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KENYA

Holocene Occupation of the Mount Porr Strand Plain in Southern Lake Turkana, Kenya

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Introduction

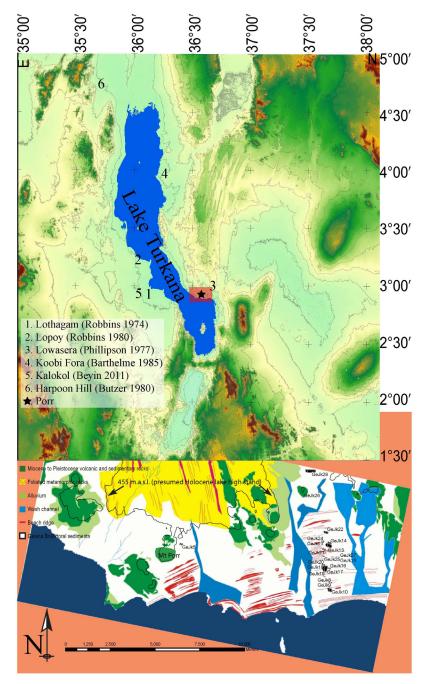
This paper presents the results of two field seasons of archaeological survey, mapping and limited test excavations of two sites adjacent to southeastern Lake Turkana. Within the study area, archaeological sites are located on small rises within a ridge and swale landscape. The ridges and swales are relics of past littoral beach processes. Evidence for occupations spanning centuries to millennia are located on these ridges, confirmed by radiometric dating of stratified archaeological deposits. The limited scope of these preliminary field investigations did not allow for complete collections of archaeological materials observed during pedestrian reconnaissance, therefore the presentation of data in this manuscript is largely qualitative and oriented toward showing the types of archaeological settlement of this portion of Lake Turkana. In this paper, we present a classificatory and temporal scheme for archaeological sites detected within our project area as a basis for further study.

Background to the Study Area

Prior to the arrival of domesticated animals in the Lake Turkana region, human subsistence was focused on exploiting aquatic resources. This is exemplified by the so-called "Bone Harpoon Cultures," dated to ca. 8000 BP, but they likely span additional millennia prior to and following this date (Robbins 2006). All of these occupations were coeval to a presumed high stand of Lake Turkana of +80m, or 455m asl (Owen et al. 1982). After 4000 BP, the subsistence economy shifted to cattle and caprine herding complimented by ceramic use and a microlithic tool industry called the "Pastoral Neolithic" (Bower and Nelson 1978). The period from 1000 until 200 BP can be defined as the "Turkana/ Maa/Cushitic" period following the evidence that this was the period in which eastern Nilotic (proto-Turkana/Maa)-speaking people from southern Sudan entered the Cushitic-speaking Turkana Basin (Ehret 2011: 117-119; Schlee 1985; Spear and Waller 1993). Archaeological sites that date to within the last 1000 years show great diversity in the tools and modes of subsistence people practiced (Robbins 1984). Figure 1 shows the spatial distribution of Holocene archaeological sites and hotspots reported on the Turkana strand plain (Barthelme 1985; Bevin 2011; Butzer 1980; Phillipson 1977; Robbins 1974, 1980).

The present study area is known locally as "Porr," which refers to the 225m high cinder cone volcano that dominates the visual scape of a thick apron of Holocene-aged deposits northwest of the town of Loiyangalani along the southeastern shores of Lake Turkana (Figure 1). Holocene deposition across the Lake Turkana Basin is comprised of littoral and lacustrine deposits called the Galana Boi Formation and rise to an elevation of 80m above the modern lake level (Butzer 1980; Owen et al. 1982; Owen and Renaut 1986). Beach ridge deposits are often capped by eolian sediments, which reflect local reworking of medium-grained sands. Aggradation of eolian landforms occurs primarily in the form of coppice dunes in which eolian sands accumulate around the margins of tree stands. Sandy alluvium filled drainages that dissect the project area from north to south, exposing beach ridges and cop-

Figure 1: Archaeological sites and Digital Elevation Model (DEM) of the Lake Turkana Basin, surficial processes and archaeological sites recorded within the project area. DEM provided by the United States Geological Service (USGS) Earth Resources Observation and Science (EROS) Center (<u>http://edc.usgs.gov/</u>).



pice dunes, and deposit sediments as alluvial fans on the north side of a large east-west trending beach ridge located at 11m above the modern lake level (m a.l.1.).

Project goals and methods

Archaeological survey and limited test excavations were undertaken in 2008 on the Porr strand plain of Lake Turkana (Figure 1). The project's goals were to map archaeological site occurrences and recover a temporally representative dataset of material culture. Future analyses will correlate the archaeological data with geomorphic evidence of the relic shorelines to reconstruct paleoecological settlement systems from the middle to late Holocene. Our team plans to return with a total station to map and collect artifact scatters on many of the sites reported here.

Archaeological survey was primarily conducted in January 2008, although political events associated with a contested presidential election curtailed full completion of the project objectives. Nevertheless, a series of north-south transects were walked with 15m interval spacing and recorded using a Trimble XT handheld GPS unit, and postprocessed using Pathfinder 3.1 software. When archaeological artifacts were identified, a 5m grid was established and artifacts were collected or recorded with the GPS. The field crew included American volunteers and staff from the National Museums of Kenya (NMK) accompanied by a local "home guard" to assist in navigation and translation with local Rendille and Turkana people encountered while doing fieldwork.

Archaeological sites were recorded within the Standardised African Site Enumeration System (SASES) accessioned at the NMK. In a few instances, isolated lithic or ceramic artifacts were identified and recorded as "sites" due to the lack of a classification scheme of isolated occurrences within the SASES system. The perimeters of archaeological sites were defined by the absence of archaeological artifacts for at least 50m. For sites with smaller artifact assemblages (<20 artifacts), a total artifact collection strategy was undertaken. For sites with >20 artifacts present on the ground surface, collection of artifacts was generally made representatively, with all identified temporally or culturally diagnostic artifacts piece-plotted and collected. In some cases, archaeological sites were subdivided into loci, typically defined by landforms, when material classes seemed similar and were spread over large areas. All archaeological materials were returned to Nairobi for analysis and curation at the NMK.

Two archaeological sites identified in the January survey were subjected to screened test excavations during the December 2008 field season. Excavations were carried out primarily as 1m x 1m test units (TUs) dug in 10cm spits and screened through ¼" (5.25mm) mesh. One "stripping unit" (SU) was excavated by removing the loose, sandy overburden atop a buried soil to see if archaeological features could be identified in plan view from an area of dense artifact scatter. Selection of the locations of test units was made judgmentally--typically in areas where dense artifact scatters were identified from surface contexts, but scattered across the landform so as not to prejudice the identification of stratified, subsurface deposits.

Description and interpretation of sediment profiles used United States Department of Agriculture (USDA) nomenclature focusing on sediment grain sizes, structure and soil properties (Soil Survey Staff 1993, 1999, 2002). All artifacts and fauna were bagged in the field, returned to Nairobi for photographing, morphometrics, and were curated within the NMK Nairobi facility. Faunal analysis was conducted by Paul Watene at the NMK and included identification of faunal elements, bone aspect, paleopathology (if present), presence of burning on the artifacts, and species (when diagnostic attributes were present). Simuyu Wandibba provided insight on the ceramic assemblages, and

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SASES	Name	Type	Cultural Identity	Fauna	Lithics	Ceramics	size (ha)
GeJk5		settlement/campsite	LSA - PN/PIA	X	flaked cores, microliths	large, grit-temper	0.46
GeJk6		IO	unknown		flaked core		0.01
GeJk7		IO	unknown			Х	0.01
GeJk8		scatter	PN/PIA		1 flake, FCR	handled vessel frags, X	0.12
GeJk9		campsite	PN/PIA	mammal	1 flake	handled vessel frags, X	0.08
GeJk10	Balo	settlement/campsite	PN/PIA	bovid, fish	flaked cores, microliths	Nderit, X	3.28
GeJk11		IO	unknown		1 flake		0.01
GeJk12		settlement/campsite	unknown	Bovid 1, Bovid 2			0.07
GeJk13	Adakurake	settlement/campsite	LSA - historic	bovid, fish, ostrich egg	microliths, scrapers, FCR	Nderit, X	3.18
GeJk14		settlement/campsite	PN/PIA	X	scrapers, FCR	Nderit, X	0.59
GeJk15		IO	unknown		scraper		0.01
GeJk16		scatter	LSA		scrapers, microliths		0.23
GeJk17		scatter	PN/PIA	bovid, donkey, fish	blade, scrapers, proj. point	Nderit, X	4.03
GeJk18		ritual/ceremonial center	Rendille (historic)				0.03
GeJk19		scatter	PN/PIA			Nderit, X	0.06
GeJk20		scatter	PN/PIA	ostrich egg	scraper	corrugated, X	0.24
GeJk21		scatter	PN/PIA	camel	scraper	Nderit, corrugated, X	0.31
GeJk22		settlement/campsite	LSA - historic	Х	scraper, FCR	Nderit, corrugated, X	1.26
GeJk23		scatter	PN/PIA			large, grit-temper	0.16
GeJk24		scatter (near manyatta)	LSA - historic	ostrich egg	scrapers	Х	0.1
GeJk25		scatter	PN/PIA		scrapers	Х	0.16
GeJk26		settlement/campsite	PN/PIA	X, ostrich egg	blades, microliths	Nderit, X	0.15
GeJk27		scatter	LSA		flakes		0.01
GeJk28		settlement/campsite	LSA - PN/PIA		scrapers, microliths, FCR	Х	6.3
GeJk29		cairns	LSA - historic		scrapers	Х	18.23
* not in pe	destrian survev	* not in nedestrian survey corridor (located while driving)	(J				

* not in pedestrian survey corridor (located while driving)
 X present, but not typologically diagnostic
 NOTE: All sites with lithic tools also had flakes except IOs

Charles Nelson's detailed photographs and descriptions of Turkana ceramics were also consulted for further clarification of diagnostic wares (<u>http://</u><u>www.chaz.org/</u>). Generalized stone tool analysis was performed by DKW following Nelson's (1973) and Mehlman's (1989) typologies. Flaking, reduction patterns and raw material were also noted with the assistance of Sonia Harmand.

Results of Archaeological Investigations

Cultural-temporal categories. Archaeological sites were assigned five primary temporal/ cultural components: LSA, PN/Pastoral Iron Age (PIA), historic and LSA through historic. The first category includes Mode 5 microliths (Clark 1977) made from obsidian, chalcedony, silcrete, chert or quartz flakes. Two of the sites also included large basalt or phonolite reduced cores, which are common from middle Holocene assemblages (Barthelme 1977). In our classificatory scheme, these sites lack ceramics to distinguish them from ceramicvielding sites, and are located above +75m, which is close to the Holocene transgressive limit of the lake. Ceramics were recovered from PN/PIA sites, which also typically had microliths, but there was no clear evidence of historic habitation. PIA and PN sites were not differentiated in our study because of the difficulty in defining the "PIA" in the Lake Turkana context. Historic sites have exogenouslyintroduced artifacts such as glass, metal alloys, or plastic. The latter category generally includes archaeological assemblages with prehistoric artifacts that are unattributable to a specific archaeological culture. There were three settlement/camps that included historic surface components and one site, Adakurake (GeJk13) that had discrete loci where the differing ratios of historic vs. prehistoric artifacts were discernable. There were also four sites categorized as having "unknown" components because the surface deposits were too sparse to assign a site classification.

Pedestrian reconnaissance. Archaeological surveys identified 21 archaeological sites that were divided into five different categories (Table 1).

"Settlements and/or campsites" typically consisted of numerous ceramic sherds and lithic flakes scattered on gentle ridges and knolls that characterize the project area. One site (GeJk9) had evidence for cooking activities (ceramic vessel fragments and faunal material), but was only 0.08ha in area so it was provisionally accessioned as a campsite. At sites GeJk5 and GeJk28, hearthstones were identified intermixed with LSA ceramics and lithics. An OSL age of beach ridge deposits underlying GeJk28 provides a maximum constraining age of settlement at 6530±465 BP (UIC2719). GeJk28 is located at +75m relative to the 2008 lake level (445-446 m asl on the SRTM DEM using the EGM96 geoid). Artifact densities at GeJk5 and GeJk28 were relatively high compared to the other archaeological sites documented in the project area. A total of 60 lithic and ceramic artifacts were collected from GeJk5 and 38 shell, lithic and ceramic artifacts were collected from GeJk28, but hundreds more artifacts were observed at both sites and will be piece plotted at a later date.

Archaeological sites that occur further below the high water mark of Lake Turkana have low-density artifact scatters, typically consisting of 20 or fewer artifacts. Notable caveats are the archaeological sites of GeJk10 and GeJk13, which were subject to test excavations and described in the section below. Hearthstones were provisionally identified at GeJk13 and GeJk18, but were associated with decomposed manyatta (residences for pastoralists made from animal skins strewn atop a wooden frame). Heavily fragmented faunal remains and charcoal were recovered from a shovel test at GeJk14, indicating cooking activities occurred. However, in most cases, the term "campsite" likely best represents the character of the archaeological sites rather than "settlement." This is because the archaeological assemblages tended to be diverse (including more than one material class), but indicated only ephemeral human settlement.

The other primary types of archaeological sites identified were "scatters" and "IOs" (isolated occurrences). Scatters are defined as having mul-

four IOs and nine scatters.

tiple artifact finds, but lacking clear evidence for cooking or settlement activities. In most cases, <10 artifacts were identified and recovered, although in the case of GeJk17, 24 individual artifacts were distributed over 4.03ha (surveying the site in 5m intervals). IOs are single artifact finds recovered from the ground surface. The surveys in 2008 identified

One site, GeJk18, was interpreted as a ritual/ceremonial center based on information provided by local Rendille informants. GeJk18 consisted of a line of rocks, some of which appear to be stacked on top of each other and are generally oriented in a straight line (Figure 2). The stones measured generally less than 20cm along the longest axis. The project's guard/informant ("Anton") identified this site as a place where Rendille met annually to exchange livestock and brides, and feast together at some point in the past (*zamani*). In the rituals, goats and sheep were corralled into the ceremonial center and forced to pass through two ends of an opening between which fires were lit. The goats were then sent to pasture. This ceremony did not necessarily occur at the same location every year.

Lake Turkana is rimmed with so-called "stone pillar sites," which are interpreted as ceremonial centers related to mortuary practices (Hildebrand et al. 2011; Nelson 1995; Robbins 2006) or astronomical markers (Lynch and Robbins 1978). The scale of the linear stone features at GeJk18 is far smaller than those of Jarigole or other stone pillar sites. Stone pillars can measure as much as 2.5m long and are frequently associated with human remains. Neither scenario applies to GeJk18.

The final site category defined in the survey was cairns. Our Rendille informant indicated that the cairns were graves, but we did not attempt to



Figure 2: GeJk18.

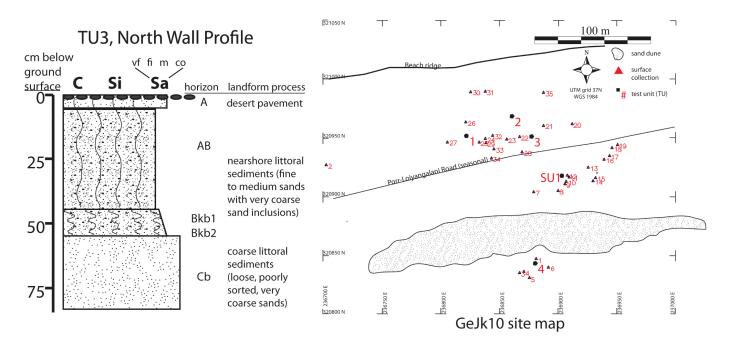
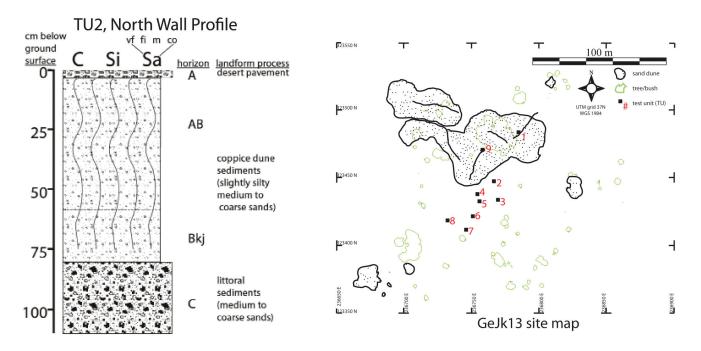


Figure 3: Balo (GeJk10) site map and representative profile.

Figure 4: Adakurake (GeJk13) site map and representative profile.



excavate any of the cairns as confirmation. Isolated cairns were not given site numbers, but were located by GPS or were incorporated within other site boundaries. However, one location, GeJk29, had a cluster of 39 cairns located on a high volcanic ridge adjacent to Lake Turkana. The locations of cairns were recorded and artifacts were collected from the ground surface. Most of the artifacts identified are historic or modern in origin. However, three nondecorated potsherds, a nose scraper and an endscraper collected from the ground surface are interpreted as likely dating from the PN/PIA occupation of the area.

Archaeological excavations and surface collections. Archaeological excavations and intensive surface collections were undertaken at two sites and demonstrated that settlement within the strand plain was ephemeral. At Balo (GeJk10) a total of six 1m² test units were screened and excavated to culturally sterile levels (Figure 3), whereas at Adakurake (GeJk13) 8.5m² were excavated (Figure 4). A 7.8m x 11.9m stripping unit (SU) was also excavated at

 Table 2: Fauna recovered from Balo (GeJk10).

Balo to expose subsoil that corresponds to the AB horizon in an area of dense artifact scatter, and to identify features related to past human occupation. However, no cultural features were identified in either the test or stripping units at either site.

In situ artifact deposits were primarily concentrated in the upper 20cm of each test unit excavated, although deeper archaeological deposits at Adakurake reflect repeated occupation of the landform during sediment accretion. Coppice dune accretion was the mechanism of burial for cultural strata at Adakurake and appears to have been a continuous process through human occupation of the site. Ostrich eggshell from Adakurake recovered 40-50cm below the modern ground surface in TU2 provided a 14C age of 2575±20 14C years BP calibrated to 2725-2745 BP (ISGS A-1341; Reimer et al. 2010). This level is the earliest detected occupation. At Balo, an OSL age of 2555 ± 175 BP (UIC2718) derived from quartz grains assayed from (C-horizon) littoral sediments provides a close, but possibly maximum limiting age for the site.

TU	Taxonomy	Element	Burned?	Size	#
shovel test	fish	spines			2
surface	adult bovid	Px metacarpal		2	1
surface	adult bovid	R ischium		1	1
surface	mammal	long bone			1
surface	mammal	bone			2
surface	bovid	tooth		2	1
surface	mammal	tooth			1
surface	terrestrial	bone			7
1	terrestrial	bone			3
3	terrestrial	bone			33
3	terrestrial	bone	Х		1
3	mammal	tooth			2
4	terrestrial	bone			32
5	terrestrial	bone			2
5	terrestrial	bone	Х		1

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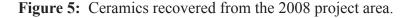
TU	Taxonomy	Element	Burned ?	Size	#
surface	adult bovid	phalanx 3	Х	3	1
surface	bovid	R humerus	Х	3	1
surface	mammal	cervical	Х		1
surface	mammal	lumbar	Х		1
surface	mammal	vertebra	Х		2
surface	mammal	bone			2
1	bovid	tooth		2	2
1	bovid	tooth			14
1	fish	exonoste			1
1	fish	vertebra	Х		5
1	fish	vertebra			2
1	terrestrial	bone	Х		139
1	terrestrial	bone			128
1	mammal	centrum	Х		1
1	mammal	petrosal	Х		1
2	bovid	tooth		2	4
2	bovid	tooth			2
2	ostrich	eggshell			4
2	terrestrial	bone			5
3	terrestrial	bone			2
4	bovid	tooth		4	1
4	ostrich	eggshell			1
4	terrestrial	bone	Х		4
4	terrestrial	bone			10
5	ostrich	eggshell			9
5	terrestrial	bone			18
6	terrestrial	bone			50
6	tilapia	spines			3
6	tilapia	spines/ vertebrae			16
8	terrestrial	bone			2
9	ostrich	eggshell			1
9	terrestrial	bone			1

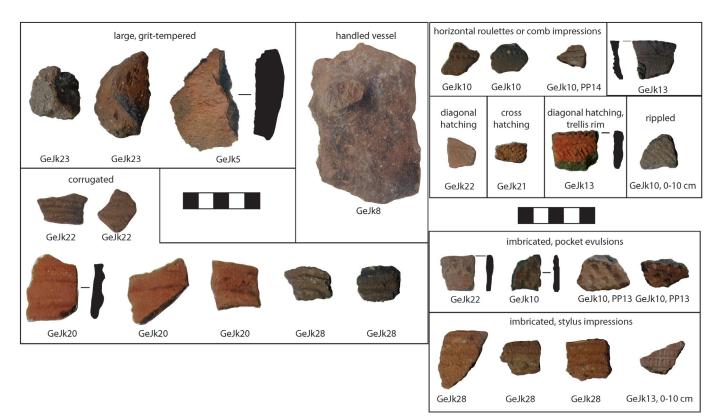
 Table 3: Fauna recovered from Adakurake (GeJk13).

The fauna recovered *in situ* was fragmentary but derived from terrestrial bovid(s), fish and ostrich eggshells (Tables 2 and 3). Adakurake had the most diverse faunal assemblage of the two sites tested, and shows that people were engaging in mixed fishing, foraging and likely pastoral subsistence. *Boscia coriacea* and *Salvadora persica* trees grow in abundance at Adakurake, which are important food sources for pastoralists who inhabit the Turkana region (Stave et al. 2007). Donkey (*Equus asinus*) and fish fragments were recovered from the ground surface of GeJk17 and a camel astragalus was recovered from the ground surface of GeJk21.

Ceramics recovered from the two sites consisted mostly of undecorated sherds (87% at Adakurake [n=26], 82% at Balo [n=102]), but decorated sherds were identified as variants of the Nderit ceramic tradition (Figure 5). Nderit tradition ceramics recovered from both excavations and pedestrian reconnaissance were typically thin-walled sherds with pocket evulsions stippled into the interior of the vessel. Some Nderit tradition sherds also had trellis rims and cross-hatching patterns on the body of the sherd, and two rippled body sherds were also recovered. Large, low-fired, grit-tempered sherds were recovered from GeJk5 and GeJk23 (Figure 5) and may be fragments of figurines rather than vessels based on their shapes. Three other sites (GeJk20, GeJk21, and GeJk22) had well-fired, corrugated ceramic sherds (Figure 5) that were originally accessioned as Turkwell tradition ceramics (cf. Lynch and Robbins 1979). However, based on these sherds' association with Nderit tradition ceramics, lack of clear decorative association and the absence of material cultural attributes typically associated with Turkwell artifact assemblages such as fishing implements, these sherds are classified as "corrugated" pending further study.

Lithics fall into three primary categories: reduced basalt or phonolite cores and flake tools; Mode 5 microliths and flakes produced from quartz, chert, chalcedony, silcrete and obsidian (Figures 6





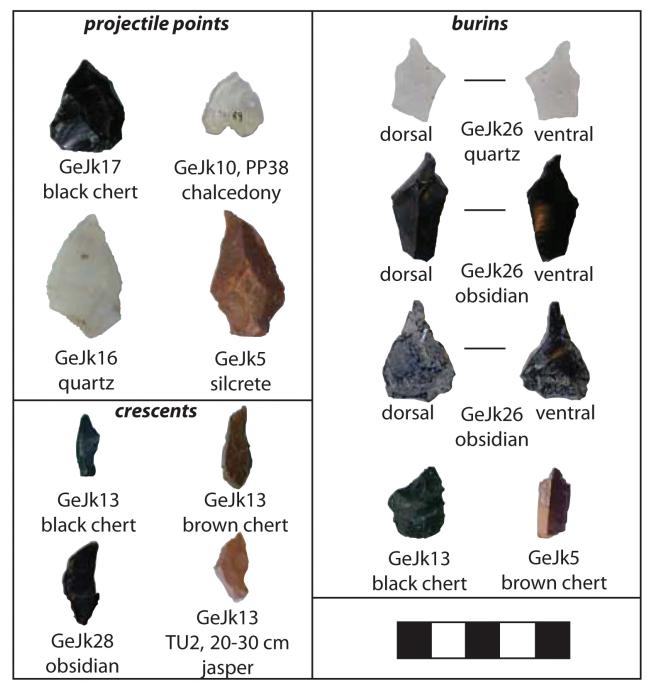


Figure 6: Bifaces, burins and crescents recovered from the 2008 project area.

and 7); and fire-cracked rock (FCR). The centripetally-reduced igneous cores are morphologically indistinguishable from Mode 3 tools (Clark 1977), but are clearly associated with Mode 5 LSA/PN/ PIA assemblages. Obsidian blades measuring 3-4cm in length and scraper microliths recovered from GeJk17 and GeJk26 are common features of middle Holocene sites elsewhere in the Turkana

Basin (Barthelme 1977). Overall, the lithic assemblages from the Porr project area are geared toward chopping and splitting (large cores), hunting (projectile points/bifaces), cutting soft or fleshy items (blades and crescents), boring (burins) and scraping hides or scales (scrapers). The assemblages are not specifically geared toward procuring fish, intensive cultivation or processing plants.

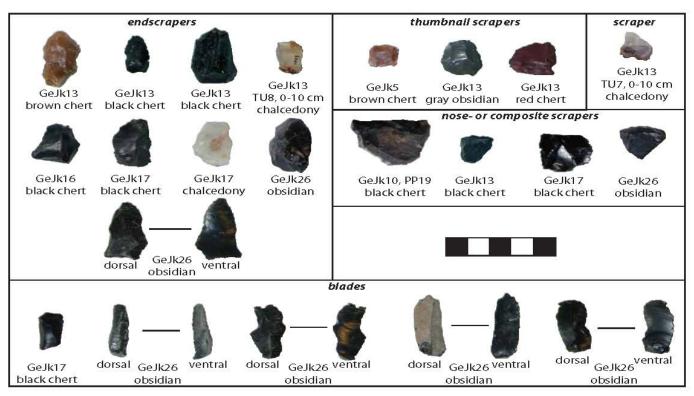


Figure 7: Microlithic scrapers and blades recovered from the 2008 project area.

Discussion

Our research goals during the 2008 field season included developing a cultural historical framework from which future studies could stem. Sites GeJk5, GeJk26 and GeJk28 are the most likely candidates to have pre- or early-pastoral settlement components based on their locations near the limit of the late Holocene transgressive strand plain (>75m above the modern lake level) and dense LSA microlithic artifact assemblages. The absence of bone harpoons identified during pedestrian reconnaissance differentiates these sites from other middle Holocene settlements in the region. Site GeJk5 had coarse grit-tempered, thick-walled pottery sherds, large basalt cores, and at least one biface fragment that was likely used as a projectile point-attributes of which signify that it might be an early PN site (e.g., Barthelme 1977). Five obsidian blades, three burins (two obsidian) and two obsidian scrapers were recovered from GeJk26, which are highly characteristic of middle Holocene LSA assemblages. The 2008 survey results agreed with previous surveys (Barthelme 1985;

Phillipson 1977, 1984; Robbins 1972) that the artifact density is higher in middle Holocene sites than compared to the later prehistoric and historic sites.

Direct evidence for the presence of domesticated animals within the 2008 project area was scant. Forelimb bones from a domesticated donkey (Equus asinus) were recovered at GeJk17 and an astragalus of a camel (Camelus dromedarius) was recovered at GeJk21. But, the provenance of surface finds is difficult to assess, and the absence of diagnostic faunal material from the ground surface is interpreted as a preservation bias. Previous studies of archaeological sites across the prograded strand plains of the Turkana Basin show middle to late Holocene subsistence strategies involved keeping domesticated livestock and engaging in lakeside foraging (Barthelme 1985; Marshall et al. 1984; Robbins 1984). Fauna from Adakurake (GeJk13) show that people exploited both terrestrial (ostrich eggs, bovids) and aquatic (tilapia) resources. Although the evidence is limited at the Balo site (GeJk10), the fauna remains consist of terrestrial and limited aquatic genera. Adult bovids

in size classes 1 and 3 (Brain 1981) in the faunal assemblages of Balo and Adakurake indicate that people were hunting, while the bovids from size classes 2 and 4 are potentially domesticated animals (ovicaprids and cattle, respectively). Riparian plant species from the nearby drainages would have been an important component of the subsistence regime of people inhabiting this landform (Morgan 1981; Stave et al. 2007), but direct evidence from archaeological remains has yet to be identified.

The two sites that were subject to subsurface testing as part of the project have temporal components that occur within or immediately preceding the time period spanning from 2500 to 1600 BP when terrigenous pollen spectra from a deepwater sediment core reflect a climate shift to arid conditions (Mohammed et al. 1995). We presume that the settlements were close to the lake margin, and people were opportunistically foraging when resources were available.

Conclusion

Preliminary research in the Porr strand plain of southeastern Lake Turkana has identified 25 archaeological sites, primarily from the late Holocene, which indicate repeated, but ephemeral use of the landform. Two archaeological sites (GeJk5, GeJk28) located near the presumed Holocene transgressive mark for Lake Turkana have denser archaeological deposits, but lack bone harpoons found in other assemblages adjacent to Galana Boi sediments. Fauna recovered from surface contexts and screened test units indicates hunting and fishing activities continued in the area after 3000 BP. Diagnostic ceramics were primarily Nderit tradition, but a previously unreported "corrugated" variant was located at GeJk20, GeJk21, and GeJk22 during pedestrian reconnaissance. The lithic assemblages recovered are geared toward chopping, hunting, cutting, boring, and scraping activities, but not fishing or plant cultivation or processing. Obsidian artifacts and the presence of Nderit tradition ceramics show that the inhabitants of the Porr landform were in contact with their neighbors to the west and north

even if the archaeological assemblages do not include clear evidence for sustained PN occupations or bone harpoon "cultures" found elsewhere in the Lake Turkana region.

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