Chapter 7

PUEBLO I (A.D. 750-900)

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GENERAL INTRODUCTION TO PUEBLO I RESEARCH

There is recent evidence that the Pueblo I period (A.D. 750-900) was one of rapid demographic and organizational change throughout the San Juan drainage basin (e.g., Kane 1989; Varien et al. 1996; Wilshusen and Ortman 1999; Wilshusen and Schlanger 1993). In the A.D. 800s, a number of highly aggregated but short-lived Pueblo I villages in southwestern Colorado rivaled in size the large settlements of the late Pueblo III period. The study area appears to have experienced substantial population decline at the end of the A.D. 800s. Recent increases in the quality and quantity of evidence from southwestern Colorado and northwestern New Mexico allow one to trace the movements of populations and communities, and to relate these events to developments in the San Juan Basin, including the Chaco Canyon area. To understand where Pueblo I research stands at present, the history of archaeological work of this period is briefly reviewed.

Research on Pueblo I sites dates back to almost the beginning of formal archaeological work in the Four Corners. As early as 1913-1914, Earl Morris (1919b) excavated or tested a number of Pueblo I habitation sites (Morris Sites 9, 11, 12, 13, and 17). Morris recognized these sites as representing a potential transitional site type between earlier Basketmaker sites and the later cliff dwellings on Mesa Verde. Strides were made in identifying and characterizing Pueblo I as an identifiable stage of cultural development at the first Pecos Conference (1927). In the Pecos Classification, the stage was characterized by a population that practiced cranial deformation and lived in rectangular masonry pueblos. Sites of this stage could be identified by gray pottery with neckbanding. Until the last few years, an expanded attribute-based version of this same system served to identify Pueblo I sites. As it has become clear that all parts of the Southwest did not go through all of Kidder's developmental stages at the same time, Pueblo I increasingly has been defined as a period of time with specific changes associated with particular areas.

Though the first Pecos Conference was a momentous gathering, there were still misgivings after the conference about the transition framed by Basketmaker III, Pueblo I, and early Pueblo II (e.g., Woodbury 1993:108-110). This transition had previously been denoted by a muddle of various terms—post-Basketmaker (Basketmaker III), pre-Pueblo or slab house (Pueblo I)—and the new Pecos terminology changed little in terms of the available data on this interval. With the conclusion of the Pecos Conference, a renewed interest in the transition between Basketmaker and Pueblo emerged and some of the best work at Pueblo I sites occurred between 1928 and 1938 (Brew 1946; Martin 1938, 1939; Morris 1939; Morris 1959; Roberts 1929, 1930, 1939a). This post-Conference work focused on 1) delimiting the length of time that the Basketmaker to Pueblo transition took, 2) understanding how populations and their lifeways changed, and 3) understanding how these developments underpinned (or underlay) large sites such as Pueblo Bonito (Judd 1922, 1924). Many of the inherent previous assumptions about the Pueblo I transition—such as its assumed length of many hundreds, if not thousands, of years (Morris in Lister and Lister 1968:93-95) and the assumption that Pueblo I habitation sites were necessarily

smaller and simpler than later sites (see Brew 1946:219)—were shown to be erroneous by this research.

In spite of the relative success of the Pecos Classification, most researchers recognized a wide diversity of house types, pottery types, and site layouts within Pueblo I (e.g., Morris 1939:29-33). There was little success in tearing the developmental scheme (in other words, how people's lives changed in particular places) from the chronological scheme (when something occurred in time). Between the 1950s and 1970s a variety of local developmental schemes (Figure 7-1), typically using Willey and Phillips' (1958) phase-based classification, were devised for different locales in southwestern Colorado or adjacent areas (Brew 1946; Eddy 1972; Hayes 1964; Kane 1984; O'Bryan 1950; Reed 1958; Rohn 1977). Simultaneously, methodological strides were made in absolute dating methods (e.g., Dean 1978; Long and Rippeteau 1974), ceramic classification (Breternitz et al. 1974), and other common means to construct regional chronologies. While there was progress in documenting and dating change at the local level, there was still limited success in explaining why change occurred regionally. All this became the focus of attention in the 1970s.

Though there were numerous studies of change and scientific explanation in the 1970s, Fred Plog's *A Study of Prehistoric Change* (1974) was the first to focus on the questions of why and how the shift from Basketmaker to early Pueblo may have occurred. Plog argued that by examining the more general dimensions of population (i.e., variables such as population density and structure), differentiation (i.e., diversity of activities), integration (i.e., the coordination of activity), and energy, it might be possible to explain the broad changes that occurred from the Basketmaker to Pueblo periods. Plog (1979) and Cordell (1979), as well as others (see summary in Cordell 1984:230-242) concluded that changes in demographic strategies, productive strategies, and social organization were at the heart of any explanation of Pueblo I. However, the "big picture" that Plog and Cordell attempted to elucidate simply was not testable with much of the spotty and disparate archaeological data for Pueblo I that was available at that time. Their challenge to think outside the "norms" of the Pecos Classification drew much attention, but required much more hard data than was readily available to actually test their proposals.

In one of the early attempts to pull data together at a larger than regional level, Michael Berry (1982) offered a radical model of population movements that was in accord with the Pecos Classification periods. However, Berry's database and methods were argued to be flawed (Dean 1985; see Berry 1985), and though Berry's argument was fascinating to many archaeologists, it did not win sufficient adherents to become accepted as a major research focus in the Southwest. It is ironic that Berry's argument was built to exploit the strengths of the biased excavation samples that hindered progress on the questions proposed by Plog and Cordell.

Fortunately, in the 1970s a number of massive projects could be turned toward some of the pressing questions of the day. Among these projects were the Mancos Canyon Road project (Colorado), the DAP (Colorado), Black Mesa (Arizona), and aspects of the Chaco project (New Mexico). Each of these projects offered a different twist on Pueblo I, and each focused on particular research problems. Though the substantive results—especially for the projects in the study area—are addressed later in this chapter, a brief overview of the work of each project is offered here to place the research of the last 30 years into context.

In one of the first attempts to rethink the "pithouse to pueblo" transition or the "Basketmaker-Pueblo transition," Gillespie (1975, 1976) examined a late Pueblo I site, the Ute

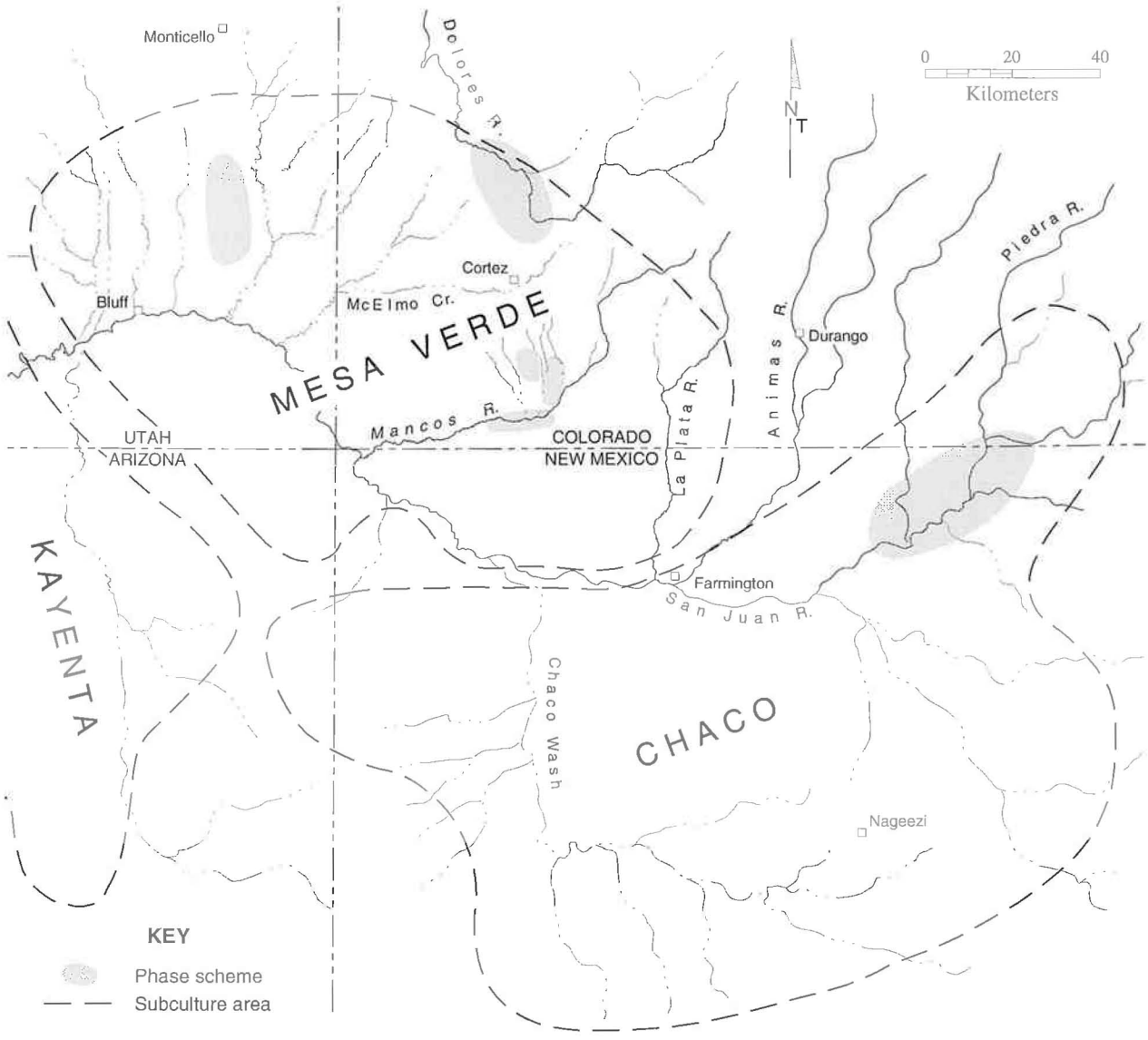

Figure 7-1. Kidder's (1962) original definition of the spatial extent of the Mesa Verde and Chaco "sub-cultures" in the San Juan River drainage basin and relative locations of different phase schemes for the northern half of the San Juan region (Wilshusen and Ortman 1999:Figure 1). (Reprinted with permission of *Kiva*.)

Canyon site. The site consisted of approximately 30 rooms and had a robust record of construction in the middle to late ninth century. Gillespie's model of site formation and use assumed that there is increasing population and that multigenerational use of a site might result in differentiation between pithouses and surface rooms, as well as increased use of surface rooms for a wider range of activities than just storage or seasonal use. Gillespie's focus was on changing architectural use through time and the shift to new architectural forms such as "kivas."

The work at Black Mesa was contemporary with Gillespie's research, but Black Mesa had a much more limited Pueblo I occupation (Plog 1997:112) than did southwestern Colorado. Patricia Gilman (1987) made the most of the Black Mesa data to propose a model of architectural change that emphasized the functionally adaptive qualities of pit structures and pueblos. The use of pit structures was tied to seasonally variable economies in which people made seasonal residential shifts between summer and winter resource bases. Pueblos were seen as structures that were favored in more stable and intensive economies in which people did not make dramatic seasonal moves. Much of the argument was built on the evidence from the one relatively large Pueblo I site on Black Mesa, an A.D. 800s pueblo with 39 rooms (Green et al. 1985).

The Chaco project documented a relatively large number of small Pueblo I unit pueblos (Hayes 1981:75; though see Windes 1993:339-340 for questions about the dating of these sites). Certainly there were many more Pueblo I sites at Chaco in comparison to Black Mesa. The Chaco Wood project (Windes and Forde 1992, 1996) confirmed the presence of late ninth century and early tenth century construction at three early Chaco great houses with room blocks of approximately 15 to 35 rooms. However, Chaco, Black Mesa, and even earlier projects at Mesa Verde (Hayes and Lancaster 1975), were overshadowed by the scale of the DAP investigations in Pueblo I which followed and the intensity of the Pueblo I occupation documented in the Dolores area.

The DAP intensively investigated over 50 Pueblo I sites, and it was distinguished from other projects by the very large size of the late Pueblo I sites in the Dolores drainage (Breternitz et al. 1986). In addition, the variability in the organization of these villages and an impressive Pueblo I abandonment in the A.D. 880s and 890s made for interesting Pueblo I research. The Dolores villages clearly were "villages" with a minimum of 50-100 rooms. Seven Dolores villages were potentially contemporary with up to 15 other known villages in the region that dated to A.D. 840-880. The villages had distinct evidence of variable social organization in different villages (Kane 1989; Wilshusen 1989, 1991; Wilshusen and Ortman 1999), and these organizational differences corresponded to abandonment differences in the A.D. 880s. So much information has been produced by major projects such as Dolores, Chaco, and other more recent cultural resource management projects, that only in the last years have researchers begun to effectively summarize and synthesize the findings (e.g., Kohler 1993; Lipe 1998).

The objectives of the chapter are to build on this total history of research and to briefly summarize what is known about Pueblo I chronology, site types, regional site distributions, subsistence patterns, and the mobility and/or persistence of Pueblo I communities. Though artifacts and specific site records are an incredibly important aspect of the total data, they are not the focus here, in order to keep the attention on drainage unit and regional patterns. A requirement for addressing key problems for Pueblo I is obtaining accurate estimates of regional populations for southwestern Colorado, southeastern Utah, and northwestern New Mexico. This might allow researchers to establish Pueblo I cultural identities and to understand the regional dynamics. Because at least 4,539 Pueblo I site components have been recorded in southwestern Colorado and

that this represents 34 percent of all prehistoric site components in the study area reinforces the importance of Pueblo I research for this study.

CHRONOLOGICAL CHANGE AND CHARACTERIZATION OF THE RECORD

A variety of relative and chronometric methods is commonly used to place sites or cultural materials in the Pueblo I period. The relative dating methods include changes in settlement patterns, architecture, site layout, and ceramic styles that broadly separate Pueblo I from Basketmaker III and Pueblo II sites. Specific shifts in house or site construction generally characterize Pueblo I, but a certain amount of architectural variability is specific to particular locales or to particular time intervals of Pueblo I. Changes in ceramic styles allow a more accurate and precise placement of sites to specific periods of time, but again may vary depending on the area one is examining. Several chronometric methods are used to date potential Pueblo I sites and include—in order of higher to lower precision—dendrochronology (tree-ring dating), archaeomagetic dating, and radiocarbon dating, especially accelerator mass spectrometry (AMS) dating. Other chronometric methods, such as thermoluminescent dating of burned materials,are still in the experimental stage but do show some promise. This section briefly reviews the broad changes in architecture and site plans characteristic of the period, lists key sites that have been well dated with tree-ring samples, and notes some of the specific changes in ceramic styles and site layouts that promise to let researchers better date surface evidence in the future.

Broad Trends in Pueblo I Sites

Recent work has confirmed that the period between A.D. 750 and 950 was one of rapid demographic and organizational change not only throughout the study area, but also throughout the San Juan drainage basin (Kohler 1993; Wilshusen and Wilson 1995; Wilshusen and Ortman 1999). Between the late A.D. 700s and late 800s, there were at least three periods in which aggregated, but short-lived Pueblo I villages dominated portions of the southeastern Utah, southwestern Colorado, and northwestern New Mexico landscapes (Orcutt et al. 1990). The study area appears to have several intervals when population increased rapidly in particular drainage units. By the A.D. 880s and 890s, there was a substantial population decline across southwestern Colorado and an attendant population increase in northwestern New Mexico. To understand these changes in any detail would require that one looks outside the study area and examines the whole San Juan drainage basin. For the purposes of this study, it is possible only to summarize the broad trends, and not necessarily explain them.

In the past, the Pueblo I period has been characterized as one in which above-ground masonry habitations become more common architectural features than below-ground pithouses (Kidder 1927; Plog 1979). Yet on surface surveys, the evidence of these early masonry rooms is often difficult to see and often obscured or obliterated by historic disturbances such as plowing. The ceramic assemblages at early Pueblo I sites are similar to Basketmaker III sites in that the pottery sherds are primarily plain gray, and it is simply the small percentages of neckbanded gray ware, and decorated red wares and white wares that betray a post-A.D. 750 date. Plog (1979:115) characterized the evidence for Pueblo I change as "diverse and disparate if not contradictory."

Part of what has made the period difficult to interpret from a settlement perspective is that although there are distinct areas in the study area where population is aggregated into large villages of 75-400 rooms, there are other nearby drainage units where contemporary populations are settled on the landscape in dispersed hamlets of 3-20 rooms. What makes this even more

complicated is that the villages typically last only for 30-40 years and then break up so that the local drainage unit landscape is often depopulated for a time thereafter. At that time, these villages may contribute to population growth in another drainage unit, or the people may even leave the Four Corners area. As a consequence, it is impossible to characterize architectural or settlement change in the whole region by examining only a few particularly well documented sites. It is possible to point out general trends in the location of Pueblo I population aggregates throughout the 150 years of the period, but both villages and hamlets by themselves can date between A.D. 750 and 900 based on dates for these two distinct settlement forms across the study area.

In terms of site layout, the greater tendency is to a regular site layout with room blocks to the north and pit structures to the south in the western drainage units (Monument-McElmo, Mesa Verde-Mancos, Dolores). In the eastern drainage units (La Plata, Animas, and Upper San Juan-Piedra), there is more of a northwest/southeast alignment and considerably more variability in site layout. Middens are similarly aligned, being south of pit structures in the western drainage units and in the eastern half of the site in the eastern drainage units (Figure 7-2). It is possible that local wind patterns have a great deal to do with site layout, given that pit structures and surface structures require clear alignments for fresh air for their ventilators or chimneys, and given that middens would preferably be located downwind. In many cases, a secondary midden is immediately north of the larger room blocks, suggesting that the roofs of surface structures may have served as work areas with limited amounts of trash from these areas deposited on the ground immediately north of these structures. Plaza work areas, with hearths, ramadas, and other work features, are typically located between the pit structure and the surface structures.

In terms of surface architecture, some broad changes do materialize between A.D. 750 and 900. Surface structures become more well built and incorporate more stone into their wall construction through most of the Pueblo I period. This is only a general trend, and when one looks at specific Pueblo I sites built over a period of less than a generation, it is possible to find jacal-style walls, earth-and-stone walls, composite walls (earth, stone, and vegetal materials), and almost complete masonry walls in the same pueblo. There is considerable variability, but generally much more stone is incorporated into surface wall construction by A.D. 850, when compared to A.D. 750 (Hayes and Lancaster 1975:183; Wilshusen 1988b:623). However, this trend reverses itself by the A.D. 880s and 890s through the 930s in many parts of the study area or adjacent areas (Dykeman 1986; Eddy 1966:493; Lipe, Kohler et al. 1988:1235; though see Gillespie 1976), and surface structures become secondary in size and construction to pit structures.

In the construction of pit structures, one distinct trend is deeper excavation of pit structures through the period (Hewitt et al. 1983; Wilshusen 1988b:615). The material consequences of this are that pit structure roofs at A.D. 750 would have been 50 cm to 75 cm above the ground surface, whereas pit structure roofs at A.D. 850 would have been almost level with the ground surface, assuming that a 2 m high interior space was required for people to stand upright. Again, by the A.D. 880s and 890s this trend is reversed in some parts of the study area, with the appearance of small "pocket" pit structures with roofed floor areas of 12 m^2 and floor depths of 1.25 m below prehistoric ground surface (Lightfoot et al. 1993:81-90; Wilshusen 1988a, 1988b:626; Wilshusen et al. 1999).

Pit structures are typically square to rectangular with rounded corners in plan, and function with ventilators rather than antechambers by A.D. 750. Almost all roof construction is based on a four post, almost square plan, with about two-thirds of the roof area between the posts. This means that a cantilevered roof is likely, with about one-third of the weight of the roof carried

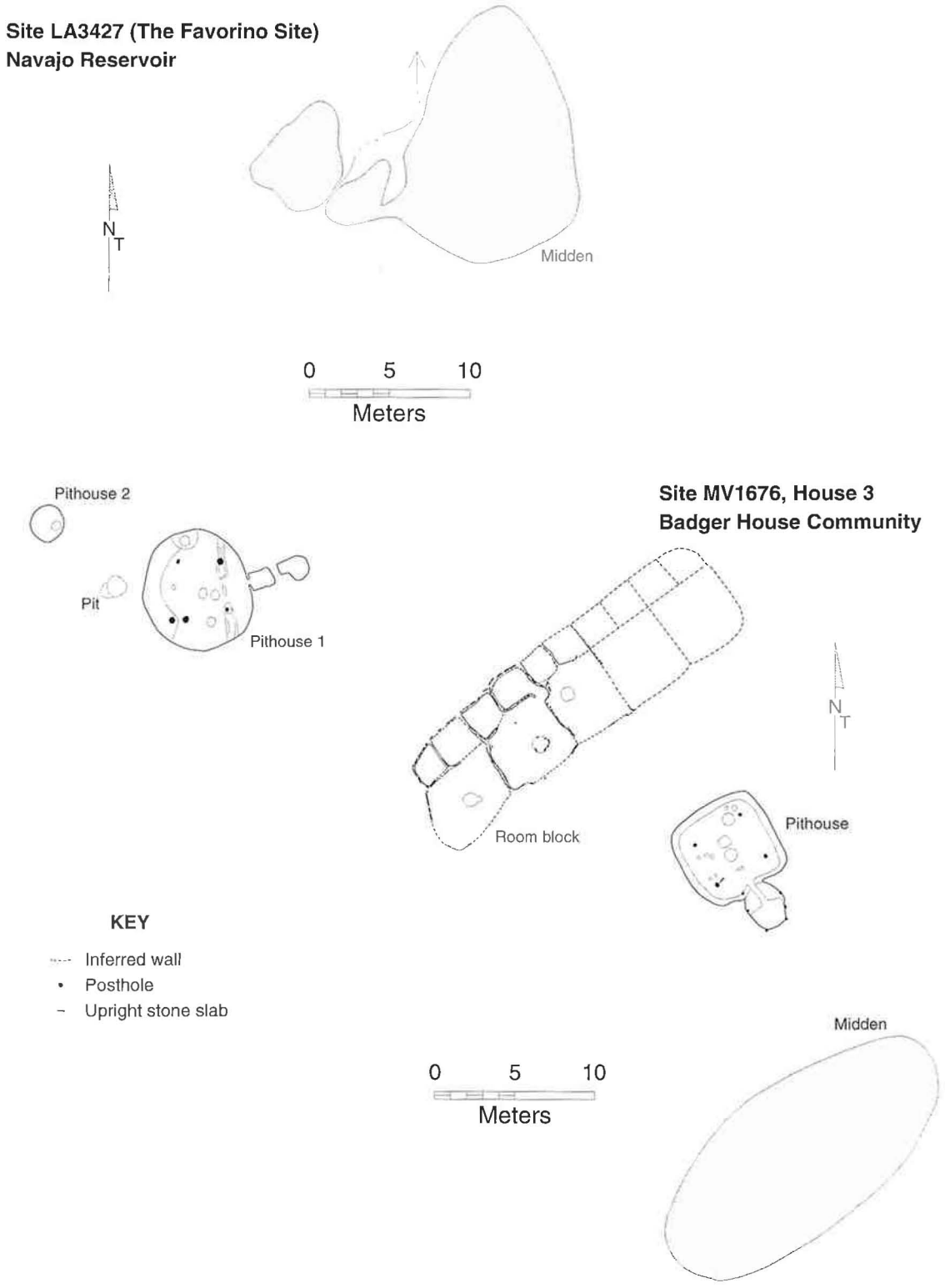

Figure 7-2. Comparison of a single-residence hamlet typical of the eastern portion of the study area (Favarino site from the Upper San Juan-Piedra drainage unit) and a multiple-residence hamlet from the western part of the study area (House 3 at Badger House Community from the Mesa Verde-Mancos drainage unit) (after Eddy [1966:Figure 9] and Hayes and Lancaster [1975:Figures 2, 12, and 13]). (Reprinted with permission of La Plata Archaeological Consultants.)

around the edges (Figure 7-3). In the cases where roofs have been destroyed by fire, it is possible to reconstruct these roof designs in considerable detail. Primary beams typically would have had diameters of more than 20 cm; secondaries, diameters of 10-15 cm; and tertiaries, diameters of 6-12 cm. Closing material consisted of smaller plants such as sagebrush or juniper branches typically covered with a layer of earth at least 15-30 cm thick. Early in the Pueblo I period, the greater tendency is to have pit structure benches with posts or rafter beams incorporated to either help hold up the exterior edges of the roof or to provide interior "attic" space (see Wilshusen 1988b). Functional benches are much less common after A.D. 800, until approximately A.D. 950, when benches are increasingly common.

Well-dated Pueblo I Sites: A Baseline for Future Work

Tree-ring dating is "independent" of archaeological context and systematics (Dean 1978:226). It is a potentially powerful tool for dating deposits, but it also must be carefully evaluated for applicability in each case. Over the last 20 years archaeologists have understood that tree-ring dates often represent reused or stockpiled timbers (Ahlstrom 1985; Dean 1969a), and that there may be may sources of variability in the tree-ring record (Ahlstrom 1997). A particularly good example of a well-dated Pueblo I structure in the Monument-McElmo drainage unit, the Duckfoot site, 5MT3868 (Lightfoot 1992, 1994), is illustrative of the issues one may face in using dendrochronological analysis to date the construction and use of structures at a site. Duckfoot had a suite of 375 tree-ring dates, with more than 50 percent representing cutting dates, or the likely year that a tree was cut down or died. Though a 99-year span occurred between the earliest cutting date (777 A.D.) and the latest cutting date (A.D. 876), the construction and use of the site dated from the mid-850s to the late 870s based on a careful contextual analysis of the dates and date clusters. In the examples of sites in Table 7-1, researchers are not blessed with nearly as many tree-ring samples or as well-documented contexts as the Duckfoot site, so some caution must be exercised. It is still a remarkable beginning for dating Pueblo I developments in southwestern Colorado.

Table 7-1. Important Tree-ring Dated Sites in the Context Area with Pueblo I Construction Dates.

Site Number and Reference	Type of Site	Drainage Unit	Probable Date (A.D.)
MV1676 (Hayes and Lancaster 1975) Room block 3	hamlet	Mesa Verde-Mancos	750s
Ign 7:23 (Dean 1975)	hamlet	Animas	760s
Ign 7:30 (Carlson 1963)	hamlet	Animas	760s
Ign 7:31 (Carlson 1963)	hamlet	Animas	760s
Ign 7:36 (Carlson 1963)	hamlet	Animas	760s
5LP481 (Fuller 1988a)	hamlet	Animas	760s
5MT2236 (Kane and Chenault 1982)	hamlet	Dolores	760s

Morris Site 23 (Morris 1939)	village	La Plata	760-780s
5MT8838 (Morris 1988c)	hamlet	Monument-McElmo	770-780s
5LP110 (Gooding 1980)	hamlet	Animas	770s
5LP115 (Hibbets 1976)	hamlet	Animas	770s?
5MT2193 (Brisbin et al. 1986)	hamlet	Dolores	770s
5MT4644 (Brisbin 1986b)	hamlet	Dolores	770-790s
5MT2108 (Martin 1938)	hamlet/village	Dolores	770s
5MT2181 (Etzkorn 1986)	hamlet	Dolores	780s
5MT2182 (Fields and Nelson 1986)	hamlet	Dolores	780-790s
5MT2848 (Hewitt 1986)	hamlet	Dolores	780s
5MT8794 (Morris 1986a)	field house	Dolores	780s
5MT23 (Lipe, Kohler et al. 1988)	village?	Dolores	790s
5DL2 (Cavanaugh 1982)	hamlet	Monument-McElmo	early 800s
5MT5478 (Spears 1982)	hamlet	Monument-McElmo	early 800s
5DL1120 (McNamee and Hammack 1992)	hamlet	Monument-McElmo	810s
MV1676 (Hayes and Lancaster 1975)	village	Mesa Verde-Mancos	810-860s
5MT2831-Morris 33 (Morris 1939)	village	Mesa Verde-Mancos	820-840s, 860s
5LP379 (Adams 1982)	hamlet	La Plata	830s
5MT4002 (Riches and Biggs 1983)	hamlet	Dolores	830s
MV107 (O'Bryan 1950)	hamlet	Mesa Verde-Mancos	830s
5MT2559 (Farmer 1977)	large hamlet?	Mesa Verde-Mancos	830-850s
5MT2826 (Reed et al. 1985)	village	Mesa Verde-Mancos	830-840s
MV1 & 102 (O'Bryan 1950)	hamlet	Mesa Verde-Mancos	830-840s
MV1930 (Smith 1987)	great kiva and village	Mesa Verde-Mancos	830-870s, 890s

5MT2347, 5MT2350 (Farmer 1977; Gillespie 1975)	small village?	Mesa Verde-Mancos	830-880s, later 920s
McPhee Village: 5MT4475, 4477, 4480, 4725, and 5107 (see Kane 1986b for summary)	village	Dolores	830-870s
5MT23 (Lipe, Kohler et al. 1988)	village	Dolores	830-880s
MV105 (O'Bryan 1950)	hamlet	Mesa Verde-Mancos	840s
MV58-Slab House (Robinson and Harrill 1974)	hamlet?	Mesa Verde-Mancos	840s
5MT4006 (Riches and Biggs 1983)	hamlet	Dolores	850s
5MT4007 (Riches and Biggs 1983)	hamlet	Dolores	850s
5MT3868 (Lightfoot 1994)	hamlet	Dolores	850-870s
5MT2108 (Martin 1938)	village	Monument-McElmo	850-870s
LA 4408 (Eddy 1966)	hamlet	Upper San Juan-Piedra	850-890s
5MT2182 (Wilshusen 1986b)	village	Dolores	860s
MV1966 (Smith 1987)	hamlet?	Mesa Verde-Mancos	860s
5LP2164-Morris 25 (Morris 1939)	village	La Plata	870s
LA 4086 (Eddy 1966)	hamlet	Upper San Juan-Piedra	880s
Far View No. 12 (Robinson and Harrill 1974)	?	Mesa Verde-Mancos	890s
5MT8653 (Birnie 1993)	?	Ute	930s?
5MT8371 (Dykeman 1986)	hamlet	Monument-McElmo	930s

If the above data are viewed simply, one would reconstruct a history in which villages emerge by the early ninth century and become more common through the ninth century. At least two obvious deficiencies can be identified. If one scans the above table, there is potential bias in where excavation has occurred and a clear bias on only sites in the state of Colorado. What is not obvious in the table of tree-ring dated sites are the contemporary population centers just across the state borders in Utah, New Mexico, and Arizona. When one considers well-dated sites from these adjacent areas, a much more complicated settlement picture emerges. This is considered in a following section on settlement patterns. Similarly, the excavation focus on the Mesa Verde-McElmo, Dolores, Monument-McElmo, and Animas drainage units has also somewhat skewed the picture. Again, this will have to be balanced against surface evidence at sites in less well

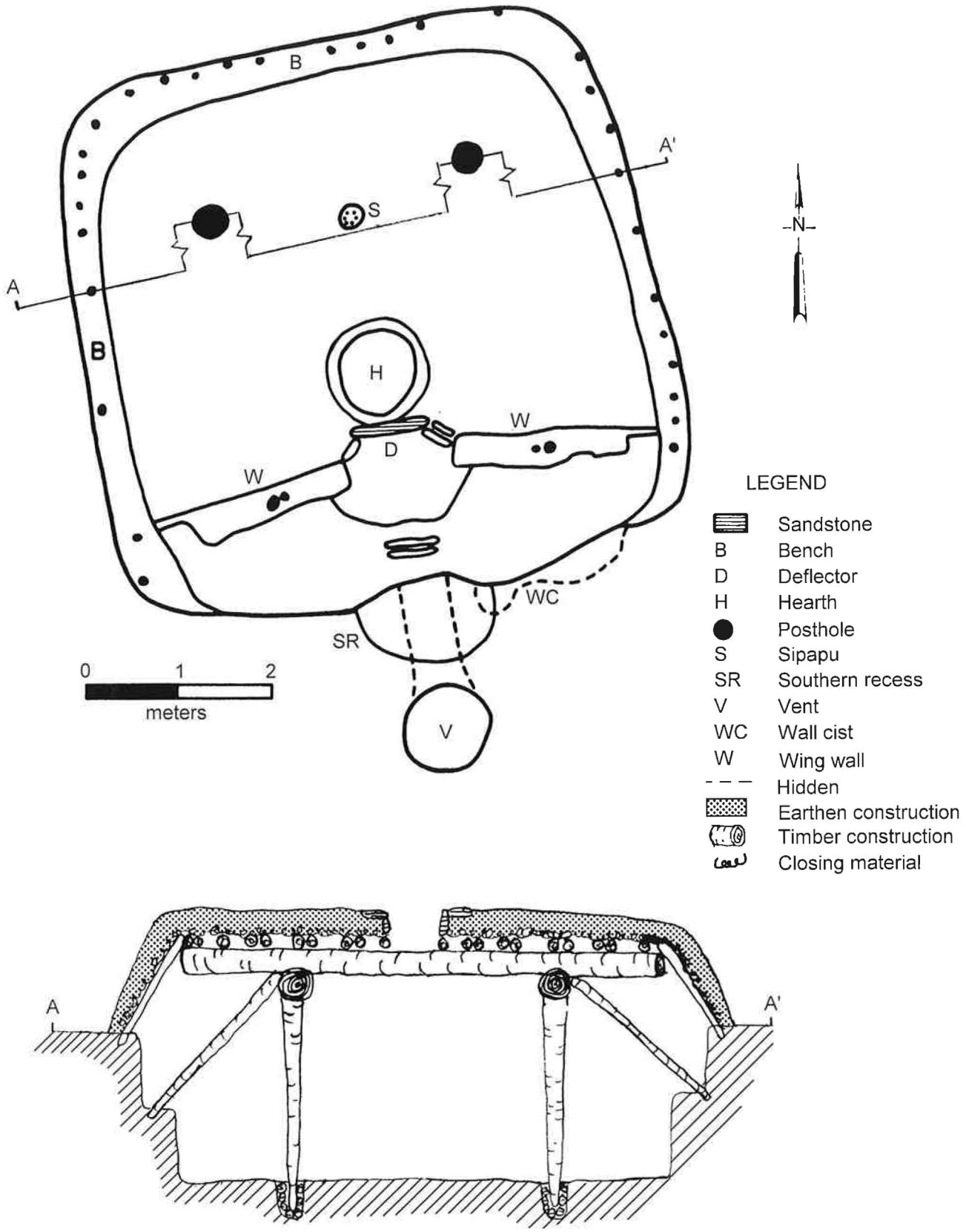

Figure 7-3. Plan view and architectural reconstruction of Pit Structure 2 at Windy Wheat hamlet (site 5MT4644). Reconstruction shown in profile (after Wilshusen 1988b:Figures 18.1 and 18.8).

represented areas to create a more complete picture of the Pueblo I occupation of southwestern Colorado.

Tree-ring dates have also been used to calibrate models of ceramic change, so that chronological seriations of stylistic and technological changes are possible (Blinman 1988b; Breternitz et al. 1974). Given that at least 4,539 Pueblo I site components have been recorded in the study area, ceramic chronologies are still much more important than tree-ring dating or other absolute dating methods for building regional chronologies.

Ceramic Chronology

Given the wealth of archaeological investigations in Pueblo I sites over the last 20 years, general trends in ceramic change, architectural change, and other technological and stylistic changes are relatively well documented. A review of the key points in Blinman (1986a, 1988a, 1988b), Wilson and Blinman (1993), Hegmon (1995), and Hegmon et al. (1997)—among others—should illustrate the key ceramic changes. Blinman's (1988a) review of the ceramic dating scheme devised for Dolores in addition to Wilson and Blinman's (1993) review of Upper San Juan pottery are the most used references for current work with Pueblo I pottery. Both references build upon the fundamental synthesis for ceramic dating for this region (Breternitz et al. 1974). Though there has been important work in the portion of the Monument-McElmo drainage unit just to the west in Utah as well as the areas west of Montezuma Creek and south of the San Juan River in Utah (e.g., Davis 1985; Hurst et al. 1984), the dating of ceramic change in this area is less well understood.

In many cases in the Mesa Verde and Dolores areas, it is possible to find sufficient "information" in the ceramic assemblage on a Pueblo I residential site to create a formula for actually estimating the occupation date of the site within 25-50 years (e.g., Dykeman 1986:83-87; Wilshusen and Blinman 1992:256). While the Dykeman formula is still in use, the regression equation for change in gray wares between A.D. 750 and 900 has proven less applicable across the Four Corners area. There has been an assumption that neckbanding as a decorative element is nearly universal in Pueblo I contexts (Kidder 1927; Wilshusen and Blinman 1992), but work in the Upper San Juan-Piedra drainage unit over the last five years has made it clear that the amount of neckbanded gray ware is much less, and the arrival of this style much later, than is common at sites in the Mesa Verde-Mancos, Dolores, and Monument-McElmo drainage units. Similarly, changes in white ware styles, once thought to be relatively uniform spatially, now are seen as more variable. For example, though Piedra Black-on-white is confidently found in Dolores collections as early as A.D. 765 (Blinman 1988b:520), it is not encountered with any regularity in some Upper San Juan-Piedra collections until the mid-ninth century (Adams 1975:159-161; Wilson and Blinman 1993:33) and possibly not until after A.D. 875 (Wilshusen et al. 1999).

If the Four Corners area is divided into the centers of distinct decorative styles and technological production traits at about A.D.840 (Figure 7-4), it is possible to suggest that three slightly differing ceramic subtraditions exist (see Breternitz et al. 1974). These three areas, while sharing a great deal of similarity in styles, production technique, and their uses for pottery, may have more distinct cultural histories than was suspected in the past, and as a consequence, ceramic changes may characterize each of them separately, yet may not be widely shared. Given that Pueblo I ceramic assemblages are almost always composed of 80-90 percent (or more) of plain gray sherds, one must necessarily return to the presence or absence of ceramic types that are particularly diagnostic of a temporal period and locale. For example, in the case of many of the

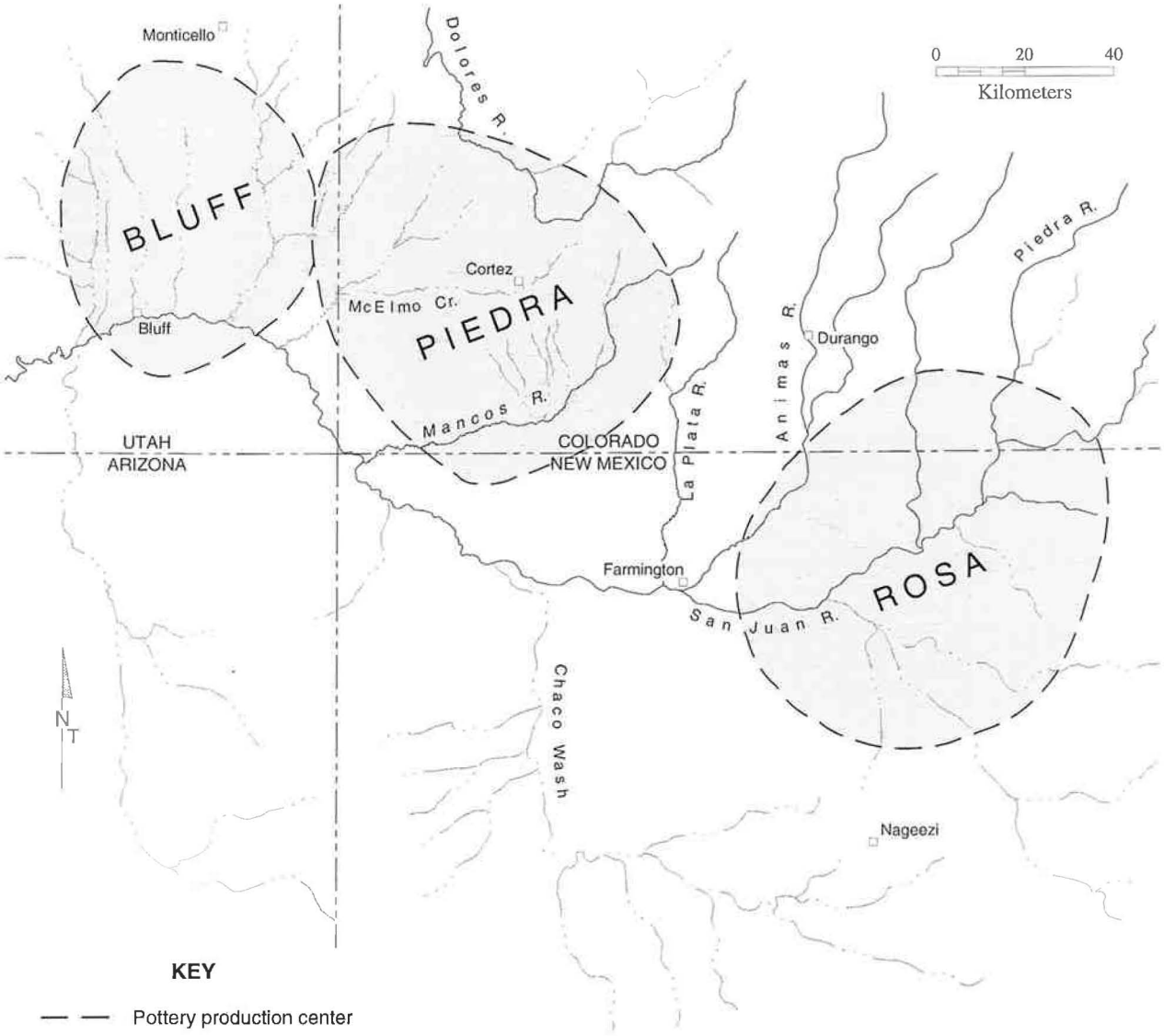

Figure 7-4. Relative centers of red ware and white ware ceramic production at approximately A.D. 840 (Wilshusen and Ortman 1999:Figure 6). (Reprinted with permission of *Kiva*.)

middle to late Pueblo I sites in the Upper San Juan-Piedra drainage unit, the presence or absence of key types such as Rosa Black-on-white or Piedra Black-on-white is important, along with site layout and architecture, for assigning the site to either a pre- or post-A.D. 850 context.

In the next two to five years, there should be a number of statements about ceramic change in the Pueblo I period in the eastern drainage units, so possibly some of the confounding variability noted above will be settled. The key need at this point is to assess how much ceramic assemblage variability there is for contemporary sites that are well dated with tree-ring samples and which have large, well-provenienced ceramic assemblages, but represent different parts of the context area. At present, certainly the Upper San Juan and Mesa Verde ceramic traditions appear sufficiently distinct to warrant careful comparison.

Other Absolute and Relative Chronologies for Pueblo I Sites

Architectural changes in early Pueblo contexts are well documented for the Dolores (Hewitt et al. 1983; Wilshusen 1988b), La Plata and Mesa Verde-Mancos (Morris 1939), and Monument-McElmo drainage units and many other adjacent out-of-state areas (e.g., Brew 1946; Bullard 1962), but no synthesis of the dated architectural changes really stands as an independent means of dating sites beyond generally placing them in or out of the Pueblo I period. Broad trends occur in architectural change, such as increasing pit structure excavation depth through most of the Pueblo I period, but this broad trend is not totally consistent across the context area, and late in the period, the trend abruptly reverses. The same general statement could be detailed for the presence or absence of particular pit structure features such as benches, four- or six-post roof construction, wing wall construction, as well as the particulars of surface room construction. It is difficult to find a single set of architectural attributes that taken together may produce a real "construction" date estimate for a site. Some of these changes are discussed in more detail under the site type descriptions in the following subsection.

The accuracy and precision of other dating techniques such as archaeomagnetic dating (Eighmy and Sternberg 1990), AMS radiocarbon dating, and thermoluminescence have been improved. However, tree-ring dating remains the "gold standard" for precision. Its main drawback is that tree-ring samples are found only in very dry or burned contexts and this necessarily may bias the record for this type of dating (Ahlstrom 1997).

SITE TYPES

Seven different site types are proposed as meaningful for understanding Pueblo I settlement patterns: 1) villages, or settlements with evidence of at least 15-20 households, or 50 or more rooms, 2) multiple residence sites (large hamlets) that have evidence of anywhere from three to seven households, 3) one- to two-household residences (small hamlets), 4) public architecture such as great kivas or landscape sites such as petroglyph panels or shrines, 5) field houses, which were seasonally used residences or storage and processing facilities close to fields, 6) nonresidential artifact scatters with features, and 7) nonresidential artifact scatters with no apparent features, other than for artifact concentrations (see Wilshusen 1995 and Wilshusen et al. 1999). A variety of site types (e.g., Eddy et al. 1984:7-12) and means of defining site types (e.g., Sebastian 1983) have been proposed, but there are merits in limiting the total number of types to fewer than 10. By doing so, it is possible to recognize variability in the data to generate currently applicable site definitions, and to allow for future revision based on additional archaeological reconnaissance data or changing research assumptions. The last two site types include what have

often been called limited activity sites in the past. They are given more descriptive terms in this analysis simply to emphasize how little is known about how they functioned within a larger settlement pattern.

Site types are identified by discussion and illustration using excavated sites from the study area. It is impossible to illustrate the full range of temporal variability for the 150-year range of the Pueblo I period or the diversity of cultural differences across the study area, but variation is mentioned for key architectural features. In most of the cases discussed here, excavated sites are the focus. However, the majority of the data for the study area come from survey or limited testing, and so a certain amount of discussion also focuses on how different site types may appear as surface remains.

Villages

Villages, or settlements with a minimum of 50 contiguous or near-contiguous surface rooms, were a distinctly new phenomenon in the Pueblo I period, but near the end of the period probably more than half of the population in the northern San Juan was living in villages. The earliest villages in the study area were probably along the western edge of the Monument-McElmo drainage unit and slightly later in a band stretching from the southern portion of the Mesa Verde-Mancos unit to the Animas drainage unit. Limited excavations have been undertaken in these earliest villages (e.g., Morris 23 described in Morris 1939), so the focus here is on villages dating to the last, and possibly the most extensive, interval of village formation, dating to A.D. 840-880. In this period a broad band of villages stretched from the Mesa Verde-Mancos drainage unit across the uplands of the Great Sage Plain that form the border of the Dolores and Monument-McElmo boundary and into southeastern Utah (Figure 7-5).

The known villages (Table 7-2) for this 40- to 50-year interval suggest that the average size of a single village is 123 rooms (with a standard deviation of 73), with 15 associated pit structures (assuming 80 percent occupancy of potentially contemporary structures). The sites listed in the table provide a baseline for estimating the number of sites for this period. Pueblo I villages are sometimes difficult to document from surface evidence, especially in locations where they have been affected by plowing or other agricultural activities. In well-preserved situations they are evident as low mounds denoting room blocks, slight depressions marking possible filled-in pit structures, and large, low trash areas to the south or east of the architecture.

Based on chronometric data from a number of excavated villages, most appear to have been short-lived, with an average occupation span of 25-40 years. Though the average use life of Pueblo I villages may strike some as surprisingly short, it actually compares favorably with a worldwide cross-cultural sample of prestate villages (Wilshusen 1991:55). It should be emphasized that the villages in Table 7-2 are only about half of the known Pueblo I villages in the study area, since there are many villages in the area with primary occupations predating A.D. 840 (e.g., Cirque site, Boon Pueblo, Crossroads site, Blue Mesa, Sacred Ridge, and many of the Morris sites). For about half of the listed villages, such as the Dolores villages, the time placement to the A.D. 840-880 interval is relatively precise because it is based on substantial excavation data and tree-ring dated structures. In other cases, the placement is based on extensive surface inventories of sherds dated by a very refined ceramic chronology (e.g., Wilshusen and Blinman 1992). A best guess is that the period of maximum occupation of all the villages was approximately 860 A.D., based on tree-ring dated construction timbers at excavated sites and ceramic assemblages at unexcavated sites.

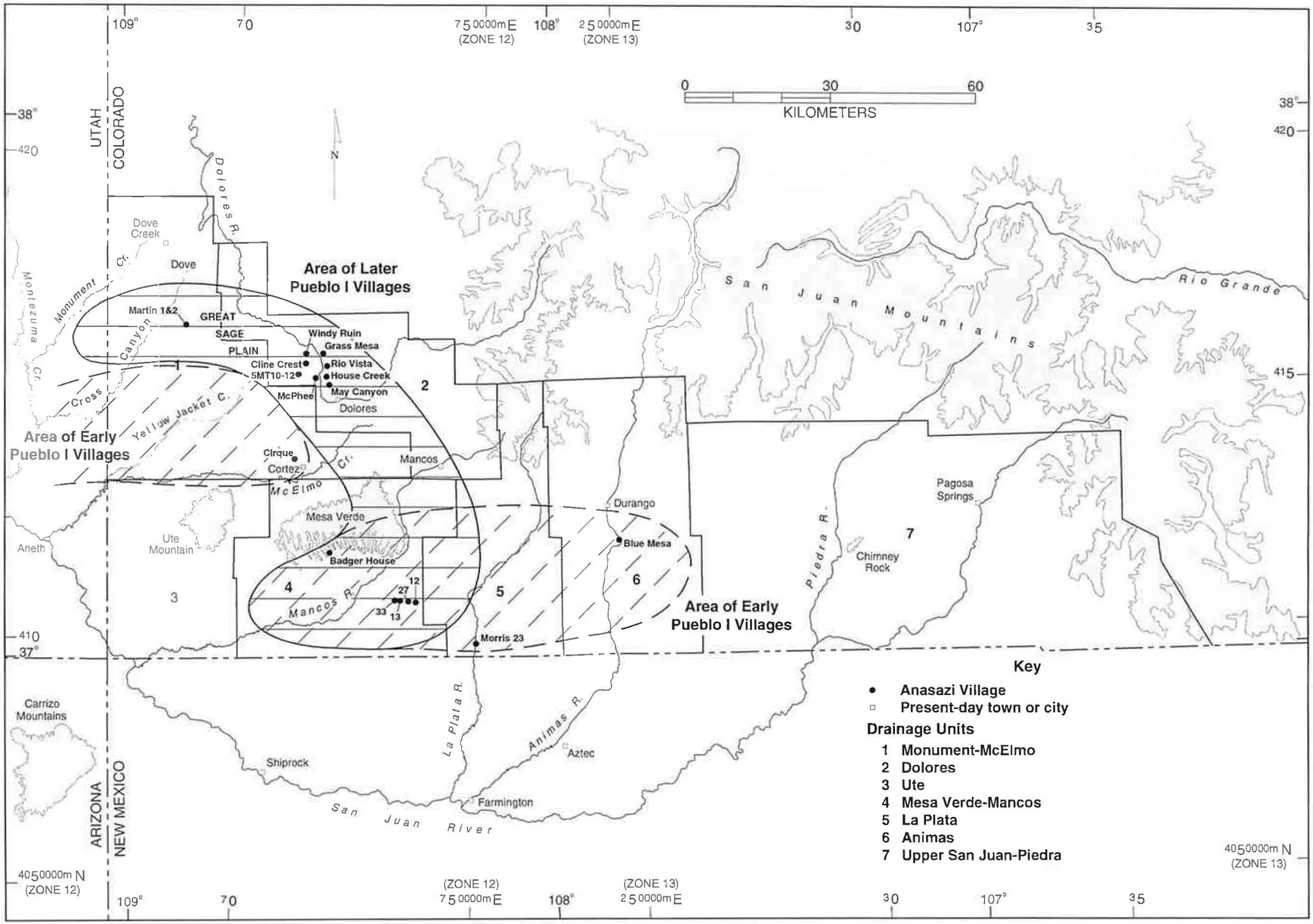

Figure 7-5. Distribution of late Pueblo I villages, with general areas of earlier Pueblo I villages also delimited (after Wilshusen 1991:Figure 7.1) (Reprinted with permission of Crow Canyon Archaeological Center.)

Table 7-2. Northern San Juan Pueblo I Villages, A.D. 840-880.

Site	No. of Room Blocks and Total Length		No. of Households	Reference
McPhee (various sites)	18-20	855m	140	Kane 1986b
Windy Ruin (5MT4353)	13	485m	82	Kane 1986b
Cline Crest (5MT2663)	10	470m	75	Kane 1986b
Grass Mesa (5MT23)	6	370m	57	Lipe, Kohler et al. 1988
May Canyon (5MT6794)	15	530m	70	Blinman 1986a
Rio Vista (5MT2182, 5MT4793)	7	230m	40	Wilshusen 1986a
House Creek (5MT2320)	7	170m	32	Robinson and Brisbin 1986
Unnamed (5MT10-12)	13	450m?	77	Wheat 1955b
Lost Creek (not recorded)	15	400m	74	Wilshusen, personal observation
Martin 1 (5MT2108)	4	135m	23	Martin 1938
Smoot (5MT6849)	7	420m	65	Honeycutt and Fetterman 1982
Badger House (MV1676, Room blocks 1, 2, 4, 5, 6, 7, 8)	6	270m	37	Hayes and Lancaster 1975
Singleton (5MT4003)	4	90m	13	Riches and Biggs 1983
Morris 11 (not recorded)	8?	-----	40 (guess)	Morris 1919b
Morris 12 (5MT2822?)	2	260m	35	Wilshusen, personal observation; Farmer and Emslie 1976
Morris 25 (5LP2164)	11	335m	59	Morris 1939
Morris 15 (not recorded)	4	90m	18	Wilshusen, personal observation; Morris 1919b
Morris 18 (not recorded)	3	200m?	27?	Morris 1939
Unnamed (MV1552-55)	4	90m	13	Hayes 1964
Ute Canyon (5MT2347, 5MT2350)	3?	?	12? (guess)	Farmer 1977; Gillespie 1976
Hedley West Hill Ruin (42SA22760)	3	165m	23	Ortman and Wilshusen 1996

The estimates of the number of households in Table 7-2 are based on a previously published regression equation that estimates the number of household units in a room block based on the length of the room block (Wilshusen and Blinman 1992). This equation was derived by measuring unexcavated Pueblo I room blocks and then later comparing this measurement with the number of household units noted once the room block had been excavated. The household

population estimates are maximum estimates and should be lowered by 20 percent if one assumes that only 80 percent of all structures were occupied during maximum occupancy of a village (see Wilshusen 1991:210 for discussion of the percentage of rooms typically in use). Average household population in Pueblo I villages appears to be 5 individuals, or what might be similar to a nuclear household.

These early villages were in some ways similar to modern trailer courts in that residences were tightly packed together, but of single stories and grouped into clusters. Early researchers such as Earl Morris assumed that various room blocks in these clusters represented a sequence of construction that might span 80-100 years or more, and in some cases, such as at Badger House Community on Mesa Verde, this has been partially validated by excavation results (Hayes and Lancaster 1975). However, most research demonstrates that the structures within villages were built as interdependent units and were constructed to last no more than 15 to 20 years. Even with a major episode of rebuilding, most of these villages have tree-ring dates that span only 25 to 30 years.

Villages in this period are not the central places of more dispersed settlement systems, but rather the primary residential locus for entire communities (Wilshusen 1991). A variety of village layouts occurs, but certain general characteristics are common to all villages of this period and region. There are always multiple room blocks, with villages made up of between two and possibly 18 room blocks. Room blocks contain individual household suites, which are composed of living rooms with hearths, mealing areas, and other features characteristic of domestic life, and smaller rooms, which appear to be specialized for long-term storage of agricultural produce. Room blocks, depending on their size and construction, have between three and 19 associated households (at 80 percent occupancy). Room blocks range in length from about 22 m to more than 170 m. It appears that room blocks may be one level of social organization within the larger village, because they represent distinct construction units in which dwelling units share common walls and access to a common plaza, pit structures, and a trash area. However, some room blocks also may have internal divisions as well, based on distinct construction breaks.

Although a significant number of Pueblo I villages have been well recorded in the last two decades, much of the evidence of this type of site is relatively easily destroyed by modern farming and construction practices. For example, the Crossroads site (5MT6), which was recorded as three distinct room blocks in 1955, is now all but invisible unless one spends a great deal of time mapping what is now a big artifact scatter. Much of the site appears to have been bulldozed away in constructing a microwave relay station and in converting an old dryland farm into an irrigated pasture. Only by recording artifact densities and mapping midden areas and areas of burned jacal fragments is it possible to detect the broad outlines of what was once a fairly well preserved village of approximately 22 households. It is likely that the best ways of detecting what remains of the village would involve either extensive auger testing or remote sensing to map the village's pit structures.

Hamlets: Single- and Multiple-residence Sites

All early Pueblo residential sites—whether villages, multiple-residence hamlets, or single-residence hamlets—typically consist of three spatially discrete elements: a primary residential area, one or more food-processing or food storage areas, and an area for trash or waste. Early Pueblo I residences are focused on pit structures with floors that were at least a meter or below the prehistoric ground surface and had roofs rising almost a meter above this surface. These structures

are currently noticeable as shallow depressions where a stratigraphic test shows disturbed sediment for a meter or more. There is the possibility of having surface rooms or roofed, but open-air, food-processing areas for use in warmer weather, but early in the Pueblo I period these rooms are rarely substantial enough to be year-round domestic activity areas.

After the ninth century A.D. in many areas the focus on surface architecture increased, so that above-ground pueblos with living rooms and storage rooms become the primary architectural form. However, surface structures in the ninth century range from increasingly substantial surface pueblos to relatively simple or insubstantial isolated surface structures. Surface structures on sites are often marked by areas of mounded earth, scattered rock rubble, upright slabs, or burned earthen building debris. Finally, at a habitation site occupied for a significant portion of each year, a discrete trash area is likely to be downwind for reasons of hygiene and odor. This trash area, or midden, is likely to have a significantly higher artifact density than other areas and is sometimes also evident as a mounded area of darker sediment or soil. Residential sites provide the foundation for any settlement study.

Residential sites that might be classified as hamlets range in size from a single household to up to nine households, but typically are one to six households. These archaeologically derived definitions actually compare well with evidence from a worldwide ethnographic sample. In a standardized cross-cultural sample of 28 sedentary or semisedentary prestate societies, Wilshusen (1991:46) found that the average number of people in a single-household residence is 7.7 people (with a standard deviation of 2.5) and for a multiple-household residence, or a large hamlet, the average is 25.8 people (with a standard deviation of 15.4). Hamlets in both the archaeological and ethnographic records are characterized by settlements that last less than 25 years, by a lack of public architecture, and by proximity to fields or other primary subsistence resources (Wilshusen 1991).

Estimating population for early pueblo hamlets and villages usually relies on one of two proxy measurements. Estimating residential (i.e., room block) roofed area when possible is probably the most accurate proxy measure for village populations (Brown 1987; Dohm 1990; see Naroll 1962; Wilshusen and Blinman 1992). However, for single- or multiple-residence hamlets it may be better to use the number of pit structures as a proxy measure to estimate site population. Lightfoot (1994:148-149) has argued in the case of a Pueblo I hamlet, the Duckfoot site, that both pit structures and room blocks are used by households as residential space. This is contrary to the evidence in villages where some pit structures are clearly used by multiple households for community activities (Wilshusen 1989). As a consequence, one might overestimate a hamlet's population if one assumes that pit structures are used by multiple households, as probably was the case for villages. Lightfoot derives an average household population of 5 to 8 people at Duckfoot. Taking into account the cross-cultural data given earlier for hamlets, it is suggested that extended households with an average of 7 people may be the norm for Pueblo I hamlets. If one assumes one extended household per pit structure at hamlets, but use residential space for estimating the number of nuclear households (with 5 persons per household) at villages, some of the apparently contradictory data in Pueblo I population estimates can be addressed.

Given that it is often difficult to separate a single-household site from a two-household site in the archaeological record without recourse to total site excavation, by definition a single-household site—that is, a Pueblo I hamlet with a single pit structure—may actually have a population of one to two households. A multiple-household hamlet is one with two to nine households.

At one time or another during Pueblo I, the settlement pattern in almost every part of the study area is either single-residence or in multiple-residence hamlets. Single- or multiple-residence hamlets make up 81 percent (3,667) of the known total number of Pueblo I sites in southwestern Colorado (4,539). Residential structures are best defined in hamlets by the presence of probable pit structures, sometimes surface structures to the north, and usually a midden to the east or south. Evidence of possible surface rooms is much more likely in early residential sites in the western drainage units than in the eastern ones, but even in these cases the evidence is often either insufficient to define more than a possible, small and isolated structure or is questionable at best (see Brisbin et al. 1986; Brisbin 1986b; Fuller 1988a; Hayes and Lancaster 1975). Because surface evidence of prehistoric pit structures is sometimes difficult to detect, in some cases potentially residential sites are defined primarily by the presence of substantial middens and only confirmed later with subsurface auger testing of possible pit structures or careful mapping of surface structure areas.

Pueblo I residential middens typically are a mound or scatter of trash south of the pit structure in sites within the Mounument-McElmo, Dolores, Mesa Verde-Mancos, and La Plata drainage units. In drainage units to the east (Animas and Upper San Juan-Piedra), more variability occurs in the placement of trash, with east, southeast, north, and northeast as the predominant directions. Though some aspects of site layout may be particular to specific cultural groups with historical or ideational reasons for those layouts, there are also clear-cut functional explanations for some layouts. For example, it is clear that topography is a determining factor in the directional alignment of room block, pit structure, and midden for many sites. In other cases, there also could be a possible relation between the predominant wind direction (more from the west in these eastern localities in the winter and more from the north in the more westerly localities) and the alignment of pit structure ventilators (upwind) and midden placement (downwind). In those sites with substantial room blocks it is also common to find middens to the immediate north of the room block, almost as if trash was thrown from the top of the room block to the north.

In almost every case where sites were defined as residences, at least one midden was recorded. In some cases, especially at multiple-residence hamlets, two to five middens may be present. A normal domestic midden has a surface artifact density of 1-10 artifacts per m^2. Given that individual middens range in size from 15 to 750 m^2, typically anywhere from 30 to more than 1,000 artifacts are obvious in a surface inspection of a single midden area. Artifacts typically consist of sherds, flaked lithic debris, limited amounts of ground stone, and occasional bone or bone fragments, with rare occurrences of worked semiprecious stone and possible manuports such as nonlocal fossils. At the Duckfoot site, a multiple-residence hamlet with a use life of about 20-25 years, the almost total excavation of the midden yielded more than 80,000 artifacts (Lightfoot and Etzkorn 1993). Though considerable variability is shown in the number of middens at a site, the size of various middens, and the topographic setting and relative preservation of middens, it does appear that there is a meaningful correspondence between higher numbers of people who lived in a place (and presumably how long they lived there) and higher numbers of artifacts (Varien and Mills 1997; Varien and Potter 1997). It is also important to recognize that the midden areas often served as cemeteries.

Upon examination of three well-documented Pueblo I hamlets, it is possible to see some of the variability in the architecture and layout of these sites. The Dos Casas site (5MT2193) is a relatively early Pueblo I site dating to A.D. 760-780 (Brisbin et al. 1986). It was completely excavated as part of the DAP. The site had two overlapping components of occupation, one of which consisted of a single southern pithouse and associated features dating to approximately A.D.

760 and a second pithouse just to the north of the first with at least seven small associated surface structures (Figure 7-6). The second component of construction dated to the A.D. 770s based on tree-ring dates from pithouse roofing timbers. The site is an excellent example of an early Pueblo I site in which surface structures are equally evident as seasonal, or possibly almost year-round habitations. It also serves as an example of how some single-residence hamlets may have two or more pit structures simply because they have two or more components of construction and reuse of the site.

In other early Pueblo I sites, such as House 3 at Badger House Community (see Figure 7-2), excavators have argued that surface rooms that are more substantial than those at Dos Casas may date to as early as A.D. 700 or so (Hayes and Lancaster 1975:23). However, they also argue that these rooms last for almost a century, which appears to be physically impossible, given the problems with rotting timbers and freezing and thawing degradation of jacal-style surface architecture (Wilshusen 1988a:674-675). It is more likely that the main pit structure and surface pueblo construction at House 3 dates to about A.D. 750, based on the tree-ring dates from the pueblo, the pottery at the site, and the architectural styles represented. Even with this later date, the pueblo is one of the earliest occurrences of substantial surface structure architecture at a residential hamlet. It is likely that the room block at the site only lasts for 20 years at most.

Hamlets dating to the early 800s typically have more substantial pueblo surface rooms in the western and central drainage units (see Hayes and Lancaster 1975; Wilshusen 1988b), but this is not always the case in the east (i.e., the Upper San Juan-Piedra and parts of the Animas). In the eastern locales surface architecture at many Rosa and Piedra phase sites is still quite insubstantial when compared with the western drainage units (see Favarino site illustrated in Figure 7-2). Rosa phase sites such as those excavated as part of the Bodo Canyon uranium tailings work (e.g., Fuller 1988a:122-128) or Rosa-Piedra phase sites such as those documented in the upper reaches of the Piedra and San Juan rivers by Eddy (e.g., 1966:169-170) have surface structures that appear to be seasonal work areas or short-term storage structures based on their insubstantial walls, lack of internal hearths, and other evidence that might suggest year-round domestic use or long-term food storage. Only a few excavated hamlets date to the early ninth century and they are in the Monument-McElmo drainage (e.g., Cavanaugh 1982; McNamee and Hammack 1992; Spears 1982). It is possible that these more dispersed hamlets are not well represented in the excavation record because they are abandoned and their timbers are stripped and used in later structures. It is also possible that some drainage units have population decreases in the Pueblo I period (Fetterman and Honeycutt 1987:119-123; Schlanger and Wilshusen 1993:88-89), and these decreases are most evident in the middle of the period, or approximately A.D. 790-825.

By the middle to late ninth century, surface pueblos are typically paired with pit structures at what are almost always multiple-residence hamlets. This kind of site is best illustrated by the almost completely excavated and extremely well dated site of Duckfoot (5MT3868; Figure 7-7), but a number of other exemplar hamlets are known for the period A.D. 825-875. Hamlets are represented across many of the drainage units, with possible examples including the following sites: 5MT2161 (Sebastian 1986) and 5MT4002, 4006, and 4007 (Riches and Biggs 1983) in the Dolores drainage unit; 5MT2559 (Farmer 1977) and MV1, 102, 105, and 107 (O'Bryan 1950) in the Mesa Verde-Mancos drainage unit; 5LP379 (Adams 1982) in the Animas drainage unit; and LA 4408 (Eddy 1966) in the Upper San Juan-Piedra drainage unit.

The basic design of small, multiple-residence hamlets changes somewhat in the Pueblo II and III periods, but the idea of a "unit pueblo" (Prudden 1918) can be traced back to clear Pueblo I

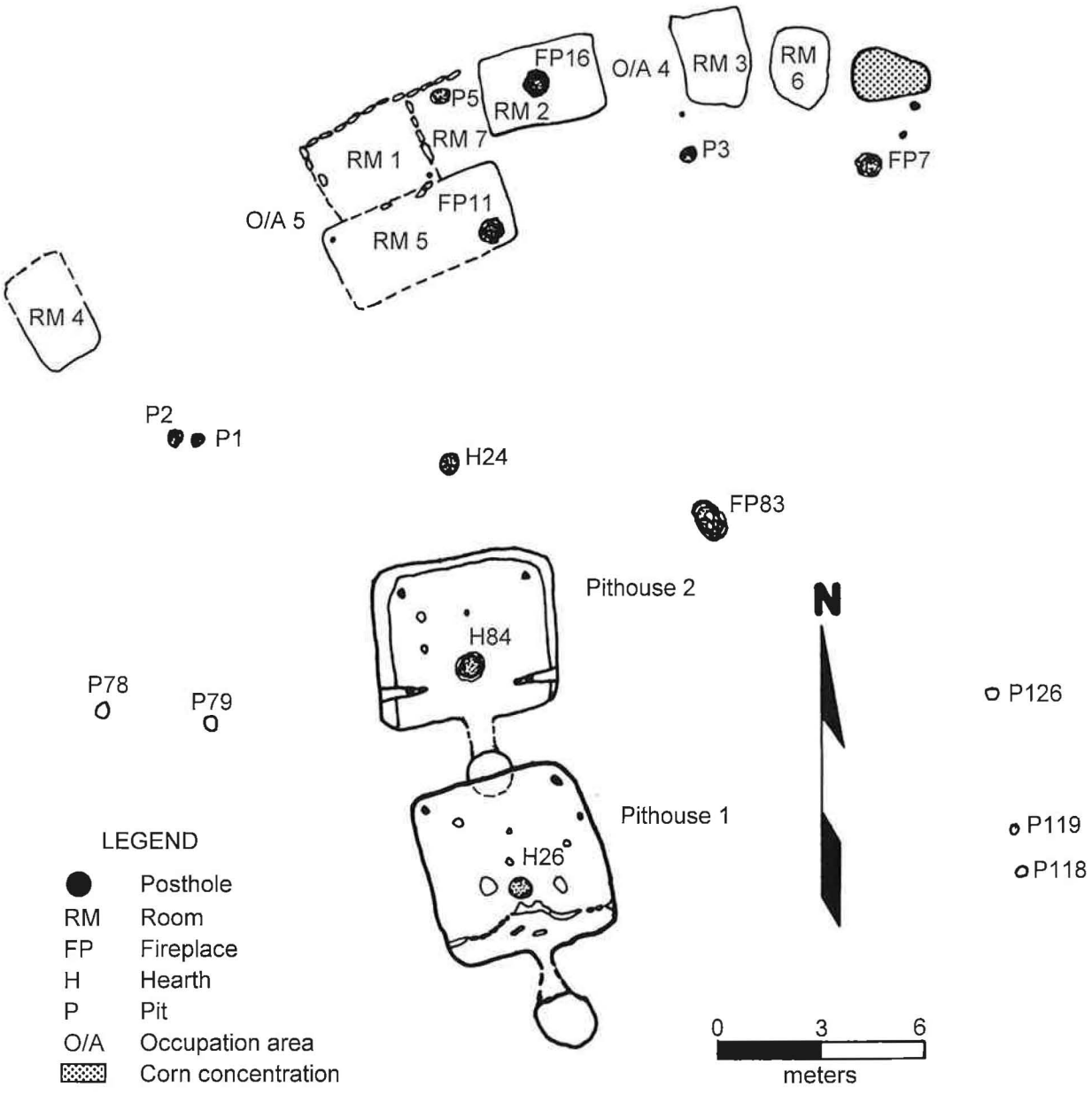

Figure 7-6. Plan map of Dos Casas hamlet (site 5MT2193) (after Brisbin et al. 1986:Figure 8.10). Note that two components are represented on this map.

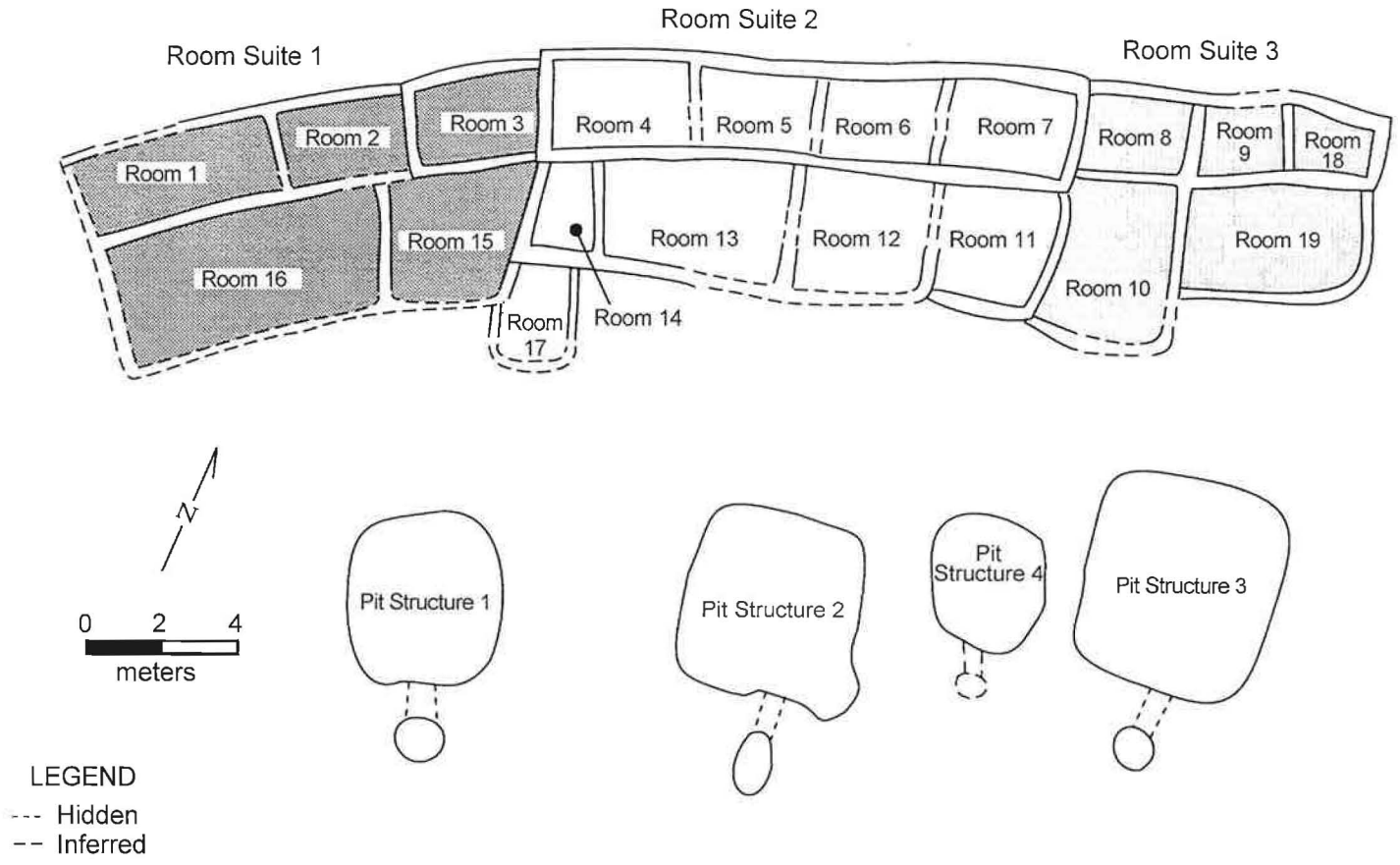

Figure 7-7. Plan map of Duckfoot site (site 5MT3868). Note spatial association between Pit Structure 1 and Room Suite 1, Pit Structure 2 and Room Suite 2, and Pit Structure 3 and Room Suite 3 (after Lightfoot 1994:Figure 2.1). (Reprinted with permission of Crow Canyon Archaeological Center.)

roots. A unit pueblo at its essence is a Pueblo I hamlet, and as Kidder (1927:67) long ago noted, the unit-type pueblo holds the germ of Pueblo architecture. Others such as Steward (1955:163-167), Chang (1958), and Chandler (1977) have all proposed that localized lineages occupied these "units" and that they are the fundamental building blocks of larger settlements such as villages. Lipe (1989) evaluated this argument against more than 400 years of architectural data and concluded that prior to A.D. 1300, the most important Anasazi social unit probably consisted of a group of cooperating households and individuals that would have been the equivalent of a unit pueblo. This unit certainly has its origins in Pueblo I (Roberts 1939b).

Although villages flourished in portions of the Pueblo I period, multiple-residence hamlets appear to be the more resilient settlement form through time. It is interesting that villages become the dominant locus of population only late in Pueblo I.

Great Kivas, Rock Art Panels, and Landscape Features

Public architecture and publicly displayed symbols in landscape contexts such as petrogylph or pictograph panels may occur as separate sites or as features associated with villages or large hamlets. At least 11 great kivas are known for the northern San Juan, of which eight are in the drainage units in this study (Adler and Wilshusen 1990). Only a handful of rock art sites in southwestern Colorado are assigned to Pueblo I contexts, but it is still difficult to discriminate Pueblo I rock art on stylistic criteria alone. Both great kivas and petroglyph panels likely functioned within a larger public context and probably served to reinforce social identity and establish social structure(s) at a community or regional level. In past archaeological research, it would have been unlikely to gather features such as great kivas, rock art, and shrines under a single heading, but archaeologists are increasingly understanding that if one is to understand community and regional organization, one must look for patterns in how people organized and altered their landscapes (Bradley 1997, 1998). If one accepts that "monuments" are an important means of reminding people about their histories, then it is reasonable to gather together features such as rock art, great kivas, and shrines.

Great kivas are typically pit structures of more than 10 m in diameter. All but two of the Pueblo I cases appear to have been roofed structures (Table 7-3). Lightfoot's (1988) reconstruction of the roof of the great kiva at Grass Mesa demonstrated that early great kivas are truly monumental architecture, similar to a Neolithic long barrow (Bradley 1984) or a Maya minor noble's palace in terms of the amount of labor required to make it (8,850 person-hours). The roof on top of the kiva had to span more than 22.5 m and would have had to carry a load of 227 metric tons. Though the Grass Mesa great kiva is one of the largest, it is an adequate indicator of the "monumental" nature of these structures.

In addition, though all great kivas appear to be associated with village sites, it is clear in the majority of cases that the great kiva was built at the edge of the village. In several cases, these large structures were constructed before the main occupation of the village and were not necessarily maintained at the height of the village's occupation. In at least several cases (e.g., Grass Mesa, Badger House) village trash is in their fill and structures are built over the abandoned great kiva (Lightfoot et al. 1988:Figure 7.15; Hayes and Lancaster 1975:Figure 45). In only one case (Morefield) is it clear that the great kiva was maintained over several generations' time (Ahlstrom 1985). In only one case is the great kiva isolated from a Pueblo I village. Though Singing Shelter is overlooked by House Creek village (Nelson and Kane 1986), it is at least several hundred meters away from the village. In all cases it appears that the dirt excavated from

the great kiva was used only for construction of its roof and leftover dirt was bermed around the great kiva; the dirt was not used in surface structure construction at the pueblo. This is totally abnormal for the Pueblo I period, a time in which dirt from other pit structures is the primary material for building pueblos.

Table 7-3. Great Kivas in the Study Area or in Adjacent Areas.

Site	Floor area (m^2)	Depth (m)	Date (A.D.)	Reference
Blue Mesa (Ignacio 12:27)	90	1.5	early 800s	Gladwin 1957; Fuller 1989b
Grass Mesa (5MT23)	401	1.8	early 800s	Lightfoot 1988; Lipe, Kohler et al. 1988
Badger House (MV1676)	85	1.2	early 800s	Hayes and Lancaster 1975
Singing Shelter (5MT4683)	(not roofed) 830	1.0	825-880?	Nelson and Kane 1986
Morefield (MV1930)	146	2.0	829-865	McLellan 1969
Martin Site 1 (5MT2108) (two structures)	135 479 (not roofed?)	2.0 ----	? ?	Martin 1938
Site 33 (5MT2831)	290	1.5	830s	Morris 1939
Bancos Pitstructure.1 (LA 4380)	146	2.4	880s	Eddy 1966
Bancos Pitstructure. 8 (LA 4380)	142	1.4	880s-890s	Eddy 1966
Sambrito Pitstructure. 3 (LA 4195)	129	2.0	890s	Eddy 1966
LA 78535	177	----	880s?	Wilshusen and Wilson 1995
LA 98500 (two structures)	133 269	---- ----	880s? 880s?	Wilshusen and Wilson 1995

Early great kivas do not have a consistent set of internal features, yet they clearly do not function for domestic activities. When compared with ethnographic case studies, the size, construction, and potential uses of great kivas appear to be similar to what ethnographers have documented for high-level social integrative facilities (Adler and Wilshusen 1990). In other settings archaeologists such as Cherry (1978) have argued that monumental construction often

occurs at a time of change and during the establishment of a common ideology or identity. If the chronological placement of Pueblo I great kivas is accurate, then these public features occur early in the formation of the last sequence of villages and only in certain villages. It is fascinating that great kivas are not common again until late in the sequence when a new series of communities is forming just south of the context area in portions of the Upper San Juan-Piedra and Animas drainages in New Mexico. These patterns are discussed in the section Cultural Dynamics: Pueblo I Change.

In addition to great kivas, rock art at Pueblo I sites also may have served a public purpose as images of ancestors, traditional histories, or claims to territory. Though Pueblo I rock art is not as well known as earlier Basketmaker art, it is an important aspect of public imagery which may have served to make histories known, land claims clear, or social identities better known. Schaafsma (1980) has associated styles such as Rosa Representational with the late Basketmaker and Pueblo I periods. Anthropomorphs dominate, but there is considerable diversity in style, kinds of imagery, and production technique based on limited surveys and summaries of the rock art of this area (Ives 1986; Cole 1990). Cole is the first to focus in on the Pueblo I rock art that is particularly evident in the Mesa Verde-Mancos and Dolores drainage units. Striking examples of rock art that dates at least in part to Pueblo I include site MV2469 (Battleship Rock) in Soda Canyon at Mesa Verde and 5MT4549 in the upper Dolores River valley. Anthropomorphs are rectangular or squared bodied with square heads, which are in some cases open with imagery inside them. Antlered quadrupeds and lizard men are also on these panels. In some cases the anthropomorphs appear to have or be wearing horns on their heads. Geometric shapes such as Vs, "turkey tracks," and straight lines are among the most common images at these sites.

Farmsteads/Field Houses

Farmsteads or field houses are not commonly defined for Pueblo I sites, but there is increasing evidence for field houses, as well as more elaborate structures one might call farmsteads (Kohler 1992a; Wilshusen 1986c; Wilshusen and Wilson 1995). In the archaeological record both are defined by the presence of isolated surface structures of one to two rooms without the full residential complement of a pit structure and formal midden. Artifact densities should be lower than at residences, but higher than at simple artifact scatters. Finally, the location of farmsteads/field houses should be found in areas more favorable for fields and away from residential sites.

A certain overlap likely exists between field houses and farmsteads, because a single-season site such as a field house is difficult to distinguish in the archaeological record from a two- or three-season residence such as a farmstead. The difference in gradation is from a farmstead, a site with most of the attributes of a residence, to a field house, or a seasonal activity area close to a household's fields. Wilcox (1978), Kohler (1992a) and others have emphasized that field houses/farmsteads also may serve to mark claim to particular agricultural fields. If this is the case, then pithouse residences may actually be nearby, and farmstead/field houses may simply be more well-designed shelters for summer activities that are adjacent to, and in a sense demarcating fields.

Few excavated examples of field houses or farmsteads are known for the Pueblo I period. It is not clear whether this site type is rare or simply underappreciated. Examples of field houses defined by excavation include sites 5LP1096 (Fuller 1988a) in the middle of the Animas drainage unit; 5MT8794 (Morris 1986a) and 5MT8829 (Morris 1988b) in the Monument-McElmo drainage unit; 5MT4512 (Wilshusen 1986c) in the Dolores drainage unit; and LA 98460, an excellent

possible field house defined close to the Animas Valley but just below the state line in New Mexico (Wilshusen and Wilson 1995). They are all characterized by one or two small surface rooms, possible outdoor activity areas, a small midden, and locations in favorable agricultural settings. The modal size for the scatters of structural debris is approximately 25 m^2, or about the size of a very small residence. In some cases the sites are within a half kilometer to within three kilometers of residential sites with pit structures, and they may actually be the summer extensions of residential sites, when above-ground living is much more pleasant and when close guard must be maintained over nearby crops.

The average densities of surface artifacts at field house/farmstead sites appear to be much lower than that for residential sites. Densities ranged from 0.5-0.02 artifacts per m^2, with 50 or fewer artifacts on the surface at these sites. Site areas ranged from about 200 to more than 4,000 m^2. It might be expected that one could test whether there were assemblage differences with residential artifact assemblages, as proposed by Sebastian (1983).

Soil data and, if possible, historic farming data are needed to understand these field house/farmstead sites better. For example, if one assumes that 2.0-3.2 hectares (4.9-7.9 acres) per household are a reasonable agricultural carrying capacity for the soils of this area (using historic agricultural data for the Hopi-Tewa [Stanislawski 1979:594; Dozier 1954] and Pima-Papago [Castetter and Bell 1942:54] for comparison), and if one assumes that fields are left fallow two of every five years (Hastorf 1980:100), then it would be possible to model the relative productivity of particular areas at particular times (see Burns 1983; Van West 1994a). Key values for soil nutrients such as nitrates and phosphorus may be low enough so that farmers might need either to have a longer fallow period or to resort to other methods such as trapping organic matter on the agricultural slopes to maintain productivity (Decker and Petersen 1987). The identification and elaboration of these farming sites will be vital to any future understanding of the subsistence of the region.

Nonresidential Sites: Artifact Scatters with Features

Artifact scatters with features and simple artifact scatters represent approximately 19 percent of the total number of Pueblo I sites in the context area. These sites range from small artifact scatters of less than 250 m^2 that may be no more than a pot drop with an ill-defined hearth, to well-defined scatters of 10,000 m^2 with a number of hearths or even more substantial features such as possible kilns. Well-defined hearths, areas of charcoal-stained soil, and clusters of oxidized sandstone fragments are by far the most common features at these sites. Artifact densities in even the densest portions of these scatters average typically below 0.1 artifact per m^2. Total surface artifact estimates range from fewer than five Pueblo I artifacts to hundreds of items.

For the Pueblo I period, two broad categories of artifact scatters with features are apparent. In one category are those sites that represent a broad level of occupational activities throughout a heavily occupied area. For example, in many cases it is likely that "field-tending" sites may not leave enough of a record to be evident as a field house/farmstead. They may be obvious only as artifact scatters with features. Until researchers find the means to bring more interpretive power to these sites, it is possibly best to gather them under a more descriptive rubric. A second category appears to represent use of special zones such as upland hunting or gathering areas or special resources along watercourses. These sites may represent seasonal hunting camps.

Most of the artifact scatters with features are sites with difficult-to-specify functions. Archaeologists tend to gloss them as "special use sites" but rarely understand their specific uses. They typically have a confusing variety of feature and artifact patterns. Ten to 15 different types of sites applicable to the Pueblo I period have been called either "seasonal use" or "limited activity" sites (Eddy et al. 1984:9). In a search of the state site files, it is clear that archaeologists have had a difficult time applying a detailed typology such as this, given that very few site uses are labeled consistently to this degree of detail.

Ethnoarchaeological investigations suggest that the archaeological record at nonresidential sites may be a complicated account—or a palimpsest—of a variety of activities, rather than an account of distinctly different activities at different sites. In addition, the focus on residential sites in past archaeological investigations in the study area has necessarily limited the understanding of the range and variability within sites that might be characterized as artifact scatters with features. If one is to understand how early Pueblo people used the larger landscape, one must address questions about how nonresidential sites might contribute to this understanding.

Nonresidential Sites: Artifact Scatters

The final site type is scatters with low artifact densities and without structures or features. Site size for these scatters is approximately 2500 m^2 or less. Artifact density is too variable to compute an average, but 0.01-0.1 item per m^2 is suggested from previous surface surveys of artifact scatters in the study area. In some cases the scatters are substantial and may represent sites for special use of the landscape but that still lack obvious surface features. These sites are interpreted as part of the general distributional pattern of Pueblo I use of this whole landscape, and at some point it may be possible to define larger use patterns of landscapes for particular times by simply focusing on artifact scatters. In some cases however, it appears that the patterns created by the scatters are more of a reflection of those areas with higher erosional or modern disturbance activity. Again, researchers must begin to consider the larger landscape in the Pueblo I period to begin to make sense of these smaller, nonresidential sites.

Isolated Finds

Isolated finds associated with the Pueblo I period typically consist of gray ware, white ware, or red ware sherds dating to the Pueblo I period or projectile point types associated with the early Pueblo period. These distributions may reveal general occupational trends when comparisons are made between different Pecos Classification periods, but these analyses were not done as part of this study given the disparate nature of the present database. In many artifact categories, for example, ground stone, it is difficult to place these items temporally since very few of them have particular attributes diagnostic of a specific temporal period. As a consequence, the isolated finds have only limited analytical utility at this point, though the potential for larger analyses of changing human behavior is certainly possible.

REGIONAL SITE DISTRIBUTION

This section discusses landscapes as divided among communities at particular points in time. Two later sections, one on regional population levels and distribution and another on cultural identities and diversity, focus on even larger patterns within the site data at regional levels.

Based on a variety of excavation and survey data in combination with the state site files, it is possible to gauge changes in site distribution across the study area from the early Pueblo I to early Pueblo II period. For a variety of reasons, which will become clear in the sections on community persistence and mobility as well as regional population trends, it is necessary to consider site data to approximately A.D. 920-940. Variability in the distribution of site types, especially the variability in the location of villages through the period, is a particularly important topic.

Two sources of regional site distribution data are available. This section takes data derived from major block surveys and previous regional syntheses (Adler 1990, 1992; Chandler et al. 1980; Chenault 1996; Davis 1985; DeBloois and Green 1978; Dittert et al. 1961; Eddy 1974; Eddy et al. 1984; Fetterman and Honeycutt 1987; Fuller 1988a, 1988c, 1988d; Gillespie 1976; Gomolak 1990; Hannaford 1993; Hayes 1964; Kane 1984; Morris 1939; Rohn 1977; Schlanger 1985, 1988; Varien et al. 1996; Wilshusen and Wilson 1995) and identifies broad diachronic patterns in the distributions of different site types across the context area. The second source of data is the SHPO site data files (Table 7-4). The broad patterns identified here are considered to represent more than just the vagaries of sampling, and may actually show broad shifts in the way that people divide and utilize landscapes as communities. Essentially, communities "format" landscapes through their economy, social structure, and historic uses of an area; they transform natural landscapes into cultural landscapes.

Table 7-4. Distribution of Pueblo I Sites across the Context Area by Drainage Unit.

	USJ-Piedra	Animas	La Plata	Mesa Verde-Mancos	Ute	Monument-McElmo	Dolores
Habitations	301	168	33	2,038	53	684	390
Nonhabitations	183	74	25	97	30	223	239
Total Pueblo I site components	484	242	58*	2,135	83	907	629

* A total of 59 Pueblo I components is recorded for the La Plata drainage unit, but one case has missing values so that it cannot be classified as a habitation or nonhabitation.

Settlement Patterns, A.D. 750-875

The settlement patterning in the Pueblo I period shifted rapidly between A.D. 750 and 875. These shifts essentially represent the changing ways of doing business on a cultural landscape. If one examines the northern Pueblo I settlement "format" at four different times between A.D. 750 and 875, one sees three patterns with a mix of villages and hamlets and a final pattern based on village-based communities.

At A.D. 775 two very different kinds of landscapes were apparent in different parts of the study area. There was a limited number of large, singular villages in particular areas, such as Alkali Ridge (just west of the Monument-McElmo drainage unit) and Morris 23 (in the La Plata drainage unit). The big village at Alkali Ridge (Brew 1946) had a distinctive layout with multiple L-shaped room blocks attached to one another and had a population of approximately 50

households (definition of the total village was never completed). Morris 23 potentially had more than 70 households (Morris 1939). There are at least six to seven other villages, primarily in the Monument-McElmo drainage unit (see Figure 7-5 for general distribution), that appear to date to this time based on surface ceramic assemblages. Even though these settlements are large, the structures that comprise them cannot be long-lived, given the limitations of jacal or composite earth and vegetal architecture in this climate of winter and summer temperature extremes. A likely use life for these villages is 15-40 years, and even this short estimate would include one to two major episodes of rebuilding. Though the early villages are striking, it is likely that the majority of the population lived in single-residence hamlets, with the number in multiple-residence hamlets a close second.

Communities made up of dispersed, single- and multiple-residence hamlets must have been the main society units that organized the landscape early in the Pueblo I period. For example, within the well-researched Dolores drainage unit, it is probable that hamlets such as Dos Casas (5MT2193), Windy Wheat (5MT4644), and Casa Bodega (5MT2194)—which all date to approximately A.D. 780—were part of a much larger community that was the primary organization for this locale. Though there might be distinct neighborhoods of sites, a larger community made up of 20 to 30 households would likely be necessary to exert social and economic power over a particular area. The large spatial extent of these communities (they must be at least four to five kilometers in diameter simply for agricultural requirements) and the need for incredible precision in dating sites has made archaeological identification of these communities difficult so far, but there must be some sort of community organization similar to this, given the archaeological landscapes reconstructed for the late eighth century.

Dispersed hamlets remained the main settlement pattern in the early A.D. 800s, with only a few large villages breaking this pattern. Multiple-residence hamlets may be the most common site type. Though villages are few in number, some are notable examples. These include the settlement on Blue Mesa, just southwest of Durango, and a series of villages in the Ridges Basin area, all of which are in the Animas drainage unit (Fuller 1988b, 1989b). Based on dates from a number of poorly provenienced tree-ring samples and dating estimates from surface ceramic assemblages, these villages appear to be occupied between the late A.D. 790s and 840s. If all 63 of the Pueblo I room blocks at Blue Mesa are roughly contemporaneous, then they comprise one of the largest pueblo villages in the Southwest prior to Pueblo IV. Even if only half of the room blocks are occupied at any one time, a population estimate of approximately 123 households, or more than 600 people, is reasonable. There are also possible early A.D. 800 villages in the La Plata, Mesa Verde-Mancos, and even the Dolores drainage units.

It appears that multiple-residence hamlets and great kivas in the Monument-McElmo, Mesa Verde-Mancos, Dolores, and Animas drainage units are the most common forms of residential and public architecture on the landscape in the early A.D. 800s. This time may represent a significant period of reorganization based on new forms of public architecture and shifting populations. In some drainage units, such as Dolores, it appears that the local population declines in the early 800s (Schlanger and Wilshusen 1993), and in others such as the Monument-McElmo drainage unit, it may rise slightly. Though little is known about community organization in the early 800s, it is likely that great kivas were at the center of some of these communities. At least six, and possibly seven, great kivas were constructed in the early A.D. 800s (see Table 7-3). For the three cases for which detailed excavation information is available, it is clear that the great kiva was one of the earliest constructions at a locale that would later have a village (Grass Mesa and Badger House) or that the great kiva was set apart from any settlement (Singing Shelter).

These facts suggest that great kivas may have functioned to organize early, dispersed Pueblo I communities, but that as communities assumed more aggregated forms, these structures were sometimes abandoned.

By A.D. 825 several large Pueblo I villages—Badger House Community, Morris 33 and 13, Morris 27, and other sites (e.g., 5MT2826)—were centered primarily on the Mesa Verde cuesta. These villages range from 17 to more than 50 households and last into the A.D. 840s and possibly as late as the 860s (Wilshusen and Blinman 1992). Again, most of these villages appear to last one or two generations at most. Badger House Community is the exception rather than the rule here and may be continuously occupied—at least at the community level—for up to 60 or more years (Hayes and Lancaster 1975; see also Breternitz 1981). Though villages are forming or established in at least four or five of the drainage units at this time, the majority of the population still appears to be distributed across the landscape in multiple-residence hamlets.

For A.D. 840-880, at least 21 villages are known in the Mesa Verde region (see Table 7-2). There are a number of smaller, hamlet-level late Pueblo I sites, such as Duckfoot, (Lightfoot 1992; Lightfoot and Etzkorn 1993), but these appear to be a minority if population is considered. Overall, not many late Pueblo I hamlets exist, based on surveys in the Dolores, Monument-McElmo, Animas, and La Plata drainage units. It is possible that more Pueblo I hamlets are buried under later sites in the Mesa Verde and La Plata drainage units, but the presence of villages in these units suggests even in these cases that the majority of population is in villages. Certainly when the large size of the Pueblo I villages is considered and their relative clustering is taken into account, it is clear that a substantial portion of the late Pueblo I population is housed in village settings. While single villages have been regarded as more typical, it appears more likely that clusters of villages in middle to late Pueblo I period are the rule. Almost all of the later Pueblo I villages are in clusters of three to seven contemporaneous villages, where one village is separated from another by one to two kilometers.

The average size of a separate village at this time is 120 to 140 surface rooms and approximately 15-16 pit structures. Excavated Pueblo I villages range in size from approximately 45 to possibly more than 400 rooms. Use life appears to be 30 years or less given the tree-ring and construction records at various sites.

From the standpoint of internal settlement arrangement in Pueblo I villages between A.D. 750 and 875, two key patterns are apparent: the long, almost L-shaped pueblos with multiple room blocks such as at Alkali Ridge and Grass Mesa, and the multiple, crescent-shaped room blocks such as at McPhee Village and Blue Mesa (Figure 7-8). Great kivas occur at some of the villages, but they appear to date early in a village's development and to actually fall into disuse as the village forms. A possible exception to this is the Morefield great kiva, which is long-lived and at the eastern end of a possibly associated Pueblo I village. Integration for village-based communities appears to be centered on oversized pit structures with special suites of features (Wilshusen 1989). These features are similar in form to features later found in Pueblo II great kivas and historic kivas which control communitywide ritual. Though the oversized structures are large, with a typical floor area of 35-75 m^2, they are clearly not great kivas.

Settlement Patterns, Post-A.D. 875

Soon after A.D. 875, all the known villages in the study area appear to either break down through lack of maintenance or actually fragment as communities (Schlanger and Wilshusen 1993;

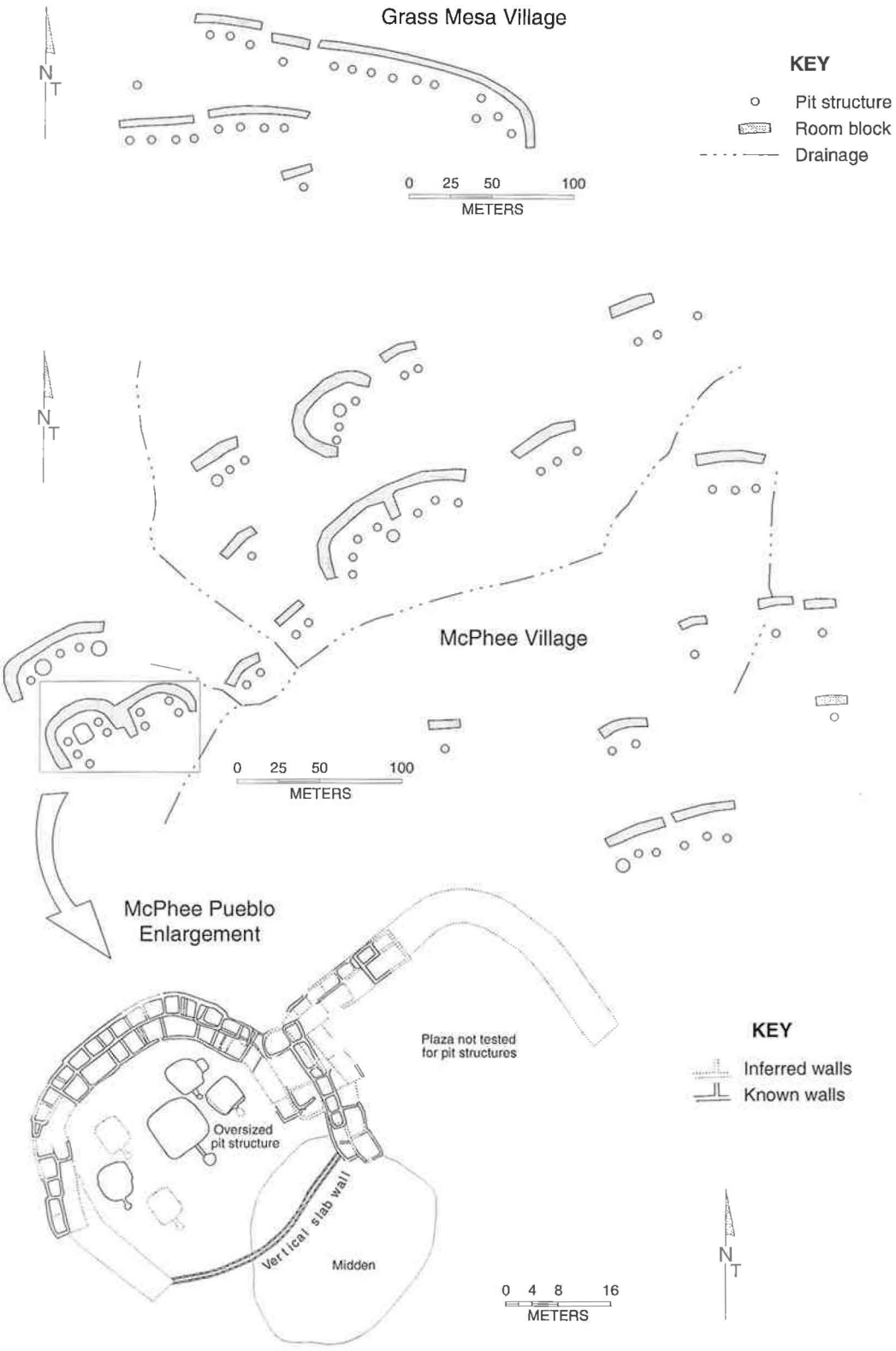

Figure 7-8. Plan maps of Grass Mesa Village and McPhee Village, A.D. 840-880; note detail of room block within McPhee Village (Wilshusen and Ortman 1999:Figure 5). (Reprinted with the permission of *Kiva*.)

Wilshusen 1986c; Wilshusen and Ortman 1999). Current data show only three hamlets with dates between A.D. 880 and 940 and two villages that continue to approximately A.D. 890. A small, late, ninth century village in the southwestern corner of the Mesa Verde-Mancos drainage unit (Farmer 1977; Gillespie 1976), and an interesting but short-lived pithouse village at the site of the previous Grass Mesa pueblo village (Lipe, Kohler et al. 1988) are all that remain of the large villages in the western drainage units. In both of these cases it is unclear whether either village continues into the tenth century as an occupied site. Settlement patterning does not just change; it more accurately disappears. The possibilities for a limited, continued occupation of the area are discussed later, but certainly there is a dramatic change in the settlement pattern of the area after A.D. 880 and possibly through 950.

The population evident in the late ninth century is along the extreme southern boundary of the study area or across the New Mexico state line and close to the San Juan River (see data for the Upper San Juan-Piedra in Table 7-4). At least two, and possibly three, potential communities at Navajo Reservoir date to the late 890s or early 900s (Eddy 1972, 1974). These communities have at least 54 habitation sites, which include no less than three villages. In addition, Adams (1975:159-161) notes a population increase and the possibility of immigration along the Piedra in Colorado after A.D. 850. He notes at least one large village for this phase. More recent data from other portions of the Animas and Upper San Juan-Piedra drainage units reinforce the idea that this area southeast of the main Pueblo I villages may become a sizable population center between A.D. 880 and 910. Two communities near Cedar Hill, New Mexico have been fairly well mapped and dated to A.D. 885-915 (Wilshusen and Wilson 1995). Together, the Loma Enebro communities have 62 room blocks, with each community having an estimated population that is remarkably similar to the average population for the 21 late Pueblo I villages just mentioned (39 households for the late Pueblo I villages and 41 households for each of the Cedar Hill communities, assuming 80 percent occupancy of potentially contemporaneous structures).

Whereas the settlements of the two Cedar Hill communities dating to A.D. 895 are spread over areas of approximately 4 km^2, the villages to the north dating to A.D. 870 are confined to 0.4 km^2, or only 5 percent of the space occupied by Cedar Hill communities (Figure 7-9). Though the population size is similar for the Pueblo I villages and the more dispersed communities that immediately postdate them in late Pueblo I-early Pueblo II periods, the actual spatial distribution on the landscape is totally different. As discussed in the following sections on subsistence strategies and community persistence, it is likely that these changes in the larger cultural landscape represent significant shifts in how people are organized socially and economically.

SUBSISTENCE STRATEGIES

Most studies of Pueblo I subsistence—whether they are studies of macrobotanical or faunal remains, or studies of the potential of long-term (multiyear) food storage, or models of resource potential and constraints—conclude that the economy was centered on dryland corn and bean agriculture, with the use of wild, ruderal, and specialized agricultural foods to enrich the diet or ward off starvation. Animal resources would have been valuable commodities because of their relative rarity (Potter 1997). The high population densities reached by some village-centered communities necessitated considerable dependence on stored foods, exchange systems, and specialized agricultural production strategies to deal with long-term economic risks imposed by years of agricultural shortfalls (Blinman 1989; Gross 1987; Kohler and Van West 1996). Agricultural intensification and the relative distribution of economic resources are crucial issues in any discussion of Pueblo I.

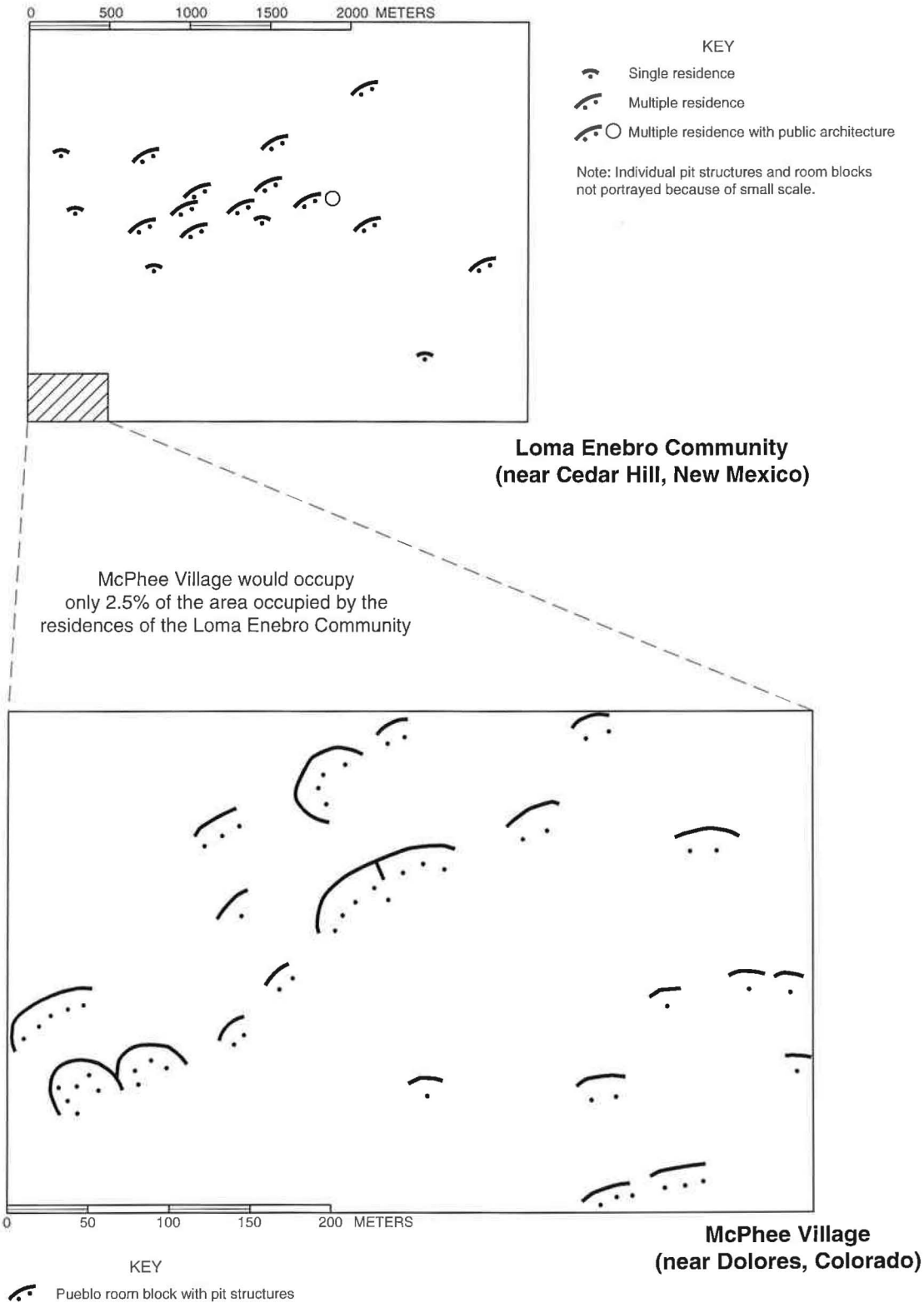

Figure 7-9. Comparison between the McPhee Village in the Dolores vicinity and the Loma Enebro Community close to Cedar Hill, New Mexico (after Wilshusen and Wilson 1995:Figure 6.12). (Reprinted with permission of La Plata Archaeological Consultants.)

This summary focuses on the evidence of subsistence strategies as they are reflected on the landscape. Archaeologists can find evidence of prehistoric subsistence strategies at a large scale in settlement patterns and at a small scale in the recovered archaeobotanical, faunal, and other subsistence-related materials from specific sites. Site-specific information on subsistence resource mix and resource depletion in village contexts has most recently been discussed in the context of the immense DAP (Floyd and Kohler 1990; Gross 1987; Kohler and Matthews 1988; Matthews 1988a, 1988b; Neusius 1988; Neusius and Gould 1988; Orcutt 1988a, 1988b). For hamlets investigated outside the Dolores area, possibly the Duckfoot site in the Monument-McElmo drainage unit is the most thoroughly documented case for subsistence studies (Lightfoot and Etzkorn 1993). Although a great deal of work has been done in this area, details about the relative amount of maize and beans in the diet, about the relative flexibility to move to other subsistence strategies in times of risk or horticultural failure, and about the relative importance of wild or ruderal plants in the diet are all open to contention. However, many investigators presently accept that corn is the mainstay of the Pueblo I diet, that wild foods still were an important contribution to the diet, and that households may have tried to store more than a year's supply of basic foodstuffs such as corn as insurance against hard times (Gross 1987).

Pueblo I Field Houses and Field Areas

The locations of field houses and hamlets in the middle of Pueblo I are often close to previous late Basketmaker III or early Pueblo I habitations and in settings that are more favorable for fields than for locations of the village sites. In fact, in many cases these sites are found in historic agricultural fields. As noted earlier, Wilcox (1978), Kohler (1992a) and others have suggested that field houses/farmsteads may serve other than just utilitarian purposes; for example, they may serve to mark a claim to particular agricultural fields. The parent villages for these field houses form a rough northwest/southeast alignment through the center of modern-day Montezuma County (see Figure 7-5). These villages are typically within a kilometer of permanent water sources such as the Dolores River, but are also located close to locales with deep, Pleistocene loess soils.

Investigators have not found Pueblo I field marking systems or good direct evidence of how these fields were cleared or maintained. However, high amounts of charcoal in Pueblo I sediments downslope from the potential field areas (Petersen 1985b) and decreasing percentages of wood and increasing percentages of shrubs, cottonwood, and corn in Dolores village hearths (Kohler and Matthews 1988), support the proposal that fields were initially cleared of woodlands and burned. Chipped or ground stone hoes are also associated with late Pueblo I villages and field houses that show wear consistent with a task such as clearing fields of brush (see Mills 1987).

Though the evidence for actual agricultural practices is sketchy, the evidence noted above—primarily the increasing presence of field houses—supports a late Pueblo I agricultural intensification that accompanies the aggregation of a large percentage of the regional population into a number of villages, each with a population of several hundred people. The actual practice of agriculture in the mid-ninth century in the Mesa Verde region appears to be based on dryland strategies where there is limited capture of rainfall runoff and little control of eroding sediment within the fields. Of course, it is possible that ephemeral water control features such as small brush dams or strategically placed logs were used and that these perishable materials have not survived in the archaeological record (see Doolittle 1984, 1985), but it is clear that there was not significant alteration of the landscape to capture sediment or water. Precipitation averages 405 mm (16 inches) to 480 mm (19 inches) in this area, an area that is almost exactly the historic dry-farming

zone (Petersen 1988). The relatively high areas favored by Pueblo I village inhabitants are good from a moisture perspective, but come with the threat of cold air drainage associated with the higher elevation and the proximity to deep river or creek drainages that drain both water and air from much colder mountainous areas (Adams 1979; Petersen and Clay 1987).

The Pueblo I agricultural strategy appears based on regularly shifting agricultural fields and results in communities that do not last longer than 40 to 50 years (Kohler and Matthews 1988; Schlanger and Wilshusen 1993). The present evidence from both surveys and excavated sites in southwestern Colorado is that the Pueblo I villages were abandoned during or soon after a series of drought years in the early 880s (Schlanger and Wilshusen 1993; Wilshusen and Schlanger 1993; Varien et al. 1996; Wilshusen and Varien 1996). Because more than 90 percent of the villages dating to A.D. 840-880 are at an elevation of 2100 m ([6890 ft] with a standard deviation of approximately 50 m), these settlements are particularly vulnerable to fluctuations in the climate along these upland ridges.

Late Pueblo I/Early Pueblo II Field Houses and Field Areas

After the breakup of the large villages in A.D. 880, it is difficult to understand subsistence strategies in the context area. It is necessary to examine information for the late ninth century for portions of the Animas and Upper San Juan-Piedra drainage units to find information on nearby agricultural strategies and subsistence practices. A number of field houses, as well as late Pueblo I residences, were documented in the Cedar Hill area, close to the Animas River in northwestern New Mexico (Wilshusen and Wilson 1995). For example, site LA 98460 is a near-perfect example of a Pueblo I field house with associated check dams or water spreader features (Wilshusen et al. 1995:198-199). It had a well-burned, two-room surface structure, which appeared to have burned with corn inside or nearby. Corn ear impressions were found in the highly vitrified construction material, suggesting that the structure had collapsed and melted onto ears of corn. In addition, the area had no evidence of—and few likely locations for—a pit structure, as well as having no formal midden. Field houses were identified at 15 sites (11 percent of total Pueblo I sites) within two prehistoric communities in this area.

In the Cedar Hill area, likely locations for agricultural fields were identified based on drainage, soils, and historic use. The most obvious locations for fields were favorable agricultural areas immediately adjacent to the A.D. 890s room blocks. The presence of a residence allows clear claim to the use of the land and permits the monitoring of fields during critical times, and in almost 90 percent of the cases it was reasonable to consider prehistoric fields in these locations. A secondary location was one where almost all of the field houses were located: upstream from the main community clusters. This pattern of field houses that radiate from the core areas of possible communities reinforces the community interpretation, especially if communities are to be identified by their potential control of productive resources.

Though distinct communities can be identified in this area, some features suggest that community control of resources must have overlapped. In one case, two communities are in the same drainage and it is likely they had to coordinate to control the water in this drainage. Late Pueblo I water spreader/check dams are located at the upper end of the valley (Wilshusen and Ruppé 1995:28-29; Wilshusen and Wilson 1995:61-63); it is also possible that water control features were made of more perishable or difficult-to-detect materials (e.g., see Doolittle 1985) in the main valley based on a geomorphological study. The need to control runoff in this particular valley is real, given the potential similarity of historic and A.D. 890s rainfall patterns. There are

often less than 12 inches (305 mm) of precipitation per year with summer precipitation characterized by massive monsoonal storms. Water control by small dams and diversion features probably would have been as much for domestic water as it was designed to capture sediment and water for fields. Interviews with settlers in this area from the 1920s demonstrated that historic maize farming required exactly these measures to succeed (Ruppé and Wilshusen 1995).

Much work remains to be done in isolating agricultural areas and subsistence strategies for Pueblo I communities throughout the Four Corners. What is needed is a fine-tuned map of changing population, potential resources (plants, soils, water, and animals), and climatic conditions at decadal or better intervals. This map would allow one to see the relative draw of different resources on the larger landscape to evaluate the subsistence risks and opportunities for these communities at different times.

SETTLEMENT AND COMMUNITY: PERSISTENCE AND MOBILITY

It appears that settlement longevity and community persistence are variable across the study area for Pueblo I. If there is any central tendency in settlement longevity, it is for settlements and communities to last no more than 25-40 years. This includes very large settlements such as villages. However, in a few locales—especially the Mesa Verde-Mancos drainage unit—it does appear that Pueblo I communities are much more long-lived and that communities may persist for up to 60-80 years (e.g., Gillespie 1976; Hayes and Lancaster 1975). This variability needs to be examined critically and explained. Researchers are not at the point in the understanding of the area to truly control for this variability, so the following discussion must be tempered with this caveat.

It must be emphasized how very different the settlement patterns in this region are from other areas with Pueblo I occupation, such as Chaco Wash or Black Mesa. Those areas have settlement patterns characterized by relatively compact Pueblo I hamlets, whereas the Dolores, Mesa Verde-Mancos, and portions of the La Plata, Monument-McElmo, and Animas drainage units at times in Pueblo I have settlement patterns based on villages. Both the large size of the villages and the high density of settlements in the Four Corners area make for a very different pattern of agricultural land use than may be seen elsewhere between A.D. 750 and 900. High population must necessarily limit any community's options for falling back on wild resources in bad agricultural years. In other words, the potential risk of community wide disruption in times of economic, environmental, or social stress is great. However, during parts of the Pueblo I period, clearly the risks are deemed worth taking, and immense village-based communities come into being.

The characterization of Pueblo I communities is made difficult by their short-lived nature and by the relative mobility that one sees on this landscape between A.D. 750 and 950 (Schlanger 1985, 1988; Schlanger and Wilshusen 1993). If one follows Adler and Varien's (1994:84) definition of the "community" as a territorial unit whose members recognize shared access to the productive resources of a vicinity, even though those resources may be allocated to individual users, then it is likely for aggregated settlements that the village itself is the "community." With an average of 123 rooms and 15 pit structures (assuming an 80 percent occupancy rate), villages may have average populations of between 125 and 185 people, depending on whether one estimates potential population based on floor area (Brown 1987), room counts (essentially one person for each room), or by estimating the number of households and then computing population (Wilshusen 1991). The smallest villages would have populations of about 50 people, and some of the largest Pueblo I villages potentially could have had populations of more than 500 people. From the

standpoint of population size, as well as control of productive resources, the village could reasonably be considered one form that community takes in Pueblo I.

It is reiterated here that villages are not the central places for more dispersed settlement systems, but the primary residential area for whole communities (Wilshusen 1991). In short, villages are where the majority of an area's inhabitants live when aggregation is the norm. These villages are potentially organized in several ways, and this is in part probably related to how the agricultural landscape is divided and used (see Stone 1996), as well as due to traditional forms of organization typical of the groups who settle the area. Potential organizational differences between contemporary villages are discussed in a later section.

Defining "community" for more dispersed settlement patterns of single and multiple hamlets is necessarily more difficult, given the short use lives of these sites and the relative mobility of populations in this period. It is possible that great kivas may identify community centers at particular times, since these public features appear to predate the main construction at some villages and sometimes even have villages built over them (e.g., Hayes and Lancaster 1975:60-63; Lipe, Kohler et al. 1988:1224). However, Pueblo I great kivas are too rare for this period, and so there must have been other means in many cases for community integration in those areas with settlement patterns characterized by dispersed hamlets. Certainly the definition of communities for these more dispersed settlements is a crucial problem for future Pueblo I settlement organization studies.

Only four or five sites are known for the A.D. 890-940 period in the whole Mesa Verde region, and a substantial portion of the population appears to have emigrated to what is presently northwestern New Mexico. The dated villages of the Navajo Reservoir area, such as Bancos and Sambrito, have cutting dates clustered in the A.D. 890s and early 900s (Eddy 1966). In addition, recently documented late Pueblo I communities in the Cedar Hill area (Wilshusen 1995), plus numerous other late Pueblo I sites in the Upper San Juan, Burnt Mesa, and Gobernador Canyon areas offer the possibility that significant population decreases in the upland Colorado villages in the A.D. 880s are related to dramatic population increases in northwestern New Mexico in the late A.D. 890s and early 900s. In summary, there are no well-documented "communities" for the study area late in Pueblo I, and it is likely that there is considerable emigration from the area.

The communities in northwestern New Mexico that date to the A.D. 890s are typically centered on sites with great kivas and have locations and settlement patterns that are very different from the Pueblo I villages that date to the A.D. 860s in the Mesa Verde region. Though the population estimates for these communities are comparable to the earlier villages to the north in Colorado, the distribution of room blocks across the landscape is much more dispersed when compared to the mid-ninth-century, village-based communities. The average residential community, as defined by the area of nearby, contemporary residences, averages 4 km^2, as opposed to the average of approximately 0.4 km^2 areas for the slightly earlier villages to the north. Though the area with fields and field houses for the earlier villages would encompass an area comparable to the 4 km^2 areas of these A.D. 890 communities, the actual village area would occupy only 10 percent of the area spanned by the residences and adjacent fields of the later communities in New Mexico.

The presence and prominence of great kivas in these communities suggest a very different community organization than that of the somewhat earlier, village-based communities. Great kivas allow face-to-face contact for all who are gathered. With interior space holding 150 to more than

300 people, depending on their size, they truly can be considered community kivas, or gathering places. They may be the place where the tensions resulting from limited, but shared access to community productive resources (such as agricultural land) are resolved. As a consequence, community organization appears to be either very flexible or quite variable across the Pueblo I landscape in the study area. Much is left to be done in this area of investigation.

REGIONAL POPULATION LEVELS AND DISTRIBUTION

Regional population is estimated by drainage units at three points in the Pueblo I period (A.D. 800, A.D. 860, and A.D. 920; note that earlier population estimates are presented in the Basketmaker III chapter by Wilshusen). These are relative estimates of population and are built on intervals of fewer than 250 people, between 250 and 500 people, between 500 and 1,000 people, and multiples of 1,000 people. These estimates are derived from an intensive reanalysis of archaeological block survey data for the Monument-McElmo, Ute, Mesa Verde-Mancos, and Dolores drainage units (Wilshusen and Varien 1996). Though there are block survey data for portions of the La Plata and Animas drainage units, the ability to differentiate Pueblo I sites into 60-year intervals is less secure, and so the population estimates are necessarily less accurate with respect to time. The Upper San Juan-Piedra drainage unit needs much more work in order to generate quantifiable population estimates, and the estimates in Figure 7-10 represent best guesses based on a variety of data.

Clearly, numerous assumptions are made to generate the population estimates, and the estimates can change significantly based on how accurately one can estimate site use life, occupational dates, and population, and potential contemporaneity with other sites in the vicinity, among other variables (see Nelson et al. 1994). Though the estimates in Figure 7-10 hopefully will be challenged and improved in future work, they are a necessary and defensible set of figures based on present data (Wilshusen and Varien 1996; Wilshusen and Ortman 1999). The estimates for A.D. 860 in Figure 7-10 are derived from population density figures (people/square kilometer) for the drainage units based on the SHPO site data and block survey information. The total figure of 9,500-10,500 for all the units for A.D. 860 is actually surprisingly close to other estimates that could be derived from other data. For example, if one uses only known village population estimates for the western drainage units for A.D. 860 (see Table 7-2) and add in the estimated "undiscovered" villages for comparable unsurveyed areas in the massive private lands in the Dolores and Monument-McElmo drainage units, one derives an estimate of approximately 5,200-7,600 for people living in villages. If approximately one-third of A.D. 860 population (3,200) is in hamlets (based on survey data), then with the 5,200-7,600 estimate for villages, one derives an alternative population estimate (8,400-10,800) that is surprisingly close to the density-derived estimate.

Looking at the change in population distribution over time, two areas of note are apparent. First, population changes clearly must reflect at least some immigration early in the Pueblo I period and significant emigration or mortality by late in the period. Total estimated population increases from approximately 6,000 at A.D. 800 to approximately 10,000 at A.D. 860, and falls dramatically to possibly 2,500 by A.D. 920. These changes are well outside the reasonable rates of natural increase or mortality for societies comparable to the Anasazi. As a consequence, migration must be increasingly considered as important in understanding early Pueblo history as it is later in time (Anthony 1990; Cameron 1995; Cordell 1995). Second, the concentration of population early in the Pueblo I period has eastern (Upper San Juan-Piedra and Animas) and western (Monument-McElmo) centers. By A.D. 860, population is almost centered in the western drainage units.

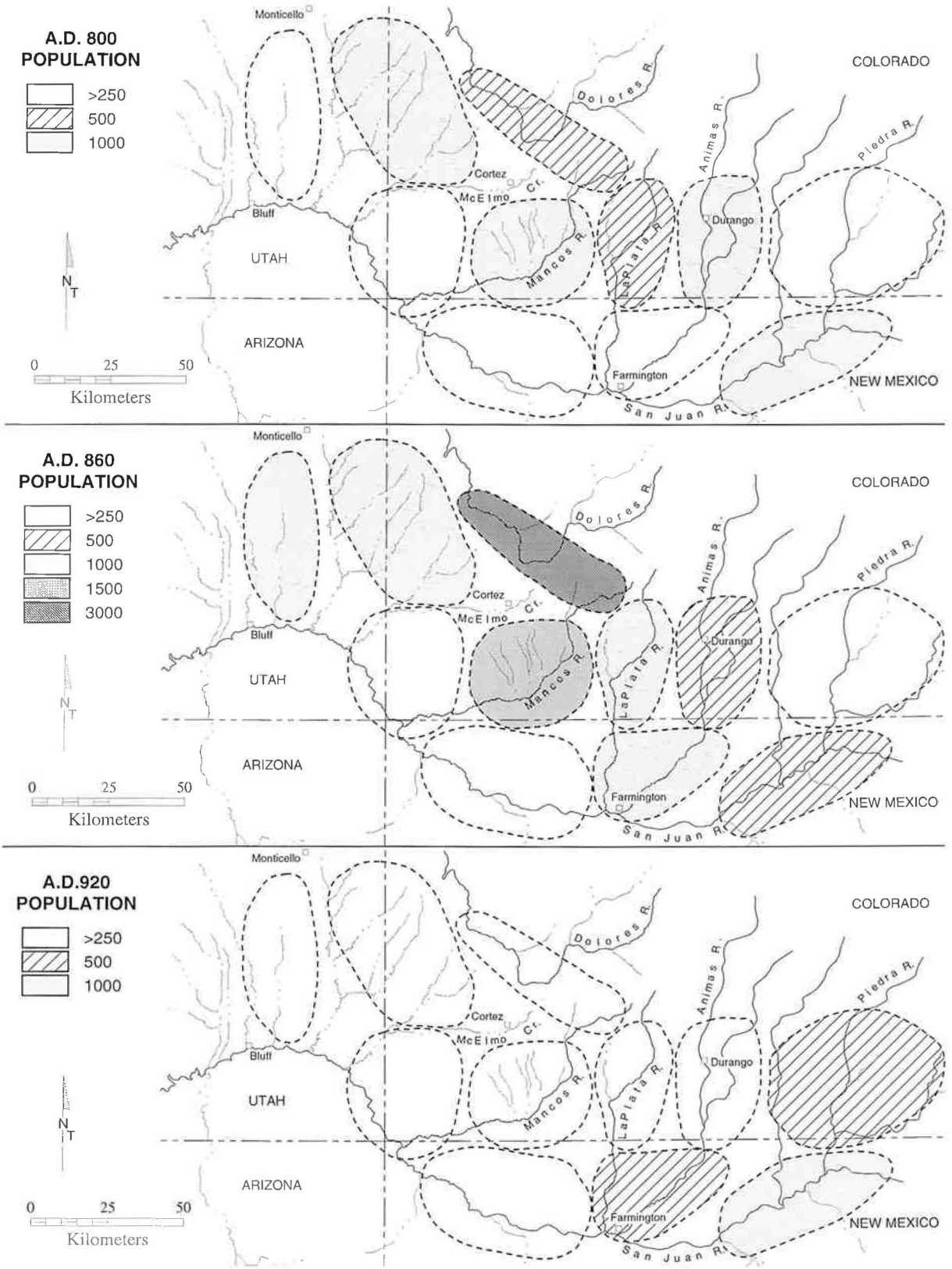

Figure 7-10. Population estimates of the context area by drainage unit (with nearby areas) for A.D. 800, 860, and 920 (Wilshusen and Ortman 1999:Figure 3). (Reprinted with permission of *Kiva.*)

Though these early concentrations may be coincidental, it does appear that early Pueblo I populations have at least two, and possibly three, different areas of pottery production and design which become subsumed under one design tradition (Piedra) by the end of the ninth century.

The idea of an influx of population suggested by the settlement data finds some confirmation in the architectural, site, and ceramic data, which suggest considerable cultural diversity in the populations of the big villages (Wilshusen and Ortman 1999). These data are only introduced below, but they deserve more scrutiny and critical attention in future work.

CULTURAL IDENTITY AND DIVERSITY: INTERCOMMUNITY AND INTERREGIONAL TIES

Distinct traditions of ceramic style in the east (Rosa), central (Piedra), and west (Bluff) of the study area in the Pueblo I period suggest the real possibility of at least three distinct and contemporary pottery production traditions in the area (see Figure 7-4). What is intriguing now is that differences in public architecture and site layout suggest contemporary organizational and possibly cultural differences between neighboring Pueblo I villages. These data are detailed more fully in a paper that compares the Dolores villages dating to A.D. 860 (Wilshusen and Ortman 1999).

If the eight villages in or close to the DAP area are examined (see Figure 7-5), four are located on the east side of the Dolores (Grass Mesa, Rio Vista, House Creek, and May Canyon) and four are on the west side (Windy Ruin, Cline Crest, 5MT10-12, and McPhee). The four villages on the east side are characterized by long, relatively straight room blocks, whereas the four western villages have long room blocks with a two-sided symmetry and a horseshoe shape that encloses their plazas. Similar differences occur in public architecture for the two sides of the river, with great kivas found only on the east side and a three-level hierarchy of pit structure types on the west side (Wilshusen 1986c, 1989). In some east-side cases, pit structures appear to be little more than domestic structures, and in other cases they have much of the material evidence that will characterize a headman's kiva in historic Pueblo villages. Suggestive, but small, differences are evident in the early pottery of the east-side and west-side villages, with greater ties to Rosa Black-on-white production styles on the east side and Piedra Black-on-white on the west side.

The east- and west-side differences extend to even the abandonments of the villages. In the single case of abandonment on the west side (McPhee) the room blocks are abandoned, with community pit structures deliberately burned and secondary pit structure roofs collapsed on paired human burials. For the east side, room blocks are abandoned, multiple-household pit structures are burned, and small, single-household pit structures replace surface rooms as the primary residences in the last decade of occupation.

Both Wilshusen (1991:156-199) and Kane (1989:321-322) examined economic differences in variables such as the agricultural potential in different villages' catchment areas to try to explain some of the differences between villages, but were not able to create a satisfactory explanation by invoking ecology or function. Instead, it may be that these cultural differences go back to traditional differences in the social organization, economic practices, and identities of the various immigrants who moved into southwestern Colorado in the late eighth through mid-ninth centuries.

The importance of this theme has not always been stressed in Southwestern archaeological research, but if investigators are to understand where the "extra" population for the Pueblo I

villages originates and where much of the population goes with the breakup of the villages in A.D. 880, it is vital to be able to differentiate the cultural identities of these immigrants. A single example may suggest the importance of this. In the areas of the Animas and Upper San Juan-Piedra drainage units just south of Colorado in New Mexico, the occurrence of Piedra Black-on-white is rare until about A.D. 875. Instead, the black-on-white design tradition in this area can be solidly identified as Rosa Black-on-white until A.D. 850 or so. Is there not a relationship between the influx of population to the north with the formation of the last Pueblo I villages and the decline of Rosa Black-on-white and decrease in site population to the south? Should one be surprised when Piedra Black-on-white appears fully developed by A.D. 875 in these southern areas, even though for the previous century it has been the black-on-white tradition associated with the villages and hamlets of the Mesa Verde-Mancos and Dolores drainage units?

Although many anthropogenic, climatic, and basic economic changes clearly shape the aggregation of Pueblo I villages in the context area, it is also evident that researchers have not focused enough on the cultural histories or traditional practices of the peoples who form these villages. It appears that histories and initial conditions do shape simulations of the past, and there should be no doubt that cultural histories shaped the formation of Pueblo I villages and may have influenced their breakup.

PUEBLO I CULTURAL CHANGE

Pueblo I represents a classic example of the emergence of formative societies that are organized around villages. The rapid emergence of these villages, their short use lives, and the probable migration of thousands of people across the region are all aspects of Pueblo I change in the northern Southwest. For example, in a 40-year period (A.D. 840-880), the prehistoric societies of southwestern Colorado were transformed by a rapid change in settlement patterns from dispersed to aggregated, by the potential influx of thousands of people into the central portion of the study area (Mesa Verde-Mancos and Dolores drainage units) from peripheral areas in New Mexico, Utah, and Arizona. This transformation was made more complex by the mixing and interaction of up to three different, neighboring cultural groups. These changes demonstrate the need to take a truly interregional view to understand these tumultuous times. It will be necessary to use archaeological data from the whole northern San Juan to account for even a fraction of these developments. This context summary of Pueblo I change is only a beginning.

The shift in settlement locations from north (southwestern Colorado) to south (along the San Juan River in New Mexico) in the late ninth century all spell major changes in community organization and the formatting of the cultural landscape. Agricultural settings change from upland, dryland agricultural plots in the north to lower elevation settings with less rainfall in the south. Sociopolitical organization varies between systems based on fairly hierarchically organized ritual systems with oversized pit structures only in particular room blocks and in particular villages, and alternative systems centered on singular great kivas and numerous smaller pithouses with very few differences. Site settlement patterns shift from large, tightly interconnected villages to dispersed communities of single-residence hamlets. Agricultural strategy varies from dryland farms in thick rich loess in the north to a southern focus on fields in relatively poor soil along manipulable drainages. Pueblo I is nothing if it is not full of change and the potential for conflict.

Certainly any explanation of village formation and breakup must be tied to the broad differences between the risks of the northern Pueblo I dryland farming communities that were tied to a bimodal (i.e., winter and summer) precipitation pattern and the very different risks of the more

southern Pueblo I communities along the San Juan River, which were focused on more intensive control of runoff from a primarily summer-dominant precipitation pattern (see also Dean 1996). However, any explanation must also make sense of the cultural histories of the Basketmaker III and early Pueblo I communities that come before and the early Pueblo II communities that follow closely on the heels of the migration from this region. The great kiva communites such as those documented at Cedar Hill by Wilshusen and Wilson (1995) may either foreshadow, or be contemporaneous, with the early Pueblo II great houses elsewhere in this area (Windes and Ford 1992:82-83; Fowler and Stein 1992). It is striking that these communities are in many cases at the upland edge of the San Juan Basin, or in the same setting for many of the most important post-Chacoan (early Pueblo III) great houses. When we compare the settlement pattern of the late Pueblo I Cedar Hill communities in New Mexico with the later Chacoan great house communities, the similarities are apparent, especially when compared with the earlier, compact Pueblo I villages. It may be that the "collapse" of Pueblo I villages in the context area sows the seeds for the subtle, yet important changes in the tenth and early eleventh centuries (Judge et al. 1981; Vivian 1990).

DATA NEEDS, BIG PICTURE PROBLEMS, AND PUEBLO I RESEARCH ISSUES

General Statements About 1984 Context

In the 1984 prehistoric context for southwest Colorado, Eddy et al. (1984) reviewed the archaeological data for 10 different drainage units in essentially the same area being examined in the present context. At the end of each discussion, they offered suggestions for future research in each drainage unit. There is considerable overlap between the definition of the drainage units in the 1984 context and the organization of the present analysis, so it should be possible to answer some of the questions of the previous context, as well as to note which questions have defied solution.

A major explanatory focus of the 1984 context for the discussion of the Pueblo I period was the movement of population within drainage units based on proposals of arroyo-cutting, climatic change, and anthropogenic degradation of landscapes such as had been proposed by Eddy (1972, 1974) for the Upper San Juan-Piedra area. There was also a focus on the aggregation of population in certain drainage units, such as Dolores, and lack of population in other units, such as the Monument-McElmo. Eddy et al. (1984) combined Berry's (1982) proposal of cyclic population movement with Stuart and Gauthier's (1981) and Earle and Christenson's (1980) proposals about the relationship between human economic organization and environmental circumstance. Berry's (1982:120) proposal in essence was that "(1) during drought periods, a portion of the Plateau Anasazi population crowded into the few existing microenvironments that could support maize farming; (2) the remainder left the Plateau, most likely moving into the southern Basin and Range province of Arizona and New Mexico and the southern tip of the Rocky Mountain province in the area around Santa Fe; and (3) with the amelioration of climatic conditions, significant numbers of people returned to the Plateau." Eddy et al. (1984) combined this idea of population migration with an economic model that shifted between efficiency (least cost) systems in benign environmental circumstances and power (optimizing) systems in stressed or unstable environmental circumstances. What was left unclear throughout the context was how the major environmental shifts and economic shifts were evident in some drainage units but not in others. In other words, there was not the ability to map out the changes with any precision or accuracy at both regional and local levels.

In addition, for a number of drainage units—for example the Mesa Verde-Mancos, La Plata, and Animas—though a great deal of work had been done early in archaeology's history, there was little ability to correlate these findings with the more detailed chronologies and understandings of social change prominent in recent research efforts. As a consequence, though the model could be mapped out in some detail (Eddy et al. 1984:94), the details such as population estimates, organizational changes, and climatic effects on different context landscapes through time could not be given. In short, it was an interesting model, but the test could not be performed for lack of sufficient data across the context area. A test requires not only positive outcomes in some areas of the model, but also negative outcomes in others.

It is interesting to see how many of the ideas in the earlier context remain relevant, but which are much more addressable with present-day data sets. Whereas Eddy et al. (1984) suggested possible scenarios for change, there really was not the detailed synthesis of population, climatic, and subsistence data for the context area or the northern San Juan that was necessary to test the reasonableness of these scenarios. As a consequence, it was difficult to relate changes in different drainage units to one another, much less to relate these changes at the level required to test Berry's proposals about population shifts across the immense space of the Colorado Plateau. The "tests" of the explanations in the 1984 context were at the scale of each drainage unit, even though the explanations assumed interconnections and possible population migrations across the whole Southwest.

Specific Recommendations for Future Work

The scale of archaeological research and management concerns range from the analysis of artifacts to the preservation of landscapes. The following recommendations are simply initial suggestions. On a broader level, it is recommended that the Colorado Council of Professional Archaeologists formally devote a full annual meeting to discuss recommendations for future work. It would be good if this meeting could be coordinated so that members of the Utah Professional Archaeology Council and New Mexico Archaeological Council could also attend.

Artifacts

For artifacts, it is important to consider how to share analytical data via electronic means. Currently, no uniform standards exist for artifact data from archaeological investigations. Many of the issues most important to Pueblo I research will require comparison of artifacts and databases from a variety of projects. Over the next few years, investigators must make progress on sharing artifact data and comparing artifact classifications with one another. Key issues such as tracing the movement of Pueblo I emigrants from the area and isolating ethnic variation within and between villages will require different and specialized methods of ceramic, architectural, and other analyses. Ceramic production analysis, such as refiring and trace element work, as well as more detailed stylistic analyses, may be means of tracing the origins of vessels possessed by recently arrived immigrants. Similarly detailed comparisons of architecture and site layout may provide another measure of comparison.

Site Types

For sites, it is important that archaeologists evaluate the site types used in this report. At present there are more than 30 types commonly used to discuss Pueblo I sites. Though the seven types of sites discussed herein may seem overly simplified, they are turned toward understanding

key problems identified for the Pueblo I period. The present database is focused much more toward management of cultural resources and description of specific sites than toward specific problem-solving. The site types used here emphasize understanding site variability in population, economy, and landscape use—all important variables in describing Pueblo I change. By keeping site types to 10 or fewer, it will be possible to evaluate interregional variation and temporal shifts in Pueblo I, which may aid the understanding of village formation and breakup. However, to achieve that goal, it will require reworking the present files and assembling new site data in a manner that allows for data comparability. The two temporary, nonresidential site types (artifact scatters and artifact scatters with features) definitely need revision and improvement. They are simply descriptive types that flag how little is known about Pueblo I limited activity sites. These sites will be extremely important in understanding the organization of the larger landscape culturally and economically.

Settlement Patterns

While real progress has been made over the last 15 years in understanding Pueblo I villages, the communities of dispersed hamlets are much less well understood. It is important to try to understand the place of dispersed hamlets in the larger settlement scheme. Researchers need to identify the communities to which they belonged and to estimate their use lives, using techniques similar to those suggested by Varien and Potter (1997) and derived from Lightfoot's baseline work at Duckfoot. Somehow, archaeologists must combine extensive work such as focused reconnaissance surveys with intensive examinations of sites in harm's way. This may require a plan that combines both research and CRM monies to succeed. An important research aspect for the Pueblo I period would be to devise a predictive survey of where remaining Pueblo I villages or great kivas might be and to try to locate and map villages or great kivas in these areas. As was noted in the case of 5MT6 (the Crossroads site) Pueblo I villages are a fragile and diminishing resource and a central problem is to identify as many as possible in the next five to 10 years. This is crucial to understand the nature and scale of village formation in this area.

Culture History

Finally, crucial bits and pieces of culture history are in disarray. The end of the Basketmaker III period and beginning of the Pueblo I period are poorly represented in our excavated sample, and tremendous mobility exists in the location of Pueblo I settlements across the context area between A.D. 760 and 880. Researchers have only a limited idea from where immigrants come and where they emigrate in the A.D. 880s. The research focus must be expanded to a much larger landscape if one is to understand the population growth, the economic intensification, and the ethnic diversity characteristic of the Pueblo I period.

Investigators are not yet able to examine change across the whole northern Southwest, but it has been possible to begin to discuss Pueblo I changes across much of the northern San Juan. These changes—as noted above—center on village aggregation, human population migration, and the mixing and interaction of different cultural groups. The syntheses of settlement patterns, population distributions, and community organization in this chapter are data-rich and all have testable proposals embedded with them. As a first approximation of Pueblo I change at the scale of the region, this summary likely has some data and many interpretations that will not stand the test of time. However, it is much more clear than it was in 1984 that a culturally focused description of important changes in the Pueblo I period is possible, and that one could learn a great deal about formative societies in general by better understanding the causes of change. Finally, Pueblo I

studies may provide a comparative window on similarly principled changes in Pueblo III (e.g., Adler 1994, 1996b; Lipe 1995), another period of time in which the forces of aggregation, migration, and cultural genesis were prominent.