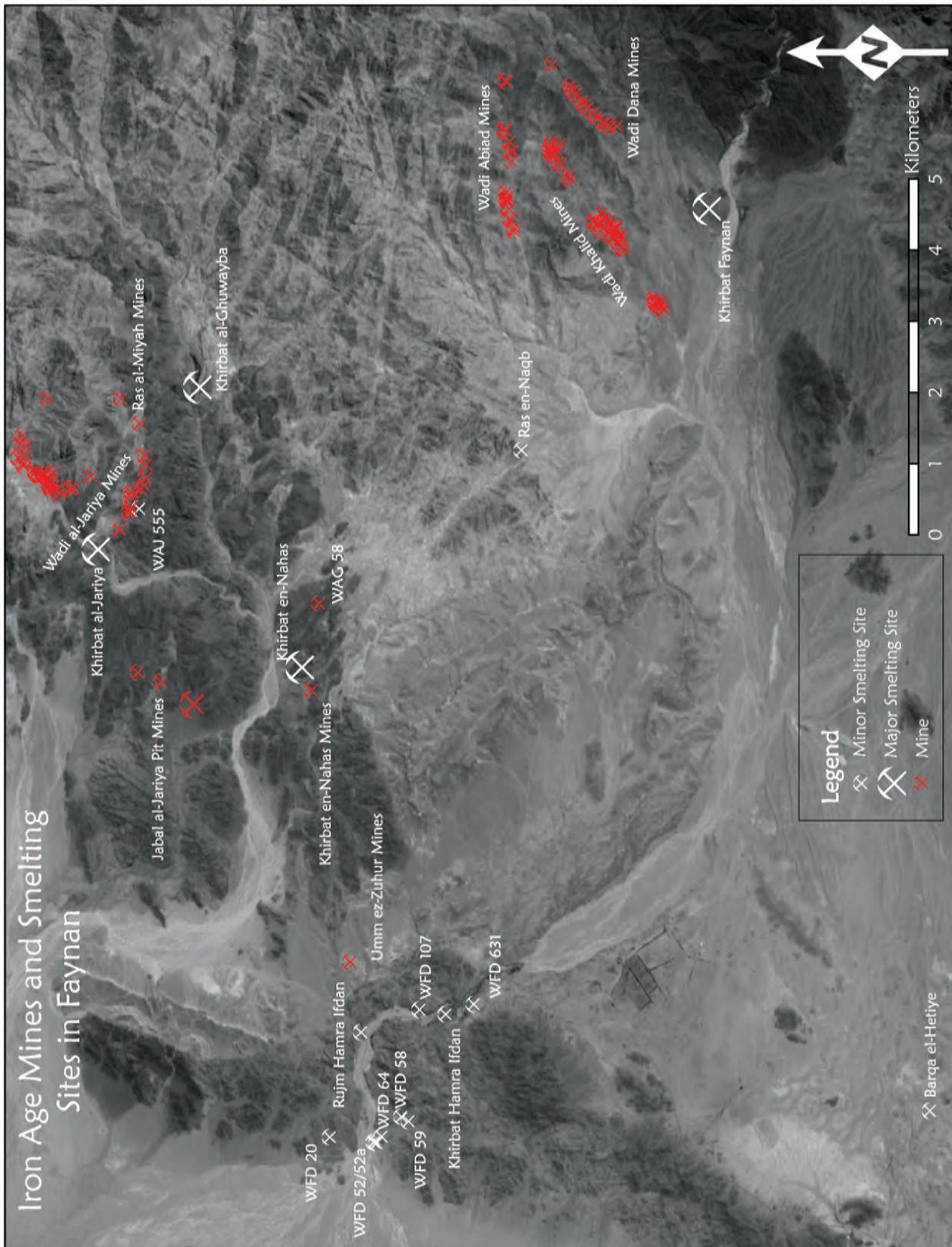


Figure 7.10 Map of all major Iron Age mining and smelting sites located in the Faynan district. Background image: (C) CNES/SPOT Image 1992–1994.

remains, there are many Iron Age slag mounds around the site in addition to smelting debris from other periods (Hauptmann 2007:94–109; Musil 1907). Previous surveys by the DBM (Hauptmann 2007) and Council for British Research in the Levant (CBRL) (Barker et al. 2007), which have focused on Khirbat Faynan and the area surrounding it, have generally broken it up into many “sites,” with each slag mound and many other features being assigned individual site numbers. Hauptmann (2007:97) notes, however, that the Iron Age slag mounds surrounding the site are probably connected to one another, although it is not possible to prove this without excavation. North of the tell itself, there is also a “field system,” called WF424 by the CBRL team, containing nonagricultural buildings and evidence of smelting activities, which dates to the Iron Age (Mattingly et al. 2007:278–279). Several agricultural field systems also yielded Iron Age sherds in the area around Khirbat Faynan, although much of the evidence for Iron Age farming has been obscured or destroyed by later activity (Mattingly et al. 2007:282–285). All of this suggests that Khirbat Faynan was a center of both settlement and copper production in the Iron Age.

Beyond this, however, the Iron Age occupation of Khirbat Faynan is not well understood. Ben-Yosef et al. (Chapter 12, this volume) discuss the possible political and economic significance of the site in the early history of Edom, but little can be said for certain. Likewise, the connection between the copper production activities at Khirbat Faynan and the smelting sites in Wadi Fidan, Wadi al-Ghuwayba, and Wadi al-Jariya is not clear.

Wadi Abyad. The Wadi Abyad mining district contains two sets of mines. There are 10 Roman mines dug into previous Chalcolithic mines exploiting the Umm ‘Ishrin sandstone, as well as 14 tailing piles from the BDS in the bottom of the wadi, which were dated as Iron Age II based on associated ceramics (Hauptmann 2007:115–116). Based on their location, the mines in Wadi Abiad were most likely associated with smelting activities at Khirbat Faynan (see Chapter 12 and Figure 12.5, this volume).

Wadi Khalid Mines. The mining district in Wadi Khalid consists of 56 mines, all exploiting deposits in the BDS. The mines were exploited for a long period, and evidence for mining activity in the Early Bronze Age, Late Bronze Age, Iron Age, and Roman period has been found (Hauptmann 2007:116–121). Like the mines in Wadi Abiad, it is likely that mining activities here

were devoted to obtaining ore to be smelted at Khirbat Faynan (see Chapter 12 and Figure 12.6, this volume).

Wadi Dana Mines. Wadi Dana contains 14 mines that date to the Early Bronze Age and Iron Age (Hauptmann 2007:122). These mines are even closer to Khirbat Faynan than the mines in Wadi Abiad or Wadi Khalid, and like both of those mining districts, the mines in Wadi Dana are probably related to copper production activities at Khirbat Faynan (see Chapter 12 and Figure 12.7, this volume). The following section presents descriptions of the Iron Age sites recorded during the four surveys under discussion, organized by site type.

Results of the Surveys

The classification of archaeological sites into categories is a necessary but somewhat arbitrary process. There is little consistency regarding site type classifications in the Mediterranean, which is why explicitly stating the criteria used to determine site categories, whether descriptive or functional, is so important. The types described below apply to only those sites that have an Iron Age occupation.

Agricultural Sites

Only two Iron Age agricultural sites were recorded by ELRAP team members, both in Wadi Fidan. The category is defined as sites that exhibit evidence only of agricultural features and do not have evidence of a settlement nearby. Sites that were interpreted as serving an agricultural function were usually made up of a terrace or field system and often had irrigation channels.

WFD 007 is composed of two small dams in the wadi separating clusters of possible structures or field walls. The measured size of this site is 1,700 m². Two circular features were also recorded close to the site. Eleven of the 13 ceramic sherds collected from the site date to the Iron Age.

WFD 019 is located in a small wadi that branches off of Wadi Fidan, about 70 m south of WFD 007. The site consists of several walls varying from one to three preserved courses, which extend over an area of 1,700 m². Most of the wall lines follow natural contours and appear to cut across a drainage channel, although the walls in the channel are quite eroded. These walls stretch for over 50 m, forming a rectangle in the valley. The walls may have been used as part of an ancient terrace system. Thirty-one sherds were collected at the site, all of which date to the Iron Age.

Architecture Fragment Sites

Architecture fragments are defined as sites containing surface remains that were most likely part of a building, but their function is unclear and the density of architectural remains is lower than at a settlement site. The definition is intentionally vague due to the prevalence of poorly preserved and ephemeral sites encountered during the survey. One architecture fragment from the Iron Age was recorded during the ELRAP surveys.

WAJ 640, a site that spans approximately 600 m on the west side of Wadi al-Jariya, was the only architecture fragment site from which we collected Iron Age ceramics. Each feature, located on a low, sandy plateau above the wadi, is separated by small drainages that run perpendicular to Wadi Jariya. The site is composed of poorly preserved architecture fragments (Figures

7.11 and 7.12) that may have been part of a campsite. A number of cairns and circular features (Figures 7.13 and 7.14) were also recorded. The features at this site are spread sporadically across the wadi terrace.

Cairns

We define *cairns* as large rock piles lacking surface evidence that the feature or features were used as graves or as structures. This category is another intentionally neutral term that results from the uncertainty of interpretable materials found at the site.

WFD 010 is a group of five cairns spread over several hilltops north of Wadi Fidan. The cairns and associated artifacts were recorded within an area of 200 m². Four Iron Age body sherds were collected from this site.



Figure 7.11 View south at several eroded architecture fragments built of stone against a hillside at WAJ 640.



Figure 7.12 Another view of WAJ 640, with an eroded architecture fragment visible in the foreground. The feature has been constructed on a low, flat terrace above the wadi channel.



Figure 7.13 A circular depression at WAJ 640, now overgrown with *Anabasis* shrubs.



Figure 7.14 A circular feature incorporating a larger standing stone at WAJ 640.

WFD 014 is a single small cairn, roughly 400 m southeast of WFD 010, surrounded by many lithic flakes and debitage. A single Iron Age sherd was collected near the cairn.

WFD 015 is a small site consisting of two cairns (015a and 015b) on a hilltop, one with standing stones. Each cairn is 4 m in diameter. Although no ceramics were collected at WFD 015, the site was dated to the Iron Age based on its proximity to WFD 007, an Iron Age agricultural site (Figures 7.15 and 7.16). Located near the mouth of the Wadi Fidan overlooking the Wadi 'Araba, these standing stone features may have been territorial markers near one of the main western entrances to Faynan.

WFD 067 consists of three cairns on the northern slope of the drainage, constructed within an area of 1,000 m². The cairns are composed of diorite and sandstone, which stand out against the surrounding peaks of granite. Thus, these features may have marked a pathway or trail. In addition to the cairns, the surveyors observed a small scatter of slag.

WFD 089 is a group of four cairns associated with a relatively dense Iron Age pottery scatter within an area of 25 m². Thirty-three Iron Age sherds, including a painted rim, were collected from the site.

WFD 602 is located on a flat ridge on the northern side of Wadi Fidan, near Khirbat Hamra Ifdan. There is a circular feature, most likely an eroded cairn, near the center of the site, around which was found a concentration of Iron Age pottery (Figure 7.17). The site also contains eight stone circles running in a northwest-southeast line, as well as three very short single-course wall lines and a cairn. Three small rectangular features were also observed,

possibly related to recent use of the site as a campsite. In addition to these architectural features, a substantial lithic scatter dating to the Paleolithic was also found. These features are spread over an area of 6,800 m².

WFD 630, a cluster of four oval-shaped cairns that range in size from 2 to 4 m, is oriented roughly from east to west along the top of a high hill between two small wadis. The site was measured to make up an area of 150 m² within which four sherds of Negebite ware were collected.

WFD 631 is a group of cairns and stone circles located approximately 600 m south of Khirbat Hamra Ifdan. Between the concentration of cairns and the concentration of stone circles is a scatter of slag. Iron Age and Roman/Byzantine pottery was collected at the site, as well as numerous lithic flakes within an area of 200 m².

WAG 059 is situated on the eastern end of the plateau bounding Wadi Nuqayb al-Asaymir to the north. Clear views of Khirbat en-Nahas and Wadi al-Ghuwayba are afforded from all features at this site (4,300 m²), which consists of one cairn approximately 1.5 m in diameter, along with six fragmentary cairns in the form of concentrations of eroded shale slabs. A large sample of Iron Age pottery, along with slag, was recovered from the surface immediately surrounding the six cairn fragments.

WAG 515 includes an area of 5,900 m² to the west of Wadi al-Jariya. A number of cairns are present throughout the site (Figures 7.18 and 7.19), mainly in the west. Two circular features, one in the eastern part of the site and one near the center, are also present. Two short wall lines were found in the western part of the site. Iron Age pottery was collected at the central circular feature and the surrounding area.



Figure 7.15 Feature A at WFD 15, a small cairn incorporating a standing stone.



Figure 7.16 Looking north from feature B at WFD 15, a small cairn.

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Figure 7.17 The prominent circular feature at the center of WFD 602. A dense concentration of Iron Age pottery was found around this feature.



Figure 7.18 One of several cairns concentrated in the western portion of WAJ 515.



Figure 7.19 One of two short wall lines present in the western part of WAJ 515.



Figure 7.20 A cairn built in a relatively cleared area at WAJ 523.

WAJ 522 is a cluster of seven badly preserved cairns, mostly concentrated along the south edge of a narrow strip of sediment bounded by gullies to the east, north, and south and by a cliff to the west. Ten sherds of Iron Age pottery were collected at the site. The total measured site size is 300 m².

WAJ 523 consists of nine cairns of varying sizes, most of which are concentrated at the central part of the site. The site measures 1,500 m² (Figures 7.20 and 7.21).

WAJ 527 is situated on an extensive field on the lower slopes of the granite range to the east of Wadi al-Jariya. The site extends over an area of 5,500 m² and consists of several cairns and crude stone circles found in a sparse scatter throughout the site (Figures 7.22 and 7.23).

WAJ 590 is a small site that consists of three small cairns on a rocky plateau 70 m east of Wadi al-Jariya. Although a small amount of Iron Age ceramics were

collected from the site, which covers an area of 2,600 m², the features there were badly preserved.

WAJ 596 sits on a rocky plateau above Wadi al-Jariya. The site contains a variety of features, and it is difficult to define according to one site type. The primary features are four large cairns, one of which has a rock line that extends away from it about 2 m to the north. Within an area of 12,700 m², surveyors also recorded a tent clearance and a large rock circle, 5 m in diameter, constructed of large rocks placed on their side. Iron Age, Roman/Byzantine, and Islamic period pottery was collected at the site (Figures 7.24–7.27).

WAJ 641 (4,700 m²) consists of three robbed cairns and a hearth on a sandy plateau above the junction of Wadi al-Jariya and a smaller wadi system. Robber trenches around the cairns were still visible during the 2007 season. Pottery collected at the site dated to the Iron Age and Roman/Byzantine periods (Figure 7.28).

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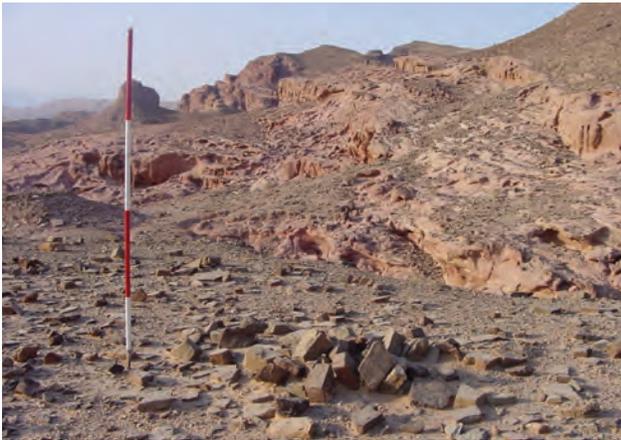


Figure 7.21 One of the small cairns recorded at WAJ 523.



Figure 7.22 One of the small stone circles found at WAJ 527.



Figure 7.23 A view south from a small cairn at WAJ 527, showing patches of *Haloxylon* and other scrub plants growing along the edges of Wadi al-Jariya.



Figure 7.24 Two of the cairns at WAJ 596, which sits atop a rocky plateau above Wadi al-Jariya.



Figure 7.25 The tent clearing recorded in a field of stones at WAJ 596.



Figure 7.26 The largest of the four cairns found at WAJ 596.



Figure 7.27 The large (ca. 5 m in diameter) circular feature at WAJ 596, constructed primarily of standing stones.



Figure 7.28 The robbed cairns that were found at WAJ 641.

Campsites

Sites identified as campsites consist of low-density and ephemeral habitation areas, often with at least one of the following characteristics: tent clearings, hearths, and animal pens. These site types are surprisingly absent from the Wadi Fidan and Wadi al-Ghuwayba surveys; Iron Age campsites were recorded only in Wadi al-Jariya.

WAJ 516 is an ancient campsite located approximately 250 m west of Wadi al-Jariya on small and relatively flat terrain, which is covered with eroded shale. The site encompasses an area of 3,000 m². A large rectangular feature, which probably represents a tent clearing, was found at the center of the site, and this feature has been divided into two uneven spaces. The largest of these spaces measures 14 x 10 m, and the small space measures 7 x 5 m. The feature is surrounded by 12 cairns. Considerable amounts of ceramics and some flint artifacts were found in and around the rectangular feature (Figures 7.29–7.30).

WAJ 521 is located on a topographic saddle around 250 m to the west of Wadi al-Jariya. The large rectilinear structure (Figure 7.31) is similar to other campsites recorded in Wadi al-Jariya and by the FBRS (see Chapter 5, this volume). In addition, there are more than 10 cairns at this site (3,200 m²). At the highest point of the saddle, there is a stone circle measuring 4.5 m in diameter (Figure 7.32). A large amount of Iron Age pottery was collected



Figure 7.29 The large rectangular feature at the center of WAJ 516, probably a tent clearing.



Figure 7.30 One of the 12 cairns surrounding the large rectangular feature at WAJ 516.



Figure 7.31 The large rectangular feature located at the high point of the topographic saddle at WAJ 521. This feature is most likely a tent clearing.



Figure 7.32 A view of the topography of WAJ 521, also showing one of the eroded cairns found at the site.



Figure 7.33 A view looking south across WAJ 530, highlighting the heavily eroded and ephemeral nature of most features at the site. Acacia trees, such as the one visible at the site in this photo, are more common in the southern portion of Wadi al-Jariya.



Figure 7.34 A heavily eroded tent clearing found at WAJ 562.

between the cairns and in the surrounding area. Some of the cairns appear to be relatively recent, but most seem to be much earlier.

WAJ 530 consists of a large number of various stone-built installations, most of which are poorly preserved and of unknown purpose. Several hearths and cairns are scattered throughout the site across an area of 14,000 m². None of the features at the site are more than 80 cm in diameter. Iron Age pottery and some slag were collected at the site, as well as some lithic artifacts (Figure 7.33).

WAJ 562 (1,900 m²) is located on a low terrace below a sandstone outcrop to the south of a small wadi branching east off of Wadi al-Jariya. A small channel running north-south bisects the site. A number of tent clearings and other architecture fragments were observed, most of them in the western portion of the site: seven rectangular, two circular, and five highly fragmentary. Ceramics

dating to the Iron Age and Late Islamic period were collected from the western part of the site (Figure 7.34).

WAJ 565 (200 m²) is located on a low sandstone terrace above a small wadi. It is sheltered to the west by sandstone cliffs. The surveyors recorded a rectangular structure measuring 5 x 4 m and a stone circle approximately 2 m in diameter. These features probably represent the remains of a campsite. A groundstone mortar was also recorded in close proximity to the site (Figure 7.35).

WAJ 586 (1,100 m²) is located on a hill 50 m east of Wadi al-Jariya. The main feature at the site is rectangular and consists of two rock walls preserved to two to three courses, with much rock collapse and a possible doorway in the east wall. The northwest side of the feature takes advantage of a low sandstone outcrop to form the north and west walls. To the north of this feature is a rectangular depression that possibly served as a tent clearing. On the

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northern side of the hill is a tall cairn. A road built in the mid-twentieth century by the Jordan Natural Resources Authority (NRA) bisects the site in the northeast, and on the north side of this road are two small cairns. Ceramics dating to the Iron Age and Roman/Byzantine period were collected at the site (Figure 7.36).

WAJ 588 is located on a rocky hill and plateau above Wadi al-Jariya. The site (21,800 m²) extends to both sides of the wadi, although most is on the east side. On the eastern side of the wadi, two large tumuli, one of which has been looted, were observed at the bottom of the hill, and much pottery was collected near this feature, especially near the looted tumulus. On top of this same hill are two hearths. Two rectangular terraces, one with clearly visible wall lines and one with wall lines that were less visible on the surface, were also noted. Two other terraces, one at the southern margins of the site, contained numerous

rock circles identified by the survey team as graves. On the western side of the wadi is a small, sheltered terrace with the remains of a recent campsite, and to the north of this feature are five rock circles, also identified as graves (Figures 7.37 and 7.38).

WAJ 591 (1,000 m²) consists of a small hearth, a tent clearance, and three cairns on a plateau above Wadi al-Jariya. Iron Age and Roman/Byzantine ceramics were collected at the site.

WAJ 593 (2,000 m²) is located on a plateau on the western side of Wadi al-Jariya and consists of several square rooms, approximately 5 x 5 m, arranged around a central courtyard. A modern-looking wall faces the wadi and an NRA road goes up to the site from the wadi. At the south end of the site there is a small platform built of rock and cement. Iron Age, Roman/Byzantine, and modern ceramics were collected at the site (Figures 7.39 and 7.40).



Figure 7.35 A view of WAJ 565, looking west toward the sandstone cliffs that shelter the site. In the left of the photo, two wall lines of a rectangular feature, probably the remnants of a tent clearing, can be seen.



Figure 7.36 The rectangular depression, probably a tent clearing, at WAJ 586. In the top left of the image, a road constructed by the NRA in the mid-twentieth century is visible.



Figure 7.37 One of two tent clearings (rectangular) identified at WAJ 588, with its accompanying hearth clearing (circular). At the top of the image, Wadi al-Jariya to the southeast is visible.



Figure 7.38 Two small cairns recorded at WAJ 588.

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WAJ 595 sits on a high plateau to the northwest of Khirbat al-Jariya. The site (8,800 m²) provides spectacular views of Wadi al-Jariya, Wadi al-Ghuwayba, Khirbat al-Jariya, and even as far as the Wadi 'Araba. Features include a small tent clearance with a rock wall on the southeastern side of the site and a tumulus near the center

of the site, which appears to be robbed. Some of the collapsed stones on this feature could be capstones. There are also small circular features in the eastern and south-eastern parts of the site. Ceramics collected from the site date to the Iron Age, Roman period, and possibly the Early Bronze Age (Figures 7.41–7.45).



Figure 7.39 One of the rectangular features at WAJ 593, which was identified as a tent clearing.



Figure 7.40 Several wall lines at WAJ 593, arranged around the central cleared area.



Figure 7.41 Four circular features found at WAJ 595.



Figure 7.42 The tent clearing found in the southeastern part of WAJ 595.



Figure 7.43 The large robbed tumulus near the center of WAJ 595.



Figure 7.44 Looking west over the Wadi 'Araba from WAJ 595. The site commands views of Wadi al-Ghuwayba, Wadi al-Jariya, and west as far as the 'Araba.



Figure 7.45 Looking southeast over Wadi al-Jariya from WAJ 595. Khirbat al-Jariya is visible in the center of the photo.



Figure 7.46 WFD 604—small circular fragment recorded during the 2004 survey of the Wadi Fidan, on the northeast bank above the wadi channel.

Cemeteries

Cemetery refers to an area with multiple features that mark graves, such as rock piles, stone circles, or groups of tumuli. The most prominent, and only securely dated, example of an Iron Age cemetery is WFD 040 (see Chapter 8, this volume). WFD 040, a large Iron Age cemetery located to the north of Wadi Fidan, was excavated as part of the JHF and ELRAP projects during the 1997, 2003, 2004, and 2009 field seasons. See Chapter 9 (this volume) for a detailed presentation of this site.

Circular Features

This is another category that is intentionally vague. A circular feature is defined by rounded walls that cannot be definitively identified as part of a building and may vary greatly in size.

WFD 013 (70 m²) consists of two small circular features located next to a cluster of standing stones. One of the circular features showed signs of paving on the surface. The standing stones are oriented on an east-west axis, and stand up to 1 m in height.

WFD 604 (5,200 m²) consists of two circular features (Figures 7.46 and 7.47), between 1 and 3 m in diameter, on the northeast bank of the Wadi Fidan. In addition, surveyors recorded a large wall fragment (Figure 7.48) that is 6 m long and two courses wide, as well as an architectural fragment that may be rectangular in shape but no more than a few meters wide.

WAG 024 is situated on a terrace north of Wadi al-Ghuwayba, near the junction of Wadi Ghuwayba al-Ghani and Wadi Ghuwayba al-‘Atshana. The site (4,500 m²) is bounded in the north by a smaller drainage, which runs east-west. Numerous extensively



Figure 7.47 A larger circular feature, pictured here, was also recorded at WFD 604, on a flat, rock terrace above Wadi Fidan. View is to the east.



Figure 7.48 A single-course, partially buried wall line makes up one of the features at WFD 604. Wadi Fidan can be seen in the background, below the Jabal Hamrat Fidan mountains.



Figure 7.49 One of the circular features recorded at WAG 24, on a terrace above the Wadi al-Ghuwayba, which is visible in the background. Orientation to the north.



Figure 7.50 Another circular feature at WAG 24, in Wadi al-Ghuwayba. Like the previous feature, this one was constructed on a terrace just above the wadi.



Figure 7.51 This circular feature at WAG 60 has been heavily disturbed by looters. Similar to WAG 24, this feature was constructed on the bank above Wadi al-Ghuwayba.



Figure 7.52 WAG 61, a series of circular features and cairns on a hill above Khirbat en-Nahas. From the terrace, the site commands an excellent view of Wadi al-Ghuwayba, Wadi Nuqayb al-Asaymir, and Khirbat en-Nahas.

eroded circular features (Figures 7.49 and 7.50) are scattered over the surface of the site, although four more well-preserved examples were recorded in the southern part of the site. Three fragmentary stone circles were also found. Many lithic artifacts were collected, as well as six Iron Age sherds. A small amount of copper ore was also collected.

WAG 060 (150 m²) is located on a hillock surrounded by drainages at the mouth of Wadi Nuqayb al-Asaymir. To the west of the site, a small wadi running north-south separates WAG 60 from Khirbat en-Nahas. In the western part of the site is a large, circular feature (Figure 7.51), which has been robbed. In addition to this feature, a cairn was recorded at the eastern part of the site.

WAG 61 (2,700 m²) is located on the western end of the plateau bounding Wadi Nuqayb al-Asaymir to the south. The site follows the cliff line and has a clear view of Khirbat en-Nahas and Wadi al-Ghuwayba to the northwest. Eleven circular features were identified (Figure 7.52), along with 31 irregular-shaped cairns.

Located along the western bank of Wadi al-Jariya, WAG 514 is 1,200 m² in area. The site is situated on an elongated strip of an alluvial fan cut by gullies, which bound the site on all sides with the exception of the east, where it is bounded by the wadi. Despite the relatively large size of the site, very few structures were recorded. These include two circular features, a cairn, and various poorly preserved installations, which measure no more than 1.5 m in diameter (Figure 7.53).



Figure 7.53 Stone circle at WAJ 514. In the background, there is a possible circular feature.



Figure 7.54 One of the circular features recorded at WAJ 537. Wadi al-Jariya can be seen in the background.

WAJ 520 is an impressive site that may be a cemetery. The site (33,600 m²) is located on a plateau 50 m west of Wadi al-Jariya. Dozens of cairns are scattered on the surface, with varying degrees of preservation. The survey team made a conservative estimate of between 40 and 50 cairns at the site. On the northeastern edge of the site, there is an isolated, rectangular accumulation of rocks that may represent a demolished structure containing several rooms. The surveyors noted an unusual density of ceramics throughout the site compared to other nearby sites, although the density of pottery was noticeably lower near the tumuli. The majority of ceramics collected at the site are Iron Age, with others dating to the Roman/Byzantine periods and possibly the Early Bronze Age.

WAJ 535 is situated on a small plateau between a narrow wadi gorge and granite hillocks. The site is found on the western part of the plateau, where two small (less than 1 m in diameter) circular features were found a meter apart. There is a fragmentary wall adjacent to these features.

WAJ 537 (4,300 m²) sits on a flat, sandy plateau above and to the southwest of Wadi al-Jariya. It consists of several circular features (Figures 7.54 and 7.55), cairns, and wall lines. The site covers a large area, but the density of archaeological remains is low. Some lithic artifacts, copper ore, slag, and a copper object were found, as well as a small quantity of pottery that dates to the Iron Age and possibly the Early Bronze Age.

WAJ 561 (60 m²) consists of a small half-circle of rocks stacked against a rock outcrop. A bedrock mortar was recorded on top of the outcrop. The half-circle of rocks may have been used as a hearth or storage area.



Figure 7.55 Another well-preserved stone circular feature recorded at WAJ 537.

WAJ 564 sits on a low sandstone shelf above a small wadi, sheltered to the west by sandstone cliffs. Approximately eight circular features were recorded, varying from 1 to 3 m in diameter. The site extends over an area of 150 m².

WAJ 574 (700 m²) is located on a rocky plateau south of WAJ 560, a mine. This site takes advantage of a natural rock outcrop to form one side of a wall. Two rock walls are roughly perpendicular to the outcrop and the south side is open (Figure 7.56). The surveyors recorded a stone circle at the southern end of the structure, and nearby are a hearth and two cairns. This site probably functioned as a temporary camp for the people working in the mines nearby.

WAJ 575 was recorded on a low step above the wadi, on a sandy and rocky surface. It consists of a poorly preserved circular feature approximately 2.5 x 4 m. We observed two additional small circular features (Figure



Figure 7.56 WAJ 574, a circular feature built against a natural stone outcrop. The person in the photo stands on the outcrop, which forms a shelf and was used as a wall. The other two walls extend for approximately 3 m perpendicular to the wall, forming a horseshoe-shaped feature.



Figure 7.57 A small rock circle feature with a standing stone that is part of WAJ 575.

7.57) near the rock circle and a single post hole near the wadi channel. The site, which may have functioned as a campsite, comprises an area of 250 m².

WAJ 582 (20 m²) is situated on a low sandy hill at the end of a small wadi surrounded by sandstone cliffs, near ancient mines and a possible ancient road to the Ras al-Miyah fortresses (see Chapter 11, this volume). Two circular features, one partial and one complete, were identified. Each one measures about 2 x 1 m. The features may have been used as a road marker of some kind. The area has been damaged by heavy bulldozing and erosion (Figure 7.58).



Figure 7.58 Overview of WAJ 582, which is composed of circular features that have been disturbed by bulldozing and erosion.

Metallurgical Sites

This category refers to smelting sites and ore-processing sites. Metallurgical sites include anything from a small scatter of slag to a large smelting site, such as Khirbat en-Nahas or Khirbat al-Jariya.

WFD 020 is one of the smallest metallurgical sites (1 m²) found in the Wadi Fidan and consists of a scatter of copper ore on a hilltop not associated with other artifacts. Ore does not occur here naturally.

WFD 052 (6,500 m²) is a complex site, composed of numerous walls (Figure 7.59) in association with a small drainage (Figure 6.60) alongside a Pleistocene conglomerate outcropping. The site extends westward, where the surveyors recorded three large rectilinear structures. The dimensions of the structures are approximately 10x20 m. Pieces of slag are scattered uniformly across the site. Five cairns mark the southern extent of the recorded site boundaries. Another set of features, called WFD 52a, consists of three semicircular stone structures on a slope

of a conglomerate outcrop. The survey team collected crucible fragments, indicating the use of this feature as a copper production area. Ceramics collected from WFD 52 and 52a date to the Early Bronze Age, Iron Age, and Roman/Byzantine periods. The four Iron Age sherds make up about one-third of the ceramics collected from the site.

WFD 058 is a relatively large (4,700 m²) area littered with large quantities of slag, also discussed in Chapter 11, this volume. Fifteen rock piles were observed on the surface, which may represent small smelting installations. The site is also located near a small spring. Thirty Iron Age sherds and a crucible fragment were collected at the site.

WFD 077a, known as Rujm Hamra Ifdan (RHI), was excavated as part of ELRAP during the 2004 field season. Dates from the site have been published previously (Levy et al. 2008), and analysis of the site formed part of Smith's (2009) doctoral dissertation. The excavations at RHI are discussed in Chapters 10 and 12 (this volume).



Figure 7.59 One of the walls recorded at WFD 52. Due to the presence of crucible fragments at the site, a metallurgical function is suggested. Wadi Fidan is visible in the background.

WFD 120 refers to Khirbat Hamra Ifdan, a large copper production and settlement site that dates primarily to the Early Bronze Age III to IV but also has important Iron Age smelting evidence (see Chapter 12, this volume). The site was excavated as part of the JHF and ELRAP projects during the 1999, 2000, and 2007 field seasons. Preliminary results relating to the Early Bronze Age have been published by Levy et al. (2002), and the Early Bronze Age faunal assemblage was analyzed by Muniz (2007) as part of his doctoral dissertation. Metallurgical activity at KHI in the Iron Age has been shown through the use of both radiocarbon and archaeomagnetic dating, and these results, as well as a discussion of the 2007 excavation of an Iron Age slag mound at the site, are presented in Ben-Yosef's (2010) doctoral dissertation.

WAG 062 is the survey number given to Khirbat en-Nahas. The site (ca. 10 ha) was excavated during three seasons (2002, 2006, and 2009). Numerous aspects of the site have been published previously, including the pottery from the site (Smith 2009; Smith and Levy 2008), the metallurgical remains (Ben-Yosef 2010), and the site's impact on Iron Age chronology (Higham et al. 2005; Levy et al. 2004; Levy, Najjar, van der Plicht, et al. 2005; Levy et al. 2008). Detailed discussion of various aspects of the JHF and ELRAP excavations at KEN can be found in Chapters 2, 5, 8, and 13 (this volume).



Figure 7.60 Overview of WFD 52 and the small drainage, where the team also recorded circular features. These can be seen to the left of the tree in the center of the picture.



Figure 7.61 One of the installations recorded at WAJ 511. Because of the high amount of copper slag found at the site, it has been classified as serving a metallurgical function.

WAJ 511 (1,100 m²) is situated on a flat terrace to the east of Wadi al-Jariya. Its boundaries are naturally marked by small tributary wadis to the north and south, and a range of granite hills to the east. Three structures were observed at the site, of which only the corners can be seen above ground. These are built of stone to a maximum height of 1.5 m. The remains of several badly preserved walls or installations (Figure 7.61) were recorded at the northern end of the site. A limited amount of pottery dating to the Early Bronze Age, Iron Age II, and Roman/Byzantine period was collected, as were several flint artifacts. A relatively large quantity of copper slag was observed throughout the site.

WAJ 540 is the site number assigned to the Iron Age site of Khirbat al-Jariya, which was excavated during the 2006 field season (Ben-Yosef et al. 2010). The results of this small excavation, which focused mostly

on Iron Age metallurgy, have been published previously (Ben-Yosef 2010; Ben-Yosef et al. 2010). For further discussion, see Chapter 12 (this volume).

WAJ 555 was identified as an ore-processing site. It is located in the valley bottom below the Iron Age mines at WAJ 546 and WAJ 547. Several cairns and stone circles were found here extending over an area of 700 m².

Mining Sites

This refers to a site where mine shafts, adits, or tailing piles were found. The majority of the mines that were found in the ELRAP surveys were associated with the Wadi al-Jariya. The locations of these mining areas have been noted by previous researchers (Hauptmann 2007; Rabb'a 1994), but the ELRAP surveys reported here were the first to systematically record the mining features in high detail. Site size is not presented here because it was impossible to accurately estimate the extent of each mine. However, in some cases, the surveyors measured the sizes of tailing piles (see Table 7.3). In these cases, the range of sizes is presented. Although the surveyors did not record evidence of Iron Age occupation at each mine, we believe a majority of the mines were used primarily during the Iron Age based on their proximity to the Iron Age smelting sites at Khirbat al-Jariya and Khirbat en-Nahas. In addition, Early Bronze Age materials are scarce, as are classical period finds. The nearest classical period site is the caravanserai excavated at Khirbat al-Ghuwayba. Mining sites were found in clusters during the 2002 and 2007 survey seasons. As such, clusters of mines and prominent features found there are presented, rather than descriptions of each mining site. In total, five clusters of mines were recorded and are presented below.

The first cluster of mines, recorded in 2002, was given the site number WAG 58. This group of mine shafts is located on a plateau to the north of Wadi Nuqayb al-Asaymir. Three mine shafts are visible on the surface, and these are surrounded by tailing piles (Figure 7.62). This mine extracted ore from the same mountain as the larger and primarily Middle Islamic mine site WAG 57, located just down the slope to the south. The mining at WAG 58 is of a smaller scale than WAG 57. Two sherds of Iron Age pottery were collected, as well as some slag. Based on location, it seems likely that the mines at WAG 58, like WAG 57, were reused as part of the Middle Islamic copper production at nearby Wadi Nuqayb al-Asaymir, in addition to their use during the Iron Age.

The second cluster of mines (WAJ 542–554) was recorded during the 2002 survey season. The mines are all clustered in a tributary wadi that lets out near Khirbat al-Jariya. While Iron Age ceramics were collected at only one of the sites, 548, they have all been treated as Iron Age mines due to their close proximity to the large Iron Age smelting site, Khirbat al-Jariya. Surface artifacts were scarce at these mines, and only at one other site were the surveyors able to collect ceramics: at WAJ 551, where they collected Roman/Byzantine ceramics. In addition, one quartzite hammer stone of unknown date was collected from WAJ 544, and four mining hammers, similar in style to those collected from Wadi Fidan 4, were collected from WAJ 548.

The third cluster of mines (WAJ 560, 572, 577, and 578; Figures 7.63–7.69) was recorded during the 2007 season in a tributary wadi connected to Wadi al-Jariya, just 100 m north of Khirbat al-Jariya. The tributary is



Figure 7.62 A possible infilled mineshaft at WAG 58. The site is composed of three infilled mineshafts that are surrounded by tailing piles.



Figure 7.63 WAJ 560, a large mine tailing pile that is part of the first cluster of mines recorded during the 2007 Wadi al-Jariya survey. The site has been heavily bulldozed by the Jordan Natural Resources Authority. For scale, note person standing above the tailing.

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Figure 7.64 A close-up of a section of the tailing pile at WAJ 560 that was exposed during bulldozing by the NRA.



Figure 7.65 A wall at the top of the tailing pile, which may have surrounded a shaft entrance that is now covered with collapse.

bounded by sandstone cliffs and ascends gradually in elevation. There is an NRA road, and past the road, a path can be followed to the Ras al-Miyah fortresses. The surveyors recorded three mines in this area. WAJ 560 is a mineshaft and mine tailings covering an area of about 3,130 m² (Figures 7.63–7.65). The mine begins between two distinct sandstone formations on a steep hill. The site has been bulldozed by the NRA. One large swale goes up the mountain and cuts into the mine tailings. Other smaller tracks have moved the mine tailings and sandstone rocks in random directions. A large pile of sediment and mine tailings has been piled in the center of the site. The surveyors found a few pieces of pottery that date to the Iron Age.

WAJ 572 is a mineshaft that has been filled with sediment and collapse (Figures 7.66–7.67). The shaft



Figure 7.66 WAJ 572—a light scatter of copper ore and Iron Age ceramics below a collapsed mineshaft opening (see below).



Figure 7.67 Collapsed mineshaft opening at WAJ 572.



Figure 7.68 WAJ 577—a possible mineshaft opening (above the north arrow) that has been filled with rock collapse and sediment.

is about 1.5 m in diameter. Very few tailings were observed, suggesting that the mine might not have been used extensively.

North of the NRA road is another mine, labeled WAJ 577. The sandstone cliffs have been excavated and a possible shaft has been filled in with sediment (Figure 7.68). No finds were collected from this site.

The mine entrance at WAJ 578 was bulldozed by the NRA. A possible shaft or gallery may have been exposed by the NRA activity (Figure 7.69).

At the fourth cluster of mines, surveyed during the 2007 season, 19 distinct mining sites were recorded (WAJ 587, 600–615, and 617–618; Figures 7.70–7.83). These mines are located along the eastern side of the Wadi al-Jariya channel at the base of the sandstone cliffs that border the wadi. The cluster begins about 1.5 km north of Khirbat al-Jariya, extending north

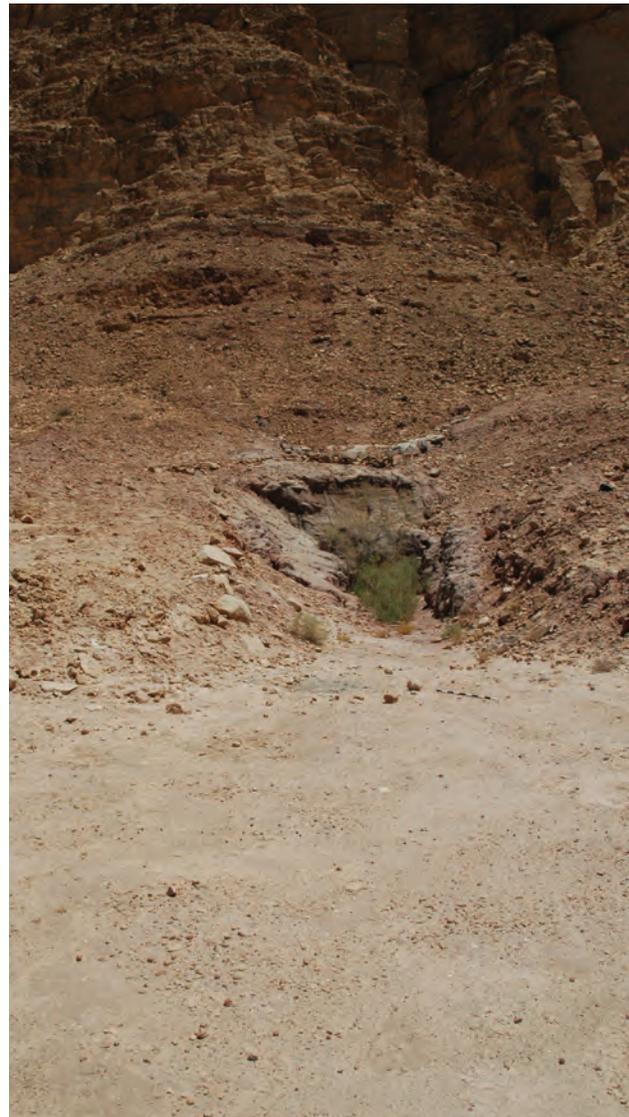


Figure 7.69 A mine opening at WAJ 578. The opening has been enlarged by a bulldozer. The modern digging stops after about 10 m, after which the mine may open into a gallery or a shaft.

for about a kilometer. Most of these sites consist of mine tailing piles; the mineshafts have probably been filled in with sediments. The largest tailing pile covers an area of 15,580 m², and the smallest is a little more than 200 m². Iron Age ceramics were collected from the surface of 14 sites, while ceramics from other periods were collected from 9 sites. Early Bronze Age style mining hammers were collected from five of the tailing piles. Only one mine shaft (Figure 7.81) was recorded at the second cluster of mines, at WAJ 614. The shaft appeared to be approximately 7 to 10 m deep and was surrounded by tailings.

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Figure 7.70 WAJ 587—a large tailing pile that is part of the first cluster of mines recorded during the 2007 survey. The tailings are located in a small tributary wadi that connects to Wadi al-Jariya.



Figure 7.71 A small circular feature in the tailings of WAJ 587.



Figure 7.72 Four tailing piles on the east side of Wadi al-Jariya, which can be seen in the upper left part of the frame. The central tailing pile is WAJ 602. Tailing piles were recorded individually to measure their size and have better control over the surface artifacts collected during the survey.



Figure 7.73 Typical tailing piles at the second cluster in Wadi al-Jariya. In the foreground, WAJ 605 can be seen. The tailing piles are located on the east side of the wadi at the base of the sandstone cliffs. The view is approximately to the north.



Figure 7.74 A typical tailing pile at WAJ 607, in a small tributary on the east side of Wadi al-Jariya. The view is to the west.



Figure 7.75 Small, approximately 1 m in diameter, circular features found adjacent to the tailing pile at WAJ 607.

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Figure 7.76 WAJ 608—a large scatter of mine tailings on the east side of Wadi al-Jariya. The wadi is bounded here by high sandstone cliffs. Site 608 has been subject to substantial erosion, which has created a drainage channel that runs toward the bottom right of the image.



Figure 7.77 A cross section of the mine tailings at WAJ 608. The cut (perhaps by the NRA) shows that the tailings are over a meter deep in some areas.



Figure 7.78 A possible mine adit at WAJ 608. The small feature was eroded from weathering. Note the pencil placed for scale.



Figure 7.79 A small scatter of mine tailings (WAJ 612) at the base of a low cliff on the east side of the Wadi al-Jariya. The photo is oriented to the northwest. Wadi al-Jariya and Jabal al-Jariya are visible in the background. The Jabal al-Jariya mines are located to the west of the mountain (see Chapter 12, this volume).



Figure 7.80 A large scatter of copper ore at WAJ 614, where surveyors also found a mineshaft (see next image). The view is to the west. Wadi al-Jariya is visible in the background.

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Figure 7.81 An open mineshaft at WAJ 614. The shaft measured about 1.5 m in diameter and extended to a depth of 10 m.



Figure 7.83 Copper ore mineralizations at WAJ 615. The ore was easily accessible near the surface of the site and along the floor of the channel (see previous image).



Figure 7.82 WAJ 615 was unlike any other mining feature the surveyors recorded. No mineshaft or gallery was visible, but the copper ore mineralization appeared to have been reached along the bottom of the channel. Toward the back, the ore could be extracted by digging into the small cliff. A few small mine tailing piles were recorded around the site.



Figure 7.84 WAJ 621: the entrance to a mineshaft or gallery, which opens toward Wadi al-Jariya, to the west. It has been filled in with sediment and collapse. The surrounding area contained few tailings. The tributary wadi where the third cluster of mines was found extends into the background (upper right).

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Sixteen mine sites were recorded in the fifth cluster (Figures 7.84–7.92): WAJ 620–629, WAJ 631–634, WAJ 636, and WAJ 637. These mines are north of the second cluster in a tributary wadi that connects to Wadi al-Jariya. These mines are all within 2 km of Khirbat al-Jariya. The tributary wadi is bounded by sandstone cliffs that cover the dolomite shale that contains copper mineralizations. The area has also been exploited by the NRA, who have constructed roads and cut into many existing mine tailing piles. Most of the sites recorded during the survey consist of mine tailing piles. These piles range in size from 200 to 7,750 m². Iron Age ceramics were collected from six of the recorded sites, while ceramics from other periods were collected from only four sites. Three mineshafts were recorded in association with mine tailing piles.



Figure 7.85 The entrance to WAJ 621. The opening would have been quite large before it was in filled with collapse and sediment.



Figure 7.86 WAJ 622 is a large pile of tailings eroding down a hill slope. There has been a great deal of NRA construction around this site, which has disturbed the archaeological remains. The site is located adjacent to Wadi al-Jariya, at the mouth of a tributary wadi.



Figure 7.87 One of the features at WAJ 623, the mouth of a possible mineshaft or mine gallery that has been filled with sediment. There are two smaller holes that have been dug into the sandstone to the right of the opening. The mine opens to the east, away from Wadi al-Jariya.



Figure 7.88 This tailing pile at WAJ 623 has had a trench dug through it, most likely by the NRA. View is oriented to the north. The small channel of the tributary wadi is visible in the background.



Figure 7.89 A small tailing pile at WAJ 626. The tailings are located just above the modern wadi channel. A wall line is visible in the background (top center). The architecture most likely dates to the Late Islamic period, based on ceramics collected around those features.



Figure 7.90 A small architecture fragment at WAJ 626. Late Islamic (i.e., Ottoman period) ceramics were collected from the ephemeral architectural features at the site. Their relation to the mine tailings could not be established but most likely postdated the mining since no Late Islamic mining or smelting is known from Faynan.



Figure 7.91 WAJ 628—a large tailing pile is visible in the background, across the wadi. Construction and bulldozing by the NRA are visible in the foreground, and a modern road runs from the left to the right of the frame.



Figure 7.92 WAJ 629—a large pile of tailings covers the surface of the hill slope. A large, approximately 1-m-wide trench has been dug through the tailings. The modern wadi channel of the tributary wadi is visible in the background.

Rectangular Features

Rectangular features are another category that is intentionally vague. They are defined by features with rectilinear walls that cannot be definitively identified as part of a building.

WFD 062 contains a rectilinear structure, measuring 20 m² on a hilltop above WFD 4. One Iron Age pot sherd was collected from this site, which can only tentatively be dated to the Iron Age.

WFD 112 consists of a rectangular building measuring 22 x 8 m. It is a wide building with an entrance to the south. It is constructed of stone that is preserved to one course high. The east side is much better preserved;

the surveyors recorded a plaster floor and two circular installations in center of building. Each installation is approximately 1 m in diameter. The building is on the edge of a plateau above the wadi and is surrounded on three directions by fields of cairns. There is a line of cairns, wall-like, stretching east to west for approximately 10 m to the south of the rectangular feature. The features were recorded within an area of 1,800 m². Seven Iron Age ceramic sherds were collected from the site, along with four Roman/Byzantine sherds.

Located on a plateau above Wadi al-Jariya, WAJ 643 (1,700 m²) is approximately 1 km south of the



WAJ 643

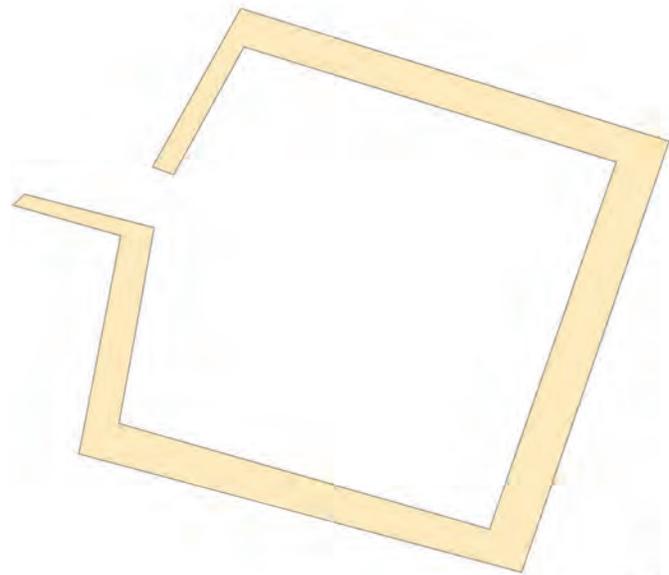


Figure 7.93 (a) WAJ 643, view to the south. This rectangular feature is approximately 1 km north of 'Ayn al-Jariya, a small perennial spring. It is one of the northernmost sites in the wadi and was constructed at the beginning of a rapid ascent to higher elevations. The structure is surrounded by lots of collapse. (b) GIS map of the feature.

Wadi al-Jariya spring. The main feature at this site is a rectangular feature (Figure 7.93) just south of where the wadi becomes very narrow and begins to ascend rapidly to higher elevations. The structure, which has collapsed, is oriented on a northeast to southwest axis, and there appears to be a doorway on the west side of the building near the northwest corner. This site may be related to the Iron Age road system that connected the Faynan district to the highlands (Chapter 6, this volume).

Rock Shelter

This category represents small, cave-like openings at the base of a cliff that contain evidence for human occupation or features that use an overhanging cliff as partial shelter. In general, rock shelters contain only ephemeral architecture, if there is any at all.

WAJ 518 (4,400 m²) is located 250 m to the west of Wadi al-Jariya at the base of a small cliff. The site's boundaries are marked by gullies to the north and south, a small cairn field to the east, and a cliff face to the west. The site consists of five rock shelter complexes (Figure 7.94) with various stone built features and two semi-circular ruins at the eastern rock shelter. Some walls are preserved up to five courses of stone. A number of small structures, possibly storage facilities, were built throughout the site.

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Figure 7.94 These small, circular wall features were constructed at the base of an overhanging cliff, forming a natural rock shelter. The site is located some distance from the Wadi al-Jariya—over 250 m. They may be related to the campsites the survey team found in the same wadi system.

Sherd Scatters

A sherd scatter is defined by a concentration of pottery found in an area with no visible architectural remains. This category may include pot drops or other, more dense and widespread assemblages of pottery.

Just a thin scattering of pottery, WFD 081 is a very small scatter of pottery sherds (1 m²). Nine sherds were collected: five date to the Iron Age, two date to the Early Bronze Age, and two date to the Roman/Byzantine period.

WFD 087 is a dense scatter of Iron Age pottery, located near possible grave features on the eastern edge of the feature. The sherd scatter covers an area of 90 m².

WFD 096 is a small scatter of four Iron Age ceramic sherds. No other features were recorded in association with this feature.

WFD 628 is located on the western bank of 'Ayn Fidan. No architectural features were observed. The main feature at this site was a large lithic scatter (3,900 m²), but there was also a smaller pottery scatter. The pottery dated to the Early Bronze Age, Iron Age, and Roman/Byzantine periods.

WAG 026 is located on a low terrace east of Wadi al-Jariya and north of Wadi al-Ghuwayba. Wadi al-Jariya forms the western boundary of the terrace. The find spot (350 m²) is cleared of the cobbles that would seem to be normally covering the surface. Finds included many Iron Age sherds, lithics, and copper ore.

WAJ 635 is another scatter in the Wadi al-Jariya, consisting of about 15 Iron Age sherds found at the base of a sandstone cliff along a box canyon. WAJ 635 is located at the eastern end of the tributary wadi containing the third cluster of mines identified during the 2007 survey.

Tumuli

Tumuli are cairns or rock piles that mark graves. They are often indicated by a visible, robbed burial chamber.

WFD 123 is composed of two robbed tumuli built out of local rocks, probably collected from the wadi. At both tumuli, human remains are scattered throughout the pile of fill and boulders left by the looters. A single Iron Age sherd was collected at the site, which covers an area of 70 m².

The tumuli at WAJ 639 are located on a sandy steppe above Wadi al-Jariya in a box canyon. There are three robbed tumuli (Figure 7.95) in the eastern portion of the site (covering an area of ca. 3,300 m²). In addition to these, there are numerous rock circles in a shallow



Figure 7.95 WAJ 639—these tumuli have been robbed. They were built on a terrace on the eastern side of the Wadi al-Jariya. A group of mines can be seen in the background, below the cliffs that bound the eastern side of the Wadi al-Jariya.

channel leading into the small box canyon. To the east there is a sandstone outcrop that forms a natural rock shelter. Below it is a line of rocks, underneath which the survey team noted fabric from a goat hair tent. Iron Age pottery was collected near the robbed tumuli, but no artifacts were found around the rock circles or tent.

Discussion of the Results

The intensive pedestrian surveys carried out by the ELRAP team along the Wadi Fidan, Wadi al-Ghuwayba, and Wadi al-Jariya provide important Iron Age data concerning a landscape of copper extraction and production during the Iron Age. While absolute dating of the mines identified in these surveys is not possible at present, given the overwhelming evidence for early Iron Age copper production at the two main sites—Khirbat en-Nahas and Khirbat al-Jariya—it seems most likely that the mines described above are contemporary. The three wadis discussed were part of a settlement system that was mainly focused on the extraction, processing, and distribution of copper. A comparison of the results for each wadi catchment is discussed below and presented in Table 7.1.

Wadi Fidan

As seen in the distribution of Iron Age sites along the Wadi Fidan (Figure 7.96; Table 7.1), Iron Age settlement function varied significantly compared to the WAJ/WAG catchment. A total of 26 Iron Age sites were recorded in Wadi Fidan (Table 7.2). As one of the main western gateways to the Faynan district was the Wadi Fidan, it is interesting that Iron Age settlement in

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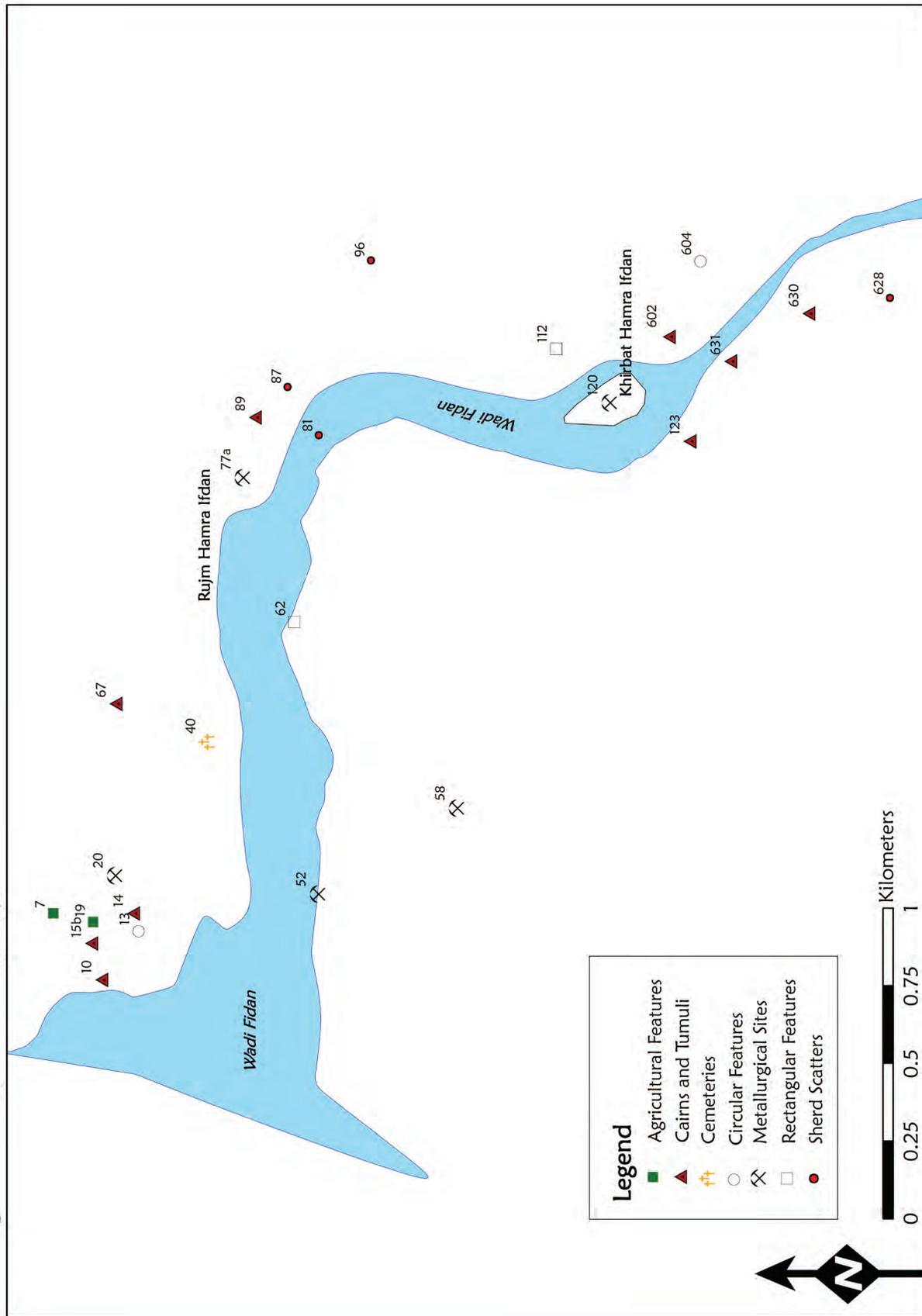


Figure 7.96 Map of Iron Age sites recorded in Wadi Fidan during the 1998 and 2004 surveys.

Table 7.1 Frequency of sites by type in Wadi Fidan and Wadi al-Jariya/Wadi al-Ghuwayba catchment. The number of sites in WAJ/WAG is significantly higher than in Wadi Fidan, in part because of the ore distribution and the importance of the area for copper extraction.

Site Type/Wadi System	WFD	WAJ/WAG
Agricultural	3	-
Architecture Fragment	-	1
Cairns	8	8
Campsite	-	10
Cemetery	1	-
Circular Features	2	12
Metallurgical	5	4
Mines	-	54
Rectangular Features	2	1
Rock Shelters	-	1
Sherd Scatter	4	2
Tumuli	1	1
Total	26	94

this area was not as intense as it was in early periods. Nevertheless, many of the sites were dated using small samples of Iron Age sherds, and the overall quantity of Iron Age materials suggests that Wadi Fidan was an important locus of activity during this period.

The evidence for sedentary occupation is scant, especially compared to other areas, such as the Wadi Faynan valley. Wadi Fidan was an important gateway to these areas and seems to have been a well-traveled route, based on the presence of eight large cairn sites and five pottery sherd scatters. The large cairns recorded by ELRAP, many of which were built on high ground, would have been visible to travelers walking along the wadi channel below the Holocene and Pleistocene terraces. These cairns may have marked the route to some of the major Iron Age sites in the region.

In addition to the smaller, ephemeral sites, surveyors recorded two small Iron Age agricultural sites in Wadi Fidan. Archaeologists have suggested that Iron Age groups subsisted on a mostly pastoralist economy (LaBianca and Younker 1998; Chapter 8, this volume). With the exception of the immediate area around Khirbat Faynan (Barker et al. 2007), the lack of permanent agricultural settlements throughout Faynan seems to corroborate this hypothesis. However, the ELRAP surveys recorded two Iron Age agricultural sites with either agricultural terraces or field systems,

similar to those at Wadi Faynan, but much smaller. It is important to note that the presence of Iron Age sherds in agricultural features is not enough to exclusively date them to a particular time period. However, the presence of Iron Age ceramics at these sites suggests that small-scale agriculture may have been used to supplement a mostly pastoralist lifestyle. Compared to Wadi al-Jariya and Wadi al-Ghuwayba, the soils of the wadi beds in Wadi Fidan and Wadi Faynan are more conducive to agricultural production. In addition, the perennial spring at ‘Ayn Fidan would have aided seasonal crop production.

Iron Age copper smelting in Wadi Fidan was carried out on a very small-scale basis. Unlike the larger smelting sites, Khirbat Faynan, Khirbat an-Nahas, and Khirbat al-Jariya, there are no large Iron Age slag piles or deep deposits of smelting waste in Wadi Fidan. However, the sites of Rujm Hamra Ifdan and Khirbat Hamra Ifdan, where ELRAP excavations revealed Iron Age copper production, are important exceptions (see Chapter 10 and 12, this volume).

Summary of Wadi al-Jariya and Wadi al-Ghuwayba

Seventy-five Iron Age sites were recorded in Wadi al-Jariya and Wadi al-Ghuwayba (Figure 7.97; Table 7.3). Unlike the wadis to the south and southeast, there was no agricultural production in Wadi al-Jariya or Wadi al-Ghuwayba; the wadis would not have been conducive to agriculture, because there is very little arable land and water. Instead, these areas were dedicated to the mining and production of copper and were an important route connecting the highlands and the lowlands (Chapter 6, this volume). There is little evidence of permanent Iron Age settlement in Wadi al-Ghuwayba and Wadi al-Jariya, although the large sites of Khirbat en-Nahas and Khirbat al-Jariya served as major centers of mining, smelting, and production.

Although Early Bronze Age mining hammers were found at some of the mines in Wadi al-Jariya, the majority of the mines should be dated to the Iron Age. This is, in part, based on proximity—there are no Early Bronze Age smelting sites within 5 km of the mines. The nearest Early Bronze site, Ras en-Naqb, is much closer to the mines at Faynan, and the Early Bronze sites in Wadi Fidan are more than 7 km from the Wadi al-Jariya mines. It would have been more efficient to exploit ore from local sources, such as at Umm ez-Zuhur. Similarly, the workers at Khirbat al-Jariya most likely exploited the closest sources of ore in the wadis just north of the

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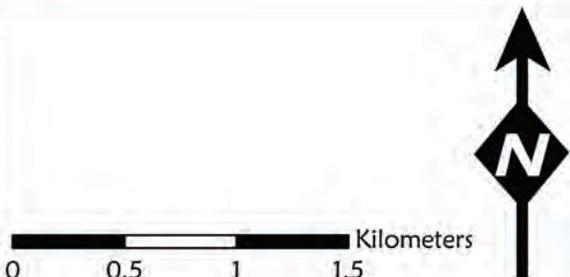
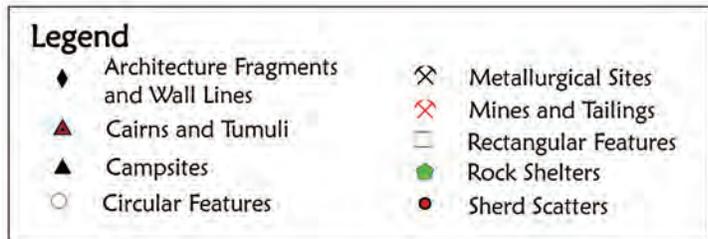
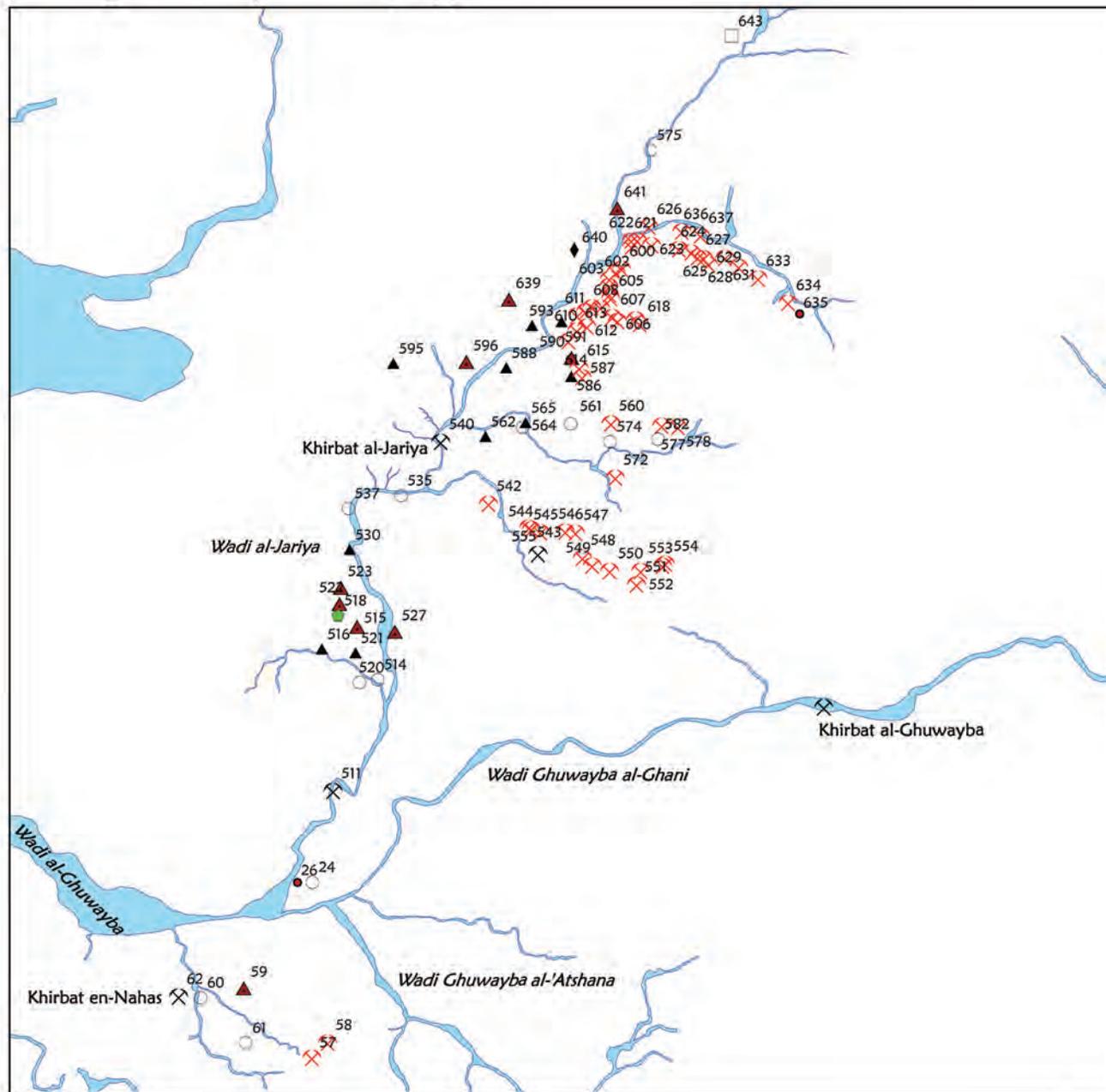


Figure 7.97 Map of Iron Age sites recorded in Wadi al-Ghuwayba and Wadi al-Jariya during the 2002 and 2007 surveys.

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site. The presence of mining hammers at some of these sites may indicate limited exploitation during the Early Bronze Age, or it may be the result of reuse of the hammers. That said, mining hammers like those found at the Early Bronze Age site of Wadi Fidan 4 are not a well-established indicator of cultural chronology. Most of the Early Bronze Age mining hammers found at Wadi Fidan 004 were recovered from the surface; few of them have been recovered from stratified contexts. Since the raw materials to make the hammers are not readily available in Wadi al-Jariya or Wadi al-Ghuwayba, miners would have made them near the source of the stone so as to minimize the amount they had to carry.

A total of 36 mining sites with evidence of Iron Age exploitation were recorded in the WAG/WAJ catchment, although the total number of such sites is more than double that. As we describe above, most of the mining sites were probably exploited during the Iron Age as a part of the copper production system centered at Khirbat en-Nahas and Khirbat al-Jariya. The ELRAP excavations at these sites, combined with intensive archaeological surveys, provide a clear and detailed picture of copper production systems that operated in Faynan (see Chapter 12, this volume; Ben-Yosef 2010).

Another interesting discovery from the Wadi al-Jariya surveys was the presence of eight Iron Age campsites. These sites are some of the few campsites from the Iron Age recorded in Edom. In addition, numerous architectural features and rock shelters provide evidence for an ephemeral, transient occupation of the wadi. Many of these sites are located close to the mining site clusters recorded by ELRAP. The temporary nature of these sites and their proximity to mining sites suggest these may have been temporary encampments used by Iron Age miners who extracted and transported the copper ore to Khirbat al-Jariya.

In summary, the frequency of metallurgical and mining sites in Wadi al-Jariya/Wadi al-Ghuwayba highlights its characterization as a copper production landscape. Unlike the wadis to the south and southwest, where Iron Age settlement was geared toward copper production and agricultural production, there is an absence of any permanent settlement sites in the Wadi al-Jariya/Wadi al-Ghuwayba catchment. This pattern of land use must be viewed as a part of the regional exploitation of copper resources in Faynan during the Iron Age.

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Table 7.2 Iron Age sites from Wadi Fidan surveys.

Site Number	Northing	Easting	Elevation	Site Name	Site Size (m ²)	Major Periods	Other Periods	Site Type	Site Type 2
WFD 007	396571	727472	-38		1,700	IA		Agricultural	
WFD 010	396355	727411	-18		200	IA		Cairns	
WFD 013	396238	727571	-19		70	EB, IA		Circular features	
WFD 014	396256	727628	-12			IA	Paleo	Cairn	Lithic scatter (50 m ²)
WFD 015	396353	727547	1			IA		Cairns	
WFD 019	396378	727595	-29		1,700	IA		Agricultural	
WFD 020	396320	727748	-3		1	IA		Metallurgical	
WFD 040	396075	728144	13			IA		Cemetery	
WFD 052	395667	727709	-18		6,500	EB, IA, Roman		Metallurgical	Rectangular features, circular features
WFD 058	395228	727998	14		4,700	IA		Metallurgical	
WFD 062	395768	728580	29		20	IA		Rectangular feature	
WFD 067	396322	728303	8		1,000	IA		Cairns	Metallurgical
WFD 077a	395950	729021	18	Rujm Hamra Ifdan		IA		Metallurgical	
WFD 081	395708	729186	10		1	EB, IA, R/B		Sherd scatter	
WFD 087	395807	729330	41		90	IA		Sherd scatter	
WFD 089	395914	729238	36		25	IA		Cairns	
WFD 096	395556	729754	53			IA		Sherd scatter	
WFD 112	394939	729486	60		1,800	IA	Roman	Rectangular feature	Cairns
WFD 120	394776	729319	53	Khirbat Hamra Ifdan		EB, IA	R/B, Early Islamic	Metallurgical	Settlement
WFD 123	394508	729203	57		70	IA		Tumuli	

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Table 7.2 Iron Age sites from Wadi Fidan surveys. (continued)

Site Number	Northing	Easting	Elevation	Site Name	Site Size (m ²)	Major Periods	Other Periods	Site Type	Site Type 2
WFD 125	395381	729400	17			IA		Agricultural	
WFD 602	3394646	729542	58		6,800	Paleo, IA		Cairn	Circular features
WFD 604	3394548	729786	68		5,200	Paleo, IA		Circular Features	Rectangular features
WFD 628	3393939	729673	67		3,900	Paleo, EB, IA, R/B		Sherd Scatter	Lithic scatter
WFD 630	3394199	729621	63		150	IA		Cairns	
WFD 631	3394448	729465	55		200	IA, R/B		Cairns	Metallurgical

Paleo = Paleolithic; EB = Early Bronze; IA = Iron Age; Nab = Nabatean; Nab/Roman = Nabatean/Roman; R/B = Roman/Byzantine; MI = Middle Islamic

Table 7.3 Iron Age sites from Wadi al-Jariya/Wadi al-Ghuwayba surveys.

Site Number	Northing	Easting	Elevation	Site Name	Site Size (m ²)	Major Periods	Other Periods	Site Type	Site Type 2
WAG 024	3397582	734173	94		4,500	IA	EB	Circular features	Cairns
WAG 026	3397583	734096	87		350	IA	EB	Sherd scatter	Lithic scatter, metallurgical
WAG 057	3396659	734158	106			MI II		Mines	
WAG 058	3396737	734242	135			IA	MI	Mines	
WAG 059	3397030	733805	136		4,300	IA		Cairns	Metallurgical
WAG 060	3396984	733579	86		150	IA		Circular feature	Cairn
WAG 061	3396743	733813	153		2700	IA		Circular features	Cairns
WAG 062	3396991	733464	83	Khirbat en-Nahas	100,000	IA		Metallurgical	
WAJ 511	3398059	734289	100		1,100	EB, IA, R/B		Metallurgical	
WAJ 514	3398640	734532	136		1,200	IA	EB	Circular features	Cairn
WAJ 515	3398919	734427	125		5,900	IA	EB	Cairns	Circular features, wall lines
WAJ 516	3398807	734240	132		3,000	IA		Campsite	Cairns
WAJ 518	3398982	734328	134		4,400	IA	EB	Rock shelters	Architecture fragment

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Table 7.3 Iron Age sites from Wadi al-Jariya/Wadi al-Ghuwayba surveys. (continued)

Site Number	Northing	Easting	Elevation	Site Name	Site Size (m ²)	Major Periods	Other Periods	Site Type	Site Type 2
WAJ 520	3398627	734436	120		33,600	IA	EB	Circular features	Cairns
WAJ 521	3398783	734417	125		3,200	IA		Campsite	Cairns
WAJ 522	3399040	734335	138		300	IA		Cairns	
WAJ 523	3399126	734345	137		1,500	IA		Cairns	
WAJ 527	3398890	734625	127		5,500	IA		Cairns	Circular features
WAJ 530	3399326	734394	131		14,000	IA	EB	Campsite	
WAJ 535	3399606	734668	143		10	IA	EB	Circular features	Wall line
WAJ 537	3399542	734390	133		4,300	EB, IA		Circular features	Cairns, wall lines
WAJ 540	3399885	734880	154	Khirbat al-Jariya		IA		Metallurgical	
WAJ 542	3399555	735126	163			IA		Mine	
WAJ 543	3399428	735336	194			IA		Mine	
WAJ 544	3399419	735351	196			IA		Mine	
WAJ 545	3399402	735396	206			IA		Mine	
WAJ 546	3399403	735527	224			IA		Mine	
WAJ 547	3399397	735581	223			IA		Mine	
WAJ 548	3399264	735616	236			EB II, EB III, IA	Byzantine	Mine	
WAJ 549	3399223	735666	238			IA		Mine	
WAJ 550	3399194	735758	247			IA		Mine	
WAJ 551	3399121	735898	263			R/B		Mine	Metallurgical
WAJ 552	3399191	735921	271			Modern	IA	Mine	
WAJ 553	3399217	736036	289			IA		Mine	
WAJ 554	3399228	736051	293			Unknown		Mine	
WAJ 555	3399287	735382	187		700	IA	Modern	Metallurgical	Cairns, circular features

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Table 7.3 Iron Age sites from Wadi al-Jariya/Wadi al-Ghuwayba surveys. (continued)

Site Number	Northing	Easting	Elevation	Site Name	Site Size (m ²)	Major Periods	Other Periods	Site Type	Site Type 2
WAJ 560	3399672	735661	0			IA		Mine	
WAJ 561	3399672	735453	244		60	IA	Paleo	Circular feature	
WAJ 562	3399606	735008	184		1,900	IA	Islamic	Campsite	Architecture fragment
WAJ 564	3399653	735203	193		150	IA, R/B		Circular features	
WAJ 565	3399678	735218	194		200	IA		Campsite	
WAJ 572	3399390	735685	257			Unknown		Mine	
WAJ 574	3399577	735658	254		700	IA		Circular features	Cairns
WAJ 575	3401097	735867	221		250	IA	EB	Circular features	Campsite
WAJ 577	3399660	735926	278			EB		Mine	
WAJ 578	3399654	736011	277			R/B		Mine	
WAJ 582	3399592	735908	273		20	IA		Circular features	
WAJ 586	3399918	735455	227		1,100	IA, R/B		Campsite	
WAJ 587	3399913	735511	227			IA		Mine	
WAJ 588	3399964	735116	182		21,800	IA		Campsite	Tumuli
WAJ 590	3400014	735456	205		2,600	IA	Paleo	Cairns	
WAJ 591	3400204	735405	192		1,000	IA, R/B		Campsite	
WAJ 593	3400184	735251	191		2,000	IA	Paleo, R/B	Campsite	
WAJ 595	3399986	734529	252		8,800	IA, R/B	EB	Campsite	Tumulus, circular features
WAJ 596	3399993	734908	209		12,700	IA, N/R, Islamic		Cairns	Circular feature
WAJ 600	3400477	735717	201			IA		Mine	
WAJ 601	3400461	735686	201			IA, Nab		Mine	
WAJ 602	3400425	735653	199			IA	EB	Mine	
WAJ 603	3400388	735652	201			EB, IA		Mine	

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Table 7.3 Iron Age sites from Wadi al-Jariya/Wadi al-Ghuwayba surveys. (continued)

Site Number	Northing	Easting	Elevation	Site Name	Site Size (m ²)	Major Periods	Other Periods	Site Type	Site Type 2
WAJ 604	3400345	735653	201			IA		Mine	
WAJ 605	3400324	735660	201			IA	Paleo, EB	Mine	
WAJ 606	3400206	735696	210			IA, N/R	Paleo	Mine	
WAJ 607	3400227	735668	207			EB, IA		Mine	
WAJ 608	3400276	735607	197			IA		Mine	
WAJ 609	3400277	735562	194			IA	EB, Late Islamic	Mine	
WAJ 610	3400257	735529	195			IA	R/B	Mine	
WAJ 611	3400233	735485	189			IA, Roman	Paleo	Mine	
WAJ 612	3400178	735536	199			IA		Mine	
WAJ 613	3400157	735484	198			IA	Late Islamic	Mine	
WAJ 614	3400102	735440	199			IA	Paleo	Mine	
WAJ 615	3399962	735496	206			EB, IA		Mine	
WAJ 617	3400214	735790	225					Mine	
WAJ 618	3400190	735811	227			Unknown		Mine	
WAJ 620	3400593	735768	200			EB		Mine	
WAJ 621	3400625	735767	198			IA	Paleo	Mine	
WAJ 622	3400627	735798	201			EB, IA, R/B		Mine	
WAJ 623	3400601	735873	210			IA		Mine	
WAJ 624	3400580	736015	220			EB, IA		Mine	
WAJ 625	3400563	736079	229			Unknown		Mine	
WAJ 626	3400697	735859	206			Late Islamic	IA	Mine	Campsite
WAJ 627	3400537	736113	226			EB		Mine	

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Table 7.3 Iron Age sites from Wadi al-Jariya/Wadi al-Ghuwayba surveys. (continued)

Site Number	Northing	Easting	Elevation	Site Name	Site Size (m ²)	Major Periods	Other Periods	Site Type	Site Type 2
WAJ 628	3400533	736144	229			Unknown		Mine	
WAJ 629	3400501	736169	235			Unknown		Mine	
WAJ 631	3400535	736255	224			Unknown		Mine	
WAJ 632	3400488	736326	227			Unknown	Modern	Mine	Campsite
WAJ 633	3400428	736427	232			Unknown		Mine	
WAJ 634	3400301	736583	242			IA, Nab		Mine	
WAJ 635	3400244	736645	248			IA		Sherd scatter	
WAJ 636	3400672	736030	213			IA		Mine	
WAJ 637	3400651	736128	218			IA		Mine	
WAJ 639	3400319	735130	194		3,300	IA		Tumuli	
WAJ 640	3400577	735470	217		36,200	IA	Paleo, PPN, EB, Nab	Architecture fragment	
WAJ 641	3400795	735693	216		4,700	IA	R/B	Cairns	
WAJ 643	3401693	736291	263		1,700	IA	Paleo	Rectangular feature	

Paleo = Paleolithic; EB = Early Bronze; IA = Iron Age; Nab = Nabatean; Nab/Roman = Nabatean/Roman; R/B = Roman/Byzantine; MI = Middle Islamic

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