THE SHAMMĀKH TO AYL ARCHAEOLOGICAL SURVEY, SOUTHERN JORDAN: SECOND SEASON 2011

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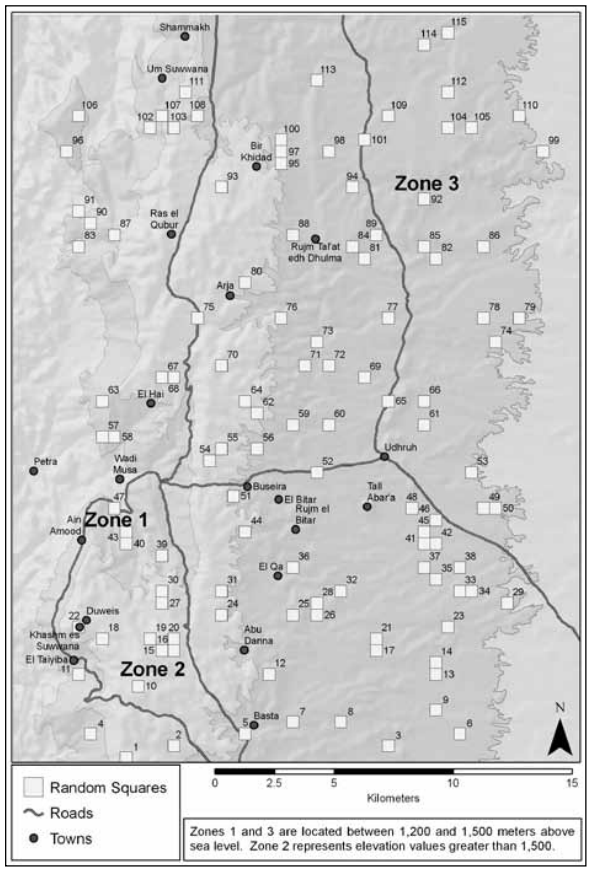
Introduction

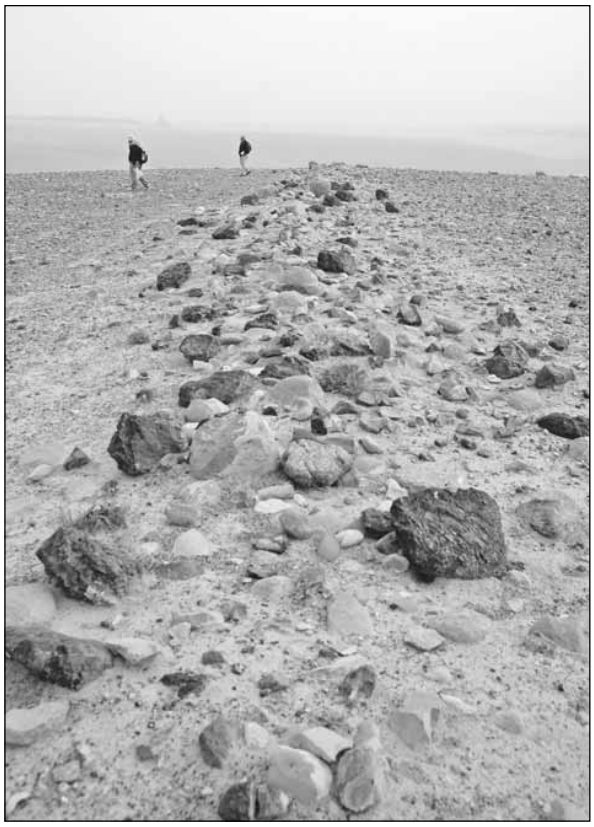
The second season of the Shammākh to Ayl Archaeological Survey project (SAAS) in southern Jordan was in the field from 24 April to 8 June 2011[1]. Team members for the season included the authors of this article and Sate Massadeh, representative of the Department of Antiquities of Jordan[2].

The main objective of the SAAS project is to discover, record and interpret archaeological sites in an area of approximately 600km^2 (**Fig. 1**). Other objectives are to determine the area's settlement patterns from the Lower Paleolithic (*ca* 1.4 mya) to the end of the Late Islamic period (AD 1918), to investigate Pleistocene (as late as *ca* 10,000 BC) sediments and lakes in the eastern segment of the survey territory, to document the many farms, hamlets and villages that provisioned the major international sites of the area, e.g. ash-Shawbak, Petra and Udhruḥ, to investigate further the *Khaṭṭ Shabīb* or Shabib's Wall, a low stone wall running in a generally north-south direction (**Fig. 2**), to record the inscriptions, rock drawings and *wusūm* (tribal markings) within the area, and to link up with previous work that the project director and others have carried out in southern Jordan (e.g. Abudanh 2004, 2006; 'Amr *et al*. 1996, 1997, 1998, 2000; 'Amr and al-Momani 2001; Findlater 2000; Glueck 1935, 1939; Graf 1979; Hart and Falkner 1985; Hart 1987, 1989; MacDonald *et al*. 1988, 1992, 2004, 2011; Tholbecq 2001; Whiting *et al*. 2009)[3]. Accomplishment of the above-mentioned objectives will contribute towards the writing of an archaeological history of southern Jordan from Wādī al-Ḥasā in the north to Rās an-Naqab in the south.



1. The Shammākh to Ayl Archaeological Survey: ecological zones and random squares.

1. For reports on the 2010 season of the project see MacDonald *et al*. 2010a and b.
2. Team members and their roles for the 2011 season were: Burton MacDonald, director, Larry G. Herr, ceramic specialist, D. Scott Quaintance, photography and mapping, GPS, and database and website manager, Wael al-Hajaj, lithic analyst, Aurélie Jouvenel, GPS, GIS, mapping and artifact registrar and Sate Massadeh, representative of the Department of Antiquities of Jordan.
3. For an overview of the contribution of some of the above-listed surveyors to the archaeology of southern Jordan see MacDonald *et al*. 2010a.



2. Site 267: a segment of the Khaṭṭ Shabīb cutting through RS 92.

The territory being investigated is part of the southern segment of the Transjordanian plateau, that is, the so-called Edomite Plateau. It includes the area from just north of the village of Ayl in the south to Shammākh in the north, from the 1200m contour line in the west to the 1200m contour line in the east, i.e. into the Jordanian desert immediately west of the city of Ma'ān. The area is *ca* 30km (north-south) by *ca* 20km (east-west). As **Fig. 1** indicates, however, the survey territory is not rectilinear but follows the 1200m contour line in both the west and east.

Altitudes vary within the territory: 1200m on the western and eastern boundaries, 1521m just south-east of Shammākh, 1736m in the central segment and 1506m at Ayl in the south-central area, immediately south of the survey territory. Much of the western half of the survey area is part of Jabal ash-Sharāh, the mountain range which extends from ash-Shawbak in the north to Rās an-Naqab in the south.

Present annual rainfall in the area varies from a high of around 300mm to less than 100mm: *ca* 300mm in the ash-Shawbak-Nijil region (elevations of *ca* 1500m or more), *ca* 200mm immediately to the east and west (elevations of *ca* 1500-1300m) and 100mm in the area between Udhruḥ and Ma'ān in the eastern portion of the territory. Thus, the eastern segment is located in the steppe, that is, the area between 'the desert and the sown', where evidence of pastoral activity is present in many archaeological periods.

Methodology

For archaeological investigative purposes, the survey territory is divided into three topographical zones: Zone 1 (the western segment) lies in the area where elevations are between 1200 and 1500m; Zone 2 (the west-central segment) is the mountainous region where elevations values are greater than 1500m (actually, as indicated above, part of Jabal ash-Sharāh); Zone 3 (the eastern segment) is the area between the 1500m and 1200m contour lines (see **Fig. 1**).

The principal method for discovering archaeological materials, including sites, is a technique based on recording the remains collected while transecting randomly-chosen squares (500 x 500m) in the three topographical zones of the survey territory. A Geographic Information System (GIS) database randomly selected the 115 squares which represent about five percent of the total area of each of the topographical zones in the survey territory.

Investigation of these random squares in each zone performs three primary functions: (1) it provides a baseline, against which artifactual material collected from archaeological sites in the region may be compared, (2) it forces survey team members into all areas of the territory, eliminating any sampling bias the team may have toward easily accessed areas and (3) recording random squares has proven to be an effective means of discovering sites, within, adjacent to and while traveling to / from the squares. In essence, the recording of random squares provides access to a statistically valid sample of archaeological materials, including sites, within the territory (Herr and Christopherson 1998: 52).

The GIS database provides the co-ordinates for each of the 115 randomly-chosen squares. Team members use a Global Positioning System (GPS) to locate one corner of a square. Once it is located, they (five persons) position themselves, usually at a distance of *ca* 50m apart (the visibil-

ity in the region is generally good) along one of the lines of the square. With the help of a compass to maintain a straight line, team members transect the square, picking up lithics, sherds, glass and other portable artifactual materials. For each 500 x 500m square, team members walked two transects.

The recording of a random square involves recording data on the 'Random Square Data Sheet'. The transecting and recording of each square takes approximately two-person hours (excluding the time spent locating and getting to the square).

When an archaeological site, i.e. individual features that combine in a variety of ways to form a single unit, is discovered within the square, it is recorded separately on a 'Survey Site Sheet'.

Once the random square and any archaeological sites within it are recorded, survey team members turn their attention to the surrounding area in their search for sites. We spend a fair amount of time searching for and recording any archaeological sites in the vicinity of the square. In addition, we speak with the people living and / or working in the area, e.g. farmers and shepherds, about the whereabouts of sites. Moreover, while driving to / from the square, team members are on the lookout for sites. When located, they are also recorded on 'Survey Site Sheets'.

Once a site is 'discovered', it is 'sherded' for artifacts, described and plotted on a map using the co-ordinates obtained from the GPS unit. Survey data sheets are filled out initially in the field. All collected materials are labeled before being placed in the vehicle. Additional information is being added as analyses progresses.

Digital photographs are taken of the topography of all random squares and the features of all sites. These are added to the project's database and are used while analyzing the artifactual materials from squares and sites; some will be published in black and white format in survey reports, and all will be put on a DVD which will be part of the project's final report.

Each day, preliminary washing and registering of the collected artifacts is done, 'Survey Artifact Forms' are completed, photographs are taken of significant artifacts, and descriptions of the random squares transected and sites investigated are entered into the project's database.

Following the field season, selected artifacts, *viz.* lithics and sherds, are shipped with the Department of Antiquities' permission to the home universities of the director and his collaborators. These are further analyzed, drawn, photographed and prepared for publication.

Work Accomplished

During the 2011 season, SAAS team members concentrated their efforts on the northern half of the survey territory, that is, from the area immediately to the north of random squares RS 55-56 and 57-58. In this area, they transected 50 random squares: four in Zone 1, 10 in Zone 2 and 36 in Zone 3 (**Table 1**).

SAAS team members were not able, for various reasons, to transect seven squares this season. Owing to time constraints and difficulties encountered in accessing them, SAAS team members did not transect RS 83, 90, 91, 96 and 106 in Zone 1. They spent three and a half days in their attempts to transect these squares. On 6 May 2011, they attempted to reach the area of RS 83, 87, 90 and 91. Although team members did not reach any of these squares on that day, they did record seven sites, *viz.* Sites 211-217. On 7 May 2011, two SAAS team members drove down the Bayḍā-Wādī 'Arabah road with the intention of finding a way into these four squares as well as RS 96 and 106. However, they were unsuccessful in finding a route into the squares. On 16 May 2011, SAAS team members, with the aid of maps from Google Earth, transected RS 87. In addition, they documented six sites, *viz.* Sites 260-265. Two of these, namely Sites

Table 1: List of Random Squares transected in each Topographical Zone – 2011 Season.

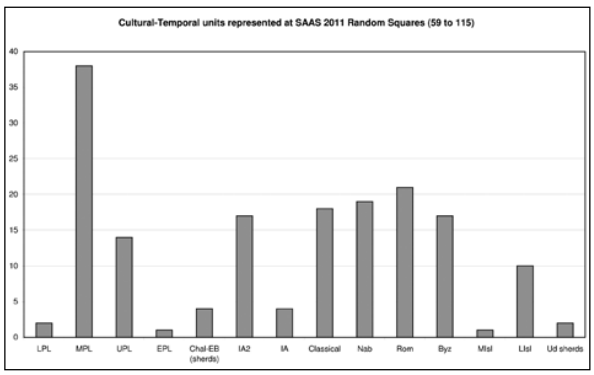
Zone 1: 63; 87; 102; 107 (n=4);
Zone 2: 62; 64; 70; 75; 67; 68; 80; 93; 103; 111 (n=10);
Zone 3: 59; 60; 61; 65; 66; 69; 71; 72; 73; 77; 76; 74; 78; 79; 81; 84; 89; 94; 98; 101; 88; 82; 85; 86; 95; 97; 100; 92; 99; 105; 109; 114; 108; 110; 113; and 115 (n=36).

264 and 265, were near RS 87. On 25 May 2011, SAAS team members, with the aid of maps from Google Earth, again attempted to transect RS 83, 90 and 91. However, due to wash-outs in the wadis, we were not able to reach them by vehicle and time did not allow us to walk to them and adequately transect them that same day. We did, however, document seven sites, *viz*. Sites 305-311. After these attempts, SAAS team members, owing to other priorities, gave up on their attempts to transect the squares in question. Nevertheless, as indicated above, attempts to reach these squares in Zone 1 resulted in the 'discovery' and documentation of 20 sites. These RS in Zone 1 can, of course, be transected by back-packing into the area and devoting the personnel, time and energy to this end.

Because of the location of modern farms and orchards, SAAS team members could not transect RS 104 and 112 in Zone 3. The reason is that both of these squares fall within farms which are guarded and enclosed by 2m high fences.

On the basis of preliminary analyses to date, materials, i.e. lithics and sherds, which survey team members collected in the 50 random squares, range in date from the Lower Paleolithic to the Late Islamic period. However, not all cultural-temporal units are represented. Of those that are, the best-represented cultural-temporal units / periods are: Middle Paleolithic (in 76% of the squares), Iron 2 (in 34%); Classical-Hellenistic-Byzantine (in 36%), Nabataean (in 38%), Roman (in 42%), Byzantine (in 34%) and Late Islamic (in 20%) (**Fig. 3**).

Survey-team members collected lithics and sherds from 92 percent of the 50 random squares. However, it should not necessarily be concluded that SAAS team members collected both in the same squares.



3. Cultural-temporal units represented in SAAS 2011 random squares (RS 59-115).

The lithic materials collected are typical of surface finds. They include bifaces, borers, burins, cleavers, cores (a variety from several periods), Levallois flakes, points and blades, perforators (some with notches) and scrapers (end, side and transverse).

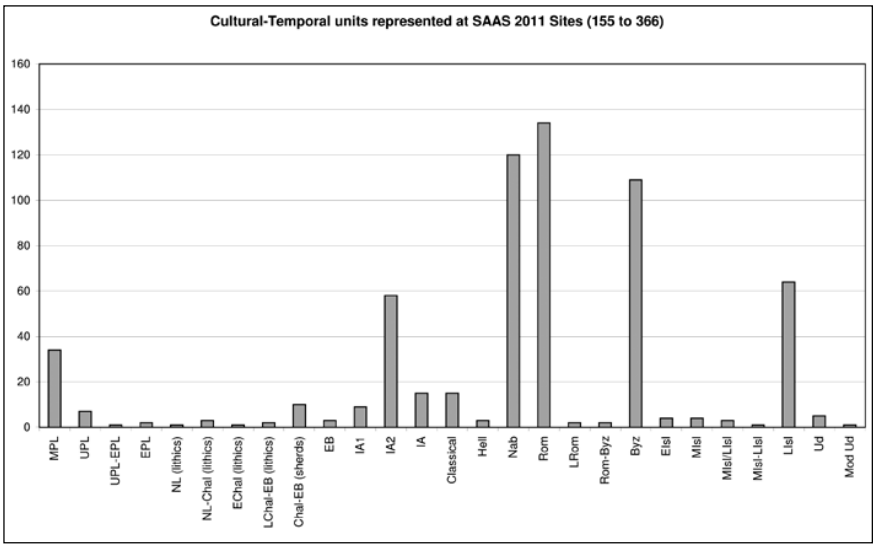
It ought to be noted that RS 67 and 68 in Zone 2 and RS 74, 78, 79, 82, 99, 105 and 110 in Zone 3 produced an especially heavy concentration of lithics. Thus, these squares, which could have been production and / or knapping areas, ought to come in for further study on the part of lithic specialists.

The Zone 3 RS listed in the previous paragraph, which have an especially high density of lithics, are in barren areas presently devoid of any appreciable vegetation. Thus, it seems safe to conclude that the environment in these areas would have been significantly different during the Paleolithic periods. It is also in these areas that Pleistocene lakes would have been located.

Survey team members recorded 212 sites, *viz*. Sites 155-366, during the 2011 season (**Table 2**). Thirty three (or 16%) of these 212 sites are within the 50 transected random squares, while 39 (or 18%) of them are nearby. Thus, it is probable that some of these 72 sites would not have been 'discovered' if team members had used a methodology that did not rely on the transecting of randomly chosen squares.

The cultural-temporal units / periods best represented at the 212 sites are the same as those for the random squares: Middle Paleolithic (at 16% of the sites), Iron 2 (at 27%), Classical (at 7%), Nabataean (at 57%), Roman (at 63%), Byzantine (at 51%) and Late Islamic (at 30%) (**Fig. 4**). Again, it must be noted that not all cultural-temporal units, e.g. Middle and Late Bronze, are represented.

Using Google Earth, David Kennedy (University of Western Australia, Perth) identified and labeled (Google Earth (KML file 7/21/2010)) a number of sites on the Bīr Khidād map (Sheet 3150 IV, Series K737, 1:50,000), almost the entire area of which is within the SAAS territory. SAAS team members recorded 41 of these as sites (**Table 3**), several of which they would not have otherwise 'found'. They are among the 212 which survey team members recorded this season.



4. Cultural-temporal units represented at SAAS 2011 sites (Sites 155-366).

Table 2: The Shammākh to Ayl Archaeological Survey project: list of sites, 2011.

Site#	UTM Coordinates*	Site Name	Function**
155	0751179/3359463		Tomb (?)
156	0752238/3360171		Seasonal camp (?)
157	0749376/3359837		Milestone fragments
158	0748366/3359222		Quarry
159	0745477/3359615		Seasonal camp (?)
160	0744652/3360524	Umm Ṭirān	Agricultural village
161	0744052/3361803	Mulghān West	Agricultural village
162	0744344/3361565	Mulghān East	Fort (?)
163	0744297/3360194		Agricultural tower (?)
164	0744036/3360419		Seasonal camp – agricultural (?)
165	0743870/3360733		Road
166	0743775/3360917		Agricultural village
167	0744169/3360851		Road
168	0742928/3362243	Kh. al-Manāsib	Agricultural village
169	0742626/3366039		Agricultural features
170	0737851/3361309		Farm (?)
171	0737883/3361435		Agricultural village/hamlet
172	0739025/3360726	Al-Ḥay	Traditional, south-Jordan agricultural village
173	0739967/3360661		Agricultural village
174	0742533/3358311	Kennedy's Khidād	Ruins 4 Agricultural complex
175	0742241/3358649		Seasonal pastoralists' camp
176	0742226/3359274		Agricultural village
177	0741899/3364003		Defensive site (?) along *Via Nova Traiana*
178	0741783/3364526		Waystation (?) along *Via Nova Traiana*
179	0741316/3361482		Fort (?) along *Via Nova Traiana*
180	0739906/3361641		Agricultural village
181	0740068/3362022		Seasonal camp for farmers and pastoralists
182	0740425/3361215		Agricultural village/hamlet
183	0740939/3362051		Farmers' and/or pastoralists seasonal camp
184	0740876/3361182		Agricultural village (?)

185	0740808/3360535		Tower (?)
186	0742064/3360132		Agricultural village
187	0742106/3360299		Agricultural village
188	0740901/3361552		*Via Nova Traiana* - segment
189	0746870/3363296		Agricultural village
190	0746091/3363109		Tower (?)
191	0746353/3363280		Water installation for pastoralists
192	0744838/3362936		Enclosure and tomb
193	0749472/3358115		Church
194	0748917/3356320	Tall Abū ar-Ra‘a	Observation point
195	0748745/3355154	Udhruḥ Qanat 2	Water-channeling system
196	0748693/3361771		Water management system (?); tombs (?)
197	0748479/3358117	Kennedy’s Circle 5	Unknown
198	0748479/3358117		Road
199	0749534/3364483		Tombs (?);water management system (?)
200	0746812/3365359	Rujm Abū al-‘Alaq	Watchtower
201	0747178/3365332		Caves – corrals and former dwellings (?)
202	0745474/3364030		Agricultural tower (?); seasonal camp (?)
203	0744788/3364149		Seasonal camp
204	0745158/3364019		Arabic inscriptions
205	0744541/3364741	Kh. al-‘Arja	Agricultural village
206	0745803/3364822	‘Arja Caves	Dwellings (?) and corrals
207	0743084/3365161	‘Arja	Traditional, south-Jordan agricultural village
208	0743911/3365534		Observation point
209	0744238/3365920	Kh. ad-Dabba	Agricultural village
210	0743358/3365532		Farm
211	0738211/3371205		Farm
212	0738649/3371473		Agricultural facility – farm (?)
213	0739071/3370824		Agricultural village
214	0738809/3370503		Cave- dwelling and animal pen
215	0739709/3370484		Agricultural village
216	0739947/3372228	Kh. al-Kur	Agricultural village
217	0739986/3372947	‘Ayn al-‘Irāq	Spring area
218	0755504/3364332		*Wusm*
219	0754572/3364460		Seasonal pastoralist’s and/or hunter’s camp
220	0750590/3366757		Knapping area and more recent residence
221	0749887/3363687	Kennedy’s Circle 6	Unknown
222	0754570/3364464		Enclosures, pastoralists’ seasonal camps
223	743717/3366057	Khazzān aṣ-Ṣuwayyah	Cistern; mill (?); storage area (?)
224	743650/3366272	Kh. aṣ-Ṣuwayyah	Agricultural village
225	743616/3366542	Tall ar-Rumayl	Agricultural village
226	744334/3366435	Kh. Bīr ar-Rumayl	Agricultural village
227	743422/3366299		Retaining wall – unknown
228	744700/3367057	Kh. ar-Rumaylāt	Agricultural facilities site
229	744651/3367965	Kh. Umm Ḥayyānah	Agricultural village
230	744972/3366371		Agricultural facilities site
231	744897/3366051		Agricultural village/hamlet
232	744800/3366132		Farm (?)
233	744568/3365728		Agricultural village
234	747293/3371037		Lithic production area and rock art

235	747319/3371087		Quarry
236	746697/3371180		Defensive site (?)
237	746676/3371297		Rock art
238	747101/3371434		Pastoralists' seasonal camp
239	747312/3371510		Pastoralists' seasonal camp
240	746674/3371447		Farm building (?)
241	750532/3362473	Kh. Jarba	Agricultural town
242	746685/3367544	Al-Kuwayz	Agricultural facility
243	746707/3367021	Al-Qulayb ash-Sharqī	(East) Agricultural village
244	746764/3367186		Corrals and habitation site
245	746359/3367011	Al- Qulayb al-Gharbī	(West) Cemetery (?); enclosures; cistern (?)
246	745648/3367740		Pastoralist's seasonal camp
247	743585/3368489		Enclosure around a cistern
248	743436/3368460		Caves –function unknown
249	743272/3368275		Enclosures; cisterns; habitation (?) cave
250	743453/3368134		Water preservation area; habitation cave
251	742852/3368808		Agricultural village and defensive site
252	753523/3367325		Pastoralists' seasonal camp
253	755638/3368266		Pastoralists' seasonal camp and lithic production site
254	744232/3370650	Kh. Bīr Khidād	Traditional, south-Jordan agricultural village
255	744668/3369899	Kh. at-Tīn	Defensive – observation point
256	745247/3372401	Kh. ar-Rafāy'ah	Agricultural village
257	744786/3366920		Pastoralists' seasonal camp
258	744853/3366432		Tower and associated (?) wall
259	743100/3369626		Pastoralists' shelters and cisterns
260	743143/3370441		Agricultural facilities
261	741166/3369436	Kh. Maqdis Umm Ṣuwwān	Agricultural village
262	740822/3368953	Ṭābiyat Umm al-Qubūr	Defensive tower; pastoralists' dwelling
263	740467/3368193		Pastoralists' family complex
264	739154/3367794		Pastoralists' seasonal camp
265	738840/3367718		Pastoralists'/family seasonal camp
266	737914/3364633		Traditional dwelling and other structures
267	751460/3369302	*Khaṭṭ Shabīb*	Boundary wall
268	751178/3369394		Pastoralists' seasonal camp
269	750819/3367760		Towers – defensive
270	740662/3372347		Farm
271	739748/3372446		Pastoralists' seasonal camp
272	739633/3372438		Pastoralists' seasonal camps
273	739522/3372428		Pastoralists' seasonal camp
274	739925/3373052	Kh. al-'Irāq al-Junūbiyya	Agricultural village
275	739993/3373372	Kh. al-'Irāq ash-Shamāliyya	Agricultural village
276	741498/3373795		Pastoralists' seasonal camp
277	741380/3373892		Farm buildings (?)
278	740897/3373420	Rujm al-Minṭār	Observation tower
279	741429/3374241		Agricultural hamlet (?)
280	740196/3374334	Al-Junaynah	Traditional, south-Jordan agricultural village
281	740255/3374489	Kh. al-Junaynah	Agricultural village (?)
282	740157/3375612		Agricultural hamlet or farm
283	740049/3376175	Rafāy'ah	Traditional, south-Jordan agricultural village

284	753318/3372498		Lithic production centre and hunters' and/or pastoralists' seasonal camp
285	753323/3372125		Pastoralists' seasonal camp
286	752745/3372662		Pastoralists' seasonal camp
287	752651/3372783		Inscription
288	753036/3371930		Rock art and inscription(s) (?)
289	738892/3352349		Observation/defensive tower (?)
290	739000/3352274		Agricultural village (?)
291	741161/3372399		Farm building or dwelling (?)
292	740843/3371615	Kh. al-Fajaj	Farm buildings, tomb, observation point
293	740918/3372696	Kh. Ḥawāla	Traditional, south-Jordan agricultural village
294	742362/3372897	Ghunayma	Agricultural village
295	741680/3371502	Kh. Umm Ṣuwwāna	Complex associated with *Via Nova Traiana*
296	742520/3373254		Agricultural village
297	742995/3372317	Kh. ash-Shurayf ash-Shamāliyya	Features associated with *Via Nova Traiana*
298	742955/3371999	Kh. ash-Shurayf al-Janūbiyya	Features associated with *Via Nova Traiana*
299	741177/3376120	ʻAyn Shammākh	Spring
300	741249/3375732	Shammākh	Traditional, south-Jordan agricultural village
301	746772/3374633		Tower, enclosures, and caves
302	746773/3374267		Pastoralists' seasonal camp
303	750367/3362140		Tower – observation – defensive
304	742735/3362271		Farm building (?)
305	738120/3368907		Agricultural facilities
306	739310/3368660		Agricultural village
307	738516/3367975		Farm or agricultural hamlet
308	737921/3368187		Agricultural facilities
309	737919/3367496		Cave – corral and dwelling (?)
310	737600/3367451		Agricultural village or hamlet
311	737300/3367350		Caves – extended family complex (?)
312	739516/3367699	Kh. al-Bagīdra	Agricultural village
313	739752/3358756		Observation/defensive site
314	739756/3359193		Farm building (?)
315	740162/3359518		Quarry
316	740047/3359933		Pastoralists' seasonal camp
317	742993/3362007		Residential and pastoralists' site
318	742970/3361761		Farm (?); observation site (?)
319	743328/3362002		Spring
320	741365/3359172		Watchtower
321	741236/3358536	Kh. Mudayrij aṭ-Ṭuwaysī	Agricultural village (?)
322	744200/3347034	Kh. Basṭa	Traditional, south-Jordan agricultural village
323	744141/3346801	Kh. Jabal Basṭa	Agricultural village
	324	741907/3365597	Kh. Maqtal al-Thawr Fort
325	741822/3365888	Sadr Abū ʻAyadah	Cave; cistern (?); tomb
326	741568/3365786	ʻAnabah	Agicultural village
327	740989/3366305	Kh. ash-Shuʻaybah	Corrals; cave dwelling
328	742353/3365004	Kh. Injaṣah	Agricultural facilities
329	745538/3363568	Kh. Ifnayn	Agricultural village
330	745166/3363367		Cave dwelling
331	739965/3364916		Agricultural village or hamlet
332	742201/3353476		Observation tower and tombs

333	742506/3353691		Farmers and pastoralists' facilities
334	742221/3353906		Observation tower and corrals
335	742243/3354149		Pastoralists' camp – seasonal
336	742168/3354488		Pastoralists' camp – seasonal
337	742151/3354913		Cistern; enclosure; major wall
338	742145/3355402		Farmers and pastoralists' facilities
339	742407/3355621		Farmers and pastoralists' facilities
340	742086/3350609		Farmers and pastoralists' camp
341	742559/3350814		Pastoralists' seasonal camp
342	742806/3350644		Pastoralists' seasonal camp
343	743545/3350711		Pastoralists' seasonal camp
344	743684/3351299		Pastoralists' seasonal camp
345	742711/3351486		Agricultural village
346	740526/3366233		Way station along *Via Nova Traiana* (?)
347	741537/3350501	Rujum al-Baṭṭāḥ	Tower and/or small fort
348	741344/3350893	Kh. al-Baṭṭāḥ	Agricultural village
349	741517/3350837		Pastoralists' seasonal camp
350	740360/3367011		Farm (?)
351	740291/3366992		Agricultural village
352	740227/3367010		Farm (?)
353	739143/3366732		Agricultural village
354	739045/3366441		Observation point
355	738782/3366190		Agricultural village
356	738338/3366057	Al-Heleen	Watch tower
357	738965/3364541		Way station
358	739081/3357818	Kh. an-Nawāfla	Traditional, south-Jordan agricultural village
359	738912/3358203	Ṭuwaylān	Agricultural village
360	738602/3358651	Kh. al-Muzayra'a/Kh. al-Qarār' a	Agricultural village
361	744866/3356926		Farm
362	744370/3356954		Rock shelter
363	744219/3356822		Fort
364	743078/3354152		Farmers and pastoralists' facilities
365	750665/3356532	Udhruḥ Qanats 1	Water-channeling system
366	752462/3355891	Fuqayy Qanats 1	Water-channeling system

* The coordinates system is UTM Zone 36N, European Datum 1950.

** Of course, the determination of "function" on the part of SAAS team members must be tentative at this stage of investigation. Generally, it is only with the excavation of the site in question will it be possible to determine, with greater certainty, its function(s).

Two of Kennedy's sites, Circle 5 (SAAS Site 197) and Circle 6 (SAAS Site 221), are of particular interest owing to their uniqueness. The former lies on the western edge of the village of Udhruḥ, near a road junction. The latter is located west of the north-south road between Udhruḥ and ash-Shawbak. It is *ca* 5km north of the former. Both circles are near-perfect and almost exactly 400m in diameter. There are no traces of internal structures within them. The results of SAAS team members' preliminary analysis of the collected materials from within and near Circle 5 are Late Chalcolithic-Early Bronze lithics, Iron 2, Nabataean, Roman and Late Islamic; for Circle 6 they are Epipaleolithic and Chalcolithic-Early Bronze lithics, Iron 2, Roman and Late Islamic. The function of the circles is unknown.

The ceramic specialist read and handled the pottery in much the same way as he did for the 'Tafila-Busayra Archaeological Survey 1999-2001' in west-central Jordan (MacDonald *et al.*

Table 3: SAAS sites and Kennedy's designators for the same sites on the Bīr Khidād map (KML file 7/21/2010).

SAAS Site #	Kennedy's Designation	SAAS Site #	Kennedy's Designation
156	Khidād Ruin 27	230	Khidād Ruin 31
157	Milestones ?	241	Khidād Jarba
158	Udhruḥ Quarries (Roman)	253	Khidād Stone Circle
160	Khidād Ruins 22	294	Khidād Ruin 28
161	Khidād Ruins 21	297	Khidād Ruin 29
162	Fort	298	Khidād Ruin 47
174	Khidād Ruins 4	334	Khidād Tower 2
179	"Tower"	337	Khidād Ruins 41
185	"Tower" (?)	338	Khidād Ruins 9
186	Khidād Ruins 1	339	Khidād Ruins 8
187	Khidād Ruins 39	341	Khidād Ruins 16
188	"Road"	342	Khidād Ruins 17
189	Khidād Ruins 35	343	Khidād Ruins 43
190	Khidād Ruins 37	344	Khidād Ruin 18
191	Khidād Ruin 48	347	Khidād Ruin 12
194	Tall Abū ar-Ra'a	348	Khidād Ruin 13
195	Udhruḥ Qanat 2	349	Khidād Ruin 42
197	Circle 5	363	Khidād Ruin 7
221	Circle 6	365	Khidād Udhruḥ Qanat 1
225	Khidād Ruin 30	366	Fuqayy Qanats 1
226	Khidād Ruin 46		

2004) and the 'Ayl to Ras an-Naqab Archaeological Survey 2005-2007' in southern Jordan (MacDonald *et al*. 2011). Diagnostics were preregistered and then saved and shipped to Canada for sawing, drawing, ware description and plate preparation. They will be published, along with their respective random squares and sites, as part of the final report on the SAAS project.

We had been requested to break some of the broad periods, e.g. the Byzantine period, into sub-periods. After considerable thought, we have retained the previous system of naming only the broad periods. We feel we need to avoid problems that arise when there are too many transitions. Some pottery may be isolated to a single sub-period, but others span two periods etc.. We felt that breaking the pottery into sub-periods would have made the readings too subtle for many database searches to handle easily and could skew the results of future researchers. We believe it is better to let researchers find all 'Byzantine' vessels and to decide themselves what the precise range of the forms allow.

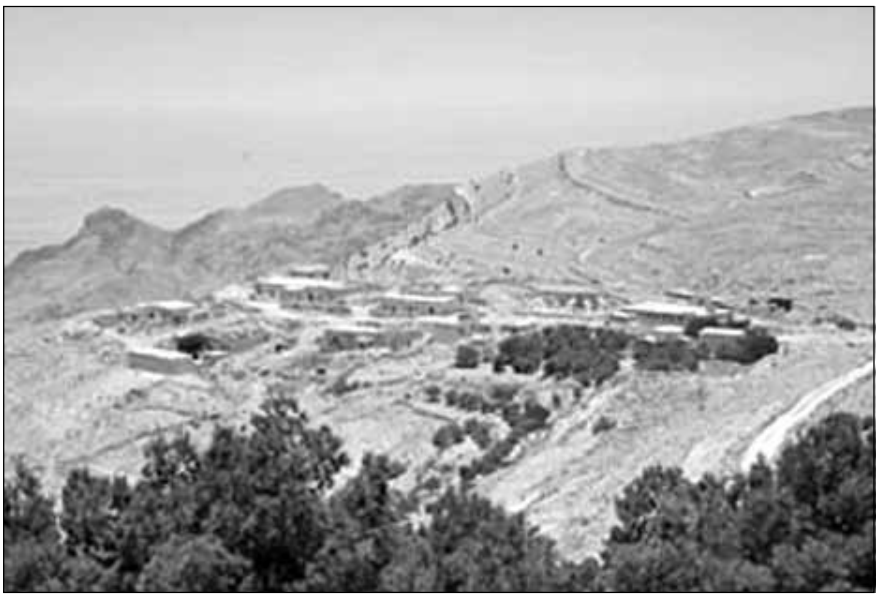
As in the previous two surveys carried out by the director and his colleagues, the term 'Nabataean'-as used in the cultural-temporal designations-refers more to a cultural assemblage than a chronological one. It implies the typical pottery of Petra. As such, some 'Nabataean' pieces can go as late as the Late Roman period. A 'Roman' reading usually means Late Roman, but could also include forms that began in the first century AD.

The imported pottery which team members collected includes African Red Slip Ware (at Sites 236, 245 and 328) and *terra sigillata* (at Site 229). This indicates that international trade impacted not only the city of Petra but also nearby areas.

The type of sites documented include agricultural hamlets and villages, aqueducts, a church, enclosures-many of which are circular and probably seasonal pastoralists' camps, farms, forts (**Fig. 5**), graves / tombs, inscriptions, rock art and *wusūm* (tribal markings), lithic and sherd scatters, rectilinear structures, roads-including segments of the *Via Nova Traiana*, traditional, south Jordan agricultural villages, e.g. Shammākh (**Fig. 6**), watchtowers and winnowing areas (see **Table 2**).

Among the sites recorded, we judged 45 of them to be former agricultural villages or hamlets. In addition, we recorded nine traditional, south Jordan agricultural villages. They are Al-Ḥay (Site 172), 'Arja (Site 207), al-Junaynah

5. Site 363: north wall of a (?) fort in the area where the sown meets the desert.



6. Site 300: part of Shammākh,a traditional, south Jordan agricultural village.

(Site 280), Kh. Bīr Khidād (Site 254), Rafay'ah (Site 283), Kh. Ḥawāla (Site 293), Shammākh (Site 300), Kh. Basṭa (Site 322) and Kh. an-Nawāfla (Site 358). These are sites at which there are a number of traditional stone-built houses with mud plaster still standing. Some of these former villages are completely abandoned, e.g. Rafay'ah. Others are close to modern villages, e.g. Kh. Bīr Khidād. In the latter case, as is the case for many of these villages, the traditional buildings are now generally used for storage and / or penning goats and sheep. One of these villages, Kh. an-Nawāfla (`Amr *et al.* 2000), has been transformed into the modern five-star hotel of Beit Zaman.

We judged at least 31 of our recorded sites to be pastoralists' camps. They are found in all three topographical zones of the SAAS territory. Many of them are in the form of an enclosure or a number of associated enclosures, some of which appear, especially from a distance, to be circular (hence the common nomenclature, 'circular enclosure'). It is likely that shepherds would have used these camps seasonally. There were probably many more of these structures within the survey territory in the recent past. However, they could have been easily removed, especially by bulldozing,

in development associated, for example, with field clearance.

Other sites, e.g. Sites 338-340, have enclosures as one of their features. However, they appear to be much more than just seasonal pastoralists' camps since they have features that appear to be temporary residential areas. These sites therefore give the impression that they could have been used both by farmers and pastoralists, though not necessarily at the same time. We have therefore labeled them 'farmers and pastoralists' facilities / camps'.

The impression received from survey work is that the area was extensively used for pastoral and farming pursuits. However, only further study, including excavations, will determine how many of these sites were in use in any particular cultural-temporal unit. This, in turn, will lead to understanding how dense the population was and how extensively the resources of the area were exploited at any given time.

A number of the 2011, SAAS-recorded sites have been excavated. Among them are a church at Udhruḥ (Falahat 2007) (SAAS Site 193), Kh. ad-Dabba (Whiting *et al*. 2008) (SAAS Site 209), Kh. al-'Irāq ash-Shamāliyya (Smith 2009: 302-07) (SAAS Site 275), Kh. al-Kur (Smith 2009: 296-302) (SAAS Site 216), Kh. an-Nawāfla ('Amr *et al*. 2000) (SAAS Site 358) and Ṭuwaylān (Bennett and Bienkowski 1995; Smith 2009: 307-13) (SAAS Site 359). The interested reader will find more information on these sites in the cited references.

Concluding remarks

The area of the SAAS project is one in which field clearance and the building and maintenance of terrace walls has gone on for millennia. As a result, there are numerous stone piles, some of them with impressive and imposing retaining walls, and heavily eroded terraces throughout the territory. Although these are the result of human activity, we did not record them as archaeological sites. Nevertheless, if they occur within a random square or near a site, they are generally noted in our random square and / or site description.

Jordan is undergoing rapid development in most areas of the country. This development is leading to the destruction of many archaeological sites. Thus, the findings of the survey are being communicated immediately to the Department of Antiquities of Jordan in order that important sites may be 'salvaged' and as much information as possible obtained from them before further damage is done.

The lithics and sherds not shipped to Canada for further analyses are stored in the Department of Antiquities' storerooms at ash-Shawbak castle. They are thus available, with the Department of Antiquities' permission, to researchers.

This publication serves as an invitation to researchers to follow up on these preliminary findings by carrying out further investigation of the areas in which the random squares and sites of the SAAS project are located. SAAS survey team members welcome further investigation, with permission of the Department of Antiquities, of the area and its sites.

Acknowledgements

SAAS team members would like to thank Dr Ziad al-Saad, former Director General of the Department of Antiquities of Jordan, for permission to carry out this season of work. In addition, special thanks are extended to Sate Massadeh, the Department's representative to the project, and other members of the Department of Antiquities' staff at its office in Amman. Hani Falahat, Chief Inspector of the Department of Antiquities' office at Ma'an, provided assistance throughout the season. Drs Barbara Porter and Chris Tuttle, Director and Associate Director respectively of ACOR, and all ACOR staff members made sure that the team members got into the field and were provided with the necessities to carry out a fruitful season. SAAS team members express gratitude to David Kennedy (University of Western Australia, Perth) for his identification, using Google Earth, and labeling of a number of sites within the survey territory. Finally, Gary L. Christopherson (University of Arizona, Tucson) is thanked for his work on the Geographic Information System database and the map (**Fig. 1**) used in this publication.

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