Understudied Landscape Dimensions
This chapter discusses the settlement history of a sample of early great houses and associated communities outside Chaco Canyon, including their likely population sources and reasons for settlement. Our primary goals are to highlight the research significance of key Chacoan sites outside the national park boundary and to argue that their continued protection from energy extraction and landscape intrusion is of critical importance (Udall 2018). These early sites are not only sources of essential knowledge on the rise of Chaco culture but also meaningful elements of contemporary culture and heritage to Native descendant communities. It is within these noncanyon settings that the origins of the Classic Bonito phase developments will be found, the homelands of its participants and creators will be identified, and a richer understanding of the diverse agricultural strategies and technologies that enabled Chacoan communities to thrive will be achieved.

The setting of our sample is the San Juan Basin of northwestern New Mexico (figure 3.1), defined by major mountain masses along its margins: the Jemez Mountains along the east; Mt. Taylor, the Dutton Plateau and Zuni uplands to the south; the Chuska,
Lukachukai, and Carrizo Mountains to the west; and Sleeping Ute Mountain, Mesa Verde, and the La Plata and San Juan Mountains to the north. These highlands represent powerful places in a cultural landscape that provides deep meaning for contemporary Pueblo and Navajo peoples and, we infer, for their ancient ancestors.

Our sample comprises eight Chacoan communities, distributed along a roughly east-to-west transect with Chaco Culture National Historical Park at its center. The sample “bookends” are two well-known great house communities with spectacular and far-reaching viewsheds: Guadalupe on the east and Skunk Springs on the west. In between are six other Chacoan communities: Pueblo Pintado, Chaco East, South Fork–Fajada Wash, Padilla Wash (i.e., Padilla Well), Casa del Rio, and Willow Canyon.

Figure 3.1. Isopluvial contours across the San Juan Basin. Courtesy of the National Park Service, Chaco Archives (CHCU 65034) with Chaco community sample locations in red.
The following brief summaries represent what we currently know about these Chacoan communities. Tables 3.1 and 3.2 compile data for each community.

GUADALUPE COMMUNITY

Guadalupe Ruin (LA2757) and its associated community comprise the easternmost site in our sample. It also is the easternmost of all currently known Chacoan communities and is located in the Middle Rio Puerco valley (MRPV), some 90 km southeast of Chaco Canyon. The Guadalupe great house, with initial construction in the early-to-mid AD 900s, is a single-story structure located on La Mesa Encantada (also known as Enchanted Mesa) rising about 60 m (197 ft.) above the valley floor. The area Puebloan community had its origins, however, in the Basketmaker III period and persisted through late Pueblo III.

Unlike the other sites in our sample, the Guadalupe Community has been subject to both extensive survey and limited excavation (e.g., Baker 2003; S. Durand and R. Durand 2000; Durand et al. 2012; Flam 1974; Pippin 1987; Proper 1997; Roney 1996). Pueblos, Navajos, and Hispanics also occupied this portion of the Rio Puerco valley in the Protohistoric and post-1600 Historic period. Documented history of Hispanic settlement and farming techniques between about 1870 and 1950 in the MRVP (e.g., García 1987, 1992, 1994, 1997, 2002, 2015; Widdison 1958, 1959) provides information useful for understanding the Chacoan period occupation of the valley.

The MRPV exhibits a stunning array of physiographic features that must have held deep significance to its ancient inhabitants (figure 3.2); it continues to be a place of sacred places and community memory for Puebloan, Navajo, and Hispanic peoples. The dominant feature is Cabezón Peak (elevation 2373 m), a volcanic peak that rises 500 m above the surrounding valley; along with eight other volcanic peaks (2063–2404 m), they create a dramatic local landscape. Cabezón Peak was and is a culturally significant place. On its summit, which may have once been part of the Chacoan shrine visual communication system (Van Dyke et al. 2016), is a large active shrine that replaced an earlier 1970s shrine. From here, the Sandia, Ortiz, Sangre de Cristo, and Jemez mountains are visible, and far to the south, Ladrón Peak between Socorro and Albuquerque. Contemporary Zia and Santa Ana pueblos are visible to the east.

The members of the Guadalupe Community chose their settlement locale for its great visibility, protection, and access to two major adjacent side drainages (figure 3.3). Their great house was on top of a high narrow mesa and its community houses clustered below on hills and ridges. The attraction of this
Table 3.1. A sample of early Chaco settlements across the San Juan Basin.

<table>
<thead>
<tr>
<th>Community</th>
<th>Great House Present</th>
<th>Great Kiva (GK) Present</th>
<th>Prehistoric Roads/Segments</th>
<th>Pioneer N. San Juan-style PI house</th>
<th>No. of Small Houses</th>
<th>Puebloan Start-End (AD)</th>
<th>Origins/Occupation Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guadalupe</td>
<td>Medium</td>
<td>None; Court Kiva?</td>
<td>Yes</td>
<td>None</td>
<td>PII = 16 + 5 on top</td>
<td>875–1200s</td>
<td>Local Chaco, NSJ, Hispano</td>
</tr>
<tr>
<td>Pueblo Pintado</td>
<td>Large</td>
<td>None</td>
<td>Yes</td>
<td>1 Medium</td>
<td>PII E = 16</td>
<td>875–1200s</td>
<td>NSJ and Southern Chaco, Navajo</td>
</tr>
<tr>
<td>Chaco East</td>
<td>Medium</td>
<td>None</td>
<td>Yes</td>
<td>None</td>
<td>EPII = 11</td>
<td>900–1200s</td>
<td>Unknown Chaco, NSJ, Navajo</td>
</tr>
<tr>
<td>S. Fork–Fajada</td>
<td>Proto</td>
<td>PI GK</td>
<td>Yes</td>
<td>1 Medium</td>
<td>PI = 26</td>
<td>750–800</td>
<td>SCR</td>
</tr>
<tr>
<td>Padilla Wash</td>
<td>Small</td>
<td>PI GK; nearby PII GK</td>
<td>Yes</td>
<td>1 Small?</td>
<td>PI = 13+ PII = 15±</td>
<td>875–1200s</td>
<td>Local Chaco, NSJ, Navajo</td>
</tr>
<tr>
<td>Casa del Rio</td>
<td>Small</td>
<td>None</td>
<td>Yes</td>
<td>1 Large</td>
<td>PII = 3</td>
<td>850; 875–1130</td>
<td>Western Chaco, Navajo</td>
</tr>
<tr>
<td>Willow Canyon</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
<td>1 Medium</td>
<td>PI = 7+ PII = 12±</td>
<td>875–1130</td>
<td>Western Chaco, Navajo</td>
</tr>
<tr>
<td>Skunk Springs</td>
<td>Medium</td>
<td>PI? GK; PII GKS (2)</td>
<td>Yes</td>
<td>1 Huge</td>
<td>PII = 80±</td>
<td>800±1130+</td>
<td>Western? Chaco, NSJ, Navajo</td>
</tr>
</tbody>
</table>

a EP = Early Pueblo; LP = Late Pueblo; P = Pueblo.
b NSJ = Northern San Juan region; SCR = Southern Chaco Region (southern San Juan Basin).
c The Michael Marshall et al. (1979:110) map does not show all of the PI–PII houses and none of the fifteen below the Skunk Springs Wash.
### Table 3.2. Environment, landscape, and topographic features.

<table>
<thead>
<tr>
<th>Site Area Community</th>
<th>Shrines*</th>
<th>Visible Peaks</th>
<th>Water Source*</th>
<th>Drainage(s)*</th>
<th>Total Annual Precipitation (in.)</th>
<th>Summer Precip. (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guadalupe</td>
<td>Cabezón Peak, unknown others?</td>
<td>Cabezón + many other volcanic necks</td>
<td>Floodwater (P); irrigation (H)</td>
<td>Rio Puerco (G, I, S); Tapia and Salado side canyons (I, S); Local tributaries (I); springs</td>
<td>Cabezón Village: 10.21</td>
<td>Montaño Grant: 7.49</td>
</tr>
<tr>
<td>Pueblo Pintado</td>
<td>29Mc 187</td>
<td>Jemez</td>
<td>Floodwater (N, P)</td>
<td>Chaco River (G, S); Chacra tributaries (I)</td>
<td>9.7 ± 2.2 (21 yrs.)</td>
<td>5.3 ± 1.8</td>
</tr>
<tr>
<td>Chaco East</td>
<td>29Mc 187 29Mc 567</td>
<td>None</td>
<td>Floodwater (P); dams (N)</td>
<td>Chaco Wash (S); three main side drainages (I, S) incl. Wild Horse Canyon</td>
<td>Wild Horse Canyon (mouth): 9.2 ± 1.8 (26 yrs.)</td>
<td>4.8 ± 1.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wild Horse Canyon (head): 9.7 ± 1.8 (26 yrs.)</td>
<td>4.9 ± 2.0</td>
</tr>
<tr>
<td>S. Fork–Fajada</td>
<td>29Mc 187 29SJ 710 29SJ 2386</td>
<td>Fajada, Huergano</td>
<td>Floodwater; ditches (P)</td>
<td>Fajada Wash (S); South Fork–Fajada Wash (G?, S)</td>
<td>6.6 ± 1.5 (21 yrs.)</td>
<td>3.6 ± 1.5</td>
</tr>
<tr>
<td>Padilla Wash</td>
<td>29SJ 1088</td>
<td>Hosta Butte (head of valley)</td>
<td>Floodwater; groundwater (N, P)</td>
<td>Chaco River (G, S); Padilla Wash (I, S)</td>
<td>Near Pueblo Bonito: 8.6 ± 2.8 (51 yrs.)</td>
<td>4.4 ± 1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Near South Gap: 8.2 ± 2.1&quot; (25 yrs.)</td>
<td>4.0 ± 1.4</td>
</tr>
<tr>
<td>Casa del Rio</td>
<td>29SJ 1088</td>
<td>None?</td>
<td>Floodwater; groundwater (N, P)</td>
<td>Chaco River (G, S); Kin Klizhin Wash mouth; Ah-shi-sle-pah Canyon</td>
<td>Less than 8.0</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

*continued on next page*
<table>
<thead>
<tr>
<th>Site Area Community</th>
<th>Shrines(^a)</th>
<th>Visible Peaks</th>
<th>Water Source(^b)</th>
<th>Drainage(s)(^c)</th>
<th>Total Annual Precipitation (in.)</th>
<th>Summer Precip. (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willow Canyon</td>
<td>White Mesa?</td>
<td>Ford Butte, Bennett Peak, Shiprock</td>
<td>Floodwater; groundwater (N?, P)</td>
<td>Chaco River (G, S); Willow Canyon (G, I)</td>
<td>Approx. 7.0</td>
<td>Unknown</td>
</tr>
<tr>
<td>Skunk Springs</td>
<td>LA 7000, Shiprock?, Ford Butte?, Bennett Peak, Shiprock</td>
<td>Sleeping Ute, Ford Butte, Bennett Peak, Shiprock</td>
<td>Runoff irrigation (N, P)</td>
<td>Skunk Springs; Tuntsa and Captain Tom Washes (G, S, Irrigation); springs</td>
<td>Approx. 6.0–7.0</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

\(^a\) Not all shrines may be contemporaneous with the Puebloan occupation (e.g., for the South Fork–Fajada Community). See also Chapter 6, this volume.

\(^b\) H = Hispano, N = Navajo, P = Pueblo.

\(^c\) I = Intermittent, S = Seasonal, G = Groundwater.
portion of the MRVP to agriculturalists of all times, however, is its surface water and arable land (figure 3.4). The primary drainage of the MRVP is the 240-km-long Río Puerco, an intermittent and ephemeral stream, which heads in the San Pedro Mountains northeast of Cuba some 57 km north of Cabezón Peak. A major tributary to the Puerco that provides seasonal runoff is Arroyo Chico, which originates from Mt. Taylor’s high northern Mesa Chivato and joins the Puerco not far north of La Mesa Encantada. Local arroyos on the east and west sides of the Río Puerco near Guadalupe Ruin provided water for Hispanic settlements, and we presume they were exploited by ancient farmers as well. Byrd C. Bargman et al. (1999:table 2.19) report that they recovered...
maize dating to circa 1700–1200 BC from site LA 110946 just north of Cabezón Peak on the Rio Puerco floodplain, yielding seven shallow structures and fifty-two storage pits, along with many manos and basin, trough, and slab metates.

This portion of the MRPV supported several medium-size prehistoric Puebloan communities. During the 1971–1982 Rio Puerco Valley Project, led by Eastern New Mexico University’s Cynthia Irwin-Williams, archaeologists surveyed two large block areas—an earlier northern one centered on

Figure 3.3. The possible Chacoan “court” kiva-size depression (see Windes 2014) at the top of a cinder cone looking southeast from La Mesa Encantada, which overlooks the potential farming area along the Tapia Wash floodplain. Photograph by Christine Gilbertson, April 2, 2017.
Guadalupe Ruin and a southern one about 20 km distant. In both cases most early occupation was located on and along the mesas west of the Rio Puerco, a location also favored during the early Navajo and Hispanic settlements in the 1700s. In the late 800s and early 900s, the number of pueblo house sites in the northern area increased only from 25 to 34, but their estimated room numbers concurrently rose from 89 to 218 (Baker 2003:table 8.2). Afterward, house numbers increased through time until about 1100, when a rapid decline in room numbers by half occurred, the number not exceeding previous levels again until the early 1200s. In the southern survey area, which began to grow in the mid-to-late 900s, a sudden rise in house sites and room numbers occurred in the late 1000s but showed the greatest numbers of rooms in the 1200–1250 period, greatly exceeding the northern area’s numbers.

Although little is known of the subsurface deposits in the sixteen small houses below the Guadalupe great house (figure 3.2b), most of which were along the south side, the great house was not built until after the small houses were established. It closely resembles in form, size, and location the later-dating great house at Bis sa’ani along the Escavada Wash north of Chaco Canyon (Breternitz et al. 1982). In 2001, archaeologists excavated a test pit

**Figure 3.4.** Google Earth view of the Guadalupe community area shown with agricultural areas marked by old fields and potential floodwater usage with green pins.
2.5 m below the highest part of small house ENMU 848 to examine the sequence of Puebloan occupation and the juxtaposition of two contrasting masonry styles, of sandstone overlain by vesicular basalt (Durand et al. 2012). The senior author examined 4,300 ceramics recovered from this excavation unit and found a small but persistent presence of wide neckbanded and probable Kiatuthlanna Black-on-white pottery that marks the earliest occupation of the house and probably others nearby by at least the late 800s. This ceramic pattern mirrors the establishment and abandonment of early Chacoan communities across the San Juan Basin and beyond.

After a few centuries of scant land use, Navajos and Hispanics reoccupied this portion of the MRPV in the 1700s. Historic Puebloan groups from Jemez, Zia, and Santa Ana also used the general area, comprising both immigrant and indigenous populations who continue to reside in the nearby Middle Río Grande (see Ellis and Dodge 1989:50–51).

A LIKELY ANALOGUE: HISPANIC OCCUPATION AND AGRICULTURE IN THE MIDDLE RIO PUERCO VALLEY

The initial 1700s Hispanic settlement of the MRPV failed due to raiding by nearby Navajos, but Hispanics returned in the 1870s after the US government incarcerated many Navajos in Bosque Redondo (1864–1868) and created a Navajo reservation. Hispanics reestablished four small villages and scattered homesteads along the edges of the floodplain near Cabezón Peak around 1872: San Luis, north of the peak; Cabezón village, near the base of the peak; Guadalupe village, just upstream from the Chacoan Guadalupe Community; and Casa Salazar, about 7 to 8 km south of Guadalupe Ruin.

Hispanic subsistence practices and methods were similar to prehistoric practices, with two major exceptions: Hispanics possessed livestock and had access to metal tools. Nevertheless, these subsistence advantages failed to prevent the hard times that eventually led to the eventual abandonment of the Guadalupe area. As with their Puebloan predecessors, historic period farmers experienced highly variable farming conditions in terms of yearly temperatures and precipitation, particularly those multiyear “warm and dry” or, worse, “cold and dry” periods (Van West 1994; Van West et al. 2013) that are the most detrimental to crop success (figure 3.5).

Historic research indicates Hispanics from these four villages used Pueblo-style dryland farming and akéhin-type farming where it was possible to capture seasonal water flow from side drainages. Hispanics also irrigated their crops in small streamside fields from ditch water temporarily impounded behind
Figure 3.5. Temperature and precipitation graphs for the Guadalupe area using the San Francisco Peaks temperature and Jemez Mountain precipitation dendrochronological indices. Note the cold period (in orange) for AD 1258–1272 (see arrow), a worldwide northern hemispheric event caused by Java’s Samalas AD 1257 volcanic megaeruption, and the cold era between ca. 1910 and 1930. These were periods of depopulation in the Four Corners region and the MRPV, respectively. See endnote 3.
simple dams during unpredictable floods on the Rio Puerco. Except for late summer storm flooding, the Rio Puerco provides little reliable water by the time it reaches the MRPV (Widdison 1958:19; 1959:251–253). Occasionally, when the Rio Puerco flooded beyond the channel, water would cover fields and result in successful crop production, before the Rio Puerco became too deeply entrenched (Widdison 1959:267). Figure 3.6 illustrates the distribution of dams, ditches, and irrigated land near Guadalupe Ruin that supported Guadalupe and Casa Salazar and those near San Luis and Cabezón to the north. Periodic fires and floods eventually destroyed the dams, and farmers were compelled to capture ditch water from side-drainage flooding to irrigate their crops. Despite the MRPV’s reputation as “the bread basket of New Mexico” for its fruits and vegetables (Widdison 1959:266), farming here was always a struggle, and gradually the valley lost population. Residents began abandoning their villages in the 1930s and 1940s, with termination at Cabezón and Guadalupe in the early 1950s at the beginning of the severe and widely experienced 1950s drought. A graph of period June–August precipitation.

Figure 3.6. The Hispanic irrigation ditches (orange) and dams (red) along the Rio Puerco in the Cabezón area. Revised from Widdison 1958, 1959.
reconstructed for the region south of Guadalupe reveals the perilous weather the farmers faced (figure 3.7).

**PUEBLO PINTADO GREAT HOUSE COMMUNITY**

The Pueblo Pintado (29Mc 166) Great House Community (figure 3.8) is located at the head (east end) of Chaco Canyon, along the north foothills of Chacra Mesa. Archaeologists know little about the vast area between Pueblo Pintado and Guadalupe Ruin, but it may contain other great house communities. The Pintado Community (figure 3.9) links to the central canyon via a prehistoric road and the shrine-visual communications network. Notably, there was no prior occupation before immigrants established
community houses there in the late 800s at two separate loci adjacent to the prehistoric road.

Pintado’s eastern subcommunity first contained five houses between the western prehistoric road and Chaco Wash, which later grew to seventeen houses, while a western subcommunity 2.5 km away initially established sixteen approximately coeval houses along the western prehistoric road across alluvial fans at the mouths of several small tributaries draining northward from Chacra Mesa. The eastern subcommunity is marked by a 50-m-long pioneer late Pueblo I slab-lined house (29Mc 765) similar to those common in the Northern San Juan. Many of the painted early ceramics associated with this eastern locus have crushed rock temper from the Northern San Juan area. The western subcommunity’s ceramics are thick-slipped, crazed, and crackled, unlike any others from the Chaco Wash area; these did not have rock temper. Inhabitants likely came from the south near Mt. Taylor. Pioneer late Pueblo I houses at this location are not visible. Residents of
both the eastern and western subcommunities mostly left their homes in the mid/late 1000s.

These two subcommunities probably provided the labor for the great house construction in the late 900s. There is no great kiva here, despite published references and maps to the contrary (e.g., Marshall et al. 1979:83). A third subcommunity of about twenty-four houses formed in the late 1000s/early 1100s directly south of the great house above and below the ridge, which also may have had nonlocal origins. New residents augmented the occupation of the Pintado great house in the early 1100s and built a house in the former enclosed plaza; another reoccupation occurred in the 1200s. Massive midden deposits date almost entirely to the 1000s, with sparse ash and vegetal remains, similar to most other 1000s canyon great house middens. The prehistoric occupation of this site ended by 1300. During the historic period, Navajos used part of the great house plaza as a corral, and Anglos used several rooms as a trading post.

The Pintado landscape allows visibility east to the Jemez Mountains and northwest to Sisnathyel Mesa, but the local setting is otherwise enclosed by the surrounding hills, ridges, and lesser highlands. The eastern subcommunity’s chosen location adjacent to Chaco Wash is no accident, as the floodplain

**Figure 3.9.** Pueblo Pintado Chacoan subcommunity settlements, AD 875–1130; after Windes 2018:548. The great house is 166.
collects some 780 sq km of runoff before dropping into Chaco Canyon. Two broad and non-incised drainages across the wash to the northeast are regularly green with grasses during moist periods and would have made for the area’s best fields (figure 3.10). It is important to note that very few mapped soil types identified in Chaco Canyon and surrounding areas are considered suitable for modern agriculture by the US Natural Resource Conservation Service (formerly the US Soil Conservation Service; see Windes 2018:36–39), but some of these same soil types are arable when the labor-intensive methods used by Puebloan and Navajo farmers are utilized (see figure 3.26). As always, precipitation is the most important factor for sustainable agriculture in this arid region, but no drainages had reliable long-term stream flows.

Despite local plundering, the two initial subcommunities are surface-littered with manos and metates, which attests to much corn production and probable surpluses that could have been carried into Chaco Canyon (see Benson et al. 2019). A nearby rain gauge records twenty-four years (1993–2017) of local precipitation data (see table 3.2) with an annual average of 246 ± 56 mm (9.7 ± 2.2 in.) including 135 mm (5.3± in.) during the growing season—totals exceeding those in the lower Chaco Canyon.
Seven kilometers downstream from Pueblo Pintado is a community started at about AD 900 on virgin lands centered on Wild Horse Canyon (Windes 1993:459–463, 2018:552–555; Windes et al. 2000). First identified by the Chaco Canyon National Monument staff in the 1950s but later forgotten, Chaco Project staff rediscovered the Chaco East community in 1989 (figure 3.11). The tenth-century settlers established eleven houses, most of which were on the south side of Chaco Wash, east and west of the mouth of Wild Horse Canyon. Community members built the tall single-story great house (29Mc 560) in the late 900s with classic Type I masonry (exposed in a twentieth-century bulldozer cut), which typically marks early great house construction. A prehistoric road looped south around the great house from the Chaco Wash floodplain.

**Figure 3.11.** The Chaco East Community during the AD 900–950 and 950–1000 periods; note preference for a south-side house location, indicative of seasonal occupations, within the narrow canyon. From Great House Communities across the Chacoan Landscape by John Kantner and Nancy M. Mahoney, © 2000 The Arizona Board of Regents; reprinted by permission of the University of Arizona Press.

**THE CHACO EAST COMMUNITY**

Seven kilometers downstream from Pueblo Pintado is a community started at about AD 900 on virgin lands centered on Wild Horse Canyon (Windes 1993:459–463, 2018:552–555; Windes et al. 2000). First identified by the Chaco Canyon National Monument staff in the 1950s but later forgotten, Chaco Project staff rediscovered the Chaco East community in 1989 (figure 3.11). The tenth-century settlers established eleven houses, most of which were on the south side of Chaco Wash, east and west of the mouth of Wild Horse Canyon. Community members built the tall single-story great house (29Mc 560) in the late 900s with classic Type I masonry (exposed in a twentieth-century bulldozer cut), which typically marks early great house construction. A prehistoric road looped south around the great house from the Chaco Wash floodplain.
The great house changed little in the eleventh century, but laborers enclosed the plaza with a curved wall and a large midden east of the structure sometime in the mid-1000s. By the end of the thirteenth century, there were thirty-five houses, some remodeled and others newly built, with many of the new houses located on the north side of the wash. Some use of the great house also occurred in the 1200s (figure 3.12).

Residents established the settlement astride Chaco Wash and two of its tributaries across from one another (Windes 2018:fig. 4.3). One tributary, Wild Horse Canyon, runs south over 2 km into Chacra Mesa, is not incised, and is rich in grasses during wetter years even today. Two rain gauges established by the senior author at the head and mouth of Wild Horse Canyon have

**Figure 3.12.** The Chaco East Community great house and the AD 1175–1300 small house community occupation; note expansion of small house settlement to the north canyon side. From Great House Communities across the Chacoan Landscape by John Kantner and Nancy M. Mahoney, © 2000 The Arizona Board of Regents; reprinted by permission of the University of Arizona Press.
recorded data for the past twenty-six years (1992–2017). The head gauge (see table 3.2) measured more mean precipitation than the mouth gauge (246.9 mm versus 232.7 mm, or 9.72 in. versus 9.16 in.), where a stock dam is now located, indicating that runoff is generated during storm events. Such a source of water likely permitted community residents to successfully grow crops within Wild Horse Canyon and along the margins of the Chaco Wash floodplain (figure 3.13). Despite these horticultural advantages, the near absence of surface groundstone artifacts on locality sites suggests this community was perhaps seasonally self-sufficient but incapable of producing reliable surpluses that would benefit neighboring communities.

The immediate physical setting of the East Community restricts landscape views from the residential area and its great house to an outside view. The narrowness of the canyon also imposes limited solar advantages during the cold season; community members’ initial south-side selection defies interpretation for a year-round occupation during the Chaco period, as do the house orientations (figure 3.14) (see Windes et al. 2000). Nevertheless, the community was
Figure 3.14. House orientations for the Chaco East Community sites. Note preference for nontraditional orientations (those other than southeast and south) that indicate seasonal occupations. From Great House Communities across the Chacoan Landscape by John Kantner and Nancy M. Mahoney, © 2000 The Arizona Board of Regents; reprinted by permission of the University of Arizona Press.

not culturally isolated. It is associated with a canyon-long prehistoric road and is connected to downtown Chaco and to Pueblo Pintado via two separate visual line-of-sight shrines (Windes et al. 2000:fig. 4.2) and their communication relay locations.
THE SOUTH FORK–FAJADA WASH COMMUNITY

This community provides us with insights into a failed early community and its relationship to the inhabitants of Chaco Canyon. Clustered about 10 km south of the national park and along State Route 57, it is the only large clustered Pueblo I community in and around Chaco Canyon dating to about AD 800 (Windes 2004, 2018). It exhibits many aspects of the later Pueblo II great house communities that give rise to the Chaco Phenomenon, but it did not persist beyond the mid-800s.

Unusual for the times, the South Fork–Fajada Wash Community has two small houses partially built with Type I masonry (29Mc 184); perhaps “proto-great houses,” but not great houses, aligned with two small adobe houses (figure 3.15) connected to a rare great kiva via a short prehistoric roadway. All other members of the twenty-eight mostly one-to-two-domicile houses within the community can see these two diminutive stone house “bumps” as well as Fajada Butte and Huerfano Mesa (figure 3.16). Huerfano Mesa visually connects, via a possible communications shrine, with Aztec Ruin, Salmon Ruins, and Chimney Rock Pueblo (Van Dyke et al. 2016; Windes et al. 2000:42–43), among great houses.

Rain gauge data for twenty-one years (1995–2015) marks this as the driest Chacoan community within the canyon area (168.4 ± 38.6 mm, or 6.63 ± 1.52 in.), growing season of 92.5 ± 38.6 mm (3.64 ± 1.5 in.) (table 3.2). The locality is devoid of precious wood and water resources, and almost no later Pueblo III nor Navajo occupation occurred here—a testament to its unfavorable horticultural potential. Ceramics with chalcedonic temper and high percentages of yellow-spotted chert (up to 40% of total chipped stone) derive from the eastern Zuni Mountain Range (LeTourneau 1997, 2000), suggesting southern community origins in the Mt. Taylor/Red Rock Valley area.

THE PADILLA WASH COMMUNITY

The southwestern area of the national park is one of the most densely settled, with occupations dating from Basketmaker III through Pueblo III. Yet, this area is generally unfamiliar to Chacoan scholars because of its difficult access and remoteness. The Padilla Wash Community contains a small great house connected to a nearby AD 1000s great kiva (both 29SJ 352) by a short prehistoric road (figure 3.17). From its architecture and ceramics, the great house dates to the 1000s, but its eastern midden reveals much late 800s and early 900s trash, which indicates an earlier structure exists underneath the present one. A number of Pueblo I and Pueblo II houses are within
Figure 3.15. Pueblo I houses at 29Mc 184, South Fork Community: (a) Proto–great house (House B mound), looking northeast; photo by Tom Windes, 2000s. (b) Upright house foundation slabs (note lack of house mounding) of House C, a typical Chacoan adobe house of the period. Looking west; 1957 Thunderbird vehicle for scale; photo by Tom Windes in 1976, courtesy of the National Park Service, Chaco Archives 2/2.004-n12110.
**Figure 3.16.** The South Fork Valley at left looking north to Fajada Butte and Chaco Canyon, with Huerfano Mesa along the far horizon. Photo by Tom Windes, May 11, 2005.

**Figure 3.17.** The Padilla Wash Valley great house, great kiva, and connecting prehistoric roads. Modified by Friedman 2017, after Richard Friedman, Dabney Ford, and John Stein, July 16, 1999.
250 m of the great house, but whether a pioneer late Pueblo I community led the way for a later immigration is unknown (see Windes 2018:593–600). This community may be a home-grown product, given the long occupational use of the valley.

Kellam Throgmorton (2019) recently conducted intensive surface recording and magnetometry in the community as part of his dissertation research. Throgmorton’s findings confirm and clarify the senior author’s observations. Throgmorton’s work also suggests 29SJ 1882, in the southeast part of the community, may be a proto–great house.

Despite the valley’s small size (about 2.5 km long with a drop of about 20 m from head to mouth), the location of this Chaco River tributary is likely key to its settlement. Whereas badlands of clayey hills border the western side of Padilla Wash Valley, the high imposing cliffs of West Mesa (part of Chacra Mesa) flank the eastern side. On the summit of West Mesa, a Chacoan visual communication shrine (29SJ 1088) and a series of barrel-shaped stone cairns line the cliff edge (figure 3.18). Of importance, the western side of West Mesa is the location of one of the two giant early Basketmaker III communities (29SJ 423, along with Shabik’eschee) in the national park, with 100+ possible pit houses scattered north to south across the mesa and exhibiting a series of superimposed great kivas starting in the early 500s (Windes 2018:88–120, 586–591). It also contains buried in Basketmaker III trash, a Pueblo II/III communications shrine—the key feature discovered by the Chaco Project for the existence of the Chacoan visual communication system (Hayes and Windes 1975). There are also hills of “Red Dog” shale and selenite used for local ornament manufacture.

The two most likely sources of water for crop production are valley floodwater runoff and groundwater within the broad, braided, and sandy Chaco River floodplain (figure 3.19). Three years into the 2000–2007 drought, the Chaco River was the only green area in the dry, parched brown land across the Chaco Basin. During that same period, the senior author sampled the depth to groundwater in the Chaco Wash/River channel from Pintado to Shiprock, found it was a constant 50 cm (20 in.) deep, and concluded that alluvial sediments could have supported crops during most drought years. A local Navajo land lessee reported to Windes that his parents and grandparents successfully grew melons, squash, and corn in the side drainages to Chaco Wash, near the buttes south of Casa del Rio, and along the margins of and within the Chaco River floodplain (Windes 2018:697). These former field areas are visible from the mouth of Padilla Wash Valley. Navajos also grew crops in the riverbed further upstream.
Figure 3.18. The shrine and cairns at 29SJ 1088 on the top west end of West Mesa. (a) Some of the cairns; photo by either C. Mindeleff or F. Russell in ca. 1890. Courtesy of the National Anthropological Archives, Smithsonian Institution Photo Lot 14: NM-284-B. (b) Shrine (split by cliff fissures; cairns in background) by Buck Cully in 1972 (CHCU n31694); courtesy of the National Park Service, Chaco Archives. (c) Overview looking west past the Chaco visual communications shrine to the mouth of Padilla Wash Valley (left center) and the Chaco River below by Nancy Akins in 1979 (CHCU n28394); courtesy of the Chaco Archives, National Park Service.

CASA DEL RIO GREAT HOUSE

Located just west of the national park boundary and Chaco Canyon, this isolated great house (LA17221) was well established by the early AD 900s (figure 3.20). It is part of a cluster that includes the Peñasco Blanco, Padilla Wash, and Kin Klizhin great houses. It also is one in a series of small great houses along the margins of the Chaco River running west to the “Great Bend” before the river turns north. Despite their diminutive size, these sites are incredibly dense with cultural material. Before downtown Chaco was a cultural center, these great houses connected with the Chuskan area where large quantities of cultural material were procured and produced. There is neither a formal...
community nor a great kiva at Casa del Rio, but the prehistoric Great West Road passes close by (Windes 2018:692) and the communication shrine and cairns at 29SJ 1088 are clearly visible to the southeast. The presence of other small buttes and distinctive geological features in the area suggest this area was an important location during the development of Chaco.

The curvilinear-shaped late Pueblo I/early Pueblo II great house is preceded by a huge mid-800s Pueblo I arc-shaped adobe-and-slab house—the largest in the Chaco Canyon area—stretching in a 112-m-long arc, representing an estimated sixteen households. The size and form of this house are reminiscent of those in the Northern San Juan (Windes 2018:690–698). In front of the mid-800s house are three associated middens (#2–4). This early house was mistakenly designated a sizable multistory great house with 100 ground-floor rooms built at about 1000 (Marshall et al. 1979:31–32). Sometime around the late 800s, however, the Pueblo I house was abandoned and the small single-story, Type I masonry great house built on top, with seemingly little interval between the occupations. This great house has a mere twenty-one to

Figure 3.19. Google Earth view of the Padilla Wash Valley dominated by the Chaco River with its reliable ground waters suitable for farming. Note the proximity of the Casa del Rio, Kin Klizhin, Padilla Wash Valley, and the Peñasco Blanco great houses to one another, and the Escavada Wash/Chaco River and Chaco Canyon. Some areas for potential agricultural lands marked by various green pins.
twenty-seven rooms, but the elevated midden (#1) to its southeast towered 5.5 m high, contains a staggering 1,480 to 1,849 m$^3$ of cultural material, and partially blocks a view east to the nearby Chaco River. This Pueblo II midden does not yield the clean sandy deposits of the typical 1000s great house middens; instead it is filthy with firepit charcoal and ash, as well as sherds, lithics, and ornaments in various stages of production—much of it Chuskan derived. A badger’s retrieval of two complete ceramic vessels suggests there are burials within the midden. These deposits are household material along with much debris and tools from ornament and ritual artifact manufacture.
The local landscape is one of badlands and seemingly unfavorable for successful horticulture. As discussed above, however, the Chaco River provides a reliable shallow water table for crops (see figure 3.19). There are also dunes along the river’s eastern terraces and high cliffs, which may catch summer storms. Deeply cut arroyos running downslope from the cliffs attest to storm action. The mouth of Kin Klizhin Wash enters the Chaco just upstream from the site, and the long, deep Ah-ši-šle-pah Canyon tributary is just northeast downstream; both provide storm runoff possibilities. The head of this tributary canyon is connected by a short prehistoric road to the huge Peñasco Blanco great house in the park. The presence of more than 500 broken manos and metates on the middens of Casa del Rio attests to the probable occurrence of surplus food production in the locality. Without doubt, this is an important site for understanding the early origins of the Chaco Phenomenon. Use of the site diminished by the 1000s, possibly signaling the increasing importance of great house activities in downtown Chaco Canyon.

WILLLOW CANYON COMMUNITY

The Willow Canyon Community is situated on the east side of Willow Canyon, a deep gorge that drains north into the Chaco River about a 1.5 km away and a few kilometers east of the Great Bend great house (LA6419). There is a scatter of small Pueblo I houses along the west side ridges of Willow Wash, plus a few houses of modest size and partial stone masonry located on the mesa tops (Marshall et al. 1979:91–94; Windes 2018:705–711).

The main community is a tight cluster of at least twelve masonry houses, many of Type 1 masonry, within a 200-by-200-m area (figure 3.21). There is a massive amount of refuse, covering 7,700 sq m, much of it forming distinctive mounds. The Great West Road passes through the community, and there is a stone circle, a herradura (Kincaid 1983), and a possible shrine on the low, flat mesa to the north. A 21-m-long late Pueblo I adobe-and-upright-slab foundation pioneer house lies in the middle of the community. Two small masonry houses, founded circa AD 875, are similar in plan (LA139389 and LA139390) and slightly higher than the community at its southern end. The mesa directly behind and south of the community exhibits a single room of Type I masonry and a low-walled special use plaza (16 by 18 m). Architectural styles and ceramic dates suggest most of the residential community was in place by the late 800s, but there is neither an associated great house nor a great kiva. The Willow Canyon Community exemplifies the continuum of the varied early migration settlements into the interior Basin.
From the highest point of the south mesa, much of the Chuska Valley is visible to the northwest, including the Chuska, Lukachukai, Ute, La Plata, and San Juan mountains. The Dutton Plateau and Hosta Butte are visible to the south and Huerfano Mesa to the northeast. Willow Wash is not incised, and the valley bottom is often green with grasses that the local Navajos use for grazing livestock. The canyon area is, however, without tree cover, and the east side of the valley borders badlands. Most likely, the canyon wash bottom and

Figure 3.21. The Willow Canyon Community. Note the centrally located late pioneer Pueblo I house in orange, the unusual widespread use of Type I masonry, the prolific gray midden deposits, and the lack of a great kiva and great house. From Windes 2018:707.
nearby Chaco River floodplain margin served as primary farmlands, as both contain shallow alluvial groundwater (figure 3.22). Otherwise, annual precipitation here is minimal (see table 3.2).

SKUNK SPRINGS COMMUNITY

The Skunk Springs Community is on the eastern slope of the Chuska Mountains, southwest of Newcomb, New Mexico. It is a gigantic community with 50 to 100 houses. Its great house (LA7000), three great kivas, and a shrine are located on the flat ridge (Gray Mesa) above and north of the community (Marshall et al. 1979:109–113; Windes and Ford 1992:80). Occupation spans the Pueblo I, II, and III periods, circa AD 850 to 1250.

Marshall et al. (1979:109–111) recognized the western room block and the westernmost of the three great kivas as the Pueblo I component of the Skunk Springs great house. The long, crescent-shaped Pueblo I house extends east under later portions of the multistory structure. Laborers built the great house with Type I masonry in the late 800s or early 900s and created long tiers of rooms similar to those of early great houses in Chaco Canyon (figure 3.23). Community residences are aligned along streets or walkways, akin

Figure 3.22. Google Earth view of the Willow Canyon Community area shown with some potential agricultural areas marked by various green pins.
to community house alignments mapped by Windes at Navajo Springs, yet another Chacoan great house community, along the Puerco River of the West.

The position of the great house on high ground enables awe-inspiring views to the north and south, including many mountain ranges and peaks, and to the east toward Chaco Canyon country (see Bernardini and Peeples 2015:227, 231; Van Dyke et al. 2016). Ute Mountain is the most prominent landmark for the communities near the Four Corners, and oral traditions regarding it as a special place are still present among the Puebloan descendants in the Northern Rio Grande (Ortman 2012).
Archaeologists have proposed connections between Skunk Springs and downtown Chaco for many years. For example, a Navajo informant told Harold Gladwin (1928), who was surveying the Chuska Valley in the 1920s, that the Chuskas were the source of roofing timbers taken by road to Chaco Canyon and Pueblo Bonito, and segments of a prehistoric road were still in use by Navajo people (Marshall et al. 1979:113). In the 1970s researchers identified a prehistoric road running east from the great house toward the Chaco River’s Great Bend and Chaco Canyon, later identified as part of the Great West Road. More recently, Valerie King (2003) demonstrated that people transported pottery made in the Skunk Springs area to Chaco Canyon and Pueblo Bonito.

Local Navajos still practice agriculture by running water down ditches adjacent to the prehistoric community houses at Skunk Springs and at nearby Two Gray Hills and Newcomb. These ditches are thought to be part of three prehistoric Puebloan systems (Friedman et al. 2003), so it is instructive to examine the present practices as possible antecedents of prehistoric ones. The one at Newcomb, 7 km in length, uses water captured from Captain Tom Wash to irrigate 794 ha of arable land (figure 3.24). Despite their location within the Chuskan Valley east-side rain shadow, these three communities are close enough to the mountain slopes to take advantage of local springs, spring snowmelt, and summer storm runoff (figure 3.25).

SUMMARY AND CONCLUSIONS

These eight cases represent a sample of Early Bonito phase (AD 850–950) Chacoan communities across the San Juan Basin and into the Middle Rio Puerco Valley. Each community began in the late Pueblo I/Early Pueblo II developmental period (ca. 875–925) and most experienced occupation or use through the mid-1050s or longer. All were along intermittently flowing streams and had access to groundwater and/or seasonal runoff for domestic and agricultural use. Only one community (South Fork–Fajada Wash), in a particularly resource-poor location, did not endure for more than a generation or two. Seven of the eight communities contain early architecture interpreted as a great house or proto–great house; only Willow Canyon lacks a great house of any form. Three of the eight Chacoan communities have one or more great kivas, each constructed in the 1000s, long after the founding of the community. Most communities were visible to at least one other Chacoan community across the Chaco Basin and had elevated topography or architecture from which special mountains, mesas, and buttes are discernible.
Figure 3.24. View of the present ditch-irrigated fields (marked by multiple fine light-green parallel lines) at Newcomb, New Mexico, which may have prehistoric origins. After Friedman et al. 2003.

Taken as a group, the compiled data reveal several common themes for our understanding of early Chacoan community development: (1) who were the founding settlers, (2) what were the critical factors in selecting a suitable community setting, (3) where and when did these settlers inhabit these residential and communal centers, and (4) possibly why they were drawn to the Chaco area.

Immigration and Founding of New Communities

It is the contention of the senior author that immigrant populations originating from earlier settlements primarily north but also west and south of the San Juan Basin seeking arable lands for maize agriculture founded these early Bonito phase communities. These immigrations likely occurred in response to environmental changes in former homelands that negatively affected food supply and personal security and created societal discord. Persistent drought, short growing seasons, and possibly the prolonged effects of volcanic eruptions are often-cited environmental forcing factors for prehistoric population
movement in the US Southwest (Elson et al. 2002; Guillet et al. 2017; Kohler and Varien 2012; Kohler, Varien, and Wright 2010; Salzer 2000; Stahle et al. 2009; Windes 2019). Anthropogenic factors—such as resource depletion, competition for scarce resources, and warfare—may have also contributed to emigration (Driver 2002; Duff, Adams, and Ryan 2012; Kuckelman 2010).

Several communities and/or great houses were initiated by new settlers to the area, which closely followed a pioneer large Pueblo I house pattern reminiscent of those found in the Northern San Juan and outside the basin interior. Many of these communities occurred in previously uninhabited or marginally Puebloan-occupied areas, with freedom to choose house locations. The senior author suggests pioneers probably established a small outpost to test the feasibility of the locale for successful horticulture and multiyear, seasonal, and/or year-round settlement (see Burmeister 2000). The evidence for their presence is the recovery of much wide neckbanded Kana’a Gray-style pottery, which is introduced to the San Juan Basin region by 850–875, along with Kiatuthlanna Black-on-white, in deposits associated with larger-than-normal-size late Pueblo I houses (Windes 2018:459–463). It is possible these houses were the residences and storage features for community pioneers.
Notably, there is considerable diversity in site layout and community elements, perhaps indicative of the influx of various peoples from different parts of the region. Some early communities lacked great houses, some great houses lacked adjacent communities, and most lacked great kivas. We also include a short-lived Pueblo I community (South Fork–Fajada Wash) that is an earlier footprint of the Pueblo II house settlements that occurred throughout the San Juan Basin, which bares additional inspection. Whether this was a community rejected from moving to better farmlands within nearby Chaco Canyon, or a temporary settlement quickly accepted into a more sustainable community, is unknown. Whatever its true history, it was a community that largely dispersed before about AD 850. For now, we consider it a failed community that could not support itself, given resource limitations.

In all eight cases the original settlers chose locations they anticipated would fulfill basic requirements for a sustainable farming community: access to potable water, arable land, fuelwood, construction timber, local building materials, and wild resources for supplemental subsistence. Settlers also selected habitation settings that would minimize cold-air drainage and enhance sunshine and warmth if they anticipated year-round occupation. We also suspect that more subtle requirements and intangible considerations influenced the choice of location. Whereas the six interior communities are along prominent intermittent drainages in narrow valleys with restricted vistas, all eight communities have access to an unusual feature or structure on higher ground that enables a visual connection to one or more prominent peaks within the basin or along its margin. Among these were vistas to suspected former homelands rich with positive memories and alignments to cardinal directions and other important features such as springs, prominent peaks, and other regional markers. Each community also had access to travel routes linked to natural resources and other communities—past and present.

The presence of an elevated natural or cultural feature overlooking the larger landscape is typical of early and later great house sites. These locations provided a view of the associated households below, the movement of peoples and weather conditions, fields and other subsistence areas, and distant landscapes that held important topographical features critical to the religious ideology and interrelationships of a society (e.g., Anschuetz 2005; Bernardini and Peoples 2015; Ford 2014; Lewis 2017; Snead 2004, 2008; Tosa 2016; Van Dyke 2003, 2007, 2011, 2017a–b; Varien and Wilshusen 2002).

Although some researchers have identified Chaco Canyon, and specifically Pueblo Bonito, as the source of the great house phenomenon, we now know that many early great houses were of similar age and that downtown Chaco
was not the ninth-century center (Windes 2018). Despite Pueblo Bonito’s fame and unique history of excavation, the key site to understanding early great houses is Peñasco Blanco. From its position at the west end of the canyon, it has a commanding view of both Chaco Canyon and the Chaco River, as well as Chaco Wash and its junction with the Escavada Wash/Chaco River. It also has a view down river to the Padilla Wash area, and is likely the initial starting point for the Great West Road. Its enormous early refuse piles are similar to the household refuse deposits marking Casa del Rio—cultural deposits unlike those at other early great houses within the park.

Land-Use Practices

The suite of agricultural strategies pursued in the new lands likely was not the same as those employed in the former homelands. Differences in elevation, landforms, primary water sources (direct precipitation, surface water, groundwater), and soil characteristics influenced the selection of field locations and required a reformulation of farming techniques and technologies. Some of these same variables also influenced season of residence. Given the Chaco Basin’s reputation for cold temperatures from the late fall through early spring, we suspect that community members of some low-lying communities in the Chaco Basin resided in these homes during the warm season but not the cold season.

Except for the failed community at South Fork, all others arose in areas where multiple water sources and diverse topographies were available, a necessity in the arid environment of the San Juan Basin. From our sample, every community received less than 254 mm (10 in.) of mean annual precipitation. Migrants coming into the interior region from higher, wetter elevations must have employed farming strategies that did not rely on direct precipitation—a source of water only effective during exceptionally wet periods in the San Juan Basin. Founders of the interior basin communities chose areas where convergent large drainages associated with storm runoff and high-water tables existed (Dean 1988, 1992). In contrast, founders of the Guadalupe and Skunk Springs communities in the eastern Rio Puerco and along the Chuskas selected locations adjacent to reliable mountain springs, winter snowmelt, and summer runoff that permitted more successful crop production.

Researchers have documented numerous strategies and techniques used by Indigenous southwestern peoples to successfully grow maize and other cultigens, and encourage the growth of useful wild plants in and near fields (e.g., Anschuetz 1998; Bradfield 1971; Hack 1942; Kennard 1979:554–557; Maxwell 2000). Depending on the source, volume, and predictability of water to nurture
plant growth, farmers can harvest, conserve, and direct water to fields in a variety of landscape positions with one or more of the following agricultural systems (figure 3.26). Among the most common agricultural systems are the following: (1) direct precipitation for dryland fields (with and without cobble borders, terraces, grids, and rock mulch); (2) intermittent rain and snowmelt captured for runoff fields below mesas, cliffs, and moderate slopes; (3) water diverted from rivers, intermittent streams, and springs to irrigated fields; and (4) accessible alluvial groundwater present in both permanent and intermittent streams for floodplain fields.

Recent work in the Chama River valley has demonstrated the importance of shallow groundwater in floodplain for successful crop production (Eiselt et al. 2017; Huckleberry and Billman 1998). We suggest the presence of shallow groundwater within the Chaco River was an attraction for the early Chacoan
communities west of Chaco Canyon and could have been exploited for crop production and potential drinking water (see Benson 2016; Windes 2018). We also suspect that farmers regularly used runoff agriculture where topography permitted this strategy to be effective. Finally, we suggest that members of the Guadalupe Community impounded and diverted water from local drainages to raise crops, using methods similar to those documented for nineteenth- and twentieth-century Hispanos.

**Mobility as Response to Environmental Variability, Conflict, and Extra-Local Attractions**

The principle of movement is an essential tenet of Puebloan life (Naranjo 1995; Nelson and Strawhacker 2011). In the often harsh, dry, highly variable environment of the San Juan Basin and the broader Colorado Plateau (figure 3.27), the recurrent need to relocate one’s homesite and community is a requirement of sustainable living.

A significant event in the origins of the Chaco Phenomenon was the late Pueblo I (ca. 850/875–925) abandonments of large villages in the Northern San Juan region and perhaps elsewhere, affected by diminished frost-free seasons (Peterson 1987, 2012; Peterson and Clay 1987). This depopulation of the Northern San Juan was coeval with a massive influx of community houses into the Southern San Juan region, including the San Juan Basin. The timing of these two events are linked, with population movement from north to south in the late 800s and early 900s (Wilshusen 1999; Wilshusen and Ortman 1999; Wilshusen and Van Dyke 2006; Wilshusen et al. 2000; Wilshusen et al. 2012; Windes 2004, 2018; Windes and Van Dyke 2012).

At about the same time, there are strong material culture links between early sites in “downtown” Chaco Canyon and new great house communities along the Chaco River with existing settlements in the Chuska Valley, which suggests population movement from east to west or vice versa (Windes 2018). Some Pueblo I/early Pueblo II sites in Chaco Canyon also appear to have come from southern source areas (Toll and McKenna 1997; Windes 2018). The late Pueblo I/early Pueblo II period in the San Juan Basin appears, then, to have been an era of marked social disruption and the movement of many people (Mills et al. 2018).

Of significance, the late Pueblo I/early Pueblo II period is not the only example of mass movement in the region that affected the Chaco system. The founding of many later great houses in the Northern San Juan region in the late 1000s and early 1100s suggests a return migration of some peoples from
Figure 3.27. Temperature (orange) and precipitation (blue/green) graphs for Chaco Canyon and northwest New Mexico, AD 825–1000, 1100–1300, 1850–1950, using the San Francisco Peaks temperature and Chaco Canyon precipitation dendrochronological indices. See endnote 3.
the south to the north, and a subsequent return of some Northern San Juan region migrants to the San Juan Basin in the early 1100s. At a local scale, there is evidence for major depopulation of Chaco in the middle and late 1000s, the arrival of new villagers in Chaco Canyon in the very late 1000s and early 1100s, and another wave of migration out of Chaco Canyon in the middle 1100s—the latter not long after the arrival of immigrants in the early 1100s. A steady migration out of the Northern San Juan region occurred in the middle and late 1100s and early 1200s, followed by a major exodus of remaining Northern San Juan populations in the middle to late 1200s, when the region was totally depopulated by Puebloan peoples.8

Concurrently, there is a poorly documented but noticeable influx of Northern San Juan region peoples throughout the San Juan Basin and beyond in the late 1100s and early 1200s, including Chaco, and another influx of Northern San Juan peoples in Chaco Canyon, along Chacra Mesa, throughout the Colorado Plateau and beyond in the late 1200s (e.g., Cameron 2010; Lekson and Cameron 1995).

In brief, this recurring pattern of population movement between adjoining but contrasting geographic regions is a long-standing practice for Puebloan peoples that has continued into historic times. The option to undertake short-term but long-distance migration was still common during the early Historic period (ca. 1600–1800) among the Hopi, Zuni, and Eastern Pueblos as a response to lengthy or severe periods of drought, pestilence, and strife, as well as to undertake short-distance seasonal migrations to occupy distant field areas (e.g., Dockstader 1979:525, 529; Woodbury 1979:472).

Future Research

Although archaeologists and land managers are aware of the 100 or more Chacoan communities and great houses in northwest New Mexico and adjacent areas (Fowler and Stein 1992), there is a surprising dearth of information on communities just outside the national park and especially east of the canyon and west into the San Juan Basin interior. Some poorly known communities are located on private land not subject to federal and state inventory requirements, others are difficult to access by vehicle, and many are far from centers of archaeological research. Nevertheless, these near-park communities have been the focus of the senior author’s research for over forty-five years (e.g., Windes 2018; Windes et al. 2000; Windes and Ford 1992; Windes and Van Dyke 2012) and are essential resources for understanding the origins and nature of the early and later Chacoan world.
Chacoan scholars and park staff need additional information to understand and interpret these extracanyon resources. We need to know more detail concerning the source populations and life histories of these communities, including whether community residents were self-sufficient relative to subsistence. To obtain these data, we need additional inventory around and between communities as currently defined to expand our understanding of territory and permanence. We need to conduct subsurface survey with nondestructive technologies to reveal the nature and extent of the built environment near community centers. We need to remap some of the earliest recognized Chacoan communities, such as Skunk Springs, to better assess the presence and sizes of small houses and their occupation spans. We need to undertake targeted programs of limited testing and analysis to retrieve artifacts and environmental samples that can be associated with their sources. We need to conduct studies addressing local agricultural potential and environmental change. Finally, we need to engage in geographically comprehensive analyses of Chacoan communities with and without great houses to generate better models of how Chacoan society evolved, thrived, declined, and perhaps still persists within extant descendant communities. Most important, protection is needed to ensure that these many resources survive to enable future research and to persist as important places for Native cultures to interact with and acknowledge as part of their ancestral history.

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NOTES

1. Chaco Project archaeologists climbed Cabezón Peak in May 1977 and found a standing historic C-shaped shrine facing east-southeast with lots of turquoise (Windes, shrine notes) and two Archaic points, which were not evident in 2017. A new shrine has replaced the previous shrine. From the top we observed Hosta Butte, the small peaks at the Cerrillos turquoise mines area, and the area of a key Chacoan shrine on Chacra Mesa (29Mc 187) connecting downtown Chaco with the Chaco East Community and Pueblo Pintado (Windes et al. 2000:43). Three other small rock structures are also scattered across the top of Cabezón.
2. In historic times Santo Domingo was part of an extensive visual communications network in the nearby Middle Rio Grande Valley that reached Santa Ana Pueblo, among many other present-day villages and topographic points (Florence Ellis, archive notes, Maxwell Museum). It is probably not fortuitous that the long axis of the old Santa Ana mission church is directly aligned with Cabezón Peak (Windes 2015) and the Ortiz Mountains.

3. Tree-ring data used in this chapter. Figure 3.5 displays reconstructed October–June precipitation values for the Jemez Mountains, northern New Mexico (see Touchan et al. 2011 for a full chronology spanning AD 824 to AD 2007), and reconstructed annual mean–maximum temperature for the San Francisco Peaks (SFP), northern Arizona (see Salzer and Kipfmueller 2005 for a full chronology spanning 663 BC to AD 1996). Van West obtained the Jemez Mt. dataset from the NOAA Paleoclimate website (Touchan et al. 2011; see Stahle et al. 2009) and the SFP data from the Laboratory of Tree-Ring Research (LTRR). Van West converted each chronology to Z scores (standard deviation units) and overlaid each chronology on the same graph. Note: The zero line represents the long-term average value for the entire chronological series. Positive values represent wetter or warmer than long-term normal; negative values represent drier or cooler than long-term normal. Whereas total annual precipitation is a local phenomenon, temperature is a geographically widespread phenomenon.

Figure 3.7 displays the reconstructed Region 2, North American Monsoon Index (NAMI) subannual precipitation indices for the years AD 1900 to AD 2000 (Griffin et al. 2013). Their full reconstruction spans the AD 1896 to AD 2007 period. Van West obtained this NAMI dataset from the NOAA Paleoclimate website. Cumulative moisture values reconstructed for the cool season months of October through April are depicted in blue, whereas the cumulative moisture reconstructed for the summer monsoon months of June through August are depicted in red. These values can be independent of each other. When they are both greater than the long-term mean, they often result in abundant harvests; when both are less than the long-term mean, they often result in drought conditions.

Figure 3.27 displays reconstructed annual total precipitation for the Chaco Canyon area and northwest New Mexico (Dean and Funkhouser 2002) and reconstructed annual mean–maximum temperature for the San Francisco Peaks, northern Arizona (Salzer and Kipfmueller 2005). Van West obtained both tree-ring datasets from the LTRR. She converted each chronology to Z scores and overlaid each chronology on the same graph. Note: The zero line represents the long-term average value for the entire chronological series. Positive values represent wetter or warmer than long-term normal; negative values represent drier or cooler than long-term normal. Whereas total annual precipitation is a local phenomenon, temperature is a geographically widespread phenomenon.
4. Floodwaters measured at a gauge on the Rio Puerco near Cabezon Peak (1952–2012) yielded the highest yearly mean flooding at a mere 24 cfs in August for the 1,088 sq km drainage area above the gauge (BLM 2012:1-4). This is not a reliable amount of water for irrigated farming. Neither is direct rainfall. Near the village of Cabezon, average annual precipitation is 259 mm (10.2 in.), but at the Montano Grant further south, it is only 190 mm (7.5 in.) (Widdison 1958:table 1). Here, as elsewhere across the Colorado Plateau, precipitation is extremely variable.

5. Many former residents moved in with relatives in Albuquerque and other nearby towns. Descendants occasionally visit and a few have returned in recent years to San Luis, where they have refurbished the church and some homes. The other three villages are ghost towns. Individuals continue to use the area for livestock grazing.

6. Huerfano Mesa is the Navajo home of Goods of Value Boy and Girl and First Man and Woman (Van Valkenburgh 1999:55), which overlooks the Dinétah initial homeland. It is a traditional cultural property and a sacred place to Navajo people.

7. Although the early deposits at Pueblo Bonito are buried, it and the other early great houses along tributaries of the Chaco River appear to have been little used in the late AD 800s/early 900s, if we use refuse mound volume as a measurement of activity. Despite early construction, the Kin Bineola, Kin Nahasbas, Una Vida, and probably Chaco East great houses lack substantial early deposits.

8. The recent discovery of a unique megaevent in the last 2,000 years—the massive AD 1257 eruption of Mt. Samalas’s volcano on Indonesia—should be of great interest to archaeologists. The ejecta from this volcanic eruption darkened much of the world in 1258 and 1259 and caused widespread starvation from crop failure across the northern hemisphere (Guillet et al. 2017:fig. 4; see Windes 2019:45–48). Interestingly, this was a period of greatly decreased precipitation and cooler temperatures in the Northern and Southern San Juan and during a widely acknowledged depopulation.

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