

Ancient Agricultural Systems and Settlements in Lefthand Canyon, Safford Basin

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The well-watered northern foothills of the Pinaleño Mountains contrast sharply with the fan terraces immediately north of the Gila River, where the Safford gridded agricultural field complex (AZ CC:2:1[ASM]) is situated. Archaeological surveys on the northern flanks of the Pinaleño Mountains south of the Gila River have revealed extensive complexes of well-preserved agricultural fields and water management features (Doolittle and Neely 1998; Neely 2001; Neely and Doolittle 1996; Neely 1997; Neely and Crary 1998; Neely and Rinker 1997; Rinker 1996, 1998; Rinker and Neely 1998), including a variety of dry-farming and irrigated fields dating from ~A.D. 800-1450. The irrigation systems documented in Lefthand Canyon by Professor James Neely and his students and colleagues are among the most sophisticated non-Hohokam agricultural systems in the American Southwest. The Lefthand Canyon systems consist of small earthen canals and rock-bordered canals fed by snow melt and runoff that served as irrigation and domestic water supplies to the inhabitants of the Goat Hill Site (AZ CC:1:28[ASM]), the Spear Ranch Site (AZ CC:1:11[ASM]), and nearby prehistoric settlements that dot the landscape to the north. The foothill canals range in elevation from about 1000 to 1300 m (~3200 to 4300 ft). Compared to flood plain canals, the foothill canals were quite steep, with gradients as high as 2.6 % (Rinker 1998: 27). Based on work to date, the longest canal is 4.6 km in length (Neeley 1995) and total length of all canals is about 10 km. Most of these canals are earthen-walled, but short segments, especially sandy and more erodible segments, are lined with stone borders to stabilize their channels.

The Goat Hill Site (AZ CC:1:28[ASM]) is a 35-room, masonry pueblo that was occupied from ~A.D. 1275 to 1315 (Woodson 1995; Figure 1). The site sits on a high promontory near the base of the Pinaleño Mountains, sandwiched between Lefthand Canyon to the east and an unnamed ephemeral tributary. The setting is marked by a spectacular view of the Gila River and Safford Basin to the north. Water in Lefthand Canyon typically flows 9 to 10 months a year, from about September through June (Woodson 1995:9). Woodson's Masters research was based on his 1994 excavations of 11 habitation and storage rooms at the Goat Hill site and a survey of associated agricultural features. Excavations focused on rooms that had not been badly disturbed

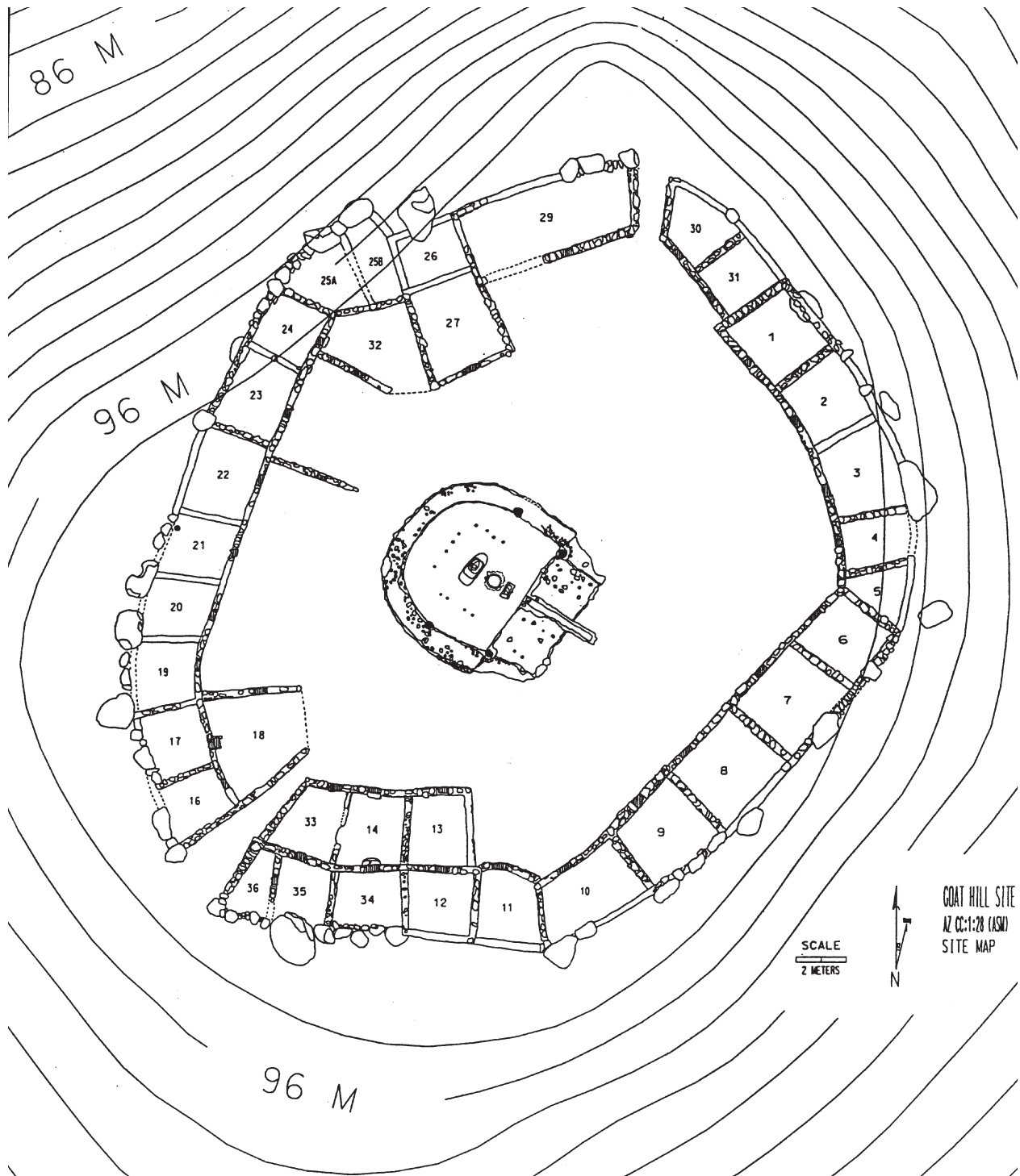


Figure 1. Map of the Goat Hill Site (AZ CC:1:28[ASM]) (after Woodson 1995, fig. 5).

by pot-hunting activity. Woodson concluded that Goat Hill was occupied by migrants with close ties to the Western Anasazi (now Ancestral Pueblo). This assessment was based on (1) intrusive pottery styles, including Maverick Mountain Polychrome jars and a Black-on-red jar similar to Pinedale Style designs; and (2) architectural styles from the Tusayan (a D-shaped kiva) and Kayenta (entryboxes and courtyard-oriented room clusters) branches of the Western Anasazi (Woodson 1995:294-296). Earlier, Jeffrey Brown (1973: 76, 82; cited in Woods 1995: 15) had noted a ceramic figurine and a flat metate on the surface that were similar to types common in the Kayenta area.

Other habitation sites dot the landscape along Lefthand Canyon to the north. Irrigation and habitation features in Lefthand Canyon that date to A.D. 1000-1450 were excavated by Rinker (1996) as part of her Masters research. She conducted test excavations at the Murphy (AZ CC:1:52[ASM]), Crary (AZ CC:1:53[ASM]), and Dewster (AZ CC:1:56[ASM]) sites. She documented two canals on the west side of Lefthand Canyon Wash, a lower canal that fed about 16-21 hectares on the flood plain and an upper canal that fed about 11-17 hectares (Ringer 2001: 210). Rinker (1998: 212, Table 6.2) estimated human population size in Lefthand Canyon as follows: (1) Late Two-Dog Phase (A.D. 1000-1100): 163-293 individuals; (2) Bylas Phase (A.D. 1175/1200-1300): 50-89 individuals; and (3) Safford Phase (A.D. 1300-1400/1450): 119-289 individuals. Rinker (1998: viii) concluded that, "Settlement patterns shifted through time from numerous, dispersed Two-Dog Phase small and large pithouse sites to fewer, relatively aggregated Safford Phase small and large multi-room villages." She also argued that the issue of potential Hohokam influence on irrigation technology in Lefthand Canyon could not be answered at present. Other archaeological investigations in Lefthand Canyon include excavations conducted at the Spear Ranch Site, a large Safford Phase settlement on the eastern side of Lefthand Canyon Wash about 2 km north of Goat Hill.

Pam Rule and, later, Wes Jernigan, both of Eastern Arizona University, have directed archaeological field schools at the Spear Ranch Site. This work has focused on documenting habitation structures and an irrigation canal. A report on the excavation results is yet to be

produced, but Jernigan notes that there were two major occupations that he characterizes as “an earlier pithouse phase (c. A.D. 1260-80) which exhibits characteristics similar to Western sites, and a later, pueblo phase (post A.D. 1280) which was a Saladoan occupation” (Woodson 1995:13).

To date, 27 prehistoric habitation and activity sites and six canal systems have been identified in Lefthand Canyon. Agricultural fields have been found in association with all six canal systems. Two types of canal systems have been recorded, ones that are stone-bordered (figure 2) and ones that are not. The use of stones apparently functioned to provide stability in the loose, sandy soils. Canal System 1 (AZ CC:1:33[ASM]), located in the southern portion of Lefthand Canyon about 250 m northwest of Goat Hill, is particularly well-preserved. It consists of a complex of stone-bordered canals and stone-faced, linear-bordered and terraced fields that extend over a triangular area that is at least 150 m wide and 650 m long, composed of five roughly parallel sets of canals and terraced fields. The types of irrigation features and the overall layout of portions of this complex have been described and mapped in detail by Neely (1997: fig. 3) and briefly summarized by Doolittle (2000: 319-321). Sections of the stone-bordered canal and stone-faced terraces are shown in more detail in Figures 3 and 4. The canal system begins as a small, broadly U-shaped channel that branches from a cutbank of Lefthand Canyon Wash that is now elevated about 3.5 m above the canyon floor. The small channel courses downslope for about 50 m and then becomes increasingly visible, marked by two closely spaced parallel alignments of unshaped slabs and boulders. Further downslope the canal branches into smaller secondary and tertiary canals, continuing along the top of finger ridges between drainageways. The canals either ran past the terraced fields, where water could be turned out directly into the fields through gates in the canal walls, or in smaller canals branched from the main canal to direct water to the fields. To date, 1.3 km of this canal system has been mapped, about half of which consists of smaller secondary and tertiary branches that delivered water from the main canal to terraced fields.

Two sections of the canal and associated features were mapped in detail and one of these

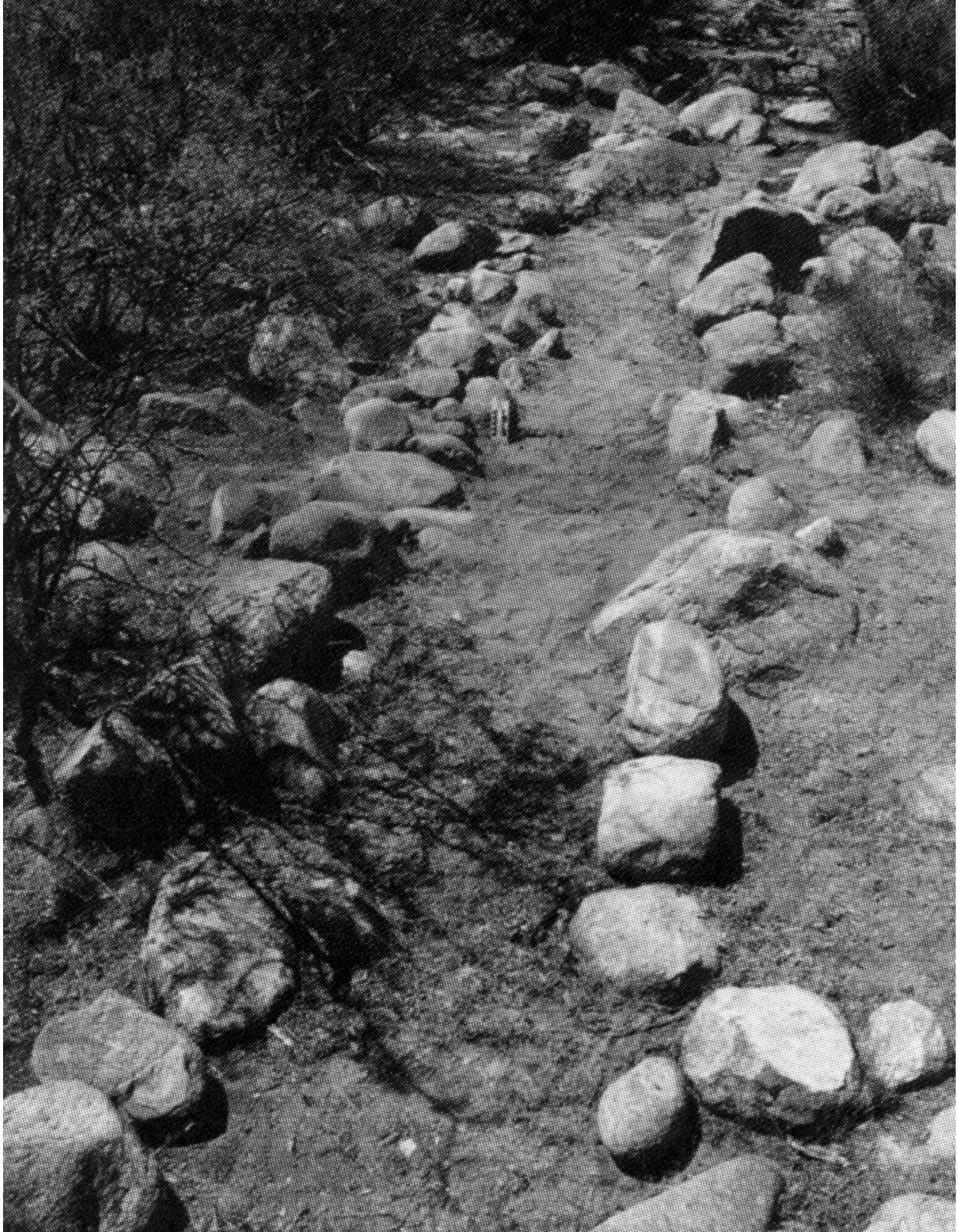


Figure 2. Photograph of a stone-bordered canal in an area of sandy soil.

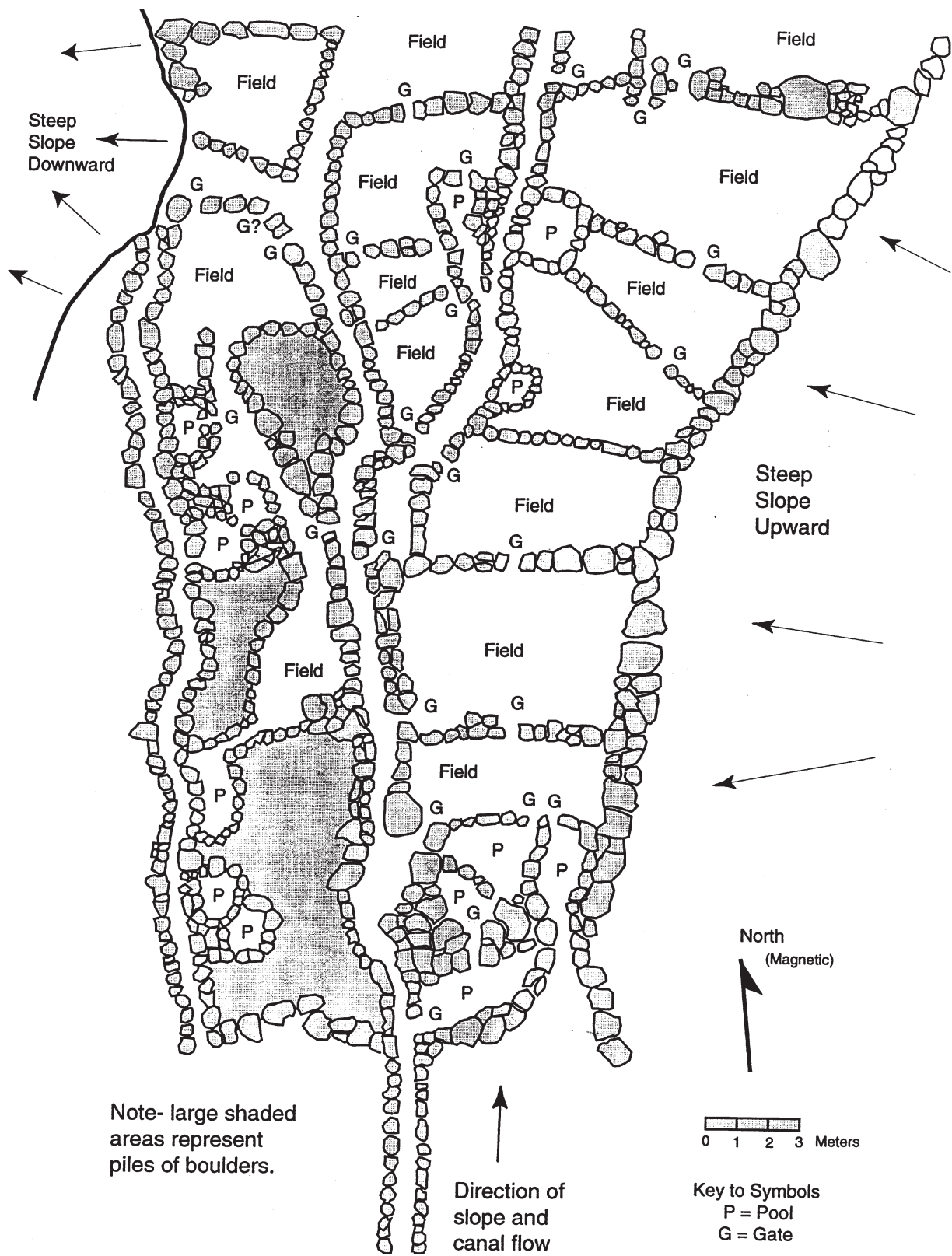


Figure 3. Map of the canal system 1 section: detail of stone-bordered canal, stone-faced terraced fields, and pools (after Neely 1997, fig. 4; also published in Doolittle 2000, fig. 9.7).

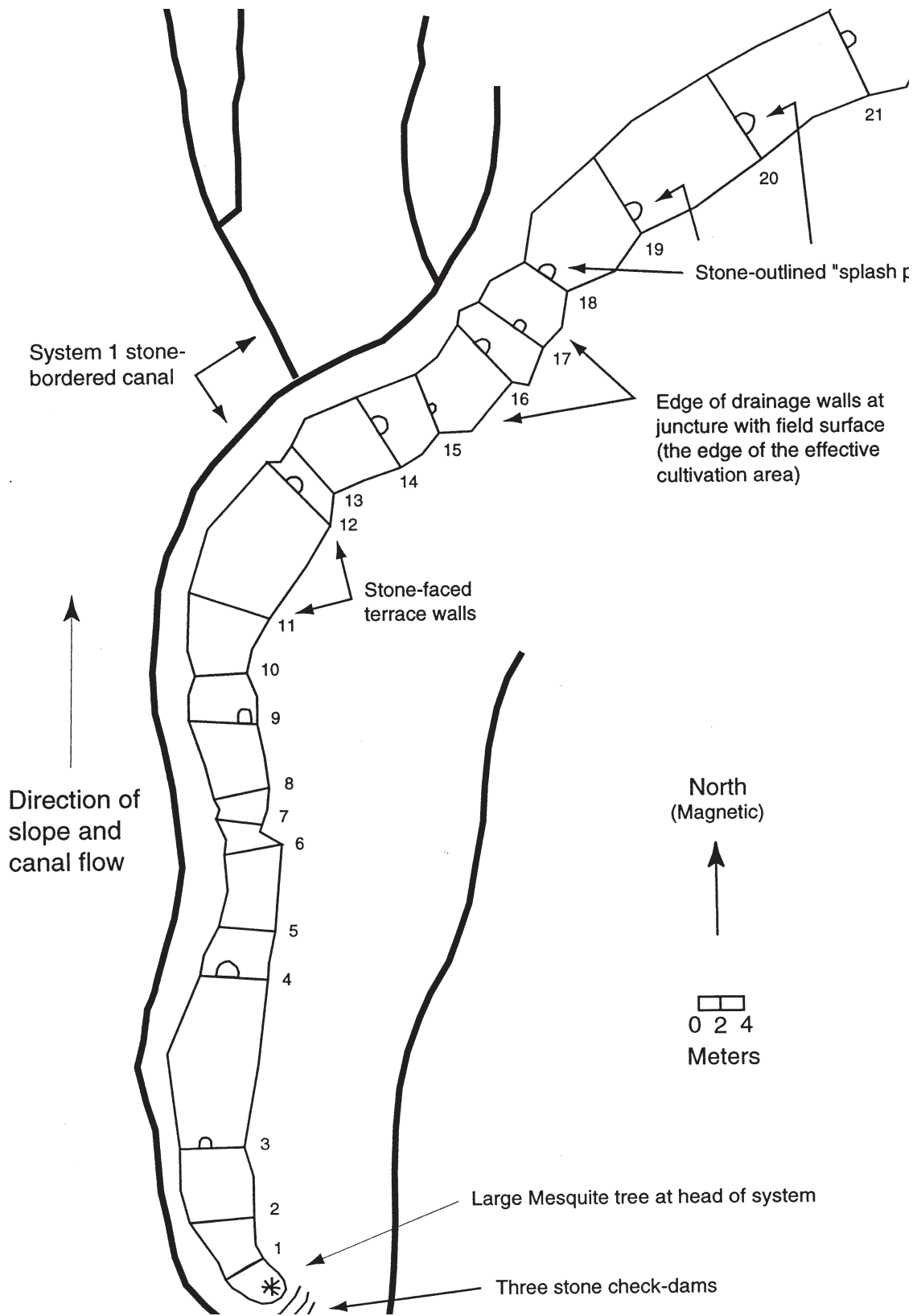


Figure 4. Map of canal system 1: detail of the first 22 stone-faced terraced fields (after Neely 1997, fig. 6).

is shown in Figure 3. This figure illustrates the small turnouts, or gates, in the canal that allowed controlled amounts of water to be diverted into fields and into stone-bordered “pools.” These gates could easily be closed or opened by inserting or removing a large stone or by piling up a mound of earthen material to block the flow. The pools vary in shape and range from about 0.5 to over 6.5 m. In all, about 100 of these pools were recorded in Canal System 1. They were likely designed to impound small amounts of water, where farmers could dip water and place it on wilting plants, as needed, but their precise function is not known with certainty. Interspersed between the canals on finger ridges are ephemeral drainageways where stone-lined terraces were constructing for cultivation. At least 400 of these terraces were constructed in a step-wise fashion within the channels, which encompass a total of about 9 hectares of cultivable field area. Only one of these terrace complexes has been mapped in detail, consisting of 93 agricultural terraces that extend over a length of nearly 600 m. The first 22 of these terraces, the best-preserved ones in the complex, are depicted in Figure 4. A number of tributary channels also contain terraces. Individual terraces, the effective area of cultivation, range from about 9 to 124 m², with an average of nearly 55 m² and a total field area of roughly 1,050 m². Thirty-five of the terrace walls in this complex have a small, semi-circular, cobble-filled or coble-outlined area immediately downslope (see Figure 3). These features are believed to have functioned as “splash pads” that prevented erosion gullying within the terraced fields.

The irrigation agricultural complexes described above are termed “Foothill Systems” that comprise one of several forms of water management in the Safford Basin. To date, these systems have been found only on the northern flanks of the Pinaleño Mountains, where they conveyed water from springs and runoff from storms and snowmelt to agricultural fields and associated habitation sites. Today, ranchers and personnel from the Bureau of Land Management and the Forest Service report that water flows in channels here persist into late June and frequently into early July, when the summer monsoons typically start. Assuming that such flows were as high or higher in prehistoric times, the timing would have supplied year-round water for agricultural and domestic use. It is possible that Canal System 1 represents a construction effort by Ancestral

Pueblo populations or groups strongly influence by these populations. This possibility is supported by the: (1) general similarity of the canals to ones documented by Lex Lindsay in southeast Utah; and (2) the close similarity of architectural and ceramic styles at Goat Hill to those of the Kayenta and Tusayan branches of northeast Arizona. Future investigations promise to further our knowledge of the origin and functioning of these unique foothill irrigations systems in Lefthand Canyon

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