

RESULTS OF THE SOUTHEAST 'ARABAH ARCHAEOLOGICAL RECONNAISSANCE

by
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I. Introduction

The Wadi 'Arabah is a linear valley that extends ca. 165 km north from the Gulf of Aqaba to the escarpment overlooking the Southern Ghor of the Dead Sea, within which we define the southeast sector as the area extending ca. 75 km south from the drainage divide to Aqaba.¹ The limited state of knowledge of the archaeological record for the southeast 'Arabah necessitated a preliminary reconnaissance to determine whether an intensive, systematic survey of the area is warranted. The following discussion outlines the results of the Southeast 'Arabah Archaeological Reconnaissance (SAAR).²

The reconnaissance was conducted as a feasibility study between June 12 and June 22, 1993, and the field team included the director, Andrew M. Smith II of North Carolina State University, and geologist, Dr. Tina M. Niemi of Stanford University. Four specific objectives were outlined while formulating this feasibility study. First, a reconnaissance was required to learn more concerning the natural environment, i.e., the geomorphology, hydrology, climate, flora, fauna, etc. Second, a principal goal of the project was to assess the known evidence for past human activity in the area by visiting previously-reported archaeological sites. The third specific goal was to search for evidence of new archaeological sites in the study area. Finally, the

reconnaissance was in the field to assess the prospects for a formal survey of the southeast 'Arabah.

II. Study Area

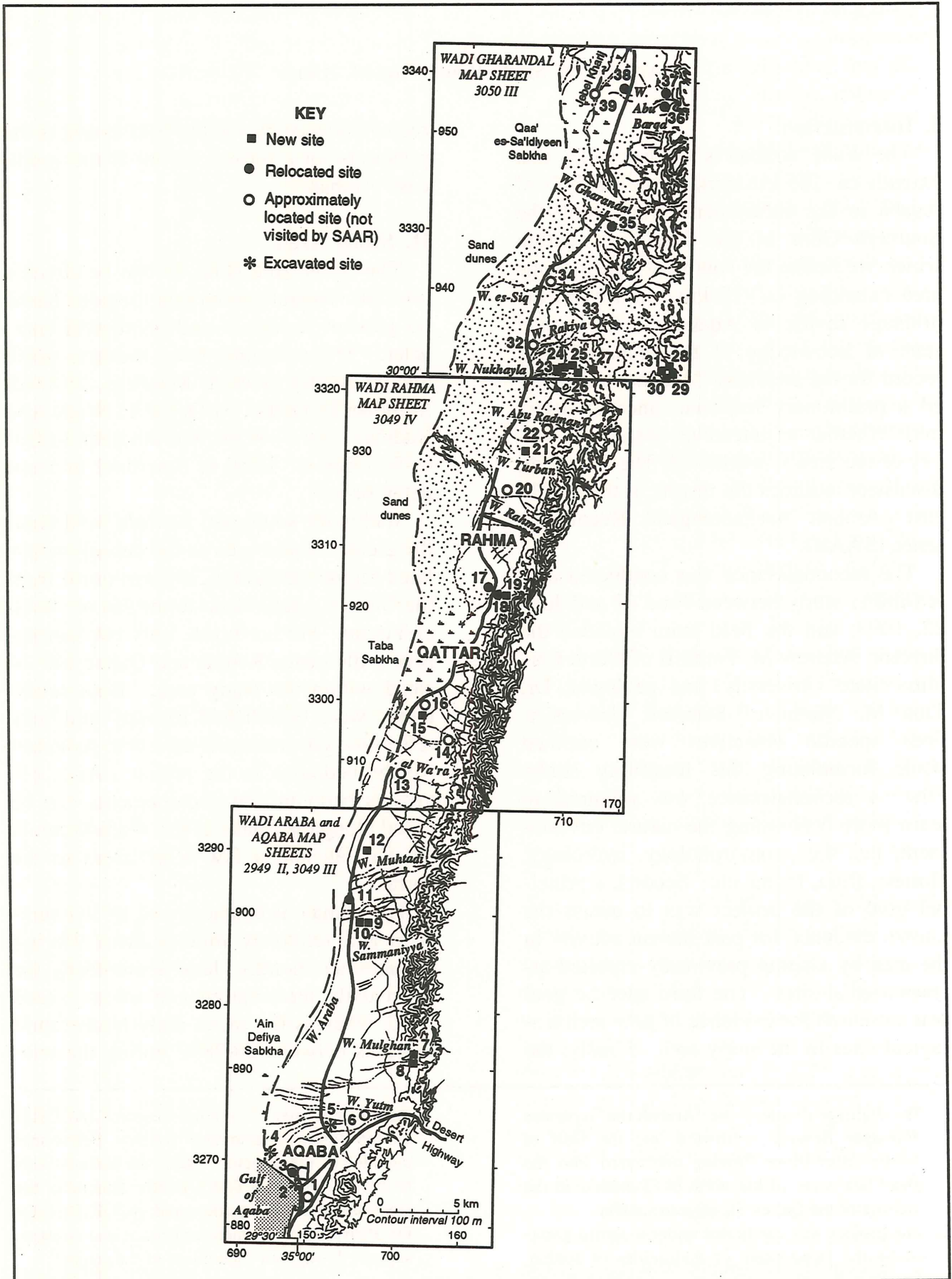
The study area (Fig. 1) can be divided into four separate geographic regions based on geomorphological and geological character. These regions from south to north are: 1) Aqaba to Wadi Mulghan, 2) Wadi Mulghan to Qaṭṭar, 3) Qaṭṭar to Wadi Abu Radman, and 4) Wadi Abu Radman to Qa'es-Sa'idiyeen. Each is described in more detail below.

Within the southeast 'Arabah, we delimit the greater Aqaba area as the densely populated region extending ca. 7 km north from the Gulf of Aqaba coast to the fan of Wadi el-Yutum. Further north, only two permanent settlements, Raḥma and Qaṭṭar, are located within the study area. Both settlements were established recently and they reflect the governmental efforts to sedentarize the bedouins in the region. Also, numerous bedouin tent encampments can be found along the flanks of the Wadi Muhtadi alluvial fan and a few other areas to the north.

The climate is characterized by hot summers and relatively mild winters. During the summer months (June-September), the mean daily temperature can often exceed 40°C, whereas the mean daily temperature averages between 20-28°C during the win-

1. The drainage divide of the 'Arabah that separates drainages flowing southward into the Gulf of Aqaba from those flowing northward into the Dead Sea is ca. 11 km north of Gharandal in the vicinity of the Qa'es-Sa'idiyeen sabkha.
2. The project was conducted under a permit granted by the Department of Antiquities of Jordan. Funding for the project was provided by an

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1. Map of the southeast Wadi 'Arabah.

ter months (November-March). Rainfall in the region is sparse, averaging between 50-100 mm annually, and occurs only during the winter months.

Aqaba to Wadi Mulghan

Granitic rocks crisscrossed by a series of black dikes form the backbone of the mountain range that lies east-northeast of Aqaba. The sharp boundary between the 'Arabah valley and the mountains to the east is formed by tectonic motion along the main escarpment fault of the Dead Sea-Jordan Rift. Within this southern section between Aqaba to Wadi Mulghan, the range front is oriented at an angle northeast of the trend of the main escarpment. Here, the mouths of two wadis, Wadi el-Yutum and Wadi Mulghan, debouch through steep gorges and form large alluvial fans that radiate into the Wadi 'Arabah valley. The active channels of these alluvial fans flow predominately westward into the 'Ain ed-Defiya sabkha depression, although several branches of the el-Yutum flow southwestward toward the Gulf of Aqaba. El-Yutum is, by far, the largest drainage system in the study area, reaching far into the eastern plateau. Wadi Mulghan follows a linear, fault-controlled northeast course into the heart of granitic terrain.

Wadi Mulghan to Qaţtar

In this region the granitic rock forms a very steep escarpment rising to elevations near 1200 m over a short distance. Narrow gorges incised across the range front in an east-west direction are cut by the major drainages. Where these wadis emerge from the escarpment, they form radiating alluvial fans. Because of the greater drainage area of Wadi Muhtadi, the alluvial fan that emanates from its mouth reaches elevations of nearly 400 m and extends far westward restricting the width of the Wadi 'Arabah valley. Elevated Pleistocene alluvial surfaces

dissected by modern wadi incisions typify most of the region. These older alluvial fan surfaces can be distinguished by a veneer of desert varnish on surface gravels. North of the Muhtadi fan, there is a unique occurrence of Cretaceous sandstone and limestone outcrops that form low hills west of the main mountain front.

Qaţtar to Wadi Abu Radman

The region that extends from the village of Qaţtar to the Wadi Abu Radman is a transitional area between the large alluvial fan system to the south and the sand dune field to the north. Here, few drainages penetrate deeply into the predominately granodioritic bedrock east of the escarpment, and subsequently, there is diminution of alluvial fan development. An exception to this is the alluvial fan of Wadi Raḥma (Wadi Darba on the topographic maps) whose drainage follows northwest trending faults across the escarpment. In the southern sector of this area, the drainages are ponded in the Ṭaba sabkha depression. A sharp east-west boundary marks the northern limit of this mudflat and the southward migrating sand dune field.

Wadi Abu Radman to Qa' es-Sa'idiyeen

The southern limit of this region is defined by a profound lithologic boundary between the granitic rock to the south and the sedimentary and volcanic to the north. The prevalence of easily-eroded sandstone that forms isolated buttes and mesas also represents the origin of large quantities of sand that has collected within the Wadi 'Arabah valley. Sand dunes are elongated in a northwest-southeast direction and blanket rock outcrops several kilometers east of the escarpment. The southern wadis in this region, Wadi Nukhayla, Wadi Rakiya, and Wadi es-Siq, have large branching drainage systems. To the north drainages such as Wadi Gharandal and Wadi Abu Barqa have

more limited watersheds within older crystalline basement rocks. Throughout the whole area, the westward drainage is structurally blocked by the low-lying, northeast-trending hills of Cretaceous limestone of Jabal Kharij. The Qa' es-Sa'idiyeen sabkha is a product of this tectonically blocked drainage.

III. Previous Investigations

Three pioneering explorations were launched within Wadi 'Arabah at the turn of this century. Alois Musil explored the 'Arabah in 1898 and again in 1902;³ Fritz Frank conducted archaeological surveys in the 'Arabah during the winters of 1932 and 1933/34;⁴ and Nelson Glueck directed his archaeological survey in 1934,⁵ followed by an aerial reconnaissance in 1939.⁶ Although the published accounts of these surveys are the basic references for the archaeology of the eastern Wadi 'Arabah, they provide very little information about the southeast sector of the valley north of greater Aqaba and south of Gharandal. In this area, only one archaeological site was recorded during these early explorations. In the southern Wadi 'Arabah, these scholars avoided the route along the eastern escarpment in favor of a more westerly route, rec-

ognizing 'Ain Ghdayyān as a hub between Gharandal to the north and Aqaba to the south.

More recently, regional studies within the eastern Wadi 'Arabah have intensified.⁷ However, only two contemporary archaeologists, David McCreery and David Graf, conducted fieldwork in the study area north of greater Aqaba. In 1979, McCreery directed a brief survey around the modern villages of Gharandal and Rahma without finding any new evidence of ancient remains.⁸ In 1980, Graf visited three sites known previously to be in the study area during his survey of the Hisma desert.⁹ The unpublished reports from these projects make only a limited contribution to the present state of knowledge of the archaeological record for the study area.

In spite of past fieldwork conducted within Wadi 'Arabah, the southeast sector of the valley remains void of any systematic investigation. The only extensive account of the archaeological history of this area is contained within an unpublished report submitted to the Department of Antiquities of Jordan by Thomas Raikes.¹⁰ This report is a valuable source, but it is primarily a descriptive record of archaeological sites encountered during Raikes' brief, pur-

3. A. Musil, *Arabia Petraea*, Band II, *Edom: Topographischer Reisebericht*, Teil 1, Georg Olms, Hildesheim, 1989, p. 241-310; *idem.*, *Arabia Petraea*, Band II, *Edom: Topographischer Reisebericht*, Teil 2, Georg Olms, Hildesheim, 1989, p. 178-215.
4. F. Frank, 'Aus der Araba I: Reiserberichte', *ZDPV* 57 (1934), p. 191-280.
5. N. G. Glueck, *Explorations in Eastern Palestine*, II, *AASOR* 15 (1935), p. 1-53.
6. Nelson Glueck, 'An Aerial Reconnaissance in Southern Jordan', *BASOR* 67 (1937), p. 19-26.
7. See B. MacDonald, *The Southern Ghor and Northeast 'Arabah Archaeological Survey*, Sheffield, J.R. Collins, 1992; G.R.D. King *et al.*, 'Survey of Byzantine and Islamic Sites in Jordan, Third Preliminary Report (1982), The Wadi 'Arabah (Part 2)', *ADAJ* 33 (1989), p. 199-215; A.

- Hauptmann and G. Weisgerber, 'Archaeometallurgical and Mining-Archaeological Investigations in the Area of Feinan, Wadi 'Arabah (Jordan)', *ADAJ* 31 (1987), p. 419-437; H.G. Bachmann and A. Hauptmann, 'Zur alten Kupfergewinnung in Fenan und Khirbet en-Nahas im Wadi Arabah in SüdJordanien. Ein Vorbericht', *Der Anschnitt* 35 (1984), p. 110-123.
8. D. McCreery, 'Initial Report of the Archaeological Survey of the Southern Ghor and 'Arabah, May 2-16, 1979', Unpublished Report (1979), p. 1-16.
9. D. Graf, 'Survey of the Hisma Desert, Southern Jordan, 1980', Unpublished Report (1980), p. 1-11.
10. T. Raikes, 'Ancient Sites in the Wadi 'Arabah and Nearby', Unpublished Report (1976), p. 1-48.

positive survey of the 'Arabah. Accordingly, our knowledge of past human activity in the southeast Wadi 'Arabah remains slight.

IV. Methodology

The reconnaissance employed purposive vehicular and pedestrian transects conducted with mixed frequency dependent on the location within the study area. Also, the application of each survey method was governed by the principal objectives of the project outlined above. In the southern region where large alluvial fans expand into the 'Arabah, purposive vehicular survey proved difficult. As a result, pedestrian transects sufficed for general coverage of the area. In the sand dune district to the north, however, both survey methods were employed somewhat consistently. For the most part, coverage in the north was limited to the areas immediately adjacent to the escarpment. Finally, limited pedestrian transects were carried out within Wadi Mulghan, Wadi Rakiya, and Wadi Nukhayla. In the northern parts of the survey area and within Wadi Rakiya, the reconnaissance was assisted by local bedouin guides.

In order to assess the known evidence for past human activity in the region, the first priority was to locate the sites mentioned in Raikes' unpublished report. From the Qa' es-Sa'idiyeen sabkha south to the northern boundary of greater Aqaba, Raikes made 20 entries in his report. Omitting entries that did not mention the presence of cultural material, Raikes recorded 15 archaeological sites in the area. Due to time

constraints and the limitations of the terrain, only seven of these sites were located. Out of 39 total sites recorded in this report, 17 were new discoveries.

Since this project was designed within the parameters of a feasibility study, there was no attempt to collect any artifactual material. Such collection awaits a forthcoming survey of the region when the task of managing the artifacts will be logistically possible.

Four K737 series topographic maps at a scale of 1:50,000 were used in the reconnaissance survey. From south to north, these maps are the Aqaba 3049 III, Wadi 'Arabah 2949 II, Wadi Darba 3049 IV, and Wadi Gharandal 3050 III. Field observations were supplemented by 1:50,000 scale geologic maps of these sheets: Aqaba/Wadi 'Arabah,¹¹ Wadi Rahma (called Wadi Darba in the topographic series),¹² and Wadi Gharandal.¹³

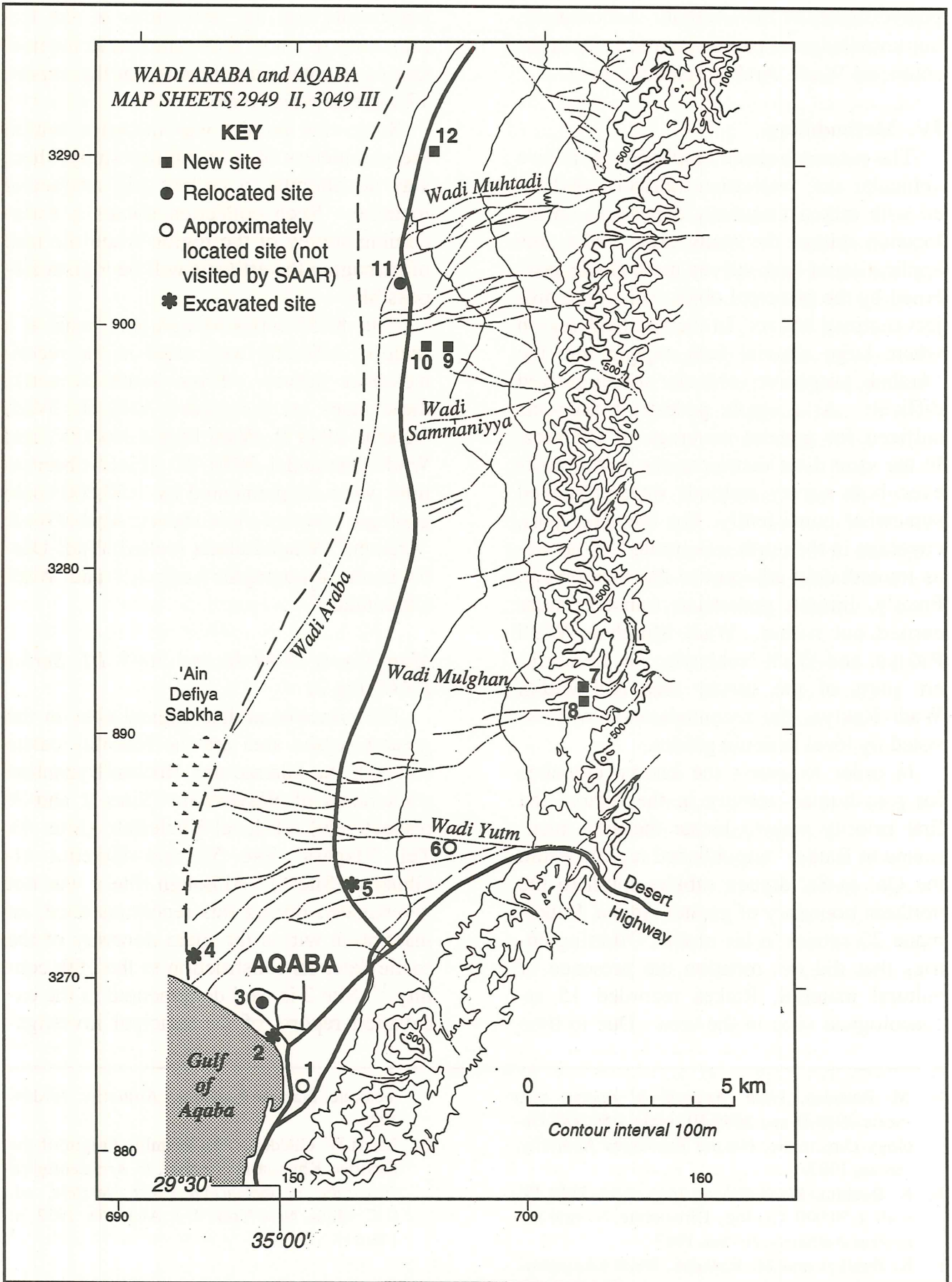
Map Sheets 2949 II and 3049 III, Series K737 (Fig 2)

The principal archaeological sites in the greater Aqaba area are the Mamluk castle (Site 1), the Islamic and Roman/Byzantine settlements of Wayla/Aila (Sites 2 and 3, respectively), Tell el-Kheleifeh (Site 4), Tell Magass (Site 5), and Hujairat el-Ghuzlan (Site 6). Although Site 1 was not investigated during this reconnaissance, an inscription within the main doorway of the castle dates its construction to the 16th century.¹⁴ Site 2 is well documented in the excavation reports of its principal investiga-

11. M. Rashdan, *Wadi 'Arabah, Al Aqaba*, map sheets 2949 II and 3049 III, scale 1:50,000, Geology Directorate, Natural Resources Authority, Jordan, 1987.
12. K. Ibrahim, *Wadi Rahma*, map sheet 3049 IV, scale 1:50,000, Geology Directorate, Natural Resources Authority, Jordan, 1987.
13. K. Ibrahim and M. Rashdan, *Wadi Gharandal*, map sheet 3050 III, scale 1:50,000, Geology Di-

rectorate, Natural Resources Authority, Jordan, 1988.

14. See H.W. Glidden, 'The Mamluk Origin of the Fortified Khan at al-'Aqaba', in *Archaeologica Orientalia in memoriam Ernst Herzfeld*, ed. G.C. Miles, New York, J. J. Augustin, 1952, p. 116-118.



2. Wadi 'Arabah and Aqaba, Map Sheets 2949 II and 3049 III.

tor, Donald Whitcomb, and it is not necessary to iterate here the details of the site.¹⁵ Site 3 is the area encompassed by the archaeological survey directed by John Meloy in 1990,¹⁶ and further investigation of this region is needed to confirm that this is indeed the Nabataean/Roman/Byzantine city of Aila. The Iron Age/Persian site of Tell el-Kheleifeh, located ca. 500 m north of the shoreline and adjacent to Jordan's western border, was first discovered by Fritz Frank in 1933 and later excavated by Nelson Glueck.¹⁷ More recently, Gary Pratico concluded a definitive reexamination of the results from Glueck's excavations at Tell el-Kheleifeh.¹⁸ The Chalcolithic site of Tell el-Magaşş, located 1.7 km north of the junction of the Airport and Desert highways, was first exposed during highway construction and later excavated by Lutfi Khalil.¹⁹ Site 6 was not visited in this reconnaissance, but is described as a tell twice as large and contemporary with Tell el-Magaşş.²⁰

Located on a saddle near the mouth of the Wadi Mulghan gorge, there is a ruined structure, perhaps a tower, not more than 7 m square (Site 7). The south wall of the structure is partially intact for a length of ca. 3 m and appears to be at least two-courses wide. Adjacent to the south wall, there may be evidence for later reuse of the stones (cemetery?). A small sherd scatter is associated with the structure. Forty meters west-northwest of Site 7 is a modern bedou-

in cemetery.

Topographically, Wadi Mulghan appears as an easy route ascending up the plateau to the northeast. We made a pedestrian survey ca. 1 km up Wadi Mulghan, where we observed the remnants of an older alluvial fan above the active wadi bed. This older surface may be a potential location for archaeological sites, however, no cultural debris was found along our transects. The wadi bed is bounded by steep cliffs.

On a small alluvial fan on the flank of the west-facing, low granitic ridge ca. 300 m south of Site 7, there are 11 structures recorded as Site 8. The site is located on a terrace above a wash that cuts the older alluvial fan surface. Nine of the structures are circular mounds of rock, ca. 3 m in diameter, and appear to be tombs/graves. The remaining two structures measure 4 m along three walls that form an open rectangle. Whereas the westernmost structure is open to the north, the structure further up the slope is open to the south. No pottery or lithics were associated with the site.

The distal portion of the alluvial fan emanating from the mouth of Wadi Sammaniya, about 13 km north of the Desert highway junction and south of a gravel borrow pit, is characterized by debris flows that have the deceptive appearance of linear stone alignments. During a brief, pedestrian survey of this area, we discovered Site 9, a two-course high enclosure wall encompassing an area cleared of stones measuring

15. D. Whitcomb, 'Excavations in 'Aqaba: First Preliminary Report', *ADAJ* 31 (1987), p. 247-266; *idem.*, *Aqaba: Port of Palestine on the China Sea*, Amman, Jordan, 1988.

16. J. Meloy, 'Results of Archaeological Reconnaissance in West Aqaba: Evidence of the Pre-Islamic Settlement', *ADAJ* 35 (1991), p. 397-414.

17. Frank, 'Aus der 'Araba I', p. 243-245; N. Glueck, 'Ezion-Geber', *BA* 28 (1965), p. 70-87.

18. G. Pratico, 'Nelson Glueck's 1938-1940 Excava-

tions at Tell el-Kheleifeh: A Reappraisal', *BASOR* 259 (1985), p. 1-32.

19. L. Khalil, 'Preliminary Report on the 1985 Season of Excavation at el-Maqass-'Aqaba', *ADAJ* 31 (1987), p. 481-483; *idem.*, 'Excavation at el-Maqass-'Aqaba, 1985', *Dirasat* 15 (7) (1988), p. 71-117.

20. L. Khalil, 'Some Technological Features from a Chalcolithic Site at Maqass-Aqaba', *SHAJ* IV (1992), p. 148.

ca. 25 m by 27 m. Site 9 is located ca. 500 m east of the road, where three lithics were found. Located on the same fan as Site 9 and ca. 300 m to the west of it, there is a tumulus (Site 10). No pottery or lithics were associated with Site 10.

Site 11 (Raikes site 6) is located 17.2 km north of the junction of the Desert highway, where the road cuts through a Pleistocene alluvial fan of Wadi Muhtadi. The site consists of at least six ancient structures. Four of these are grouped together on a small knoll including two stone-lined, open rectangular depressions measuring 2.5 m on a side, a third depression where the stones appear to have been removed, and a rock mound ca. 3 m in diameter. The depressions are filled with wind-blown sand. Two additional rock-lined depressions are found ca. 60 m to the northeast. Some pottery (Chalcolithic ?) and lithics were found at the site. Large, rectangular, brick-shaped slag and fragments of copper ore are concentrated on the east face of the knoll and associated with a cut in the slope. Raikes interpreted the structural remains at this site as evidence for a possible kiln or furnace.²¹ The area has been modified by the construction of modern structures.

Site 12 is located ca. 2.5 km north of site 11 and east of the highway, where there is a marked step in the Pleistocene alluvial fan surface due to active faulting. On this older fan surface we located a variety of burials. Four of these appear as oblong rings of stones measuring ca. 2.5 m long, although there is a single burial less than 1.5 m long. This smaller grave is set parallel to a larger one, and both are oriented east-west. The remaining two graves are oriented north-south. There is a light sherd scatter associated with the site. Moreover, opposite

these burials to the north and separated by a fresh wadi cut, there is a ca. 1.2 m semi-circular pavement of stones. We interpret this feature to be another burial, but of a different type.

Map Sheet 3049 IV, Series K737 (Fig. 3)

Bordering the Aqaba and Wadi Rahma topographic map boundary is the Wadi Muhtadi and Wadi el-Wa'ra alluvial fan complex. Raikes recorded a group of large boulders with an associated scatter of Nabataean pottery (Raikes site 8) on the distal portions of the Wadi el-Wa'ra fan just east of the highway, which we designate as Site 13. With Aqaba visible to the south and the Nabataean defensive structure (our Site 17 below) visible to the north, Raikes suggested that this would be a likely location for an intermediate relay station designed to send signals in either direction.²² Since Site 13 was not visited during the reconnaissance of the region, confirmation of its position and presumed significance awaits future fieldwork. Our field observations in this area, however, suggest that the higher elevations at the mouth and distal portions of the Wadi Muhtadi fan would offer a much better regional vantage point.

During geologic mapping at the mouth of Wadi el-Wa'ra, Ibrahim found evidence of an ancient smelting site adjacent to a series of hills west of the main escarpment (Site 14).²³ This site is located ca. 4 km east of the main road and is not accessible by any dirt track. It was not visited during the reconnaissance.

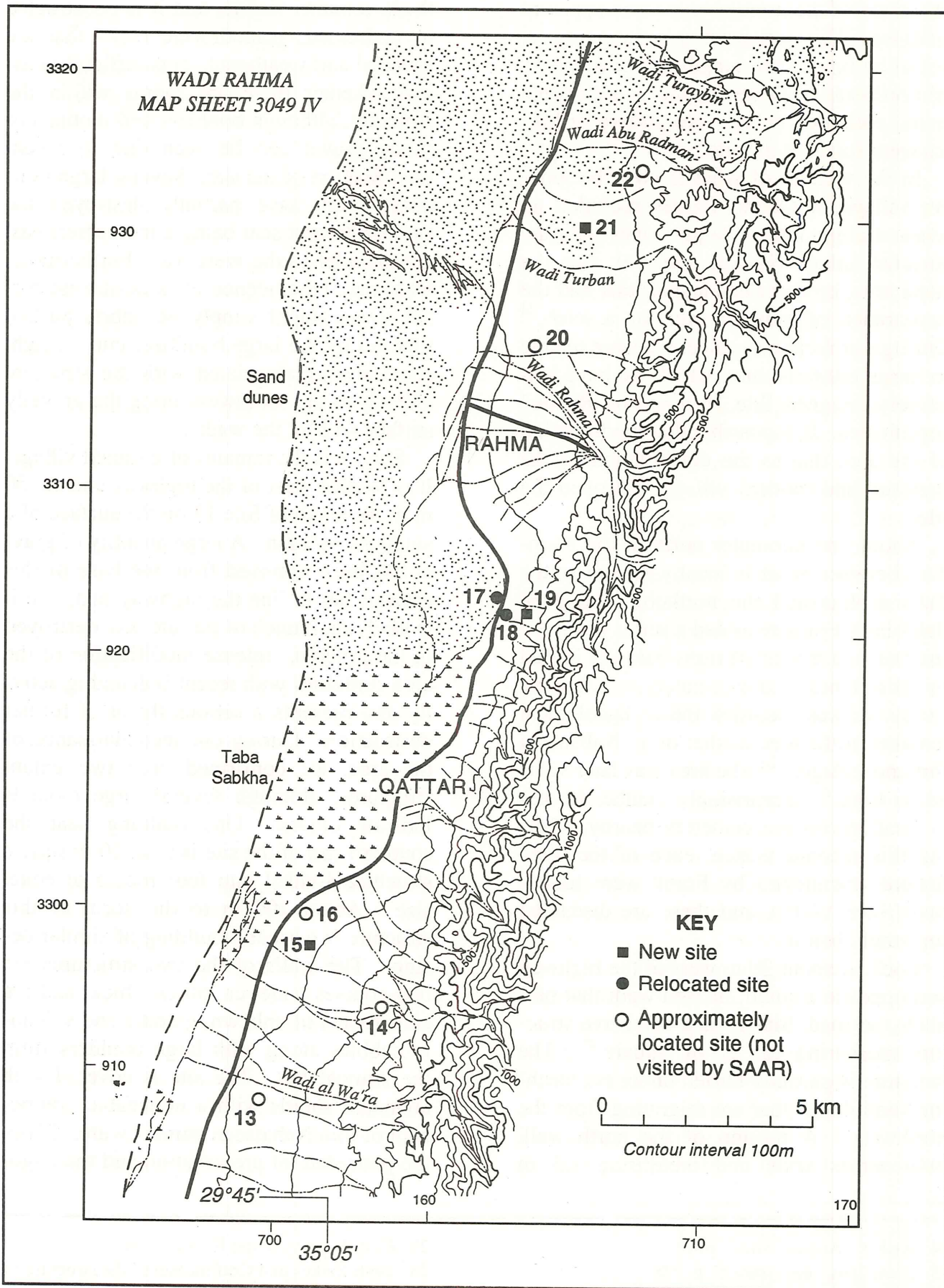
West of Site 14 and ca. 900 m east of the highway, Site 15 is a tumulus constructed of granitic rock boulders piled ca. 1.2 m high and measuring ca. 5 m in diameter. A small, rectangular compartment is exposed

21. Raikes, 'Ancient Sites', p. 13.

22. *Ibid.*

23. K. Ibrahim, *The Geology of the Wadi Rahma,*

map sheet 3049 IV, *Geological Bulletin* No. 15, Geology Directorate, Natural Resources Authority, Jordan, 1991, p. 107.



3. Wadi Rahma, Map Sheet 3049 IV.

at the top of the tumulus due to an apparent collapse. This collapsed area measures ca. 1.3 m by 0.6 m, and lengthwise it is oriented north-south. Bone fragments are visible in the collapsed debris. No pottery or lithics were found at the site.

In the vicinity of what is now the modern village of Qaṭṭar, Raikes recorded an unusual alignment of large stones with associated lithics (Raikes site 10). In the same area, he described a shaft that had the appearance of either a well or a tomb.²⁴ During our reconnaissance, we were unable to locate either feature, which we have tentatively assigned Site 16 based on Raikes' coordinates. It is possible that modification of the area due to the construction of the highway and modern village destroyed the site.

About one kilometer north of the boundary between what is locally known as the Ṭaba sabkha and the northern sand dune field, Fritz Frank recorded a series of ruined structures, a mound of ruins partially buried by sand dunes, and a cemetery.²⁵ More recently, Raikes recorded the archaeological remains in the area as that of a "Nabataean fort and village."²⁶ The area was later visited by Graf.²⁷ Surprisingly, neither Raikes or Graf recorded a cemetery nearby. During this reconnaissance, each of the three features mentioned by Frank were identified (Sites 17-19), and these are discussed separately below.

Located about 20 m west of the highway and opposite a small, incised wadi that parallels the road, Site 17 is a defensive structure measuring ca. 21 m. square.²⁸ The structure is partially buried under encroaching sand dunes that are migrating from the northwest. A portion of the north wall, two-courses wide and measuring 1.3 m

thick, remains visible, and it is constructed of undressed, granodioritic rocks that are rounded and weathered. It is difficult to assess whether there are rooms within the structure, although boulders and mounds of sandy gravel can be seen due to recent modification of the site. Several large bulldozer scars have partially destroyed the site, the largest scar being a few meters east and parallel to the west wall. Furthermore, what may be evidence for a northwest corner tower might simply be debris pushed forward by the large bulldozer cut. A light sherd scatter associated with the structure extends to the southwest along the gravelly surface west of the wadi.

Site 18 is the remains of a ruined village. It is located west of the highway and ca. 50 m to the south of Site 17 on the surface of a small alluvial fan. A large quantity of gravel has been removed from the base of this alluvial fan to line the highway bed, and it is likely that much of the site was destroyed in the process. Intense modification of the area continues with recent bulldozing activity and presents a serious threat of further destruction. During our reconnaissance of the area, we confirmed only two extant structures, although several large mounds indicate others. One building near the southern end of the site is a ca. 10 m square structure divided into four rooms of equal size. About 100 m to the north of this structure is a second building of similar design. The walls of the two structures are two-courses wide, ca. 50 cm thick, and are constructed of unhewn, granitic and volcanic cobbles along with large boulders from the alluvial fan. The site is covered with abundant sherds with a noticeable component of thin Nabataean painted ware. Given the poor state of preservation and the ongo-

24. Raikes, 'Ancient Sites', p. 14.

25. Frank, 'Aus der Araba I', p. 238.

26. Raikes, 'Ancient Sites', p. 14-15.

27. Graf, 'Survey of the Hisma', p. 6.

28. Both Raikes and Graf measured the structure to be 12 m square.

ing destruction of the site, the area warrants an immediate and intensive archaeological investigation.

Site 19 represents at least 50 tombs/burials located on the steep slope of the alluvial fan above Site 18. These appear as large, circular piles of stones with a diameter that averages between 5 and 7 m. The material used in the construction included cobbles and boulders that measure more than 2 m in length. Because several of these tombs/burials were recently excavated and looted, we observed that they are constructed around a central cavity where the largest stones served as lintels. Among the debris littering the ground are bone fragments, terrestrial snail shells, and scattered sherds. The pottery here is similar to that observed at the village below.

North of the Wadi Raḥma alluvial fan and ca. 5 km north of Sites 17-19, Raikes identified a group of large stones on the tops of sand dunes with associated worked flints (Raikes site 14). He interpreted the stones as the possible foundations for small huts. Raikes also described a similar site (Raikes site 15) north of Wadi Turban.²⁹ These two sites are labeled on our map as Sites 20 and 22, respectively, based on Raikes' coordinates. These sites were not verified.

Between Wadi Turban and Wadi Abu Radman, ca. 2 km east of the highway, we were taken by a local bulldozer operator to a site that he had carelessly and completely destroyed (Site 21). The site was described verbally as a circular pile of stones. Based on the few remaining bone fragments and the crude description of the site, we had the impression that this was once a tomb, oriented in a non-Muslim fashion. An inscription discovered at the site is currently being studied.

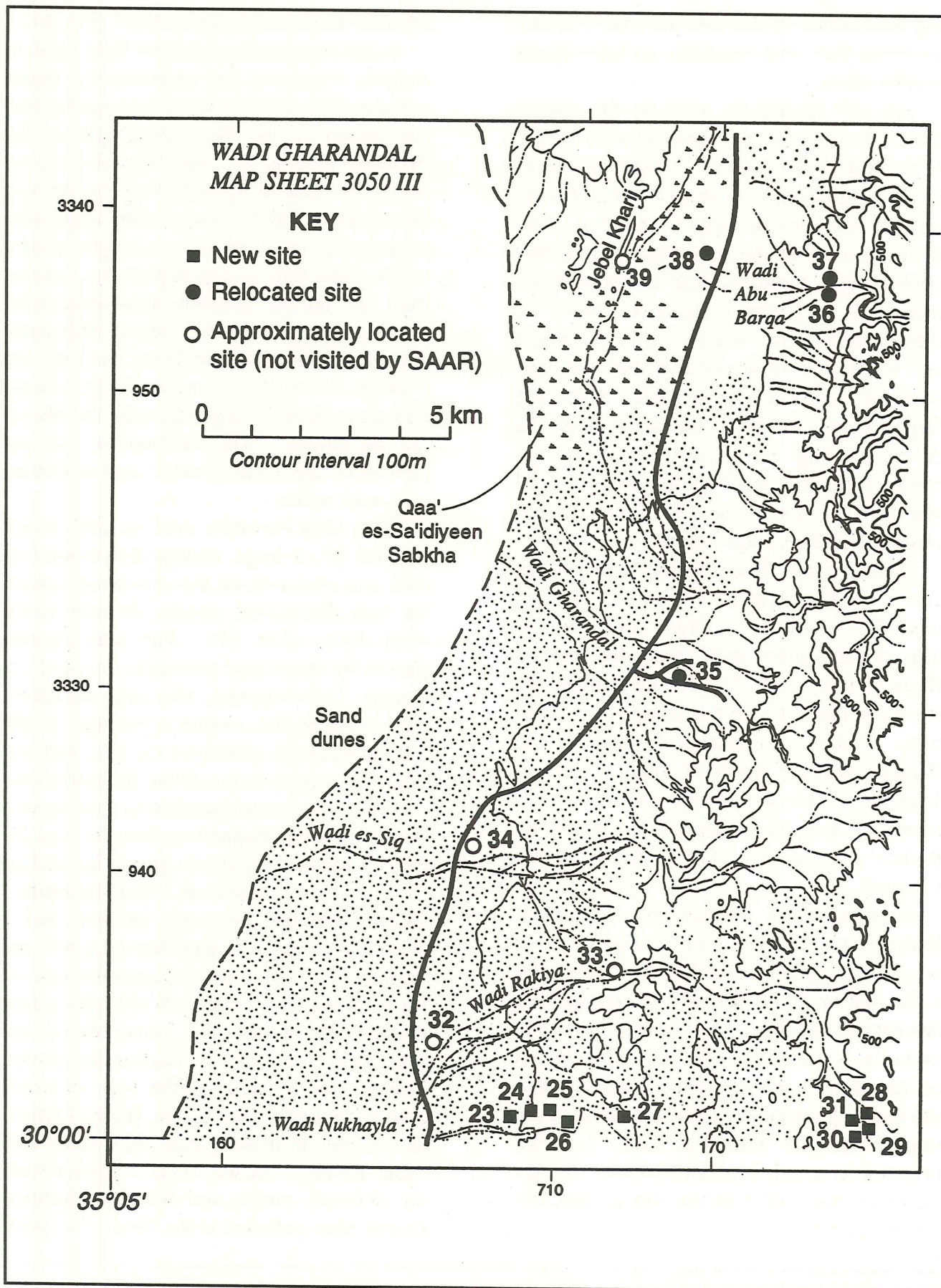
Map Sheet 3050 III, Series K737 (Fig. 4)

In the expansive sand dune field north of Raḥma, we traced the remains of a paved surface (Site 23) for ca. 1 km north from the mouth of the Wadi Nukhayla to the drainage leading to 'Ain Nuweiba', a recently developed spring. This paved surface/road is 500 m west of the range front escarpment and follows a straight, north-south route that is interrupted by sections that are buried beneath advancing sand dunes. The pavement is edged with curbstones and has a total width of ca. 3 m. On average, the curbstones measure 30 x 40 cm and are somewhat larger than the cobbles of the pavement. The curbstones and the pavement are local granitic and sedimentary wadi rocks.

Near 'Ain Nuweiba' and ca. 500 m east of Site 23, a large rectangular mound of rock and sand with an associated sherd scatter was discovered amidst the advancing sand dunes (Site 24). The area encompassed by the mound measures ca. 16-21 m square. Unfortunately, two large bulldozer cuts through the southern portion of the mound virtually destroyed the site, and this adds uncertainty to the above measurement.

We found a concentration of rock mound burials that are mapped as Sites 25 and 26. Site 25 consists of several graves located on the low hills south of 'Ain Nuweiba'. These have been recently robbed, and a scatter of barrel disc shell beads, a few sea shell beads, and copper fragments can be found along the surface. Within the center of the rock mounds, we found cranial and other bone fragments. Additional graves, Site 26, are located on the rock outcrops above the south bank of the Wadi Nukhayla. Some of these burial sites have also been robbed, and we found a similar scatter of bones, shells, and beads, in addition to one blue polished stone bead. The pres-

29. Raikes, 'Ancient Sites', p. 15.



4. Wadi Gharandal, Map Sheet 3050 III.

ence of these shell beads leads us to suggest that these burials are early, perhaps Chalcolithic.³⁰

Site 27 is located ca. 2 km east of the mouth of the Wadi Nukhayla gorge on a fluvial terrace ca. 20 m above and north of the wadi bed. Two structures are visible on this terrace surface that is dissected by one main and several branch gullies. One of the branch gullies drains through and erodes a semi-circular structure. Measuring from the face of the interior wall, the diameter of the structure ranges between 5-6 m and its walls are two courses thick (ca. 60-62 cm). On a low interfluvium between two incising gullies 14 m northwest of the first structure, there is a similar, more rectangular structure. Also, remnants of perhaps two additional structures to the west-northwest appear to have been destroyed by recent headward erosion by the main gully. No cultural stratigraphy was apparent in the side walls of these gullies or within the numerous robber's pits that have been dug at the site, although a dense sherd scatter and a few worn lithics were observed on the surface. The sherd scatter does not extend more than 6 m upslope to the east. On the terrace surface to the southwest, across the main gully, similar sherds and lithics were found without associated structures. On a higher terrace surface ca. 200 m to the northwest, there are a series of 10-15 rock mound burials.

A large distribution of sites (Sites 28-31) within an area of 0.5 km were discovered ca. 4.5 km east of the mouth of the Wadi Rakiya (Wadi Heimir on the topographic map) gorge and 2.5 km along a narrow wadi that branches off to the south. With one exception (Site 28), these are all lithic sites with no associated pottery. Unfortunately, time constraints as well as the vast

nature and distribution of the sites did not allow us to record them fully. At two of the sites (28 and 29), we observed the foundations for a series of structures indicative of a prehistoric village. Site 28 is located on a fluvial terrace surface ca. 20 m above the wadi bed. A portion of the site has been removed by cutbank erosion of the modern channel. There are numerous structural remains visible on the surface, in addition to a single structure that appears to be a cistern or a basin for water catchment. Several robber's pits were recently excavated at Site 28. Further up the drainage where the wadi makes a sharp bend, another occupational site (Site 29) is located on a terrace surface perched above the wadi bed. Visible on the surface are the foundations of several large rectangular structures. Viewing the wadi course to the south and east, we noted that there are additional sites on the remnant fluvial terrace surfaces.

On a mesa of the cliff southwest of Site 28, we discovered a lithic site where six large granite monoliths had been erected (Site 30). On average, the large granitic monoliths measure ca. 2 m in length and most have been toppled. Associated with the monoliths is a jumble of brick-sized sandstone blocks that may have formed a pavement or structure around the pillars. On an isolated rock pinnacle ca. 500 m to the north is a second monolith site (Site 31). Here, three rectangular granite rocks are lying flat in a row, and a fourth is fragmented and set to the side. There is a scatter of granitic rock chips and lithics suggesting that the granite was shaped at the site. A large number of sandstone blocks are found beneath the monoliths at Site 31 and nearby. Part of a wall composed of these blocks is visible on the south side of the site and remnants of a platform or pave-

30. We base this speculation on comparison with beads published from the northeast 'Arabah and Southern Ghor. See N.H. Broeder and H.C.W.

Skinner, 'Beads from the 1986 Season', in *The Southern Ghor and Northeast 'Arabah Archaeological Survey*, p. 135-154.

ment are visible to the east.

Other prehistoric sites were noted by Raikes at the mouths of Wadi Rakiya and Wadi es-Siq. Although we did not verify these sites, they are mapped as Sites 32-34 based on the coordinates produced in Raikes' report (Raikes sites 16-19). At each site, Raikes reported groupings of large stones with associated lithic scatters.³¹ It is clear from both Raikes observation and our reconnaissance within Wadi Rakiya, that this area is exceptionally rich in prehistoric cultural remains and warrants further investigation.

Proceeding north from Wadi es-Siq for about 5 km is the wadi and spring of Gharandal. Since the archaeological remains associated with the fort at Gharandal (Site 35) are well documented,³² our reconnaissance in this region was brief. It is interesting to note, however, that ca. 300 m northwest of the fortress we saw what appeared to be remnants of a stone paved surface. This feature is very similar to our Site 23, which may represent the continuation of the same road. This aspect of the remains around Gharandal will be investigated more fully during the summer of 1994.

Sites 36 and 37 are located west of the main escarpment on sections of a narrow, north-trending ridge just south and north of the mouth of Wadi Abu Barqa, respectively. Site 36 is a lithic scatter that is in danger of destruction by gravel borrow pit activity. To the north, Site 37 is a similar lithic scatter with evidence of limited copper smelting activity. Small pieces of slag

(on average 0.5 cm) and fragments of copper ore were found along with a small, circular rock clearing (ca. 1.8 m in diameter). The ridge upon which these sites are situated is composed predominately of limestone and chert cobbles and boulders that have been mapped as the Oligocene to Pliocene Dana Conglomerate.³³ This formation is a rich source of nodular chert, perhaps the highest concentration in the region. Both the sediments on the Wadi Abu Barqa Dana Conglomerate hills and the slightly lower, yet fluviially isolated Pleistocene alluvial fan surface are covered with a mature patina. A distinct patina development is also noted on the worked flints, although tool edges are still sharp suggesting these may be Middle Palaeolithic.³⁴

The defensive structure in Qa' es-Sa'idiyeen is designated as Site 38 on our map. This structure was first reported by Raikes and was later visited by David Graf.³⁵ The site is situated on the distal alluvial fan of Wadi Abu Barqa adjacent to the Sa'idiyeen sabkha. A low ridge to the west (Jabal Kharij), the south extension of Jabal er-Risha, is composed of Cretaceous limestone. Here, along the west flank of the ridge, geologists Ibrahim and Rashdan identified the ancient quarry site from which the stones for the structure were drawn (Site 39).³⁶

During our visit to Site 38, we located two well preserved corners, viz., the southwest and southeast corners, and measured the length along the south wall at 21 m. The length of the east wall measured ca.

31. Raikes, 'Ancient Sites', p. 16.

32. G.R.D. King *et al.*, 'Byzantine and Islamic Sites', p. 207; Graf, 'Survey of the Hisma', p. 5; Raikes, 'Ancient Sites', p. 17; Glueck, 'Explorations in Eastern Palestine, II', p. 39-40; Frank, 'Aus der Araba I', p. 231-232; Musil, *Arabia Petraea*, Band II, *Edom: Topographischer Reisebericht*, Teil 2, p. 193-197.

33. Ibrahim and Rashdan, *Wadi Gharandal*, map sheet 3050 III, 1988.

34. G. Clark, personal communication.

35. Raikes, 'Ancient Sites', p. 17; Graf, 'Survey of the Hisma', p. 5.

36. Ibrahim and Rashdan, *Wadi Gharandal*, map sheet 3050 III, 1988.

32.5 m, but the absence of a well-defined northeast corner makes this measurement speculative.³⁷ The main reason for this uncertainty is that most of the north wall of the structure has been destroyed by bulldozer activity. The exposed walls are two-courses wide, measuring ca. 65 cm in width, and are largely composed of dressed limestone blocks. The structure does not have corner towers, although a large circular mound extending beyond the presumed northwest corner may be an exception. However, it seems more likely that the mound is a consequence of the bulldozing activity. North of the structure is a mound of ashy soil with abundant sherds and a few fragments of bone, glass and corroded artifacts. Two inscriptions discovered at the site are currently being studied.

Conclusion

The results of the reconnaissance and feasibility study in the southeast Wadi 'Arabah show that a systematic archaeological survey is both warranted and long overdue. Accordingly, the first season of an intensive survey of the region is planned to begin in the summer of 1994. A preliminary outline of the scope and goals of the project is provided below.

The primary goal of the project will be to conduct an intensive survey in the area extending north from Aqaba to the alluvial fan of Wadi Muhtadi. The survey will concentrate on recording all evidence of past human activity in the region. The results will then allow the archaeological evidence from the greater Aqaba area to be placed

within a proper regional context.

The second specific goal of the project reflects the director's primary interest, viz., the history and archaeology of the 'Arabah in the Nabataean, Roman, and Byzantine periods. It involves the study of communication networks and trade routes within the valley. Initially, the survey will focus on the paved surface/road discovered during the reconnaissance to determine its extent and approximate alignment. Concurrently, an attempt to locate associated structures will be made. This information will assist with the task of assigning a relative date of use and construction of the road, which is necessary to determine its relationship with known routes and existing defensive structures in the valley. Indeed, if the road dates to the Roman period then this would certainly contradict some scholarly interpretations of the nature of traffic in the 'Arabah, viz., that the Wadi 'Arabah was little more than an inconvenient obstacle for numerous east-west crossings.

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37. Raikes estimated that the structure measured ca. 60 m square, and Graf recorded it as 35m square.

