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Wadi Hasa Ancient Pastoralism Project

Field Season: 16/8/08-31/8/08

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**Preliminary Report of the 2008 Season of the Wadi Hasa Ancient Pastoralism Project**

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## **Introduction**

The Wadi Hasa Ancient Pastoralism (WHAP) Project, in conjunction with the Mediterranean Landscape Dynamics (MEDLAND) Project Barton 2004, aims to better understand human interaction with the landscape east of the Jordan Rift during the Neolithic and Chalcolithic periods. To that end, the current field season has focused on two major aspects: reinvestigation of previously discovered sites that may be related to ancient pastoral activity, and geoarchaeological investigation of the Holocene history of Wadi al-Hasa and its tributaries. This two-pronged approach is necessary in order to gain a more complete picture of ancient human activity and the potential effects of that activity on landscape evolution in the region.

## **Fieldwork Goals**

### *Summary of Archaeological Goals*

Archaeological investigations in the summer of 2008 were carried out by Isaac I Ullah, director of WHAPP and in conjunction with the MEDLAND Project. A major aspect of the WHAP Project is to reinvestigate sites that were recorded by previous survey projects. In particular, the field work carried out in this field season relocated and re-documented sites originally discovered by both the Wadi Hasa Survey and the Wadi Hasa North Bank Survey Hill 2006, MacDonald 1982, Clark, et al. 1987, Coinman 1998, MacDonald, et al. 1998, MacDonald 1992. These surveys were extensive, and covered large portions of the Wadi al-Hasa region. While much important information was gathered by the original surveys, their major thrust was discovery of sites rather than in-depth documentation of all sites discovered. The sites included for investigation in the current field season were chosen because the original surveyors: a) indicated that they were either of Neolithic or Chalcolithic age; b) indicated the presence of stone circles, which are potentially pastoral in nature; c) were locatable on imagery using tools such as Google Earth and GRASS GIS to a reasonably high degree of confidence. Sites were then ranked in terms of priority for field investigation based on: a) their potential significance as could be determined by the original field notes; and b) the ease of accessibility to the site (ie. the presence of navigable access roads, and the distance of the site from the nearest paved road).

Because the WHAP Project utilized modern technologies such as GPS and GIS, which were not available during the previous surveys, the previously documented sites can be located with more accuracy. A major aspect of the post-fieldwork analysis will be to determine the amount and character of positional offset between the originally recorded location of the sites and their newly re-documented positions. This information will be vital in assessing the viability of older survey data for precise settlement pattern analysis, especially for predictive modeling and human-landscape interaction studies. Ideally, this analysis will identify and separate any systematic error in the way sites were originally located, which should allow for correction of site location data from older surveys in the region.

An additional goal of the current field work is to expand our knowledge of the mobile component of the Neolithic and Chalcolithic food production system in the region. To that end, the WHAP Project focused on intensive surface recording of relocated sites. The particular methodology included detail mapping of architectural remains, surface artifacts and the geomorphology of the site environs, detailed artifact density studies in randomly selected test units (1x1 meter squares), and in-field photographic documentation of formal and informal stone tools. It is important to note that this field methodology stresses minimal impact to the integrity of the sites (all documented artifacts were left in place), leaving them

essentially undisturbed for possible future work. Post fieldwork analysis will include lithic artifact studies (from the photographs recorded in-field), further geomorphologic analysis of site catchments with high resolution remotely sensed data, and GIS-based modeling of site location and landuse patterns during these periods in the Hasa region.

#### *Summary of Geoarchaeological Goals*

Geoarchaeological investigations in the summer of 2008 were carried out by the Joseph Schuldenrein and Mark Smith in conjunction with the MEDLAND Project. The objectives of the current field season were twofold:

- To refine landform and stratigraphic relations at the Hasa for the Holocene;
- To develop a landscape perspective for viewing settlement patterns based on changing environments as signaled by landform sequences in the Hasa.

The field phase of the project is the target of the present report. All work was conducted in conjunction with the WHAP Project which centers, in part, on site and landform associations for the Early to Middle Holocene periods (ie., the later Neolithic through the Chalcolithic). A primary emphasis was placed on absolute dating of stratigraphic and landform complexes in select reaches of the Hasa drainage, specifically those of Early to Middle Holocene age. The method of Optically Stimulated Luminescence (OSL) featured prominently in the dating methodology, as no samples of this type have as yet been processed for the Hasa region.

### **Fieldwork Summaries**

#### *Summary of Reconnaissance*

The first two days of the field project (17-18 August) involved canvassing the project area to determine those locations that were both most suitable and accessible for field work. Sites examined during the first day included locales within the downstream (central to western) reaches of the trunk drainage. These included WHS 422; WHS 60 and WHS 69; and an abortive attempt to reach WHS 122, which proved inaccessible. Sites viewed during the second day were concentrated on the upstream (eastern) segment of the Hasa drainage. Sites visited included WHNBS 14 and WHS 797. Additionally, we visited a critical outcrop of the Hasa Terrace, the primary alluvial landform flanking the wadi floor, and accounting for the baseline chronology that has already been advanced for the Middle Holocene Hasa sequence Schuldenrein 2007. The Hasa Terrace has been defined as a 3-5 m high landform. At the reconnaissance location, recent well exploration exposed a profile in excess of 5-6 m beneath the wadi floor such that a composite 10-11 m profile could be mapped at this location. The implication was that exposures beneath the recent wadi floor could date episodes of channel incision and floodplain history related to earlier Holocene landscape change.

At each geoarchaeological site stop during the reconnaissance schematic stratigraphic and/or surface texture profiles were drawn. This was the initial step in determining which locations would be investigated for comprehensive geoarchaeological work. Archaeological reconnaissance consisted of casual observation of the presence of diagnostic artifacts and the basic density of artifacts in general, as well as notation of any possible architecture. Several archaeological sites could not be visited initially but were deemed “high priority” and were subsequently investigated when a second field vehicle was procured.

#### *Summary of Archaeological Field Work*

All archaeological work was conducted between 19 and 30 August 2008. On August 19th, fieldwork began in earnest at WHS 326, a supposed Chalcolithic site located in Wadi Ja'is about 2.5 kilometers upstream from its confluence with the main Hasa trunk. Although the original site coordinates were found to be faulty, the site was none-the-less relatively easy to relocate due to detailed description in the original survey notes of the landform on which the site is situated. The site consisted of a fairly dense distribution of debitage and stone tools. The majority of stone tools at the site were informal flake tools. These tools displayed evidence of high usewear and significant resharpening. The only formal tools noted from this site were two sidescrapers, and one endscraper, all constructed on flakes. The lithic evidence, although far from concrete, does indeed point to a Late Neolithic or Chalcolithic age for this site, although OSL dating of the terrace (see below) should help narrow down the possible timeframe when the site could have been occupied. There were also some bedrock mortars located in close proximity to the site, but any association of these features with the lithic debris is tenuous. In addition, several later tombs (Probably Iron Age) as well as later circular structure (probably the "stone circle" that was noted by the original surveyors) are located on the same landform.

On 20 August, the project shifted locales to the eastern Hasa region, and investigations were conducted at WHS 797. This site is located on a high ridge overlooking a sinuous bend in the main Hasa channel about 7 kilometers west of the Desert Highway. The original surveyors noted a stone circle and some possibly Neolithic lithic artifacts. Although there were several rock features along the ridge, there was only one that matched the general description in the survey notes, although it was located about 200 meters off from the specified coordinates. Again, most of the tools discovered at the site were informal flake tools. The only formal tools of note were an endscraper and a double endscraper, and possibly an incipient celt or adze. The architecture consisted of natural stones and was preserved to two courses at most. The stone circle had a diameter of 8 to 9 meters, and had small abutting room (diameter of 1.5 meters) to the east. There were three outlying rock cairns each of which had high densities of tools in their vicinities. Although there are no diagnostics from this site, the artifact densities, and character of the flake tools are very similar to the other sites with diagnostic Late Neolithic/Chalcolithic tools.

21 August began with an eventually abortive attempt to reach WHS 924, a PPNB Burin Site on the southern ridge of the central portion of the main Hasa drainage. A two hour truck drive down the drainage over very difficult roads brought us close to the site; however, the wadi margins are sheer cliffs rising at least 150 meters from the drainage without any plausible route for ascent. If this site is to be investigated in the future, access will have to be gained overland from the south. After this initial unsuccessful attempt, we were able to rediscover site WHNBS133, a complicated site that consists of several overlapping stone circles on an alluvial fan in a northern tributary wadi of the main Hasa trunk drainage. The remainder of the day was spent mapping the complicated and often confusing pattern of architecture at the site. The next day (22 August) we returned to WHNBS 133 to continue investigations. This day saw artifact density mapping, density unit analysis, and artifact photography. The original survey notes indicated that a Chalcolithic tabular scraper was found at this site by the original surveyors, and we were able to find three more, reinforcing the Chalcolithic date for this site. There were also very high quantities of flake tools on irregular flakes. Some of these seem to have been expediently used, but most display high degrees of retouch. In fact, almost all sizeable flakes found at the site seemed to exhibit usewear to some degree. Although one circle at the site had been reused recently by local Bedouin (as a corral!), fairly high amounts of deposition were noted on the upslope side of walls, and inside the circles, which bodes well for preservation of subsurface artifacts in these areas.



On 23 August, work refocused on the central western portion of the Hasa drainage, and archaeological investigations were carried out at WHS 421, another stone circle site located on a terrace in the bend of a meander of the main Hasa channel. There is a Roman/Byzantine tower located on the same landform, which, unfortunately, seems to have encouraged looters to dig at the site. Three looter's pits were noted at the site, one of them dug to approximately 1.5 meters! The prehistoric site is located slightly upslope from the Roman tower, and therefore seems to be mostly intact. The partial remains of two stone circles are in evidence, and the rest of the circles may be intact but buried by colluvium from upslope. Like the other sites, the main tools at this site were informal flake tools, although the discovery of three tabular scrapers and two endscrapers indicate that this site is also most probably Chalcolithic. A recent Bedu tent footprint (Marh al 'Arab) slightly intrudes upon the northern edge of the site.

25 August began with another unsuccessful attempt to get to a PPNB Burin Site (WHS 610) in the central Hasa, this time from the King's Highway. The dirt road leading down from the town of 'Ayna became impassable shortly after it crossed the Wadi channel and began its ascent to the south. Therefore, work was refocused on the rediscovery of several "low density lithic scatters" noted at confluence of Wadi al Ali and the main Hasa channel. The description of the site locations in the original survey notes do not go further than to note that they are in the vicinity of the wadi confluence, so relocation was very difficult. Only one small site was found on a small remnant of the 12-15 meter terrace just to the West of the confluence of the two wadis, which is most probably WHS 1008 although it is impossible to tell for certain. This site was very poorly preserved, having been mainly obliterated in antiquity by the construction of a Roman tower, and a later series of tombs. One looter's pit was also noted at this site, directly adjacent to the Roman tower. No architecture of prehistoric origins was noted at all. There were very few artifacts present, and only nine tools, although among the tools featured a tabular scaper and an endscraper. This indicates a Chalcolithic presence at this location, although the site was too disturbed for any meaningful density information to have been collected.

On 25 August, all fieldwork was focused on geoarchaeological investigations at the "Ancient Valley Site" (see below). While conducting geomorphic mapping of the landform, densities of artifacts present on the surface were also noted. Artifacts from many time periods were noted on this landform, which is a relic of the ancient valley bottom preserved in antiquity by diversion of streamflow after a large landslide. In particular, stone tools were noted from the Paleolithic (Middle and Upper), Neolithic, and also probably Chalcolithic. Nabatean pottery and ancient field walls were also noted.

Following a break in fieldwork on 26 August where two members of the field crew departed, work then resumed on 27 August. This was the last day in the eastern study area, and investigations focused on WHNBS 14, which was initially rediscovered during the reconnaissance. This site is located very near to the Desert Highway in small tributary wadi to the north of the main Hasa drainage. This site was originally noted as a partial stone circle with abutting cairns in the original survey records, but closer examination of these features shows them to be relatively recent (Bedouin?) tombs that are arranged in a loosely circular manner. Very low densities of undiagnostic lithics were found near these tombs, but this is common on this landform, which is a stable low (1-2 meter) terrace intercut by the current wadi channel. All was not lost, however, as an area of high tool density was discovered approximately 100 meters downstream of this area. After the discovery of two very nice tabular scrapers and a crested blade, I decided to focus attention on this area, calling it "Locus 1" of site WHNBS 14. This site is a medium to high density lithic scatter with no architecture, although there may be the remnants of a rock lined hearth feature. In addition to the scrapers and crested blade, several cores were discovered, and a variety of highly

retouched flake tools of indeterminate purpose. The remaining tools were all lightly to moderately retouched flake tools or flakes with a high amount of usewear.

On 28 August, work shifted back to the western project area where investigations were carried out at WHS 60 and WHS 69, both on the side of the road through Wadi Afra. WHS 60 was noted as a “Neolithic Camp” by the original surveyors, and the rediscovery of several Naviform cores confirms that it is mostly likely of Prepottery Neolithic age. A recent Bedouin encampment and some bulldozer activity disturb a large part of the site, but the northern portion remains intact. No architecture was noted, although any architectural remains that may have been part of the site was likely destroyed by the aforementioned disturbance. There were moderate densities of flakes and a few blades, but little else. WHS 96 is located approximately 60 meters downstream from WHS 60, and is even more poorly preserved. Investigations on either side of the road indicate that the site was likely to have been mainly located directly where the current Wadi Afra road was built. In fact, most of the hillside was bulldozed away to make way for the road, and what remains of WHS 69 are a very few number of flakes of indeterminate age, and no formal tools at all.

29 August saw the last full field day of archaeological work, which was focused on a site that was newly discovered during the geoarchaeological fieldwork in the vicinity of site WHS 421. This site, named WHAPP 1 by this project, consists of a small (10 meter diameter) stone circle on the top of the 12-15 meter terrace to the south of WHS 421 that was one of the main foci of the geoarchaeological work in the vicinity (see below). There was a moderate density of flake tools discovered at the site, but no formal tools were discovered. The flake tools were of similar dimensions and character to the flake tools discovered at WHA 421 and the other Chalcolithic sites, however, which suggests that this site may be Chalcolithic as well.

The last day of field work was 30 August, which was used as a “catch-up day” where the geomorphic settings of sites WHS 421, WHAPP 1, WHS 60, and WHS 69 were mapped in more detail, and all notes and paper work were double checked before leaving the project area.

### *Summary of Geoarchaeological Fieldwork*

All geoarchaeological work was conducted between 19 and 25 August 2008. On August 19 intensive geoarchaeological work began at site WHS 326, a Chalcolithic site above a fluvio-limnic terrace of the Wadi Ja'is. A comprehensive cross-wadi profile was drawn illustrating stratigraphic relations between the wadi floor, the Low Ja'is Terrace, and the Pleistocene fill of the 12-15m terrace. A single OSL sample was taken at a depth of  $\pm 1$ m beneath the surface preserving the Chalcolithic remains. Subsequent attempts to procure OSL specimens on the terrace were not successful because of the calcareous composition of the sediment matrix that prevented penetration of the OSL sampling tubes. To compensate for this problem, a bulk organic  $^{14}\text{C}$  specimen was taken within the basal sediments of the Wadi Ja'is exposure at a downstream location in the site vicinity.

Intensive work at the Hasa terrace exposure formed the largest component of the geoarchaeological effort. It proceeded between 20-22 August. As noted, well excavation activities exposed a composite vertical depth of  $>10$ m. Four separate, but adjacent exposures were assembled for the overall sequence. These were subdivided as follows:

- Section A: the uppermost 2.65m of the Hasa Terrace, south face; net depth 2.65m
- Section B: the basal 0.2m of the Hasa Terrace and the uppermost 2.7m beneath the recent wadi floor, south face; net depth 6.05m
- Section C: the next 1.3m beneath the recent wadi floor, north wall of excavated well complex; net depth 7.35m

- Section D: the final 1.5m of the profile sampled beneath the wadi floor; north wall of excavated well complex; net depth of 8.85m.

The depth of the composite profile reached nearly 9m, of which the bottom 6m consist of gravels and sands beneath the Middle Holocene alluvial plain. Sections A and B incorporate the Hasa Terrace and the transition from the terrace to sub-wadi floor stratigraphy was preserved in Section B. Sections C and D would appear to register well defined Late Quaternary erosional episodes.

To establish the depositional contexts for the Hasa Terrace soil-sediment columns (for sedimentology and geochemistry) were taken from Sections A and B. To calibrate chronologies for the Hasa Terrace two (2) OSL specimens were obtained from Section A and two (2) radiocarbon samples were recovered from Section B. The choice of specimen type for dating was dependent on the sedimentology of the sequence: typically OSL dates are taken from sandy matrices, while radiocarbon materials are better preserved in denser, silt and clay-rich deposits. An OSL specimen was taken from Section C. Finally, OSL samples were also retrieved from two (2) additional locations within the deeper sands and gravels: one at a depth of ca. 9 m along the north wall of the well complex to the east of Section D and a second ca. 20 m west of Section B, again well within the gravelly-sand complex.

After the field mapping and profiling of the Hasa Terrace and sub-wadi locale was concluded, the authors proceeded to relocate an outcrop profiled and dated by the senior author in an earlier publication Schuldenrein 2007. The objective was to revisit the stratigraphy and to obtain, if possible, an OSL sample, to refine the sequence put forward in the earlier publication. The outcrop had been originally described as “in the vicinity of WHS 621”. With GPS co-ordinates that location was identified near another locale in which well excavation was active. A profile of the 5 outcrop was drawn and an OSL specimen and a bulk radiocarbon sample were taken. This concluded the field work portion of the Hasa Terrace explorations at the eastern end of the project area.

On August 23 site WHS 421 (Chalcolithic) was visited to develop a landform context for the site which is perched on a 12-15 m terrace grading towards a piedmont surface southward to the Wadi al-Hasa. The surface is underlain by a thin veneer of slopewash and poorly sorted silts, sands and gravels. The piedmont series is the dominant landform and a surface texture profile was drawn of the composite landforms extending to the lower gravel benches on either side of the Wadi al-Hasa and terminating at a 12-15 m fluvio-limnic terrace. OSL and bulk radiocarbon specimens were taken from the basal 2 m of the latter terrace. The objective was to determine if the dates of initial alluviation could be ascertained.

On 24 August a 50 m length of the 5 m high Hasa Terrace was isolated in the central western portion of the drainage. This was the first extensive outcrop identified to date in a critical downstream reach. A detailed stratigraphic profile was drawn and single OSL and a bulk organic specimen were taken from the base of the sandy silt sediment, at the interface with massive fluvial gravels. It is hoped that this sequence can be correlated with the Hasa Terrace's upstream counterpart. That same day, the authors returned to WHS 60 and WHS 69 and plotted a surface texture profile of that Neolithic site. A remnant tufa as well as distinct hydromorphic and reduced organic spring facies were sampled at an outcrop overlooking the road immediately opposite the lower bench that housed the densest artifact assemblages. These specimens will be submitted for radiometric determinations.

August 25 was the final day of fieldwork for the geoarchaeological component of the project. A unique landform known as the “Ancient Valley Site” was visited. Here a near level 20 m terrace segment of the Wadi Laban preserves a former alluvial surface that was cut-off from the primary channel trench by a landslide. The landslide is registered in a knoll shaped landform adjacent to the valley segment. The knoll is comprised of massive boulders that are

collapsed around and within finer sediments. The chrono-stratigraphy of this event is critical in understanding the geomorphic history of the central-western Wadi al-Hasa watershed. It was possible to take OSL and radiocarbon specimens from the upper 2.5 m of the “ancient valley site” landform. Extensive slope collapse and poor accessibility impeded sampling at the base and middle sections of the profile.

### **Preliminary Conclusions and Future Directions**

The WHAP Project is the first project of its kind in the region. The data gained during this field season should add greatly to the current picture of mobile pastoral economies in the Late Neolithic and Chalcolithic periods in the region. In addition, post processing of the new site location data with the original site location data should help to clarify the utility of using older survey data in the region for settlement pattern analysis and human landscape interaction studies. The detailed information on lithic artifacts, artifact densities across sites, and the relationship of these density profiles to the architecture of the sites should also help to build up a better understanding of mobility patterns, economic activities, and domestic space in the Hasa region.

The geoarchaeological component of this study marks the first comprehensive effort to link Holocene landscape change with human mobility strategies and settlement systems along major segments of this critical drainage net. Geoarchaeological studies of landforms at Neolithic and later sites should establish site-landform chronologies and correlations. To date, researchers have noted the presence of Holocene sites on “upland landforms” (of unknown to poorly documented morphogenetic origins) without exploring the possibility of contemporaneous landform evolution or postulating reasons for what appears to be a period of Early Holocene erosion.

The application of OSL and AMS radiocarbon based dating strategies should furnish dates to fill in gaps in the terminal Pleistocene to Middle Holocene stratigraphic records at the Wadi al Hasa. When coupled with settlement pattern studies, it should be possible to establish a baseline chronology that links human mobility systems with landform change into a more comprehensive model of human ecology for the past 10,000 years.

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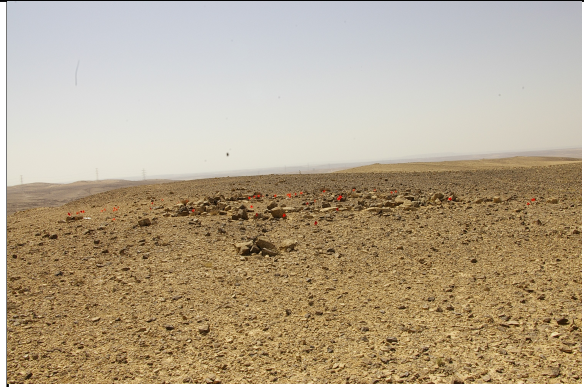
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## **Plates**





WHS 326



WHS 797



WHNBS 133



WHS 421



WHS 1008



WHNBS 14





Ancient Valley Site

Hasa Terrace Profile



OSL Sampling



Tabular Scraper