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Late Archaic wells on the Gila River Indian Community, Arizona

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ABSTRACT

Eight prehistoric wells dug to a depth of ~2 m below the modern ground surface were found in the alluvial sediments of McClellan Wash on Gila River Indian Community in southern Arizona. Charcoal from the sediments filling the wells yielded radiocarbon ages of ~1000 B.C. The time in which wells were dug coincides with a period of general regional aridity and high ENSO activity in the American Southwest. Digging to access water may have occurred in response to period(s) of resource uncertainty, or as a logistical activity that engaged increasingly resource-tethered Late Archaic/Early Agricultural populations. These activities laid the foundation for agricultural practices that eventually became the dominant mode of subsistence in the low-lying areas of the Sonoran Desert.

1. Introduction

How prehistoric people procured water in arid environments remains a subject that is only marginally understood. The locations of surface water from fluvial or spring sources would have been well known to people inhabiting a particular area. However, a shift in climate toward more arid conditions may drive water underground in places and present a problem for resource security within marginal environments. The strategies employed to mitigate periods of resource stress during prehistory are relevant subjects of study for modern archaeologists who attempt to elucidate common patterns of human behavior under such conditions (Bird and O'Connell, 2006; Dean, 2007; Fisher et al., 2009; Hodder, 1979; Speth, 1990; Trawick, 2002).

Geomorphic trenching in the McClellan Wash undertaken in 1999 by Waters and Loendorf unearthed eight features interpreted as wells within the floodplain of the present day wash channel, located on the Gila River Indian Community (GRIC) of southern Arizona. More recently, archaeological data recovery at the Upper Santan site on the Pleistocene fan interface with the second terrace above the Gila River floodplain (T-2) (Waters and Ravesloot, 2000) located two additional well features (Fig. 1). Both sets of features yielded charcoal that were sampled for radiocarbon (^{14}C) dating and provide evidence for Late Archaic aged water extraction at a time when the local climate may have been experiencing the effects of a more-active-than-mean cycling in the El Niño-Southern Oscillation (ENSO) index. This manuscript presents the results of archaeological investigations of these atypical features and contextualizes the broader implications of well excavation ca. 1000 B.C. within this area of the American Southwest.

2. Environmental/physiographic setting of the project area

The project area is located within the McClellan Wash channel close to its intersection with the Little Gila River within the middle Gila River Valley (Fig. 1). The Little Gila River diverges from and runs parallel to the main Gila River channel for ~1 km, which is either a natural anastomosing feature or the remains of a prehistoric Hohokam canal (Huckleberry, 1992: 10). This area is mapped as the first river terrace above the floodplain (T-1), which was incised

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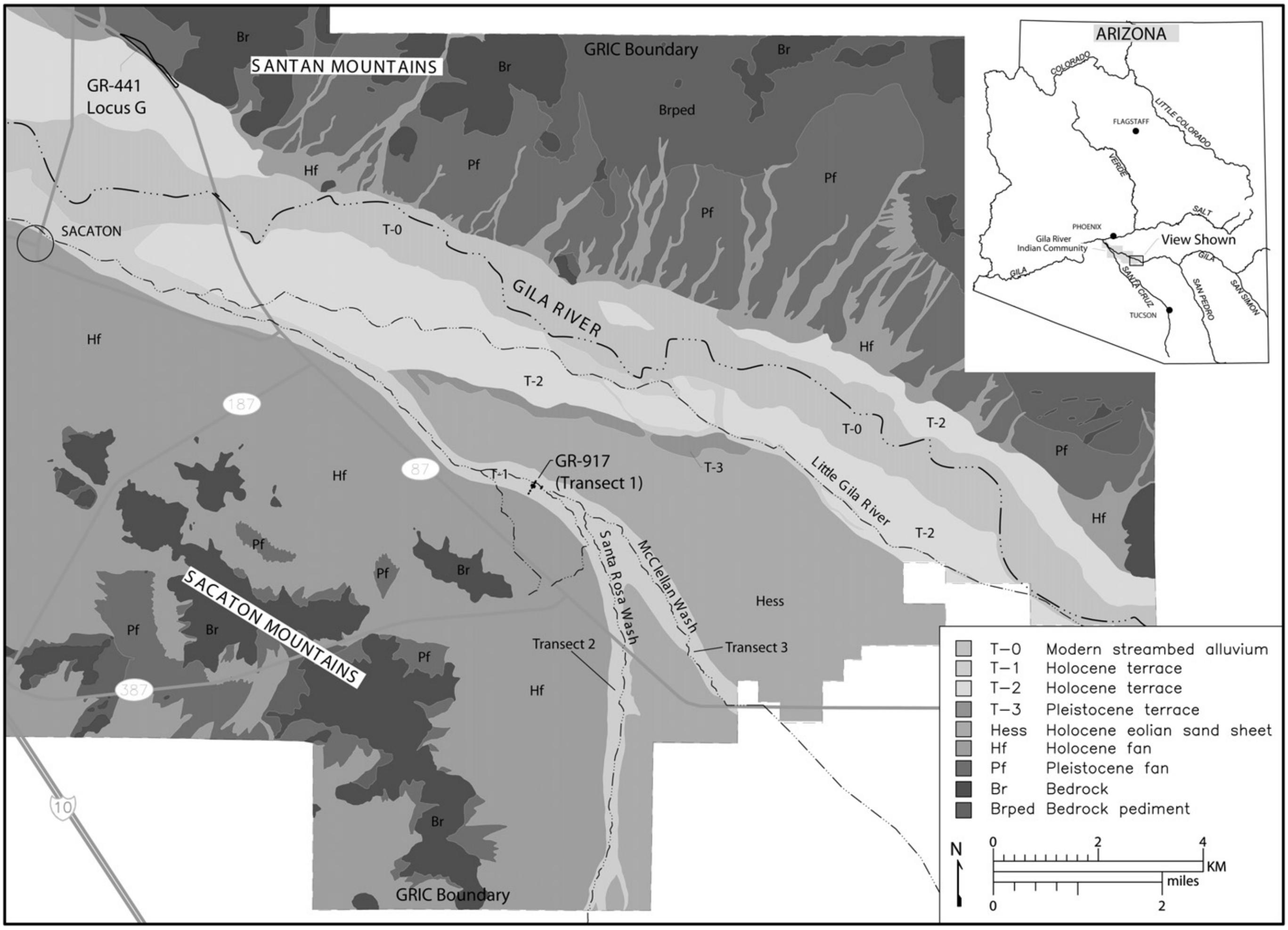

Fig. 1. Geomorphic map of the Gila River Indian Community (*sensu* Waters, 1996) showing the location of the project area.

during the late Holocene, but includes aggradational sediment packages dating from the early Holocene (Waters, 1996; Waters and Ravesloot, 2000). The middle Gila River Valley has witnessed significant changes in hydrology since the early Holocene transitioning from a perennially flowing, high discharge fluvial system to an intermittent stream with strongly seasonal flow regimes (Waters, 2008; Waters and Ravesloot, 2000). Due to ground water pumping, impoundment, and channelization of the upstream reaches of the Gila River, the middle Gila River is presently an intermittent stream flowing only during the rainy season or during early Spring snow melting from the mountains in the Upper Gila River catchment (Darling et al., 2004; Waters and Ravesloot, 2000).

The middle Gila River Valley is situated within the Sonoran Desert subprovince of the Basin and Range physiographic province, locally referred to as the Phoenix Basin. The Phoenix Basin is rimmed by mountains and detachment faults which shoulder alluvial fans filling in the valley floor. The valley contains three major landforms: the river channel, terraces, and bajadas (Waters, 1996). An eolian sand sheet also covers large portions of the Pleistocene terrace.

McClellan Wash is a seasonally-filled tributary of the Gila River that originates from the Picacho Mountains and flows across gently undulating topography adjacent to Coolidge and the Districts 1 and 2 of the Gila River Indian Community. The trough of the channel is very shallow (<3 m; Huckleberry, 1992), so the thalweg frequently changes position within the floodplain. The sediment matrix of the channel deposits tend to be coarser loamy sand to sandy loam deposits upstream, while fine loams dominate the lower reaches of the wash. Within the present project area, Typic Natargid and calcareous Typic Torrifluvent soils formed in the first terrace adjacent to McClellan Wash (United States Department of Agriculture, 2010). These soils form in stabilized overbank fluvial deposits within a loamy matrix. McClellan Wash runs parallel to the Santa Cruz Wash, which originates in northern Mexico and is deeply incised in the Tucson Basin. By the time the washes reach sand sheet deposits near Picacho, the drainages are fan deposits and sheet washes, which laterally migrate/intersect each other depending on the water flow and sediment load in the drainage (Jackson, 1990: 6).

The project area is located within the Upper Sonoran Desert biome, which is a water-deficient region, with evapotranspiration usually exceeding precipitation (Waters, 1998). This region is characterized as having five meteorological seasons: a cool and slightly rainy winter (December 1–February 15), a mild and dry spring (February 16–April 30), a hot foresummer with low humidity (May 1–June 30), a hot summer with high humidity associated with the North American Monsoon (July 1–September 30), and a warm fall with low humidity (October 1–November 30) (Phillips and Comus, 2000). The wettest months are typically July and August, during which afternoon thunderstorms develop and produce heavy but localized rainfall. A secondary period of precipitation occurs in the winter when large storms from the