

## Chapter 6

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# Scale and Diversity at Late Formative Period Pukara

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### Introduction

On May 9, 2011, the Pukara Archaeological Complex was declared cultural patrimony of the nation, as documented in the “Normas Legales” published in *El Peruano* (May 14, 2011:442445–46). Pukara was the first regional center in the northwestern Lake Titicaca Basin of Peru and its influence can be traced through much of the south-central Andes during the Late Formative period<sup>1</sup> (500 BC–AD 400<sup>2</sup>) (Fig. 6.1) (see Klarich 2005 for a summary). The Pukara<sup>3</sup> culture is characterized by its elaborately decorated polychrome pottery, intricately carved stone sculpture, and monumental architectural complexes (Chávez 1992; Franquemont 1986; Mohr Chávez 1988; Mujica 1978; Paredes 1985; Stanish 2003; Wheeler and Mujica 1981). The early growth of Pukara is contemporaneous with the initial occupations of Tiwanaku in the southeastern Lake Titicaca Basin (Stanish et al. 1997). However, unlike Tiwanaku, subsequent occupations did not obscure or heavily modify Late Formative Pukara, except in limited areas that were reoccupied by the Colla and Inca during the Altiplano period and Late Horizon, respectively (Abraham and Balasalle 2011; Hyslop 1990; Wheeler and Mujica 1981) (Fig. 6.2).

In 1939, Alfred Kidder II of the Peabody Museum at Harvard University conducted large-scale excavations and identified a

variety of areas with Late Formative occupations within the site (Fig. 6.3): the central sunken court located on the Qalasaya architectural complex, a truncated step-pyramid with stone-faced terraces (Area VI); a probable residential area and production zone on the site periphery (Areas I, II and III); and fragments of buildings in the central district of unclear scale and function (Areas IV and V) (Chávez 1992; Inojosa 1940; Kidder 1942). In the 1970s, Plan Copesco (Comisión especial para coordinar y supervigilar el plan turístico y cultural Perú-Unesco) worked for over four years at Pukara (Paredes 1985; Wheeler and Mujica 1981). The project included extensive horizontal and vertical excavations of the central sunken court first excavated by Kidder and reconstruction of the stone-lined terraces and stairways of the Qalasaya.

Even with data accumulated through excavation and mapping projects in the architectural core and site periphery over the last century, archaeologists have not arrived at a consensus regarding the most basic characteristics of Pukara—the scale, site organization and diversity of areas within the site (Fig. 6.4) (see Klarich 2005 for summary). Site size estimates, for example, range from 1.5 km<sup>2</sup> (Chávez 1992; Cohen 2010:67) to 2 km<sup>2</sup> (Stanish 2003:142) to 4 km<sup>2</sup> (Erickson 1988:12; Tantaleán 2010:54, citing Mujica 1978:290) to up to 6 km<sup>2</sup> (Mujica 1991:276). The smaller size estimates include the central ceremonial district and

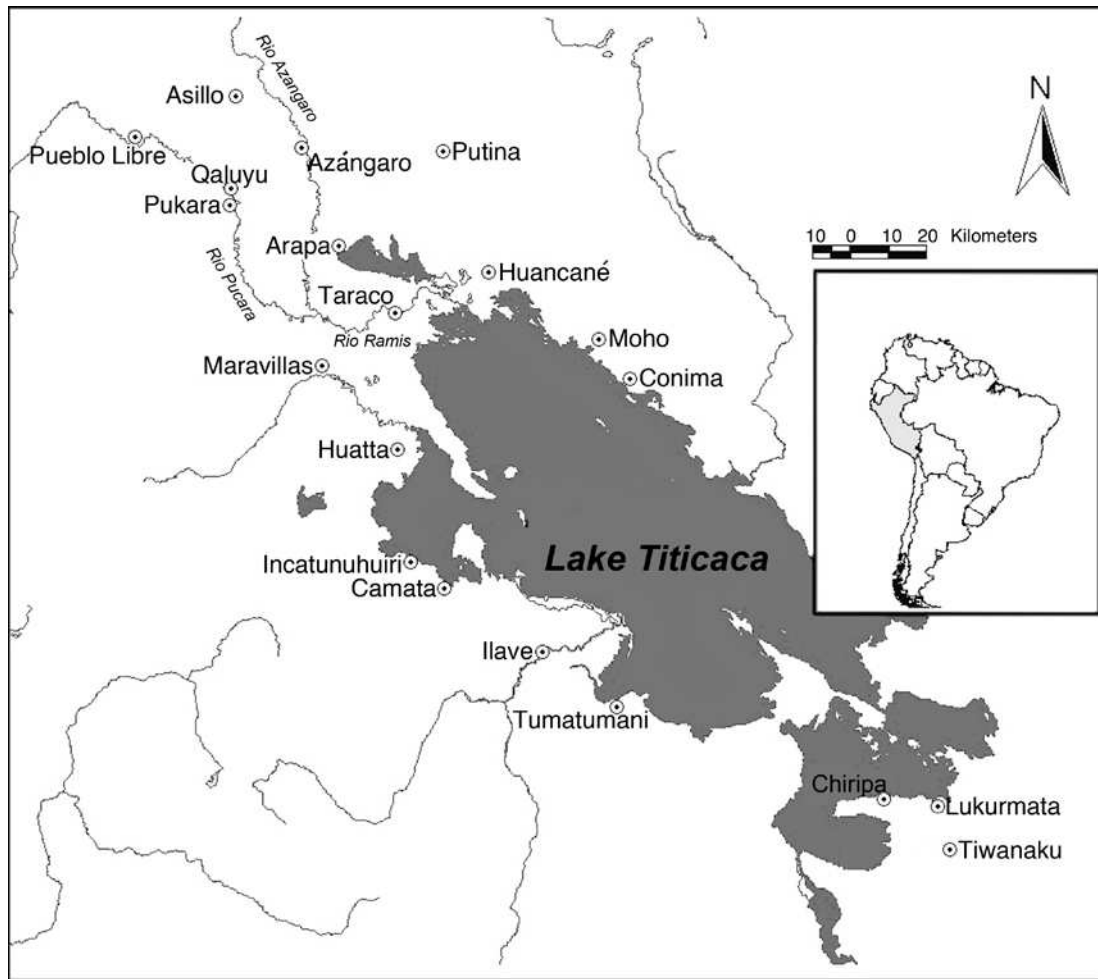


Figure 6.1. Map of the Lake Titicaca Basin with Formative period sites and modern towns.

some of the area under the modern town of Pucará, as outlined by Stanish (2003:142–43):

This estimate includes the central architectural core and the surrounding area with surface materials. Consistent with the observations of Franco Inojosa (1940), several areas appear not to have Upper Formative occupations, which account for the lower estimate of habitation area size than given by other researchers. The upper limit of my estimate includes all areas with possible buried Upper Formative occupations. There are additional mounds and other refuse areas near the river, as mentioned by Kidder, but these were not counted in my total habitation area estimate given the existence of nonoccupied areas between these mounds and the central architectural core.

In contrast, the larger estimates include the architectural core and extend the boundaries to the riverbank to the east and to the Formative period site of Qaluyu to the north. It is unclear if these larger site size estimates were based on systematic survey of Pucara and its surrounding areas or gleaned from informal

site visits and information regarding surface materials provided in excavation reports by Kidder, Plan Copesco, and others.

### Project Methods

In 2006, a survey was conducted with the goal of systematically defining the site boundaries while recording the distribution of surface architecture and artifacts from all occupations, including modern impact on the site. Pre-fieldwork project development entailed obtaining and integrating three types of complementary spatial data: historic air photos of Pucara and its surrounding areas from the national air photo service in Peru (SAN, Servicio Aerofotográfico Nacional); field notes and informal maps drawn by Alfred Kidder II during his 1939 excavation project (see Chávez 1992) and by the members of Plan Copesco from the 1970s (Wheeler and Mujica 1981); and base maps of the region downloaded and subsequently organized into a GIS database.

BC/AD	Central Andes	Southern Titicaca Basin	Northern Titicaca Basin	Pukara
	Late Horizon	Inca-Pacajes	Expansive Inca	<i>Inca</i>
1400	Late Intermediate Period	Early Pacajes	Altiplano Period	<i>Colla</i>
1200		Late Tiwanaku V		
1000	Middle Horizon	Early Tiwanaku V	Expansive Tiwanaku	<i>Late Pukara (AD 100-300/400)</i>  <i>Middle Pukara (200 BC-AD 100)</i>  <i>Initial Pukara (500-200 BC)</i>  <i>Cusipata? Qaluyu?</i>
800		Late Tiwanaku IV		
600	Early Intermediate Period	Early Tiwanaku IV		
400		Late Formative II <i>Tiwanaku III</i>		
200		<i>Tiwanaku II/LF 1B</i>		
0		Late Formative I	Late/Upper Formative	
200		<i>Tiwanaku I/LF 1A</i>		
400	Early Horizon	<i>Late Chiripa 2</i>	Middle Formative	
600	Initial Period	Middle Formative		
800		<i>Late Chiripa 1</i>		
1000		<i>Middle Chiripa</i>		
		Early Formative	Early Formative	
1500		<i>Early Chiripa</i>		
2000				

Figure 6.2. Regional chronology (compiled from Janusek 2004, Rowe 1960, Stanish 2003, and Mujica 1988).

For the pedestrian survey, the site was divided into four principal zones: Zone 1 to define the northern site boundary; Zone 2 to define the southern boundary; Zone 3 to clarify the eastern boundary; and Zone 4 to document prehistoric use of Pucatorqo, a peak just north (and overlooking) the architectural core (Figs. 6.5, 6.6). In each of these areas, the crew was spaced between 1 m and 5 m depending on ground cover, and the presence and distribution of surface architecture and diagnostic artifacts were recorded. It was likely, based on a systematic survey and 100% surface collection of 32 blocks (5 m × 5 m each) in the central pampa area in 2000 (Klarich and Diaz 2001), that surface remains would primarily reflect later prehistoric (Colla) and modern

occupations (Fig. 6.7). Therefore, special attention was paid to areas with intrusive modern activities, such as mining for clay or plowing for agriculture, as Formative period remains are typically located 30 to 50 cm below the modern ground surface. In addition to the chief surveyor carrying the GPS unit and the data collector, crew members were responsible for taking photos, written descriptions, and artifact collections.

Field observations were recorded using a sub-meter accuracy GPS unit (Trimble Pro-XR) and organized in-field using a data collector unit (Recon) running the program TerraSync. The entire process is quite flexible; the data are collected and categorized through project-specific data dictionaries developed in TerraSync

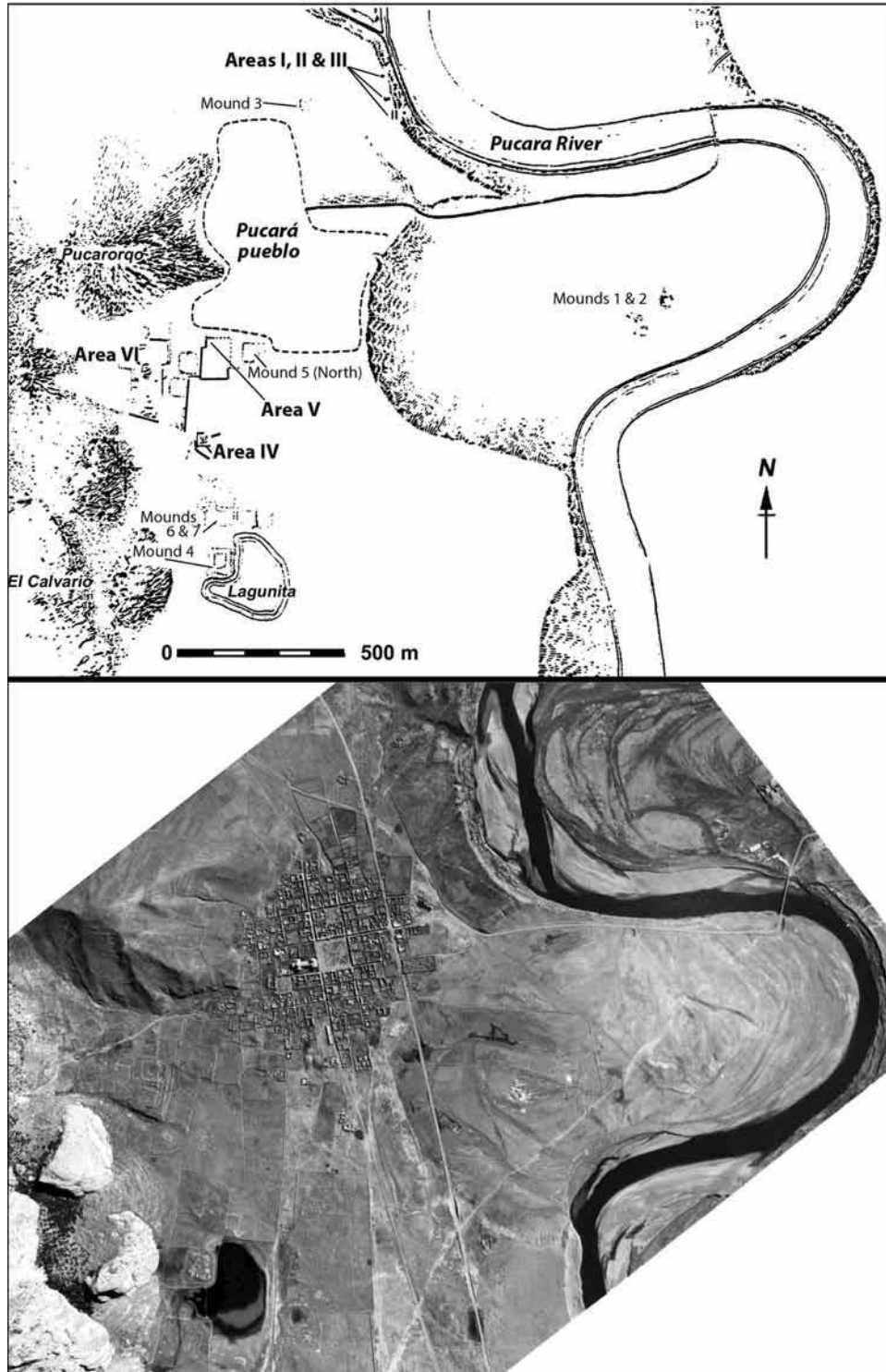
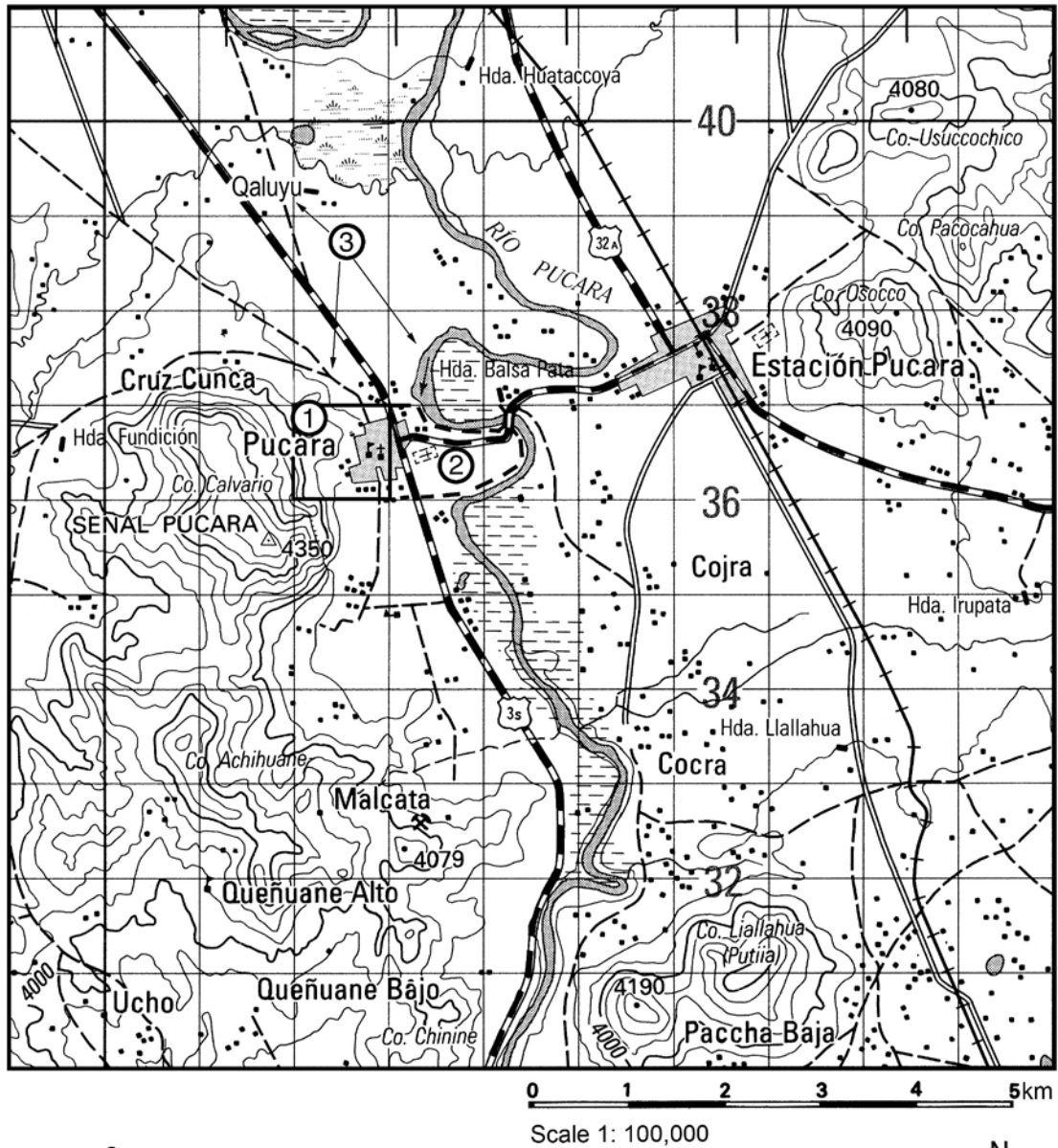


Figure 6.3. Location of Pukara (the site) and Pucará (the town), indicating areas excavated (Areas I–VI) and mounds observed (Mounds 1–7) by Kidder in 1939 (map adapted from Mohr Chávez 1988; air photo courtesy of SAN, Peru).



- 1) 1 km<sup>2</sup> limit (solid black line)
- 2) 2 km<sup>2</sup> limit (dashed black line—area 1 & to the river)
- 3) 4 to 6 km<sup>2</sup> (indicated by arrows—areas 1, 2 & north to Qaluyu)

Figure 6.4. Proposed limits of Pukara.

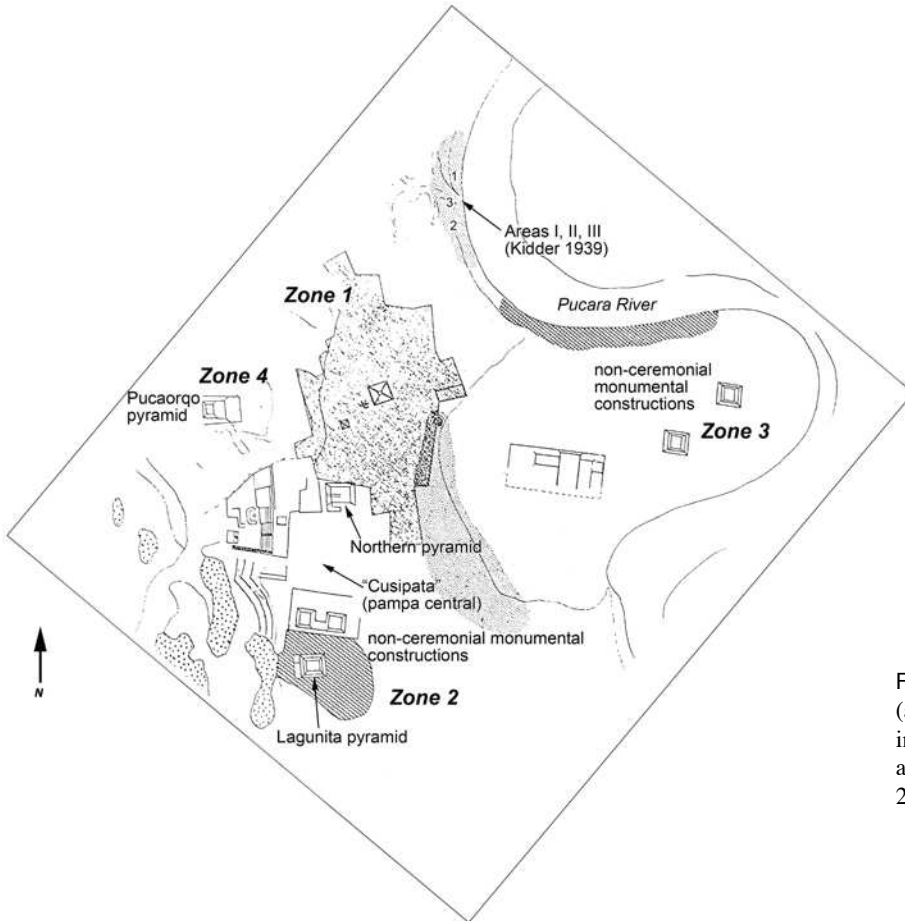


Figure 6.5. Map of Pukara center and periphery (adapted from Wheeler and Mujica 1981), indicating the mounds observed by Kidder (1939) and by Plan Copesco (1970s). Four areas from the 2006 survey are noted (Zones 1–4).



Figure 6.6. Air photo of the four survey areas from 2006 (SAN, Peru). The architectural core is within the area outlined in black and overlapping Zone 2.



Figure 6.7. Project areas from 2000 and 2001. Kidder's Area IV excavations are visible to the west and south of Block 3.

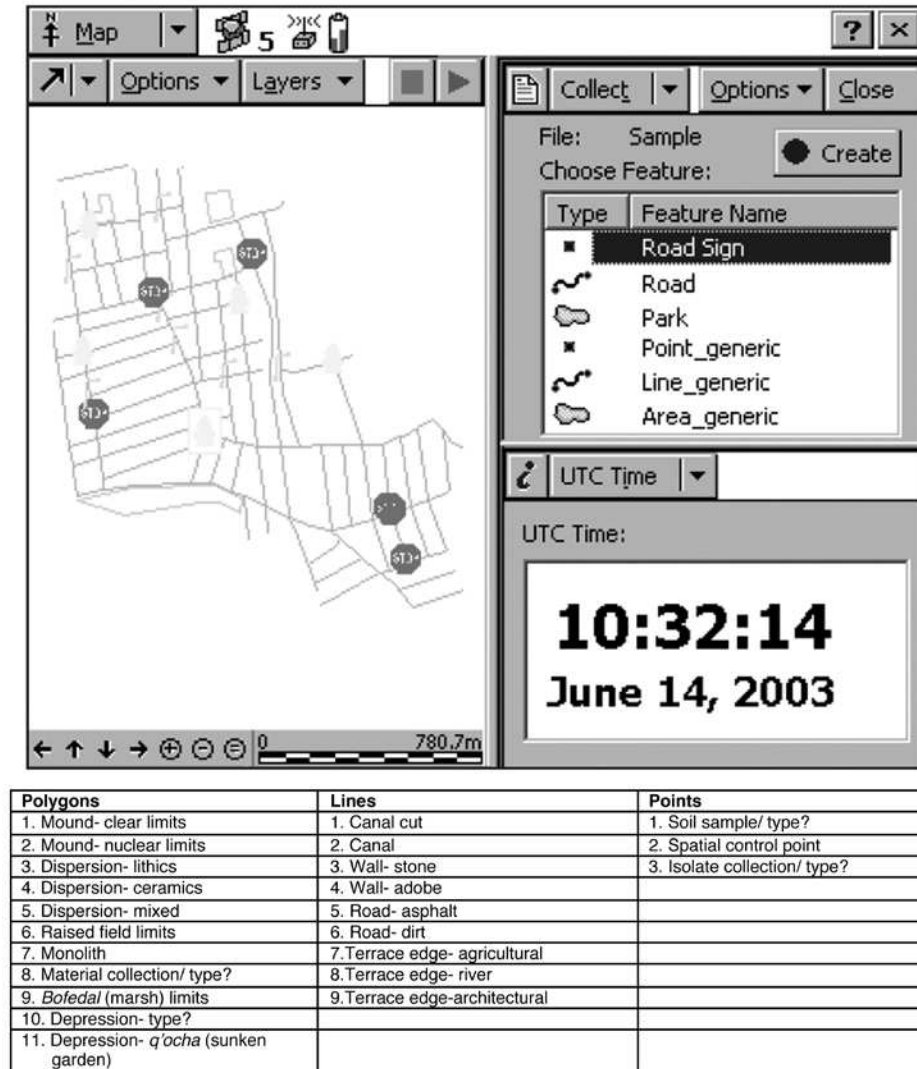


Figure 6.8. Data collector screen running TerraSync, Version 2.40 (upper) (Trimble Navigation Limited 2003:8) and table with data dictionary developed for recording polygons, lines and points during 2006 survey (lower).

(Fig. 6.8). Features are recorded as “wall fragment,” “ceramic scatter,” or “mound perimeter” and are noted as prehistoric, modern or unclear in order to facilitate analysis and map production using GIS software (ESRI ArcMap).

At the end of each day, the field data were downloaded from the hand-held Recon unit into the project laptop, copied, and transferred into the project GIS database. A key step was the differential correction of the raw survey field data, which improves the accuracy of the GPS from approximately 3-meter to sub-meter recording intervals. This was accomplished by first downloading GPS data recorded by a permanent base station in

Arequipa, Peru, and operated by the International GNSS Service (IGS).<sup>4</sup> Each weekend, the crew downloaded the Arequipa base station data from the IGS webpage that corresponded to the time each day during which the Pukara data were being collected in the field. Using GPS Pathfinder Office it was possible to use the data from the Arequipa base station to correct the newly collected field data and produce more accurate site maps.

In addition to the GPS, historic air photos from 1968 were essential for navigating Pukara on foot and provided different views that highlighted changes in the location of structures, pits, agricultural field walls, and other clear surface and sub-surface



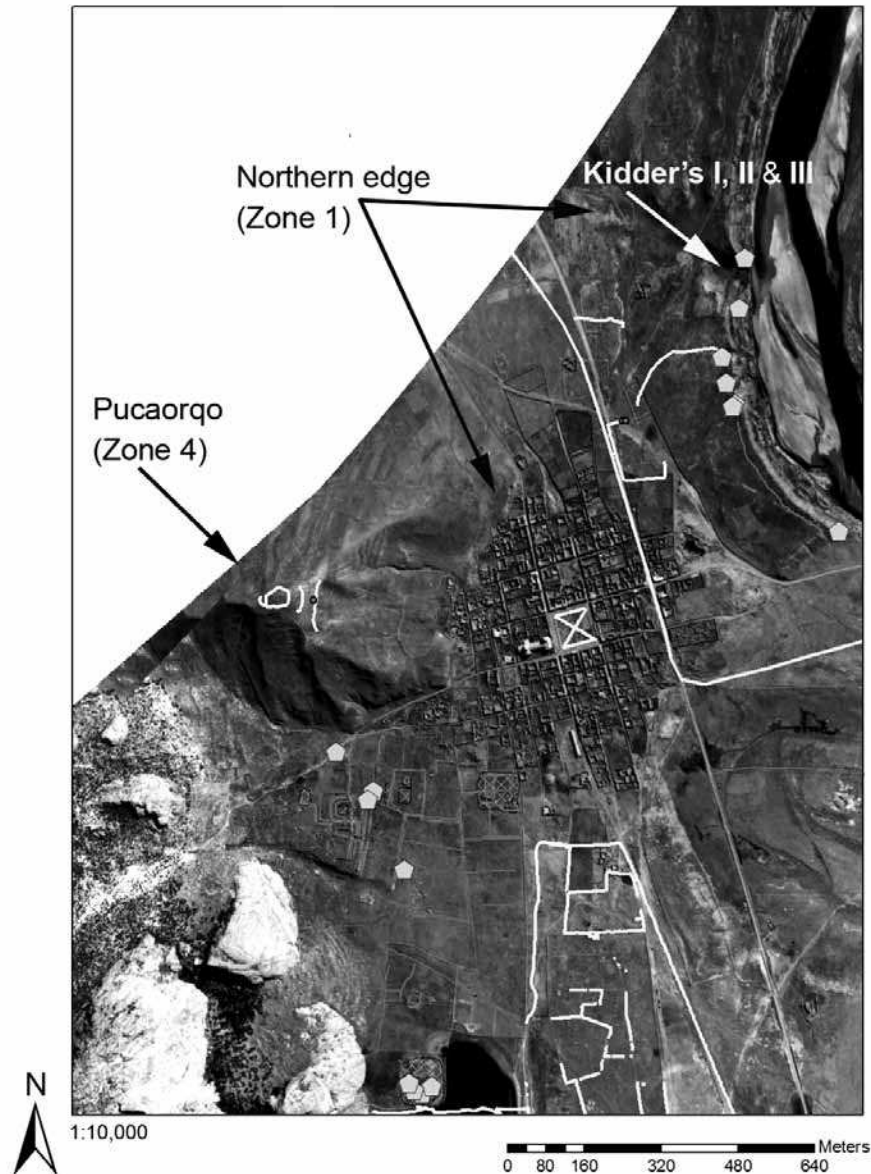


Figure 6.9. Zones 1 and 4 on georeferenced air photo (SAN) with surface collections marked in solid white pentagons. Variety of linear features recorded with GPS, indicating modern and prehistoric surface remains.

modifications from the last 40 years of town expansion. The survey crew also relied on the air photos for locating features in the central architectural district as they appeared before the Plan Copesco excavation and restoration project in the 1970s and early 1980s.

### Results

For the survey project, Zone 1 included the area between the northern edge of the modern town of Pucará and the archaeological site of Qaluyu, located approximately 4 km to the

north. Because both sites include significant Formative period occupations, including mounds with sunken courts, some have argued that Qaluyu served as the northern boundary of Pukara during the Late Formative, extending the site boundaries to 6 km<sup>2</sup> (Wheeler and Mujica 1981: Fig. 10; Mujica 1991). Starting at the edge of town, the survey was relatively straightforward because hundreds of meter-deep holes were present in the area due to modern clay mining practices for making adobes, in addition to open large fields that have been plowed deeply using agricultural machinery and foot plows (Fig. 6.9). Based on the 2006 survey, the Formative period occupation of Pukara does

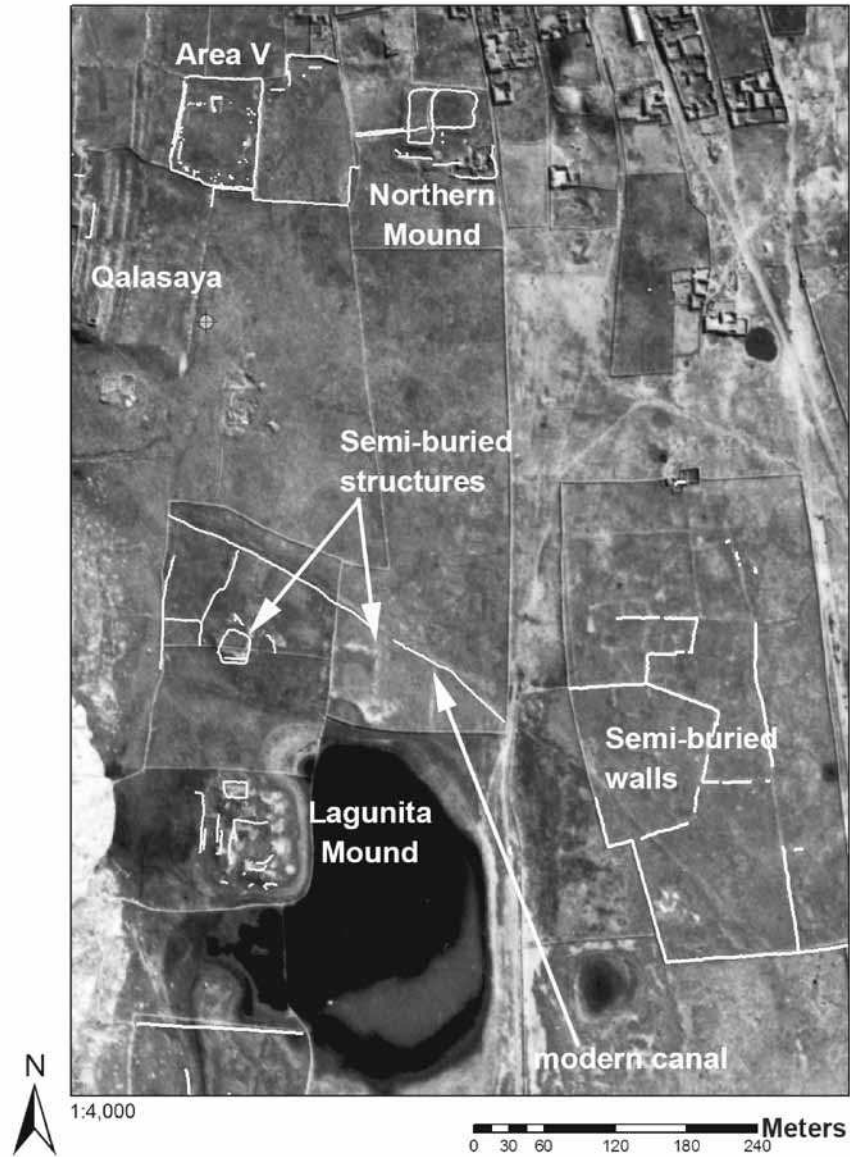


Figure 6.10. Zone 2 on georeferenced air photo (SAN), indicating the Lagunita and Northern Mounds and a variety of semi-buried features in the architectural core recorded in 2006.

not appear to extend much beyond the northern boundaries of the modern town.<sup>5</sup> However, due to issues with a local landowner, the crew was not able to survey the area just south of Qaluyu, but did visit the site for preliminary mapping.

Zone 2 was directly south of the monumental architecture at Pukara; it focused on defining the area around the Lagunita Mound (Fig. 6.10). A lagoon surrounds this mound and its southern limit has been treated as the southern border of the site, but this area had not been documented in any detail. It was evident from the historic air photo, the Copesco maps, and previous visits to the site that this area was covered with semi-buried walls and

surface artifacts. Also, Manuel Chávez Ballón excavated in this general area in 1949: “los resultados obtenidos fueron muchos miles de fragmentos de alfarería y sólidos conocimientos sobre la Cultura Pukara”<sup>6</sup> (Chávez Ballón 1950:42). A final report of these excavations has not been published, but local residents report that he excavated near the Lagunita Mound.

The survey of Zone 2 began with the mound, which measures several meters in height and was looted before Kidder’s 1939 excavation project. The trench cut through the middle of the mound is visible today and, unfortunately, local landowners continue to use the area as a source of stone blocks for

construction projects.<sup>7</sup> The edges of the mound were mapped, a number of distinct construction terraces were recorded, and surface artifacts were collected, including obsidian flakes and incised Classic Pukara pottery. To the south and east of the mound is a lagoon area that fluctuates seasonally in size. The water table is very high in this area and there is runoff from the nearby hills, resulting in many marshy zones; presumably this area was naturally inundated and expanded as a borrow pit for the mound's construction. Along the periphery of the lagoon and to the south there were no surface artifacts or evidence of semi-buried walls, indicating that the Formative period occupation of Pukara did not extend much beyond the previously discussed south boundary.

During field recording on Pukara's southern edge, the crew took advantage of the opportunity to further document a number of important architectural features in the site's central area. The Qalabaya dominates the site core; it is a 30-m-tall structure with stone-lined terraces on its eastern face, a central staircase, and an upper platform with three semi-subterranean buildings or sunken courts (Wheeler and Mujica 1981). It is located at the base of the Peñon, a massive pink sandstone outcrop visible throughout the valley that serves as the western boundary of the site; a number of lower artificial terraces and mounds extend to the northeast and southeast, forming a U-shaped area designated as the central district.

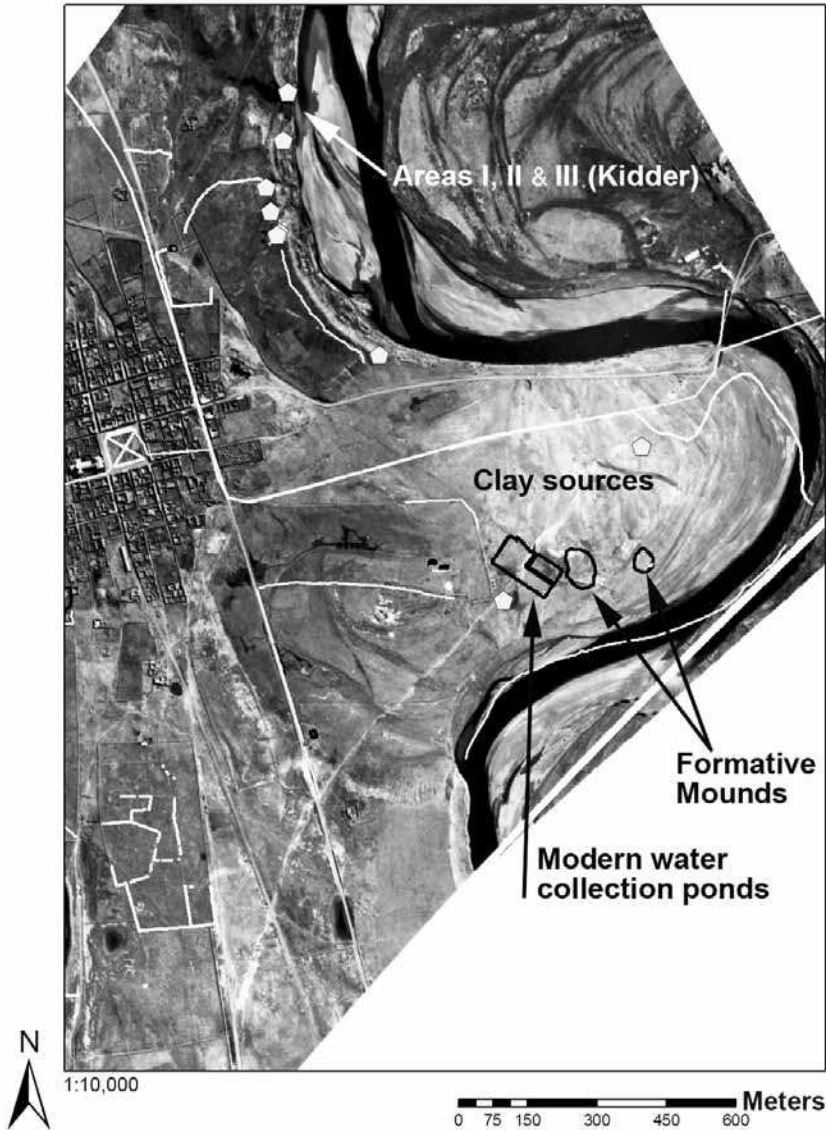
At the base of the Qalabaya terraces is the central pampa, an area excavated by Kidder in 1939 (designated Area IV) and Klarich in 2001 (Klarich 2005), which featured a variety of constructions during the Formative and Altiplano periods (see Fig. 6.7). In 2006, the first area re-mapped was the Northern Mound, a structure approximately the same size as the Lagunita Mound, located on the northern edge of the central architectural district. The mound has been heavily affected by modern activities, particularly related to mining for stones and adobe materials, and merits additional investigation to determine the presence of a sunken court on the uppermost platform. Located between the Qalabaya and Northern Mound is the largest single platform constructed at the site, which has a number of exposed large stone slabs forming structures around a central, sunken area. In 1939, Kidder excavated a single wall of one of these stone structures, designated as Area V, but the exact location and layout of the surface architecture had yet to be mapped.<sup>8</sup> Additionally, a number of semi-buried walls visible in the historic air photos were identified by the survey crew and recorded using the GPS. Lastly, the crew mapped a few architectural features of the Qalabaya, including the central sunken court and several terrace edges, to assist in the process of accurately georeferencing the historic air photo in the project GIS.

Zone 3 included the areas along the banks of the Pucara River, which apparently served as the site's eastern border (Fig. 6.11). Zone 3 was subdivided into the northern area, a relatively entrenched area of river with a high terrace located just east of town, and the southern area, a low-lying zone highly affected by the meanderings of the river. In the northern area, the crew

identified a number of archaeological deposits, including the excavation scars and back dirt piles from Kidder's excavations of Areas I, II and III (see Chávez 1992; Inojosa 1940; Kidder 1942). Based on exposed archaeological contexts in the riverbank profile, this area was used extensively for dumping Late Formative period trash. On the open terrace area directly west of the riverbank there was limited surface material, but a trench recently excavated for a sewer line exposed dense deposits of Late Formative material directly behind the grade school, approximately 30 to 50 cm below the ground surface. These finds were a surprise, challenging models that posit a noncontinuous occupation between the architectural core of the site and the extensive middens located on the periphery excavated by Kidder.<sup>9</sup> Additional test excavations and geophysical survey would provide valuable insights into whether occupations on the site periphery were ephemeral or continued relatively uninterrupted from areas of visible architecture and surface remains. Lastly, there was no indication that the Formative period occupation extended north of the large *quebrada* in this area. It was clear from the survey along the riverbank that the prehistoric deposits have been heavily affected by riverine cutting and depositing, processes that need to be documented by a trained geomorphologist during subsequent projects at the site.

To the south, a major goal of surveying near the riverbank was to relocate a series of large mounds documented by Kidder and Plan Copesco (Fig. 6.11). The limits and general characteristics of two mounds were recorded near the modern river course. They measure only a meter in height and have few surface artifacts, but the presence of large cut stone blocks at their bases and in the general vicinity are characteristic of Late Formative constructions and there were few surface indications of later materials. Several community members have mentioned that this area had more numerous blocks in the past that have been removed to build field walls and modern constructions. Lastly, along both the northern and southern areas of Zone 3 the crew collected various clay samples under the direction of Honorato Ttacca, a project member and experienced Pucará potter.

Finally, Zone 4 included Pucaorqo and the surrounding hills (see Fig. 6.9), which are located north and overlooking the architectural core of Pukara. At the top of Pucaorqo is an artificially leveled platform with a large carved monolith and a series of stone terraces (Fig. 6.12). While the construction date of the terraces is unclear and there are few surface artifacts, the monolith is clearly Formative (Fig. 6.13). Today the peak is a pilgrimage destination and the monolith is covered with modern burned offerings and ash deposits. The crew continued to survey along the spine of the hills to the north and south, including the area directly west of the Qalabaya. There are few Formative period artifacts on these upper slopes and along the eroding stone terraces. Instead, the area is covered with Collao sherds from the Altiplano period, which were first mentioned by John Rowe during a visit to Pukara (Rowe 1942).



(left) Figure 6.11. Zone 3 on georeferenced air photo (SAN), with surface artifact collections and samples from clay sources marked in solid white pentagons. Remains of mounds recorded by Kidder and Copesco relocated (see Figs. 6.3, 6.5).

(below) Figure 6.12. Zone 4, view of artificial platform on Pucatorqo. Photo taken from Pucará main square, facing west. Modern cross is located on peak next to Formative monolith (photo courtesy of Matt Wilhelm).





Figure 6.13. Zone 4, Formative period monolith on Pucaorqo. Photo taken facing west (photo courtesy of Matt Wilhelm).

### Future Directions

Data from the 2006 survey were used to develop a preliminary delimitation for Pukara, providing further evidence for the smaller site size estimates discussed above (Fig. 6.14). If occupation was spatially continuous during the Late Formative—from the central architectural district and extending under Pucará and to the riverbank—the largest extent of the site measures 2.2 km<sup>2</sup>. As noted by Stanish (2003) and further noted during our survey, it is likely that there were clusters of occupation, possibly with dense residential and activity areas clustered on the western and eastern limits of the site. However, geophysical survey and further excavations are necessary to determine the relationship

of surface and sub-surface remains, as both cultural and natural factors continue to modify the landscape of the site and its surrounding areas.

Unfortunately, the lack of Formative period surface remains across much of prehistoric Pukara and modern Pucará makes it difficult to discuss the nature of site organization and the diversity of site areas beyond very general divisions between the “architectural core” and “periphery.” Excavations in 2009 (Flores 2009) and 2010 (Carbajal 2010) targeted areas within both areas to clarify how different areas of the site were being used, with a particular focus on refining the site chronology and determining the directionality of growth and development of Pukara during the Formative period.

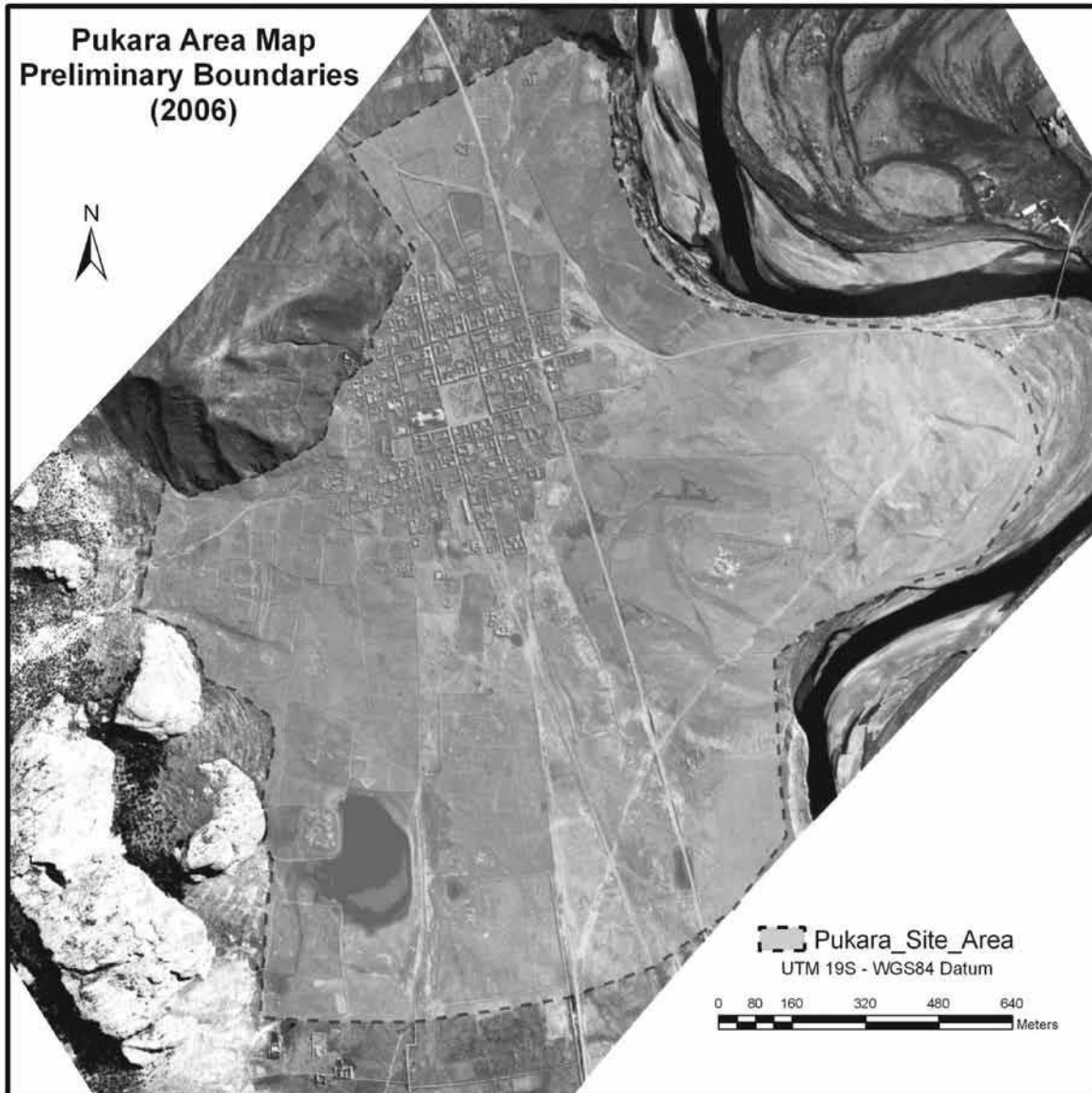


Figure 6.14. Preliminary maximum limits of Pukara based on 2006 survey (2.2 km<sup>2</sup>).

At Pukara, debates have primarily centered on whether the site functioned as an urban center, a ceremonial site, or a regional political center within the Lake Titicaca Basin (see Klarich 2005 for summary). These “top down” approaches, which focus on elite guided activities as central to site development and social change, neglect to consider the role of non-elites in social, economic, and political change. By further documenting the

temporal and spatial organization of both the site periphery and monumental constructions of the site core, it will be possible to formulate a more complete picture of Pukara. In turn, the insights gained at Pukara will contribute to the growing body of archaeological and anthropological literature addressing early centers across the globe.

### Acknowledgments

Funding was received from the Howard Heinz Endowment for Archaeological Field Research in Latin America for *Scale, Layout and Diversity: Documenting the Regional Center of Pukara, Lake Titicaca Basin, Peru* (Project No. 704177). The project was co-directed by the authors during the summer of 2006 (Proyecto Arqueológico Pukara, Resolución Directoral Nacional No. 1347) and was greatly facilitated by the Puno office of the National Institute of Culture. Logistical support was provided by Programa Collasuyu and a special thanks to Mark Aldenderfer for loaning us his Trimble Pro-XR unit and to Charles Stanish for the use of his vehicle. The field crew—David Oshige, Barbara Carbajal, Matthew Wilhelm and Honorato Ttacca—formed an incredible team that showed no fear in the face of stampeding llama herds, the freezing cold Río Pucara, and precarious clay sources. Lastly, thank you to Nathan Craig and Nico Tripcevich for answering countless tech questions over the years; to Margaret Brown Vega for collecting valuable spatial data for the project in 2009; and to Matt Wilhelm for his help with the maps.

### Notes

1. The Late Formative is also called the Upper Formative (e.g., Stanish 2003).
2. Following Mujica (1988), the Pukara period is divided into Initial Pukara (500–200 BC), Middle Pukara (200 BC–AD 100) and Late Pukara (AD 100–300).
3. The archaeological site and culture are spelled “Pukara” by the Peruvian Ministry of Culture (formerly the National Institute of Culture) and the modern town where the site is located is spelled “Pucará.”
4. See <http://igsch.jpl.nasa.gov/network/site/areq.html>.
5. In future projects we hope to document the presence of prehistoric architecture and/or artifacts within the modern town of Pucará. Many local people have mentioned finding monoliths or broken pottery in their house compounds or fields, but these occurrences have yet to be systematically recorded.
6. “The results obtained were many thousands of ceramic sherds and solid knowledge about the Pukara Culture.”
7. The mound is highly disturbed and limited excavations in 2009 recorded additional looting since 2006.
8. In 2009 and 2010, this area was mapped and further excavations were conducted by the Pukara Archaeological Project.
9. Luis Flores directed additional excavations of this area in 2009 (Flores 2009), with publications forthcoming.

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