DEEP ROOTS

A 10,000-Year Indigenous History of the Grand Staircase-Escalante National Monument

By Jerry D. Spangler & Matthew K. Zweifel

Utah Bureau of Land Management
Cultural Resource Series No. 30

Grand Staircase-Escalante National Monument
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**This work is dedicated to our fathers,
who were always fascinated by what we do, but who never
got the chance to read this volume:**

Emery Emerson Spangler (1939 to 2021)

Dr. Richard G. Zweifel (1926 to 2019)

Acknowledgments

The following volume involved reviewing and digesting literally hundreds of archaeological reports, theses and dissertations, monographs, and books, and then condensing complex concepts into only a few paragraphs. This difficult (and sometimes impossible) task was greatly facilitated by more than a dozen archaeologists who willingly reviewed drafts, offered polite corrections and different perspectives, contributed unpublished data, and shared copies of long-forgotten reports we had once thought to be lost. We offer our gratitude to Joel C. Janetski, Richard K. Talbot, and James Allison, all of Brigham Young University; paleoenvironmental specialist Rob D'Andrea; Connie Reid of the Kaibab National Forest; Lori Hunsaker, at the time with the St. George Field Office (BLM); Sarah Page with the Arizona Strip Field Office (BLM); Heidi Roberts of HRA Inc. in Las Vegas; Jennifer Dierker with Grand Canyon National Park; retired BLM archaeologists Doug McFadden and Gardiner Dalley; Phil Geib at the University of Nebraska, Karen Harry at University of Nevada-Las Vegas; Kelly Beck with SWCA Environmental, and Peter Yaworsky, Kenneth Blake Vernon, and Brian Codding at the University of Utah. We also acknowledge the efforts of Nathan Thomas at the Utah State Office and Valerie Russell, the new archaeologist at Grand Staircase-Escalante National Monument, for pushing this manuscript toward publication in time for the 25th anniversary of the Monument. Special thanks are also in order for our technical editors Jame M. Aton, James Thalman, and Donna Kemp Spangler. All mistakes and misinterpretations of the data are ours alone.

Preface

No one knows what the Ancient Americans of southern Utah called themselves. Most likely it was some variation on the term "The People." Many different names have been ascribed to the Ancients by modern groups, and some of those names are now deemed inappropriate or offensive to those who trace their ancestry to the Ancients. We prefer the term Hisat'sinom, a Hopi word meaning ancient people or those who came before. In the Hopi view, the Hisat'sinom are not distinguished on the basis of ethnicity, language, or cultural practices. All who came before are Hisat'sinom. We find this all-encompassing term quite appropriate, but perhaps a bit cumbersome to the average reader. By necessity, we use a number of different names in the following chapters — Archaic, Fremont, Ancestral Puebloan, Ancestral Paiute — as literary shorthand for many different groups who occupied the Monument over ten millennia.

Archaeologists still cannot agree, for the most part, who the Ancients were, when and where they came from, and where they went, if they went anywhere at all. In the following chapters, the Hisat'sinom of Grand Staircase-Escalante National Monument are discussed from the perspective of various archaeological and ethnographic perspectives offered by researchers over the past 150 years. In effect, this publication is a history of previous archaeological research. It is also inherently biased. The thoughts, ideas, and theories offered over the years have come from Euro-American researchers, most of whom gave little thought to what the modern descendants might have to say about their conclusions and interpretations. This entrenched ethnocentrism is slowly eroding due to federal laws mandating greater tribal consultation and involvement, as well as a handful of archaeologists who have actively engaged the tribes during the course of their research.

Tribal perspectives are extremely rare in any of the reports synthesized in this overview, and hence they are sorely lacking in the following discussions. But as more archaeologists embrace the wisdom and oral traditions of indigenous groups, chances are that tribal voices will ring more prominently in future publications than they do in this one.

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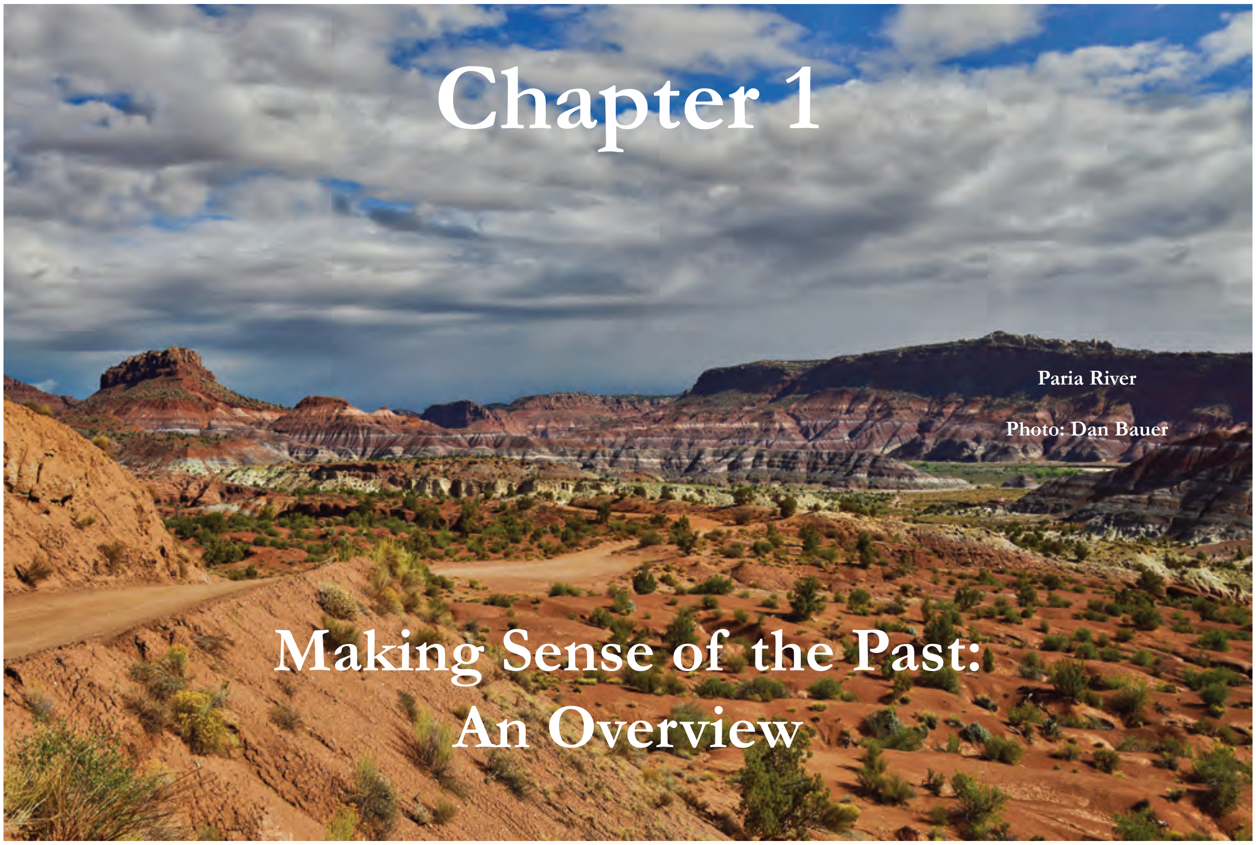


Paria River

Photo: Dan Bauer

Chapter 1

Making Sense of the Past: An Overview

Grand Staircase-Escalante National Monument (GSENM) is a desert landscape of deep sandstone canyons with ever-changing hues, seemingly limitless rolling hills carpeted with pinyons and junipers, arid badlands ripped and rent by erosion as thunderstorm runoffs work their way south to the Colorado River, and high plateaus standing as sentinels to discourage anything but temporary human trespass. It is a land that is brutally rugged and often impenetrable. It would seem to be both foreboding and forbidding to humans.

But looks can be deceiving. GSENM has actually been home to families for the past 12,000 years. In fact, there has rarely been a time since humans first arrived on the northern Colorado Plateau near the end of the last Ice Age that the region was not occupied. These earliest inhabitants proved remarkably adept at surviving, even thriving, in an inhospitable environment for thousands of years.

The earliest GSENM residents might have been deer hunters who returned time and again to a rockshelter just outside Escalante, beginning about 10,000 BC when local environments were changing rapidly from colder, wet conditions to warmer, drier ones. The last vestiges of the massive glaciers on the Aquarius Plateau were, at that time, sending waters cascading down North Creek to the Escalante River. The lush forests that had once graced the foothills began to give way to junipers and later pinyons, and entire plant and animal communities were reorganizing in response to increased aridity.

By about 8000 BC, the glaciers had vanished, and once-abundant wildlife had dispersed across the snow-free high plateaus. And humans did what humans have always done: They adapted. By necessity, they became more mobile, ranging farther and farther. They became increasingly dependent on wild plants — seeds, tubers, berries, nuts — and they devised stone tools to process them. They became increasingly reliant on small game, especially rabbits. They came to know the landscape intimately, harvesting early maturing grass seeds in the Colorado River lowlands in the late winter or early spring, then moving their camps to the benches as they followed the ripening plants to ever higher elevations. By summer, they were on the high plateaus, which offered a cornucopia of deer and elk, fish and birds, berries and nuts, seeds and tubers. Autumn would have found them retreating downslope to harvest pinyon nuts and to ambush mule deer making their annual winter migrations. They most likely harvested and stored enough food for the dreary winter months ahead.

Archaeologists call these hunters and gatherers Archaic people, but no one knows what they called themselves. They probably operated as extended family units, although several families might have come together for communal rabbit drives and deer hunts. Some used stone tools identical to contemporaneous groups in the eastern Great Basin. Others used tools more akin to those found on the Great Plains, and a few might have come from south of the Colorado River, although swimming the river with children and elderly family members in tow would have been a daunting undertaking in those days. A continuous sequence of radiocarbon dates suggests the Archaic hunting and gathering way of life continued unabated and with few modifications over seven millennia.

Something happened about 1000 BC. Populations seem to have increased throughout the GSENM region, perhaps due to families fleeing droughts in the Great Basin. Another possibility is that families began to arrive from south of the Colorado — families who brought an entirely new way of life centered on maize (corn) farming. Recent evidence from the Jackson Flat area south of Kanab suggests the first farming might have occurred here between about 1300 and 800 BC, which is roughly a thousand years or so earlier than traditionally thought. By about AD 200, maize farming had become widespread, not only in the Kanab area but along the Escalante River corridor far to the east.

Farming arrived in the Kanab area, perhaps introduced by San Pedro immigrants from the south, by around 1000 BC.

Farming requires a certain commitment to staying put to plant, water, and tend crops. And the earliest farmers of the Grand Staircase region took to a settled way of life early on. They constructed circular residences partially below ground that featured several standardized features: floor pits, central fire pits, robust roof support systems, and in some instances benches encircling the interior. They also constructed very large and elaborate food storage cists in nearby alcoves — pits that were also used to bury the dead. Some families might have coalesced into small hamlets, a harbinger of the larger villages that would come later. Archaeologists see a lot of similarities between these earliest farmers and contemporaneous groups of the Kayenta and San Juan River areas where they are referred to as Basketmaker II peoples.

The increased sedentism evident in the Grand Staircase has not yet been documented in the Escalante River region at such an early date. Maize farming was unquestionably being practiced by AD 200, but these might have been seasonal occupations where the farmers moved into an optimal area along the river in the spring and then returned to a winter residence after the fall harvest. Instead of formal pit houses, they lived the warmer months in the shade of alcoves and rockshelters near their fields, and perhaps temporary brush structures that have not withstood the ravages of time. The large number of granaries and slab-lined cists found along the Escalante River attests to the importance of cultivated foods at this time. Archaeologists believe these earliest farmers were ancestors of later farming groups collectively referred to as the Fremont Complex.

For about 800 years, beginning about AD 200, groups in the Grand Staircase and Escalante River areas maintained separate identities, suggesting well defined cultural boundaries between them. On the west, those of the Grand Staircase became increasingly dependent on cultivated foods, with maize representing 80 percent or more of the diet. Pithouses became more formalized, and they were commonly attached to rows of storage cists. Clusters of residences hint at the emergence of village life and increased social complexity. Culture change through this period was marked by accretion of new traits rather than replacement of old patterns. Differences in painted ceramics and the shape of the pottery jar rims are often the only surface clues as to the age of these sites. These locally produced ceramics all have correlates to vessels found in the Kayenta region where they are assigned to the Basketmaker III, Pueblo I, and early Pueblo II periods of Ancestral Puebloan prehistory. They are also quite similar to ceramics found on the Arizona Strip, St. George Basin, and lower Virgin River-Moapa Valley area of southern Nevada.

This same ceramic tradition is largely absent in the Escalante River Basin to the east. Instead, a distinctive grayware with basalt tempering, called Emery Gray, was utilized by about AD 500, which is the defining characteristic of the beginning of the Fremont Complex. The ceramic evidence suggests the Fremont were socially and economically connected to other Fremont groups to the north and northwest. There is minimal evidence they interacted with their Ancestral Puebloan neighbors until sometime around AD 750.

Ancestral Puebloan farmers successfully grew maize on Fiftymile Mountain at elevations between 7,000 and 7,500 feet — a remarkable feat not possible with today's arid climates.

The Fremont are traditionally thought to have been mobile farmers who continued to be proficient hunters and gatherers, although farming increased in importance over time. Pithouse architecture appeared in this region by about AD 750, and the interior features are strikingly similar to Ancestral Puebloan ones to the west with encircling benches, ramped lateral entryways, and various floor pits, some of them quite large. This might be evidence of increased social interaction or intermarriage between the two groups, resulting in more permeable cultural boundaries. As their ancestors had done in the centuries before, Fremont groups farmed along the Escalante River during the warm months and then returned to a winter residence, perhaps in the Wide Hollow area near Escalante. Some Fremont farmers might have moved into the Kaiparowits Plateau at this time, as evidenced by the large number of granaries there.

At about AD 1000 or 1050, the boundary between the two groups seems to have collapsed altogether. Ancestral Puebloan immigrants arrived in the Escalante River country, constructing large pueblos at Coombs Village and Lampstand and occupying former Fremont sites like Arrowhead Hill and Fremont territories like the Kaiparowits Plateau. It is not known whether they absorbed or assimilated the Fremont people already there, or whether the Fremont were pushed out of their homelands that had been theirs for 800 years or more.

Archaeologists continue to debate the source of this Ancestral Puebloan migration, with some arguing it can be found in the Kayenta region of northern Arizona and others arguing it was from the Grand Staircase, which received its own influx of Kayenta immigrants at the same time. It is quite evident that migrations were occurring throughout the region, and these disrupted long-held traditions. In the Grand Staircase, Kayenta immigrants might have remained only about 50 years before they either returned to their homelands or were absorbed by Virgin Branch populations. On the Kaiparowits Plateau, the ceramic evidence suggests a mix of Kayenta and Virgin Branch traits, but this occupation was likewise brief, probably only a hundred years or so. It might have lasted only somewhat longer in the upper Escalante River area.

This period of time, referred to as the late Pueblo II-Pueblo III, was remarkable because the immigrants cultivated their crops using only natural rainfall — an extremely risky practice in areas that receive less than 12 inches of rain annually. But they were apparently very successful at it, farming the high Kaiparowits Plateau at elevations well above 7,000 feet. This raises the possibility that climates at this time were wetter and warmer than present.

These Ancestral Puebloans also brought with them an increased social complexity, as evidenced by the appearance of small, aboveground pueblos, some with courtyards or plazas, and by deep subterranean structures used for ceremonial and community purposes, called kivas. Trade networks linked communities to distant regions. This pattern persisted from about AD 1050 to 1150, at which time crippling drought might have depleted their storage capabilities, especially in light of the much larger populations. Some immigrants might have returned south across the Colorado River at this time, while remnant populations remained in optimal environmental niches for another century. Another crippling drought at about AD 1280 proved to be a death knell to the remaining farmers.

The abandonment of farming in the middle AD 1200s is not easily explained. The ancient farmers had survived lengthy droughts before, probably by relying more on wild plants and animals when their crops withered. So why was this event so catastrophic? One answer might be the arrival of hunter-gatherer immigrants from the Great Basin — ancestors of the modern Southern Paiutes.

There is growing evidence that Ancestral Paiutes were present in the region by AD 1250, if not earlier. Some researchers see them as militaristic, forcibly displacing the Ancestral Puebloan farmers (there are also oral histories to that effect). Other researchers see the Ancestral Paiute as extremely efficient foragers who out-competed their farmer rivals. And when farming proved untenable, the farmers found they no longer had access to the wild plants and animals that had provided relief during earlier times. Both groups might have coexisted for 50 years or more before the farmers picked up and left or they were simply absorbed into the Ancestral Paiute way of life.

During this period of coexistence and assimilation, Ancestral Paiutes might have learned the basic principles of agriculture. There is some archaeological evidence, albeit limited, that these foragers also cultivated maize and beans, although never on the scale of their Ancestral Puebloan predecessors. They were still farming along the creeks and rivers when they were encountered by the first Euro-Americans to traverse the area in 1776.

This publication is intentionally "different" from other archaeological overviews, referred to as Class I overviews, because our intended audience extends beyond land managers. Monument officials and the Colorado Plateau Archaeological Alliance (CPAA) have long shared a conviction that preservation of archaeological resources can be fostered only when the public understands and appreciates the scientific value of those resources. In effect, the public cannot fully embrace preservation if they have little or no understanding of the importance of archaeological resources, especially if those resources might lack perceived visual appeal. This monograph, revised from a more technical report (Spangler et al. 2019), is intended to be intelligible, informative, and enjoyable to the general public, while also being useful to land managers in the future.

Location and Setting

GSENM is located in Kane and Garfield counties in southern Utah. At 1.9 million acres in size, it is also the nation's largest national monument, and it is one of four national monuments, four national parks, and one national recreation area on the northern flanks of the Colorado River subject to enhanced environmental protections. It was the first national monument to fall within BLM's management responsibilities. The Monument is also unique among national monuments because it was created specifically as an outdoor scientific laboratory, with archaeological resources warranting specific acknowledgment in the presidential proclamation establishing it in 1996.

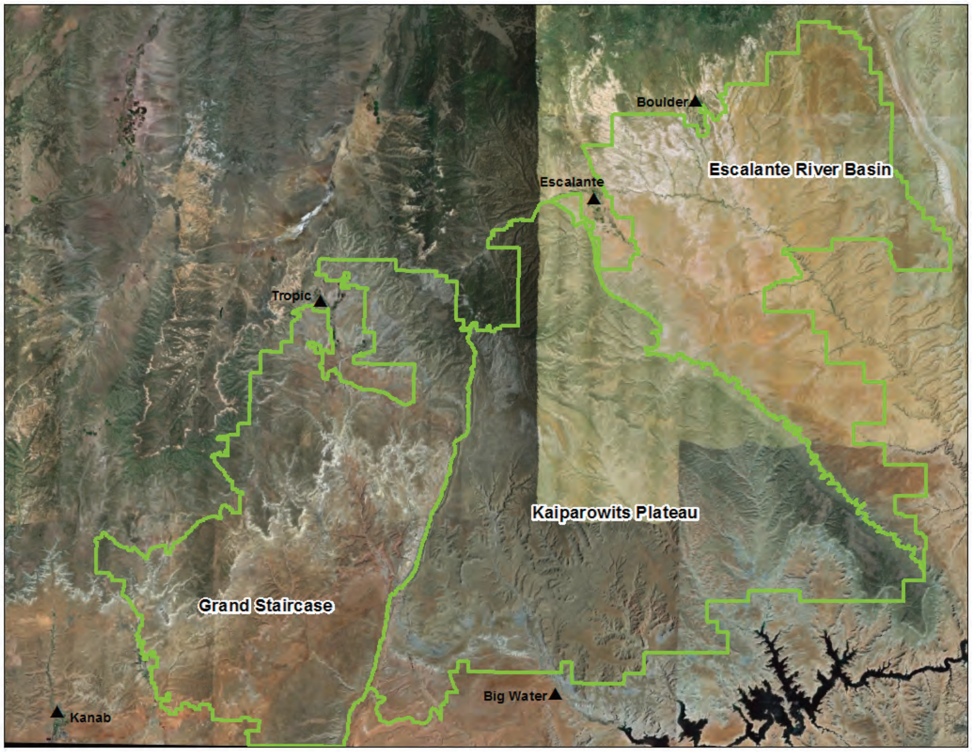


Figure 1.2: The Monument is divided into three distinct regions, each based on unique topography.

GSENM is included within the much larger Colorado Plateau physiographic province centered on the Four Corners of Utah, Colorado, New Mexico, and Arizona (Stokes 1986), specifically the northern Colorado Plateau subsection that includes the entire plateau north and west of the Colorado River. The GSENM region consists of mostly north-to-south tilted terrain that includes a variety of topographic settings ranging to about 11,000 feet elevation on the Aquarius Plateau on the north to less than 2,000 feet elevation along the Colorado River within the lower Grand Canyon.

GSENM is comprised of three distinct geographic sections (Figure 1.2):

- The Grand Staircase, the westernmost section, is located just east of Kanab, Mt. Carmel, and Orderville, and just south of Bryce Canyon National Park. It is defined by a series of cliffs and terraces that rise from south to north. It is largely characterized by a pinyon-juniper environment interspersed with colorful sandstone outcrops and escarpments. The Paria River is the primary permanent water source (Figure 1.3), although permanent water is also found in Johnson Canyon (Figure 1.4) and at scattered springs and seeps. The eastern edge of the Grand Staircase section is the Cockscomb, a prominent geologic feature that spans the entire Monument from north to south. Prehistoric occupations were focused predominantly along permanent water sources, along the base of the Vermilion Cliffs and the terraces above, and the Buckskin Mountain area in the southeast portion. The Kanab Creek drainage, which features prominently in subsequent narrative chapters, is actually outside the Monument boundaries along the western border.

- The Kaiparowits Plateau, the center of the three sections, is a wedge-shaped region characterized by rolling hills and benchlands in the west. These rise gradually toward the east, cresting on Fiftymile Mountain, a north-south trending high plateau rimmed by steep cliffs and with elevations ranging from 7,000 to 8,000 feet. Lower elevations are characterized by pinyon-juniper forests that were heavily utilized by Archaic hunters and gatherers (Figure 1.5). The high plateau is characterized by broad,

Grand Staircase Environments

Figure 1.3: The Paria River (above) bisects the Grand Staircase from north to south and is the largest source of permanent water in the western portion of the Monument.

Figure 1.4: Johnson Wash (below) was once a meandering creek with wet meadows and lakes. Small lakes are still found at the mouth of the Dairy Canyon tributary.

Kaiparowits Plateau Environments

Figure 1.5: The lower, western portion of the Kaiparowits Plateau (above) is carpeted by pinyon and juniper forests that were rich in big game throughout prehistory.

Figure 1.6: The upper, eastern portion of the Kaiparowits Plateau (below), also known as Fiftymile Mountain, had unique environments that allowed high-elevation maize farming in prehistoric times.

Escalante Canyons Environments

Figure 1.7: The lower Escalante River country (above) is largely inhospitable deserts, but prehistoric farming occurred all along the river corridor.

Figure 1.8: The upper Escalante River country (below) features an abundance of pinyon and juniper forests, as well as small creeks, that were home to prehistoric groups for thousands of years.

open sagebrush flats interspersed with pinyon-juniper forests (Figure 1.6). This section is bordered by the Cockscomb on the west, the Straight Cliffs on the east, the Colorado River on the south, and the Aquarius Plateau foothills on the north.

- The Escalante River Basin, the easternmost of the three sections, can be described as a series of high plateaus, expansive deserts, and spectacular canyons incised into the uplifted sedimentary strata (mostly sandstone). The lower, southern portion features very sparse vegetation (Figure 1.7), and most prehistoric occupations were focused on the Escalante River corridor. The upper Escalante River country, situated at the foot of Boulder Mountain and the Aquarius Plateau, features comparatively dense patches of pinyon and juniper, which coincide with greater evidence of permanent residences. The upper basin also features numerous Escalante River tributaries such as North Creek, Birch Creek, Deer Creek, and Boulder Creek (Figure 1.8). It is bordered on the east by the imposing Waterpocket Fold and on the west by the 50-mile-long curtain of sandstone known as the Straight Cliffs.

The Monument is bounded to the north by the Dixie National Forest, and on the east by Capitol Reef National Park and Glen Canyon National Recreation Area. The southern boundary skirts the Glen Canyon NRA, a portion of U.S. Highway 89, and the Utah-Arizona border. The western boundary of the monument is generally defined by the Skutumpah Road and Bryce Canyon National Park. The monument consisted of 1.7 million acres at the time it was created by executive order on September 18, 1996. In 1998, the state of Utah traded School Trust inholdings to the federal government, which increased the size of the Monument to about 1.9 million acres representing a full spectrum of environments.

Environmental Context

A fundamental premise of archaeological studies in modern times has been the relationship between human populations and their natural environment. Variations in size and structure of human populations are generally believed to correspond to variations in the natural setting, and environmental changes over time are believed to directly influence human behavior (Aikens 1983). Exactly how natural environments influenced early humans has been the subject of considerable debate over the years. Steward (1938, 1940, 1955) maintained that human groups in the American West effectively exploited both vertically and horizontally differentiated environments, arguing "the physical environment exerts but a permissive and limiting effect" on human populations (1955:34).

More recent theoretical approaches have focused on the premise that variations in human behavior are shaped by natural selection. As articulated by O'Connell et al. (1982:233), "all else being equal, more efficient strategies - those that produce greatest return in energy relative to time or effort expended - will be favored over those that are less efficient." Optimal foraging theory has become a standard approach to modern hunter-gatherer research throughout the West, and it has been applied to recent hunter-gatherer studies in the GSENM region.

This overview emphasizes that the relationship between humans and their local environments defies straight forward explanations. Humans certainly responded to the distribution of local resources, but less obvious is whether the distribution of certain resources was a determining (or limiting) factor in human adaptations, and how social factors influenced those decisions. All characteristics of local environments probably influenced human responses to a greater or lesser degree. As summarized by Reed and Chandler (1984:3),

> *The influence of the physical environment on site locations is universal, regardless of the level of social organization, time period or region. Simply put, man selects for habitation or use locations perceived as appropriate based on factors such as the gentleness of slope, the distribution of water, food, and fuel resources, and quality of shelter. Site locations are not randomly scattered across the landscape [and] the physical attributes of site locations can be easily defined and measured.*

Geib (1989a) also observed that single environmental factors are rarely sole determinants of land-use patterns. For example, during one study on the southern Kaiparowits Plateau, Geib examined soil types he considered to be important determinants of plant growth, primarily deep aeolian and alluvial sands that fostered high concentrations of economic grasses (e.g., ricegrass, dropseed) important to human subsistence. However, the pattern of prehistoric exploitation of such resources was not consistent from one area to the next. One sample unit (Romano Bench) featured deep sands and supported high densities of ricegrass and dropseed, but it exhibited a low site density. A nearby sample unit (Grand Bench) with identical soil and vegetation characteristics was heavily utilized. The only obvious difference was that the Grand Bench area afforded immediate access to Kaiparowits Plateau uplands, but the lightly exploited Romano Bench area did not.

We intend to discuss archaeological phenomena of GSENM within the broad context of human responses to spatially and temporally variable environments. This approach is predicated on the assumption, one articulated by Jesse Jennings more than 50 years ago (1966b), that human populations exploited a wide range of ecotones at different times of the year and perhaps year-to-year depending on resource availability. This pattern of resource exploitation would have been both horizontal, which involved moving significant distances between resource patches, and vertical, which mandated movement between lowland and upland resources.

GSENM itself is characterized by a variety of ecological settings ranging from about 4,000 feet elevation in the south to 8,000 feet in the north. Collectively, these environments offered a complex assemblage of relatively barren deserts, riparian valleys, pinyon-juniper foothills, and alpine forests. The gradational elevation of this topography offered human populations a broad spectrum of predictable plant and animal resources that could have been exploited by human populations at different times of the year. As observed by Jennings (1966b:29), the environments found at different elevations offered complementary resources to one another, and "the canyons and the uplands were aboriginally a single ecosystem and ... the aboriginal occupants of the area exploited the resources on this basis." In other words, it is impossible to consider lowlands adaptations without also considering the interrelatedness of midlands or upland environments.

Jennings (1966b), Ambler et al. (1964), and Long (1966) recognized two basic environmental zones, one a lowland (or canyonlands) zone below about 4,500 feet elevation, and the other a highland environment above about 4,500 feet elevation. More recently, Geib (1996f) argued for three zones, a "lowlands" zone consisting of the arid canyon bottoms below 4,500 feet elevation, a "midlands" zone characterized by benchlands and low plateaus with desert flora, and an "uplands" zone above 5,500 feet elevation that featured pinyon-juniper forests, cooler temperatures, and more precipitation. These three zones are generally consistent with the desert, semi-desert, and upland climatic zones identified in GSENM planning documents (BLM 1998:3.16).

Two other ecozones must also be considered. The high elevations found on the Kaibab, Aquarius, Paunsaugunt, and Markagunt plateaus feature alpine environments quite different from the pinyon-juniper "uplands" zone. For our purposes, the "alpine zone" includes those environments above about 8,000 feet elevation that afforded summer and fall access to abundant, but dispersed faunal resources. This zone also afforded access to fish, berries, roots, and other floral resources that would have ripened much later in the seasonal cycle than resources found at lower elevations.

A fifth ecozone discussed throughout the narrative (one that greatly influenced prehistoric land-use patterns) consists of riparian environments (Figure 1.9). These can be found within all four of the other ecozones. In arid climates they typically feature greater biodiversity, greater abundance of economic plant species, and more numerous faunal resources tethered to a greater or lesser degree to the permanent water. Riparian zones were also manipulated for agricultural purposes.

All five ecozones are represented in the GSENM region, but not necessarily within the monument boundaries. In summary:

- The "lowlands" zone consists of the arid canyon bottoms of the Colorado River and the lower extremes of its northern tributaries (e.g., Escalante River, Paria River, and Kanab Creek) lying below about 4,500 feet elevation. This zone is especially prevalent in the Glen Canyon region. Within GSENM, this zone is limited to a few areas along its southern margin below the Vermilion Cliffs.

- Geib (1996f:6) described the "midlands" zone as arid benchlands and low plateaus lying between the canyon rims and the slopes of higher-elevation plateaus from about 4,500 to 5,500 feet elevation. These areas feature vast expanses of slickrock, dune fields, shadscale, and blackbrush. Within GSENM, this zone includes almost the entire Escalante River corridor as far north as the town of Escalante (but not the benches above), as well as the first terrace above the Vermilion Cliffs, lower Johnson Canyon, the lower-middle Paria River, and the lower benches of the Kaiparowits Plateau.

- The "uplands" zone is characterized by the abundant pinyon-juniper forests found in the foothills below the high plateaus, as well as throughout most of the Kaiparowits Plateau, all at elevations from 5,500 to 8,000 feet. The vast majority of GSENM is located within this zone, including the Wygaret Terrace and others ascending to the north, the upper Escalante River and its Boulder Creek, Deer Creek, and North Creek tributaries, the Lampstand area, and the Aquarius Plateau-Boulder Mountain foothills.

- The "alpine" zone is characterized by high plateau forests of mixed conifers and aspens, greater precipitation, and greater biodiversity, all found above 8,000 feet. It would have provided nuts, berries, tubers, and plant seeds not found at lower elevations, as well as summer-fall access to faunal resources. This zone is not found within the Monument boundaries, but is prevalent on adjacent high plateaus managed by the U.S. Forest Service.

- The "riparian" zone is limited mostly to narrow canyon corridors with permanent flowing water. These include Kanab Creek, Paria River, Escalante River, and Johnson Wash, as well as some tributaries. There are a few other anomalous riparian areas. There is an isolated bog or "lake" on the Kaiparowits Plateau, as well as numerous springs, especially under the rim of the plateau; there are scattered springs and seeps throughout the Monument; and there

Figure 1.9: Riparian zones, like this one along the Escalante River, offered critical plant and animal resources in an otherwise arid environment, as well as water for irrigation of crops.

are abundant small lakes in alpine settings. Some drainages also have intermittent water flows that can foster riparian vegetation.

Archaeologists on the Monument

Archaeological research in the GSENM conducted prior to designation of the monument in 1996 has, for the most part, mirrored theoretical approaches elsewhere in the Southwest as each has emerged, only to be later modified and in some instances discarded. Significant ethnographic research was conducted in the region between about 1870 and the 1930s, but little has been done since that time. These historical trends are discussed in much greater detail in an earlier Class I overview (see Spangler 2001) and the technical version of this monograph (Spangler et al. 2019).

The history of archaeological and ethnographic research in the region can be divided into four periods: (1) A period from 1776 to 1900 when the first archaeological and ethnographic observations were made, often by individuals untrained in this still-emerging science, and archaeology was still viewed as a mere curiosity; (2) A period from about 1900 to 1950 when archaeology emerged as the domain of formally trained archaeologists focused largely on careful descriptions and classifications; (3) A period of regional inventories of massive scale, epitomized by the Glen Canyon Project, from about 1950 to 1963, and (4) Archaeological investigations conducted pursuant to passage of the National Historic Preservation Act in 1966 and other federal laws mandating protection of cultural resources on the public domain, commonly referred to as CRM archaeology.

The earliest ethnographic observations in the GSENM region were those of Catholic friars returning to New Mexico in 1776 after a failed attempt to reach the Spanish garrison in Monterey, California (Warner 1976). And the earliest accounts of archaeological resources of the study area were recorded by members of the Colorado River expeditions of Major John Wesley Powell from 1869 to 1872 (Figure 1.10). While not specifically archaeological in purpose, these expeditions nonetheless provided valuable information on the nature and location of certain archaeological sites. The ethnographic observations made by Powell and several members of his expeditions, especially Frederick Dellenbaugh, also contributed immensely to the ethnographic record at a time when indigenous peoples still retained many traditional lifeways.

The earliest accounts of indigenous peoples in the region are found in the journals of Father Silvestre Velez de Escalante, who led a Spanish exploring expedition into Utah and northern Arizona in 1776 along with Father Francisco Atanasio Dominguez. Escalante's journal offers vivid descriptions of Southern Paiute groups in the Cedar City and St. George areas, as well as the scattered bands they encountered on the Arizona Strip. They passed just south of GSENM on their way to Crossing of the Fathers (now under Lake Powell) on their return to New Mexico.

Various travelers and adventurers passed through the region in the decades that followed, and there are a handful of colorful and usually pejorative descriptions of the indigenous groups of southern

Figure 1.10: John Wesley Powell was a keen observer of Southern Paiute bands in the GSENM region in the 1870s. Photo: J.K. Hillers Collection, Smithsonian Institution.

Utah, but for the most part, these chroniclers traveled the Old Spanish Trail route that bypassed GSENM to the north and west. The first references specific to the GSENM area occurred in the fall of 1858, when missionaries traveled along the foot of the Vermilion Cliffs to Pipe Springs where they visited a Paiute encampment. They continued southeast across the Kaibab Plateau to House Rock Valley where they met, traded, and dined on rabbits with a band of Southern Paiutes (Little 1909).

At the same time religious colonists were settling southwestern Utah, the U.S. government become obsessed with westward expansion, fueled not only by romanticized accounts of trappers and adventurers but by a growing fascination with scientific discovery. At least 12 major expeditions into the region were conducted during this period, but only John Wesley Powell's Colorado River Exploring Expeditions of 1869-72, George M. Wheeler's 100th Meridian surveys of southern Utah and northern Arizona from 1871 to 1873, and Robert B. Stanton's railroad surveys of the Colorado River in 1889 and 1890 made contributions to an understanding of the archaeology and ethnohistory of the GSENM region. Powell's keen interest in the archaeology and indigenous peoples was unprecedented for that time.

In 1874, renowned ornithologist Spencer Baird, at that time assistant secretary of the Smithsonian Institution, enlisted Powell's support to plan the 1876 Centennial Exposition in Philadelphia. Also prominent in these plans was Frederick Putnam of the Peabody Museum. Their efforts were to include an extensive display of ethnographic and archaeological artifacts from North American Indians that had been, and to some extent were still being, collected by various surveys operating throughout the Western territories (Fowler and Matley 1978:20; McVaugh 1956:68).

Among the emerging scientists recruited to assist with collections for the Centennial Exposition was Edward Palmer, a medical doctor and Civil War veteran. Palmer's interest in archaeology and ethnology first brought him to southwestern Utah in October 1875 where he conducted archaeological excavations and recorded observations of indigenous Southern Paiute peoples. His base of operations was the St. George residence of Joseph Ellis Johnson, who had distinguished himself locally as a horticulturalist and whose family afforded Palmer opportunities to explore archaeological sites on various properties along the Santa Clara River. In November 1875, Palmer made a brief excursion to Johnson Canyon east of Kanab, where he excavated a rockshelter (Palmer 1876, 1878). This would have constituted the first formal archaeological excavations of any site within GSENM.

Palmer left the St. George area in early 1876, but returned in December of that year under the auspices of the Peabody Museum. Throughout 1877, he excavated mounds in the Washington City, Paragonah, and Beaver areas, and he might have resumed excavations in Johnson Canyon. It is not clear from Palmer's brief report whether the excavations described occurred during his first visit in 1875 or in 1877 when he returned to the area, or whether the report represents a combination of two field seasons. The artifacts he collected are currently at the Peabody Museum at Harvard University and at the Smithsonian Institution.

Pioneering archaeologist William Henry Holmes (Figure 1.11) also visited the Kanab area in the mid-1870s. He wrote (1886:281),

> *The remarkable desert-like plateau lying north of the Grand Canyon of the Colorado contains many house and village sites. At intervals along the very brink of the great chasm we come upon heaps of stones and razed walls of houses about which are countless fragments of this ware. These are identical in nearly every character with the pottery of St. George on the west, of the San Juan on the east, and of the Gila on the south. A few miles south of Kanab stands a little hill — an island in the creek bottom — which is literally covered with the ruins of an ancient village, and the great abundance of pottery fragments indicates that it was, for a long period, the home of cliff-dwelling peoples. In no other case have I found so complete an assortment of all the varieties of coil-ornamentation.*

There are no maps to indicate exactly where Holmes witnessed the "ancient village," but it might well have been the multitude of sites in the

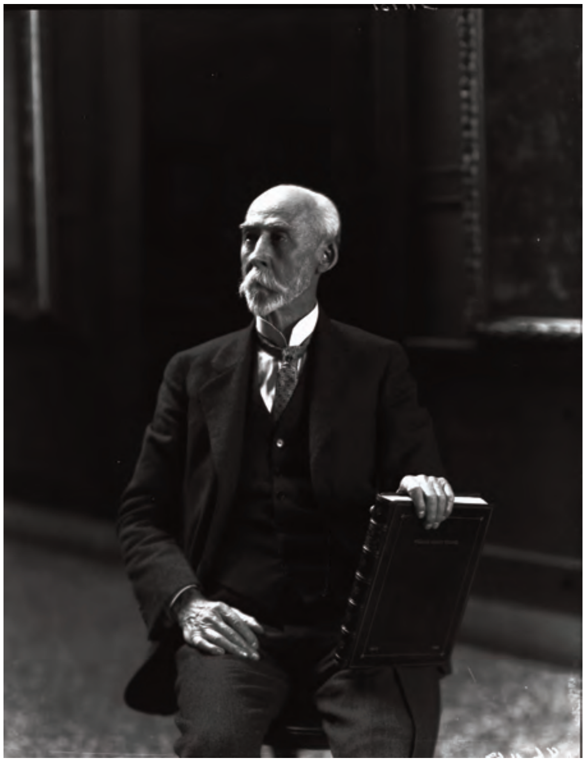


Figure 1.11: William Henry Holmes was a pioneer in the still-emerging science of archaeology in the late 1800s. He visited the area in the 1880s and described sites south of Kanab. Photo: Smithsonian Institution SIA-MAH-18645.

Jackson Flat area just south of Kanab that were recently excavated as part of a reservoir project. As we discuss in later chapters, these sites have made enormous contributions to archaeologists understandings of prehistoric peoples in this region (Roberts 2018).

The First Archaeologists

The origins of archaeological research are often attributed to the pioneering excavations of Edward Palmer from 1875 to 1877. But it was Neil M. Judd, who arrived in the Grand Staircase in 1915, who offered the first substantial descriptions of prehistoric remains in the region and who established its first theoretical framework. He was followed by other early archaeological pioneers: Jesse Nusbaum in 1919 and 1920, Alfred Kidder and Samuel Guernsey in 1920, Henry Roberts and Donald Scott of the Peabody Museum Expedition of 1928, Julian Steward in 1932, and Ben Wetherill in the mid-1930s. This same period also saw a flourishing of ethnographic studies related to the Southern Paiutes by noted ethnographers Edward Sapir and Isabel Kelly.

Archaeological research elsewhere in southern Utah continued unabated in the 1880s and 1890s and into the early 1900s, usually within an environment of artifact acquisition, but these projects skirted GSENM to the south and east. Byron Cummings, who is often credited as the first true pioneer of Utah archaeology, conducted archaeological surveys in the Natural Bridges, White Canyon, and Armstrong Canyon areas in the early twentieth century. Accompanying Cummings on these expeditions was his nephew, Neil M. Judd, who would later rise to prominence as Curator of American Archaeology at the Smithsonian Institution (Judd 1954:154).

Judd (Figure 1.12) turned his attention to the GSENM region specifically in 1915 (Judd 1920, 1926). He returned again in 1916 under the auspices of the Smithsonian Institution's Bureau of Ethnology, and in 1917 as part of an expedition sponsored jointly by the University of Utah and Smithsonian Institution. He resumed research in southwestern Utah in 1919 and 1920 under the authority of the Smithsonian Institution.

Most of Judd's initial reports of his fieldwork are frustratingly brief, and the only report of substance is his classic *Archaeological Observations North of the Rio Colorado* (1926) that synthesizes his many years of research in the region. His research was based on a hypothesis formulated during his early association with Cummings that the origin of prehistoric Pueblo cultures would be found north and west of the Colorado River, and that Ancestral Puebloans migrated from north to south, becoming more sedentary as they approached the Colorado River (1917:40). Judd (1920:68-69) observed,

> *The results of these recent excavations tend to confirm, therefore, the belief that in western Utah there is certain evidence of a prehistoric people which originated some place in the northwest and journeyed southward; that during the course of their long-continued migrations they changed rather rapidly from a semi-nomadic to a sedentary life as they ap-*

Figure 1.12: Neil Judd was the first trained archaeologist to investigate sites in the Grand Staircase portion of the Monument, although his research took him throughout southern Utah and northern Arizona. Photo: Smithsonian Institution SIA-SIA2009-4254.

proached the Rio Colorado. Having gained the "red rock" country and having found, for the first time, natural caves that increased the protection afforded by their small dwellings, they became more closely related, if not identical, in culture to those people commonly recognized as the ancestors of the modern Pueblo Indians.

As Judd was concluding his research in the Grand Staircase region, another emerging archaeologist, Jesse Nusbaum, arrived with the stated purpose of "collecting ethnological material from the surviving Paiute Indians in southwestern Utah and eastward, and of investigating such archaeological sites as might be discovered during the reconnaissance" (George G. Heye, in Nusbaum 1922:11). Nusbaum was a long-time colleague of Alfred V. Kidder, working extensively with Kidder at Mesa Verde prior to the latter's investigations at Pecos Pueblo in 1915 (Cordell 1984:52-54; Thomas 1989:39). Under the direction of the Museum of the American Indian, Heye Foundation, Nusbaum first traveled through the area in 1919. While in Kane County, local residents informed him of "caves containing numerous signs of aboriginal occupancy" (Nusbaum 1922:15).

Nusbaum returned to Kane County in 1920, selecting for excavation a cave in Cave Lake Canyon about 8 miles northwest of Kanab, afterwards called Cave du Pont. Nusbaum's descriptions of the excavations (Nusbaum 1922) and the accompanying descriptive report of material culture (Kidder and Guernsey 1922) provided important evidence of a Basketmaker presence considerably removed from the Basketmaker II "heartland" in northeastern Arizona and southeastern Utah where it had been initially defined (Guernsey and Kidder 1921; Kidder and Guernsey 1919).

Deemed among the most significant Basketmaker sites anywhere in the Southwest, Cave du Pont was at that time the only site that had yielded no evidence that could be attributed to later occupations. In fact, aside from minor looting, there was no evidence the cave had been visited after its abandonment. As noted by Kidder and Guernsey (1922:65-66), particularly impressive was the "remarkable similarity, even in apparently unimportant details, between many of these specimens and corresponding Basket-maker objects ... recovered in northern Arizona. It is obvious that at Cave du Pont we are dealing with an integral part of the regular Basket-maker culture, and the inference is strong that the Cave du Pont people were approximately, if not exactly, contemporaneous with the Basket-makers of Marsh Pass and Grand Gulch."

Nusbaum, who went on to become chief archaeologist for the National Park Service, returned to Cave du Pont in 1936 to recover five cached timbers, one of pinyon, one of oak, and three of juniper. The pinyon sample (LA-U20) was examined in 1939 by W.S. Stallings Jr., who found it corresponded to the Central Pueblo Chronology for the period between 150 and 300 AD. It was determined the pinyon sample was cut in AD 217, "the earliest cutting date in the Southwest and the first from a pure Basketmaker II deposit" (Stallings 1941:3). The early tree-ring date provoked considerable discussion and repeated re-examination, but it remains valid to this day.

Shortly after Nusbaum's investigations, the Peabody Museum at Harvard University set its sights on the rugged and forbidding Kaiparowits Plateau and the upper reaches of the Escalante

River. The Kaiparowits Plateau region appears to have attracted its own share of adventurers in the early twentieth century. In 1915, John Wetherill led the "Gregory Expedition" into the Kaiparowits Plateau by fording the Colorado River at Lees Ferry and proceeding east across the mesa to the Escalante River and then north to settlements at the foot of the Aquarius Plateau. Noted author Zane Grey and movie producer Jesse Lasky employed John Wetherill to guide them into the region in 1926, but they were turned back by high water on the Colorado River. When Clyde Kluckhohn conducted his own investigations there in 1928, he encountered historic signatures dated to 1918, 1925 and 1926 (Kluckhohn 1927, 1933).

The Claflin-Emerson Expedition, inspired by Alfred Kidder's keen interest in the Northern Periphery, was to be a four-year reconnaissance of regions north and west of the Colorado River that would effectively define the Fremont Complex (Gunnerson 1969; Morss 1931), and resulted in the first formal investigations of cultural resources in the Waterpocket Fold and Kaiparowits Plateau regions. In 1928, Donald Scott led the expedition into the Kaiparowits Plateau and northern tributaries of the Colorado River between the Escalante River and the Fremont River. In many instances, crew members risked life and limb to reach sites tucked on sheer cliff faces (Figure 1.13).

Twelve sites were described during Scott's brief survey of the Kaiparowits Plateau area, including five rockshelters in the Lake Canyon drainage. Five sites were identified in the Escalante River drainage, including the Coombs Village site near Boulder that was also visited and described by Morss (1931), who was operating independently from the main expedition. Scott also identified two sites in the Alvey Wash tributary and others in Coyote Gulch, and Davis Gulch near the mouth of the Escalante River, the latter of which contained a free-standing circular structure interpreted as a kiva (1969:33-34). The site, later named Davis Kiva, was excavated decades later by James Gunnerson (1959b:117-147).

Concurrent with Scott's investigations in the Kaiparowits Plateau, Escalante River, and Glen Canyon areas, Morss conducted his own reconnaissance in the Temple Creek, Oak Creek, and Waterpocket Fold areas. Using his own funds, Morss in 1931 published a monograph that for the first time defined the Fremont culture as one that was peripherally related to the Basketmaker and Pueblo cultures of the Southwest, recognizing that prehistoric groups north of the Colorado River practiced a mixed subsistence based on agriculture, hunting, and gathering. Much of the data used in forming this hypothesis came from the Fremont River area, although he also incorporated his observations from the Dirty Devil drainage and Boulder Mountain. His broad definition of the Fremont culture is still cited by researchers today.

Figure 1.13: Claflin-Emerson Expedition crews used a variety of climbing techniques to gain access to inaccessible sites during their Utah investigations of 1928-1931. Photo: Peabody Museum of Archaeology and Ethnology, Harvard University (2004-24-10208).

At the same time the Claflin-Emerson Expedition was exploring Utah's hinterlands, professional archaeology at the University of Utah, which had languished in academic obscurity, achieved renewed respectability with the appointment of Julian

H. Steward as chairman of the Department of Anthropology in 1930 (Figure 1.14). Steward, a rising star in the profession, brought with him a singular focus toward problem-oriented research that rejected traditional descriptive approaches that equated ceramics and architecture to Pecos Classification phase sequences (Steward 1933a). He was probably the first to articulate distinct differences between the Fremont culture that occupied most of Utah north of the Colorado River and the contemporaneous occupations of the Kanab area, the Arizona Strip, and St. George basin, which had stronger relationships to major areas of the Southwest, and in fact, "many of the elements which are absent from the remainder of the Northern Periphery are found here" (1933a:19).

Steward conducted two expeditions into the GSENM region in 1932, both under the auspices of the University of Utah but with the financial assistance of several private individuals who accompanied Steward. One involved a trip with pack horses into the Paria River and Johnson Canyon areas. The other trip involved a 23-day float on the Colorado River during which the party explored the Colorado River area from the confluence of the Dirty Devil River to Lees Ferry. Some 130 sites were identified in the Paria River and Johnson Canyon areas, and 28 sites were recorded during Steward's reconnaissance of the Glen Canyon region. The results of the surveys were not published for almost a decade (Steward 1941), and modern archaeologists still haven't re-identified all of his sites.

Julian Steward of the University of Utah led two expeditions into what are now Monument lands in the 1930s. He later moved on to the Smithsonian Institution where he became one of the most influential scholars in the history of anthropology.

Steward's survey in the Kanab area marked the most significant attempt to that time to incorporate theoretical questions into a research design. In particular, Steward wanted to "discover the place and manner in which those culture elements which had been chronologically differentiated in the San Juan area had become blended into a single culture and spread northward into the Northern Periphery" (1941:281). Steward's survey in the Kanab area was designed to test his hypothesis that two archaeological manifestations would be identified: (1) a Modified Basketmaker culture lacking any Pueblo influence, and (2) a culture retaining certain Basketmaker-like elements but with the addition of early Puebloan traits (1941:241).

Steward identified a significant Basketmaker III manifestation in the region, based on the prevalence of slab cists, larger slab structures that might have been residential structures, plain gray pottery, and black-on-gray pottery (1941:287). Steward believed the Basketmaker III evidence found throughout the region was evidence of "a Basket Maker II culture [that] lingered somewhere in the southern part of the area, received increments from Basket Maker III, then spread to northeastern Utah" (1933a:6). The idea that Basketmaker III ideas and technologies, if not people, spread north to become the Fremont culture proved remarkably resilient over subsequent decades.

Steward was among the first to address archaeological resources from the perspective of human behavior within environmental contexts. This theoretical approach, which was still evolving in the early 1930s, eventually prompted him to pursue ethnographic studies of indigenous Western Shoshoni and Northern Paiute hunter-gatherers (1938). These studies led to the development of his "cultural ecology" model that attempted to "define the dynamic cause-and-effect relationships that operate in ongoing cultural systems" (Thomas 1989:147).

Figure 1.14: Julian Steward was a visionary archaeologist and anthropologist who found his way to southern Utah in 1932. This image was taken at North Wash just east of GSENM. Photo: Utah State Historical Society.

As the Great Depression raged, Benjamin W. Wetherill, with the assistance of Elmer R. Smith of Snow College, directed archaeological surveys in Zion National Park and Kanab areas beginning in December 1933 through funding from the National Park Service through the Civil Works Administration. Called the Zion National Park Archaeological Project, the survey recorded numerous sites within the park, as well as 40 prehistoric sites outside the park boundaries in the Kanab, Kaibab Plateau, Mt. Trumbull, and Beaver Dam areas "in order to gather data from surrounding regions for comparative purposes" (in Schroeder 1955:1). Fieldwork continued through May 26, 1934, and eventually included the Kanab Creek drainage and Johnson Canyon. Very little is known about his observations in Kanab Creek and Johnson Canyon because most of his notes were destroyed in a fire.

At the same time, Ben Wetherill, the son of Richard Wetherill of Mesa Verde fame, was also involved with the Rainbow Bridge-Monument Valley Expedition (Beals et al. 1945), a large-scale survey of the Navajo Mountain area south of the Colorado River. In 1937, he led a Rainbow Bridge-Monument Valley Expedition survey party into the Kaiparowits Plateau. Wetherill's exploration of the Kaiparowits Plateau was not included in the official report other than their cursory mention that he had:

... in a short time located nearly one hundred sites, from which sherd collections were taken and descriptive notes made. The study clearly indicated the presence of a large number of small sites, but the sherd collections were mostly too small or too badly weathered to afford a basis for any definitive study, and have not been considered in this report. These collections did indicate, however, marked differences in the ceramic typology of the region from that of any of the other regions studied by the Expedition, and they have all been filed and catalogued for future study in connection with additional data which may be collected in the future [Beals et al. 1945:6].

The Glen Canyon Project

There were few archaeological projects anywhere in Utah in the 1940s, and no projects of significance were initiated within GSENM. Although some drainages (e.g., Johnson Canyon, Paria River, Cottonwood Canyon) had been earlier investigated, the majority of the GSENM region lacked highly visible architectural sites, and therefore it had been largely ignored. In particular, vast portions of the Kaiparowits Plateau and Escalante River drainage remained largely unknown. This region would become the focus of an unprecedented research project from 1957 to 1963 intended to salvage archaeological data in advance of rising Glen Canyon Dam, a monumental undertaking led by Jesse D. Jennings at the University of Utah.

The Glen Canyon Project was, for all intents and purposes, an outgrowth of Jennings' earlier systematic survey of the entire state to document archaeological resources within a broad range of geographic contexts. Begun in 1949, Utah Statewide Archaeological Survey was intended to be a 10-year study whereby the university could train graduate students in field research while it documented the archaeological resources of the entire state (Gunnerson 1959c). Unfortunately, changing priorities hampered systematic surveys of the entire state, and large portions of the state were never surveyed. Only the eastern and northeastern portions of GSENM were ever addressed in any survey report (Gunnerson 1956, 1957), and those areas were discussed only cursorily.

The relationship between the two projects is important from a historical perspective. Gunnerson's 1957 investigations in the Escalante River drainage were reported in the Glen Canyon Project monographs, but the sites investigated were far removed from the area to be inundated by Lake Powell. Likewise, surveys and excavations on the Kaiparowits Plateau from 1957 to 1961 had little to do with areas to be submerged by Lake Powell. In effect, the Glen Canyon Project became the mechanism by which unrelated projects more consistent with the statewide survey were completed.

The Glen Canyon Project was a massive, federally funded initiative to document the archaeology along the Colorado River that would be lost to the rising waters behind the Glen Canyon Dam. It was initiated in 1957 with the Museum of Northern Arizona assigned to investigate sites south of the Colorado River and the University of Utah focused on sites north of the river. The 1957 investigations were focused along the Colorado River itself, but University of Utah crews also conducted a rapid survey of the Escalante River corridor and a short distance up selected tributary canyons (Lister 1958a). A second Utah crew excavated 10 sites, nine of them in the Escalante River drainage as far north as the town of Escalante (Gunnerson 1959b). Several of these sites have since been re-investigated and are discussed in greater detail in later chapters. Arguably, these investigations constituted the first systematic surveys within GSENM inasmuch as they were intended to identify all evidence of prehistoric occupations.

Despite the hurried and superficial nature of the 1957 surveys, Lister (1958a) observed that settlement patterns in the Escalante River drainage were different from those observed in other drainages west of the Escalante River. Sites in the Escalante River area included a wide variety of residential habitations, storage facilities, and campsites that were suggestive of different hunting, gathering, and agricultural activities associated with arable lands and permanent water.

Lister (1958a:20-21) concluded that most sites in the Escalante River area were occupied for short periods, perhaps seasonally, and that the cultural center of the entire region would be found on the Kaiparowits Plateau to the west. The small but numerous pueblos and settlements there exhibited a greater level of permanence than observed elsewhere in the region. The Kaiparowits Plateau, in effect, provided a residential base for populations who supplemented agriculture with hunting and gathering throughout the plateau region. The Escalante River drainages were periodically exploited by different horticultural groups who produced domesticated food resources and then cached surplus foodstuffs for subsequent retrieval during the winter and spring.

Without question, the 1958 field activities constituted the largest undertaking during the course of the Glen Canyon investigations. Several hundred sites were recorded in northern drainages of the Colorado and San Juan rivers (Fowler 1958; 1959b), whereas other surveys described previously unknown portions of the Escalante Desert (Suhm 1959), the arid drainages east of the Escalante River, and Henry Mountains (Lister 1959b, 1959c). A University of Utah excavation crew also initiated investigations at the Coombs Village site near the town of Boulder. This site, interpreted as a Kayenta outpost, may constitute the largest Formative pueblo in the region (Lipe 1958; Lister 1958b, 1959a).

Perhaps the most significant data resulting from the 1958 field season were the Kaiparowits Plateau surveys where 255 sites were identified, of which almost 200 were surface residential sites consisting of one to 10 rooms, usually situated on knolls, ridges, or eminences overlooking sage flats (Gunnerson 1958, 1959a). Given the rarity of permanent occupations throughout the Glen Canyon region, the concentration of dwellings in such a geographically restricted area with very little permanent water is remarkable. About 84 percent of the permanent structures identified by Glen Canyon surveyors were located within a 25-square-mile area on top of the plateau. This occupation was believed to mark the only time human populations ever reached significant levels in this region.

Most of the Kaiparowits Plateau residential sites were characterized as small pueblos in proximity to arable lands. Site density averaged about 10 per square mile. Population densities were estimated at about 10 to 50 individuals per square mile, based on the assumption that about 10 percent of the residential sites were occupied at the same time. A population that large would have been dependent upon agriculture, although the absence of permanent streams suitable for irrigation would have mandated dry farming. The plateau probably afforded access to upland faunal resources, but chipped-stone tools indicative of hunting and butchering activities were not especially common at residential sites. In fact, cultural refuse of any kind was not abundant at any of these surface sites, even though the plateau, as Gunnerson noted (1959a:361), "was one of the most densely populated areas in the general region in Pueblo II and Pueblo III times."

The 1959 Glen Canyon investigations were extremely limited compared to those the year before. Most of the investigations were focused on the upper portion of the Colorado River to be inundated by the reservoir, and excavations at Coombs Village (42Ga34) continued under the direction of Robert H. Lister and J. Richard Ambler. A much larger portion of the site was cleared in 1959 than had been exposed the year before, and researchers believed that even though the site had not been completely excavated, "we have obtained an adequate sample of its contents and that additional digging would only duplicate the results we have gathered" (Lister et al. 1960:1; see also Ambler 1959).

Lister and Lister (1961:5-10) offered eight hypotheses of local culture history: (1) The village was established by groups of Ancestral Puebloan immigrants who were attracted by the abundant arable lands, permanent water, building materials, wood resources, and wild faunal resources on the adjacent Aquarius Plateau; (2) The ceramic types implied cultural ties to the Kayenta region in northeastern Arizona, although there may have been some fusion of different groups affiliated with the Fremont, Virgin Branch, and Mesa Verde area; (3) The village was first occupied in the latter part of the AD 1000s, reaching its maximum development by AD 1100 due to "an extension northward of Kayenta culture rather than merely a trading relationship"; (4) Because Kayenta-made pottery was found throughout all levels, additional groups from northeastern Arizona may have joined the community from time to time, bringing pottery with them from the Kayenta heartland; (5) The natural resources around the village were equal to or better than those of many areas occupied by Ancestral Puebloans, and resources for containers, tools, buildings, clothing and food were easily obtainable; (6) The maximum population was estimated at about 200 individuals, based on the presumption that 40 of the 50 residential structures were occupied simultaneously; (7) Some 67 structures had been burned, two-thirds believed to have been occupied at the time of the conflagration; and (8) No sites later than Coombs Village were located in the area, making it "logical to surmise that they may have returned to the Kayenta area from whence they came and with which they had close ties throughout the duration of their tenancy of the Coombs Village."

Investigations in 1960 were extremely limited. Only two small survey crews were dispatched by the University of Utah, each operating only part of the field season. Lister conducted a survey around the community of Escalante, but the survey results were not published in the Glen Canyon Series, and the unpublished report, entitled Site Testing Program, 1960, San Juan Triangle Area and Escalante Utah (Lister 1960), has been lost from the Department of Anthropology files.

In 1961, the University of Utah again refocused its efforts toward the Kaiparowits Plateau and Escalante River areas within GSENM. A series of surveys (Aikens 1963, 1963d) and excavations (Fowler 1963; Fowler and Aikens 1962; Sharrock 1961) were conducted in both regions. University of Utah crews led by Don D. Fowler excavated five sites and conducted additional surveys in the Harris Wash drainage, a western tributary of the Escalante River. The canyon was initially surveyed in 1958, when 27 sites were identified (Suhm 1959), and four sites were subsequently tested in 1960 (Lister 1960). Triangle Cave, Circle Terrace, Pantry Alcove, and Sheep Horn Alcove were excavated in 1961 (Fowler and Aikens 1962; Fowler 1963), and all play prominently in our later chapters. The investigations also included a resurvey of Harris Wash (Aikens 1963b) during which 16 previously unrecorded sites were identified. The Harris Wash sites are also discussed later in greater detail.

Jesse Jennings argued that agricultural lifeways diffused from southern New Mexico to resident Archaic foragers. Fifty years later, many scholars believe immigration played a fundamental role in the emergence of Puebloan lifeways in the region.

University of Utah crews led by C. Melvin Aikens (1963a), meanwhile, returned to the Kaiparowits Plateau in 1961. In July and August, a small crew on horseback surveyed the extreme eastern and western ends of the plateau not previously investigated by Gunnerson (1959a). A total of 50 new sites were identified (Aikens 1963a), and some sites recorded earlier by Gunnerson were revisited.

Eleven sites were subsequently excavated (Fowler and Aikens 1963), mostly in the area east of Basin Canyon near the Straight Cliffs escarpment. These sites were primarily one- and two-room residential structures of coursed masonry with remnants of adobe in the building stone. The sites were located in direct association with sage flats that were assumed to have been prehistoric fields. Most residential sites were also located on knolls and ridges adjacent to the flats, although some small sites were actually located on the flats. Small structures of jacal or brush built in or near the fields were interpreted as temporary shelters occupied during the growing and harvesting seasons. Rockshelter sites were not common, but a cluster of them was noted in the Pleasant Grove area.

The Glen Canyon Project formally concluded its field investigations in 1962 with a flurry of excavations. Plans to continue excavations on the Kaiparowits Plateau were deemed "not worthwhile" (Sharrock 1961, 1962) and were abandoned in favor of surveys in the Paria River and Escalante Desert areas. One University of Utah crew investigated sites in the Johnson Canyon area near Kanab and in the St. George area (Fowler and Aikens 1963a), marking the first time the Glen Canyon Project had ventured into Virgin Branch territories significantly west of the Glen Canyon area.

Although the Glen Canyon Project had, for all intents and purposes, concluded following the 1962 field season, the University of Utah returned to southwestern Utah in 1963 with the support of National Science Foundation grants to complete excavations at Bonanza Dune in Johnson Canyon and seven other sites. It is unclear whether these investigations were officially part of the Glen Canyon Project, or whether they were simply a continuation of investigations conducted as a field school for the Department of Anthropology at the University of Utah. Aikens' investigations in the Kaiparowits Plateau (Aikens 1962, 1963a; Fowler and Aikens 1963) and in southwestern Utah (Aikens 1965a, 1965b) provided the data for his Virgin-Kayenta Cultural Relationships monograph (Aikens 1966c) that greatly influenced the perspectives of subsequent archaeologists working in the GSENM region.

The Glen Canyon project re-defined archaeologists understandings of the GSENM region and set the theoretical foundation for subsequent research over the next four decades. As summarized by Jennings (1966b:53), the florescence of a complex agricultural society in the Glen Canyon region, complete with a developed ceramic complex and large pithouses, "prove once and for all the extreme extent of the Mogollon diffusion in the first stages of Pueblo evolution." He argued the diffusion of Mogollon traits arrived in the Mesa Verde area by AD 200 or 300, then "fanning out westward" as far as southern Nevada and southwestern Utah, and then north into the Fremont and Sevier-Fremont areas. Mogollon diffusion was seen as critical to understanding the development of Virgin, Kayenta, and Fremont groups throughout GSENM from an indigenous population rather than through actual migrations. (This traditionalist view that dominated Utah archaeology has recently been challenged by the Jackson Flat excavations that revealed migrations from the San Pedro culture area in southern Arizona at about 1000 BC).

As adamant as Jennings was that Virgin and Kayenta lifeways had developed from a local base, he also acknowledged "there can be no doubt" that a Kayenta expansion occurred during the AD 1100s and 1200s, and that sites in the upper Escalante River drainage and Kaiparowits Plateau could be attributed to an outright occupation by these immigrants. Based on a critical reexamination of ceramic types (cf. Breternitz 1963), Jennings argued the Kayenta expansion evident at Coombs Village and at sites on the Kaiparowits Plateau might have begun by about AD 1150 to 1175 and persisted to about AD 1200 or 1250, perhaps even later.

These migrants were believed to have occupied the Escalante River area, and to a lesser extent the Kaiparowits Plateau, concurrently with Fremont peoples who practiced a similar lifeway (1966b:55-56). He emphasized the uniformity of lifeways among all groups in the region, contending that efforts by many researchers to "correlate or connect" the culture histories north of the Colorado River with the "high centers" of Ancestral Puebloan culture south and east of the river was a waste of time that obscured interpretive explanations of human adaptations to the canyon environment.

CRM Archaeology

For all intents and purposes, the Glen Canyon Project marked the genesis of federal policies in the GSENM region to recover archaeological data before development occurred. But the Glen Canyon Project, funded largely by congressional appropriations, was far from standard federal practice, and in some regards it was an exception intended to blunt widespread public concern over environmental resources being lost to reservoir construction. A series of federal laws were subsequently passed in the 1960s and 1970s that would mandate that all future development on the public domain include efforts to, at a minimum, identify cultural resources that would be impacted by development.

The passage of the National Historic Preservation Act (NHPA) of 1966 (U.S. Code 80 Stat 915, 94 Stat 728) marked a watershed in the protection of archaeological resources on public lands. This act created the National Register of Historic Places (NRHP) to list significant historic and archaeological properties, defined as "any prehistoric or historic district, site, building, structure, or object." It also established the Advisory Council on Historic Preservation to advise agencies on preservation matters and set up criteria for assessing NRHP site eligibility. Other federal laws followed, including the National Environmental Policy Act and the Archaeological Resources Protection Act. As summarized by Muhn and Stuart (1988:203),

By the end of the decade, the BLM had the authority and much of the capability needed to protect its huge reserve of cultural resources from conflicts generated by legitimate land use activities on the one hand, and from illegal depredation on the other. What was lacking was the ability to get out ahead of Section 106 compliance — and artifact hunters — to determine, for the resources' sake, how they should be managed over the long term.

To date, several thousand compliance projects, often referred to as Section 106 projects or Cultural Resource Management (CRM) projects, have been completed in the region. Compliance efforts in the Escalante River Basin have been focused on a variety of activities, including transportation projects, random study tracts in the Boulder Mountain foothills and Escalante Desert related to proposed coal development, and to a lesser extent vegetation projects, recreation development, and livestock improvements.

Projects in the Kaiparowits Plateau region have been mostly small-scale clearance surveys associated with hydrocarbon development. Individually, these reports are rather meaningless, but considered collectively, they demonstrate a complex distribution of hunter-gatherer campsites, hunting locales, and lithic procurement sites in a variety of environmental settings. Based on temporally diagnostic projectile points, the region was occupied throughout Archaic, Formative, and Late Prehistoric times.

Significant CRM investigations have been conducted in the Grand Staircase region, although most of these projects involved areas peripheral to GSENM itself, specifically coal development in the Alton Amphitheater area and related projects in the Mt. Carmel and Long Valley areas. Coal reserves in the Alton Amphitheater and Skutumpah Terrace areas have resulted in numerous significant investigations (Christensen et al. 1983; Halbirt and Gualtieri 1981; Hauck 1979b; Keller 1987) that identified lithic scatters and campsites indicative of higher-elevation hunting and gathering through all periods of human prehistory. A variety of vegetation restoration (Fawcett 1994) and coal development projects (Christensen et al. 1983; Hauck 1979b) in the upper Virgin River, Johnson Canyon, and Kitchen Corral Wash areas identified sedentary occupations by Virgin Branch agriculturalists from Basketmaker II to Pueblo III times.

Major CRM investigations are discussed in greater detail in the technical version of this publication (Spangler et al. 2019). Investigations conducted after the monument was created in 1996, conducted mostly under Section 110 of the National Historic Preservation Act, constitute the bulk of our discussions in the following chapters.

Organizational Context

For more than a century, researchers have been organizing archaeological phenomena into a variety of spatial and temporal categories. These include a litany of phases, periods, horizons, types, and other sub-units intended to make sense of archaeological materials, usually on the basis of distinctive artifacts or architecture with shared characteristics. This exercise has proven frustrating over the years with the emergence of different names for the same materials, depending on where they are found and their suspected temporal ranges. About the only constant is that archaeologists love to quibble with each other over their own preferred nomenclature.

The organization of specific data into categories is nonetheless an important first step in theory building. The real problem as it applies to archaeological research is that the creation of artifact categories (e.g., Emery Gray, Desert Side-notched points) and cultural labels (e.g., Fremont, Virgin Branch) tends to become an end in itself rather than a means of explaining human behavior. The tyranny of categories is accentuated when archaeologists perpetuate the validity of their assumptions through sheer repetition.

Figure 1.14: Kanab Creek cuts through the Vermilion Cliffs on its way to the Colorado River. As a source of permanent water even in the worst drought conditions, it once allowed for intense maize farming for more than 2,000 years. Photo: Jerry D. Spangler.

Such implications have rarely deterred archaeologists from equating artifacts with particular groups of people. As observed by Jones (1994:71), those items that "serve as markers of culture or ethnicity among living peoples — language, belief, tradition, social views — are not available archaeologically. The prehistoric cultures we identify are not cultures in any complete sense; they are classificatory shorthand for groups of similar kinds of archaeological remains in spatial and temporal proximity."

This was particularly evident in the 1950s and 1960s when Glen Canyon Project researchers convincingly argued, based on ceramic evidence, that the vast majority of human occupations north of the Colorado River could be attributed to Kayenta peoples who migrated north during late Pueblo II and early Pueblo III times. Contrary evidence was often ignored or dismissed. As Geib and Fairley (1998:61) later observed, "It seems that Glen Canyon Project archaeologists had on blinders when it came to recognizing Archaic remains.."

We also recognize that cultural processes were not uniform and any implied uniformity in the archaeological record is likely an intellectual distortion of actual human behavior. As observed by Madsen and Rhode (1994:217-218), "Individuals walk the landscape and individuals interact with each other. Each person faces different social and physical environments and reacts accordingly. If it is possible to define general rules which govern the way people behave, then we must expect different outcomes when those rules are applied in different physical and social settings."

For the purposes of our discussion, we prefer to use broad temporal categories without any implied temporal precision. For example, we recognize a general Archaic period from about 8000 BC to 1000 BC, and then we use lowercase modifiers such as early, middle, and late to identify points in time within that 7,000-year span. We avoid using such categories whenever possible, although it is not always possible when citing the work of others. As we discuss in subsequent chapters, there are five general periods of time relative to this overview, each defined by distinctive lifeways:

- A Paleo-Archaic and/or Paleo-Indian period at the end of the Pleistocene is characterized by small groups of hunters adapted to terminal Ice Age environments. Evidence of plant processing is currently lacking, but this will probably be found. This period encompasses all adaptations prior to the onset of fully Holocene conditions by about 8000 BC.

- The Archaic period includes hunting and gathering strategies prior to the introduction of maize farming. These highly mobile foragers were adapted to arid Holocene environments, relying heavily on plant resources and small game. Deer and bighorn sheep were important food resources, but might have been a small part of the overall diet. This period extends from about 8000 BC to 1000 BC.

- An Archaic-to-Formative transition period from 1000 BC to AD 500 encompasses that period of time when cultigens were first introduced, but hunting and gathering continued to be important, at least among some groups. This period also marked the introduction of more efficient hunting technologies (the bow and arrow), the presence of elaborate rock art traditions, the emergence of complex storage strategies to ameliorate resource shortfalls, and the use of long-term residences in some areas.

- The beginning of the Formative period is generally defined by the appearance of ceramics, which in GSENM occurred about AD 500. It is also that period of time when populations were heavily reliant on maize, beans, and squash for their dietary needs, resulting in high levels of sedentism, increased need for high-capacity storage, and increased complexity as groups aggregated into larger social units. On the west side of GSENM, this is evident in an abundance of Ancestral Puebloan occupations in most environmental niches. Fremont farmers meanwhile occupied the upper Escalante River. Formative lifeways persisted in both regions until about AD 1250, although a few farming

Escalante River

Photo: Dan Bauer

groups, both Fremont and Ancestral Puebloans, might have persisted another 50 years or so.

- The Late Prehistoric is that period of time after the collapse of agricultural lifeways at about AD 1300 until the time of historic contact in 1776. This period coincides with the arrival of Ancestral Paiute foragers in GSENM with a hunting and gathering lifeway, although they apparently practiced limited agriculture.

The following narrative is organized to discuss prehistoric lifeways as they have been described by various researchers. This report is weighted heavily toward research conducted since the monument was created in 1996. In Chapter 2, we discuss the emerging evidence of Paleo Archaic deer hunting in terminal Ice Age times at North Creek Shelter near Escalante, and in Chapter 3, we describe the Archaic hunter-gatherer adaptations prior to about 1000 BC, including the earliest evidence of plant processing, also at North Creek Shelter. Recent evidence from the Rodent Ridge and Arroyo sites near Kanab suggests some Archaic groups were more sedentary, constructing seasonal residences in optimal environmental niches to exploit predictable plant and animal resources.

We discuss in Chapter 4 the transition from hunter-gatherer lifeways to an agricultural subsistence that would have greatly limited seasonal mobility. Evidence from the Jackson Flat sites south of Kanab suggests maize farming might have appeared in this region several centuries earlier than traditionally thought, perhaps as early as 1000 BC. By about AD 200, agriculture had emerged as the predominant lifeway, with pithouse-dwelling farmers exhibiting Basketmaker II characteristics similar to those described elsewhere in the Southwest. Agriculture also appeared in the Escalante River Basin by about AD 200, although evidence of increased sedentism at this time (e.g., pithouses) remains scant. These farmers are believed to be ancestral to later Fremont groups.

The Fremont Complex, a name applied to Formative farmers in the Escalante River Basin, is the focus of Chapter 5. These farmers had their own distinctive grayware ceramics, perhaps as early as AD 500, and they might have been seasonally mobile farmers, exploiting the river corridor in both lowland and upland settings during the spring and summer before aggregating at winter residences. By about AD 750, the Fremont had embraced permanent pithouse architecture that shared many similarities with that of their Ancestral Puebloan neighbors to the west, suggesting not only increased sedentism but increasingly permeable boundaries. By AD 1050, the Fremont presence here had become nearly invisible due to the arrival of Ancestral Puebloan immigrants, only to re-emerge in the late AD 1200s after the immigrants had left. Fremont studies have benefited greatly from recent research by Brigham Young University in the Wide Hollow, Big Flat, Deer Creek, and Escalante River corridor areas.

In Chapter 6, we discuss Formative farmers of the Grand Staircase region, who were largely indistinguishable from other upland Ancestral Puebloan groups on the Arizona Strip and to a lesser extent the St. George Basin. All periods of Ancestral Puebloan prehistory are represented in the Grand Staircase, from Basketmaker III to Pueblo III times, although changes in site layout and land use changed little from AD 500 to 1050. In fact, the typical pattern of a pithouse with an arc of adjacent storage cists persisted with only minor additions or modifications until late Pueblo II times when some groups constructed aboveground pueblos and alcove residences popularly referred to as cliff dwellings. This might reflect a brief migration of outsiders from the Kayenta region that extended not only into the Kanab area, but into the Kaiparowits Plateau and upper Escalante River Basin.

The abandonment of agriculture as a predominant lifeway by about AD 1250-1280 remains an intriguing and unresolved issue in regional archaeology. In Chapter 7, we look at the collapse of Formative lifeways, the possibility that some farming groups might have persisted in isolated environmental niches, and the concurrent emergence of a hunter-gatherer lifeway with different artifact assemblages considered to be ancestral to Southern Paiutes who occupied the region at the time of historic contact in 1776.

The establishment of GSENM created an optimal environment to address many archaeological research questions, although many questions remain unanswered despite the wealth of research over the past two decades. In Chapter 8, we revisit the archaeological research conducted since 1996 when the Monument was created as an outdoor laboratory. Has this objective been met?

It should also be noted that certain terms used throughout this overview warrant additional explanation. The term "Anasazi" is firmly entrenched in the literature of GSENM and surrounding areas to describe Formative farmers with similarities to those in the Kayenta and Mesa Verde regions. This term is actually a Navajo word that carries a negative connotation for modern Puebloans with deep cultural connections to the entire GSENM region. In subsequent chapters, we use the term "Ancestral Puebloan," as recommended by archaeologists and federal agencies elsewhere in the Southwest. This term is reserved for those Formative groups with pottery and architectural traditions similar to those observed in the Kayenta region south of the Colorado River.

We also retain the term "Fremont Complex" to distinguish Formative agriculturalists of the Escalante River Basin (and perhaps Kaiparowits Plateau) with different ceramic and architectural traditions, different levels of sedentism and agricultural dependence, and distinctive iconography with pan-regional implications. We acknowledge that modern Puebloan groups make no distinction whatsoever between Ancestral Puebloans of the Grand Staircase and the Fremont of the Escalante River Basin, referring to all prehistoric peoples of GSENM as "ancient ancestors."

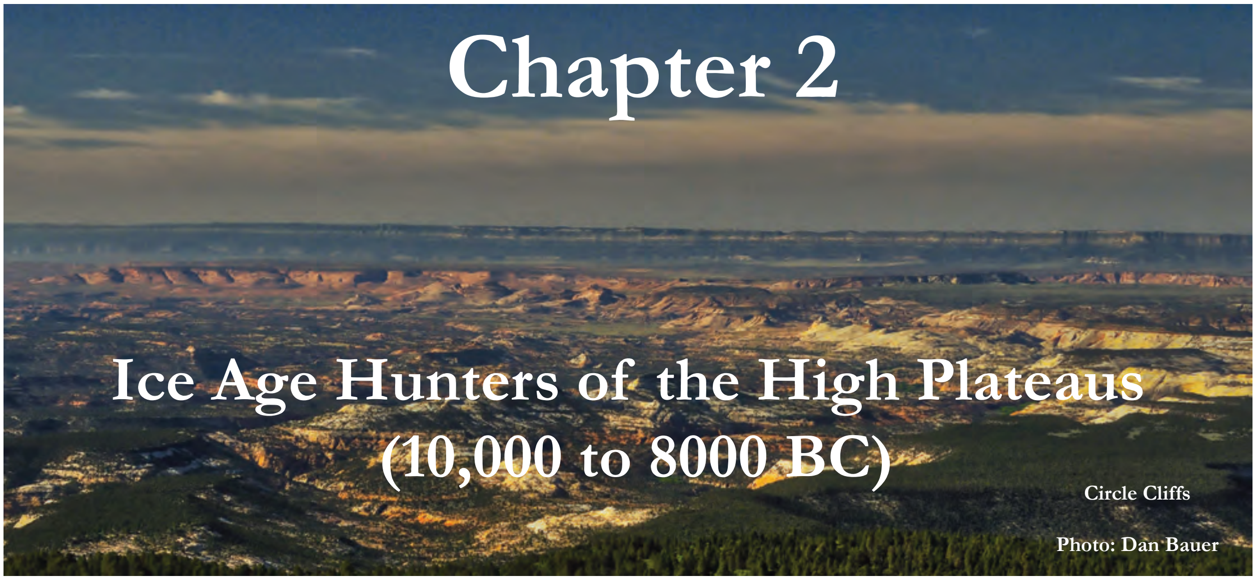
We also use the term "northern Colorado Plateau" to describe the region north and west of the Colorado River. Most Colorado Plateau researchers find the Colorado River to be a convenient delineation dividing this massive physiographic province into "north" and "south." Some researchers on the Arizona Strip and lower Virgin River country, however, bristle at the idea that this is "northern" when in fact it is hundreds of miles to the south of other sub-regions on the northern Colorado Plateau. Some have suggested terms like "upper" and "lower" Colorado Plateau, or even an "eastern" and "western" plateau, although these are also problematic for the same reason: There is no consensus as to where the boundaries are. In the absence of a more satisfactory term, we retain northern Colorado Plateau as traditionally used to describe that plateau region north of the Colorado River where all drainages flow to the south and/or east towards the Colorado River.

Short Creek

Photo: Jerry D. Spangler

Chapter 2

Ice Age Hunters of the High Plateaus (10,000 to 8000 BC)



Circle Cliffs

Photo: Dan Bauer

The first occupations of the high plateaus of southern Utah and northern Arizona are believed to reflect a greater emphasis on hunting large fauna during late Pleistocene times and prior to the onset of hunting and gathering strategies adapted to arid climates of the Holocene. Adaptations to these drier climates are typically described as the Archaic, a period of time characterized by the hunting of smaller modern mammals, increased dependence on small seeds and desert plants, and only minor changes to subsistence patterns and tool kits through time (see Chapter 3).

The following is a brief summary of the archaeological evidence of earliest prehistoric groups who inhabited the GSENM region at the end of the Pleistocene. This time frame has traditionally been organized into a variety of periods, phases, and complexes defined in specific areas of the Great Plains, Colorado Plateau, and Great Basin. These organizational schemes are summarized in greater detail elsewhere (Altschul and Fairley 1989; Berry and Berry 1986; Bond et al. 1992; Geib 1996; Huckell 1996; Irwin-Williams 1979; Jennings 1978; Lipe and Pitblado 1999; Spangler 2001; Simms 2008).

Because direct evidence from GSENM is rather limited, Paleo-Indian and Paleo-Archaic adaptations are herein discussed within a regional context focused primarily on sites north of the Colorado River in similar environments to those found in the Monument. This discussion is directed largely at the fundamental question in Southwestern archaeology of whether or not there is cultural continuity through time. Also relevant to this chapter is whether there were two distinct groups occupying the GSENM region at this time, one with cultural affinities to the Great Plains and the other with similarities to groups in the Great Basin and Rocky Mountains.

Paleo-Indian or Paleo-Archaic

The arrival of the earliest humans on the northern Colorado Plateau, commonly referred to as Paleo-Indians, has always been a topic of considerable fascination to both professional researchers and casual observers. Until relatively recently, most archaeologists denied the presence of early humans on the Colorado Plateau, citing the rarity of Pleistocene megafauna that could have been exploited by the earliest big game hunters. As late as the 1960s, Jesse Jennings argued that "probably because of aridity and a dearth of the big game animals, the classic big-game hunters of the Plains ... are not found west of the Rockies" (1966a:89).

Since that time, however, archaeologists and paleontologists have documented not only a significant catalog of extinct Pleistocene faunal remains in the region, but distinctive artifacts typically associated with the hunting of extinct and modern fauna present during terminal Ice Age times (Agenbroad 1990a; Frison 1991; Grayson 1993; Janetski et al. 2012; see also Graf and Schmitt 2007 for a Great Basin perspective).

Evidence of early humans in western North America near the end of the Pleistocene Epoch, or last "Ice Age," has been documented as early as 14,000 years ago in the Pacific Northwest (Gilbert et al. 2008), whereas the earliest evidence in the Southwest has been reported from sites dating from about 11,000 to 12,000 years ago, often in contexts related to the hunting of now-extinct mammoths and bison. A hunting strategy focused to a greater extent on large fauna persisted for several millennia in certain areas of the American West, perhaps as recently as 7,000 years ago on the Great Plains where environments were more conducive to large herds of bison (Frison 1991).

The presence of early big game hunters is now generally accepted, but beyond agreement that people were present in the American West by about 14,000 years ago, there is little consensus among scholars on chronological sequences, definitions, geographic distinctions, settlement patterns, subsistence strategies, or the technological implications of different artifact assemblages. Scholars cannot even agree whether Paleo-Indian, Paleo-Archaic, and early Archaic manifestations are one and the same, or whether they represent distinct adaptations to different environmental variables by groups from different regions.

Paleo-Indian complexes of the Plains and Paleo-Archaic traditions of the Intermountain West might represent two different adaptations resulting from at least two different migrations into the American West.

In recent years, researchers have convincingly argued for the presence of two different big game hunting traditions: Paleo-Indian, which features a lithic tool kit similar or identical to that utilized by big game hunters on the Great Plains and other areas east and south of the Colorado River, and Paleo-Archaic, which is characterized by regionally distinct tool kits and a broader-based subsistence strategy that is evident in regions west of the Front Range of the Rocky Mountains (Figure 2.2). The GSENM area is located entirely within the spatial range assigned to Paleo-Archaic adaptations in the Intermountain West, although Paleo-Indian artifacts characteristic of the Great Plains complexes have also been found here.

In this chapter, we recognize that two different big game hunting traditions might have utilized the region at the same time and might even have interacted with one another. We also agree with Willey and Phillips (1955), who observed that it is impossible to conceive that early non-agricultural groups would not make best use of whatever plants and animals were available to them within the limits of their technology. In our view, Paleo-Indian and Paleo-Archaic peoples were hunters and gatherers who placed greater emphasis on hunting larger mammals than did subsequent Archaic peoples.

Researchers throughout the region have used the term Paleo-Indian to define both a period of time (prior to 7000 BC) and a lifeway (predominantly focused on hunting large game). In this discussion, we follow the lead of other Great Basin and northern Colorado Plateau researchers who have employed the term "Paleo-Archaic" to emphasize that human adaptations were similar to those in subsequent Archaic times in that a wide array of large and small animals were exploited, as well as plant resources, although convincing evidence of the latter remains quite elusive (Beck and Jones 2009, 2010, 2012; Graf and Schmitt 2007; Haynes 2007; Janetski et al. 2012; Rhode et al. 2006). The term Paleo-Indian is retained here when referencing contemporaneous Great Plains subsistence focused toward large fauna.

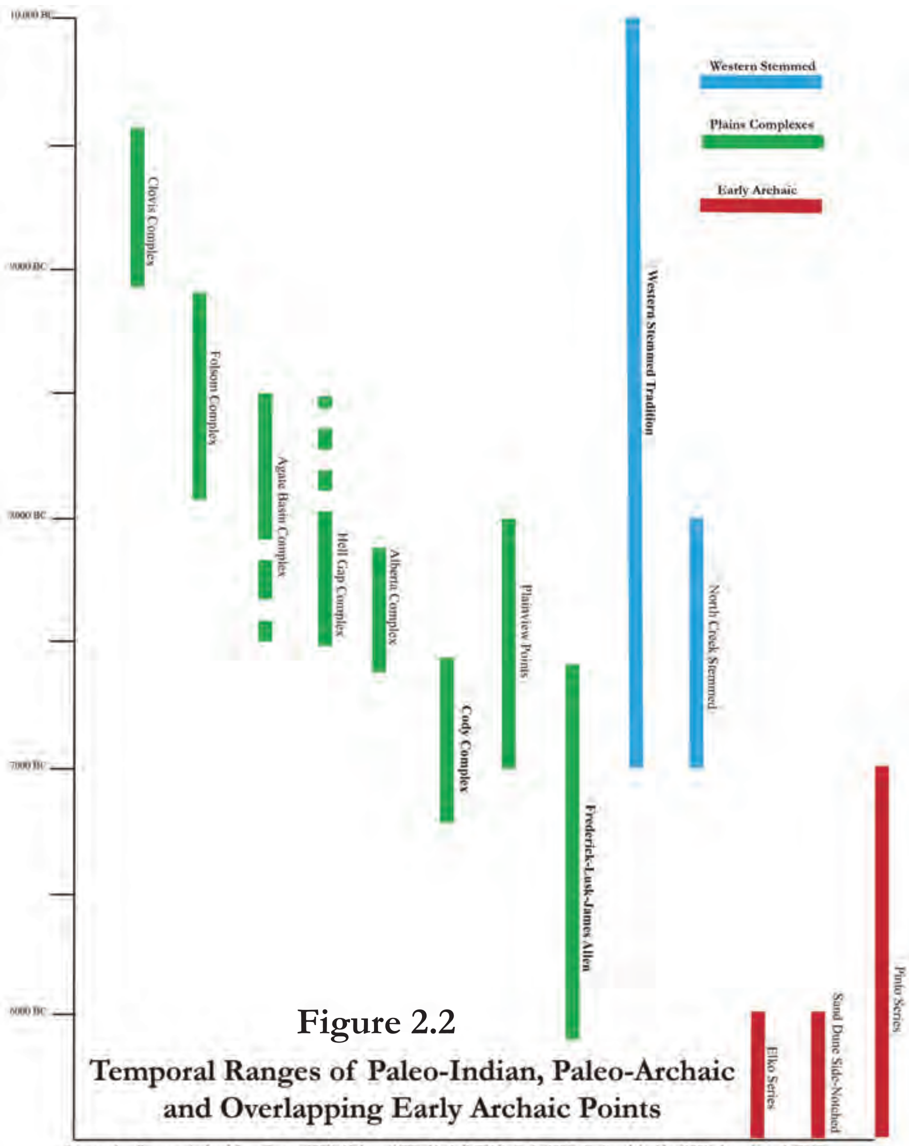


Figure 2.2

Temporal Ranges of Paleo-Indian, Paleo-Archaic and Overlapping Early Archaic Points

Sources: Age Ranges calculated from Frison (1991), Holmer (1978), Huckell (2014), Geib (1996), Geib and Ambler (1991), Janetski et al. (2012), and Beck and Jones (2012).

As discussed hereafter, the Paleo-Indian complexes of the Plains and Paleo-Archaic traditions of the Intermountain West might represent two different adaptations resulting from at least two different migrations into the region, both of which were oriented more toward hunting than the gathering of floral resources. A more generalized hunting and gathering strategy is clearly evident in the archaeological record by about 10,000 to 11,000 years ago at Danger Cave, Smith Creek Cave, and Bonneville Estates in the eastern Great Basin (Rhode et al. 2005; see also Jennings 1957a), and at Joes Valley Alcove, Cowboy Cave, and Joe Walter Cave on the northern Colorado Plateau (Barlow and Metcalfe 1993; Jennings 1980). Similarly, hunter-gatherer deposits have been dated to about 10,000 years ago at Dust Devil Cave in the Navajo Mountain area (Ambler 1996) and from open campsites on the Kaibab Plateau (Schroedl 1988). And recent investigations at North Creek Shelter identified deep stratified cultural deposits dating from about 10,000 to 11,500 years ago. These latter investigations revealed that deer hunting was the primary reason for returning time and again to the shelter, but small animals and birds were also part of the diet (Janetski 2011, Janetski et al. 2012).

Collectively, these data suggest that broad-based subsistence (Paleo-Archaic) was present in the GSENM region at the same time that big game hunting was predominant on the Great Plains. At about 7000 BC, high plateau groups adapted to more-arid Holocene environments began to exploit small seeds, tubers, and other desert plants with lower return rates, which marks the beginning the Archaic period. Evidence of Paleo-Archaic and/or Paleo-Indian occupation and exploitation of northern Colorado Plateau environmental niches is comparatively rare (Copeland and Fike 1988; Schroedl 1977, 1992), particularly when considered alongside the scores of Paleo-Indian sites documented on the northwestern Plains and southern Colorado Plateau, and the comparative abundance of early Archaic sites now reported throughout the Great Basin and Colorado Plateau.

The Monument region was once home to an array of now-extinct Ice Age mammals: mammoths, mastodons, sloths, camels, horses, bison, mountain goats, and even giant marmots.

Any attempt to reconstruct Paleo-Archaic lifeways, therefore, requires the discussion of archaeological evidence from much broader geographic contexts. For more comprehensive reviews, see Bond et al. (1992), Irwin-Williams (1979), Irwin-Williams and Haynes (1970), Lipe and Pitblado (1999), Pitblado (2003), Schroedl (1992), and Stiger (2006). See Beck and Jones (2009); Graf and Schmitt (2007), Grayson (1993), Madsen et al. (2005), Rhode et al. (2005), and Willig and Aikens (1988) for Great Basin perspectives.

Climate Change

The advance and retreat of continental glaciers have characterized Pleistocene environments in North America for much of the past 2.6 million years, referred to as the Quaternary period, and these have been well articulated elsewhere (see Grayson 1993 and Pielou 1991 for summaries). The arrival of humans in Pleistocene North America appears to have occurred during the final period of glaciation, commonly referred to as the Wisconsin Glaciation, which began about 110,000 years ago, reached its maximum by about 25,000 years ago, and concluded by 11,000 years ago when North American climates approached modern conditions. The glacial advance resulted in a lowering of worldwide sea levels by as much as 300 feet. Researchers generally agree that this glaciation resulted in the establishment of a land bridge as wide as 1,200 miles (north to south) connecting Siberia to Alaska, and it functioned as a drawbridge, of sorts, that allowed animals to migrate back and forth between the Old World and the New World (Agenbroad 1990a).

The extent of glaciation in the high plateaus of southern Utah and northern Arizona remains poorly understood, but the higher elevations most certainly experienced periods of expanding and retreating glaciers with high water run-off that fed river systems and lakes. The largest of these lakes, Lake Bonneville, was located only a short distance to the northwest of GSENM (Figure 2.3), and those living around the lake could easily have discovered and explored the high plateaus to the east.

The end of the Pleistocene in western North America was a period of remarkable environmental change. Entire plant communities were reorganized and huge glacial lakes common throughout the Great Basin shriveled and evaporated. Some 35 genera of mammals and 19 genera of birds became extinct, and the lack of these animal remains in deposits dating to the last 10,000 years suggests that the extinctions had concluded prior to that time, or that the animals had dwindled to the point they had become archaeologically and paleontologically inconsequential (Grayson 1993:68). Huckell (2014) has argued most of the extinctions had been completed by 13,000 years ago, or about the same time the first humans arrived in the West.

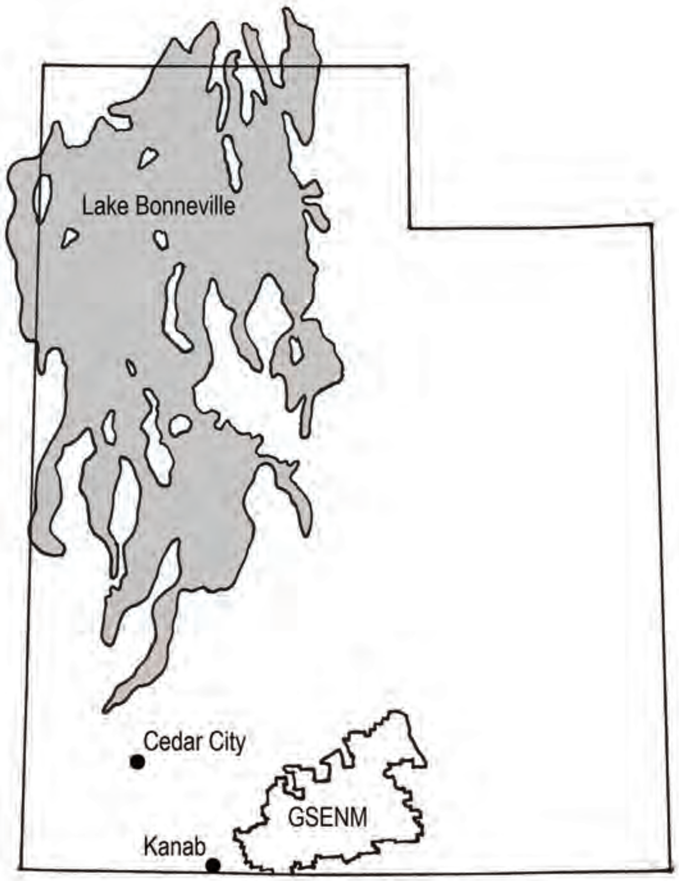


Figure 2.3: Lake Bonneville was the largest paleolake in the American West during Pleistocene times, stretching from southern Oregon on the northwest to southern California on the southwest. Hemmed by the Wasatch Mountains on the east, the ancient shoreline was 300 to 400 feet above the modern valley floor. At about 14,500 BC, a natural dam breached at Red Pass, Idaho, causing the lake level to drop dramatically and resulting in a multitude of smaller remnant lakes and lush marsh environments. Humans probably arrived shortly after the ancient lake breached and the remnant lakes in the eastern Great Basin looked something like this.

The effects of deglaciation in southern Utah were undoubtedly profound. At North Creek Shelter, located at the upper edge of the pinyon-juniper zone today, the local environments were considerably wetter during Paleo-Archaic times, supporting mixed forests of aspen, spruce, and firs, as well as subalpine grasslands and wet meadows – environmental characteristics found today at much higher elevations (Janetski et al. 2012:151; see also Newbold 2009). This wetter regime was probably due to the final retreat of glaciers on the Aquarius Plateau immediately north of North Creek Shelter. The eastern portion of the Aquarius Plateau was at one time covered by ice sheets as much as 200 meters thick that featured glacial tongues that spilled from the summit (Flint and Denny 1958; Morris et al. 2013; Osborn and Bevis 2001).

According to paleoenvironmental data from regional alcove sites, the northern Colorado Plateau was, during late Pleistocene times, a sagebrush steppe with a lush riparian community near the streams and rivers. This botanical community was virtually the same as what is found today in the higher elevations of the Henry Mountains, Kaibab Plateau, Aquarius Plateau, and Markagunt Plateau. The upward migration (increased elevation) of plant communities can be roughly correlated with warming and seasonal precipitation changes during the past 11,000 years (Agenbroad and Mead 1990a).

Research in southern Utah over the past two decades has clearly demonstrated that late Pleistocene mammals were indeed present in the region. In the Glen Canyon area, mammoth dung from Bechan Cave was dated between 11,600 and 13,400 years ago, and the evidence suggested the presence of lush vegetation adapted to wet environments where only arid deserts exist today (Agenbroad et al. 1989). In the same area, investigations at Grobot Grotto, Mammoth Alcove, Hoopers Hollow, and BF Alcove revealed considerable animal dung from now-extinct Ice Age mammals, including mammoth, mountain goat, marmot, camel, horse, and bison (Agenbroad and Mead 1990b). In south-central Utah, dung from mammoths, bison, horses, camels, and sloths was observed at Cowboy Cave (Jennings 1980). More recently, remains of a mastodon (*Mammut americanus*) were recovered in the Skutumpah Terrace area in the Grand Staircase in contexts dated to 11,250 to 11,390 years ago (Museum of Northern Arizona 2004).

No evidence of human activity in direct association with Pleistocene mammals was noted at any of these sites, although one bison bone at Cowboy Cave exhibited faint traces of polish "as if its broken end had been used as a scraper or as a polishing device against some soft material" (Jennings 1980:14-15). There is, as yet, no persuasive evidence that humans were exploiting now-extinct Pleistocene mammals in GSENM, although Newbold (2009) has suggested the mule deer bones at North Creek Shelter might represent a much larger, now-extinct ancestor of modern mule deer.

The eastern portion of the Aquarius Plateau was once covered by ice sheets as much as 200 meters thick with glacial tongues that spilled from the high plateau towards the valleys below.

The subject of continent-wide extinctions has generated considerable debate over the decades with scholars attributing them to an inability of Pleistocene fauna to adapt to changing environmental conditions, to an "overkill" by Paleo-Indian hunters, or to some combination of climatic stress and human over-hunting. The wealth of data related to climatic changes at the end of the Pleistocene and corresponding restructuring of plant and animal communities in early Holocene times offer persuasive evidence that a rapidly changing environment contributed significantly to extinctions of certain species.

In northern Colorado Plateau contexts, preserved dung of Pleistocene mammals reflected a diet rich in water plants, willows, rose, oak, birch, spruce, and other wetlands species. With the exception of cacti and sagebrush, most plant species that formed the diet of Pleistocene herbivores no longer exist in those areas or they now found at elevations up to 4,000 feet higher (Agenbroad 1990a:11).

The relatively rapid extinction of large mammals between 13,000 and 11,000 years ago and the simultaneous appearance of the distinctive, continent-wide Clovis hunting technology is viewed by many as more than coincidental. The Pleistocene overkill hypothesis presumes that waves of highly efficient Paleo-Indian hunters exploited large herbivores to extinction (Martin 1984, 1990; Pielou 1991). This might have been facilitated by drought conditions south of the ice sheets that forced larger mammals to congregate at shrinking water sources and along river corridors where they became easy prey for Paleo-Indian hunters (Agenbroad 1990a; Haynes 1991; Huckell 2014).

The best argument for Pleistocene overkill is the inability of climatic models to explain extinctions of certain species. Camels and horses, for example, became extinct in North America between 12,000 and 10,000 years ago, but they continued to thrive in the Old World where climates were virtually identical to those in the New World. Horses again thrived in the New World when reintroduced by Europeans. As observed by Grayson (1993:73), if climatic changes provided the cause of extinctions, there should have been comparable extinctions in the Old World. In the case of horses and camels, no such extinctions occurred.

Most researchers seem to prefer various climatic models for the extinction of certain Pleistocene animals, although human predation might have accelerated the extinctions and ensured the extinction of those few species that could have survived the massive environmental changes. Now-extinct Pleistocene animals present on the northern Colorado Plateau included mammoths, mastodons, camels, short-faced bears, horses, tapirs, peccary, bison, dire wolves, saber-toothed cats, mountain goats, and various sloths.

The distribution of projectile points and mammoth remains indicates that "both mammoths and mammoth hunters frequented the well-watered portions of the Colorado Plateau, such as the Little Colorado, Colorado, San Juan, and Green Rivers, as well as their major tributaries" (Agenbroad 1990a:21). In other words, some areas of GSENM, perhaps along the Paria River and Escalante River, as well as other minor tributaries like Johnson Wash and Kanab Creek, might have been suitable environments for late Pleistocene animals and the humans who preyed on them.

The Paleo Diet

Most traditional explanations have emphasized the role of big-game hunting to the near exclusion of smaller fauna or more abundant flora. As a general characterization, the earliest arrivals "were hunters and gatherers, exercising highly mobile strategies and manufacturing sophisticated hunting tools and a diversity of items appropriate for butchering game and processing hides, wood, and bone" (Cordell 1984:142). Because most Paleo-Indian sites feature items found in hunting tool kits, it has been assumed that they were following and hunting now-extinct "big game" such as mammoths, camels, bison, and horses (but see Beck and Jones 1997 and Lipe and Pitblado 1999).

Most scholars now agree that the earliest arrivals in North America probably exploited environmental niches that included both modern and now-extinct mammals, and that adaptive strategies were similar to those of the subsequent Archaic pe-

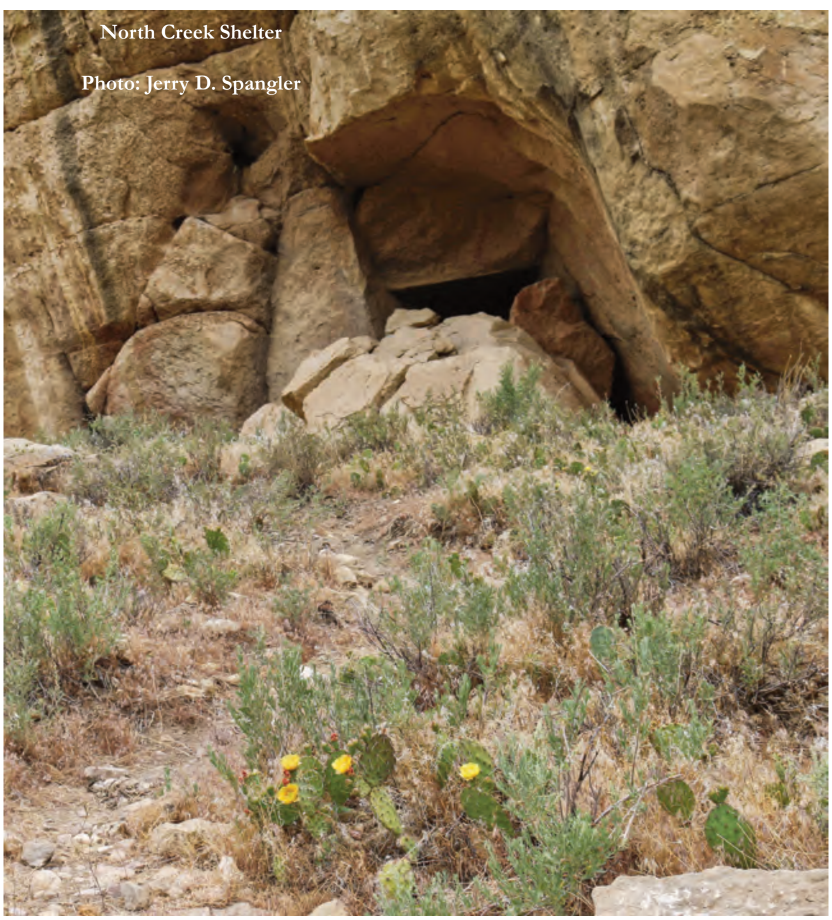

North Creek Shelter

Photo: Jerry D. Spangler

Figure 2.4: View of North Creek Shelter at the confluence of North Creek and the Escalante River. This area is now a high desert, but it was a lush riparian area in late Pleistocene times. When the first deer hunters arrived here 10,000 to 11,000 years ago, North Creek would have been swollen from the final retreat of the glaciers on the Aquarius Plateau above.

Table 2.1

Sample Material	Conventional Age BP	δ13C ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
Salicaceae	9960 ±30	AMS	BC 9635-9322	BC 9403	UCIAMS 44188	Stratum IIa, F190	Janetski et al. 2012:133
Salicaceae	9800 ±50	-23.4 AMS	BC 9336-9206	BC 9270	Beta 239022	Stratum IIa, F190	Janetski et al. 2012:133
Odocoileus Collagen	9739 ±81	AMS	BC 9337-8860	BC 9196	AA-89645	Stratum IIe, F261	J. Janetski, personal communication 2019
Dentin	9736 ±95	AMS	BC 9384-8831	BC9176	AA-89639	Stratum Ii, F263	J. Janetski, personal communication 2019
Odocoileus Collagen	9733 ±84	AMS	BC 9333-8847	BC 9185	AA-89643	Stratum IIg, F259	J. Janetski, personal communication 2019
Juniperus-Pinus	9690 ±60	-23.7 AMS	BC 9262-8856	BC 9160	Beta-221415	Stratum IIIa, F156C	Janetski et al. 2012:133
Odocoileus Collagen	9642 ±84	AMS	BC 9249-8784	BC 9026	AA-89642	Stratum IIIf, F144b	J. Janetski, personal communication 2019
Collagen	9556 ±84	AMS	BC 9205-8668	BC 8964	AA-89633	Stratum IIIb, F150	J. Janetski, personal communication 2019
Pooled Pinus	9510 ±80	-22.6	BC 9170-8639	BC 8890	Beta-207168	Level IVa, F81	Janetski et al. 2012:133
Collagen	9490 ±92	AMS	BC 9169-8583	BC 8851	AA-89640	Level IVa, F81	J. Janetski, personal communication 2019
Dentin	9406 ±96	AMS	BC 9110-8379	BC 8698	AA-89637	Level IIIe, F252	J. Janetski, personal communication 2019
Collagen-Dentin	9401 ±82	AMS	BC 9094-8438	BC 8686	AA-89635	Level Ii, F156B	J. Janetski, personal communication 2019
Collagen-Dentin	9384 ±91	AMS	BC 9093-8375	BC 8664	AA-89638	Level IIIe, F252	J. Janetski, personal communication 2019
Collagen	9237 ±83	AMS	BC 8685-8301	BC 8463	AA-89641	Level IIIe, F252	J. Janetski, personal communication 2019

Table 2.1: Paleo-Archaic radiocarbon dates from North Creek Shelter. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

riod in that a broad range of plant and animal resources were exploited. The best evidence of this comes from North Creek Shelter (Figure 2.4) where excavations revealed three Paleo-Archaic levels below well-defined early Archaic levels. These Paleo-Archaic deposits, which yielded 14 radiocarbon dates between 9400 and 8500 BC (Table 2.1), revealed a heavy reliance on mule deer. But humans also exploited a broad array of other, smaller prey, including beaver, porcupine, rabbits, squirrels, gophers, woodrats, mice, voles, turkeys, grouse, and ducks (Janetski et al. 2012:150).

Evidence of Paleo-Archaic plant procurement at North Creek Shelter was ambiguous, consisting of charred seeds representing the Chenopodiaceae, Asteraceae, and Poaceae families. But no formal ground stone tools were identified; rather they were only found in the subsequent Archaic deposits. Researchers suggested that Paleo-Archaic women had an abundance of small game to exploit, and hence there was less need to exploit small seeds. But as climates became increasingly arid, the availability of small animals adapted to wetter environments around North Creek Shelter diminished. As summarized by Janetski et al. (2012:153), in early Archaic times, "women shifted focus to grasses and other small seeded plants for the contribution to family provisioning, although use of smaller animals continued." In other words, plants were probably exploited during Paleo-Archaic times, but large-scale plant procurement and processing did not emerge until early Archaic times in response to increasingly arid conditions.

Complexes and Categories

Paleo-Indian complexes on the Plains and southern Southwest are distinguished primarily on the basis of distinctive projectile points. Sites containing remains of now-extinct Pleistocene mammals are sometimes associated with fluted points (Clovis and Folsom) and non-fluted points. And Paleo-Archaic assemblages are characterized by large stemmed points of the Western Stemmed Tradition, as well as a variety of fluted and unfluted types that may or may not be related to the Plains complexes (Beck and Jones 1997; Davis et al. 2012; Stiger 2001).

The Paleo-Indian period on the Great Plains is traditionally divided into three sequential complexes, each defined on the basis of changes in projectile point types and differences in the availability of certain animals as the Pleistocene environment changed from cooler, wetter regimes to warmer, drier modern conditions (cf. Frison 1991; Jennings 1974; Schroedl 1976, 1977). Although temporal overlapping occurs, it is generally possible to place the complexes into chronological order beginning with the Clovis Complex (sometimes called Llano), followed by the Folsom Complex, and culminating with the Plano Complex. All three are represented in southern Utah, although such evidence is rare and widely dispersed.

The fact that Clovis peoples were capable of harvesting large mammals does not mean that big game hunting provided a critical part of their diet or that mammoth hunting was even an important part of their lifeway.

A fourth lithic tradition consisting of large stemmed points (Western Stemmed Tradition) temporally overlaps all Paleo-Indian complexes defined on the Great Plains, and this is discussed separately below. In some areas (e.g., southern Arizona) large stemmed points are considered Early Archaic indicators, whereas Beck and Jones (2010, 2012) make a persuasive argument that stemmed points actually predate the fluted point complexes and are diagnostic of the earliest occupations of the Intermountain West (see Goebel and Keene 2014 for a counter-argument).

Clovis Complex

The Clovis Complex is characterized by the manufacture and use of the Clovis point, a distinctively fluted, lanceolate point averaging 8 to 15 centimeters in length (Figure 2.5). Throughout the Great Plains and Southwest, such points have been found in association with now-extinct Pleistocene fauna, in particular mammoth (*Mammuthus sp.*), which has led to the perception they were first and foremost mammoth hunters. As a result of several radiocarbon dates, the Clovis Complex has been firmly dated between about 9200 and 8900 BC on the northern Plains and 9600 to 9000 BC on the southern Plains (see Frison 1991 and Huckell 2014 for summaries of these data).

Clovis kill sites and campsites were generally located at or near water sources, suggesting that animals were ambushed at these sources. Late Pleistocene mammals might have been retreating to water sources due to warming climates and dropping groundwater tables that restricted the availability of water-adapted plants. Studies at the Lehner Ranch and Murray Springs sites in Arizona and the Blackwater Draw Site in New Mexico suggest that these Pleistocene mammals were not abundant during Clovis times and were possibly on the verge of extinction before they were targeted by Clovis hunters (Agenbroad 1990a:19).

Although it is widely assumed that Clovis peoples were specialized big-game hunters, Grayson (1993:71) cautions that the mere fact that Clovis

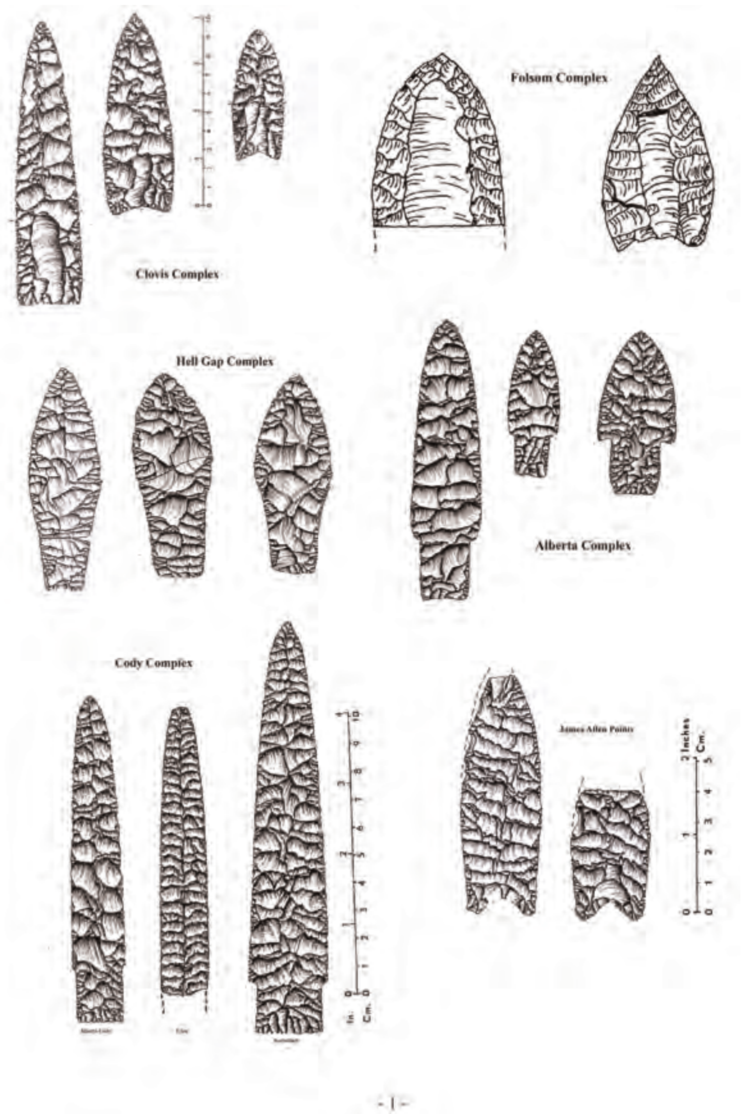


Figure 2.5: Sketch drawings of various Paleo-Indian point types found in or near the Monument. The shape and size of the points, as well as the grinding techniques used to create the points, are all sensitive indicators of when the point was made. Almost all Paleo-Indian points found in Utah have been surface finds without associated cultural deposits, but points similar to James Allen and Eden-Scottsbluff were recovered at North Creek Shelter.

peoples were capable of harvesting large mammals does not mean that big game hunting provided a critical part of their diet or that mammoth hunting was even an important part of their lifeway. The "apparent importance of mammoths to Clovis people may result instead from the very biased way in which our sample of Clovis sites has accumulated."

Most examples of Clovis points in the GSENM region have been isolated finds, or at best are associated with a minor amount of lithic debitage. The best example of a Clovis occupation in southern Utah is the Lime Ridge Clovis Site located near the San Juan River and southeast of GSENM. Some 294 artifacts were recovered, including one lanceolate biface fragment, two Clovis points, and nine end scrapers. This site is thought to represent a hunting camp overlooking a riparian corridor likely used by large animals as they moved from an upland foraging zones to the riverine environment below (Davis 1989).

Other evidence is less conclusive. Two rock art panels in the lower Escalante River area might be attributed to mammoth hunters (Figure 2.6). As noted by Hauck (1979b:320), both panels "have been well weathered but are still fairly well discernible. In each case, the tusks, knob on the top of the head, and tail are well defined and identifiable." These images are similar in execution to two other "mammoth" representations in the Moab and Indian Creek areas, both in southeastern Utah. All four of these rock art sites are associated with the Colorado River or its tributaries that featured peren-

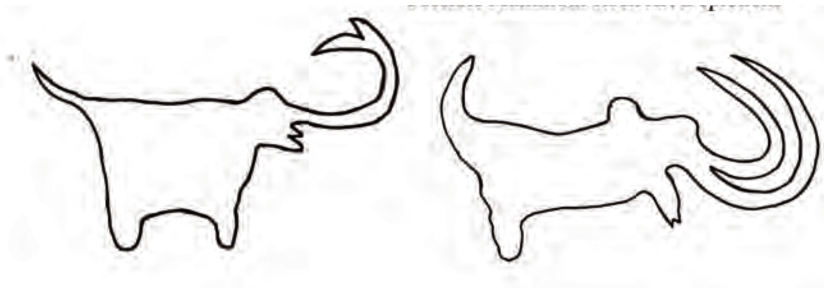


Figure 2.6: Sketch drawings of two possible mammoth petroglyphs discovered in the lower Escalante River country. Similar "mammoth' petroglyphs have been reported along the San Juan River near Bluff, in Indian Creek near the Needles District of Canyonlands, and along the Colorado River near Moab. Images used here were modified from drawings in Hauck (1979b:321-322).

nial water and wetter environments during deglaciation of the high plateaus and mountains.

Clovis points have been observed at seven localities in or near GSENM. Most of this evidence is problematic for one or more reasons. A Clovis point found in Bear Valley on a pass between the Markagunt Plateau and Tusher Mountains was photographed, but then could not be relocated for a more detailed examination to ascertain its authenticity. It was associated with an abundance of early-to-late Archaic artifacts, and the Clovis point might have been kept as a curiosity or totem by later groups. But a single Western Stemmed Tradition point of an age similar to Clovis points was also found here (Miller et al. 1995). A Clovis point found in the northern Henry Mountains was identified by a local informant, but it was never examined by archaeologists and attempts to relocate it were unsuccessful. A point found on the western Arizona Strip consisted only of a base fragment, and its identification as a Clovis point was considered tenuous, or simply "Clovis like" (Miller 1978). A point associated with a lithic scatter in the Clearwater Canyon area was described as a Clovis "mistake," but not a classic Clovis point (Bremer and Geib 1987).

Within GSENM, a Clovis point found by a private individual in Johnson Canyon was not associated with any other artifacts, whereas one found near Boulder (Figure 2.7) was found by a private individual within the context of a large lithic scatter. Subsequent test excavations at the site did not reveal additional Paleo-Archaic materials or deposits, although a Pinto Series point (early Archaic) and an Elko Series point were observed (Zweifel 2010).

Beck and Jones cautioned that many fluted points identified as Clovis points in the Intermountain West, which includes GSENM, do not exhibit the morphological or statistical traits assigned to traditional Clovis points. Of 17 fluted points at the Sunshine Locality in eastern Nevada, only two "could possibly be identified with Clovis" (Beck and Jones 2009:163; see also Beck and Jones 2010:95-96). When the sample was expanded to include other sites in the Intermountain West, they observed (2012:39) "at least a third, if not more, do not conform to Clovis morphology but, rather, are smaller, thinner forms that represent a regional development."

The seven Clovis sites in GSENM and contiguous areas are insufficient to allow us to predict where such sites might be located. It is probable that highly mobile, dispersed bands of hunters using Clovis-like points occupied GSENM where they exploited both extinct and modern fauna, but evidence for longer-term hunting forays, repeated occupations of favored locales, and organized hunts is currently lacking. Such sites would likely be associated with water sources swollen with runoff from melting glaciers, such as the Escalante River, Johnson Wash, Kanab Creek, and the Paria River.

Folsom Complex

Folsom sites elsewhere in the West typically date from about 8200 to 8900 BC on the northern Plains and 8900 to 8100 BC on the southern Plains (see Frison 1991 and Huckell 2014 for overviews), and these are identified on the basis of a fluted point smaller than the Clovis point. The flutes on Folsom points are typically longer and deeper than Clovis specimens, often running almost to the tip of the point. Folsom points are commonly found in association with burins, end scrapers, bifacially prepared cores, denticulates, gravers, bifacial knives, and bone and antler tools. Because Folsom points seem to be smaller, more stylized versions of the Clovis point, it might reflect adaptation to smaller, fleeter prey (Agenbroad 1990a:22; see also Frison 1991 and Irwin-Williams and Haynes 1970).

Animal remains commonly found in association with Folsom points include now-extinct bison (*Bison antiquus*) and many modern species. It is assumed that the shift from hunting larger Pleistocene mammals (e.g., mammoths) to bison reflected not only diminished numbers of mammoths, but changing environments from high-grass plains characteristic of the Pleistocene to shorter-grass prairies of Holocene times, which favored bison and smaller ungulates (Frison 1991).

Folsom hunting strategies might also have been focused on animals tethered to a greater or lesser degree to river corridors and springs. This is evident at two major Folsom sites along the Green River northeast of GSENM. The Montgomery Site, located on a terrace above the river, yielded 188 tools, including two Folsom point fragments, spurred transverse end scrapers, borers or gravers, and numerous flakes with bifacial retouching with distinctive Folsom attributes. As discussed by Davis (1985:12), "The large amount of debitage, stone tools, and weaponry implies a relatively large concentration of several families, possibly a band, who engaged in tool production and maintenance, faunal procurement and processing." The location of the site in proximity to the Green River might indicate large mammals were concentrating along river corridors in an otherwise increasingly arid landscape (Bond et al. 1992; Davis 1985).

Folsom hunting strategies might have been focused on animals tethered to river corridors and springs as local environments became increasingly arid.

The Dawson Site, also located near the Green River, is a large, dense lithic scatter in dune

Figure 2.7: Clovis point found near Boulder, Utah. Clovis points are synonymous with mammoth hunters, but they were likely functional tools for all sorts of large game.

deposits around a now-desiccated spring. More than 200 surface artifacts were collected, including the largest Paleo-Indian point assemblage yet documented in Utah. Point types included two Cody Complex points, 14 Folsom points and preforms, six Clovis points and preforms, two Midland points, three lanceolate points, nine Western Stemmed Tradition points, and a single Elko Series dart point (Smith et al. 2007). Researchers believed the campsite had been a repeatedly occupied over thousands of years (Byers et al. 2008).

Folsom points are quite rare in GSENM and contiguous areas north and west of the Colorado River. Seven examples have been reported, all but one of which were documented during the course of archaeological investigations (see Table 2.2 above). These are typically associated with small- to medium-sized lithic scatters, sometimes with biface tools. One site featured a slab-lined hearth of unknown temporal affinity.

As with Clovis sites, if Folsom hunters were following game tethered to water resources, then Folsom sites would be expected along those drainages still swollen with ongoing deglaciation. Because certain Pleistocene fauna had become extinct (or they were exceedingly rare), Folsom hunting camps would have been focused mostly toward hunting of modern fauna. Evidence of larger-scale band activities and/or repeated occupations of favored locales, as evidenced by the Montgomery Site and the Dawson Site, have not been reported anywhere near GSENM, but there is potential such sites will be found, probably in association with permanent water systems. A Folsom point found along the Vermilion Cliffs east of Kanab suggests that even minor canyons peripheral to the larger drainages might have featured wetter conditions suitable to hunting forays by Folsom groups.

Plano Complex

A third Paleo-Indian manifestation is collectively referred to as the Plano Complex, which is identified by a number of projectile point types that have considerable variation in form, geographic distribution, and temporal ranges. Plano points are generally lanceolate in shape, are not fluted, and exhibit fine pressure-flaking. Plano points are commonly associated with early postglacial fauna such as modern bison or antelope. The temporal sequences for some Plano points, all defined by excavations at kill sites on the Great Plains, overlap the temporal sequences for some early Archaic points as traditionally defined in the Great Basin and northern Colorado Plateau. The Plano Complex is commonly seen as a persistence of big game hunting strategies of earlier times, but adapted to Holocene environments and modern fauna (Frison 1991; Irwin-Williams and Haynes 1970).

The Plano Complex is commonly seen as a persistence of big game hunting of earlier times, but hunting strategies were adapted to drier environments and modern large game.

In southern Utah and the adjacent Arizona Strip region, Plano points are commonly described within the context of projectile point types defined at sites on the Great Plains. These identifications typically include qualifiers like "similar to" and "Plano-like," raising the possibility they represent local or regional stylistic variations that might have different temporal ranges.

Researchers have often noted that evidence of Plano peoples is virtually nonexistent in many areas of the Southwest, perhaps indicating abandonment of entire regions. Irwin-Williams and Haynes (1970:67) suggested that "in marginal areas the human population became increasingly concentrated around the principal remaining resources, leaving large areas subject to only marginal or temporary occupation." It is certainly possible that Plano hunters withdrew to areas such as the northwestern Plains where large faunal resources, in particular bison, were more abundant. It is also possible that large fauna on the Colorado Plateau were always limited, and human populations had already shifted adaptive strategies toward smaller fauna and plant resources by at least 9,000 years ago, if not a millennium earlier (Jennings 1978, 1980).

Plano point types defined in Great Plains contexts include Agate Basin, Hell Gap, Cody Complex, Alberta, Angostura, Plainview, Firstview, Frederick, Lovell Constricted, Pryor Stemmed, James Allen, Frederick, and Lusk points, among others. All of these projectile point types have been identified at sites on the northern Colorado Plateau, but not all have been found within or near GSENM.

Hell Gap Complex is a series named for a site in north-central Wyoming. It has been tenuously assigned a chronological range of 8000 to 7500 BC on the northern Plains. (Frison 1991;). One isolated Hell Gap-like point was recovered in the southern Henry Basin but "the artifact is more likely a knife fragment" (Nickens 1981:35-36). Another point at a site in the Henry Mountains was described as similar to those at the James Allen and Hell Gap sites, although a variety of points were reported from both sites and they might have been referring to Frederick-Lusk points (Geib and Bremer 1988:67-68).

Alberta points were the first to feature large stems and abrupt shoulders. They are common throughout the Plains and are similar to and often associated with Cody Complex artifacts. In some contexts, the points are referred to as Alberta-Cody. This point style has an accepted temporal range of about 7500 to 7000 BC (Frison 1991), although more recent revisions place it between 8200 and 7400 BC (Huckell 2014). One heavily patinated point recovered in isolated context in the Skutumpah Terrace area was considered similar to Alberta, but also akin to Eden, Agate Basin, and Hell Gap types (Keller 1987).

The Cody Complex is characterized by two diagnostic points, Eden and Scottsbluff, as well as the distinctive Cody knife. These are common throughout the Plains, but they are only occasionally found on the northern Colorado Plateau. The temporal range of the Cody Complex ranges from about 7400 to 6400 BC (Frison 1991). A stemmed point with a ground base from North Creek Shelter (Stratum IV) was described as similar to Scottsbluff and Eden points (Janetski et al. 2012:145). And Keller (1987) mentioned an Eden point was found at a site in the Alton Amphitheater area, but he did not describe it and it is not mentioned on the state site form.

Plainview points were defined in southern Plains contexts, although this point type has a broad geographic distribution. It is a lanceolate point with a concave base, and it has a generally accepted temporal range of about 7000 to 8000 BC (Hranicky 2011). One possible example was reported from a site in the Waterpocket Fold area that was deemed "within the range of Plainview," although other chipped-stone and ground stone artifacts at the site were not of similar antiquity (Suhm 1959:213). Two other examples were recently reported just south of GSENM (Bryce and Terlep 2017).

Frederick, Lusk, and James Allen points are quite similar to one another and have similar temporal ranges, prompting some researchers to refer to them collectively as Frederick-Lusk or Allen-Fredrick points. They have tenuous temporal ranges of about 7000 to 6000 BC (Frison 1991) or 7400 to 5800 BC (Huckell 2014) (see Figure 2.5 above). One point similar to a Frederick-Lusk point was recovered at a site in the Orange Cliffs area, and another point in the same area was described as similar to Frederick points from the James Allen and Hell Gap sites (Geib and Bremer 1988:67-68). And at North Creek Shelter, a James Allen point reworked into a drill was found in early Archaic deposits dated to about 7000 BC (Janetski 2012:145).

Several sites have yielded points with distinctive Paleo-Indian construction techniques, such as precise flaking, basal and lateral grinding, but where the point type could not be determined. One such point fragment was observed at a site in the upper Virgin River country (Fawcett 1994:39). And south of Fredonia, a large camp site situated among active sand dunes had two artifacts that were tentatively identified as Plano bifaces, although no diagnostic points were identified. And at a multicomponent artifact scatter on the Kaibab Paiute lands, one artifact was interpreted as a Plano preform (Bryce and Terlep 2017).

Western Stemmed Tradition points were present in the Intermountain West before Clovis technology was present anywhere.

The number of sites within and adjacent to GSENM with Plano points and suspected Plano artifacts is not significant (n=14), and it is insufficient to allow us to predict where such sites might be located. The identifications of these artifacts as Plano

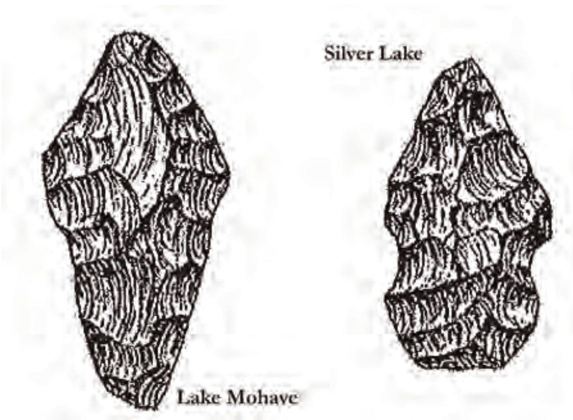


Figure 2.8: Sketch drawing of Lake Mohave and Silver Lake points common in the Monument and surrounding areas.

artifacts is also problematic in that most are fragmentary and most were described as similar but not identical to points defined in Plains contexts. It is just as likely these points represent local variations attributable to Paleo-Archaic groups who maintained periodic interaction with Plains groups.

Western Stemmed Tradition

Researchers have long recognized that large, stemmed points are commonly found in association with the earliest fluted point complexes (Clovis and Folsom), although most of this evidence was limited to surface discoveries where temporal associations were questionable. These stemmed points persisted with subtle variations from region to region. This variability led to a proliferation of named point types reflecting unique local characteristics, such as Lake Mojave, Silver Lake, Jay, Bajada, Windust, Haskett, Cougar Mountain, Parman, and Lind Coulee (see Beck and Jones 2010 for an overview). In some Southwestern contexts, early stemmed points are associated with ground stone tools and are considered to be early Archaic points.

The co-occurrence of Western Stemmed Tradition points and fluted types initially prompted some researchers to speculate that fluted points were specialized tools for the procurement of large Pleistocene fauna, whereas the stemmed points reflected exploitation of smaller mammals associated with lakeshore environments (Holmer 1986:94). Research over the past two decades has largely discredited those assumptions. Charlotte Beck and George T. Jones, prolific skeptics of the "Clovis first" explanation for the first colonization of North America, have argued that the Western Stemmed Tradition predates Clovis technology on the Columbia Plateau and Great Basin, and that "people were in the Intermountain West before Clovis was present *anywhere*" (2010:106, their emphasis).

The Beck and Jones hypothesis challenges orthodox theories that the earliest immigrants traveled south through central North America through an ice-free corridor into the Great Plains, bringing with them the distinctive Clovis technology before spreading west into the Rocky Mountains, Southwest, and Great Basin. Instead, they argue a separate migration originating in the Pacific Northwest spread east and south into the Great Basin and Rocky Mountains. These immigrants brought with them a stone tool technology characterized by large stemmed points.

Figure 2.9: These Western Stemmed Tradition points, called North Creek Stemmed, were a defining characteristic of the earliest deposits at North Creek Shelter near Escalante. They might have been used to hunt larger-sized late Pleistocene mule deer. Photo: Brigham Young University

Their hypothesis is based on three factors: (1) The earliest radiocarbon dates in this region are associated with stemmed points, (2) The stemmed and fluted point technologies are so fundamentally different that one could not have been derived from the other, and (3) There is no antecedent stemmed point tradition on the Plains. The fact that fluted points and stemmed points co-occur "suggests that the two populations utilizing them eventually encountered one another" (Beck and Jones 2012:24).

The name Western Stemmed Tradition has been employed as an umbrella term for all early stemmed points regardless of local or regional type names. These points have been found in abundance everywhere from Alberta, Canada, to Southern California, and from Oregon to Colorado, in effect the entire Intermountain West. Two point types most relevant to this chapter are Lake Mohave points and Silver Lake points (Figure 2.8). One additional point (discussed below) was identified as a Jay point, but this type, defined in southern Arizona as part of the Oshara Tradition, is quite similar to Lake Mohave points in the Great Basin. The temporal range for large stemmed points ranges from about 11,000 to 7000 BC (Beck and Jones 2012:39).

North Creek Shelter is not only the oldest site anywhere near the Monument, but it is one of the oldest anywhere on the Colorado Plateau.

Western Stemmed Tradition points have been reported throughout the GSENM region, although no spatial patterns have yet emerged. One Lake Mohave point was reported at a site in the Orange Cliffs, although it was found with more recent features (Geib and Bremer 1988:67-68). Points identified as Lake Mohave, Silver Lake, and Bajada/Jay types have been reported in the Grand Canyon area on the Kanab Plateau and Tuckup Canyon (Huffman et al. 1990), and elsewhere in the park (Hollenshead 2007). One Lake Mohave point was recovered near the Paria River (Sagebrush Consultants 2013), and two Lake Mohave points were found in isolated contexts near Kanab Creek on the Arizona Strip (Bryce and Terlep (2017). A possible Jay point was reported from a complex lithic scatter with Elko Series points on the Kaiparowits Plateau (Kearns et al. 1982), but a review of the field sketch reveals it could be a Lake Mohave point. Another point was identified in isolated context in the Circle Cliffs (Baker et al. 2001).

One complete Silver Lake point made from an unknown source of gray chert was found with a small lithic scatter near Finn Little Wash. At another site near Moonshine Ridge, a complete Silver Lake point was noted in association with eight bifaces, as well as eight additional points diagnostic of the Archaic to Pueblo II times. A third Silver Lake point, constructed of local Kaibab chert, was observed at another site nearby (Bryce and Terlep 2017).

Also relevant to this discussion are the nine stemmed points attributed to Paleo-Archaic deposits at North Creek Shelter (discussed above). These points are shouldered with short, parallel-sided stems and a rounded base, and with the exception of one obsidian point and a greenish rhyolite point, all were constructed of locally available cherts. Researchers noted the point style was different from previously described Western Stemmed Tradition points. Instead, the points were most similar to Ventana-Armagosa points at Ventana Cave in southern Arizona, but still dissimilar enough to warrant a new designation, North Creek Stemmed (Janetski et al. 2012:145; see Figure 2.9 above).

At least two sites, both on the Kaiparowits Plateau in GSENM, had stemmed points of suspected Paleo-Archaic age, but the points could not be assigned to existing types. A large shouldered point with fine pressure flaking was described as not typical of either Hell Gap or Lake Mohave points, although it shared certain charac-

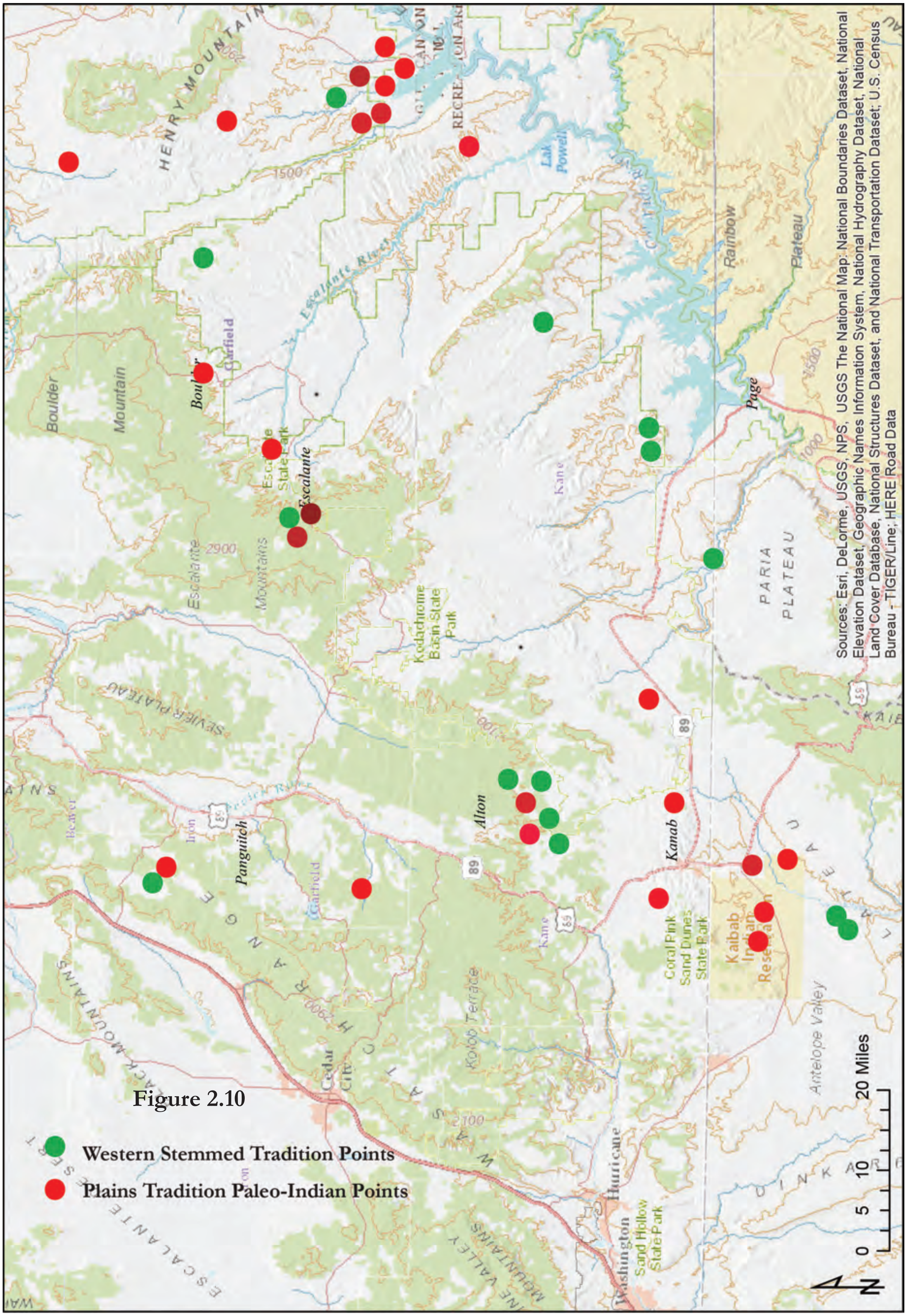

Western Stemmed Tradition Points
Plains Tradition Paleo-Indian Points
HENRY MOUNTAINS
Boulder Mountain
Boulder
Garfield
Escalante River
Escalante State Park
Escalante
Escalante Mountains
Kodachrome Basin State Park
Kane
Lake Powell
Rainbow Plateau
Page
PARIA PLATEAU
SEVIER PLATEAU
Sevier River
Panguitch
Alton
Kanab
Coral Pink Sand Dunes State Park
Kaibab Indian Reservation
Antelope Valley
Kolob Terrace
Cedar City
Hurricane
Washington
Sand Hollow State Park
PINE VALLEY MOUNTAINS
ESCALANTE DESERT
BLACK MOUNTAINS
Beaver
Iron
0 5 10 20 Miles
Sources: Esri, DeLorme, USGS, NPS, USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data

Figure 2.10

teristics with both. And a heavily patinated, concave-based point exhibited basal and margin grinding, but it could not be assigned to any known point types (Geib et al. 1999). This is not all that unusual. Paleo-Indian points rarely conform to classic "types" and in many instances they exhibit characteristics of multiple styles.

Summary

Human adaptations to late Pleistocene and early Holocene environments at about 7000 BC have been well established at numerous sites in the Great Basin (Madsen et al. 2005; Rhode et al. 2005), northern Colorado Plateau (Barlow and Metcalfe 1993; Janetski et al. 2012; Jennings 1980), and southern Rocky Mountains (Pitblado 2003; Stanford 2005; Stiger 2006). These adaptations, regardless of where they are found, have traditionally been referred to as Paleo-Indian, a de facto recognition that different groups shared projectile point technologies defined in Great Plains contexts where such groups are labeled Paleo-Indian. This orthodoxy has been challenged in recent years by scholars who argue for separate Paleo-Indian and Paleo-Archaic traditions, each defined by different tool kits, different origins, and different lifeways (Beck and Jones 2010, 2012; Janetski et al. 2012; Madsen 2007).

In brief, Paleo-Indian groups with distinctive lithic technologies might have moved west from the Plains into the Rocky Mountains and northern Southwest, exploiting herds of late Pleistocene mammals who might have been tethered to river ecosystems. Paleo-Archaic groups in the Columbia Basin, meanwhile, migrated southeast into the Great Basin where they exploited environments around what was left of Lake Bonneville, adopting a broader-based subsistence strategy that included large and small mammals, birds, and plants. Some researchers (Madsen 2007; Rhode and Louderback 2007) see continuity between Paleo-Archaic and early Archaic adaptations in the region.

Both traditions might have interacted in the Intermountain West, as evidenced by the co-occurrence of Plains-style points and large stemmed points at various sites in the West. There is limited evidence of this at North Creek Shelter, where two Plano points were identified, one from a level with Paleo-Archaic stemmed points. Possible interaction is more convincing at the Dawson Site along the Green River, a site with Clovis, Folsom, Plano, and Western Stemmed Tradition points.

Both traditions are evident in GSENM (see Figure 2.10) but only the Paleo-Archaic tradition has been convincingly documented in stratified, dated archaeological deposits. The radiocarbon dates from the lowest levels at North Creek Shelter constitute the earliest evidence of human occupancy yet documented on the northern Colorado Plateau (Janetski 2011; Janetski et al. 2006, 2012).

A growing body of circumstantial evidence from southern Utah and the Arizona Strip suggests this region was exploited by sparse and dispersed populations of hunters from about 10,000 to 8000 BC. This is based on the recovery of Paleo-Indian points (Plains types) and Paleo-Archaic points (Western Stemmed Tradition varieties). The earliest North Creek Shelter deposits were dominated by large stemmed points of the Paleo-Archaic tradition. But two specimens were similar to Plains types (James Allen and Eden-Scottsbluff), suggesting possible interaction or contact.

Aside from North Creek Shelter, sites in and adjacent to GSENM shed little light on Paleo-Indian or Paleo-Archaic lifeways. As is the case in other areas of southern Utah, rivers could have served as a vital resource base during late Pleistocene and early Holocene times. If large fauna survived in the Colorado River drainages during terminal Pleistocene times (cf. Agenbroad and Mead 1990a, 1990b), then relic populations of these animals might have eventually retreated to higher elevations as local climates transitioned toward modern Holocene conditions. In central Utah, late Paleo-Indian point types (Medicine Lodge Creek points) were recovered from a high-elevation site with nearby mammoth remains that dated to between 9500 and 7500 BC (Gillette and Madsen 1992, 1993), or about the same time as the first occupation of North Creek Shelter.

Paleo-Indian groups of the Great Plains are thought to have oriented their subsistence patterns toward the larger, migratory animals, whereas Paleo-Archaic groups of the Intermountain West employed a broader-based subsistent pattern that suggests at least partial dependence on smaller animal species and edible plants in a variety of environmental settings (Beck and Jones 1997, 2009; Janetski et al. 2012; Lipe and Pitblado 1999). Unequivocal evidence of Paleo-Archaic plant processing is currently lacking, and it might be difficult to identify due to problems of poor preservation of plant remains at open sites and the high mobility of the Paleo-Archaic groups that undoubtedly masked the overall importance of plants.

Paleo-Archaic land-use patterns in GSENM cannot be hypothesized based on the limited evidence reported to date. Geib (1996a:28-29) has argued the region had a low-level occupation until about 7000 BC, after which "Archaic hunter-gatherers soon resettled the abandoned rugged canyon landscape;" whereas contemporaneous Paleo-Indian hunters "simply moved on rather than alter their lifestyle, leaving open a vast chunk of territory for populations already employing a generalist subsistence strategy — foragers spreading out of the eastern Great Basin."

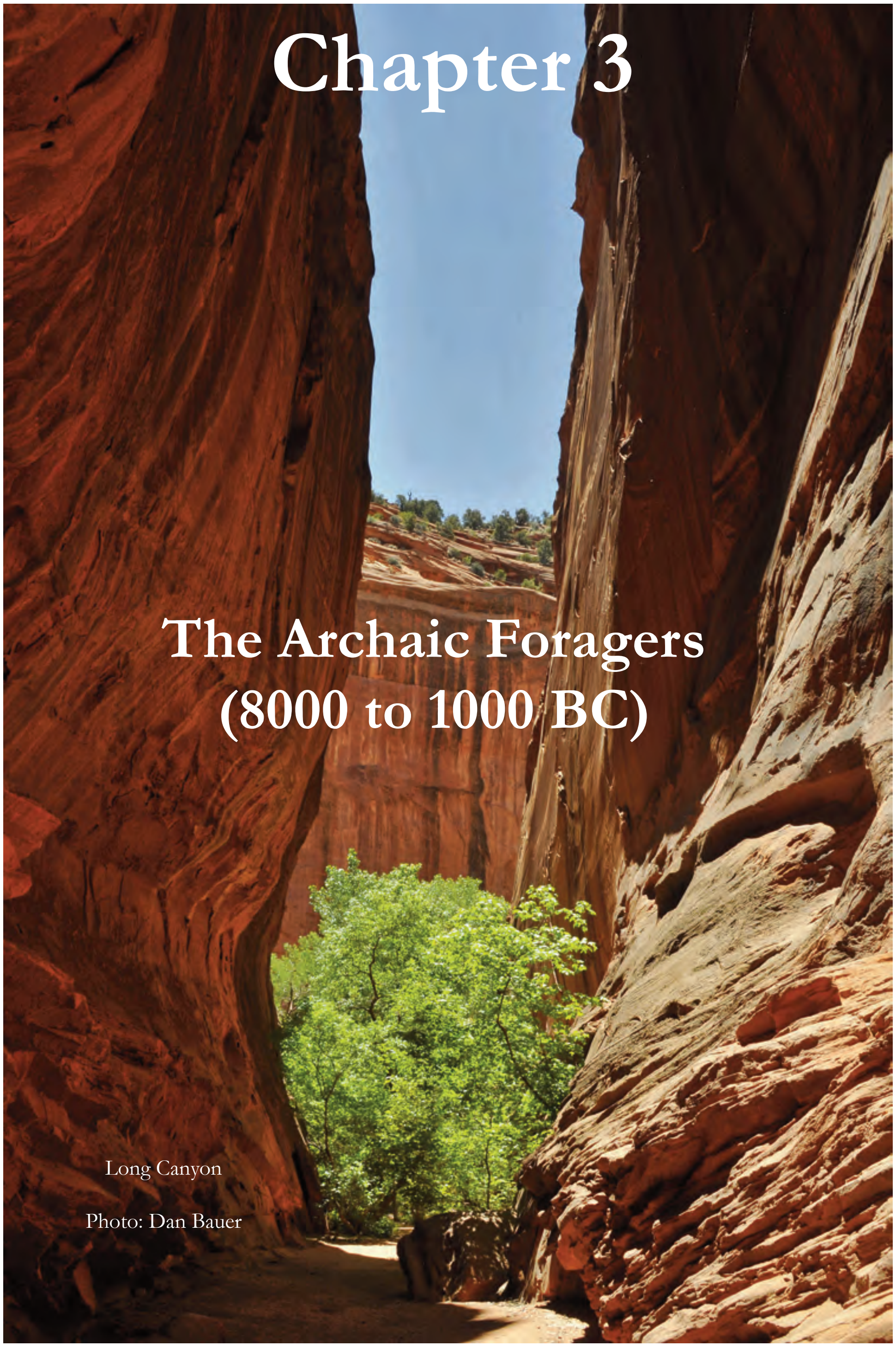
Paleo-Indian hunters and gatherers might have been comparatively rare in this region, but we suspect that the Paleo-Archaic presence here was more robust and probably peripheral to late Pleistocene and early Holocene adaptations along remnants of nearby Lake Bonneville. It is not possible with the current dataset to speculate on how Paleo-Indian and Paleo-Archaic adaptations in GSENM differed from one another, if there were any differences at all.

It is not known with any certainty when the last Paleo-Archaic hunters walked the high plateaus of southern Utah, but evidence from North Creek Shelter suggests their stemmed point tradition had been replaced by Pinto Series dart points and ground stone tools by about 8000 BC. An Archaic lifeway characterized by diet expanded to include plants, seeds, nuts, and tubers was evident throughout the region by this time, and a full-fledged hunting and gathering lifeway had become predominant by 6000 BC across the northern Colorado Plateau. The earliest Archaic hunters and gatherers might have coexisted with Paleo-Archaic hunters before the latter moved on, as suggested by Geib (1996a), or the last of the Paleo-Archaic hunters might simply have adapted their subsistence patterns to drier Holocene environments, relying more on hunting, trapping, and snaring small game and gathering more predictable plant foods, including small seeds, as suggested by Madsen (2007).


Vermilion Cliffs
Photo: Jerry D. Spangler

Chapter 3

The Archaic Foragers (8000 to 1000 BC)



Long Canyon

Photo: Dan Bauer

By about 8000 BC, the high plateaus of southern Utah and northern Arizona were coming to look pretty much like they do today. The glaciers had long since melted and water tables were dropping, and most of the minor drainages were bone dry. Climates were hot in the summer and cold in the winter, and rainfall was unpredictable, at best. And there might not have been as many large game animals as before. It is probably not happenstance that the onset of aridity across the Colorado Plateau coincides with abundant evidence that humans were responding by hunting a variety of smaller mammals *and* collecting small seeds and desert plants – a lifeway that changed little over thousands of years. Archaeologists refer to this as the Archaic period, and groups at this time are collectively referred to as Archaic peoples.

Following is a brief summary of the archaeological evidence of Archaic groups that inhabited the GSENM region prior to the advent of agricultural lifeways at about 1000 BC. This period of time encompasses human adaptations oriented toward the acquisition of locally available flora and/or fauna (food procurement), in contrast to subsequent lifeways focused on agriculture (food production). This time frame has traditionally been organized into a variety of periods, phases, and complexes defined in specific areas of the Colorado Plateau and Great Basin (see Figure 3.2).

Because direct evidence from GSENM is rather limited, Archaic hunter-gatherer adaptations are herein discussed within a regional context focused primarily on sites north of the Colorado River in similar environments as those found in the Monument. This discussion is directed largely at the fundamental question in Southwestern archaeology of whether or not there is cultural continuity through time. For example, did Archaic hunting and gathering evolve out of an earlier big-game hunting tradition, or does it represent a displacement of big game hunting groups by foragers better adapted to desert environments? Later in the Archaic period, the question of continuity is relevant to the appearance of agriculture and by extension the origins of farming. Researchers debate whether agriculture developed from an Archaic base or whether there were periods of occupation, abandonment, and reoccupation by immigrants with new technologies and different lifeways.

As discussed in Chapter 2, the earliest evidence of Paleo-Archaic hunting in southern Utah dates to between 9400 and 8500 BC at North Creek Shelter, or near the beginning of the Holocene when climates and vegetation regimes were transitioning to modern conditions. Ground stone tools indicating small seed processing, however, do not appear there until about a thousand years later, and these were associated with a different chipped-stone tool tradition: Pinto Series atlatl dart points. This site marks the earliest appearance of ground stone tools anywhere in the GSENM region.

Conditions after 6000 BC were considerably dryer than those of the preceding four thousand years, and this drying trend corresponds to an increase in the frequency of ground stone implements used to process plants.

By 6000 BC, there is abundant evidence of Archaic hunting and gathering throughout the northern Colorado Plateau, much of it derived from deposits in alcoves and rockshelters. Hunting and gathering remained the predominant subsistence strategy, although with periods of greater and lesser intensity, until 3,000 years ago when limited agriculture was first added to a foraging lifeway in some, but not all areas. Based on a growing catalog of radiocarbon dates from the region, there is no convincing evidence of long abandonments during the Archaic, nor is their persuasive evidence of major changes in hunting and gathering strategies through time. In fact, site types, site complexity, and spatial patterning were remarkably uniform throughout the Archaic.

The transition from wet Pleistocene conditions to arid Holocene ones was marked by the disappearance of large Pleistocene fauna, the appearance of vegetation communities more adapted to widespread aridity, and human exploitation of a wider range of plant and animal resources (Cassells 1997; Jones and Beck 2014). Environmental changes inevitably resulted in adaptive responses, and in some instances “the correlation between climatic change and cultural change at this time is stark” (Grayson 1993:244).

Figure 3.2: Various researchers have organized the Archaic into various sub-periods and phases based mostly on changing preferences in projectile points. The reality is that hunting and gathering strategies in the Intermountain West remained remarkably similar across 7,000 years of human prehistory with only minor changes or additions to local toolkits.

Conditions after 6000 BC were considerably dryer than those of the preceding four thousand years, and this drying trend corresponds to an increase in the frequency of ground stone implements used to process plants (manos and metates), as well as a greater frequency of birds, fish, and small mammal bones that reflect a broader diet and a greater reliance on resources that have less caloric return on investment (Beck and Jones 1997; Jones and Beck 2014). This is clearly evident at North Creek Shelter where ground stone tools first appear in early Holocene deposits dated between 8200 and 5000 BC (Janetski et al. 2012).

It is generally accepted that Archaic populations practiced a highly mobile hunter-gatherer lifeway, following the seasonal availability of plant and animal foods for subsistence and with assigned gender roles (women gathered and men hunted). They probably traveled in small groups and were able to cover large amounts of territory in a relatively short amount of time (Cassells 1997; Grayson 1993). Occupations at any single location were probably brief, perhaps only as long as necessary to deplete the locally available resources. It is possible that Archaic groups utilized alcoves at a higher rate relative to open sites, although these data might be biased in that sheltered localities offer better preservation of cultural remains (Madsen et al. 1976).

Traditional definitions of Archaic hunter-gatherers have emphasized the "broad spectrum" of resources being exploited. And although many different plant and animal species were exploited by Archaic hunter-gatherers, data from a growing number of sites on the Colorado Plateau, eastern Great Basin, and northwestern Plains suggest a more restricted subsistence strategy where organizational responses were structured around intense procurement of primary resources and opportunistic exploitation of lesser-ranked resources.

Hunters and gatherers throughout the Archaic saw only minor shifts in resource availability and, in response, they made only minor adjustments.

Theoretical Context

Archaic lifeways changed little in GSENM between 8000 and 1000 BC. something that is in agreement with observations elsewhere in the Intermountain West that support the idea that foraging strategies remained remarkably consistent over thousands of years and that subtle changes evident in the archaeological record reflect human responses to greater or lesser availability of preferred plant and animal resources.

Jesse Jennings' classic Desert Archaic or Desert Culture concept (Jennings 1956, 1957a; Jennings and Norbeck 1955) was rooted in the idea that Archaic peoples of the entire western United States were seasonal hunters and gatherers who employed common strategies to exploit a variety of desert ecosystems. Persuaded that desert environments presented an insurmountable obstacle to evolutionary progress, Jennings believed a generalized hunter-gatherer adaptation prevailed from about 10,000 years ago to the ethnographic present (see Bettinger 1991:46).

The Desert Archaic was characterized by hunting, trapping, snaring, birds, harvesting insects, hunting deer, antelope, mountain sheep, rabbits and other animals, and collecting grasses, seeds, bulbs, nuts, roots, berries, and other exploitable plants. Among the traits assigned to the Desert Archaic were sparse populations and small sociopolitical groups; settlement locations in shelters and overhangs; highly mobile seasonal gathering; and intensive but nonspecialized exploitation of food resources. Tools included basketry, cordage, netting, matting, fur cloth, grass or bark beds, tumplines as carrying devices, sandals, atlatl darts, flat milling stones with cobble manos, specialized stone tools, digging sticks, fire drills, wooden clubs, horn-shaft wrenches, tubular pipes, *Olivella* shells, and domesticated canines (Jennings 1956, 1957a, 1978).

The Desert Archaic concept has been often criticized for underemphasizing the role of climatic fluctuations and differences in regional environments (Baumhoff and Heizer 1965; Davis 1966; Heizer 1956). And Irwin-Williams (1967, 1973, 1979), while acknowledging cultural continuity throughout the Archaic, argued that Jennings failed to recognize important differences between Archaic groups adapted to Great Basin environments and those of the Southwest.

Aside from typological differences in artifacts between the two regions, the only significant difference between Irwin-Williams' Oshara Tradition and Jennings' Desert Archaic was the presence of domesticated plants perhaps as early as 2000 BC in some areas of the Southwest that would have restricted seasonal movement and encouraged sedentism. Jennings (1974, 1978) and others (Aikens 1970; O'Connell 1975) have argued that adaptive diversity to regional environments is entirely consistent with the Desert Archaic concept.

Generally, exploiting a wide variety of economic plants and animals was the dominant lifeway throughout the Intermountain West, with similarities and differences from one region to another. As summarized by Berry and Berry (1986:320), hunters and gatherers throughout the Archaic "saw only minor shifts in resource availability and, in response, made minor adjustments in exploitative range. In the process, they sometimes encountered new classes of resources that required modifications in extractive technology or a reorientation of relative resource dependency. None of these constituted major evolutionary developments."

Modern foraging theory is firmly rooted in principles of human behavioral ecology (see Winterhalder and Smith 1981, 2000), which has proven to be a productive theoretical framework for addressing changes in human subsistence. Foraging theory focuses on trade-offs in behavioral options available to hunter-gatherers (Kelly 2001), and diet breadth models assume that foragers seek to maximize their net intake of energy with calories serving as a standard unit of measure or currency (Smith and Winterhalder 1992). The highest ranked resources are usually large-bodied animals that provide a relatively high return rate per unit (Broughton 1994; Ugan 2005), whereas the lowest-ranked and most-costly resources are plants and seeds (O'Connell and Hawkes 1984). The relative abundance of higher-ranked resources (big game) determines to what extent lower-ranked resources (small game and plants) will be added to the diet.

Widening diet breadth usually indicates a shift toward more frequent use of lower-ranked resources because no higher-ranked resources are available or those resources have higher handling costs than do lower-ranked resources (Broughton and Grayson 1993). A basic assumption is that procurement of lower-ranked resources (e.g., small animals, plants, and seeds) is economically viable only when higher-ranked resources (e.g., deer and bighorn sheep) are not available or acquisition success rates are costly and unpredictable.


Circle Cliffs

Photo: Dan Bauer

Fisher and others caution that diet-based foraging models do not adequately consider economic values or benefits beyond nutrition. For example, their research at Antelope Cave on the Arizona Strip demonstrated considerable investment in large-scale, energy-expensive, communal rabbit drives. But rabbits have much lower caloric return rates compared to larger game even when the higher acquisition costs are factored. But rabbits also provide non-dietary benefits in terms of furs and skins preferred for robes, blankets, clothing, and cordage, and rabbit fur might have "acted as a currency other than calories" that made rabbit procurement a higher-return activity (Fisher et al. 2013:155). Other non-dietary currencies might also apply to procurement of other resources that otherwise have low caloric return rates (or none at all).

Recognizing the Foragers

Two basic Archaic site types are evident in GSENM: Longer-term occupations characterized by exploitation of a broad range of plant and animal species and evidence of multiple household activities, and shorter-term occupations indicative of single-event activities such seed gathering or animal butchering. Longer-term Archaic occupations, sometimes referred to as residential bases, have been well documented in regional alcoves and rockshelters, such as North Creek Shelter (Janetski et al. 2012), Dust Devil Cave (Ambler 1996), Sand Dune Cave (Lindsay et al. 1968), and Broken Arrow Cave (Talbot et al. 1999).

There is some evidence that Archaic groups also constructed formal residences in open settings (McFadden 2012; Roberts 2018), a residential pattern consistent with Archaic residences reported for the Great Basin (see Grayson 1993), Colorado Rockies and Yampa River Basin (see Spangler 2002), and southern Colorado Plateau (see Huckell 1996). The longer-term occupations typically have middens that exhibit greater diversity of faunal remains and multiple household activities (Reitz and Wing 1999), as well as increased sedentism, as was evident at North Creek Shelter (Janetski et al. 2012) and the Arroyo Site (McFadden 2012).

Short-term occupations are by far the most common Archaic sites in GSENM. These sites typically contain few artifacts, although many appear to have been reoccupied repeatedly throughout prehistory, which has resulted in the accumulation of large artifact assemblages (>1,000). These temporary sites can be organized into two basic types: (1) Hunting and butchering sites characterized by bifaces and scrapers, as well as stone tool maintenance debris discarded during male hunting forays; and (2) bi-gender foraging camps where floral resources and game were both processed, as evidenced by the co-occurrence of ground stone tools and butchering tools.

For the purposes of this chapter, we discuss Archaic hunting and gathering from 8000 to 1000 BC as a single adaptive strategy without explicitly defined sub-periods (cf. Jennings 1978), although we hereafter refer to early, middle, and late Archaic to facilitate comparisons to traditional nomenclature found in the archaeological literature. Use of the terms, early, middle, and late does not imply cultural progression from simple to more complex; rather, it is intended to reference whether a site or artifact can be assigned early in the 7,000-year period or later.

We also recognize environmental changes through time were probably the single most important factor influencing the availability of plant and animal resources, and consequently human responses to those changes. Major changes in Holocene environments through time are well defined, and human responses to those changes, as expressed by changes in artifact forms, site locations, and other factors, are evident throughout the Intermountain West. In the following discussion, we address human responses to those environmental changes within the context of the early Holocene (8000 to 5500 BC), middle Holocene (5500 to 2500 BC), and the middle-late Holocene transition (2500 to 1000 BC). This approach, patterned loosely on Grayson (1993), is justified based on the following:

- The temporal ranges for the early Holocene, middle Holocene, and late Holocene have been established through hundreds of regional paleoenvironmental studies, and these ranges are generally accepted by Quaternary scientists, although there might be disagreements as to the nature of environmental changes within these periods.

- The Archaic record of GSENM is based almost entirely on diagnostic projectile points. The temporal ranges of these points, when plotted against the temporal ranges of the Holocene periods, suggest that changes in artifact types correspond nicely to different environmental sequences.

- Orthodox taxonomies and classification schemes are irrelevant when discussing how humans responded to changing environments given that subsistence strategies were similar (or identical) over 7,000 years.

A Time of Plenty: The Early Holocene

The early Holocene is viewed as a period when climates were warmer and drier than the preceding late Pleistocene, but cooler and wetter than the following middle Holocene. This overarching characterization is generally accurate, but it also under-emphasizes the fact that climate change was incremental, occurring over thousands of years. Groups adapted to late Pleistocene environments might not have noticed subtle warming from one generation to the next. In effect, environmental changes were probably imperceptible on a 50-year or even 100-year scale. But on a broader scale, early Holocene conditions would have been unrecognizable to those living a thousand years before. Lakes were gradually retreating, bogs and marshes were drying out, vegetation was changing, and the amount of water flowing in rivers and streams was declining as the last remnants of the glaciers disappeared.

The glaciers and ice sheets that blanketed the Markagunt and Aquarius plateaus had probably disappeared or were only small remnants of their former size by the time humans arrived in the region, perhaps as early as 12,000 years ago.

Conditions between about 8000 and 5500 BC were not bad, they were just different. Biotic communities reorganized over time and in response to increasingly warmer conditions, and humans responded accordingly. And it was a time of resource abundance. As Grayson observed (1993:244), "From the point of view of its human occupants, the Great Basin may never have been more productive than it was during the early Holocene."

The same is probably true of the northern Colorado Plateau. Melting glaciers and ice sheets on the Markagunt and Aquarius plateaus undoubtedly resulted in expanded riparian and lacustrine environments rich in fish, fowl, and small mammals, and expanded grasslands that were optimal for large herds of bison, antelope, and deer. It is not surprising that human adaptations at this time were focused on lakeshore environments, riparian corridors, and lush prairie-like grasslands.

The temporal boundary between the Pleistocene and the Holocene has been placed at 10,000 years ago by the Holocene Commission of the International Quaternary Association, a date chosen because it was a "nice round number." The fact that the boundary is arbitrary, as Grayson (1993:193) noted, "does not mean that the date chosen was a bad one." It coincided with the end of the Younger Dryas cold event, the disappearance of late Pleistocene mammals, the retreat and subsequent desiccation of Lake Bonneville, and the end of glaciation across most of North America.

As we discussed in Chapter 2, humans arrived in the Pacific Northwest as early as 14,000 years ago, and over the subsequent 2,000 years they expanded south and east into the Great Basin and Rocky Mountains. These earliest arrivals would have encountered environments already assuming post-Pleistocene conditions: Lake Bonneville had breached at Red Pass by about 14,500 years ago, lowering the lake level by 340 feet and leaving remnant lakes scattered across the eastern Great Basin; the massive glaciers of earlier millennia were in full retreat and many, if not most, had disappeared; and Pleistocene mammoths, mastodons, camels, and other large animals were rapidly dwindling in numbers and perhaps on the verge of extinction. The first arrivals would have encountered mixed conifer forests at lower elevations that are dominated by pinyons and junipers today.

The earliest Holocene environments were probably not substantially different than those of the last millennium or two of Pleistocene times in that climates continued to trend warmer and drier. The cumulative paleoenvironmental record indicates a brief but intense period of increased effective precipitation occurred between 9000 and 7000 BC, although there may have been significant regional variability. In the Southwest, climatic warming resulted in strengthened monsoonal flows that yielded moist conditions (Beiswenger 1991; Carrara 2011; Carrara et al. 1991; Whitlock and Bartlein 1993). In fact, Carrara (2011), Friedman et al. (1988), and others argue the early Holocene summer monsoons were more intense than they are today, and this intensification corresponded with the shift from cool and moist conditions before 10,000 years ago to warm and moist conditions after that time (see also Markgraf and Scott 1980).

This is supported by other studies in the Southwest. In the San Juan Basin, sagebrush grassland was present in lowland areas that are now desert scrub (Hall 1990), and packrat midden analysis from the Colorado Plateau suggested an increase in subtropical moisture between 8000 and 4000 BC (Betancourt (1990). And in southeastern Utah, forest communities changed in response to warmer conditions. Engelmann spruce, subalpine fire, limber pine, and Douglas fir that dominated vegetation regimes before about 11,000 BC gave way to blue spruce, ponderosa pine, and Gambel oak. And by 6000 BC, the region was dominated by Utah juniper, ponderosa pine, and squawbush (Anderson et al. 2000).

Late Pleistocene and early Holocene paleoenvironmental evidence from the GSENM region is quite limited, but it is consistent with that reported elsewhere in the Southwest that suggest late Pleistocene deglaciation was followed by warmer, wetter conditions. Glaciers blanketed the Markagunt Plateau to the east of GSENM during terminal Pleistocene times (Anderson et al. 1999), and the Aquarius, Fish Lake, and Thousand Lake plateaus to the north of GSENM were ice-covered during much of that same time (Flint and Denny 1958; Morris et al. 2013; Stokes 1986). The Boulder Mountain ice cap did not begin its final retreat until after 13,000 BC (Marchetti et al. 2005), and "the flow from the recently melted glaciers and their remains would have been substantial at the Terminal Pleistocene/Early Holocene transition" (Janetski et al. 2012:151).

In the GSENM area, the glaciers and ice sheets that blanketed the Markagunt and Aquarius plateaus had probably disappeared or were only small remnants of their former size by the time humans arrived in the region, perhaps as early as 12,000 years ago. The rapid melt of the glaciers probably resulted in expanded riparian communities along certain drainages as the ice melt made its way south toward the Colorado River. These communities would have been rich in water fowl, fish, and small mammals adapted to wetter environments.

The foothills now covered in pinyons and junipers were at that time mixed conifer forests similar to those now found much higher in elevation. The emergence of a strong summer monsoonal climatic pattern would have fostered expansion of grasslands in certain areas (e.g., the Arizona Strip), which could have been conducive to larger herbivores. In effect, the local environment during earliest Holocene times probably offered an abundance and variety of food sources, perhaps more so than at any time before or since.

Most of the glacier-fed drainages had dried up by 7000 BC, resulting in the loss of entire local ecotones, tethering human populations to the few remaining permanent water sources, such as Kanab Creek, the Virgin River, Johnson Canyon, the Paria River, and Escalante River, as well as remnant Pleis-

Figure 3.4: The appearance of stone tools designed to process plants and seeds at about 8000 BC is a hallmark of the beginning of the Archaic period when plant foraging assumed greater importance in the wake of increasingly arid climates.

tocene lakes such as Panguitch Lake and the myriad small lakes on Boulder Mountain. The fact that seed processing was added to human resource procurement strategies by at least 7000 BC might indicate that high-return mule deer and bighorn sheep were not as abundant, that they were less predictable as a food source, or the procurement costs had increased substantially to warrant the addition of low-return seeds to the diet.

Perhaps the most important trait that distinguishes early Holocene adaptations in the GSENM region from earlier ones was the appearance and subsequent proliferation of ground stone tools for processing seeds, nuts, and tubers. As we discussed above, hunter-gatherers preferred higher-return game animals, but in an increasingly arid environment these resources were not as predictable, requiring use of lower-return, high-cost plant resources for their necessary calories.

This is quite evident at North Creek Shelter. From 8000 to 7000 BC, the local environment was rich in water-loving small animals, which appear in abundance in the faunal record. But there was minimal evidence of plant processing. Between 7000 and 6000 BC, the local environment had dried considerably, the water-adapted plants and animals had retreated to higher elevations, and the deer-hunting groups who occupied the shelter reverted to collecting and processing plants in proximity to the shelter. This was manifest by the appearance of thin slab metates that had been pecked and ground and one-hand cobble manos (Janetski et al. 2012).

The North Creek Shelter investigations augment early Archaic data derived from nearly a dozen sites on the northern Colorado Plateau, mostly rockshelters and alcove sites. At least 48 radiocarbon dates consistent with this period of time have been reported from the region, with almost half of those dates reported from sites in very close proximity to GSENM. The regional data are briefly summarized to provide context for our discussion of early Holocene adaptations in GSENM. The general location of sites discussed hereafter is indicated in Figure 3.5.

Regional Perspectives

Two sites in the Navajo Mountain area contained important early Archaic deposits that led researchers to suggest the term Desha Complex to define early Archaic peoples on the basis of unique artifact attributes (Lindsay et al. 1968). The Desha Complex has typically been assigned a temporal range of 6000 to 5000 BC, and researchers originally described it has having close affinities to early Archaic hunter-gather adaptations in the Great Basin, although this association was admittedly tenuous. The Desha Complex was originally described as an artifact inventory that included open-twined sandals, warp-faced sandals, elongated and shallowly notched dart points (now called Sand Dune Side-notched), one-rod basketry, twined grass matting, worked bobcat scapulae, worked mountain sheep hyoids, and shallow-basin grinding slabs. Subsistence patterns were focused toward exploitation of wild plants and small mammals (Lindsay et al. 1968:120-121; see also Amber 1996:40).

Investigations at Dust Devil Cave, located near the summit of Navajo Mountain overlooking the Desha Creek drainage, identified an early Archaic occupation somewhat similar to that at Cowboy Cave in the San Rafael Desert. Subsistence strategies appear to have been focused toward the procurement of plant resources, in particular prickly pear cactus. The early Archaic occupations were followed by a long period of abandonment in middle Holocene times during which earlier deposits were overlaid by a thick layer of sterile sand.

Also in the Navajo Mountain area, excavations at Sand Dune Cave identified six different occupations with Desha Complex materials, as well as another occupation deemed to have been even earlier than the Desha materials. A variety of cists, caches, and hearths were excavated, as were two burials, and a remarkable wealth of lithic and perishable artifacts were recovered. Lindsay et al. (1968) determined Sand Dune Cave was utilized primarily for habitation and storage. A number of open-twined sandals, Sand Dune Side-notched points, and bison bones were recovered in early Archaic contexts. Archaic subsistence was focused toward grass seeds and yucca, and the faunal materials included cottontail rabbit, ground squirrel (or rock squirrel), packrat, and mountain sheep.

Perhaps the most important trait that distinguishes early Holocene adaptations was the appearance and subsequent proliferation of ground stone tools for processing seeds, nuts, and tubers.

In the San Rafael Desert, Cowboy Cave contained five major strata, the earliest of which (11,000 to 9000 BC) revealed evidence of extinct Pleistocene fauna but no coexistent human occupation. Early Archaic deposits at Cowboy Cave exhibited lengthy and frequent abandonments of more than 1,000 years, and a wealth of floral macrofossil evidence suggested the site was primarily a seasonal camp for gathering seeds (e.g., Indian rice grass, goosefoot, pigweed, and dropseed) during spring, summer, and early fall. Hunting was an insignificant part of the Cowboy Cave subsistence strategy. The small amount of animal remains from early Archaic Unit II and Unit III consisted primarily of jackrabbits and cottontail rabbits, suggesting very little access to larger fauna. During later Archaic times and immediately thereafter (Unit IV and Unit V), elk, deer, and mountain sheep were added to the diet of Cowboy Cave inhabitants (Jennings 1980).

Jennings (1980:147) believed the artifact assemblage found in earliest Archaic levels bear "close and clear artifactual similarities between the so-called Desha Complex of northern Arizona near Navajo Mountain. On several counts, including the characteristic sandal, the basketry manufacturing techniques and certain other classes of artifacts, the Cowboy Cave material extends and lends credence to the Desha material." Early Archaic radiocarbon dates have also been reported from open-twined sandals at Jim Walters Cave and Rock Bar Alcove in the same general area (Geib 1996a).

To the north of GSENM, excavations at Sudden Shelter, a large rockshelter at the south end of the Wasatch Plateau, revealed 22 distinct strata. The earliest component, assigned a temporal range of about 6400 to 4300 BC, contained an abundance of projectile points, bone and stone tools, and faunal remains. Several artifact types were associated exclusively with this component, while others were shared with later components. Pinto Series points dominated the earliest three strata (6400 to 5300

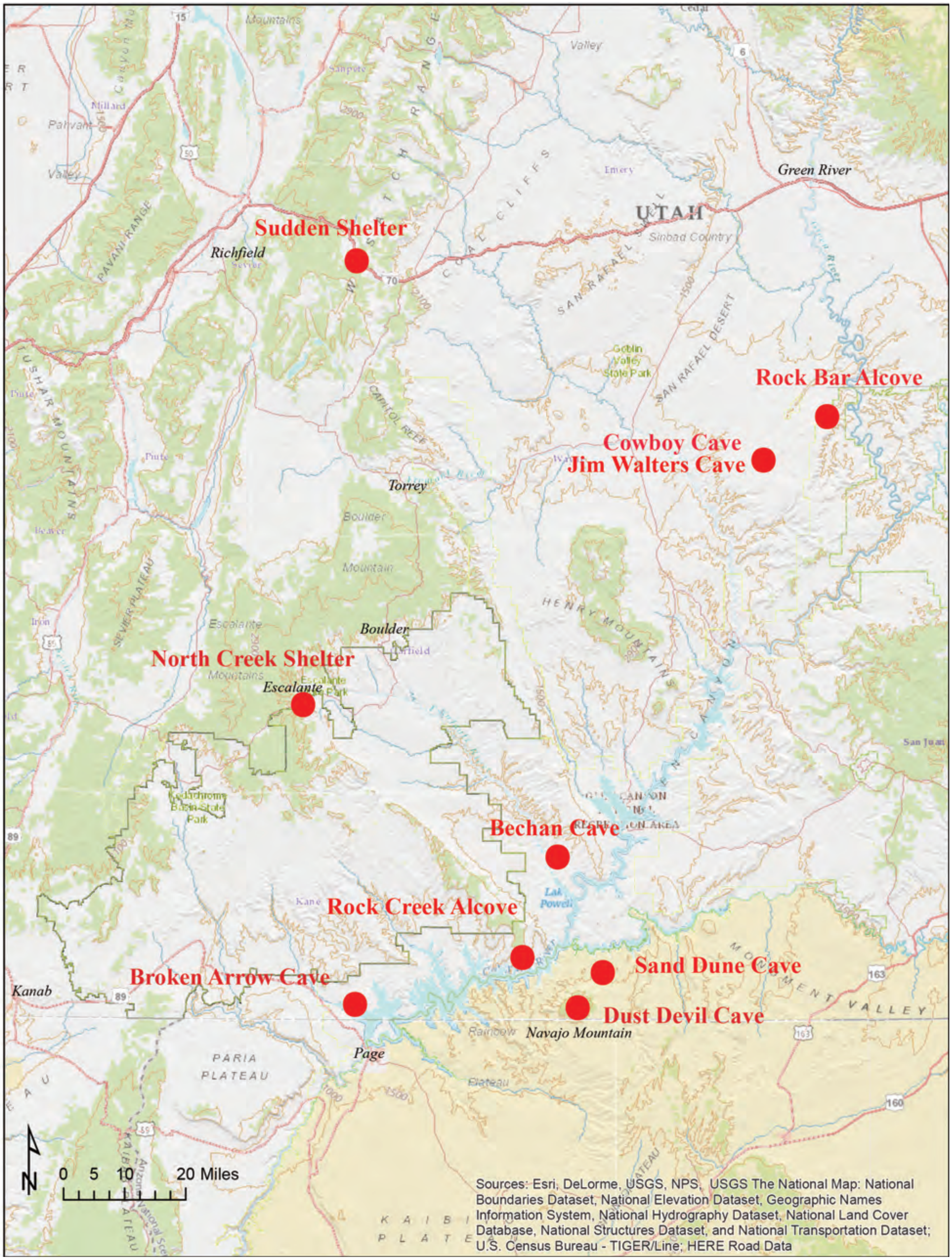


Figure 3.5: Significant regional Archaic sites occupied during the early Holocene.

BC), although the density of points was relatively low (Jennings et al. 1980:29).

A dramatic increase in point densities corresponded with the replacement of Pinto Series points with Elko Series points as the dominant type at about 5300 BC. The diversity of domestic tools suggested Sudden Shelter was a base camp or seasonal habitation, that the occupants were engaged in a variety of activities, and that the diversity of the archaeological record cannot be explained by a short-term hunting or seed-gathering camp. The seasonality of the plant remains and animal bones indicated the site was occupied during the summer months (Jennings et al. 1980).

In general, researchers suggested that the occupants during earliest and latest Archaic times had a preference for hunting, whereas those occupations in the middle range relied more on seed gathering. They concluded (1) relatively few plant species were heavily used; (2) these species included weeds encouraged by human disturbance, as well as plants from natural plant communities; and (3) grass seeds were an important dietary element for an extended period on the Colorado Plateau.

Among the earliest radiocarbon dates in the region are from a high-elevation base camp on the Kaibab Plateau to the south of GSENM that appears to have been repeatedly occupied throughout the Archaic (Schroedl 1988). The camp, situated around an alpine meadow, was apparently the focus of deer hunting, plant procurement and processing activities, and tool manufacturing and/or maintenance. Twelve atlatl dart points were recovered, but no arrow points were identified. Among the features were hearths, burned-rock middens, and subsurface pits. One hearth returned two radiocarbon dates, both at about 8000 BC.

GSENM Perspectives

No sites within the political boundaries of GSENM have yet produced early Archaic radiocarbon dates, but six sites in close proximity to the Monument have produced 22 dates, most of them coming from North Creek Shelter, an upland residential base camp at the foot of the Aquarius Plateau that was focused predominantly on mule deer hunting (see Table 3.1). Other sites include a small open camp in the Wide Hollow area, one sheltered temporary camp along the Colorado River at the base of the Kaiparowits Plateau and another along the Colorado River east of GSENM, a long-term alcove occupation in the Wahweap area, and a long-term sheltered camp in the lower Escalante River country.

At North Creek Shelter, there is no evidence of reduced reliance on deer in early Holocene times, although bighorn sheep assumed greater importance. These resources were apparently abundant in the immediate vicinity as entire carcasses were brought to the shelter for processing. A broadening of the diet to include smaller animals, as would be expected with the addition of low-return seed processing to the foraging lifeway, was not evident. And the presence of on-site pits, perhaps storage facilities, suggested early Archaic groups "were using the site more intensively and for longer periods of time than Paleo-Archaic groups" (Janetski et al. 2012:154).

The Spillway Site, located a short distance from North Creek Shelter in the Wide Hollow area, is primarily a Fremont residential site, but charcoal from an aceramic, basin-shaped fire pit returned a radiocarbon date of 8220 $\pm$30 BP (7241 BC median probability). The pit actually represents an initial small pit that was modified, expanded, and re-used over many years (Bond et al. 2014).

And at Broken Arrow Cave, a long-term residential base camp located in a large alcove overlooking Lake Powell, excavations yielded five coarse warp-faced, plain-weave sandals constructed of yucca leaves, and a single fragment from an open-twined sandal that were consistent with early Archaic sandals reported from Cowboy Cave, Dust Devil Cave, and Sand Dune Cave (Talbot et al. 1999). Based on four radiocarbon dates, this site was first occupied at the end of the early Holocene from about 6000 to 5600 BC as local environments were becoming fully arid.

An analysis of 3,738 bone fragments revealed heavy reliance on a variety of small mam-

Table 3.1

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ga5863	North Creek Shelter	Upper Escalante River	Pinus	9510 $\pm$80	-22.6	BC 9168-8641	BC 8891	Beta-207168	Level IVa	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	Upper Escalante River	Pinus	9020 $\pm$70	-23.2	BC 8382-7977	BC 8239	Beta-194030	Level Vc	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	Upper Escalante River	Juniperus	8860 $\pm$25	AMS	BC 8195-7878	BC 8084	UCAIMS 44189	Level Vh	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	Upper Escalante River	Collagen	8816 $\pm$78	AMS	BC 8209-7653	BC7928	AA-89636	Stratum Va, F221 in F22	J. Janetski, personal communication 2019
42Ka2661	Rock Creek Alcove	Glen Canyon	Charcoal	8660 $\pm$80	-25	BC 7958-7577	BC 7694	Beta-8623	Composite	Nickens et al. 1988:250
42Ga5863	North Creek Shelter	Upper Escalante River	Juniperus-Pinus	8320 $\pm$120	-21.4	BC 7560-7078	BC 7349	Beta-210253	Level Vt	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	Upper Escalante River	Juniperus	8310 $\pm$40	-20.9 AMS	BC 7482-7207	BC 7392	Beta-239023	Level Vh	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	Upper Escalante River	Pinus	8310 $\pm$70	-22.8	BC 7514-7137	BC 7369	Beta-197359	Level Vq	Janetski et al. 2012:133
42Ga6264	Spillway Site	Wide Hollow	Charcoal	8220 $\pm$30	-24	BC 7328-7107	BC 7241	Beta-379138	NS 7, F14 Fire Pit	Bond et al. 2014:115
42Ga5863	North Creek Shelter	Upper Escalante River	Juniperus	7990 $\pm$30	AMS	BC 7040-6781	BC 6928	UCAIMS 44190	Level Vu	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	Upper Escalante River	Juniperus	7970 $\pm$80	-20.9	BC 7068-6662	BC 6879	Beta-207167	Level Vt	Janetski et al. 2012:133
42Ka2546	Bechan Cave	Lower Escalante River	Charcoal	7795 $\pm$230	-25	BC 7309-6218	BC 6713	GX-10500	Charcoal Lens	Agenbroad et al. 1989:338
42Ga5863	North Creek Shelter	Upper Escalante River	Juniperus	7700 $\pm$50	-21.9 AMS	BC 6629-6460	BC 6535	Beta-239024	Level Vu	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	Upper Escalante River	Various	7670 $\pm$80	-20.2	BC 6651-6401	BC 6522	Beta-221412	Level Vu	Janetski et al. 2012:133

Table 3.1 (continued)

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ga3411	Good Hope Alcove	Glen Canyon	Yucca	7560 ±130	-21.4	BC 6649-6129	BC 6414	Beta-31191	Buried Sandal	Geib 1996a:20
42Ga5863	North Creek Shelter	Upper Escalante River	Dentin	7526 ±70	AMS	BC 6492-6246	BC 6388	AA-89632	Level Vid, F18	J. Janetski, personal communication 2019
42Ka2546	Bechan Cave	Lower Escalante River	Charcoal	7525 ±220	-25	BC 6976-5981	BC 6386	GX-10502	Lower Level	Agenbroad et al. 1989:338
42Ka4356	Broken Arrow Cave	Wahweap Creek	Charcoal	7290 ±70	-31.1	BC 6333-6032	BC 6151	Beta-111637	F62 in F15	Talbot et al. 1999:18
42Ka2546	Bechan Cave	Lower Escalante River	Yucca	6750 ±120	-25	BC 5899-5487	BC 5664	Beta-16025	E-W Trench	Agenbroad et al. 1989:338
42Ka4356	Broken Arrow Cave	Wahweap Creek	Plant Material	6700 ±80	-13	BC 5731-5496	BC 5619	Beta-111638	F16 in F9	Talbot et al. 1999:12
42Ka4356	Broken Arrow Cave	Wahweap Creek	Charcoal	6660 ±80	-11.9	BC 5705-5483	BC 5585	Beta-111636	F53 in F50	Talbot et al. 1999:24-25
42Ka4356	Broken Arrow Cave	Wahweap Creek	Charcoal	6640 ±80	-22.5	BC 5697-5463	BC 5574	Beta-111635	F55 in F50	Talbot et al. 1999:24-25

Table 3.1: Early Holocene radiocarbon dates from sites in close proximity to GSENM. None of these sites are actually within the Monument boundaries. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

mals, reptiles, and birds, including jackrabbit, cottontail rabbit, marmot, gopher, kangaroo rat, wood rat, mouse, and shrew. Large mammals accounted for only 6 percent of the total bone assemblage. The importance of plant resources was evidenced by the abundance of ground stone tools. Collectively, the evidence suggests the site was utilized during early Archaic times primarily as a plant procurement and processing site, and small animals, also with low return rates, were incorporated into the local diet. Because plant seeds at lower elevations ripen early, a spring occupation was considered likely (Talbot et al. 1999).

The remaining early Archaic radiocarbon evidence from the GSENM area is equivocal. At Bechan Cave in the lower Escalante River area, researchers excavated a 2-square-meter test pit that identified two distinct cultural units with abundant artifacts (Agenbroad et al. 1989). The lower unit (early Archaic) consisted of an occupational surface with concentrations of charcoal, matted grass and reeds, and a squash/gourd container that was probably intrusive. Charcoal from this level yielded a radiocarbon date of 7525 ±220 BP (6386 BC median probability), and a thin charcoal lens on the west side of a test trench produced a radiocarbon date of 7795 ±230 (6713 BC median probability). Both dates probably represented short-term camps.

Another early radiocarbon date was obtained from deposits at Rock Creek Alcove just above the Colorado River in what might have been a transportation corridor providing access to the Kaiparowits Plateau. A charcoal sample from the shelter fill yielded a radiocarbon date of 8660 ±80 BP (7694 BC median probability). No cultural materials were directly associated with the charcoal (Nickens et al. 1988). Given the absence of cultural materials from this level, the sample might not be of human origin. At most, it could be argued that an individual or small group camped briefly in the rockshelter during early Archaic times, but left little trace beyond charcoal from a campfire.

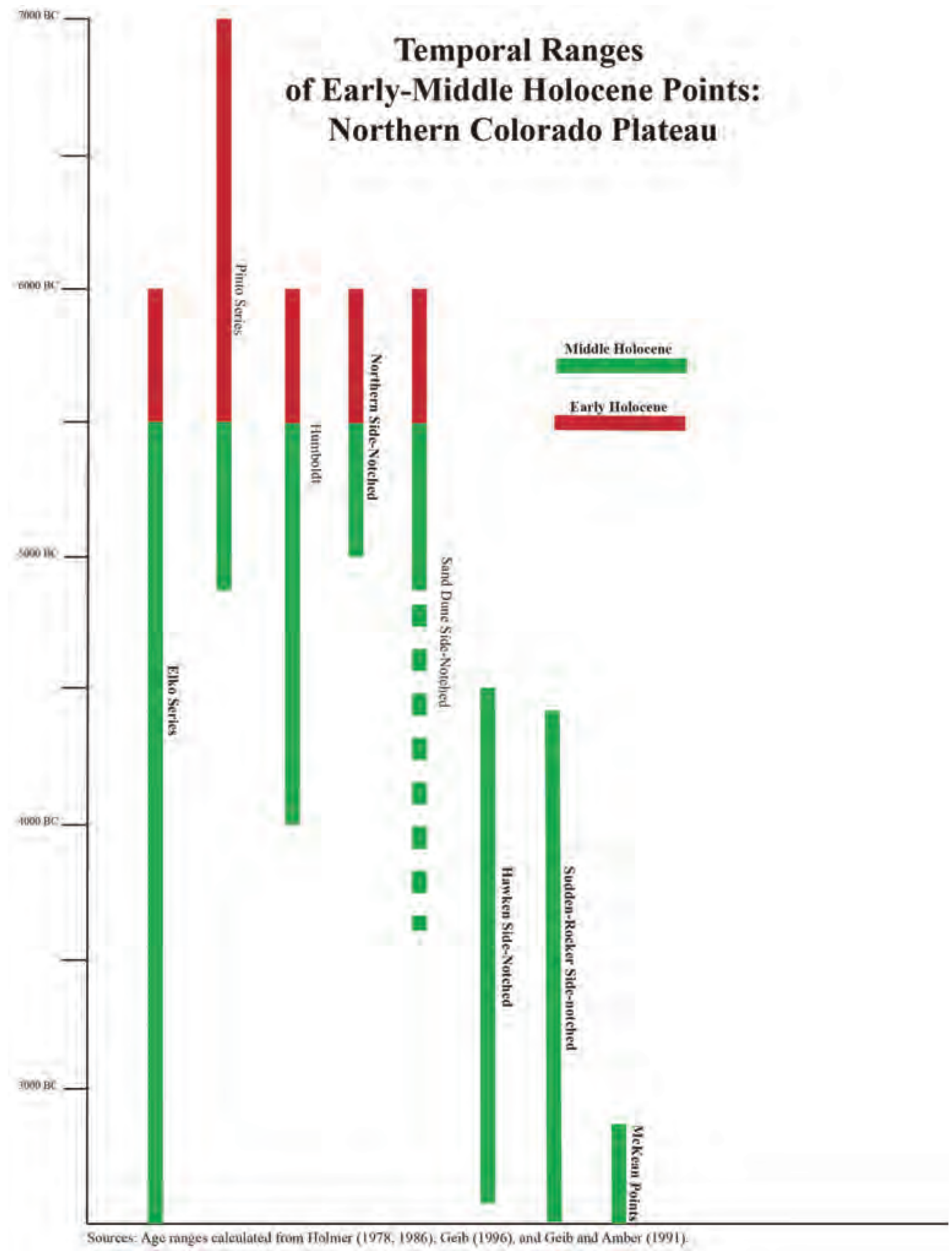
In summary, the chronometric data suggest the earliest Archaic groups on the northern Colorado Plateau were highly mobile, moving between high elevation and low elevation environments. Extended occupations of favored locations were evident at Sand Dune Cave, Cowboy Cave, North Creek Shelter, and Sudden Shelter, and repeated occupations were noted at Dust Devil Cave, Broken Arrow Cave, and sites on the Kaibab Plateau. Higher elevations richer in biotic resources afforded access to higher-ranked resources (e.g., mule deer), whereas lower elevations along the Colorado River were exploited primarily for lower-ranked plant resources (e.g., seeds).

The seasonality of this subsistence pattern is not entirely clear. Ambler (1996) suggested higher-elevation Dust Devil Cave was a temporary camp used during warmer months, whereas lower-elevation Sand Dune Cave was a preferred residential base during colder months. This is consistent with traditional mobility models in the Intermountain West where seasonal movement between higher and lower ecotones was a defining characteristic of Archaic adaptations. But Sudden Shelter, a higher elevation occupation focused on deer hunting, and Cowboy Cave, primarily a plant-processing locale in an arid setting, were both occupied during the summer months. In other words, two completely different strategies with much different return rates were employed simultaneously.

The regional data have also established that certain artifacts are unique to this period of time, and when found in undated contexts can be used as temporal indicators. Plain-weave sandals consistently date to early Archaic times, and Pinto Series atlatl dart points are considered by most to be diagnostic of early Archaic occupations throughout the region (these are the most common indicator of early Archaic hunting in GSENM). And unfired clay figurines reminiscent of Barrier Canyon rock art images were found in early Archaic levels at Cowboy Cave (Hull and White 1980; Schaafsma 1986; Schroedl 1989), although these have yet to be reported from a site anywhere close to GSENM.

Although the data are limited, there is some evidence to suggest at least some interaction between groups living north and south of the Colorado River, and that the river was not an absolute barrier to social interaction and exchange. The sandal technology at Sand Dune Cave and Dust Devil

Figure 3.6



Cave south of the river was indistinguishable from that observed at Cowboy Cave, Jim Walters Cave, and other sites north of the river. And the Kaibab Plateau sites suggest that groups used obsidian from sources in Arizona south of the river and from western Utah north of the river.

Pinto Series Points

A variety of distinctive atlatl dart points are considered diagnostic of early Holocene times, although all continued to be used in middle Holocene times (see Figure 3.6). Most researchers agree Pinto Series points are good temporal indicators of early Archaic times on the northern Colorado Plateau, based primarily on stratified deposits at Sudden Shelter, as well as at Hogup Cave and Danger Cave in the Great Basin. Holmer (1978, 1986) assigned a temporal range of 6300 to 4300 BC to this series, which includes Pinto Shoulderless, Pinto Shouldered, and Pinto Single-shouldered subtypes (Figure 3.7). Holmer's spatial range for Pinto points included portions of eastern Nevada, western Colorado, southeastern Idaho, and virtually all of Utah with the exception of the extreme southwestern part of the state. An even earlier Archaic affinity for Pinto Series points was demonstrated at North Creek Shelter near Escalante where they were recovered in deposits dated as early as 7000 BC (Janetski et al. 2012).

But the archaeological literature offers a wealth of contradictory information about Pinto-looking points with different temporal ranges, some in early Archaic times and others in late Archaic times (see Holmer 1986 for a review of the Pinto Problem). He argued that sites with Pinto points in the eastern Great Basin directly adjacent to Lake Bonneville shorelines (e.g., Danger and Hogup caves) have the same temporal span as sites on the northern Colorado Plateau (e.g., Sudden Shelter, Joes Valley Alcove). At Sudden Shelter, some 30 Pinto points were found in the oldest seven strata. The oldest stratum was not radiocarbon dated, suggesting even greater antiquity for this point type.

Because of the proximity of Sudden Shelter to GSENM, we consider Holmer's temporal range to be most applicable to our discussion, but with the following caveats: (1) Pinto and Gatecliff points look very similar and many, if not most, archaeologists cannot distinguish between them during the course of brief field inspections, and (2) if socioeconomic interaction occurred between groups north and south of the Colorado River, then Pinto points might have been brought into the GSENM region from the south during middle or late Archaic times. Pinto Series points are found throughout GSENM, but mostly in middle-range, pinyon-juniper environments.

Based on a review of relevant site forms, Pinto Series points were identified at 25 sites, about half of them in the Kaiparowits Plateau (n=12). Sites with Pinto Series points occur with almost equal distribution in the Escalante River (n=6) and Grand Staircase (n=7) geographic sub-regions. Intense utilization of upland environments (e.g., summer mule deer range) is poorly represented (n=4), although this might be a function that most mule deer summer range (e.g., the Kaibab Plateau, Markagunt Plateau, Aquarius Plateau, and Paunsaugunt Plateau) is outside the boundaries of GSENM and therefore those sites were not considered in our analysis.

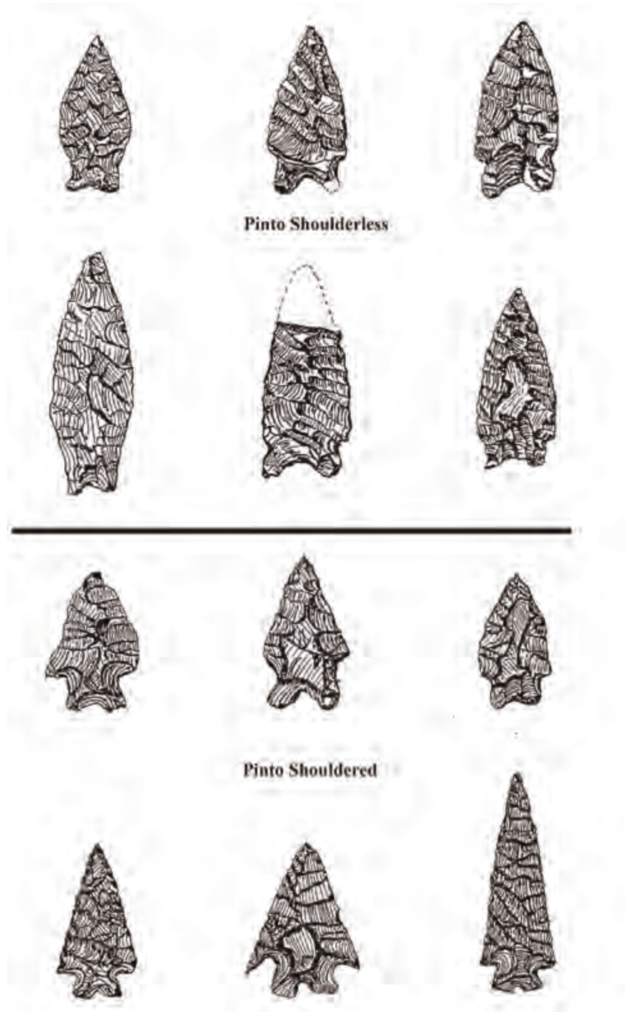


Figure 3.7: Sketch drawing of Pinto Series points considered to be diagnostic of early Holocene times in the eastern Great Basin and northern Colorado Plateau. Image modified from Holmer (1978).

The Elko Problem

Clearly, the most common Archaic projectile points found in GSENM belong to the Elko Series (Elko Corner-notched, Elko Side-notched, and Elk Eared) with 309 sites yielding one or more of this type. These points might have been used as

Figure 3.8: Sketch drawing of Elko Series points, which appeared in early Holocene times and continued to be used throughout the Archaic, Formative, and Late Prehistoric periods. Image modified from Holmer (1978).

early as 7000 BC, but at most sites in the Intermountain West they become commonplace after 6000 BC. Holmer (1978, 1986) articulated the difficulty in assigning temporal ranges to Elko Series points, noting they have a 7,000-year temporal span, they have different temporal ranges in different areas, they are easily confused with other point types, and there is tremendous variability in what can be labeled as Elko points (see Figure 3.8). Adding to the confusion, there is little or no consistency among researchers as to what constitutes a corner-notched versus side-notched point.

Archaeologists working in the GSENM region have long subscribed to the concept that Elko Series points are not diagnostic of specific sub-periods of time, but they are probably indicative of occupations sometime during the Archaic. This orthodox view was upended by Phil Geib, who argued the Elko Corner-notched and Elko Side-notched types appeared in the Glen Canyon region by 6000 BC, and that Elko Eared points were a late addition to the Archaic tool kit, appearing about 500 BC (Geib 1996a:37; see also Geib et al. 1999). GSENM site forms recorded after 1996 almost routinely assign a Late Archaic temporal affiliation to sites with Elko Eared points.

Perhaps most relevant to this discussion are the Pinto Series points recovered from North Creek Shelter near Escalante. The points were characterized by shallow, broad notches and deeply concave bases, often with serrations. Janetski et al. (2012) had difficulty deciding whether they were morphologically Pinto Series points or Elko Eared points, but eventually they settled on the Pinto nomenclature because the radiocarbon dates were consistent with those from Sudden Shelter (Jennings et al. 1980) and Joes Valley Alcove (Barlow and Metcalfe 1993) where they were labeled as Pinto Series. In other words, the earliest Archaic points in the region could just as easily have been labeled Elko Eared. The early appearance of Elko Eared points is supported by data from Hogup Cave and Danger Cave in the eastern Great Basin and at Sudden Shelter on the northern Colorado Plateau, where they co-occur with Elko Corner-notched sometime before 5865 BC (Holmer 1986).

Table 3.2

Elko Series Sites with Other Indicators

Elko Side-Notched		Elko Corner-Notched		Elko Eared	
Early Archaic	10	Early Archaic	12	Early Archaic	7
Middle Archaic	4	Middle Archaic	12	Middle Archaic	5
Late Archaic	20	Late Archaic	23	Late Archaic	8
Formative	18	Formative	38	Formative	14
Late Prehistoric	8	Late Prehistoric	5	Late Prehistoric	2

Elko Series Sites Without Other Indicators

	Elko SN Only	Elko CN Only	Elko Eared Only	Elko SN and CN	Elko SN and Eared	Elko CN and Eared	Elko SN, CN, and Eared
Total Sites	83	136	40	19	8	21	2

Table 3.2: Sites with Elko Series points *and* other temporally sensitive projectile points (top box) and sites with Elko Series points but no other temporally sensitive projectile points.

Because of the large sample size of GSENM sites with Elko Series points, we wanted to examine Geib's assumption that Elko Eared points are late Archaic indicators. If Elko Eared points appeared late in the Archaic sequence, then they should co-occur more often with other late Archaic indicators, such as Gypsum and Cortaro points. And they should occur less frequently with earlier Archaic indicators, such as Pinto Series and Northern Side-notched points. We found there is no convincing patterns that support the idea that Elko Eared points are late Archaic indicators.

Elko Eared points seem to co-occur in almost equal proportion with early, middle, and late Archaic point types. The number of sites with Elko Corner-notched or Elko Side-notched points that were also found with other Archaic point types suggest both corner-notched and side-notched types occur in almost equal proportion at early and middle Archaic sites. But by late Archaic times, the totals had increased by more than 100 percent over earlier times (Table 3.2). In other words, the Elko Side-notched and Elko Corner-notched types are more frequently associated with late Archaic hunting and gathering than were Elko Eared points.

In summary, Elko Series points appeared in the GSENM region by at least 6000 BC (Geib 1996a), and they comprise the most common chipped-stone tool over the next six millennia, even as other point types were introduced and then fell out of favor. In fact, they co-occur with all major Archaic points, although they are rarely associated with large lanceolate points. Pinto Series points, which predate the introduction of Elko Series by as much as a thousand years, were utilized along with Elko Series points until about 4800 BC, or well into middle Holocene times.

Lanceolate Points

Lanceolate projectile points were added to the GSENM tool kit at about the same time early Holocene environments were becoming increasingly arid. It is not known, based on current data, whether these new types represented a shift in subsistence toward different high-return mammals that had become more prevalent in very arid conditions (e.g., fewer deer and more bighorn sheep) for which the new points were better suited, or if they represent shifting preferences influenced by interaction with other groups. One lanceolate point style that appeared toward the end of the early

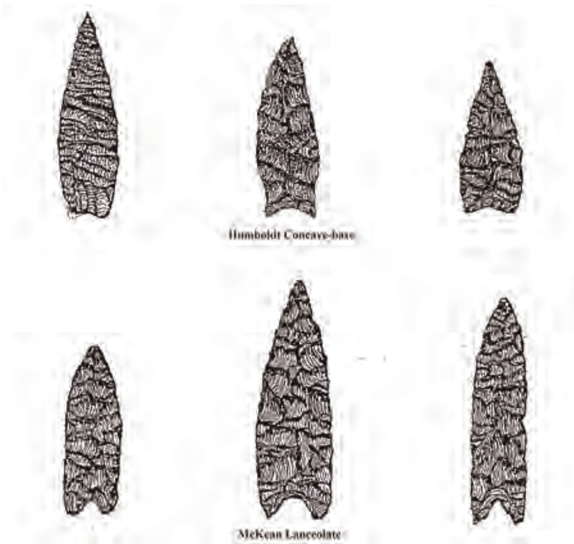


Figure 3.9: Sketch drawing of Humboldt and McKean lanceolate points. Image modified from Holmer (1978).

Holocene was the Humboldt Concave-base (Figure 3.9). Humboldt points are not especially common in GSENM (n=5 sites).

As discussed by Holmer (1978, 1986), concave-base lanceolate points have been invariably identified as Pinto Shoulderless, Humboldt Concave-base, and McKean Lanceolate points, each with subtle differences that are difficult to discern without expertise in identifying certain lithic characteristics. In fact, there is little morphological difference between Pinto Shoulderless and Humboldt Concave-base points. And the fact that Humboldt and McKean points appear quite similar to one another can result in erroneous field identifications (the only visual difference between the two is the basal notch is deeper on McKean points). Also, re-sharpening and reworking points throughout their use life can greatly alter the point from its original form.

Any discussion of the spatial and temporal ranges of Humboldt points found in GSENM are hampered by the rarity of corroborative radiocarbon data from the northern Colorado Plateau and by the morphological similarities between Humboldt and McKean points. No Humboldt points were observed at Cowboy Cave, and only small numbers of Humboldt points were recovered at Sudden Shelter. The only chronometric data relevant to this discussion comes from Sudden Shelter where this type appeared about 4700 BC and disappeared sometime before 3000 BC, making it a middle Holocene indicator. Holmer's broader age range of 6000 to 4000 BC is based mostly on evidence from eastern Great Basin sites where Humboldt points are almost always associated with Pinto Series points.

Whereas Humboldt points were defined in the eastern Great Basin (Holmer 1978), the McKean Series of lanceolate points was originally defined on the basis of excavations on the northwestern Plains. These points are actually rare in the Great Basin, and only somewhat more common on the northern Colorado Plateau (the exception being the Uinta Basin in northeastern Utah). Holmer noted (1978:69) "their occurrence at Sudden Shelter supports the suggestion ... of a possible Plains association for the northern Colorado Plateau." Several different point types comprise the McKean Series, but only the McKean Lanceolate point has been found in the GSENM area.

On the northwestern Plains, this type has been found in contexts dating from about 3000 to 500 BC, whereas Holmer (1978) assigned a temporal range of about 2800 to 1700 BC on the northern Colorado Plateau based entirely on the Sudden Shelter data. As is the case with Humboldt points, McKean Lanceolate points are not common in GSENM (n=5).

Perhaps more relevant to this discussion is why lanceolate points are comparatively rare in GSENM. There are several possibilities, although these are speculative: (1) Lanceolate points were specialty points that were rarely used, but were necessary in certain circumstances when rare resources were encountered and opportunistically procured (e.g., elk or bison). (2) Lanceolate points were all-purpose cutting and perforation tools, but were not a preferred hunting implement. (3) Lanceolate points represent brief hunting forays into the region by groups living in the eastern Great Basin (early) or northwest Plains (late), but the technology behind the points was never embraced by local Archaic groups. And (4) lanceolate points represent exotic items collected and curated by much later groups.

Organizing the Evidence

The existing GSENM site database contains 36 sites that might be attributed to the earliest part of the Holocene based on the presence of certain point types. Pinto Series, Humboldt, and Sand Dune Side-Notched points were utilized in early Holocene times through the middle Holocene, and they are herein referred to as "early" points and sites with these points are referred to as "early sites." These sites are all open artifact scatters of varying complexity.

To better understand the nature and complexity of these sites, as well as the land-use patterns associated with them, the sites were organized by size and suspected site function. The dataset was then organized into two general categories: sites that reflected occupations during multiple periods of prehistory and consequently any inferences about early Archaic lifeways would be tenuous, and those with exclusively early Archaic indicators where the artifact assemblages could more accurately reflect site complexity during early Archaic times.

A review of the dataset revealed that a high number of these sites had temporally diagnostic artifacts suggesting repeated occupations throughout the Archaic and Formative. Although the sample is small, it would appear that a good hunting and/or foraging base camp in early Archaic times remained a good base camp during later Archaic times and even into the Formative. On the other hand, 21 sites had only early Archaic diagnostics. These were predominantly kill-butchering locations (n=15), with most of those (n=11) reflecting small, single-event activities.

A good hunting or foraging base camp in early Archaic times remained a good base camp during later Archaic times and even into the Formative.

It also appears that plant procurement was a relatively unimportant activity. At those sites with only early Archaic indicators, ground stone tools were observed at only six sites (29 percent). Larger base camps used for hunting and/or foraging were also rare (24 percent). The prevalence of smaller hunting sites without ground stone tools (67 percent) suggests that hunting was the primary focus of early Archaic subsistence in GSENM, and hunting strategies were probably structured around one or two individuals, probably males, who might have been associated with base camps elsewhere.

The rarity of ground stone tools, at least compared to middle and late Holocene times, might indicate that high-return large game animals were relatively plentiful during early Archaic times, diminishing the need for intense plant procurement. But as Holocene environments became increasingly arid, plant procurement and processing assumed greater importance later in the Archaic. In effect, the earliest Archaic groups mostly hunted and they gathered what little was necessary, whereas later Archaic groups relied much more heavily on plant resources to supplement hunting.

Early Holocene Summary

Humans were clearly in the GSENM region during early Holocene times, as evidenced by the North Creek Shelter and Broken Arrow Cave data, but their numbers might have been sparse, they might have been widely dispersed, and their distinctive signature on the landscape might be indistinguishable from later occupations. Based on the extremely limited dataset, it appears the earliest hunters and gatherers in the region returned repeatedly to favored localities like Sudden Shelter, Cowboy Cave, and North Creek Shelter, and the nature of these occupations suggests longer-term, multi-seasonal occupations with group sizes somewhat greater than the nuclear family. Some of these base camps were oriented toward procurement of high-return large game animals and others were focused toward procurement of low-return plant seeds and cacti.

Longer-term base camps appear to be quite rare in GSENM, although this is probably a sampling bias in that very few early Archaic sites have been systematically investigated. Evidence from surface sites is more indicative of small hunting forays by one or two individuals. These surface sites are found in all three sub-regions of GSENM, but are clearly more common on the Kaiparowits Plateau. It is assumed that more favorable climatic regimes during the early Holocene would have resulted in robust vegetation communities that contributed to abundant faunal resources, and that humans would have had access to this abundance.

"Not only would high winds adversely affect plant life, but animal populations in turn would have been affected. Indeed, it is a wonder that any humans even lived in the region during the Altithermal" — Richard Ambler

Evidence from North Creek Shelter suggests the early Holocene from about 8000 to 7000 BC was characterized by wetter conditions and vegetation communities that were depressed hundreds of meters below their current range. Initial utilization of the shelter during Paleo-Archaic times was focused on mule deer procurement, although exploitation of abundant smaller animals was also evident. But climates had become significantly more arid by 7000 to 6000 BC, and even though subsistence remained focused on mule deer, the earlier reliance on small animals adapted to wetter environments was replaced by procurement of plant resources, something not clearly evident prior to that time. In effect, this site remained a seasonal base camp for hunting larger, high-return game as it had been for generations, but supplemental foods changed.

At Broken Arrow Cave near Lake Powell, subsistence was focused predominantly on plant procurement and processing, and prehistoric diets were supplemented by smaller animals. But evidence of higher-return larger mammals was minimal, at best. When the Broken Arrow Cave and North Creek Shelter data are considered collectively, it is easy to imagine Archaic hunter-gatherers moving between resource patches, gathering grass seeds in the spring at lower elevations and hunting large mammals in the summer and fall at higher elevations.

This simplistic characterization might be accurate to a point, but evidence from open sites in GSENM suggests a more complex adaptation wherein the earliest Archaic residents were more often hunters than they were gatherers. Based on those sites with possible early Archaic indicators only, ground stone tools are actually quite rare early in the Archaic period, but they become increasingly common as the regional environment became more arid. Collectively, this suggests that increasingly arid conditions resulted in vegetation changes that subsequently impacted the density and distribution of larger fauna in the region. Game resources that might have been commonplace, or at least predictable, in early Holocene times became increasingly rare and unpredictable, forcing Archaic groups to turn to lower-return resources such as seeds and tubers. The increased reliance on plant resources probably occurred over many centuries, beginning in early Holocene times and intensifying during middle Holocene times.

Responding to Drought: The Middle Holocene

The middle Holocene period from about 5500 to 2500 BC was characterized by episodes of much warmer temperatures and punishing droughts that, according to some researchers, created a hostile environment unsuitable for human survival. Some have argued for complete abandonment of the GSENM region (and most of the northern Colorado Plateau) at this time, although this idea is no longer supported by a growing radiocarbon database and a wealth of sites with distinctive artifacts used by Archaic peoples during the middle Holocene.

Hunter-gatherer populations likely employed several adaptive responses to increasingly arid climates. The most extreme response would have been wholesale population movement over long distances to more favorable environments found in adjacent regions. These refuges might have been in the Colorado Rockies (Benedict 1978, 1992) and lakeshore environments of the eastern Great Basin (Berry and Berry 1986). Geib (1996a:33) has argued that, given the recent accumulation of middle Archaic radiocarbon dates from the Glen Canyon region,

> *...total emigration of hunter-gatherers is not credible. Without completely discounting long-distance movement of some of the populace, it is more likely that hunter-gatherers made more localized adjustments in settlement-subsistence strategies in response to increasing aridity. One likely adjustment could have been relocation of base camps to secure water sources.... Settlement patterns may have shifted as sites situated at a distance from reliable (i.e., drought-resistant) water sources became less desirable for residential bases.*

Even in the worst drought conditions, major river systems, as well as lesser tributaries, would have provided human populations with a reliable water supply. Middle Holocene hunter-gatherers, however, would likely have been tethered to these permanent water sources more so than in the past. Another adaptive strategy, one that might have functioned concurrently with the lowland river adaptation, could have involved shifting base camps to higher elevations in the Henry Mountains, Aquarius Plateau, Kaibab Plateau, and other upland locales. These higher elevations would have provided access to greater biodiversity than what was available at the lower elevations during drought conditions (Geib 1996a).

People hunted and people gathered. But there were subtle differences in how they hunted and how they gathered, with increasing dependence over time on small seed gathering as climates deteriorated.

As we discuss later, human adaptations to harsher middle Holocene environments were similar to those of earlier times: People hunted and people gathered. But there are subtle differences in how they hunted and how they gathered, with increasing dependence on the latter as climates deteriorated. This period of time is characterized by the introduction of new a chipped-stone tool technology, specifically large side-notched atlatl dart points, and by an increased frequency of ground stone tools at open camps, which suggests plant foods were increasingly important. Sandal preferences also changed at this time. The location of the major middle Holocene sites discussed in this section is indicated in Figure 3.10.

Most researchers agree the middle Holocene was a period of unprecedented heat and aridity (Baumhoff and Heizer 1965), although there is little consensus today on the extent of these climate changes from region to region, and how humans responded to restructuring of plant and animal communities in response to persistent droughts. Some have suggested abandonment of entire regions, and it is probably not coincidence that large alcoves like Cowboy Cave and Dust Devil Cave, both favored foraging camps during earlier times, were abandoned as drought conditions worsened (Geib 1996a).

The concept that middle Holocene conditions were much hotter and drier has a long history in paleoenvironmental studies. Pioneering geomorphologist Ernest Antevs (1948, 1955) believed major

Figure 3.10: Significant regional Archaic sites occupied during the middle Holocene.

temperature changes were simultaneous over the entire Northern Hemisphere, and he assigned the name Altithermal to this period of unprecedented climate change. As Aikens (1983) observed, the accumulated paleoenvironmental data now make the general sequence of climatic shifts outlined by Antevs "uncontestable."

What is debatable is the severity of this climatic episode, its spatial extent, and the nature of regional climatic variations through time. Reexaminations of middle Holocene paleoenvironmental records suggest the severity of the Altithermal has been greatly overstated. As articulated by Grayson (1993:216), "Dates for the onset of increased aridity vary from place to place; dates for the onset of less arid conditions likewise vary. Detailed studies of this interval do not show unrelenting aridity across 3,000 years, but instead suggest high variability within a more arid period of time."

Paleoenvironmental data have mostly corroborated episodes of warming toward the end of the early Holocene, and these warmer conditions might have resulted in changing biotic communities, including the encroachment of pinyon pine, an immensely important economic resource, sometime after about 6000 BC. The warmer climatic conditions also had dramatic effects on mammal populations early in the middle Holocene, which in turn would have prompted adaptive responses by the hunters who preyed on them. These data also suggest that the climatic changes that ushered in the middle Holocene were considerably greater than those evident at the end of the interval. As a result, changes in the ranges and populations of mammals that occurred at the end of the middle Holocene were far less pronounced than those at the beginning of the middle Holocene (Grayson 1993:220-221).

There is general agreement that desert conditions much like those of today prevailed at about 5500 BC, and that a drying trend evident in the latter part of the early Holocene continued unabated and might have increased in some areas. Paleoenvironmental evidence suggests that effective moisture in the Great Basin and Colorado Plateau reached its lowest level between about 5500 and 2500 BC (Aikens 1983; Thompson et al. 1993), or that it was significantly reduced (Hall 1985, Spaulding 1991).

Evidence from the Southwest supports the idea of regional variability. In the southern Colorado Plateau, Hall (1990) suggested the Gallo alluvium (4700 to 400 BC) formed under arid conditions conducive to flash flooding. Karlstrom (1988), on the other hand, identified the Tsegi alluvium (3800 BC to AD 1450) in Black Mesa area, but suggested it formed under relatively warm, moist conditions, although drought conditions generally prevailed from about 4000 to 1500 BC.

Closer to GSENM, Withers (1989) and Withers and Mead (1993) argued that warmer, dryer conditions began about 8000 BC, culminating in very hot, arid conditions by 5000 BC. She believed the increasing aridity was due to a northward shift in the summer monsoons and polar jet stream. And at Dust Devil Cave, early Archaic deposits were overlaid by a thick layer of wind-blown sands, suggesting extreme aridity (Ambler 1996).

Somewhat warmer conditions prevailed on the Wasatch Plateau (Morris et al. 2015) and the Aquarius Plateau (Morris et al. 2013), based on pollen records indicating changing vegetative regimes from forests dominated by Engelmann spruce to subalpine fir forests by 4000 BC. Temperatures on the high plateaus were warmer in the summer and colder in the winter than at present, and precipitation might have been greater due to enhanced onshore flow of moisture from the eastern Pacific. Morris et al. (2013:119) suggested the possibility that summer precipitation events continued at upper elevations while lower elevations experienced increased aridity at this time.

Within GSENM, pollen research at Lake Pasture on the Kaiparowits Plateau indicates that an open juniper forest had become established by 5200 BC and that it remained intact through middle Holocene times, although it retracted somewhat at about 4600 BC at the same time sagebrush, ragweed, and drought-adapted herbs and flowers increased (D'Andrea 2015:84). And along Kanab

Creek, cooler and wetter conditions prevailed from about 4800 to 3800 BC, as evidenced by aggradation of the creek (Summa 2009), which stands in contrast to heightened flood events elsewhere in the region (Ely 1997).

Taken collectively, these data from locations across the Intermountain West suggest that severe drought conditions prevailed over much of the West during middle Holocene times, but that certain areas experienced periodic episodes of increased moisture. The arid conditions probably affected the distribution of certain mammals, allowed shadscale communities to replace sagebrush ecotones, and permitted the proliferation of pinyon trees. The return to wetter and/or cooler late Holocene conditions was not characterized by a resurgence of mammal populations or a replacement of shadscale vegetation with sagebrush (Grayson 1993:220-221). In other words, the biotic communities that characterized the early part of the late Holocene looked pretty much the same as they had the previous 3,000 years.

Regional Perspectives

Researchers on the northern Colorado Plateau have repeatedly emphasized that drought conditions of middle Holocene times resulted in reduced populations throughout the region, and many sites favored in earlier times were apparently abandoned. In fact, there are very few sites anywhere in the region that have yielded stratified deposits with middle Archaic components. Ambler (1996:49-50) noted that, "Sites of any type are scarce, and the few cave sites thought to have been occupied during that time (e.g., Armijo Shelter) did not have perishable artifacts preserved for that period." There are, however, a growing number of radiocarbon dates from individual features in both open and sheltered settings that suggest low intensity utilization of the region.

The introduction of large side-notched dart points at this time is an important technological milestone, but it is not an evolutionary one.

We emphasize that human responses to increasingly arid environments occurred over a long period of time, probably millennia, and there is little evidence of abrupt environmental changes that prompted immediate reactions or implementation of new tool kits. The placement of the beginning of the middle Holocene at 5500 BC (cf. Grayson 1993) is simply an organizational convenience, and hunting and gathering strategies immediately before and after that point were probably not noticeably different. Most of the major early Holocene sites discussed above continued to be occupied during the earliest centuries of the middle Holocene, and Archaic groups continued to use Pinto Series and Elko Series points, as well as open-twined sandals, as their ancestors had done. The introduction of large side-notched dart points at this time (discussed later) is viewed as an important technological milestone, but not an evolutionary one.

Perhaps the most convincing evidence of changes to seasonal hunting and gathering is the negative data from Dust Devil Cave, Sand Dune Cave, and Cowboy Cave, all of which featured a thick layer of wind-blown sand over the top of earlier Archaic deposits, but with very little evidence of subsequent Archaic occupations. The sandy deposition prompted Ambler (1996:44) to suggest that middle Holocene times were most certainly hot and dry, "but winds may have been at least as important in limiting vegetative growth in the desert West. Even with a precipitation regime similar to that of today, excessive winds would have dried soil rapidly, causing increased desertification…. Not only would high winds adversely affect plant life, but animal populations in turn would have been affected. Indeed, it is a wonder that any humans even lived in the region during the Altithermal."

The “absence” of middle Archaic deposits at Cowboy Cave have probably been overstated, or at the very least it is biased by the organization of data. In fact, this site was used repeatedly during the first thousand years of the middle Holocene (Unit III), although these occupations were less intense compared earlier times. The most common diagnostic projectile point found in these deposits was the Northern Side-notched point, which had a temporal range of 5200 to 4400 BC at Cowboy Cave. The absence of large faunal remains suggested that Northern Side-notched and Elko Series points might actually have been general-purpose knives (Jennings 1980).

Good evidence of middle Holocene occupations was also identified at Sudden Shelter, a large rockshelter at the south end of the Wasatch Plateau where the earliest component was assigned a temporal range of about 6400 to 4300 BC, which includes the first 1,200 years of the middle Holocene. A dramatic increase in point densities corresponded with the replacement of Pinto Series points with Elko Series points at about 5300 BC (Pinto points continued, but with less frequency). At about 4500 BC, Humboldt Concave-base and Northern Side-notched points appeared, followed by Sudden Side-notched, Rocker Side-notched, McKean, and Hawken Side-notched points (Jennings et al. 1980:77). As discussed above, the McKean and Hawken points were defined in northwest Plains contexts, and their appearance here was seen as possible evidence that Plains-influenced groups were venturing into the region during middle Holocene times.

While Cowboy Cave was not occupied after about 4400 BC, Sudden Shelter continued to be utilized, although the intensity of these occupations declined between 4300 and 3300 BC, followed by a rapid increase in the utilization of the shelter over the next 500 years until 2800 BC. This might reflect improving environmental conditions near the end of the middle Holocene. More important, animal bone analyses at Sudden Shelter demonstrated more significant reliance on mule deer and porcupine in early Holocene times. This pattern changed in middle Holocene times when there was greater reliance on plant gathering, bighorn sheep, and small mammals (Jennings et al. 1980).

A shift from mule deer to mountain sheep has interesting implications inasmuch as the habitats and ranges of the two species are quite different. The shift might indicate that drier climatic conditions affected the distribution of mule deer resources, but did not affect mountain sheep better adapted to drier conditions (bighorn sheep absorb much of their daily water needs from plants and are less tethered to permanent water). The shifting preferences toward bighorn sheep and greater reliance on plants occurred at about the same time that Cowboy Cave was abandoned.

The diminished use of Sudden Shelter in middle Holocene times probably reflected a significant decline in population size or in the level of seasonal use of the site. This limited use was more focused on plant resources, as well as higher-return bighorn sheep, than earlier times. In general, the evidence from both Cowboy Cave and Sudden Shelter support the idea of decreased populations and decreased utilization of alcoves and rockshelters that had been preferred before. And both settings offer support for the appearance of large side-notched dart points at this time, as we discuss later in this chapter.

On the Kaibab Plateau, Archaic groups continued to hunt mule deer through middle Holocene times in much the same way they had in earlier times, and they shared the same tool kit as groups exploiting other ecotones farther north on the Colorado Plateau. These sites also suggest that higher-elevation environments might have been less affected by the extreme aridity that characterized lower canyon environments at this time.

GSENM Perspectives

Little is known about middle Holocene adaptations in GSENM specifically, although 19 radiocarbon dates have been reported from 15 sites within or in close proximity to GSENM (Table 3.3). These include three dates associated with sandals found in rockshelter contexts in the Glen Canyon area, and five dates from four sites in the Jackson Flat area south of Kanab. The remaining dates were obtained from features in both open and sheltered settings representing temporary or seasonal use.

When considered as a whole, most of the radiocarbon data were obtained from sites in close proximity to permanent water sources, either the Colorado River or its tributaries. Recent middle Holocene radiocarbon dates were reported from sites along Kanab Creek that lend support to the idea Archaic groups were shifting to open base camps along permanent water sources, and the same sites might have been repeatedly reoccupied during the course of seasonal foraging activities (Roberts 2018).

Figure 3.11: Rabbits were an important part of the Archaic diet. The area south of Kanab and shelters in the Uinkaret Plateau were Likely used repeatedly for communal rabbit drives.

At the Rodent Ridge Site, located along Kanab Creek, researchers identified four middle Holocene residential structures, the earliest evidence yet reported for Archaic house structures anywhere in the upland plateaus north of the Colorado River. The oldest structure (Feature 7/8) was an oval, shallow pit house measuring 3 by 3.8 meters and 10 to 15 centimeters deep. It featured a central fire hearth, a ramp entryway on the north, and postholes around the perimeter. Organic sediments returned a radiocarbon date of 6000 $\pm$40 BP (4890 BC median probability). Feature 6, located above and slightly offset from Feature 7/8, was a surface residential structure, one of two oval residences 5 to 6 meters by 3 to 4 meters in size. Charcoal from this feature returned a radiocarbon date of 5840 $\pm$40 BP (4709 BC median probability). Given the stratigraphy and dates, the occupations might have been sequential (Roberts 2018).

Numerous features at Rodent Ridge were identified, including hearths and roasting pits, one of which returned a date of 5650 $\pm$35 BP (4482 BC median probability). Manos and slab metates were identified, but chipped stone artifacts and mammal remains were rare. Another middle Holocene date of 5140 $\pm$55 BP (3940 BC median probability) was obtained from a nearby site that might have been a burned residential structure or open activity area (Roberts 2018). Neither site yielded corroborative diagnostic artifacts.

Dense middens at Jackrabbit Roast, also in the Jackson Flat area, offered evidence of repeated processing and procurement activities possibly related to communal jackrabbit hunts. One roasting pit (Feature 20) returned a date of 4740 $\pm$30 BP (3565 BC median probability), but the midden itself returned a date of 3350 $\pm$45 BP (1639 BC median probability), or late Archaic times. Taken together, these dates suggest that communal rabbit hunts might have emerged in middle Holocene times and they continued unabated through the late Archaic. The site itself "may represent hundreds, if not thousands of years of repeated short-term use" (Roberts 2018:4.10).

Two middle Holocene radiocarbon dates have also been reported from the Circle Cliffs area

Table 3.3

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka2687	Perfect Ruin	Lower Escalante River	Charcoal	6500 ±80	-25	BC 5604-5322	BC 5459	Beta-19919	Hearth	Eininger 1987:33
42Ka2687	Perfect Ruin	Lower Escalante River	Charcoal	6480 ±70	-25	BC 5572-5324	BC 5435	Beta-19920	Hearth	Eininger 1987:33
42Ga5863	North Creek Shelter	Upper Escalante River	Juniper	6020 ±60	-22.2	BC 5125-4775	BC 4913	Beta-221414	Stratum VId	Janetski et al. 2012:133
42Ka6164	Rodent Ridge	Vermilion Cliffs	Organic Sediment	6000 ±40	-22.17	BC 4988-4798	BC 4890	OS-67102	F7/8 Pithouse	Roberts 2018: V2:1.10
42Ka443	The Hermitage	Glen Canyon	Grass Padding	5890 ±55	-25	BC 4901-4622	BC 4763	AA-10371	Midden	Geib 1996a:21
42Ga3132	Casa del Fuego	Upper Escalante River	Charcoal	5880 ±90	-25	BC 4975-4535	BC 4750	Beta-35559	Pit 5	Brown and Tipps 1987; Tipps 1992; Geib 1996a:18
42Ka6164	Rodent Ridge	Vermilion Cliffs	Charcoal	5840 ±30	-21.5	BC 4779-4618	BC 4709	Beta-390951	F6 Surface Residence	Roberts 2018: V2:1.10
42Ka433	Benchmark Cave	Glen Canyon	Yucca	5810 ±70	-23.5	BC 4825-4505	BC 4662	AA-13003	Stratum 5	Geib 1996a:18; Sharrock 1964
42Ka443	The Hermitage	Glen Canyon	Yucca	5665 ±60	-25	BC 4670-4373	BC 4500	AA-10372	Midden	Geib 1996a:21
42Ka6166	Preservation Knoll	Vermilion Cliffs	Charcoal	5650 +35	n/a	BC 4545-4382	BC 4482	OS-68437	F3 Thermal Feature	In Roberts 2018: Vol. 1: Appendix A:95
42Ka2546	Bechan Cave	Lower Escalante River	Charcoal	5500 ±80	-25	BC 4502-4105	BC 4352	A-3513	Auger Test	Agenbroad et al. 1989:337
42Ka2771		Lower Escalante River	Charcoal	5300 ±235	-23.7	BC 4644-3653	BC 4123	GX-11146	Soil Stain	Geib 1996a:25; Geib and Fairley 1986:143
42Ka6167	Black Stain Midden	Vermilion Cliffs	Charcoal	5140 ±55	n/a	BC 4044-3800	BC 3940	OS-68423	F2 Ash Stain	In Roberts 2018: Vol. 1: Appendix A:103
42Ga3133	Durffeys Kitchen	Upper Escalante River	Charcoal	4980 ±130	-25	BC 4046-3486	BC 3784	Beta-35561	Pit 7	Brown and Tipps 1987:62; Tipps 1992; Geib 1996a:20
42Ka6163	Jackrabbit Roast	Vermilion Cliffs	Charcoal	4740 ±30	-23.8	BC 3629-3387	BC 3565	Beta-390950	F20 Roasting Pit	Roberts 2018: Vol. 2: Chapter:4:7
42Ka2756	Co-op Site	Lower Escalante River	Charcoal	4330 ±80	-25	BC 3301-2718	BC 2980	Beta-16276	Hearth 3	Bungart and Geib 1987:78
42Ka3711	Vandals Hearth	Glen Canyon	Charcoal	4250 ±50	-25	BC 2989-2676	BC 2871	Beta-78337	Hearth	Geib 1996a:24
42Ga3800		Upper Sevier River	Charcoal	4150 ±60	-25	BC 2878-2553	BC 2735	Beta-125908	Hearth in Profile	State IMACS Form
42Ka3711	Vandals Hearth	Glen Canyon	Charcoal	4070 ±50	-25	BC 2851-2489	BC 2621	Beta-78338	Hearth	Geib 1996a:24

Table 3.3: Middle Holocene radiocarbon dates from sites within and in close proximity to GSENM. The dates from Casa del Fuego and Durffeys Kitchen are the earliest dates so far reported from sites within the Monument. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

within GSENM, the earliest dates so far reported within the Monument. At Casa del Fuego, charcoal from an unlined pit feature returned a radiocarbon date of 5880 ±90 BP (4750 BC median probability). Excavations yielded abundant evidence of unlined pits, storage pits, a plant processing area, and well-worn ground stone tools, suggesting significant reliance on plant resources (Tipps 1992).

At nearby Durffeys Kitchen, a backhoe trench revealed a small pit feature and an intact midden. Subsequent investigations identified basin-shaped, straight-sided, and jar-shaped storage and food processing pits. Charcoal from one returned a radiocarbon date of 4980 ±130 BP (3784 BC median probability). The site yielded a wide range of tools reflective of plant processing, tool manufacturing and maintenance, and domestic activities, including storage. No evidence of shelters or architecture was identified (Tipps 1992).

In summary, the regional radiocarbon database, when considered collectively, suggests that Archaic lifeways from about 5500 to 4500 BC were not substantially different from earlier times, even if climates were progressively more arid. Groups continued to use Pinto Series and Humboldt points, they preferred open-twined sandals, and they might have relied more on gathering desert seeds, cacti, and tubers, as evidenced by the large number of ground stone tools at some sites. The increased aridity might have reached a tipping point at about 4500 BC when longer-term base camps at lower elevations and those not in close proximity to permanent water were abandoned.

Hunter-gatherers at this time might have responded by exploiting higher elevations with greater biodiversity, as is evidenced at Sudden Shelter and the Kaibab Plateau sites. At lower elevations, they might have been more tethered to permanent water sources. Most of the radiocarbon dates between about 4500 and 2500 BC were derived from sites in close proximity to permanent water.

Vast regions in between the optimal higher elevations with greater biodiversity and lower elevations with permanent water continued to be exploited at this time, although the radiocarbon database offers minimal insights. As we discussed above, there are several sites in the Circle Cliffs and lower Escalante River regions where temporary foraging camps suggest limited hunting and gathering forays by small groups. It seems likely that all elevations were exploited during the latter part of the middle Holocene, but that some areas were exploited more so than others.

It is also possible that increased aridity resulted in expanded environments suitable to seed gathering, specifically the emergence of dune fields and sand sheets that would, in some circumstances, have fostered the proliferation of ricegrass and small mammals. This is particularly evident in the St. George Basin where at least 18 middle Holocene radiocarbon dates have been reported, almost all of them associated with dunes. And many of these sites featured pit houses and brush structures indicative of longer-term household activities (Gourley and Nash 2013; Landon and Roberts 2018; Roberts and Eskenazi 2006; Roberts et al. 2018; Talbot and Richens 2009). In effect, the sand sheets resulted in more abundant lower-ranked resources and, consequently, more intense human procurement of those resources. Populations might have been high

Increased aridity could have resulted in expanded environments suitable to seed gathering, specifically the emergence of dune fields and sand sheets that would, in some circumstances, have fostered the proliferation of ricegrass and small mammals that fed on them.

enough to allow communal procurement strategies, such as rabbit drives (Heidi Roberts, personal communication 2018).

The increased aridity might also have resulted in changing subsistence patterns during the middle Holocene, although the empirical data remain quite limited. Deer hunting on the high plateaus, as evidenced by the Kaibab Plateau sites, seems to have continued unchanged from earlier times. In other areas, there was increased reliance on bighorn sheep, as evidenced by the Sudden Shelter data. In both instances, this evidence is consistent with hunter-gatherer theory that high-return larger prey will be preferred over lower-return plants and small game if they are available. The predominance of ground stone tools at lower elevation sites, such as Broken Arrow Cave, suggests that larger mammals were not abundant there, requiring greater utilization of lower-return resources. The quality of these plant resources might have been poor, as evidenced by the abundance of prickly pear remains at Dust Devil Cave.

Middle Holocene occupations might have been characterized by abandonment of or a reduction in the utilization of certain sites, but abandonment of the entire region cannot be demonstrated. Apparent abandonment of long-term base camps such as Cowboy Cave and Dust Devil Cave suggest certain areas were avoided, perhaps in response to deteriorating climatic conditions. Archaeological evidence at Danger Cave and Hogup Cave in the eastern Great Basin, and at Sudden Shelter on the northern Colorado Plateau, indicate reduced utilization of these sites.

Changing Tools, Changing Preferences

Diagnostic artifacts found within GSENM that are characteristic of middle Holocene times are limited primarily distinctive projectile points, in particular the appearance of large side-notched dart points. But elsewhere in the region, other artifact types are considered to be temporal indicators of this period of time.

Open-twined sandals gave way to plain-weave sandals at about 5200 BC. Plain-weave sandals were used throughout the middle Archaic, but are found mostly in cave sites along the Colorado River and in the San Rafael Desert; none have been reported from GSENM (see Ambler 1996 for a detailed discussion of changes in sandal preferences through time). Basketry weaving techniques, which had their origins in the Great Basin and spread into the Colorado Plateau, underwent changes at this same time (Adovasio 1970b:11).

Northern Side-notched points (Figure 3.12) appeared late in early Holocene times and persisted into the earliest part of the middle Holocene on the northern Colorado Plateau, and they have a comparatively narrow temporal range of about 600 to 1,000 years (Holmer 1978, 1986). Under some organizational schemes, they are considered to be early Archaic points. They are relatively common on the northern Colorado Plateau. The Northern Side-notched point first appeared in Sudden Shelter deposits dating to about 5600 BC, and they were also present in two subsequent deposits that were not radiocarbon dated (Jennings et al. 1980). Corroborative dates were reported from Cowboy Cave (Jennings 1980). Based on radiocarbon dates from both sites, it can be conservatively estimated that Northern Side-notched points were utilized from about 6000 to 5000 BC (see also Figure 3.6 above).

Northern Side-notched points are found in all three sub-regions of GSENM, although they are much more common on the Kaiparowits Plateau (n=15) than either the Grand Staircase (n=6) or Escalante River (n=2) regions. The 23 sites with Northern Side-notched points have a median elevation of 6170 feet, or considerably higher than Sand Dune Side-notched points (5523 feet) and somewhat lower than Humboldt points (6440 feet). Ground stone tools occurred at only two of the 13 sites with exclusively Northern Side-notched points.

The Hawken Side-notched point was defined in northwestern Plains contexts that have been radiocarbon dated from about 4400 to 4000 BC that were clearly associated with bison hunting (Frison 1991). As described by Agenbroad and Mead (1990a, 1990b), bison were certainly present in the lower Escalante River area during terminal Pleis-

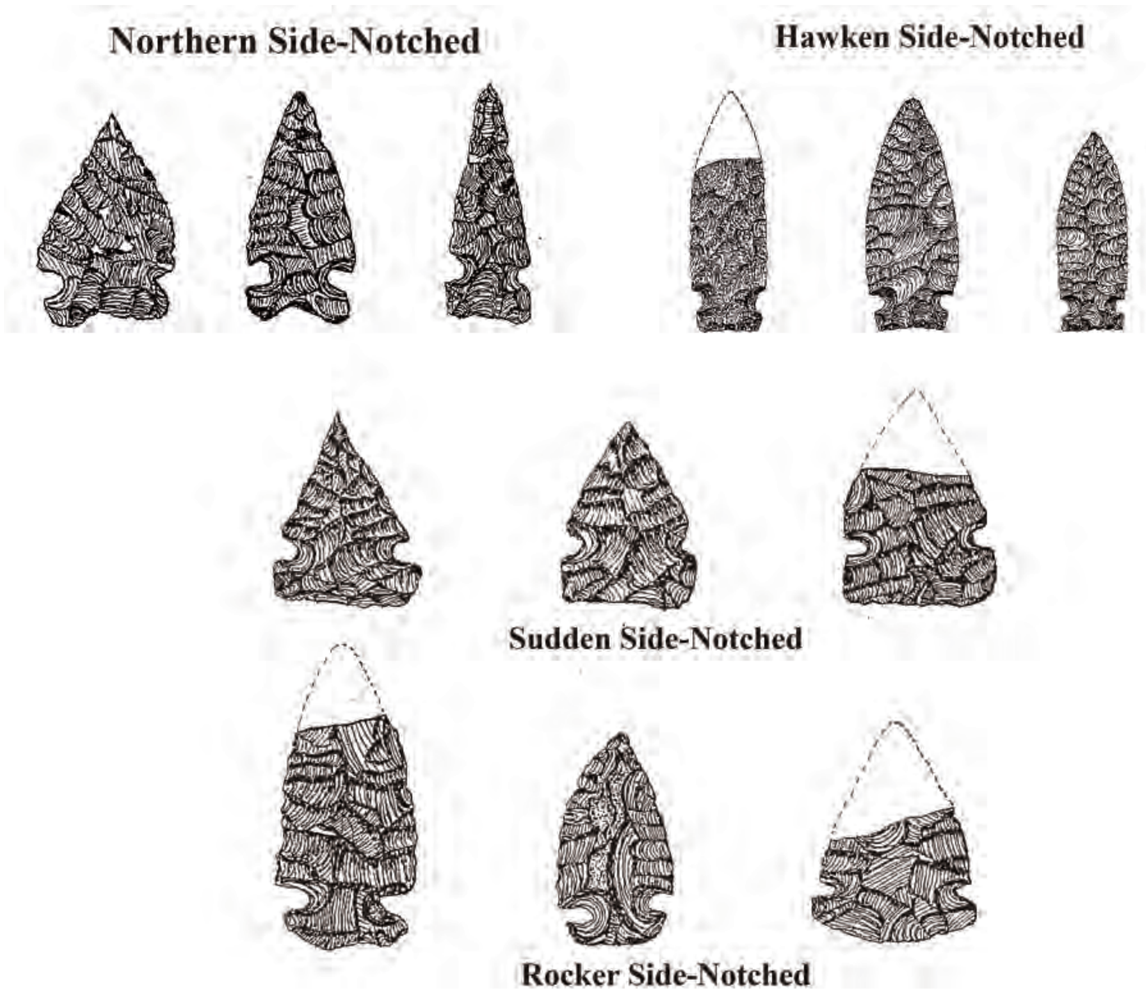


Figure 3.12: Large side-notched points appeared at the end of the early Holocene and continued to be used throughout middle Holocene times. Image modified from Holmer (1978).

tocene times, and it is certainly possible that remnant populations of modern bison survived into Archaic times and even later (a bison population, albeit one reintroduced in modern times, currently thrives in the Henry Mountains). Hawken points (see Figure 3.12) are found in all three GSENM subregions where evidence of bison hunting has not yet been documented. This suggests the Hawken point, while ideal for bison hunting, was also suitable for procurement of other types of large fauna.

The temporal range of Hawken points on the northern Colorado Plateau is based entirely on excavations at Sudden Shelter, although the stratigraphic record there is murky. Holmer (1978:68) assigned a temporal range of 4500 to 2600 BC for Hawken points at Sudden Shelter, which remains the only site with stratified deposits on the northern Colorado Plateau that has so far yielded Hawken points. He argued the point was absent in the Great Basin and extremely rare on the northern Colorado Plateau.

Hawken points appear to represent a relatively minor part of the middle Holocene tool kit in GSENM. Only seven sites have yielded Hawken points, three in the Escalante River basin and four on the Kaiparowits Plateau. At four of these sites, Hawken points co-occur with artifacts from later periods (late Archaic to Formative), three of which have ground stone tools. Ground stone tools are not found at any site with exclusively Hawken points.

Sudden Side-notched points were also defined by excavations at Sudden Shelter (Jennings et al. 1980). Holmer originally divided the Sudden Side-notched series into two types, Rocker Side-notched and Sudden Side-notched (see Figure 3.12 above). His subsequent reanalysis (1986:104) led him to conclude "it no longer seems necessary to maintain the distinction [between Sudden and Rocker] since there is no chronological distinction." This recommendation has been routinely ignored by those working in GSENM and contiguous areas. Unlike Northern Side-notched points that decrease in frequency from north to south, Sudden Side-notched points occur only in the southern half of the Great Basin and on the northern Colorado Plateau (Holmer 1986).

Sudden and Rocker Side-notched points are found in all three GSENM sub-regions, and collectively they constitute the most frequently documented point attributed to middle Holocene times (n=42 sites). Rocker Side-notched points, however, are few in number (n=6), although this might be a function of some researchers adhering to Holmer's advice to combine the two series into one, while others did not. These point types co-occur with earlier and later artifacts at 16 of the 42 sites, and these might reflect favored camps occupied repeatedly through time. Unlike earlier side-notched point types already discussed, these favored camps were less frequently associated with evidence of plant processing (44 percent). But overall, ground stone is more common at sites with Sudden or Rocker Side-notched points. Of the 29 sites with only Sudden or Rocker points, 13 had evidence of ground stone tools (45 percent). By comparison, ground stone tools were observed at only 15 percent of sites with the earlier Northern Side-notched type.

Land use patterns during middle Holocene times were largely indistinguishable from those of earlier Holocene times.

Another point type that warrants a brief mention is the Sand Dune Side-notched point, which is commonly found in the Glen Canyon and Canyonlands areas. These have been described as having shallow side notches, a general lack of symmetry, and unpatterned flaking, and generally they feature poor workmanship (Geib and Ambler 1991). These might have appeared as early as 6000 BC and were utilized alongside Pinto Series points (Geib 1996a), but this early date remains tenuous. In fact, very few radiocarbon dates have been reported from deposits with Sand Dune Side-notched points. This point type is quite rare in GSENM (n=4 sites;).

Organizing the Evidence

The existing GSENM site database contains 72 sites that might be attributed to middle Holocene occupations in the region based on the presence of large side-notched projectile points. This is more than double the number of sites attributed to early Holocene times. All of these are open artifact scatters of varying complexity, and there are subtle differences in the nature of these sites compared to earlier times. For example, there is a much greater frequency of short-term foraging camps, and perhaps a greater utilization of base camps used repeatedly throughout prehistory.

In general, the nature of sites with large side-notched points suggests that hunting and gathering groups were incorporating plant procurement and processing into their annual round to a much greater degree, and they were staying longer at single locations, perhaps to accommodate the greater energy expenditure required to gather plants over a period of several days. By inference, these would have been bi-gender groups engaged in multiple activities. And given the annual cycle of when seed plants mature, these camps might represent occupations in the spring at lower elevations and early summer at higher elevations.

Figure 3.13: Permanent water in the form of seeps, springs, and small streams like this one near the foot of the Vermilion Cliffs were critical to humans and animals alike, especially during periods of increased aridity.

To better determine if these sites were indicative of increased plant procurement, rather than the result of multiple occupations where the ground stone tools could have been left by earlier or later groups, we organized the site data to exclude all sites with multiple temporal indicators other than large side-notched points discussed above. These sites (n=50 sites) seem to support the idea of increased reliance on plant resources in middle Holocene times. At least 19 sites with large side-notched points also had ground stone tools, compared to only three sites with early Archaic indicators that had ground stone tools.

We also examined what appears to be preferred locations occupied repeatedly through prehistory (n=22). Of note, four of 16 sites occupied during early Holocene times continued to be used in middle Holocene times. By comparison, 18 sites first occupied during middle Holocene times continued to be used during late Archaic and Formative times, and in three instances into Late Prehistoric times. Although the sample size is small, this pattern suggests that a preferred location for hunting and gathering in middle Holocene times remained a good location for hunting and gathering in later times, as well, and that basic patterns of resource exploitation remained largely unchanged.

The relationship between improved climatic conditions and expanding human populations in later Archaic times is probably not coincidental.

We also wanted to determine if any spatial patterns are evident between early and middle Holocene sites. If earlier Holocene conditions were optimal for large mammals and the humans who preyed on them, sites would be more dispersed. In effect, good hunting areas would be found throughout GSENM. In contrast, more arid conditions might prompt a redistribution of high-return resources in response to the droughts, tethering them to a greater degree to permanent water sources. Middle Holocene sites therefore might be concentrated more near permanent water sources. We did not find this to be the case. Instead, the same spatial distribution is evident during both wetter and drier climatic regimes, the only significant difference being there are a lot more sites with large side-notched points characteristic of drier middle Holocene times than there are sites with Pinto or Humboldt points.

In summary, hunting and gathering continued unabated in GSENM during middle Holocene times when climatic conditions were at their worst. These conditions might have prompted shifts in adaptive strategies in some areas of the northern Colorado Plateau, but this is not obvious in GSENM where the chronometric data, combined with the large number of sites yielding large side-notched projectile points, suggest an increased utilization of mid-elevation landscapes. Based on the clustering of sites with specific temporal indicators, land-use patterns during early Holocene times were largely indistinguishable from those of middle Holocene times. This suggests the possibility that GSENM environments were not severely impacted by the regional aridity, or that large game hunting strategies were focused on the predictable migratory patterns of deer, which remained the same during wetter and drier climate regimes.

The increasingly arid conditions might have affected the overall density of high-return game resources, as evidenced by the increasing frequency of ground stone tools at sites with large side-notched points. This suggests that plant processing assumed a much greater importance, probably because higher-return resources were not as abundant or the hunting of those resources became unpredictable and incurred higher procurement costs. There is no evidence of repeated or lengthy hiatuses, and even Schroedl's argument that "population density may have been very low" (1992:9) seems tenuous in light of the current evidence.

We emphasize our tentative conclusions are based in large part on surface evidence, which might not be an accurate reflection of how, when, and why certain sites were utilized. Any discussion of how hunter-gatherers adapted to arid environments, or even whether the environment was substantially different in this area during middle Holocene times, requires an untenable amount of speculation.

Better Climates, More People: Transitioning to the Late Holocene

The late Holocene is generally characterized as a period when climates approached modern conditions, becoming somewhat cooler and moister than the preceding middle Holocene, but not as cool and moist as the early Holocene. The increasing effective moisture corresponded with apparent human population increases associated with the florescence of Silver Lake, Pinto Basin, and Little Lake complexes in the Great Basin; the San Jose, Picosa, and Chiricahua complexes of the Southwest; and the McKean Complex of the Great Plains. All of these reflected a hunting and gathering economy adapted to fully desert conditions, although agriculture might have appeared as early as 2000 BC on the southern Colorado Plateau and by 1000 BC on the northern Colorado Plateau (discussed in Chapter 4).

Some were practicing agriculture as early as 1000 BC, but most groups were engaged in the time-proven quest to procure necessary food resources through hunting and gathering.

For our purposes, hunter-gatherer adaptations before 1000 BC are discussed within the context of Archaic lifeways, but with the acknowledgment that Archaic foraging did not disappear with the advent of agriculture. In fact, hunting and gathering might have been the dominant lifeway until about 200 BC-AD 200 when a Basketmaker II-like farming strategy was flourishing in the Grand Staircase region and a Fremont farmer-forager strategy had emerged in the Escalante River Basin. Simply put, some groups engaged in agriculture as early as 1000 BC, but most groups were engaged in the time-proven quest to procure necessary food resources through hunting and gathering. It might have taken many centuries before agriculture replaced hunting and gathering as the predominant subsistence strategy in the region.

The relationship between improved climatic conditions and expanding human populations in late Archaic times is probably not coincidental. However, explanations that human populations increased in direct proportion to increases in effective moisture fail to adequately accommodate paleoenvironmental data that indicate the transitional period into the late Holocene was, in fact, characterized by significant climatic fluctuations. Periods of increased effective moisture were often punctuated by alternating periods of drought and cold. The effect of short-term fluctuations on human population dynamics was likely significant.

Collectively, the climatic changes that ushered in the middle Holocene at 5500 BC were much more pronounced than those evident at the end of the interval at 2500 BC. Grayson (1993:222) summarized the late Holocene as a period of time when the Great Basin region came to look as it does today, although there were considerable spatial and temporal climatic variability from region to region. Some areas would have been better than others for foraging, and human groups would have shifted their procurement strategies in response to greater or lesser resource availability, although the types of resources being exploited remained the same.

Most of what is known about late Archaic adaptations in the GSENM region comes from investigations in the Glen Canyon and lower Es-

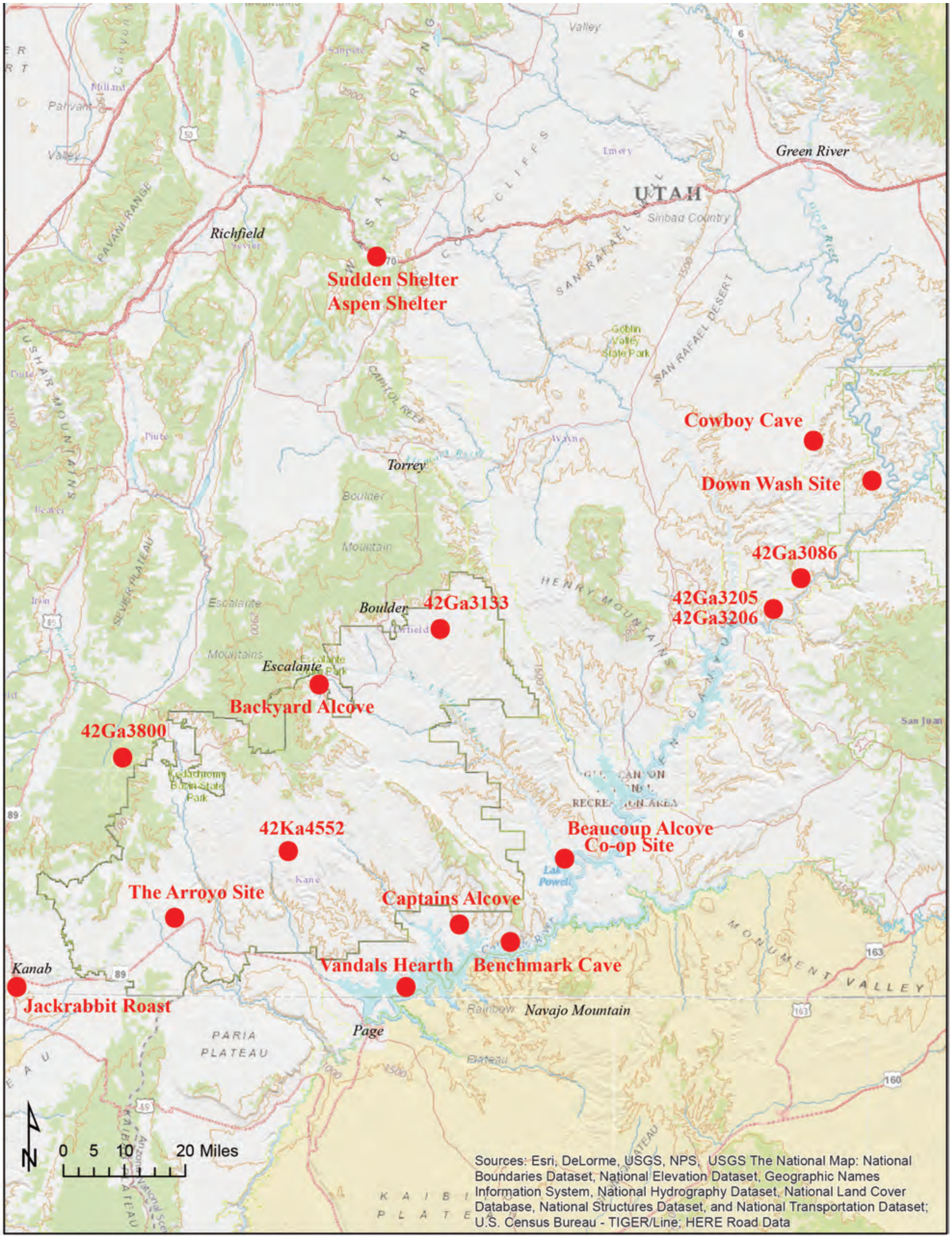


Figure 3.14: Significant regional Archaic sites occupied during the early part of the late Holocene.

calante River areas, and from excavations at the Arroyo Site and Jackrabbit Roast in the Grand Staircase area. The location of major sites discussed in this section is indicated in Figure 3.14. As we discuss below, the late Archaic is characterized by several trends that foreshadow the transition to agricultural lifeways:

- The abundance of regional radiocarbon dates attributed to this period of time, as well as the abundance of sites with distinctive dart points, has been interpreted by some as evidence of population increases that might have accelerated competition for limited wild plant and animal resources. If populations exceeded the carrying capacity of local environments, some groups might have sought alternatives to food procurement through higher or lesser mobility.

- Increased sedentism (perhaps year-round sedentism) is evident at the Arroyo Site where an Archaic pit house demonstrated that some late Archaic groups remained at preferred locations for much longer periods of time.

- Projectile point styles share close affinities to point types defined in Great Plains contexts (Mallory, McKean points) and to types defined in southern Great Basin contexts (Gypsum Series points). Some have argued that population increases at this time might be attributed, at least in part, to the migration of new groups into the region, first from the Plains and later from the Great Basin.

- Population pressures at this time appear to coincide with the florescence of at least two different rock art traditions, as well as the appearance of split-twig figurines. Barrier Canyon imagery is generally viewed as antecedent to Fremont styles and Glen Canyon Linear as antecedent to Ancestral Puebloan styles. The two different styles could be expressions of different cultural identities used to delineate groups already in competition with one another, a pattern that becomes more pronounced during the Archaic-to-Formative transition after 1000 BC.

Environmental conditions during the late Holocene reflect highly variable climatic patterns similar to today: Periods of increased effective moisture were punctuated by droughts, periods of strong monsoonal flows were followed by weak ones, shifts between summer-dominate rainfall and winter-dominant snowfall were common, and periods of intense erosion were followed by soil stability. Some regions experienced optimal conditions at the same time other regions were marginal, at best. This variability might have prompted some hunter-gatherer groups to seek out better foraging opportunities elsewhere.

Pollen analyses of high-elevation lake sediments on the Wasatch and Aquarius plateaus to the north of GSENM suggest that spruce forests decreased at about 2400 BC when there was an increase in Douglas fir and aspen. Forests moved upslope, suggesting warmer temperatures. By 1000 BC, warmer and wetter winters prevailed with a greater abundance of snow relative to rain (Morris et al. 2013; see also Morris et al. 2015).

Paleoenvironmental studies specific to GSENM are few in number. Sediment core research on the Kaiparowits Plateau at about 7200 feet elevation demonstrated the juniper woodland that had dominated the area since about 5500 BC came to be co-dominated by pinyons by about 1500 BC. The increased density of the pinyon-juniper forests at the expensive of understory shrubs supports the idea the late Holocene was a time of increased effective moisture (D'Andrea 2015:85). Similar observations were made on the Kaibab Plateau (Weng and Jackson 1999), Markagunt Plateau (Anderson et al. 1999; Morris et al. 2013), and Aquarius Plateau (Morris et al. 2013).

In Meadow Canyon, a small tributary to Johnson Canyon in the Grand Staircase, D'Andrea's sediment core research (2015:90) suggests the period from about 2100 to 500 BC was characterized by increasing water tables and by periodic erosion from the side-slopes that resulted in sand sheets on the valley floor. The climates were highly variable, as evidenced by alternative layers of sand, peat, and clay that "suggests the persistence of intervals of cooler and wetter climate."

In the GSENM region, perhaps the most significant change that would have influenced hunter-gatherer adaptations was the expansion of pinyon forests into their current mid-elevation ranges (ca. 5000 to 7000 feet). As summarized by Bungart (1996:134), cooler climatic conditions after 1500 BC might have led to greater pinyon productivity at lower elevations, where it was “more predictable than at higher elevations where spring frost was more likely to endanger the development of seed cones.”

It is not known exactly when pinyon resources expanded into the region, and whether this expansion occurred simultaneously throughout the northern Colorado Plateau or only in selected ecotones. It would not be unreasonable to suggest that a dramatic increase in radiocarbon dates attributed to the late Archaic period reflects increased human exploitation of the region, and this increased intensity might have been in response to improved climatic conditions that resulted in resource abundance.

How aridity in one region might have led to population shifts to other regions with more favorable climates is poorly understood. For example, the extreme aridity of the middle Holocene on the northwestern Plains seems to have continued unabated to about 1600 BC. And the period from about 2500 to 1000 BC coincides with the appearance of Plains-like points (McKean, San Rafael Side-notched) on the northern Colorado Plateau. Does this represent an actual movement of Plains groups into the Colorado Plateau or simply a shared technology that resulted from socioeconomic interaction between the two areas? The same question can be asked relative to the appearance of Cortaro points at the same time, which were defined in southern Arizona contexts, and Gypsum points, which were defined in southern Great Basin contexts.

The presence of walnut pollen during all Down Wash occupations was unexpected. Walnuts are not native to Utah, and the nearest walnut trees are found in southern Arizona hundreds of miles to the south.

Regional Perspectives

Excavations at cave and alcove sites throughout the Intermountain West have repeatedly demonstrated that hunter-gatherer lifeways changed little throughout the latter part of the Archaic, even as populations appear to have expanded into new environmental niches and reoccupied long-abandoned ones. In the eastern Great Basin, Layer IV at Danger Cave (3150 to 900 BC) was characterized by a variety of artifacts indistinguishable from those in earlier deposits (Jennings 1978). Likewise, Hogup Cave yielded consistently similar artifacts over thousands of years, suggesting a broadly adapted lifeway based on seed-gathering and diversified small- and large-game hunting, which Aikens (1970:190) argued, “attests to the lack of any major shift in type of economic adaptation.” Investigations on the northern Colorado Plateau have noted similar uniformity in artifact assemblages through time, but with subtle changes in procurement strategies that probably reflected greater or lesser available of certain preferred resources.

Two lines of evidence suggest increased populations at this time: A comparative abundance of late Archaic radiocarbon dates reported from the northern Colorado Plateau in both upland and lowland settings, and an abundance of sites with distinctive projectile points that are confidently dated to late Archaic times. Much of the relevant data come from investigations in the San Rafael Desert, Capitol Reef, Wasatch Plateau, and Arizona Strip regions surrounding GSENM. The sample of 55 regional late Archaic radiocarbon dates is probably biased by the abundance of dates on split-twig figurines, mostly from the Grand Canyon area.

As discussed above, extreme aridity might have prompted the abandonment of Cowboy Cave (and neighboring Jim Walters Cave) during middle Holocene times. Ameliorating climates at about 2000 BC, however, prompted not only a reoccupation of Cowboy Cave, but also occupation of several other sites in the same general area. A suite of at least 11 late Archaic radiocarbon dates have now been reported from five different sites in the San Rafael Desert and neighboring Orange Cliffs areas.

At Cowboy Cave, Unit IV, which dated from about 1650 to 1100 BC, featured abundant evidence of seed-gathering activities, as was the case in earlier times, but this was supplemented by procurement of elk, deer, and mountain sheep, which were largely absent from earlier deposits. This could reflect the improving environmental conditions that expanded the range of larger fauna and made them accessible to Cowboy Cave seed gatherers, or it could indicate more efficient hunting technologies, shifts in adaptive strategies to reflect longer-range forays, and occupations of the shelter at different times of the year more conducive to seasonal game migrations (Jennings 1980). The late Archaic deposits were associated with Gypsum dart points and split-twig figurines.

At the nearby Down Wash Site, excavations revealed a fairly continuous (but not intensive) occupation of the shallow alcove from about 3000 to 1100 BC. Pollen evidence indicated a relatively stable local environment, and human groups relied heavily on wild plants typically found in floodplain environments in juniper woodlands. The presence of walnut pollen during all periods of occupation was unexpected. Walnuts are not native to Utah, and the nearest walnut trees are found in southern Arizona. Researchers speculated that "one of the reasons for the long use of the site might have been the close proximity of walnut trees" (Alpine Archaeological Consultants 1990).

Two sites in the southern Wasatch Plateau area, Sudden Shelter and Aspen Shelter, have contributed important evidence of higher-elevation hunting and gathering at the same time. Both were oriented toward procurement of large mammals, both were summer or fall occupations of short duration, and both featured an abundance of diagnostic artifacts that were consistent with at least 15 radiocarbon dates.

At Sudden Shelter, the late Archaic was assigned a temporal range of about 2600 to 1300 BC. The earlier late Archaic deposits featured McKean Lanceolate points and San Rafael Side-notched points, the latter of which were stylistically the same as Mallory points on the Plains. The more recent deposits featured an abundance of Gypsum points (Jennings et al. 1980). The late Archaic deposits were characterized by a slight increase in hunting activities, although the relative distribution of artifact categories suggested a balance between plant and animal procurement. Emphasis on mule deer hunting that was characteristic of earlier occupations was not evident. Instead, there was greater exploitation of bighorn sheep (Jennings et al. 1980). As summarized by Schroedl (1979:350), the Sudden Shelter data demonstrate "the Archaic mode of adaptation was totally flexible and dynamic, continually adjusting and responding to various cultural, demographic, and environmental fluctuations. Adjustments to these factors are evident in the shifting use of plant and animal resources and by the changing of artifact types over time."

Aspen Shelter, located near Sudden Shelter but at a higher elevation, was utilized from about 2000 BC through Formative times. What made this site unusual was the presence of at least two house floors with associated pits, central fire hearths with deflector stones, and a massive midden. Both were probably lightly constructed brush structures (Janetski et al. 1991; Janetski and Wilde 2012). Subsistence patterns at Aspen Shelter were somewhat different from those at Sudden Shelter in that there was a much greater reliance on mule deer (85 percent of the faunal remains), with only limited evidence of elk and bighorn sheep. Plant procurement occurred here, but foraging was of secondary importance to deer hunting. The abundance of Gypsum points in late Archaic deposits supported the radiocarbon data from Sudden Shelter that this point type had appeared by 2000 BC, and at Aspen Shelter Gypsum points might have been used well into Formative times (Janetski and Wilde 2012).

To the south and west of GSENM, there is growing evidence that late Archaic hunters and gatherers continued to practice the same highland-lowland strategies of earlier times. High-elevation faunal resources (deer) on the Kaibab Plateau continued to attract hunters (Schroedl 1988). And foragers also ventured into the Grand Canyon where they cached split-twig figurines in the caves and alcoves (Coulam and Schroedl 2004; Horn 2001).

"The Arroyo Site could have provided Archaic inhabitants a relatively sedentary base for year-round foraging, or a temporary camp used to exploit seasonally available resources" — Doug McFadden

Two sites on the northern end of the Uinkaret Plateau just west of GSENM have also produced intriguing late Archaic data. The lowest levels at Rock Canyon Shelter, located at the confluence of Short Creek and Clayhole Wash, produced radiocarbon dates of 4130 ±70 BP (2713 BC median probability) and 3310 ±60 BP (1590 BC median probability). Two Gypsum points and a San Rafael Side-notched point support a late Archaic presence here, and a single Rocker Side-notched point suggested an even earlier occupation during middle Archaic times. Rock Canyon Shelter faunal remains indicated large game animals were exploited, but that smaller mammals (jackrabbits, cottontail rabbits, and rodents) and plant resources (prickly pear and grass seeds) might have comprised a much more important part of the diet (Janetski 2017; Janetski et al. 2013).

The lowest levels at nearby Antelope Cave produced three late Archaic radiocarbon dates between 3590 ±50 BP (1947 BC median probability) and 3290 ±60 BP (1569 BC median probability). These dates are consistent with two Gypsum points, whereas a single Hawken Side-notched point suggested an earlier occupation during middle Archaic times (Janetski et al. 2013).

Pollen and macrofloral analyses indicated a significance reliance on a wide variety of plant species during late Archaic times. But the primary focus at this site appears to have been large-scale rabbit hunting. The exceptional abundance of rabbit remains was consistent with the idea of communal rabbit drives by a family group repeatedly returning to the same location where they had cached their nets for future rabbit drives. This idea is supported by the recovery of numerous net fragments (Fisher et al 2013; Janetski et al. 2013)

Especially intriguing was the presence of upland plant remains such as pinyon nut hulls, hackberry seeds, and juniper parts, even though these plants are not found anywhere close to the shelter today (Janetski et al. 2013:157). Researchers suggested that Rock Canyon Shelter and Antelope Cave were part of a highly mobile strategy that involved movement of residential bases between upland and lowland environments.

GSENM Perspectives

At least 12 radiocarbon dates have been reported from the Escalante River, Kaiparowits Plateau, and Grand Staircase regions, although only three dates from two sites are actually within the Monument itself (see Table 3.4). These dates were derived from sites in a wide range of environments, including the Colorado River corridor, the Aquarius Plateau foothills, the lower Escalante River country, and the Pink Cliffs area near the headwaters of the Sevier River.

Most relevant sites in the lower Escalante River Basin were short-term hunting and gathering camps that were probably part of seasonal exploitation of lower elevations near or along the Colorado River. In the Bowns Canyon area, investigations at the Co-op Site resulted in two late Archaic radiocarbon dates, one of 3000 ±145 BP (1218 BC median probability) and one of 4330 ±80 BP (2980 BC me-

Table 3.4

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka4552		Kaiparowits Plateau	Twigs	3930 ±30	-22.2	BC 2541-2316	BC 2418	Beta-144229	Lower Fill Feature 1 Midden	Geib et al. 2001:100
42Ka2753	Beaucoup Alcove	Lower Escalante River	Human Feces	3900 ±60	-20.7	BC 2549-2206	BC 2379	Beta-38342	Site Surface	Geib and Fairley 1986:121; Geib 1996a:17
42Ka265	Captains Alcove	Glen Canyon	Charcoal	3760 ±75	-25	BC 2433-1970	BC 2182	Beta-1232	Hearth 1, Occupation A	Tipps 1983:157
42Ka3976	The Arroyo Site	Kitchen Corral Canyon	Charcoal	3420 ±90	-25	BC 1950-1520	BC 1730	Beta-77118	F21 Pit House Hearth	McFadden 2012:77
42Ka3976	The Arroyo Site	Kitchen Corral Canyon	Charcoal	3370 ±80	-25	BC 1877-1487	BC 1666	Beta-77109	F34 Pit House Surface	McFadden 2012:77
42Ka433	Benchmark Cave	Glen Canyon	Yucca	3355 ±50	-25	BC 1764-1525	BC 1644	AA-10376	F17, Stratum 12	Geib 1996a:18; Sharrock 1964
42Ka6163	Jackrabbit Roast	Vermilion Cliffs	Charcoal	3350 ±45	-20.4	BC 1739-1527	BC 1639	OS-68414	F3 Midden	Roberts 2018: Vol. 2: Chapter 4:7
42Ka433	Benchmark Cave	Glen Canyon	Yucca	3210 ±55	-23.3	BC 1609-1352	BC 1483	AA-13004	F33, Stratum 10	Geib 1996a:18; Sharrock 1964
42Ga5171	Backyard Alcove	Upper Escalante River	Charcoal	3180 ±40	-23	BC 1530-1331	BC 1456	Beta-189342	FS94	R. Talbot, personal communication 2018
42Ka265	Captains Alcove	Glen Canyon	Wood	3145 ±105	-25	BC 1642-1119	BC 1405	Uga-3254	Test Pit 8, Occ. A	Tipps 1983:157
42Ka2756	Co-op Site	Lower Escalante River	Charcoal	3000 ±145	-22.6	BC 1564-882	BC 1218	GX-11339	Hearth 2, Locus B	Bungart and Geib 1987:73
42Ka6165	Eagles Watch	Vermilion Cliffs	Zea Mays	2980 ±30	-10.4 AMS	BC 1291-1116	BC 1203	Beta-360453	F30.4 Bell-Shaped Pit	Roberts 2018: Vol. 2: Chapter 6:9

Table 3.4: Late Archaic radiocarbon dates from sites within and immediately adjacent to GSENM. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

dian probability). Excavations identified at least five different occupations, each separated by culturally sterile alluvium. The Archaic occupations were associated with ground stone and chipped-stone tools indicative of a mixed hunting and gathering subsistence (Bungart and Geib 1987:91).

At nearby Beaucoup Alcove, researchers investigated several "jar-shaped hardpan cists" they assumed had been constructed by Basketmaker II peoples (Geib and Fairley 1986:166). One of five human feces recovered from the surface of the shelter returned a radiocarbon date of 3900 ±60 BP (2379 BC median probability), or well before the first Basketmakers arrived in the area. At a minimum, this early date indicates the shelter was being used as a temporary camp during late Archaic times. But there is also the potential that late Archaic groups were also constructing storage cists to ameliorate resource shortfalls and that robust storage strategies evident in Basketmaker and Formative times had their origins in earlier Archaic practices.

Collectively, these radiocarbon dates from Bowns Canyon suggest a greater utilization of environments near the Colorado River by small groups engaged in foraging activities. By comparison, only one late Archaic date has been reported from upland settings in the Escalante River Basin, at a site near Escalante. The alcove was believed to have been repeatedly occupied in Archaic and Formative times (Richard Talbot, personal communication 2018).

Although the sample size is small, the same pattern of greater utilization of lowland environments might also be evident in the Kaiparowits Plateau region. Captains Alcove, located in Rock Creek Canyon on the southern periphery of the plateau, had evidence of multiple occupations, including two during the late Archaic. Tipps (1983:163-164) interpreted the Archaic occupations as evidence of a "field camp" where, "Archaic hunter-gatherers would have hunted small game, and collected cactus, yucca fruit, and seeds in the lowlands during late summer and fall. They may have also been in the canyons in the winter or spring gathering cactus pads, or in the early spring collecting yucca blossoms and early greens, particularly in sparse years, or when stored foods had been depleted."

Six late Archaic dates from three sites along the Colorado River corridor have now been reported, compared to only a single date from a Kaiparowits Plateau upland site, an aceramic midden at an open campsite in the Paradise Canyon area that produced a radiocarbon date of 3930 ±30 BP (2418 BC median probability). Burned bone was present, but only one jackrabbit bone was identifiable as to species (Geib et al. 2001).

The number of late Archaic radiocarbon dates from the Grand Staircase sub-region is minimal (four dates from three sites). Perhaps the most important late Archaic data in the region were derived from the Arroyo Site, located in Kitchen Corral Wash within GSENM. Excavations of a typical Ancestral Puebloan farmstead also revealed an underlying late Archaic component that featured a shallow pit house that produced radiocarbon dates of 3420 ±90 BP (1730 BC median probability) and 3370 ±80 BP (1666 BC median probability).

The pit house was dish-shaped, had a central depression that was probably a hearth, and it featured a light superstructure of brush and clay. The only artifact associated with the pit house was a portable slab metate. Pollen analyses from soil samples taken below the metate revealed that sagebrush seeds, grass seeds, cheno-ams, and a member of the Solanaceae family of plants (potato/tomato) might have been processed on the grinding slab (McFadden 2012).

McFadden (2012:78) argued the site might have provided access to different resources throughout the year and therefore could have functioned as a multi-seasonal residential base. Not only were plant resources available on the valley floor,

> *… the modern Paunsaugunt mule deer herd migrates down Kitchen Corral Wash from the high plateaus to their winter range – and probably did so in the past; open range occurs adjacent to the site that was suitable for pronghorn; and sheep habitat occurs in the rugged cliffs above the*

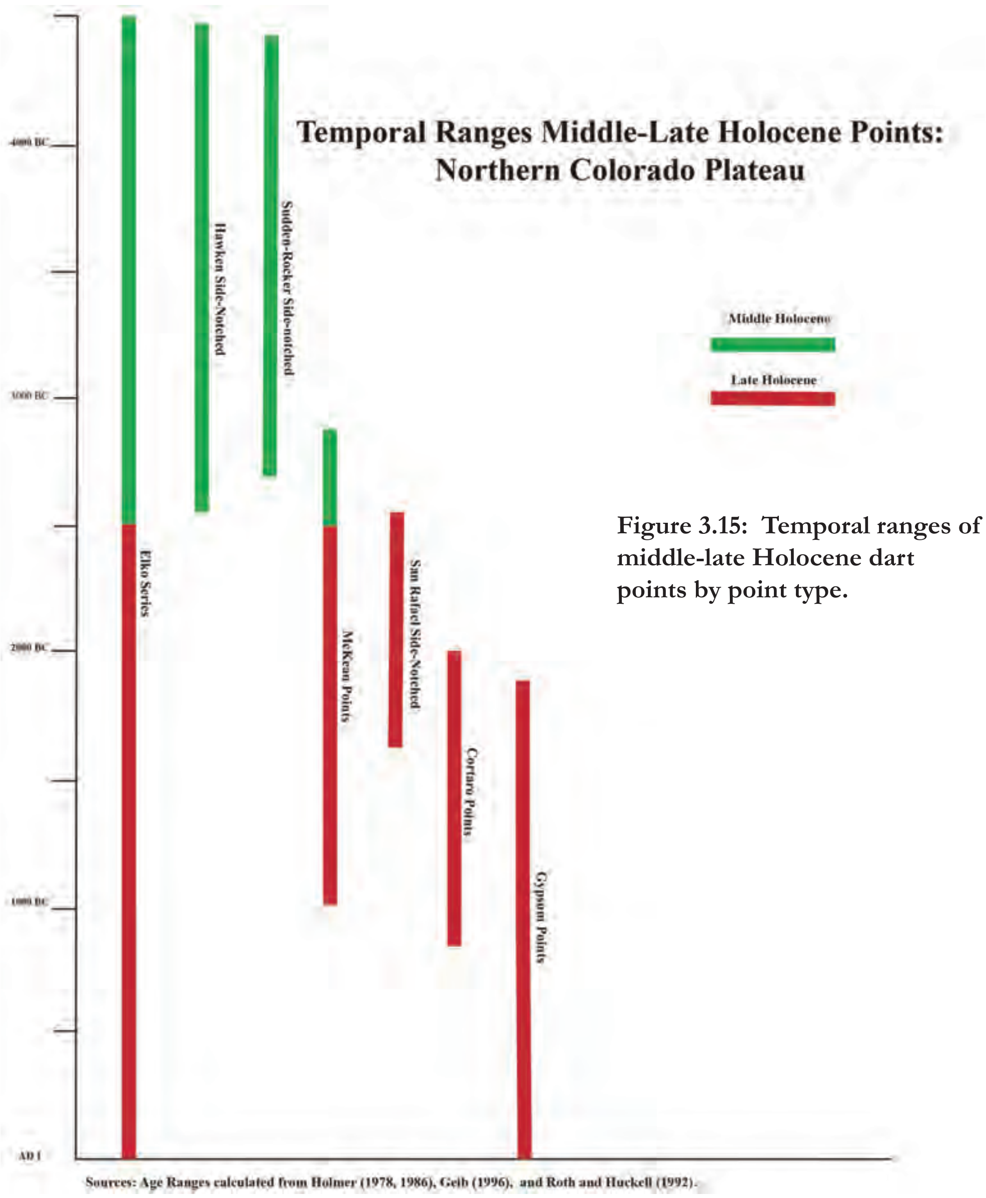


Figure 3.15: Temporal ranges of middle-late Holocene dart points by point type.

site. Taking into account resources such as pinyon and other upland species available from the surrounding slopes, the Arroyo Site could have provided Archaic inhabitants a relatively sedentary base for year-round foraging, or a temporary camp used to exploit seasonally available resources.

The Arroyo Site also serves as a reminder of what archaeologists working in GSENM have long suspected, that Archaic habitations are buried below more visible Formative occupations and are not conspicuous during surface inspection alone. As discussed above, the Jackrabbit Roast site near Kanab continued to be occupied at this time (Roberts 2018).

Late Archaic Points

As much as middle Holocene times are defined by the prevalence of large side-notched dart points, the late Archaic has traditionally been characterized by the proliferation of smaller, more-fragile side-notched points (San Rafael), lanceolate points (McKean), and stemmed points (Gypsum). These all have overlapping temporal ranges, although they can generally be divided into Plains-like points common from about 2500 to 1500 BC (San Rafael, McKean) and Great Basin-like points common from 2500 to 1000 BC, and perhaps as late as AD 500 (Gypsum points) (see Figure 3.15).

Figure 3.16: Sketch drawing of San Rafael Side-notched points characteristic of late Archaic times. Image modified from Holmer (1978).

Changes from sturdy side-notched points of earlier times to fragile side-notched points at about 2500 BC cannot be readily explained in terms of tool function. Larger side-notched points are generally seen as better suited for penetrating the thick hides of larger prey (Frison 1991), in which case, the lighter, more fragile points might have been designed to procure smaller, faster animals. But there is no evidence of this in the GSENM region. In fact, subsistence strategies during late Archaic times apparently remained the same as before with groups relying on a balanced mix of high-return resources (mule deer and bighorn sheep) and low-return resources (small mammals and plants).

The number of sites in GSENM yielding San Rafael Side-notched points is not significantly different than earlier sites yielding side-notched points (n=21 sites). Gypsum points, on the other hand, are especially abundant throughout the entire region (n=77 sites). From the limited data available, this comparison may be statistically invalid given the temporal range of Gypsum points, which might have been used during the entire Archaic-to-Formative transition from 1000 BC to AD 500. Consequently, the greater number of sites attributed to the late Archaic (2500 to 1000 BC) might instead reflect later population growth from about 1000 BC to AD 500 when maize agriculture was becoming firmly established as the predominant subsistence strategy.

At least 100 sites have projectile points commonly attributed to late Archaic times, and by far most of those are Gypsum points. Although the actual number of late Archaic sites is justifiably debatable, it can be hypothesized, based on the combined projectile point and radiocarbon data, that human exploitation of the GSENM region increased significantly at this time.

San Rafael Side-notched points are thin and fragile compared to older side-notched types (Figure 3.16). San Rafael Side-notched points were initially assigned a temporal range of about 2600 to 1700 BC on the northern Colorado Plateau, and from about 2600 to 1600 BC on the northwestern Plains where they are called Mallory points, something that Holmer (1978:69) believed, "again supports a possible Plains association with the northern Colorado Plateau." Holmer (1986:104) later modified his temporal range of San Rafael points to 2400 to 1600 BC. These points are rare in the Great Basin, but they are commonplace on the northern Colorado Plateau and throughout GSENM.

San Rafael Side-notched points are relatively common in the Grand Staircase and Kaiparowits Plateau sub-regions, but they are rare in the Escalante River drainage. They co-occur with earlier Archaic points at two sites, with later Formative artifacts at four sites, and with both earlier and later artifacts at one site. This suggests favored base camps were occasionally reoccupied. They are found without other temporal indicators at 62 percent of the sites where they have been observed. They are found at sites with a mean elevation of 6,009 feet

Figure 3.17: Sketch drawing of Gypsum points characteristic of late Archaic times. Image modified from Holmer (1978).

and a median elevation of 6,043 feet, which is only slightly lower than sites with Gypsum points.

The Gypsum point has long been considered a temporal marker of late Archaic throughout the region. Holmer (1978:49) described Gypsum points as triangular in shape with convex edges, wide corner notches forming roughly square shoulders and a contracting, convex-based stem (see Figure 3.17). Gypsum points are rare or absent in the northern Great Basin, and decrease in frequency to the north. Holmer (1986:105) noted that "wherever they occur their temporal placement is remarkably consistent - always between 2500 B.C. to A.D. 500."

In GSENM, sites with Gypsum points only rarely co-occur with earlier Archaic point types (n=8 sites), but they are relatively common at sites with later Formative and Late Prehistoric temporal indicators (n=21 sites). Gypsum points are found at sites without any other temporally diagnostic artifacts about 60 percent of the time, which is about the same frequency as sites with exclusively San Rafael Side-notched points.

One other late Archaic point type warrants a brief mention here. Roth and Huckell (1992) have defined Cortaro points in southern Arizona, which feature a leaf-shaped body and concave-base without a stem, or a triangular body without a stem. They are believed to be contemporaneous with San Pedro points, but might date somewhat earlier. They have an assigned a tenuous age range of 2000 to 800 BC. Cortaro points have been noted at five sites in the Kaiparowits Plateau, and all identifications were made by researchers familiar with southern Arizona lithic assemblages. This type could be more common in GSENM, but it might have gone unrecognized by archaeologists more experienced with northern Colorado Plateau types. The presence of Cortaro points, if accurately identified, demonstrates the Colorado River, was not an absolute cultural barrier in late Archaic times.

Organizing the Evidence

The existing GSENM site database contains 101 sites with distinctive projectile points that might be attributed to late Archaic occupations in the region. This compares to 29 sites in early Holocene times and 72 sites in middle Holocene times. All of these are open artifact scatters of varying complexity. In light of changing climates that might have influenced the density and distribution of floral and faunal resources, we wanted to see if the existing database could shed light on the following questions:

- If the larger number of sites attributed to the earliest part of the late Holocene indeed reflect population increases, are there changes in the complexity of the sites. For example, are the sites larger and therefore possibly indicative of more individuals (e.g., extended families) engaged in hunting and gathering activities at a single site? Or are there simply more short-term hunting and gathering camps in the same area?

- If mule deer and bighorn sheep herds expanded in response to improving climates, is there any evidence that plant procurement becomes less significant to foraging lifeways, as was the case in early Holocene times when climates were also more favorable? This might be reflected in increases in hunting sites without ground stone tools. Or does the ratio of sites with and without ground stone tools remain relatively balanced, as was the case in middle Holocene times?

- If the earliest part of the late Holocene featured greater effective moisture, did this result in higher groundwater and therefore more permanent water sources on the landscape (e.g., more springs and seasonal springs) that would have allowed larger prey to disperse rather than remain tethered to major water sources? This might be reflected in a greater spatial diversity of site locations than was evident in middle Holocene times.

When site complexity is considered in total, the data seem to support the idea that hunting and gathering strategies at this time were essentially the same as those in middle Holocene times, reflecting a relative balance between hunting camps (58 percent) and hunting and plant processing camps (42 percent). The exact same ratio is evident at middle Archaic sites, suggesting that the relative importance

Table 3.5

	Late Archaic	Middle Archaic	Early Archaic
Single Episode Tool Maintenance <100 flakes, no tools	6	5	0
Single-Episode Hunting Camp <100 flakes, fauna processing tools	15	12	8
Single-Episode Foraging Camp <100 flakes, minimal ground stone	2	5	0
Short-Term Hunting Camp 100-500 flakes, no ground stone	14	11	1
Short-Term Foraging Camp 100-500 flakes, ground stone	11	10	0
Longer-Term Hunting Camp 500+ flakes, no ground stone	9	6	1
Longer-Term Foraging Camp 500+ flakes, ground stone	8	4	3

Table 3.5: Relative complexity of hunter-gatherer camps through the Archaic. Temporal affiliation based on diagnostic projectile points.

of plant resources remained unchanged from earlier times, and that any increased exploitation of larger, high-return mammals, if this actually occurred, did not result in less utilization of lower-return plant resources. By inference, these would have been bi-gender groups more often than male individuals engaged in hunting activities. And given the annual cycle of when seed plants mature, these camps might represent occupations in the spring at lower elevations and early summer at higher elevations.

Thirty-five sites with late Archaic indicators also contain evidence of earlier or later occupations. About a third of these sites have projectile points indicative of earlier Archaic groups and about two-thirds had artifacts attributable to later Formative and/or Late Prehistoric groups. In other words, some camps preferred in earlier Archaic times continued to be favored in late Archaic times. And camps preferred in late Archaic times were especially popular among later groups.

To better determine the nature of late Archaic occupations specifically, we organized the site data to exclude those sites with multiple temporal indicators and include only those with exclusively San Rafael, McKean, Gypsum, and/or Cortaro points (n=66 sites). This revealed a substantial reduction in single-episode hunting and foraging camps, and a notable increase in longer-term hunting and foraging base camps. When all three periods are compared, there appears to be a shift toward increasing site complexity through time (see Table 3.5).

We also wanted to ascertain whether or not any spatial patterns are evident between middle and late Archaic sites. If middle Holocene conditions were extremely arid, then sites might be concentrated in those areas with permanent water. If late Holocene conditions were wetter, then animal populations might have dispersed. The spatial distribution of procurement sites would also be more dispersed. We did not find this to be the case. Instead, the same spatial distribution is evident during both wetter and drier climatic regimes, the only significant difference being there are a lot more sites in late Archaic times.

Based on the clustering of sites with specific temporal indicators, land-use patterns during early Holocene times might have been indistinguishable from those of middle Holocene times, which in turn are indistinguishable from late Holocene times. In short, projectile point preferences changed through time, but the artifact assemblages and relative size and complexity of the sites, and by inference the hunting and gathering strategies employed, remained remarkably consistent over 7,000 years of prehistory. The only significant difference is that there are a lot more middle Archaic sites than earlier ones, and there are a lot more late Archaic sites than middle ones. The ratio of hunting camps to hunter-gatherer camps remains rather uniform, the relative complexity of the camps is about the same, and the spatial distribution does not change through time.

Totems and Iconography

The late Archaic is also noteworthy for the appearance of distinct iconography that is reflected in the rock imagery and totems found in the region. These are manifest in the Barrier Canyon Style rock art style, the Glen Canyon Linear rock art style, and in the appearance of the split-twig figurine complex common along the Colorado River corridor and in the San Rafael Desert (figurines have not yet been reported in GSENM specifically).

Figure 3.18: Barrier Canyon Style images are found along the Green and Colorado rivers and their northern tributaries, from lower Glen Canyon on the west to the Uinta Basin on the north.

The Barrier Canyon Style of rock art has traditionally been described as an indigenous development of pre-agricultural peoples of the northern Colorado Plateau. It is common along the northern tributaries of the Colorado River, but is actually quite rare south of the river. This style is believed to be of Archaic origin, perhaps many thousands of years old (Castleton and Madsen 1981; Manning 1990; Schaafsma 1971), although this assumption has recently been called into question (Mozdy 2016; Pederson et al. 2014).

Coulam and Schroedl (1996) have noted the striking similarities between Barrier Canyon images and unfired clay figurines at Cowboy Cave (the figurines there are called Horseshoe Shouldered), suggesting the rock art style appeared about 5600 to 5000 BC. Tipps (1995), however, used excavation data and radiocarbon dates from associated materials to propose an age range of 1900 BC to AD 300. And Cole (2009:60) argues the temporal range is from about 2000 BC to AD 400, "overlapping the rise of Ancestral Pueblo (Basketmaker II) and early Fremont cultures."

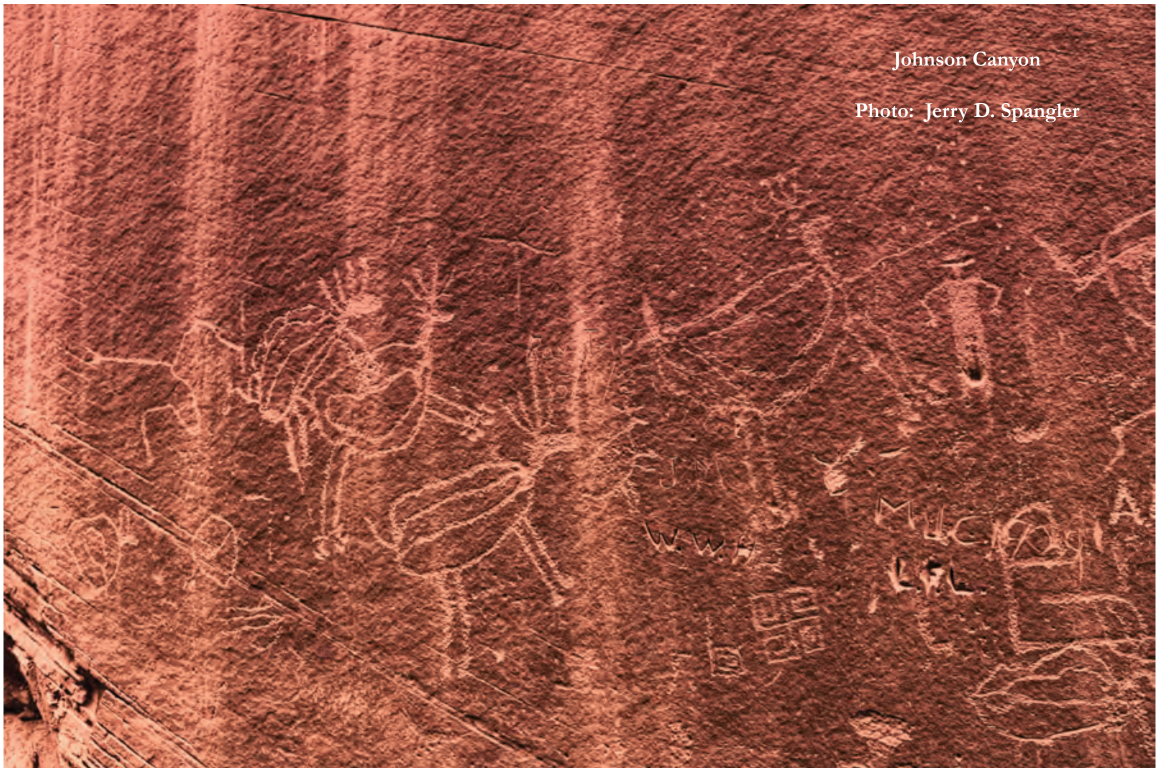


Figure 3.19: Glen Canyon Linear images are characterized by animals pecked in outline, sometimes with interior cross-hatching. They are found throughout GSENM and even as far north as the Uinta Basin, but they are more common in the Grand Staircase west of the Paria River.

The dominant motif of the Barrier Canyon Style is the long, dark form of the human torso that can range from very small to more than 2 meters in height. The figures are typically elongated and tapered, usually without arms or legs (Figure 3.18). There is no indication that Barrier Canyon panels depict hunting activities, but rather, as Schaafsma observed, "If the seed-beater, sickle, and burden baskets portrayed in connection with wild plants are correctly interpreted, then it is possible that the paintings were in part related to the ritual surrounding food-gathering practices" (1971:149). Barrier Canyon Style sites have been reported at two sites in the Glen Canyon area just outside GSENM. Four sites have been documented in the Escalante River drainage. This rock art style might be antecedent to Fremont rock art north of the Colorado River (Tokioka 1992).

Perhaps related to the Barrier Canyon Style is the Grand Canyon Polychrome Style that includes anthropomorphs with life-like details such as eyelashes, toes, and pupils. Sometimes figures are portrayed with facial expressions. In addition to anthropomorphs, the panels display birds, bighorn sheep, deer, pelt-like objects, and abstract symbols. The quadrupeds, like the anthropomorphs, are frequently painted with outlined bodies, subdivided inside into geometric shapes similar to the Glen Canyon Linear Style. The style is assumed to be Archaic based on superimposed images dating to later times (Christensen et al. 2013). This style is found throughout the Arizona Strip and south to the Grand Canyon, and it would not be surprising if such sites were identified in GSENM.

The Glen Canyon Linear petroglyphs, also called Glen Canyon Style 5 (Turner 1963), are characterized by pecked images of ovoid human shapes and ovoid-to-rectangular zoomorphic figures, some with little to no interior decorations and others with interior lines or cross-hatching. Abstract designs are usually not as common, but can include rakes, starbursts, and zigzags. Because of the stylistic similarities to split-twig figurines, this rock art style is often attributed to late Archaic peoples. It is especially common along the Colorado River and its major tributaries, but is occasionally found as far north as the Uinta Basin and south into central Arizona. It is also common in the Paria River and Escalante River areas within GSENM. The style is often considered antecedent to later Ancestral Puebloan styles (Tokioka 1992).

At least 13 sites in GSENM have images identified as Glen Canyon Linear (Figure 3.19), almost all of them in the Escalante River drainage. The rarity of such images in the Grand Staircase database is probably a bias because many researchers are reluctant to assign an estimated age to rock art images, and therefore the sites with Glen Canyon Linear images in our database are not coded as Archaic. A good example of this is a site in the middle Paria River, where Glen Canyon Linear images are abundant, but where the site form lists the cultural affiliation as general Puebloan.

Split-twig figurines (Figure 3.20) are a hallmark of the late Archaic on the Colorado Plateau. Geib (1996a) places the advent of the complex at about 3000 BC, and numerous samples collected in the Grand Canyon have produced radiocarbon dates between 2600 and 1300 BC. Based on an abundance of radiocarbon dates, these figurines or associated objects have an established age range of 2900 to 1250 BC for this complex, and as such they represent the one of the best-dated artifact types of the Archaic (Coulam and Schroedl 2004).

The figurine was constructed by weaving willows or other woody materials into the shape of animals, which are usually recovered from dry cave contexts. The figurines appear to represent two different functions, either "increase totemism" associated with magic and ritual, and "social totemism" associated with group identity (Coulam and Schroedl 2004), perhaps as children's toys (Jett 1991). The figurines are particularly common in the Grand Canyon area to the southwest of GSENM and the San Rafael Desert to the east. They have not yet been identified at any site in GSENM, but they would be expected here due to the geographic location of GSENM between those other two localities.

Late Archaic Summary

Current evidence suggests that Archaic lifeways characterized by an expanded diet and greater subsistence flexibility continued in late Archaic times in the same general pattern as earlier generations. The biggest difference might have been increased populations, something hinted at by the much larger

Figure 3.20: Split-twig figurines have been discovered at late Archaic sites along the Colorado and Green Rivers, as well as some tributaries, but not yet within GSENM. Some researchers see a shared similarity to Glen Canyon Linear images that are abundant in the Monument.

catalog of radiocarbon dates and more than a hundred sites with distinctive San Rafael Side-notched, McKean, Cortaro, and Gypsum points. There is also intriguing evidence that late Archaic hunters and gatherers might have aggregated into larger social units, perhaps for deer hunts on the Kaiparowits Plateau and communal rabbit hunts at lower elevations near the base of the Vermilion Cliffs.

The limited excavation data suggests all Archaic groups were highly mobile, moving between lowland and upland areas, and this is certainly evident in late Archaic times.

- In upland settings, such as those found at Sudden Shelter, Aspen Shelter, and the Kaibab Plateau, subsistence strategies were focused on high-return large game, probably in the summer or fall (Janetski and Wilde 2012; Janetski et al. 2012; Jennings et al. 1980; Schroedl 1988).

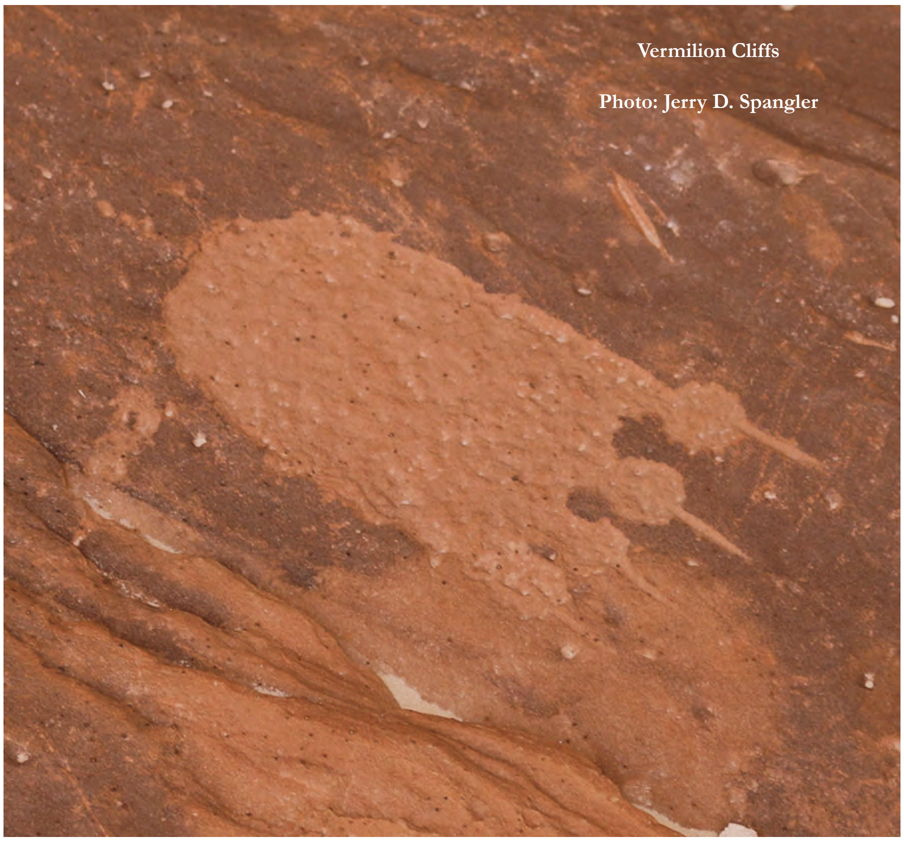
- Mid-range elevations, such as those found at Antelope Cave, Rock Canyon Shelter, and Jackrabbit Roast, might have been occupied in the late summer or fall by groups engaged in communal rabbit drives who returned to the same locations year after year for that purpose (Fisher et al. 2013; Janetski et al. 2013; Roberts 2018). Other sites, such as Cowboy Cave, reflect seed procurement and processing (Jennings 1980). And yet others, like the Arroyo Site, were situated to take advantage of migrating deer herds (McFadden 2012).

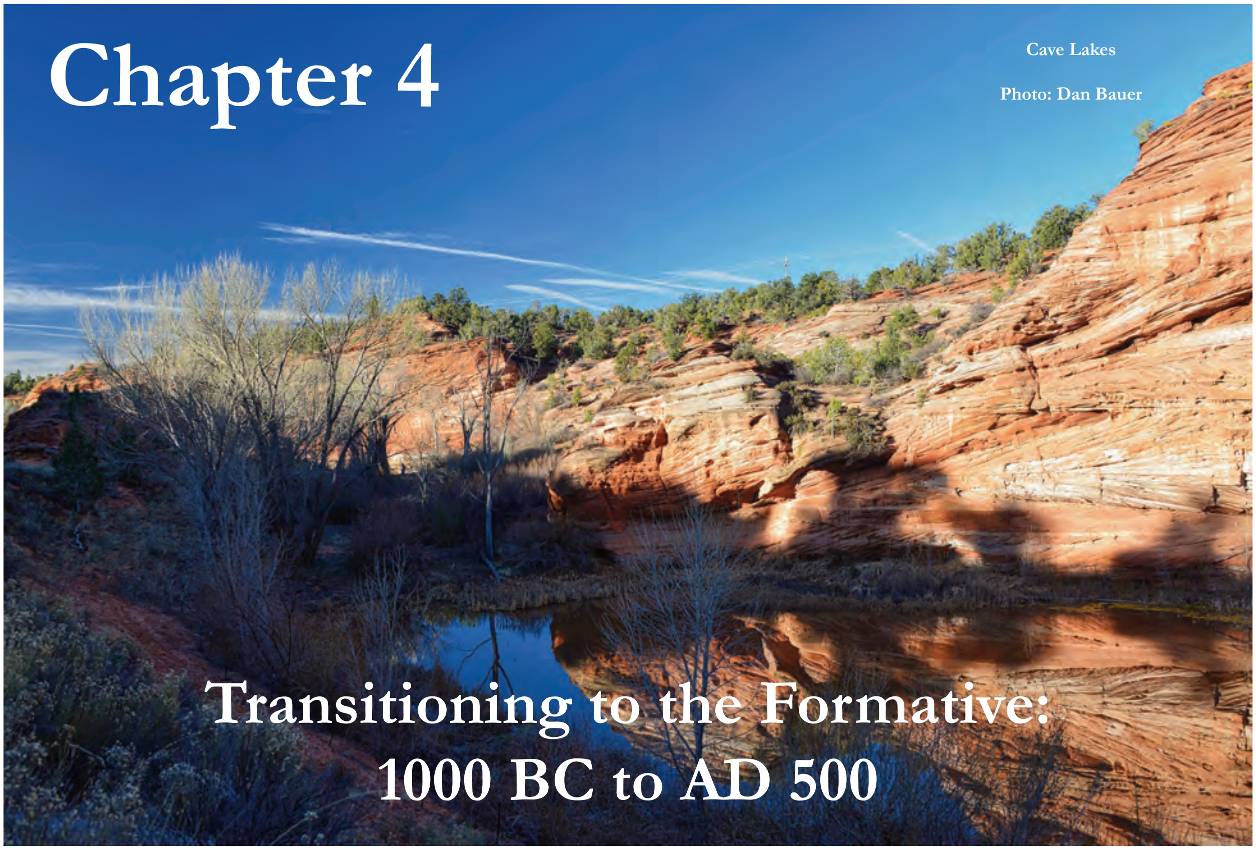
- And in lowland areas, such as those along the Colorado River, groups intensively exploited plant resources and small game, probably in the early spring (Geib 1996a; Talbot et al. 1999).

The beginning of the late Holocene might have been characterized by a dramatic increase in effective moisture, perhaps the result of a stronger Arizona monsoon and greater winter snowpack at higher elevations. This appears to coincide with the proliferation of pinyon at lower elevations after about 3000 BC and with a dramatic increase in a large number of GSENM sites with distinctive late Archaic points (mostly Gypsum points). Collectively, the regional data suggest larger populations and/or more intensive exploitation of the region after about 2000 BC, although hunting and gathering strategies were, for the most part, indistinguishable from those of earlier periods. The Rodent Ridge and Arroyo sites (McFadden 2012; Roberts 2018) offer evidence that some Archaic groups were building residential structures in optimal locations to exploit the migration patterns of larger fauna and locally available plants and small animals.

The prevalence of Gypsum, San Rafael Side-notched (Mallory) and McKean Lanceolate points at this time has been interpreted by some as evidence of possible immigrations from the southern Great Basin and northwestern Great Plains. A migration from southern Arizona into GSENM might also have occurred at this time, as evidenced by the appearance of Cortaro points. These events occurred after the hot, dry climates that characterized middle Holocene times had ameliorated and biotic resources might have expanded in response to cooler and wetter weather patterns. Particularly relevant is the expansion of pinyon forests into the region, perhaps as early as 6000 BC but certainly by about 3000 BC (Madsen and Rhode 1990).

Perhaps related to the question of regional migrations, the presence of two or three distinct rock art traditions in the GSENM region suggest that different late Archaic groups were expressing their cultural identities through different iconography. The Barrier Canyon and Glen Canyon Linear styles are seen as antecedent to the more conspicuous rock art traditions of later Fremont and Ancestral Puebloan groups, respectively. And as we discuss in later chapters, rock art is one mechanism that might have reinforced cultural boundaries and defined separate cultural identities.


Vertical Cliffs



Cave Lakes

Photo: Dan Bauer

Chapter 4

Transitioning to the Formative: 1000 BC to AD 500

Whereas previous Archaic periods were distinguished primarily by shifting projectile point preferences, this transitional period on the northern Colorado Plateau is characterized by distinctive shifts in subsistence strategies and settlement patterns prior to the introduction of ceramics at about AD 500. Among these changes:

- The cultivation of maize and squash (and perhaps beans) would have required at least some level of reduced seasonal mobility.

- Increased sedentism is reflected in the proliferation of permanent or semi-permanent houses, including population aggregations into small hamlets.

- The emergence of complex storage strategies suggests farming was quite successful and that resource surpluses were "stored away" for future use.

- The emergence of elaborate burial practices in the Grand Staircase region suggests increased social complexity that foreshadows later Formative occupations.

In the GSENM region, these changes appear to have been incremental and farming was initially supplemental to traditional hunting and gathering, although increased sedentism likely required reduction in foraging territories (McFadden 2012). This period of time, therefore, can be characterized by the appearance of subsistence strategies and settlement patterns that were not purely Archaic, nor did they exhibit all the trappings typically assigned to the Formative.

Until recent decades, evidence was scant that local populations of Archaic hunter-gatherers embraced new lifeways (e.g., sedentism and agriculture) and new technologies (e.g., bow-and-arrow and ceramics) typically associated with later Formative peoples. The rapid appearance of Formative lifeways was seen by many as evidence of an abandonment of the northern Colorado Plateau at the end of the Archaic followed by a reoccupation of the region by immigrant farmers from the south (Berry 1982; Madsen and Berry 1975). This hypothesis was based on two factors: The rarity of radiocarbon dates reported at that time for the period from 1500 BC to AD 500, and artifact assemblages found in Archaic cave contexts were decidedly different from those found at energy-expensive architectural sites with well-developed ceramic and farming traditions.

As Janetski noted (1990:5), this hypothesis is based on the idea of "a fairly rapid migration of Fremont folks into the region, people with new ideas, a new tool kit, and a different livelihood," and that the migration "was a major one with few precedents." A growing body of evidence reported from the northern Colorado Plateau over the past three decades, however, suggests that most of traits once thought to have appeared suddenly were actually present much earlier during Archaic times.

The rarity of radiocarbon dates that plagued early researchers has since been replaced by a robust catalog of more than 160 radiocarbon dates (and a few tree-ring dates) from within GSENM and contiguous areas of the Arizona Strip, Glen Canyon, and Waterpocket Fold. These demonstrate a significant increase in the intensity of human occupations beginning about 1000 BC. These data convincingly demonstrate there was no abandonment prior to the advent of Formative lifeways, and that at least three different subsistence strategies are evident in the archaeological record at this time:

- Foraging groups continued to rely on hunting and gathering in the traditional Archaic pattern that required far-ranging seasonal mobility. This evidence is especially common in deep canyon environments along the Colorado River, the Waterpocket Fold, and high elevation settings such as the Kaibab Plateau and Kaiparowits Plateau.

- Farmer-forager groups practiced a mixed subsistence strategy involving some level of maize cultivation and complex storage strategies, but they also relied heavily on foraging for wild resources within the context of reduced mobility. This strategy, considered antecedent to the Fremont Complex, is particularly evident in the Escalante River and Fremont River drainages.

- Other agricultural groups were largely dependent upon domesticated cultigens, they built permanent or semi-permanent residences, and they constructed elaborate storage facilities. This strategy is typically described within the context of Basketmaker II adaptations that were antecedent to later Ancestral Puebloan occupations. This adaptation is commonplace in the northern Grand Staircase, as well as the St. George Basin farther to the west.

The impetus for fundamental changes appears to have come from two different regions: Maize agriculture had its origins to the south in the southern Colorado Plateau and the Basin and Range country of southern Arizona, whereas bow-and-arrow technology arrived from the north and west by way of the Great Basin.

By AD 200, maize agriculture was being practiced throughout the entire the northern Colorado Plateau. The addition of the bow-and-arrow into hunting strategies at about that same time probably combined to have profound impacts on local subsistence strategies, mobility, and settlement patterns. Greater hunting and farming efficiencies might have led to improved mortality rates, larger population aggregations into small villages, reduced mobility, and increased social complexity among some groups. The impetus for these fundamental changes appears to have come from two different regions: Maize agriculture had its origins to the south in the southern

Colorado Plateau and the Basin and Range country of southern Arizona, whereas bow-and-arrow technology arrived from the north and west by way of the Great Basin.

Early farming in the Escalante River Basin appears to have been a local development wherein Archaic foragers adopted maize agriculture to a greater or lesser degree. There is considerably less consensus that local foragers adopted farming in the Grand Staircase region, but rather the evidence hints that farmers migrated into the region. Richard Talbot (1998) believed Grand Staircase foragers probably adopted farming, but he didn't rule out the possibility of an influx of immigrants into the area. In other words, the debate over local development versus migration is not a question of "either-or," but how to recognize impetus for change arising from multiple sources at different times and in different locations.

Sites in the Escalante River drainage offer intriguing evidence of Ancestral Fremont occupations where the incorporation of agriculture, residential architecture, and bow-and-arrow technology appears to have been a process of accretion over a long period of time. In the Grand Staircase area, there is evidence suggesting a "classic Basketmaker" manifestation involving complex storage strategies, heavy reliance on cultivated resources, elaborate burial practices, and a long tradition of pithouse architecture, all of which seem to have appeared rather suddenly and would appear to support a migration hypothesis.

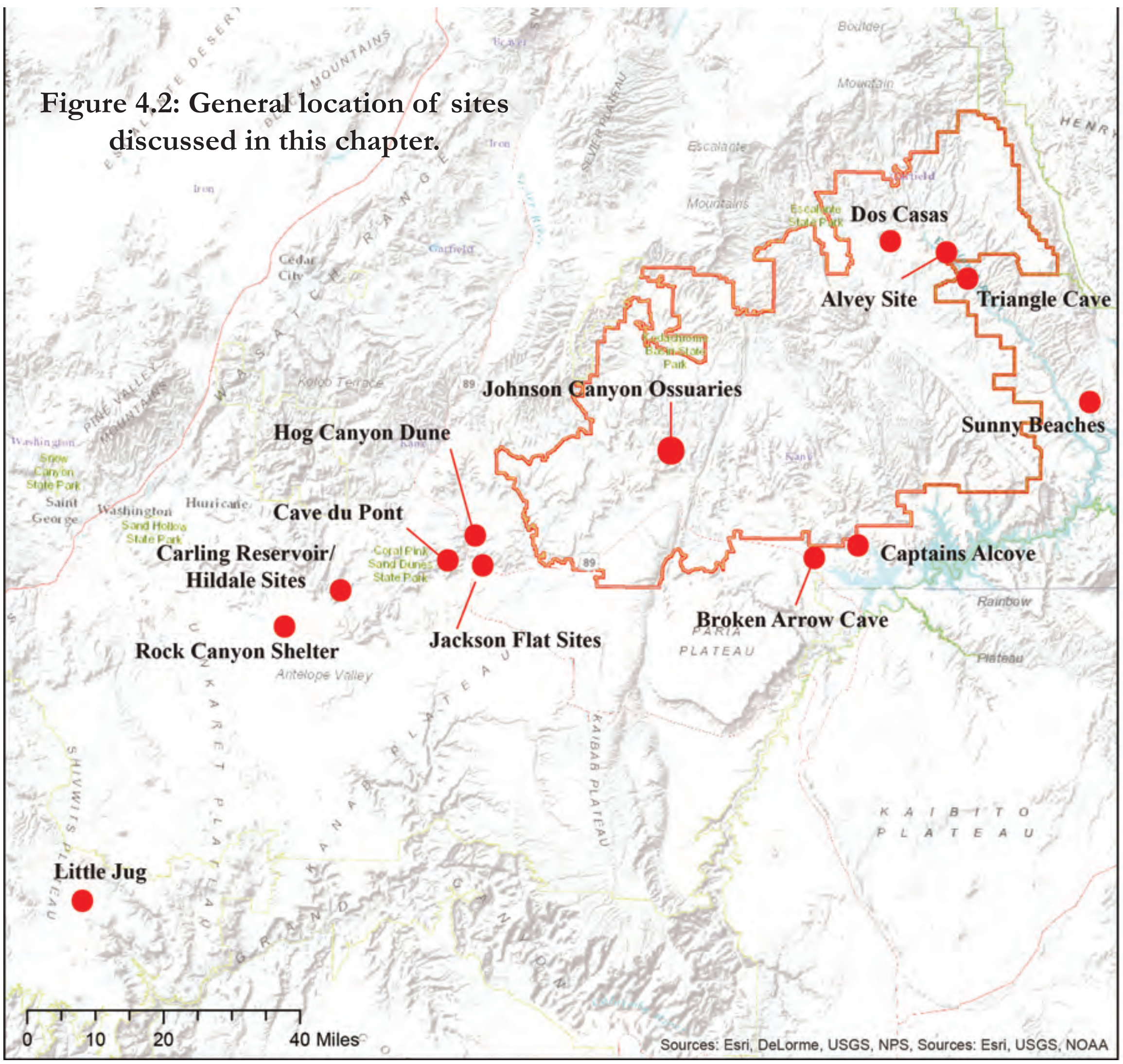


Figure 4.2: General location of sites discussed in this chapter.

In this chapter, we discuss the culture history of GSENM within the context of farmers who cultivated plant foods as their predominant subsistence strategy (Basketmaker II), farmers who grew maize but also foraged extensively for wild plants and animals (Ancestral Fremont), and those who continued to forage in the seasonal lowlands-to-uplands pattern that characterized the Archaic. We liberally discuss proxy data from contiguous non-Monument areas such as the Waterpocket Fold, Glen Canyon, and the Arizona Strip. These sites are discussed within the context of important changes in lifeways, specifically the advent of maize agriculture, increased sedentism evidenced by residential architecture, storage strategies, changes in hunting technologies, mortuary practices, and rock art. The general location of major sites discussed in this section is indicated in Figure 4.2 above.

What Do We Call Them?

*I*n this chapter, we use label Early Agricultural period as an umbrella term to reference all groups living in GSENM from about 1000 BC to AD 500 when agriculture was first practiced, but before the introduction of ceramics into local lifeways. The term Early Agricultural, as used here, is not intended to suggest that all groups were agricultural at this time. In other words, it reflects a period of time and not a way of life. We also use the term Ancestral Fremont to reference early farmer-foragers in the Escalante River Basin and Basketmaker II when discussing predominantly farming groups in the Grand Staircase.

Other terms have been applied to this period of time, including Terminal Archaic, Proto-Formative, Pre-Formative, and more recently Archaic-to-Formative Transition, an accurate but cumbersome descriptor. The Early Agricultural term, as used here, is not coequal with the same term used by Roberts (2018) to describe San Pedro farmers of the Jackson Flat area at about 1000 BC. Additionally, some researchers have organized the Early Agricultural data into "phases" with regional and sub-regional implications (see Figure 4.3).

A common temporal sequence applied to the Escalante River region is that offered by Schroedl (1992), who recognized a Dirty Devil Phase from about 1500 to 300 BC and an Escalante Phase from about 300 BC to AD 700. The Dirty Devil Phase is generally characterized by a replacement of the Gypsum point type with side-notched types identified by some as Elko Series and by others as Basketmaker points. Hunter-gatherer lifeways did not change significantly during this period. The Escalante Phase, as defined by Schroedl (1992), began about 300 BC with the introduction of maize into the region, and it terminated with the introduction of ceramics, which he placed at AD 700. Other diagnostic traits of the Escalante Phase include the introduction of the bow-and-arrow at AD 100 to 200, and the appearance of pit structures.

Long-time GSENM archaeologist Doug McFadden observed that Schroedl's timeline was a poor fit for the Escalante River region. McFadden (2016) subsequently defined the beginning of the Escalante Phase as the appearance of maize farming, possibly as early as AD 100, and the end of the phase was defined by the appearance of ceramics at about AD 500.

McFadden (2016) retained the term Basketmaker II to describe early farming adaptations in the Grand Staircase region. Researchers there have consistently applied the Basketmaker II term to suggest both a period of time when agriculture was first practiced and before the advent of ceramics, and a catalog of material culture and architectural traits. The Basketmaker label has proven remarkably resilient despite repeated scholarly criticisms of the term, and it remains engrained in the archaeological literature, especially in the Grand Staircase region.

Formal definition of a Basketmaker cultural stage was the result of the 1927 Pecos Conference, a gathering of preeminent Southwestern archaeologists to discuss fundamental problems and "lay the foundation for a unified system of nomenclature" (Kidder 1927:489). The Pecos Classification specified that Basketmaker II, a period typified by the absence of pottery, the utilization of the atlatl, the proliferation of a remarkable basketry technology, the lack of cranial deformation, and the presence of agriculture. The list of defining traits has undergone considerable revision and augmentation since 1927.

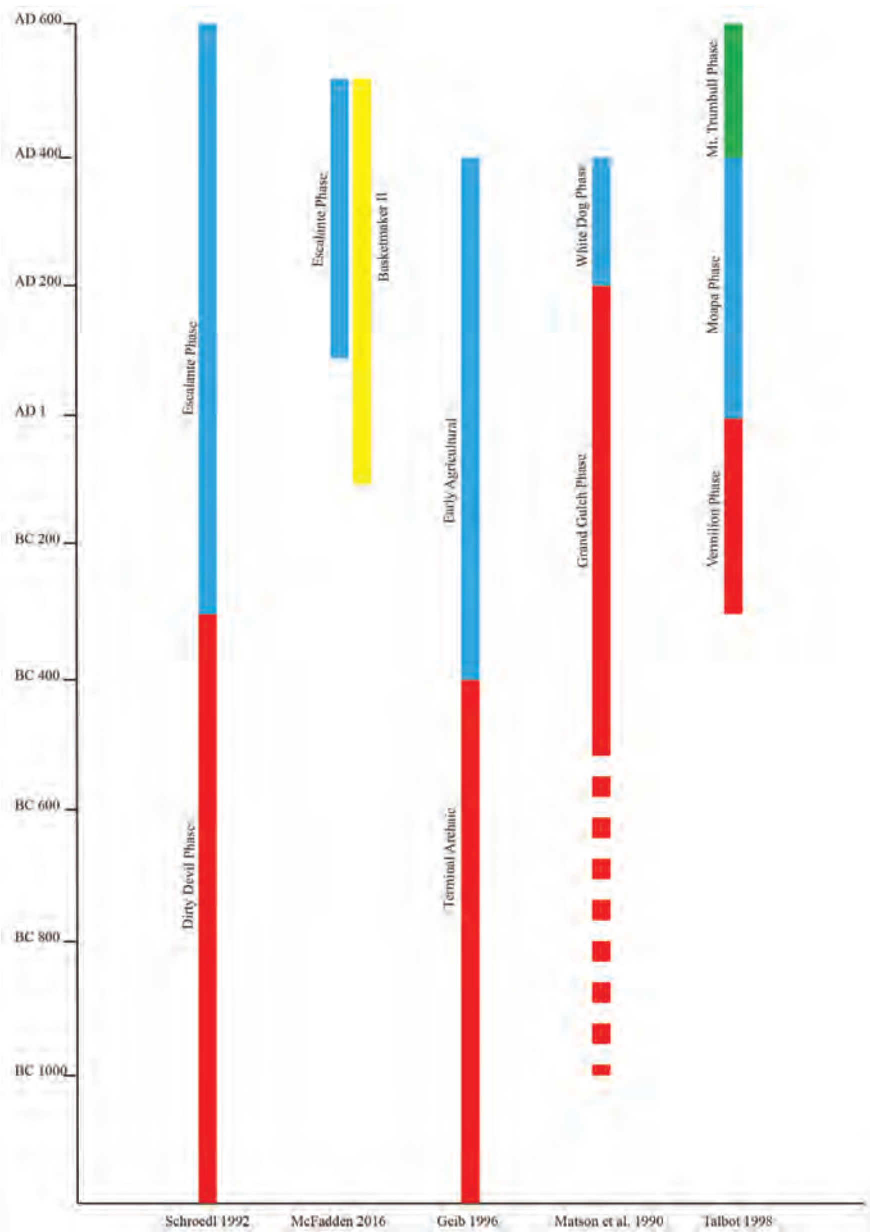


Figure 4.3 Organization schemes proposed by different researchers for the transitional period between foraging and farming in southern Utah.

As suggested by Hurst (1992), the Basketmaker II period commenced with the widespread adoption of substantial structures for surplus food crops and ended with the introduction of ceramics, and it was marked by the transition to largely sedentary lifeways focused around households. This is consistent with Smiley (1985:10), who succinctly defined Basketmakers as "peoples of the northern Southwest, organized in small groups, cultivating Mexican-derived domesticated plants, using dry caves and rockshelters as storage facilities and marking their stewardship of such facilities by placing their dead within them in comparatively rich funerary context."

The earliest detailed descriptions of the archaeological remains of the Basketmaker culture were derived from sites in northeastern Arizona where there were lesser-disturbed alcove and cave sites (Guernsey 1931; Guernsey and Kidder 1921; Kidder and Guernsey 1919), and from Cave du Pont near Kanab (Nusbaum 1922). These investigations provided the foundation for the orthodox perspective that Basketmaker II peoples were farmers who constructed bell-shaped and slab-lined storage cists in caves and rockshelters, were highly mobile in search of wild food resources, utilized atlatls with side-notched dart points, and constructed remarkable basketry, but who had no pottery in the traditional sense.

The variability in the archaeological record throughout the Southwest has prompted researchers to suggest regional variants, including the White Dog Phase in the lower San Juan River and Marsh Pass areas (Lipe 1967, 1970; Matson et al. 1990), The term White Dog Phase or White Dog Basketmaker (prior to AD 200) is commonly applied to Basketmaker II sites in the Grand Staircase region, due in large part to the remarkable similarities between the Cave du Pont materials recovered near Kanab (Nusbaum 1922) and those found at White Dog Cave and other sites in northeastern Arizona (Guernsey and Kidder 1921). More recently, Talbot

(1998) has suggested phase sequences that better represent local developments specific to the Grand Staircase, Arizona Strip, and St. George Basin. These phases include:

- The Vermilion Phase, which encompassed early Basketmaker II expressions from 300 BC to AD 1 and is considered coequal to the White Dog Phase in northern Arizona. Artifacts were indistinguishable between the two regions and local populations were probably dependent on maize agriculture at this time.

- The Moapa Phase encompassed the period from AD 1 to 400 when there was a rather sudden shift to village life characterized by clusters of shallow pithouses with internal storage features. It was considered coequal to the Lolomai and Grand Gulch phases to the east.

- The Mount Trumbull Phase from AD 400 to 600 was defined as a transitional period between Basketmaker II and Basketmaker III when groups shifted to upland settings and practiced dry farming, and they might have utilized pottery to a minor extent, something that becomes much more common by about AD 500.

The origins of Basketmaker II agricultural lifeways are typically discussed within the context of three hypothesized models. Irwin-Williams' Oshara Tradition suggested that the interval between 2500 and 300 BC was characterized by greater effective moisture than at present, with the exception of a drought at about 500 BC. If Archaic populations expanded in response to increased carrying capacity of local environments, then a drought would have prompted some groups to intensify agricultural production and implement storage strategies, thus

Circle Cliffs

Photo: Dan Bauer

initiating a transition to Basketmaker lifeways now recognized in the archaeological record (Irwin-Williams 1973; see also Wills 1988).

Other researchers have advanced the idea that climatic changes resulted in large-scale migrations leading to depopulation of some areas and population aggregation in others, and that the origins of the Basketmaker II manifestation on the Colorado Plateau could be found in the San Pedro culture of southern Arizona (Berry 1982; Berry and Berry 1986; Morris and Burgh 1954; see also Irwin-Williams 1967 and Matson 1999, 2003).

Matson (1991), drawing from his research on Cedar Mesa, has also proposed an "evolutionary model of maize horticulture" independent of local development and migration scenarios, suggesting the introduction of agriculture across the Southwest was related to a series of three climate-linked stages: (1) floodwater farming in the southern deserts by 850 BC, (2) floodwater farming of low-lying areas of the Colorado Plateau by 500 BC, and (3) dry farming of the Colorado Plateau mesa tops by about AD 200. As each new farming strategy appeared, it was first as an adjunct to an earlier form and later became the dominant form, but with the earlier forms not entirely disappearing. Hence, by AD 200, a diversity of farming strategies was present, each resulting in a different settlement pattern and each characterized by pithouse residences oriented toward the primary farming strategies.

The earliest Eagles Watch dates are almost a thousand years earlier than any other previously reported maize date north of the Colorado River.

The Earliest Farmers

Fundamental to this discussion are assumptions about food production, either as a supplement to wild plants and animals or as a predominant lifeway. Agriculture would have resulted in profound changes to human behavior that distinguishes this period of time from earlier lifeways. These changes, whether labeled Basketmaker II in the Grand Staircase or Ancestral Fremont in the Escalante River Basin, are abundantly evident in the archaeological record in both sub-regions, but they are absent from the Kaiparowits Plateau area.

There is growing evidence that the spread of agriculture was relatively rapid across significant distances, and that it occurred much earlier than previously hypothesized. In his overview of the antiquity of maize, Geib (1996c:54) argued the "picture now emerging is one of widespread and relatively early (ca. 1200 BC) use of domesticates across much of the Southwest."

Evidence of maize agriculture at such an early date has proven elusive north of the Colorado River, although recent research from the Jackson Flat area south of Kanab has upended traditional assumptions that maize agriculture first appeared here about 200 BC. At the Eagles Watch, maize from a bell-shaped pit inside a pithouse returned a radiocarbon date of 2980 ±30 BP (1203 BC median probability), and another sample from a pithouse hearth returned a date of 2730 ±30 BP (870 BC median probability). The pithouse was also associated with San Pedro Corner-notched points, bell-shaped pits, and shell and turquoise ornaments (Landon and Roberts 2010; Roberts 2018).

Maize farming at such an early date would not be unusual in southern Arizona, but the earliest Eagles Watch date is almost a thousand years earlier than any other previously reported maize date north of the Colorado River. Even in southeastern Utah, where Basketmaker II research has been ongoing for more than a hundred years, the earliest evidence of maize farming comes from Six-Toe Shelter in Butler Wash, which produced a radiocarbon date of about 550 BC (Charles and Cole 2006).

The early Eagles Watch maize dates stand in stark contrast to the growing body of evidence that maize farming became established north of the Colorado River by about BC 200 and that farming had become entrenched throughout the entire northern Colorado Plateau by AD 200. Roberts (2018) believes that Eagles Watch might represent a migration of San Pedro farmers much earlier than traditionally thought (cf. Berry 1982; Matson 1991). She suggested the San Pedro farmers perhaps traveled up the Colorado River from southern Arizona into southern Nevada and southern Utah. The site itself was abandoned at about 900 BC, and it was not reoccupied until about 100 BC when Basketmaker II farmers arrived and remained there for the next seven centuries. In other words, the early dates could represent an unrelated migration centuries before the Basketmaker II farmers moved to Kanab Creek and elsewhere along the Vermilion Cliffs.

The earliest dates at Eagles Watch raise an important question: If the San Pedro farmers left by 900 BC, where did they go? One possibility is they migrated elsewhere, taking their agricultural technologies with them. If this was the case, then the re-occupations at about 100 BC could reflect a subsequent wave of Basketmaker II immigrants at that time. Another possibility is the San Pedro simply shifted to another as-yet-unidentified farming locale in the same general area. If this was the case, then farming was being practiced in the Grand Staircase area for a thousand years before the Basketmaker II florescence, and the emergence of farming would have been a long process wherein local foragers learned agriculture from their San Pedro neighbors and eventually embraced the practice as their own, an expression now labeled Basketmaker II.

Basketmaker II Farmers

Aside from those two earliest dates, most Basketmaker II evidence at Eagles Watch and other adjacent sites at Jackson Flat are consistent with multiple radiocarbon dates reported from early maize at other sites north of the Colorado River (Jennings 1980; Wilde and Newman 1989; Zweifel et al. 2006). The Jackson Flat investigations resulted in 14 maize radiocarbon dates, as well as one squash date, between about 100 BC and AD 500 (Roberts 2018), which is more than the rest of the northern Grand Staircase region combined (see Table 4.1).

Based on the cumulative evidence, it appears that agricultural technologies became commonplace by about 100 BC, and, as Geib observed (1996c:55), "the changes it wrought appeared even more revolutionary, more in line with agriculturalist colonization of the plateau." Farming rapidly became the dominant lifeway among Ancestral Puebloan groups, and by AD 200 it was entrenched among Ancestral Fremont groups as far north as the Uinta Basin (Talbot and Richens 1996) and among Basketmaker II groups as far west as the St. George Basin (Landon and Roberts 2018; Winslow 2011).

Figure 4.5: Numerous springs feed into upper Short Creek at the base of the Vermilion Cliffs, creating a reliable water source ideal for stream diversion onto agricultural fields.

Table 4.1

Site No	Site Name	General Site Location	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Dated Feature	Citations
42Ka6165	Eagles Watch	Jackson Flat	2980 ±30	-10.4	BC 1291-1116	BC 1203	Beta-360453	F30.4 Bell-Shaped Pit	Pithouse	Roberts 2018: Vol. 2: Chapter 6:9
42Ka6165	Eagles Watch	Jackson Flat	2730 ±30	-11.6	BC 928-821	BC 870	Beta-360452	F30.1 Pithouse Hearth	Pithouse	Roberts 2018: Vol. 2: Chapter 6:9
42Ka6165	Eagles Watch	Jackson Flat	2080 ±30	-10.2	BC 175-23	BC 100	Beta-360448	F92 Pithouse Hearth	Pithouse	Roberts 2018: Vol. 3: Chapter 4:9
42Ka6165	Eagles Watch	Jackson Flat	2000 ±30	-11.2	BC 67-59 AD	AD 2	Beta-417361	F94 Bell-Shaped Pit	Storage	Roberts 2018: Vol. 3: Chapter 4:9
AZ A:3:020 BLM	Rock Canyon Shelter	Uinkarets Plateau	1980 ±30	AMS	BC 40-73 AD	AD 21	Beta-373436	Stratum IVa	Cultural Fill	Janetski 2017:214
42Ka6165	Eagles Watch	Jackson Flat	1970 ±30	-10.8	BC 37-87 AD	AD 32	Beta-360447	F18.1 Pithouse Floor Pit	Pithouse	Roberts 2018: Vol. 3: Chapter 4:9
42Ka6043		Kanab Creek	1960 ±50	-9.1	BC 79-151 AD	AD 39	Beta-202621	FS-1	Site Surface	State IMACS Form; McFadden 2016:33, 297
42Ka6165	Eagles Watch	Jackson Flat	1950 ±30	-11.2	BC 24-118 AD	AD 51	Beta-360446	2022 Midden Lower Level	Midden	Roberts 2018: Vol. 3: Chapter 4:9
42Ka6165	Eagles Watch	Jackson Flat	1920 ±30	-10.6	AD 23-140	AD 83	Beta-360444	PL19 Pithouse Floor	Pithouse	Roberts 2018: Vol. 3: Chapter 4:9
42Ka6165	Eagles Watch	Jackson Flat	1880 ±30	-24	AD 69-217	AD 121	Beta-360443	F38.1 Pithouse Hearth	Pithouse	Roberts 2018: Vol. 3: Chapter 4:9
AZ A:3:020 BLM	Rock Canyon Shelter	Uinkarets Plateau	1860 ±30	AMS	AD 83-228	AD 155	Beta-373435	Stratum IVa	Cultural Fill	Janetski 2017:214
AR-030703-462	Pack Rat Cave	Snake Gulch	1810 ±70	-11.4	AD 64-375	AD 212	Beta-52397	n/a	Granary	Kaibab National Forest
42Ws3105		Short Creek	1810 ±80	-13.4 AMS	AD 40-387	AD 211	Beta-94775	Pithouse	Pithouse	James Allison, personal communication 2018
42Ka3575		Dairy Canyon	1790 ±70	-9	AD 81-390	AD 236	Beta-140952	Cist 2	Cist	Edgar 1994; McFadden 2016:292
42Ka1168	Cave du Pont	Cave Lakes Canyon	1770 ±40	-9.4	AD 143-371	AD 272	Beta-104597	Cist 30	Cist	Smiley and Robins 1997:169
42Ka1168	Cave du Pont	Cave Lakes Canyon	1740 ±40	-9.7	AD 184-385	AD 299	Beta-104596	Cist 30	Cist	Smiley and Robins 1997:169

Table 4.1 (continued)

Site No	Site Name	General Site Location	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab. No.	Provenience	Dated Feature	Citations
42Ka6163	Antechamber Site	Jackson Flat	1740 ±30	-11	AD 239-379	AD 298	Beta-417357	F17.1 Pithouse Hearth	Pithouse	Roberts 2018: Vol. 4: Chapter 1:13
42Ka3684		Flood Canyon	1690 ±80	n/a	AD 149-535	AD 350	Beta-140953	Mixed Surface	Site Surface	McFadden 2016:293
42Ka6164	Paint Pot Village	Jackson Flat	1660 ±30	-8	AD 277-487	AD 388	Beta-368070	F25.1 Pithouse Hearth	Pithouse	Roberts 2018: Vol. 3: Chapter 3:9
42Ka6164	Paint Pot Village	Jackson Flat	1650 ±30	-10	AD 334-518	AD 398	Beta-368069	F46 Pithouse Floor	Pithouse	Roberts 2018: Vol. 3: Chapter 3:9
42Ka6160	Ravens Roost	Jackson Flat	1610 ±30	-8.2	AD 393-533	AD 463	Beta-368071	F21 Hearth	Pithouse	Roberts 2018: Vol. 3: Chapter 2:7
42Ka6165	Eagles Watch	Jackson Flat	1580 ±30	-10.3	AD 415-545	AD 483	Beta-360454	2006.2 Pithouse Floor Pit	Pithouse	Roberts 2018: Vol. 3: Chapter 4:9
42Ka1576	Indian Canyon Pictographs	Indian Canyon	1570 ±70	-9.3 AMS	AD 340-620	AD 486	Beta-128986	Disturbed Fill	Site Surface	McFadden 2016:288
42Ka6165	Eagles Watch	Jackson Flat	1570 ±30	-9.6	AD 421-553	AD 483	Beta-362337	F1000 Hearth	Pithouse	Roberts 2018: Vol. 4: Chapter 4:16
42Ka6164	Paint Pot Village	Jackson Flat	1550 ±30	-10.7	AD 428-574	AD 486	Beta-368068	F39 Cist	Slab-Lined Cist	Roberts 2018: Vol. 3: Chapter 3:9
42Ka6163	Antechamber Site	Jackson Flat	1550 ±30	-9.2	AD 429-574	AD 487	Beta-362329	F39.1 Pithouse Hearth	Pithouse	Roberts 2018: Vol. 4, Chapter 1:13
42Ka6165	Eagles Watch	Jackson Flat	1550 ±30	-8.6	AD 428-573	AD 485	Beta-390952	F1400 Hearth	Pithouse	Roberts 2018: Vol. 4: Chapter 4:16

Table 4.1: Basketmaker II-age radiocarbon dates from cultigens recovered from sites in the Grand Staircase and Arizona Strip regions. All dates derived from maize except Beta-360446 (maize and squash) and Beta-360443 (squash). The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

It is increasingly clear that once Basketmaker groups embraced farming they became highly dependent on agricultural foods. In fact, "the idea that the Basketmaker II were modified hunters and gatherers, not dependent on maize, can no longer be maintained as true for all Basketmakers" or even for most of them (Matson and Chisholm 1991:456; see also Coltrain et al. 2007).

Matson (2006b) has cautioned that the mere presence of domesticated foods is not enough to label a site as Basketmaker II. Rather, there should be other corroborating evidence, such as increased sedentism, complex storage strategies, and increased dependence on cultivated resources. Archaic groups might have cultivated a small amount of maize over a long period of time, but it would have been a minor part of the overall diet. As such, the real question is not when maize was introduced, but when it became the primary food in the diet (see also Matson 1991). In the Grand Staircase region, all of Matson's criteria are well satisfied, and most of the sites discussed in this chapter are consistent with data reported from Basketmaker II sites elsewhere in the Southwest.

The idea that Basketmaker II people were modified hunters and gatherers not dependent on maize is certainly not true for all Basketmakers, perhaps not even for most of them.

Maize appears to have become a primary food staple perhaps as early as BC 200, based on non-cultigen dates, and certainly by 100 BC, based on dates from cultigens. But pine nuts, rice grass, and other wild plants supplemented the diet, probably serving as a buffer against crop failure (Talbot 1998). Evidence of a mixed farming and foraging strategy is especially striking at Cave du Pont, a Basketmaker II storage site near Kanab that was excavated in 1920. Storage cists revealed a wealth of maize and squash remains, as well as acorns, grass seeds, sunflower seeds, yucca fruits, and Ephedra seeds. Recovered materials also included a wide variety of animal snares, meat processing tools, and remains of deer, jackrabbit, cottontail rabbit, beaver, and birds, suggesting that hunting was also an important component of Basketmaker II subsistence (Kidder and Guernsey 1922:70-72).

A mixed farming and foraging strategy was also evident at Basketmaker II residential sites in the Short Creek area (Berg et al. 2003; Nielson 1998), and at Rock Canyon Shelter, a complex foraging base camp in the lower Short Creek area (Janetski et al. 2013). Other sites dated to the same period, although uncommon, are focused entirely toward wild food resources (Reid and Betenson 2013; Talbot et al. 1999). In short, foraging appears to have been significant part of local subsistence, even if maize farming was of greater importance to some groups.

Wills (1988) and Talbot and Richens (1996) have argued that maize cultivation consisted of two critical periods, once in the spring during planting and once during the fall harvest. Group size would have been greatest during the field preparation and planting season, after which some in the group stayed behind to tend crops while others hunted and gathered. It would be expected, therefore, that sites in the Grand Staircase region exhibit evidence of sedentary residences oriented toward fields and logistical foraging camps located within a reasonable distance of the permanent residences. But that might not have been the case. No hunting and gathering sites have yet been dated to the Early Agricultural period in the northern Grand Staircase, although a few have been reported on the Arizona Strip to the south.

The assumption that foraging played a significant and dynamic roll in subsistence is also at odds with dietary evidence from the Virgin Branch region, where analysis of human remains (Martin

Figure 4.6: When it was first investigated in 1920, Cave du Pont was the first site anywhere in the Southwest that did not have more recent occupations built over the top of the Basketmaker II features. These cists contained maize at the time they were excavated. One of the cists was probably built in AD 217.

1998, 1999) demonstrated that maize dependence during Basketmaker II-III times was essentially the same as during later Pueblo times, or about 75 percent of the total caloric intake. Meat consumption was estimated at only 10 percent of the diet. Martin's conclusions are consistent with recent studies of human remains from the Tommy Turf Site near Kanab that found a maize dependency nearly identical to Basketmaker II diets elsewhere in the Southwest and that local populations were already heavily dependent on maize as a primary food source by about 50 BC (Zweifel et al. 2006). In other words, wild resources contributed little to the diet once farmers began tilling fields.

At least 93 radiocarbon dates have now been reported from the Grand Staircase and contiguous Arizona Strip that are attributed to Early Agricultural times. The majority are indirectly associated with corncobs, maize pollen, and occasionally kernels. Representative examples of Basketmaker II farming sites, are briefly summarized below (directly dated cultigens are summarized in Table 4.1 above):

- Hog Canyon Dune is a large pithouse located at the confluence of Hog Canyon and Kanab Creek. This site offers the earliest evidence that maize agriculture was practiced in the area after San Pedro farmers had abandoned Eagles Watch (see discussion above). A date of 2530 $\pm$110 BP (637 BC median probability) was reported from a burial associated with maize kernels (Schleisman and Nielson 1987). The earliest radiocarbon date seemed at the time of the excavations to be anomalous when compared to the other dates and other nearby sites with maize, but in light of the two earlier maize dates from Jackson Flats, there is certainly the possibility that maize was being grown in the area in the centuries after the San Pedro farmers abandoned Eagles Watch.

- Cave du Pont yielded large quantities of maize in large slab-lined storage features (Figure 4.6). Cist 7, the only undisturbed cist, yielded 3.5 bushels of maize; Cist 4 yielded 16 ears of maize; and Cist 30 yielded a cache of seed corn. Also present was a large squash with a light grayish-green rind streaked with irregular markings of dark, brownish-green.

The corncobs all had from 10 to 18 rows. Stallings (1941) reported a tree-ring date of AD 217(rb), and a later re-examination confirmed the date, as well as a second date of AD 220(b) (McFadden 2016:29). These dates are also consistent with two subsequent radiocarbon dates from maize remains recovered from Cist 30 (Smiley and Robins 1997).

- Dairy Canyon Alcove features several bell-shaped hardpan storage cists in the floor of a shelter, one of which contained burials. Another contained about a bushel of maize and a mass of juniper bark. All of the cobs were 10-row to 16-row types similar to those found at Cave du Pont (Edgar 1994). One 12-row cob returned a radiocarbon date of 1790 ±70 BP (AD 236 median probability). The site was ideally situated to exploit either the spring-fed bottomlands or the extensive tablelands above (McFadden 2016).

- Although badly looted at the time of investigations, the South Fork Indian Canyon Pictograph Site once contained multiple slab-lined cists and corncobs that featured 10 to 16 rows of kernels similar to those at Cave du Pont and the Dairy Canyon burial sites. Shavings from a structural timber returned a radiocarbon date of 1670 ±110 BP (AD 369 median probability) and a corncob returned a date of 1570 ±70 BP (AD 486 median probability), both consistent with the latter part of the Basketmaker II period. Three much earlier tree-ring dates were also obtained: 81 BC (++vv), 3 BC (++rGB), and AD 5 (++GB). The disparity between the tree-ring and radiocarbon dates led McFadden (2016) to suggest the site had been utilized over a period of several centuries.

- Several sites in the Snake Gulch area on the Arizona Strip feature storage structures with maize remains. One corncob from a site with abundant rock art, returned a radiocarbon date of 1810 ±70 BP (AD 212 median probability), the earliest maize date yet reported from a granary on the Arizona Strip (Connie Reid, personal communication 2018).

The earliest Basketmaker II occupants of Jackson Flats might have been much more mobile than later generations, reflecting seasonal movement between summer field houses next to maize fields to upland base camps to exploit wild resources.

Grand Staircase Foragers

Radiocarbon data related to concurrent hunting and gathering in the region is comparatively rare, and all reported evidence was derived from a handful of sites on the Arizona Strip to the south and west of the Vermilion Cliffs. Rock Canyon Shelter, located in the lower Short Creek area, is important because it demonstrates that maize was transported long distances to supplement diets during foraging activities. Maize remains were clearly associated with a level that produced radiocarbon dates of 2030 ±70 years BP (44 BC median probability) and 2020 ±60 BP (29 BC median probability). These deposits also indicated a heavy reliance on wild plants, including pinyon nuts, cacti, yucca, grasses, and wild gourds, as well as cottontail rabbits and bighorn sheep (Janetski et al. 2013).

Roberts (2018) believes the earliest Basketmaker II occupants of Jackson Flats were much more mobile than were later generations, and this could reflect seasonal movement between summer field houses next to maize fields to upland base camps to exploit wild resources (Roberts 2018). Wild resources were also abundant at several other open residential sites in the area where maize pollen was also present (Berg et al. 2003). And there are a handful of sites in the Grand Canyon and Kaibab Plateau areas that appear to be hunting and gathering camps, but without maize (Fairley et al. 1994; Jones 1986b; Reid and Betenson 2013; Schroedl 1988).

Table 4.2

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Dated Feature	Citations
AR-03-07-03-2942		Snake Gulch	Charred Material	2030 ±30	-21.3	BC 142-43 AD	BC 29	Beta-322437	F1, Unit 5, 17cm Depth	Roasting Pit	Reid and Betenson 2013:29
AZ A:3:20 BLM	Rock Canyon Shelter	Uinkarets Plateau	Pooled Charcoal	2030 ±70	n/a	BC 264-109 AD	BC 44	Beta-14604	Stratum IV	Gray-Brown Sediments	Janetski et al. 2013:126
AZ A:3:20 BLM	Rock Canyon Shelter	Uinkarets Plateau	Pooled Charcoal	2020 ±60	n/a	BC 179-97 AD	BC 29	Beta-14603	Stratum IV	Gray-Brown Sediments	Janetski et al. 2013:126
AZ A:3:1 ASM	Antelope Cave	Uinkarets Plateau	Wood	1859 ±60	n/a	AD 39-324	AD 170	Beta-8394	Rear Midden	Midden	Janetski et al. 2013:24
AZ B:11:44		Grand Canyon	Charred Material	1820 ±40	-26.9	AD 78-267	AD 167	Beta-147222	Feature 1 Roasting Pit	Roasting Pit	Grand Canyon-NPS Files
AR-030703-1042	Indian Hollow	Lower Kanab Creek	Matting	1675 ±49	-9.5	AD 254-520	AD 367	AA-66724	n/a	n/a	Kaibab National Forest
AZ B:8:7	Crane Lake	Kaibab Plateau	Charcoal	1640 ±70	n/a	AD 246-561	AD 413	Beta-24071	Locus F, Strata IIIa-Iva, Hearth	Hearth	Schroedl 1988:57
AZ A:12:148 BLM		Tuweep Valley	Charcoal	1640 ±90	Corrected	AD 190-588	AD 408	Beta (?)	Hearth	Hearth	AZ Site Form
AZ B:15:7	Tuna Creek Site	Grand Canyon	Charcoal	1595 ±65	Corrected	AD 311-592	AD 469	WSU-3045	Aceramic Level III	Roasting Pit	Jones 1986:105

Table 4.2: Basketmaker II-age radiocarbon dates from foraging sites in the Arizona Strip region. Foraging sites attributed to this period of time have not yet been documented in the northern Grand Staircase. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

The nine Arizona Strip radiocarbon dates associated with foraging or hunting activities are all contemporaneous with the advent of Basketmaker II farming along the base of the Vermilion Cliffs. In fact, no foraging dates of any kind have been reported in the northern Grand Staircase between about 1000 and 100 BC, unlike most of the northern Colorado Plateau where the number of reported dates increased dramatically at this time. The foraging sites attributable to this period of time are summarized in Table 4.2.

The absence of foraging sites in the northern Grand Staircase at this time is perplexing. Abundant Basketmaker II farming sites are found in an arc along the base of the Vermilion Cliffs, from St. George on the west to Johnson Canyon on the east. If those farmers, as Roberts (2018) suggested, were making seasonal forays into high elevations to gather wild plants and hunt mule deer, then there should be an abundance of contemporaneous forager-hunting camps in the uplands of the Paunsaugunt and Markagunt plateaus and Little Creek Mountain. But these have not yet been identified. In contrast, dozens of radiocarbon dates have been reported from foraging and hunting sites in the Escalante River Basin to the east and in the St. George Basin to the west at this same time. In both regions, the coexistence of farming and foraging at this time is unmistakable.

Agriculture was slower to arrive in the Fremont world, but once it did the shift from foraging to agricultural lifeways was almost immediate.

Foraging and Farming Along the Escalante River

The advent of agricultural lifeways in the Escalante River Basin appears to have lagged two or three centuries behind the Basketmaker II florescence in the Grand Staircase. At least 17 radiocarbon dates have now been reported from corncobs or maize kernels collected from sites along the Escalante River or its lower tributaries, and another three dates have been reported from sites in the Waterpocket Fold (Table 4.3). For the most part, these dates suggest a rather sudden appearance of maize farming at about AD 200 among groups considered to be antecedent to Fremont farmers.

Researchers north of the Colorado River have taken great care to avoid using the Basketmaker label when describing farming adaptations in the Escalante River Basin (cf. Geib 1996c), although there is no consensus as to what to call them. Among the distinctions:

- Ancestral Fremont groups (and even later Fremont groups) were more mobile, relying on hunting and gathering to a much greater degree.

- Ancestral Fremont architecture was less formalized, storage structures were smaller, and there is little evidence of social complexity beyond the nuclear or extended family.

- Basketry and other material culture traits suggest Ancestral Fremont groups were modifying and expanding on Archaic technologies originating on the northern Colorado Plateau and eastern Great Basin that were decidedly different from those south of the river.

- Farming in the Escalante River area appears to have been a local development with Archaic groups adding farming to their otherwise mobile lifeways to a greater or lesser degree, with some groups never fully embracing agriculture or sedentary lifeways.

The timing of agriculture in the Escalante River Basin is consistent with the appearance of farming sites throughout the northern Colorado Plateau. Talbot and Richens (1996) have observed that farming spread rapidly into every suitable agricultural niche north of the Colorado Plateau by

Table 4.3

Site No	Site Name	General Location	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Dated Feature	Citations
42Ka0172	Alvey Site	Escalante River	2260 ±90	-10.8	BC 673-82	BC 303	Beta-34944	Aceramic Level 1, Feature 47	Cultural Fill; Date Rejected	Geib 1996c:58
42Ka0172	Alvey Site	Escalante River	1830 ±50	-10	AD 81-322	AD 186	AA-10375	Aceramic Level 1, Feature 56	Cultural Fill	Geib 1996c:58
42Ga0288	Triangle Cave	Escalante River	1770 ±90	-11.2	AD 69-484	AD 260	Beta-34941	Structure 2	Unknown Structure	Geib 1996c:58
42Wn2234		Waterpocket Fold	1770 +50	-9.2 AMS	AD 135-379	AD 265	Beta-161592	Test Pit Below Alcove	Midden	Janetski et al. 2005:230
42Ga4536	Bear Tracks	Escalante River	1760 ±80	-19	AD 90-462	AD 272	Beta-134612	Surface	Site Surface	McFadden 2016:302
42Ka0172	Alvey Site	Escalante River	1755 ±50	-10	AD 141-387	AD 285	AA-10374	Aceramic Level 1, Feature 47	Cultural Fill	Geib 1996c:58
42Ka0172	Alvey Site	Escalante River	1735 ±50	-10	AD 157-401	AD 302	AA-10373	Aceramic Level 1, Feature 47	Cultural Fill	Geib 1996c:58
42Ga0105	Dry Laid Heaven	Escalante River	1720 ±60	-12	AD 156-475	AD 318	Beta-67495	Surface	Site Surface	Geib 1996a:20
42Wn0181		Waterpocket Fold	1700 +50	-11.3 AMS	AD 226-490	AD 343	Beta-124182	Alcove Surface	Charcoal Staining	Janetski et al. 2005:230
42Ka0172	Alvey Site	Escalante River	1690 ±80	-11.1	AD 148-536	AD 348	Beta-34942	Level II, Feature 31	Cultural Fill	Geib 1996c:58
42Ga4542		Escalante River	1650 ±70	-10.4	AD 238-557	AD 396	Beta-134615	Locus A	Site Surface	McFadden 2016:302
42Ga0103	Pantry Alcove	Escalante River	1640 ±80	-12	AD 224-578	AD 412	Beta-34936	Cist 7	Storage Cist	Geib 1996d:87
42Wn1897		Waterpocket Fold	1620 +50	AMS	AD 298-547	AD 444	CAMS-76738	Packrat Midden	Packrat Midden	Janetski et al. 2005:230
42Ga4521		Escalante River	1610 ±120	-10.1	AD 146-637	AD 436	Beta-134611	Site Surface	Site Surface	McFadden 2016:302
42Ga4540	Little Cathedral	Escalante River	1610 ±40	-10.6	AD 360-539	AD 462	Beta-134614	Site Surface	Site Surface	McFadden 2016:302

Table 4.3 (continued)

Site No	Site Name	General Location	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Dated Feature	Citations
42Ga0288	Triangle Cave	Escalante River	1600 $\pm$50	-10.3	AD 350-567	AD 469	AA-5224	Stratum 1 Maize Cache	Cultural Fill	Geib 1996d:58
42Ga4543		Escalante River	1590 $\pm$80	-9.8	AD 271-613	AD 472	Beta-134616	Site Surface	Site Surface	McFadden 2016:302
42Ga4655		Escalante River	1580 $\pm$40	-9.6	AD 404-562	AD 482	Beta-140954	Surface	Site Surface	McFadden 2016:302
42Ga0103	Pantry Alcove	Escalante River	1570 $\pm$70	-12.1	AD 339-621	AD 487	Beta-34937	Between Cists 7-8	Cultural Fill	Geib 1996d:87
42Ga0288	Triangle Cave	Escalante River	1570 $\pm$80	-10.1	AD 295-628	AD 486	Beta-34938	FS27.1 Stratum 2	Cultural Fill	Geib 1996c:58

Table 4.3: Early Agricultural-age radiocarbon dates from cultigens recovered from sites in the Escalante River and Waterpocket Fold regions. All dates derived from maize. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

about AD 200 to 300, and that domesticated foods quickly became the staple around which all other resource procurement activities were scheduled. In other words, agriculture was slower to arrive in the Fremont world, but once it did, the shift to agricultural lifeways was almost immediate, something that stands in stark contrast to the southern Colorado Plateau where the shift to agriculture occurred over thousands of years (cf. Minnis 1985, 1992; Wills 1988).

A suite of maize radiocarbon dates suggests maize agriculture first became established in the Escalante River Basin by about AD 200 and farming along the Escalante River was continuous over the subsequent centuries. This does not preclude the likelihood that maize farming was present earlier (e.g., Wilde and Newman 1989), only that farming had become commonplace by this time. All but one of the 20 maize radiocarbon dates are remarkably consistent (see Table 4.3). Representative examples of sites producing radiocarbon dates from maize include:

Maize agriculture had become established in the Escalante River Basin by about AD 200, and farming along the Escalante River continued unabated over the next thousand years or more.

- The Alvey Site is an alcove residential site or long-term camp in Coyote Gulch that was occupied repeatedly throughout prehistory. Three occupation levels were identified, the lowest of which (Level II) did not have ceramics, was 2 meters deep, and contained abundant maize and squash remains, as well as atlatl dart points and an atlatl fragment constructed of Gambel oak. Geib (1996c) later obtained five radiocarbon dates from corncobs, with four of the dates ranging from 1830 ±50 BP (AD 186 median probability) to 1690 ±80 BP (348 BC median probability). The fifth date of was statistically inconsistent with other dated corncobs from the same context, and it was rejected.

- Triangle Cave, an alcove residential site or long term camp in Harris Wash, featured five occupation levels, the lowest of which had no ceramics but featured abundant maize and squash remains, as well as basketry exhibiting Fremont weaving techniques (Fowler 1963). One corncob skewered on a stick, initially recovered from the floor of a structure returned a radiocarbon date of 1770 ±90 BP (AD 260 median probability), and loose maize kernels recovered adjacent to Cist 6 in the same level returned a date of 1600 ±50 BP (AD 469 median probability) (Geib 1996c).

- Pantry Alcove, an alcove storage site also in Harris Wash, had abundant maize and squash remains, as well as 13 slab-lined storage cists of varying sizes. One corncob from a cist later returned a radiocarbon date of 1640 ±80 BP (AD 412 median probability), and another recovered between two other cists returned a date of 1570 ±70 BP (AD 487 median probability) (Geib 1996c).

These early maize dates from the lower Escalante River country were obtained from museum collections, mostly from corncobs recovered by University of Utah researchers during the course of the Glen Canyon Project in the late 1950s. There was no reason to doubt the authenticity of the dates, but they were admittedly earlier than most had expected. Any doubts about their validity was erased a few years later when Don Keller, conducting inventories in the middle Escalante River region on behalf of the newly created Monument, reported a series of additional maize dates that fell neatly within the same age ranges. These samples also came from alcove sites, some of which were used for storage and others that appear to have been residential camps (Keller 2000).

Table 4.4

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Dated Feature	Citations
42Ga3138	Horse Canyon Rockshelter	Horse Canyon	Charcoal	2760 ±100	-25	BC 1198-766	BC 933	Beta-35319	Ash Basin 2	Hearth	Brown and Tipps 1987:73;Tipps 1992
42Ka2546	Bechan Cave	Bowns Canyon	Charcoal	2640 ±50	-25	BC 899-637	BC 815	A-3516	Auger Test	Charcoal Horizon	Agenbroad et al. 1989:337
42Ga5076		Big Flat	Charcoal	2520 ±80	-25	BC 805-423	BC 633	Beta-178857	FS27	Slab-Lined Roasting Pit	Schaub 2003:97
42Wn2357		Waterpocket Fold	Sarcobatus	2480 ±40	-23.7 AMS	BC 767-432	BC 628	Beta-161595	Shallow Midden Fill	Thermal Feature	Janetski et al. 2005:168, 230
42Ga5095		Big Flat	Charcoal	2430 ±70	-25	BC 765-403	BC 564	Beta-178858	FS27	Slab-Lined Roasting Pit	Schaub 2003:97
42Wn2377		Boulder Mountain	Charcoal Soils	2360 ±100	-25	BC 759-206	BC 480	Beta-133977	Feature 3 Hearth	Hearth	Boomgarden 2009:45; Wintch and Springer 2001:21
42Ga3138	Horse Canyon Rockshelter	Horse Canyon	Charcoal	2320 ±60	-25	BC 710-217	BC 392	Beta-39256	Firepit 4, Stratum 2	Hearth	Brown and Tipps 1987:73;Tipps 1992
42Wn2150	Junkyard Lounge	Boulder Mountain	Probably Charcoal	2320 ±70	n/a	BC 723-210	BC 394	Beta-144289	Hearth	Hearth	Boomgarden 2009:45
42Ka2730	Sifted Shelter	Bowns Canyon	Charcoal	2310 ±90	-25	BC 732-156	BC 387	Beta-19514	Organic Layer	Use Surface	Geib and Fairley 1986:97; Geib 1996a:23
42Wn0174		Waterpocket Fold	Pine Charcoal	2290 ±60	-20.1	BC 524-206	BC 341	Beta-124191	Hearth Fill	Hearth	Janetski et al. 2005:116, 230
42Ka2751	Sunny Beaches	Bowns Canyon	Charcoal	2260 ±230	n/a	BC 848-212 AD	BC 339	Beta-21235	Hearth 2, Locus A	Hearth	Geib and Bungart 1989:38; Bungart and Geib 1987:60
42Wn2377		Boulder Mountain	Charcoal	2260 ±70	-19.6	BC 495-132	BC 293	Beta-144291	Feature 3 Hearth	Hearth	Wintch and Springer 2001:21
42Ga3122	Long Canyon Dune	The Gulch	Charcoal	2250 ±70	-25	BC 457-120	BC 288	Beta-20669	Hearth 1	Hearth	Brown and Tipps 1987:27; Tipps 1992
42Wn2221		Waterpocket Fold	Juniper Artemesia	2230 ±100	-20.5	BC 637-43	BC 273	Beta-161591	Pit Fill	Hearth	Janetski et al. 2005:153, 230
42Wn2221		Waterpocket Fold	Juniper	2230 ±70	-20	BC 400-101	BC 277	Beta-161590	Pit Fill	Pit Feature	Janetski et al. 2005:153, 230
42Wn2150	Junkyard Lounge	Boulder Mountain	Probably Charcoal	2220 ±50	n/a	BC 384-165	BC 280	Beta-142657	Hearth	Hearth	Boomgarden 2009:45
42Ga3987		Circle Cliffs	Charcoal	2180 ±80	-22.7	BC 386-35	BC 236	Beta-101267	Test Pit	Charcoal Staining	Janetski and Talbot 1998; Richens et al. 1997:221
42Ga3119	Friendship Cove	Calf Creek	Charcoal	2160 ±90	n/a	BC 385-12 AD	BC 208	Missing	Midden	Midden	Spangler 2001:978

Table 4.4 (continued)

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Dated Feature	Citations
42Wn2150	Junkyard Lounge	Boulder Mountain	Charcoal	2150 ±60	n/a	BC 360-41	BC 196	Beta-142656	Earthen Oven	Earthen Oven	Boomgarden 2009:45;
42Ka2546	Bechan Cave	Bowns Canyon	Charcoal	2080 ±140	25	BC 415-223 AD	BC 113	GX-10501	Slab-Lined Hearth	Hearth	Agenbroad et al. 1989:343
42Wn2150	Junkyard Lounge	Boulder Mountain	Charcoal	2080 ±40	n/a	BC 195-1	BC 102	Beta-144290	Earthen Oven	Earthen Oven	Boomgarden 2009:45
42Ga3591		Boulder Creek	Charcoal	2040 ±50	Corrected	BC 178-55 AD	BC 51	Beta-54183	Looted Cist	Slab-Lined Feature	McFadden 2016:180, 300
42Ga0456		Waterpocket Fold	Pooled Charcoal	2030 ±120	-22	BC 349-233 AD	BC 52	Beta-128681	Stratum 1 Lower Test Trench	Midden	Janetski et al. 2005:55
42Wn2250		Waterpocket Fold	Juniper	2020 ±70	-21	BC 206-120 AD	BC 32	Beta-161593	Rock-Lined Feature	Pit Feature	Janetski et al. 2005:157, 230
42Ga3743	Haymaker Bench	Haymaker Bench	Charcoal	1910 ±160	Corrected	BC 323-471 AD	AD 99	Beta-23057	F2 Slab-Lined Hearth	Hearth	McFadden 2016:180, 301
42Ka2751	Sunny Beaches	Bowns Canyon	Charcoal	1800 ±100	-25	AD 3-461	AD 224	Beta-16272	Hearth 1	Hearth	Bungart and Geib 1987:60
42Wn2046		Waterpocket Fold	Cercocarpus	1770 ±80	-23.2	AD 80-426	AD 257	Beta-108501	Lower Fill, Possible Structure	Cultural Fill	Janetski et al. 2005:134, 230
42Wn2234		Waterpocket Fold	Zea Mays	1770 ±50	-9.2 AMS	AD 135-379	AD 265	Beta-161592	Test Pit Below Alcove	Midden	Janetski et al. 2005:230
42Wn2062		Fremont River Valley	Pine Charcoal	1760 ±50	-22.3	AD 140-383	AD 279	Beta-108499	Midden Below Alcove	Midden	Janetski et al. 2005:230
42Ka2731		Bowns Canyon	Ash-Organics	1750 ±90	-25	AD 80-510	AD 279	Beta-16587	Exposed Charcoal in Arroyo Cut	Charcoal Lens	Geib and Fairley 1986
42Wn2400		Boulder Mountain	Charcoal	1750 ±70	-21	AD 115-422	AD 284	Beta-154657	Hearth	Hearth	Wintch and Springer 2001:21
42Ka2773		Bowns Canyon	Charcoal	1730 ±70	-25	AD 136-493	AD 304	Beta-16277	Slab-Lined Hearth	Hearth	Bungart and Geib 1987:98
42Ga3303	Data Bank	Twentyfive Mile Wash	Charcoal	1690 ±50	-25	AD 241-501	AD 350	Beta-67497	Hearth	Hearth	Geib 1996a:19
42Ga3303	Data Bank	Twentyfive Mile Wash	Charcoal	1690 ±90	-25	AD 136-544	AD 346	Beta-67498	Hearth	Hearth	Geib 1996a:19
42Ka2745	Meister Knapper	Bowns Canyon	Charcoal	1670 ±70	-25	AD 195-537	AD 372	Beta-16271	Hearth Locus B	Hearth	Bungart and Geib 1987:98;
42Ka5153	Sooner Water	Sooner Bench	Charcoal	1590 ±40	-12.1	AD 395-554	AD 478	Beta-146080	Hearth	Hearth	McFadden 2016:181
42Wn2047		Waterpocket Fold	Pine Charcoal	1590 ±50	-20.9	AD 361-574	AD 475	Beta-108502	Test Pit-Fill in Alcove	Cultural Fill	Janetski et al 2005:136, 230

Table 4.4: Early Agricultural-age radiocarbon dates from forager sites in the Escalante River Basin, Waterpocket Fold, and Fremont River areas. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

In summary, the maize dates from sites in the Escalante River region are associated with three types of sites: (1) Alcove sites with abundant evidence of longer-term occupations during Early Agricultural and later times, perhaps as summer field camps (2) Alcove and rockshelter sites with small cists and granaries, and (3) Alcove and rockshelter sites that appear to have been temporary camps with minimal artifact assemblages. Several of the later dates were associated with Emery Gray ceramics, which could reflect the appearance of grayware by about AD 500.

Significant occupational deposition was observed in the lowest levels at the Alvey Site and Triangle Cave, but preservation of wild plant remains in those deposits was poor or they were not described in detail, making it difficult to ascertain the importance of wild resources in relation to domesticated ones. It appears that alcoves and rockshelters that produced maize radiocarbon dates were used primarily to store maize and perhaps as temporary shelters.

Evidence of foraging lifeways is nonetheless substantial in the Escalante River Basin. This evidence comes not from the seasonal farming camps, but from hunter-gatherer encampments and special-use sites, mostly in the Bowns Canyon and Waterpocket Fold areas (see Table 4.4). Only rarely are these sites associated with any maize remnants or maize pollen, suggesting that maize was not a significant food resource when people were out hunting and gathering. As yet, there are no sites where it appears maize was transported long distances, as was the case at Rock Canyon Shelter on the Arizona Strip. There is some evidence that Escalante River forager camps had become more complex and of longer duration at this time, as evidenced by the appearance of lightly constructed houses and an abundance of food processing pits.

Analyses of wild plant materials from cave and rockshelter sites in the lower Escalante River region have revealed that important wild resources at this time included serviceberry, hackberry, prickly pear, the fleshy cones of juniper, goosefoot, native grasses, and onion bulbs. The importance of these plant foods appears to have decreased through time, particularly after cultigens appeared in the archaeological record, a trend "that may be more apparent than real since it could be a reflection of differences in site utilization, plant disposal patterns, and differential preservation" (Judges-Edwards and Hevly 1990:37).

At least 37 radiocarbon dates from forager sites in the Escalante River Basin and Waterpocket Fold areas are consistent with hunting and gathering lifeways between 1000 BC and AD 500 (Table 4.4). These include large alcove sites with deep deposits, open base camps occupied repeatedly throughout prehistory, and yet others that represent short-term, single-event activities. A representative sample of significant forager sites in the Escalante River Basin include:

- Brigham Young University investigated 131 slab-lined pit features on the Big Flat area above the Escalante River. These included forager camps with evidence of bi-gender activities, hunting camps, and hearths. The tested hearth features contained mostly fuel wood with very few remains of economic plants. None of the tested features had evidence of maize (Schaub 2003). One feature returned a radiocarbon date of 2520 $\pm$80 BP (633 BC median probability) and another at a different site returned a date of 2430 $\pm$70 BP (564 BC median probability).

- Two Early Agricultural-age radiocarbon dates were reported from Bechan Cave in the Bowns Canyon area that was repeatedly occupied in earlier Archaic times. An auger test hole produced charcoal that returned a radiocarbon date of 2640 $\pm$50 BP (BC 815 median probability) and a slab-lined cist returned a date of 2080 $\pm$140 BP (BC 113 median probability). These were assigned to a cultural period characterized by the presence of lithic flakes, a rabbit-bone bead, reeds, yucca quids, cordage fragments, a basket, and scissor-snares similar to snares recovered from Cowboy Cave (Agenbroad et al. 1989:343).

- Excavations at Horse Canyon Rockshelter, located in the Circle Cliffs, revealed abundant ground stone, lithic debitage, fragments of unburned mammal bone, and burned rock. Five cultural strata were identified with 21 features, including 10 slab-lined hearths, four ash pits, five hearths, one fire pit, and one other pit. Artifacts included bone fragments and charred plant remains, although not in significant quantities. Two Early Agricultural dates were reported, one of 2760 ±100 BP (BC 933 median probability), and the other of 2320 ±60 BP (392 BC median probability). The large amount of ground stone suggested the site was a residential base camp (Tipps 1992).

- Long Canyon Dune was located in a large sand dune and adjacent rockshelter overlooking Long Canyon Wash. Excavations revealed a circular slab-lined hearth, as well as a two-hand mano. Charcoal from a slab-lined hearth produced a radiocarbon date of 2250 ±70 BP (288 BC median probability). Primary emphasis was on wild plant foods and secondary use of animal resources (Tipps 1992).

A robust hunting and gathering subsistence strategy was being practiced in the centuries before agriculture appeared and it continued in tandem with agriculture after about AD 200.

When all of the foraging sites are considered collectively, there is convincing evidence that a robust hunting and gathering subsistence strategy was being practiced in the centuries before agriculture appeared and that it continued in tandem with agriculture after about AD 200. The foraging sites discussed here are in relative close proximity to permanent water sources, and some might have been favored camps used before and after Early Agricultural times. Most of the sites considered in this dataset were bi-gender camps where both plants and animals were collected and processed.

It should be noted there is also a forager presence in the rugged Orange Cliffs country east of the Waterpocket Fold at this same time, but these sites are markedly different. They are generally small sites with minimal artifacts and one or two hearth features. They are mostly hunting camps without evidence of plant or seed processing (Bungart 1996). This region was certainly within the spatial range of Escalante River Basin foragers.

Foraging on the Kaiparowits Plateau

There is no evidence that maize was being cultivated in the Kaiparowits Plateau region during Early Agricultural times. Based on current evidence, the Kaiparowits Plateau was utilized by people who foraged, although they themselves might have been involved in farming elsewhere. Geib et al. (2001:374) observed that Early Agricultural foraging groups in the Kaiparowits Plateau were likely in contact with farmers and perhaps experiencing changes in land-use patterns resulting from farming activities elsewhere. But actual farming of the plateau itself has not been demonstrated at this time. They observed, "One of the largest problems is that no preceramic farming sites have been excavated on the plateau so we do not know what they actually might look like."

Ten Early Agricultural-age radiocarbon dates have been reported from the Kaiparowits Plateau region, most of which are associated with foraging camps (see Table 4.5). Six of these dates were obtained from four sheltered sites along the Colorado River where the archaeological materials were described as Basketmaker II, an assignation based on the nature of certain artifacts, burials, and rock art. On the higher plateaus, sites were rarely assigned cultural affinity due to the absence of diagnostic indicators and the inability to distinguish them from earlier Archaic sites (Geib et al. 2001).

Evidence from alcove sites along the Colorado River and upland open camps suggests a foraging strategy indistinguishable from earlier

Table 4.5

Site No	Site Name	General Site Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Site Type	Citations
42Ka265	Captains Alcove	Rock Creek	Charcoal	2735 ±115	-25	BC 1207-583	BC 917	Beta-1748	Hearth 2, Occupation B	Foraging Camp	Tipps 1983:157
42Ka265	Captains Alcove	Rock Creek	Charcoal	2720 ±205	-25	BC 1388-401	BC 896	Beta-1750	Hearth 2, Occupation B	Foraging Camp	Tipps 1983:157
42Ka265	Captains Alcove	Rock Creek	Charcoal	2445 ±85	-25	BC 778-396	BC 581	Beta-1749	Hearth 3, Occupation B	Foraging Camp	Tipps 1983:157
42Ka2661	Rock Creek Alcove	Rock Creek	Human Tissue	2420 ±100	n/a	BC 780-265	BC 557	Beta-8264	Disturbed Fill	Burial Location	Nickens et al. 1988:240
42Ka4116		Navajo Point	Charcoal	2400 ±50	-25	BC 742-401	BC 498	Beta-78339	Hearth	Hunting Camp	IMACS Form; Geib 1996a:25
42Ka3384	Doughnut Alcove	Lone Rock Canyon	Grass	2320 ±80	-24.5	BC 730-200	BC 398	Beta-30568	Pit Feature	Artifact Cache	Geib 1990:268
42Ka4547		Paradise Canyon	Charcoal	2200 ±40	-21.2	BC 370-168	BC 280	Beta-144228	F1 Basin Hearth	Foraging Camp	Geib et al. 2001:93
42Ka4356	Broken Arrow Cave	Wahweap Creek	Charcoal	2000 ±70	-25.7	BC 184-148 AD	BC 11	Beta-111634	F23 in F15 Test Trench	Foraging Camp	Talbot et al. 1999:18
42Ka4552		Paradise Canyon	Charcoal	1730 ±50	-25	AD 163-404	AD 307	Beta-144230	F4 Slab-Lined Hearth	Foraging Camp	Geib et al. 2001:100
42Ka4749		Paradise Bench	Juniper Berries	1680 ±40	-21 AMS	AD 259-476	AD 363	Beta-144226	F1 Upper Fill, F6 Hearth	Foraging Camp	Geib et al. 2001:104

Table 4.5: Early Agricultural-age radiocarbon dates from forager sites in the Kaiparowits Plateau region. No evidence of early agriculture has yet been documented in this area. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

Archaic times. Some artifacts recovered from the alcove sites were consistent with Basketmaker II materials recovered elsewhere in the region, whereas the materials observed at the higher-elevation camps were not diagnostic or the evidence was considered ambiguous. The evidence also suggests that Ancestral Fremont and Basketmaker II foragers might have been utilizing the Kaiparowits Plateau at the same time.

Shelter from the Storms

Archaeologists traditionally assumed that formal houses came as a byproduct of farming, that the restraints of planting, tending, and harvesting crops would have required them to build shelter rather than seek it out. Even the first farmers in the northern Southwest were initially defined as mobile foragers who added some degree of maize farming nto their hunting and gathering lifestyle, building large cists to store maize for subsequent retrieval, but retaining their mobile lifeway. This interpretation was perpetuated by a near absence of evidence at that time for permanent or semi-permanent residences indicative of greater sedentism.

That idea has now been largely discarded. In fact, Archaic and Basketmaker II houses have now been documented throughout the northern Colorado Plateau, including the Grand Staircase region (Berg et al. 2003; Nielson 1998; Roberts 2018; Schleisman and Nielson 1988). On the other hand, residential architecture oriented toward agriculture has not yet been described for Ancestral Fremont farmers in the Escalante River Basin, even though light brush house structures have been documented at sites where they hunted and gathered wild resources.

Figure 4.7: Pithouse 3 at Ravens Roost is typical late Basketmaker II pithouses in the region that have interior benches, central hearths, and floor pits.

As we discussed in Chapter 3, the earliest evidence of residential architecture on the northern Colorado Plateau was associated with hunting and gathering activities, not agricultural endeavors. For example, Aspen Shelter, a high-elevation camp on the Wasatch Plateau, activities were focused toward the procurement of deer beginning about 2000 BC (Janetski and Wilde 2012). The Arroyo Site in GSENM, which dated to about 1700 BC, was associated with the procurement of wild plant resources and was ideally situated to exploit the migratory patterns of mule deer (McFadden 2012). Other forager "house" sites near Richfield were dated to 2000 to 600 BC (Talbot and Richens 1993), and yet others in the Fremont River Valley (Patterson and Thornton 2010) and Salina area (Patterson et al. 2003) demonstrated that foragers were "settling down" in preferred areas for longer periods of time by about 3000 BC. In the St. George Basin, formal and informal residences had been in use since 5000 BC (Talbot and Richens 2009).

This pattern of increased sedentism became much more pronounced during Early Agricultural times. In the Grand Staircase region, this took for the form of formal pithouses with prepared floors and walls, central clay-rimmed hearths, an interior bench, and either roof or lateral entries – all architectural traits that are consistent with Basketmaker II pithouses elsewhere. In the Fremont River, Waterpocket Fold, and Circle Cliffs areas, the houses were more informal and were probably foraging base camps used between about 150 BC and AD 500 (Boomgarden 2009; Janetski et al. 2005; Janetski and Talbot 1998; Lupo and Wintch 1998; Tipps 1992). These were not pithouses in the Basketmaker sense, but they were temporary residences that exhibited shallow-basin floors, light brush superstructures, and no interior features other than informal fire pits.

Basketmaker II pithouses are well documented in the Grand Staircase region, especially along the base of the Vermilion Cliffs between Kanab Creek and Short Creek.

In other words, increased sedentism represented by residential architecture has two different expressions in GSENM: (1) formal pithouses with well-defined interior and exterior features that were oriented toward farming, which are common in the Grand Staircase region (Figure 4.7), and (2) temporary shelters oriented toward hunting and gathering, which are common in the Escalante River Basin. Both are referred to in the archaeological literature as pithouses, but their form and function were entirely different.

Basketmaker II Pithouses

Pithouses in the Grand Staircase region are quite variable in terms of size and interior features, but they are generally consistent with those observed elsewhere in the northern Southwest. As Whalen (1981:86) observed, early pithouse sites in the Southwest "are invariably small, scattered, nearly identical residences, which probably accommodated nuclear families." Gilman (1987), citing ethnographic evidence, argued that pithouses were used during cold seasons, usually winter months; that groups utilizing pithouses were engaged in at least a minimal biseasonal settlement pattern; and that these groups relied on stored food while the pit structure was inhabited. Kohler (1992:620), meanwhile, believed that "maize was already such a substantial portion of the diet that the welfare of the maturing plants in the area in which the principal strategy was prosecuted could not be left to chance, but had to be monitored closely," and hence residential structures would be located next to the fields. By inference, these represent both warm and cold weather occupations.

Berry (1982:59) recognized that pithouses prior to AD 200 were lightly constructed, and they exhibited poorly defined floor areas with minimal evidence of cists, deflectors, entryways, or substantial superstructures. They were circular to oval in shape and 4 to 5 meters in diameter. By AD 200, formal pithouses with predictable interior features, including interior pits, deflector stones, roof support beams, ramp entryways, and benches had become commonplace. Matson et al. (1990) considered the florescence of Basketmaker II pithouses on the mesa tops beginning about AD 200 to be a defining characteristic of the Grand Gulch Phase of the Basketmaker II period.

Although most Basketmaker II sites feature a single pithouse, Dohm (1994) has argued that pithouses are often found in "clustered neighborhoods" or "hamlets" of 14 to 20 pithouses in relative close proximity to one another, a pattern that is more characteristic of aggregated settlements as opposed to isolated residences. These clusters are identical in that they feature a dwelling with storage to the northwest or northeast. Residential clustering suggests a much greater level of social complexity and community organization than offered by traditional models of isolated, individual households. This aggregation foreshadowed later Basketmaker III occupations in the Southwest (Chisholm and Matson 1994; Dohm 1994; Matson 1991).

Basketmaker II pithouses are now well documented in the Grand Staircase region, especially along the base of the Vermilion Cliffs between Kanab Creek and Short Creek, although a few have been documented in the upper Kanab Creek drainage. The classic Grand Gulch Phase pithouses found on the mesa tops of southeastern Utah at this time have not yet been documented as such in the Grand Staircase region. But pithouse clusters described by Dohm (1994) have been identified, especially in the Jackson Flat and Short Creek areas where the clusters range in size from three to 11 pithouses (see Berg et al. 2003; Naylor 1996; Nielson 1998; Roberts 2018).

Evidence for dry farming of mesa tops during Basketmaker II times is limited to the Little Jug Site near Mount Trumbull (Thompson and Thompson 1974, 1978), to one site on the canyon rim above Parunuweap Canyon, and another above the Shinarump Cliffs overlooking Seaman Wash (McFadden 2016), although all three sites might actually have been early Basketmaker III occupations.

Convincing evidence of Basketmaker II dry farming within GSENM remains elusive, but it is probably present. A recent survey on the mesa top above Meadow Canyon, a Johnson Canyon tributary, recently identified large sites with significant amounts of fire-cracked rock and lithic flakes, but only very minimal ground stone. Residential structures were not identified as such, but rubble mounds and disarticulated slab-lined cists were noted at several sites. The nature of the sites overlooking sandy swales was considered to be ideal for dry farming, and the sites were considered "probably Basketmaker" (Spangler and Zweifel 2016b).

At least 45 radiocarbon dates between 1000 BC and AD 500 have now been reported from actual pithouses (Table 4.6) and another 14 dates were from features in close proximity to the residential structures, mostly from exterior hearths, shade structures, or storage features (Table 4.7). Most of these dates were obtained from sites in the Jackson Flat and Short Creek areas. Considered collectively, the repetitive and predictable nature of the Basketmaker II pithouses elsewhere in the Puebloan world is largely absent in the Grand Staircase region. In fact, the only consistent pattern is that they tend to be circular or slightly oval and they usually have a central fire pit.

In the Grand Staircase region, pithouses vary greatly in size, the nature of interior features, and the location of associated storage features. In some instances, residential sites had large, formal exterior storage features. Yet other pithouses featured a multitude of small subfloor pits on the house interior, others had large interior bell-shaped pits, and yet others have no storage at all. Some pithouses were shallow (only a few centimeters) and others were moderately deep (more than a meter deep). Some pithouses had prepared clay floors and clay-collared fire pits, but others had earthen floors and informal fire pits. Some had walls where the base was constructed of vertical stone slabs, but more often the wall bases were constructed of com-

Table 4.6

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	2980 ±30	-10.4	BC 1291-1116	BC 1203	Beta-360453	F30.4 Bell-Shaped Pit	Roberts 2018: Vol. 2: Chapter 6:9
42Ka6165	Eagles Watch	Kanab Creek	Maize and Fabaceae	2730 ±30	-11.6	BC 928-821	BC 870	Beta-360452	F30.1 Pithouse Hearth	Roberts 2018: Vol. 2: Chapter 6:9
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	2080 ±30	-10.2	BC 175-23	BC 100	Beta-360448	F92 Pithouse Hearth	Roberts 2018: Vol. 3: Chapter 4:9
42Ka6158	Toad Hollow	Kanab Creek	Charred Sagebrush	2050 ±30	-26.2	BC 157-17 AD	BC 62	Beta-390954	F1 Pithouse	Roberts 2018: Vol. 3: Chapter 1:7
42Ws3105		Canaan Wash	Charcoal	2030 ±100	-25.0	BC 340-199 AD	BC 54	Beta-94774	Pithouse	J. Allison, personal communication 2018
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	1970 ±30	-10.8	BC 37-87 AD	AD 32	Beta-360447	F18.1 Pithouse Floor Pit	Roberts 2018: Vol. 3: Chapter 4:9
AZ A:4:0027 BLM	Corral PH4	Short Creek	Wood Beams	1950 ±100	n/a	BC 207-306	AD 51	Beta-92485	Pithouse 4	Naylor 1996:58
42Ws2195		Short Creek	Charcoal/ Sand	1930 ±80	n/a	BC 131-280 AD	AD 73	Beta-28336	Feature 17	Nielson 1998:7.2
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	1920 ±30	-10.6	AD 23-140	AD 83	Beta-360444	PL19 Pithouse Floor	Roberts 2018: Vol. 3: Chapter 4:9
42Ka6165	Eagles Watch	Kanab Creek	Squash Seeds	1880 ±30	-24	AD 69-217	AD 121	Beta-360443	F38.1 Pithouse Hearth	Roberts 2018: Vol. 3: Chapter 4:9
AZ B:1:35	Carling Reservoir	Short Creek	Charcoal	1880 ±50	n/a	AD 27-248	AD 129	Beta-33816	Pit Structure 8, Hearth Fill	Nielson 1998:7.1
GC-663	Little Jug	Mt. Trumbull	Unknown	1850 ±90	n/a	BC 30-373 AD	AD 171	RL-339	F73 Fill	Thompson and Thompson 1974:34
42Ka6160	Ravens Roost	Kanab Creek	Charcoal	1840 ±35	-19.57	AD 89-257	AD 175	OS-68435	F15 Hearth	Roberts 2018: Vol. 3: Chapter 2:7
AZ B:1:35	Carling Reservoir	Short Creek	Wood	1820 ±60	n/a	AD 72-350	AD 196	Beta-33813	Pit Structure 5 Above Floor	Nielson 1998:7.1
42Ws3105		Short Creek	Maize	1810 ±80	-13.4 (AMS)	AD 40-387	AD 211	Beta-94775	Pithouse	J. Allison, personal communication 2018
GC-663	Little Jug	Mt. Trumbull	Unknown	1810 ±100	n/a	BC 13-427 AD	AD 214	RL-338	F73 Floor	Thompson and Thompson 1974:34

Table 4.6 (continued)

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ws3105		Short Creek	Charcoal	1780 ±60	-25	AD 99-384	AD 249	Beta-94776	Pithouse	J. Allison, personal communication 2018
42Ka7715		Kanab Creek	Charcoal	1770 ±30	-24.9 AMS	AD 159-342	AD 280	Beta-413698	10-12cm above Feature A House Floor	J. Patterson, personal communication 2018
42Ws4240		Short Creek	Charcoal	1760 ±40	-20.1	AD 150-378	AD 284	Beta-169736	Subfloor Fire Pit, Pit House 2	Berg et al. 2003:136
GC-663	Little Jug	Mt. Trumbull	Unknown	1750 ±100	n/a	AD 65-518	AD 282	RL-337	F56 Fill	Thompson and Thompson 1974:34
42Ws4268		Short Creek	Charcoal	1740 ±50	-25	AD 154-397	AD 298	Beta-169738	F12 Fire Pit	Berg et al. 2003:178
42Ws3108		Short Creek	Charcoal	1740 ±50	-25	AD 154-396	AD 298	Beta-94777	Pithouse	J. Allison, personal communication 2018
42Ka6163	Antechamber Site	Kanab Creek	Zea Mays	1740 ±30	-11	AD 239-379	AD 298	Beta-417357	F17.1 Pithouse Hearth	Roberts 2018: Vol. 4: Chapter 1:13
42Ka7715		Kanab Creek	Charcoal	1740 ±30	-23.6 AMS	AD 239-378	AD 299	Beta-380907	Feature A House Fill 74cm below datum	Patterson et al. 2016:44
42Ka6897	Road Grade Site	Kanab Creek	Charred Material	1730 ±30	-16	AD 245-383	AD 307	Beta-390944	F62.2 Pithouse Hearth	Roberts 2018: Vol. 3: Chapter 6:37
AZ A:4:0032 BLM	Corral PH 5	Short Creek	Charcoal	1730 ±60	n/a	AD 148-422	AD 306	Beta-92484	Pit House 5	Naylor 1996:58
AZ A:4:0136 BLM	Corral PH 2	Short Creek	Charcoal	1730 ±70	n/a	AD 133-496	AD 303	Beta-96907	Pit House 2	Naylor 1996:58
AZ B:1:35	Carling Reservoir	Short Creek	Wood	1730 ±60	n/a	AD 146-423	AD 305	Beta-33811	Pit Structure 11, above floor	Nielson 1998:7.1
GC-663	Little Jug	Mt. Trumbull	Unknown	1720 ±100	n/a	AD 89-537	AD 315	RL-335	Outside F22	Thompson and Thompson 1974:34
42Ws4238		Short Creek	Charcoal	1690 ±50	-25	AD 242-505	AD 352	Beta-169734	F1.01 Fire Pit in Pit Structure	Berg et al. 2003:113
GC-663	Little Jug	Mt. Trumbull	Unknown	1690 ±100	n/a	AD 114-565	AD 349	RL-336	F79	Thompson and Thompson 1974:34
42Ka2574	Hog Canyon Dune	Kanab Creek	Charcoal	1680 ±130	n/a	AD 75-608	AD 354	Beta-8781	Pit House Hearth 1	Schleisman and Nielson 1987

Table 4.6 (continued)

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka6160	Ravens Roost	Kanab Creek	Bone Awl	1680 ±30	-17.8	AD 265-415	AD 366	Beta-417358	F34 Floor Zone	Roberts 2018: Vol. 3: Chapter 2:7
42Ka6164	Paint Pot Village	Kanab Creek	Zea Mays	1660 ±30	-8	AD 277-487	AD 388	Beta-368070	F25.1 Pithouse Hearth	Roberts 2018: Vol. 3: Chapter 3:9
42Ka2780		Seaman Wash	Wood	1660 ±90	n/a	AD 156-581	AD 386	Beta-16080	FS37 Structural Timber	McFadden 2016:35
42Ka6164	Paint Pot Village	Kanab Creek	Zea Mays	1650 ±30	-10	AD 334-518	AD 398	Beta-368069	F46 Pithouse Floor	Roberts 2018: Vol. 3: Chapter 3:9
GC-663	Little Jug	Mt. Trumbull	Unknown	1630 ±90	n/a	AD 203-598	AD 423	RL-340	F78 Floor	Thompson and Thompson 1974:34
42Ws4268		Short Creek	Charcoal	1620 ±50	-25	AD 312-548	AD 444	Beta-169741	Central Fire Pit in F19 Pit Structure	Berg et al. 2003:189
42Ka2780		Seaman Wash	Wood	1610 ±60	n/a	AD 292-572	AD 456	Beta-16079	FS7 Structural Timber	McFadden 2016:35
42Ka6160	Ravens Roost	Kanab Creek	Zea Mays	1610 ±30	-8.2	AD 393-533	AD 463	Beta-368071	F21 Hearth	Roberts 2018: Vol. 3: Chapter 2:7
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	1580 ±30	-10.3	AD 415-545	AD 483	Beta-360454	2006.2 Pithouse Floor Pit	Roberts 2018: Vol. 3: Chapter 4:9
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	1570 ±30	-9.6	AD 421-553	AD 483	Beta-362337	F1000 Hearth	Roberts 2018: Vol. 4: Chapter 4:16
42Ka7715		Kanab Creek	Charcoal	1570 ±30	-23.5 AMS	AD 421-553	AD 483	Beta-413697	Feature A House Floor	Patterson et al. 2016:44
42Ka6163	Antechamber Site	Kanab Creek	Zea Mays	1550 ±30	-9.2	AD 429-574	AD 487	Beta-362329	F39.1 Pithouse Hearth	Roberts 2018: Vol. 4, Chapter 1:13
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	1550 ±30	-8.6	AD 428-573	AD 485	Beta-390952	F1400 Hearth	Roberts 2018: Vol. 4: Chapter 4:16

Table 4.6: Basketmaker II radiocarbon dates from house features in the Grand Staircase region, mostly Kanab Creek and Short Creek. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

Table 4.7

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Dated Feature	Citations
42Ws2743		Canaan Wash	Charcoal	2240 ±90	-23.0	BC 567-68	BC 286	Beta-94773	Ramada-Like Structure	Ramada	J. Allison, personal communication 2018
42Ka7715		Kanab Creek	Charcoal	2190 ±30	-21.9	BC 356-182	BC 290	Beta-413699	Feature C Roasting Pit	Roasting Pit	Patterson et al. 2016:47
42Ws2743		Canaan Wash	Charcoal	2090 ±60	-25.0	BC 338-25 AD	BC 115	Beta-94772	Ramada-Like Structure	Ramada	J. Allison, personal communication 2018
AZ A:4:34 ASM		Short Creek	Charcoal	2070 ±40	-12.2	BC 185-10 AD	BC 89	Beta-169745	F1 Pit Structure	Rectangular Pit	Berg et al. 2003:198
42Ka7715		Kanab Creek	Charred Material	2020 ±30	-21.5	BC 110-48 AD	BC 18	Beta-413696	Feature B Hearth	Basin Hearth	Patterson et al. 2016:45
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	2000 ±30	-11.2	BC 67-59 AD	AD 2	Beta-417361	F94 Bell-Shaped Pit	Storage	Roberts 2018: Vol. 3: Chapter 4:9
42Ka6165	Eagles Watch	Kanab Creek	Squash and Maize	1950 ±30	-11.2	BC 24-118 AD	AD 51	Beta-360446	2022 Midden Lower Level	Midden	Roberts 2018: Vol. 3: Chapter 4:9
42Ka2610	Kanab Ballpark	Kanab Creek	Charcoal	1940 ±70	n/a	BC 115-228	AD 62	Beta-10844	FS6 Test Trench	Not Specified	McFadden 2016:27
42Ka2574	Hog Canyon Dune	Kanab Creek	Charcoal	1780 ±60	n/a	AD 100-381	AD 248	Beta-8783	Aceramic Midden	Midden	Schleisman and Nielson 1987:48
42Ka4478		Kanab Creek	Charcoal	1670 ±40	-22.1	AD 263-509	AD 373	Beta-252928	F8 Cist	Cist	Nash 2013:23
42Ka6163	Antechamber Site	Kanab Creek	Charcoal	1640 ±30	-12.3	AD 346-525	AD 407	Beta-390947	F12 Surface Structure	Ramada	Roberts 2018: Vol 4: Chapter 1:13
42Ws2195		Short Creek	Charcoal	1610 ±110	n/a	AD 170-630	AD 436	Beta-28334	Slab-Lined Feature 14	Not Specified	Nielson 1998:7.2
42Ka4478		Kanab Creek	Charcoal	1570 ±40	-23.5	AD 411-573	AD 486	Beta-252929	F9 Hearth	Hearth	Nash 2013:33
42Ka6164	Paint Pot Village	Kanab Creek	Zea Mays	1550 ±30	-10.7	AD 428-574	AD 486	Beta-368068	F39 Cist	Slab-Lined Cist	Roberts 2018: Vol. 3: Chapter 3:9

Table 4.7: Radiocarbon dates from features that are probably associated with Basketmaker II pithouses in the Grand Staircase region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

pacted earth. There was no predictable pattern to the location of the roof support posts, and in some instances there appears to have been no internal roof support at all, suggesting the use of cribbed log roofs (Nielson 1998) or conical brush structures (Roberts 2018).

A representative sample of pithouse sites in the northern Grand Staircase region are briefly summarized here:

- Toad Hollow, located in the Jackson Flat area, featured an unusual oval-shaped, shallow pithouse with central support posts, a compacted clay floor, a central hearth, interior floor pits, and a light brush superstructure probably covered with clay. It might also have been conical in shape. The site was interpreted as summer field house even though maize was actually quite rare in the deposits. The presence of rabbit bones and wild plants suggested the occupants were focused mostly on wild resources, and that large on-site roasting pits were used to process rabbits and larger game animals (Roberts 2018). Sagebrush charcoal from the pithouse returned a date of 2050 ±30 BP (62 BC median probability).

- The Basketmaker II components at Paint Pot included one cluster of three pithouses, a large storage cist, and exterior hearths, and another location with one pithouse, a large roasting pit, and a midden. Various pithouse features dated to the latter half of the Basketmaker II period after about AD 250. Residential features were similar to earlier residences in that they had clay-lined or compacted-soil floors, two-to-four central roof support posts, conical brush roofs, and central fire pits. In some instances, the walls were lined with vertical slabs that were later removed and used elsewhere. (Roberts 2018). Pithouse features returned four radiocarbon dates between 1660 ±30 BP (AD 388 median probability) and 1510 ±30 BP (AD 560 median probability).

- Ravens Roost also featured three tightly clustered pithouses and a fourth nearby. The radiocarbon dates suggested initial occupations between AD 100 and 200, and these continued through the entire Basketmaker II period. The pithouses reflected different levels of investment. One was small, deep, and had few associated features. One was large, shallow, and had a low interior bench. And another was deep with well-defined vertical walls, interior roof support posts, and a formal central hearth. Bone, shell, and stone beads were common, as were pendant fragments (Roberts 2018). The site returned three radiocarbon dates between 1840 ±35 BP (AD 175 median probability) and 1610 ±30 BP (AD 463 median probability).

- The Little Jug Site, located in a highland setting near Mount Trumbull, consisted of at least six Basketmaker pithouses that were circular or slightly oval and measured 3 to 4 meters in diameter. Considerable remodeling and subsequent modifications were evident, suggesting re-use through time. Some pithouses had earthen floors and others had clay floors; some had one or two small interior pits; and some had roof support posts around the outer edge of the floors. One or two might have had a bench feature, and one had a possible ramp entryway. Formal storage structures and two bell-shaped cists were identified outside the structures. Six radiocarbon dates ranged from 1850 ±90 BP (AD 171 median probability) to 1630 ±90 BP (AD 423 median probability) (Thompson and Thompson 1974, 1978).

- Hog Canyon Dune located on a sand dune at the confluence of Hog Canyon and Kanab Creek, featured a preceramic pithouse below a later Basketmaker III occupation. Radiocarbon dates associated with associated with the Basketmaker II pithouse ranged from 1780 ±60 BP (AD 248 median probability) to 1500 ±60 BP (AD 556 median probability). The house was a slab-lined structure with an unprepared earthen floor, interior post supports, and an interior slab-lined bin. (Schleisman and Nielson 1988). The site was likely occupied from about AD 300 to 630.

- The Carling Reservoir Site, located in the Short Creek area, featured 11 Basketmaker II pithouses with three or more occupational episodes. They exhibited considerable variety in form, size, and construction detail, and they were associated with eight storage features, four of them small, shallow slab-lined storage pits and four of them large, deep slab-lined cists. Associated artifacts included Gyp-

Figure 4.8: This small residence excavated along Kanab Creek was probably a temporary field house. It lacked the interior features common in pithouses used at the same time. Photo: Jody Patterson

sum, Elko Side-notched, and Basketmaker points. Three radiocarbon dates from two pithouses ranged from 1880 ±50 BP (AD 129 median probability) to 1730 ±60 BP (AD 305 median probability) (Nielson 1998).

- Naylor (1996) also identified six Basketmaker II pithouses in the Corral Canyon area along Short Creek. Three pithouse features returned three radiocarbon dates between 1950 ±100 BP (AD 51 median probability) and 1730 ±60 BP (AD 306 median probability). The pithouses were circular and ranged from 3 to 5 meters in diameter, one of which featured a prepared clay floor and possible bench. No ceramics were observed at any of the pithouses, and there was no evidence they were modified or reused in later Basketmaker III times. At least six individual pithouses were loosely clustered within about 150 meters of one another.

All of the sites discussed above appear to have been formal residences located in proximity to agricultural fields, either occurring as a single pithouse or part of a cluster of pithouses, and the pithouses exhibited some effort and energy in their construction of a relatively permanent dwelling. But other sites in this same region might represent light brush structures or seasonal residences.

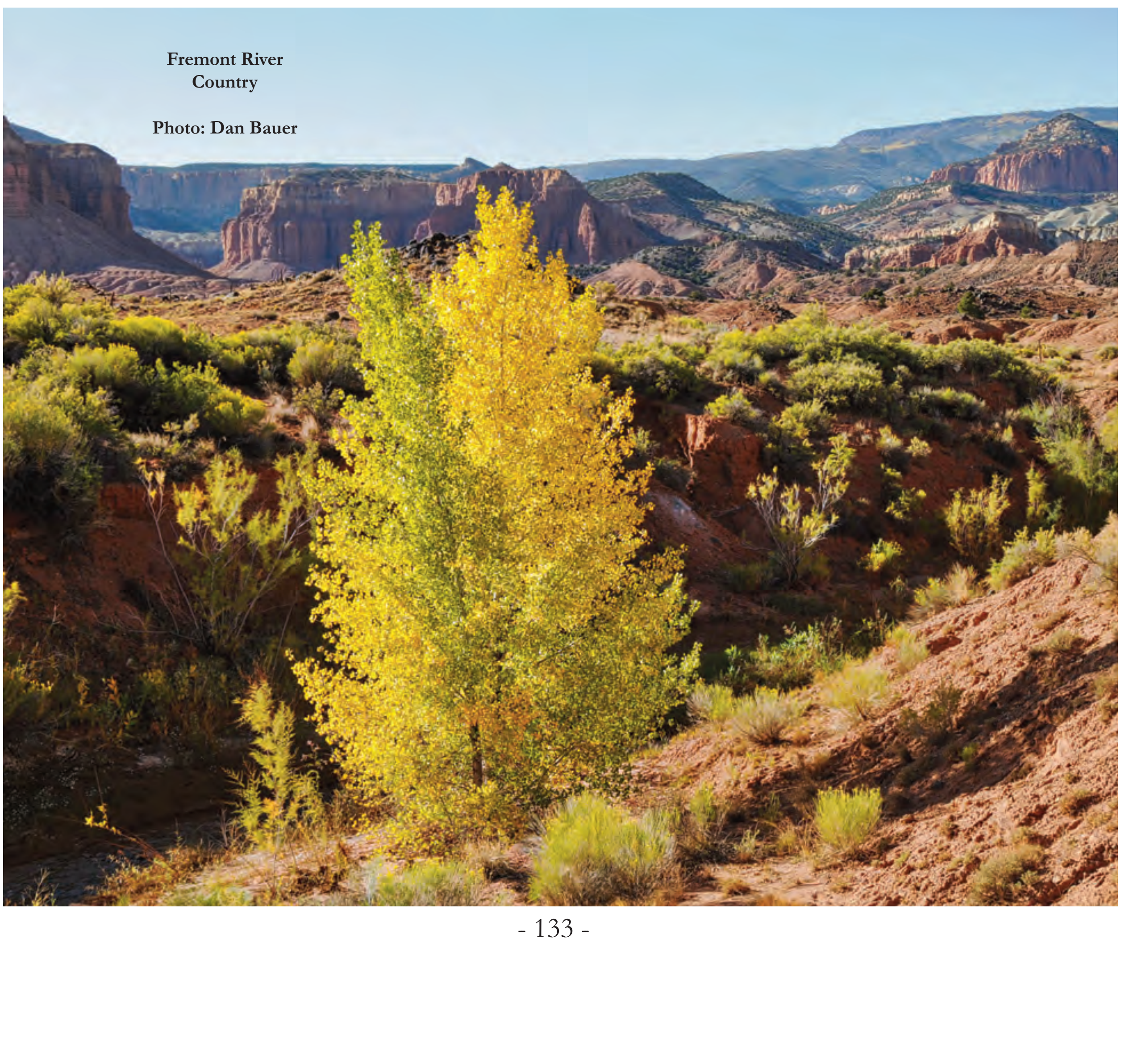
At Eagles Watch, three of the four Basketmaker II residences were shallow brush structures, probably conical in shape but without evidence of a roof support system. These were interpreted as summer field houses used between 200 BC and AD 200. The fourth structure was a true pithouse with interior support posts, a bench, and rock-lined hearth, which was occupied roughly at the same time as the brush houses. Six large bell-shaped pits indicated agriculture was successful (Roberts 2018). Ten Basketmaker II dates ranged from 2080 ±30 BP (100 BC median probability) to 1530 ±30 BP (AD 533 median probability).

Another site located at the foot of the Vermilion Cliffs in the Canaan Wash area consisted of a ramada-like structure dated to 2240 ±90 BP (286 BC median probability) and 2090 ±60 BP (115 BC median probability). It is unknown if this feature was associated with a pithouse or maize cultivation, but this was likely the case (James Allison, personal communication 2018).

And another site in the Short Creek area featured a shallow pit structure that was probably too small to have been a formal pithouse. It returned a date of 2070 $\pm$40 BP (89 BC median probability). No maize remains were identified, but a turkey bone was found (Berg et al. 2003); this radiocarbon date is the earliest reported anywhere in the region associated with turkeys. Turkeys had been domesticated in the Cedar Mesa area of southeastern Utah during Basketmaker II times (Matson 2018), but there is not yet any evidence of this in the Grand Staircase region until eight or nine centuries later. The Short Creek turkey bone could be evidence that turkeys were domesticated much earlier than traditionally thought, or it might represent the hunting of wild turkeys.

Another site in the Kanab Creek area featured a shallow oval depression that might have been a lightly constructed field house (Figure 4.8). There was no central fire pit, suggesting it was occupied during warmer seasons (Patterson et al. 2016). The site yielded five radiocarbon dates between 2190 $\pm$30 BP (290 BC median probability) and 1570 $\pm$30 BP (AD 483 median probability). The house structure was probably associated with a neighboring site with a two-tiered or "benched" storage cist with an estimated capacity of 90 bushels of unshelled maize. This cist produced a radiocarbon dates of 1670 $\pm$40 (AD 373 median probability), and a nearby hearth returned a date of 1570 $\pm$40 (AD 486 median probability) (Nash 2013). Benched storage cists were also described at Jackson Flat (Roberts 2018).

Considered together, these sites could represent summer residential activities peripheral to more permanent residences elsewhere, but where maize cultivation along Kanab Creek was



Fremont River Country

Photo: Dan Bauer

still the primary focus of these occupations. The size of the cist hints at the acreage that would have required maintenance, and the site settings along Kanab Creek suggest Basketmaker II farmers employed floodwater irrigation at this time. The lightly constructed residential structure lacks all of the interior features evident at Basketmaker II pithouses elsewhere in this region. Also perplexing is the size of the storage cist that suggests longer-term, perhaps year-round occupation, whereas the residential structure implies very temporary, seasonal use.

Formal pithouses with interior features such as benches, ventilator-tunnel entryways, prepared clay floors and fire pits, and subfloor storage pits have yet to be documented in the Escalante River region prior to about AD 750.

In summary, Basketmaker II pithouse architecture indicative of increased sedentism might have appeared in this region about 100 BC, first in the Jackson Flat area. By AD 1, small hamlets had been established in the Jackson Flat and upper Short Creek areas. By AD 200, formal pithouses were commonplace all along the foot of the Vermilion Cliffs from the St. George Basin on the west to Johnson Canyon on the east. At this same time, some groups might have expanded into upland settings that would have required dry farming.

Pithouses might have become more formalized through time with the addition of benches, antechambers, tunnel vents, clay-lined floors and fire pits, and subfloor pits. But there is extreme variability from one Basketmaker II pithouse to the next. It appears that pithouses with formal features were contemporaneous with those with earthen floors, informal fire pits, and minimal (if any) storage. This perception could change once the radiocarbon database is enhanced to include not only different types of pithouses, but different types of features found within and outside the pithouses themselves.

The current database is insufficient to speculate as to whether different house forms represent different seasonal uses, whether different residences represent different subsistence activities, or if the differences might reflect increased complexity and permanence through time. What is clear is that formal residences are a defining characteristic of Basketmaker II groups after about 100 BC, all of whom cultivated or had access to maize.

The pithouse tradition evident in multiple Basketmaker II contexts in the Grand Staircase region might have had its roots in the earlier San Pedro occupation at Eagles Watch a thousand years before. Future research might well demonstrate that these farmers, who first occupied the Jackson Flat area from about 1200 to 900 BC, never left the area, and that their descendants continued to construct pithouses over the next 800 years. In other words, there could be a continuous pithouse tradition that has yet to be identified.

Sticks and Stones: Brush Houses of the Escalante River

The prevalence of a formal pithouse tradition is simply not found in the Escalante River Basin, or at least it has not yet been identified as such, during Early Agricultural times. There is likewise no early formal pithouse tradition in the Fremont River Valley farther to the north. Most of the 17 radiocarbon dates associated with residential architecture (see Table 4.8) are problematic: (1) The houses are not agricultural pithouses, but rather are light brush structures associated with foraging; (2) the dates are clearly erroneous; or (3) the dates are so close to the transition to the Formative that the pithouses are just as likely to be later occupations.

Table 4.8

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Dated Feature	Citations
42Wn1975	Carcass Corners	Fremont River Valley	Charcoal	2310 ±70	Corrected	BC 711-205	BC 379	Beta-91330	Feature 14A Basalt-Lined Storage Pit	Cist	Lupo and Wintch 1998:39
42Wn1975	Carcass Corners	Fremont River Valley	Charcoal	2160 ±100	Corrected	BC 395-28 AD	BC204	Beta-91331	Feature 8 Structure Floor	Residence	Lupo and Wintch 1998:39
42Ga4001		Waterpocket Fold	Charcoal	2120 ±60	-22.9	BC 348-5	BC 155	Beta-101268	Pithouse 1 Floor	Pithouse	Janetski and Talbot 1998; Richens et al. 1997:221
42Ga4418		Waterpocket Fold	Various Charcoal	2110 ±70	-22.1	BC 349-24 AD	BC 142	Beta-128679	Pit 1 Fill	Ramada	Janetski et al. 2005:89
42Ga4431		Waterpocket Fold	Charred Material	2040 ±50	-21.7	BC 178-56 AD	BC 51	Beta-128674	Pit 2 Floor	Slab-Lined Hearth	Janetski et al. 2005:93
42Ga3102	Aprylls Bench	Boulder Creek	Charcoal	2020 ±160	n/a	BC 394-331 AD	BC 44	Beta-26062	Below Rock Alignment	Charcoal Staining	Jacklin 1988:23
42Ga6264	Spillway Site	Wide Hollow	Charcoal	1880 ±30	-22	AD 69-216	AD 120	Beta-379139	NST 7 Feature 10 Bell Shaped Pit	Storage Pit	Bond et al. 2014:114
42Wn2401		Fremont River Valley	Wood	1820 ±80	n/a	AD 26-381	AD 202	Beta-160651	Structural Timber	Brush Structure	Boomgarden 2009:45
42Ga4086	Dos Casas	Big Flat	Charcoal	1780 ±60	-21.2	AD 99-383	AD 248	Beta-159903	Activity Area 2 Hearth	Extramural Feature	Jordan and Talbot 2002:43
42Wn2378	Steve Allen Site	Waterpocket Fold	Pine Charcoal	1760 ±60	-20.8	AD 126-397	AD 275	Beta-161599	Test Pit-Ash Stain	Charcoal Lens	Janetski et al. 2005:230
42Ga2557		Waterpocket Fold	Charcoal	1700 ±60	Corrected	AD 182-509	AD 339	Beta-7705	Pithouse	Pithouse	Tipps 1988:73
42Ga4086	Dos Casas	Big Flat	Charcoal	1630 ±80	-21.5	AD 231-583	AD 422	Beta-159902	Structure 1 Hearth	Pithouse	Jordan and Talbot 2002:35
42Ga3132	Casa del Fuego	Deer Creek	Burned Pole	1580 ±60	Corrected	AD 353-597	AD 480	Beta-35560	Pithouse Floor	Pithouse	Brown and Tipps 1987:55; Tipps 1992
42Ga4418		Waterpocket Fold	Pine Charcoal	1580 ±80	-22.6	AD 275-620	AD 477	Beta-128680	Structure Fill	Ramada	Janetski et al. 2005:89
42Ga4437		Waterpocket Fold	Charcoal	1570 ±70	-22.8	AD 341-619	AD 488	Beta-128675	Test Trench	Oval Alignment	Janetski et al. 2005:99
42Ga5167	Calf Creek Camp	Calf Creek	Charcoal	1550 ±40	-23.3	AD 421-593	AD 493	Beta-255667	Structure Fill	Residence	McFadden 2016:192
42Ga3132	Casa del Fuego	Deer Creek	Charcoal	1550 ±60	Corrected	AD 393-621	AD 501	Beta-20671	Pit House Post Hole	Pithouse	Brown and Tipps 1987:55; Geib 1996a:18; Tipps 1992

Table 4.8: Early Agricultural-age radiocarbon dates associated with residential structures in the Escalante River Basin and Fremont River Valley. These are likely antecedent to the Fremont Complex or were early Fremont residences based on the presence of grayware ceramics. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

Furthermore, most of the house structures that have been identified lack formal features such as interior pits, prepared clay floors, and clay-rimmed fire-pits, and none are true pithouses in that they generally feature simple saucer-shaped floors only a few centimeters deep. Generally, they are consistent with observations by Janetski (1993:236) that preceramic pithouses north of the Colorado River tend to be "shallow, basin-shaped, oval-to-circular structures containing central, unprepared hearths, and roofs constructed using leaners placed over the house depression rather than within it. House size seems to be quite small, as all are under 4 meters in diameter," and they reflect expediency rather than durability.

The absence of evidence for substantial pithouses in the Escalante River Basin is perplexing. As we discussed above, maize farming proliferated in this region within a couple of centuries of when it became entrenched in the neighboring Grand Staircase, and if maize farming requires some level of sedentism to facilitate planting, field maintenance, and harvesting then there should be evidence of residences situated in close proximity to the fields. This has not yet been demonstrated. Instead, lightly constructed houses in this region seem to be oriented toward procurement of wild plants and animals. In fact, formal pithouses with interior features such as benches, vent-tunnel entryways, prepared clay floors and fire pits, and subfloor storage pits have yet to be documented in this region prior to about AD 750.

This raises several possibilities. One is that Ancestral Fremont farmers of the Escalante River Basin constructed pithouses in much the same manner as early farmers in the Grand Staircase and elsewhere in the Southwest, but these have not yet been identified or they are obscured by later Fremont pithouses built over the top of them. This might be the case at the Spillway Site, located in the Wide Hollow area, which is a Fremont residential site occupied repeatedly during Formative times. But one bell-shaped pit here returned an earlier-than-expected date of 1880 $\pm$30 BP (AD 120 median probability), although an associated pithouse was not identified (Bond et al. 2014). Given that bell-shaped storage pits were directly associated with later pithouses (some are even in the floors of the pithouses themselves), it is reasonable to speculate that Early Agricultural pithouses were also associated with bell-shaped pits and that the earlier residences went undetected.

Another scenario is that Ancestral Fremont farmers were tethered to a greater or lesser degree to the Escalante River where there is an abundance of rockshelters and alcoves that could have afforded long-term or seasonal shelter, and therefore the construction of permanent or semi-permanent residences would have been redundant. Evidence of longer-term or repeated use of natural shelters during Early Agricultural times was noted at Triangle Cave and the Alvey Site, but evidence of permanent residential architecture was generally absent at such sites. It is also possible that the people who farmed fields along the river bottoms lived in temporary brush structures that would have quickly deteriorated and disappeared, leaving little evidence of the residences themselves beyond artifact scatters and cooking hearths. Evidence of ephemeral brush structures was found at Calf Creek Camp in the middle Escalante River area (Harris 2005).

Yet another possibility is that maize farming was merely a contingency strategy that supplemented more successful hunting and gathering, and that Early Agricultural groups were never sedentary long enough to require permanent or semi-permanent residences. In other words, maize fields were left unattended during foraging forays, but farming was nonetheless successful, as evidenced by the large numbers of granaries in the area. The overwhelming number of forager sites in the Escalante River Basin, especially compared to the Grand Staircase, could reflect subsistence focused predominantly on wild resources at this time. This was certainly evident at a site in the Waterpocket Fold and Circle Cliffs area where radiocarbon dates and the presence of distinctive artifacts suggested repeated occupations of the site from middle Archaic times through late Formative times, probably by groups exploiting chert outcrops in the area (Janetski et al. 2005; Janetski and Talbot 1998; Richens et al. 1997; Tipps 1992).

An example of these light brush residences is Casa del Fuego, a large foraging base camp located on a sand dune in the Deer Creek drainage. Investigations revealed a total of 36 features, including unlined pits, storage pits, a plant processing area, and a lightly constructed pithouse measuring 3.8 by 2.9 meters that was encircled by a series of support posts covered with sticks and daub. The abundance of well-worn ground stone tools, as well as storage and food processing pits, suggesting significant reliance on plant resources. Two radiocarbon dates were obtained, one of 1550 ±60 BP (AD 501 median probability) from a pithouse hearth or posthole and another of 1580 ±60 BP (AD 480 median probability) from remnants of a pole. These dates suggest some level of sedentism at forager encampments at the transition to Formative times (Tipps 1992).

In summary, very few of the Early Agricultural radiocarbon dates associated with residential architecture in this region can be considered evidence of increased sedentism, either by foragers or farmers. Many of the dates were clearly erroneous, they reflected the burning of wood much older than the feature itself, or they dated to early Fremont times sometime after the introduction of ceramics at about AD 500. Only three sites offer convincing evidence of pre-ceramic residential structures, and all are forager camps with minimal evidence that maize was cultivated, transported, or consumed in the area. This stands in decided contrast to evidence from the Escalante River corridor that maize had become an important part of the local diet by AD 200.

Buffering Uncertainty: Food Storage Strategies

Storage facilities have traditionally been interpreted as evidence of a commitment to agriculture, an assumption reinforced by the fact few storage facilities have produced radiocarbon or tree-ring dates consistent with hunting and gathering. And hence the timing and nature of the appearance of storage structures bears directly on the timing and nature of the transition from a foraging to a farming economy. There are also inherent assumptions that storage strategies were employed to sustain populations through non-growing seasons, and that the size, nature, and distribution of these structures would reflect increased or decreased mobility (Gilman 1987; Smiley 1993).

In the region generally, storage facilities take many forms, including pits, rooms, pots, and baskets (see Gozdzik 1985). In the Escalante River drainage, large numbers of stone-and-adobe masonry granaries were constructed in alcoves, shelters, and within protective cliff overhangs during the Early Agricultural period. These are traditionally viewed as antecedent to granaries that characterize the Fremont Complex. In the Grand Staircase region, the appearance of storage cists, often elaborately constructed slab-lined subterranean structures, is considered a hallmark of the Basketmaker II period.

Smiley (1993:248) has noted that sites with storage facilities implied a planned reuse of a location as opposed to one-time use and abandonment, and that foragers "determine only how much effort they are willing to expend in harvesting a particular resource. Farming populations have an entirely different strategy in that they determine, within their technological limits, where, when, and how much of the given types of resources will be available. They decide not only future resource availability in terms of the time of harvest, but also in terms of a supply for the most distant future through storage."

In this context, the large slab-lined storage cists located in open settings and alcoves, caves, and rockshelters are likely storage facilities for agricultural products consumed during non-growing seasons, and it can be assumed that residential sites are located in close enough proximity that food resources could be effectively retrieved as needed and that there was minimal threat of human predation. The significant number of these storage facilities suggests that agricultural production was largely a successful endeavor, producing surpluses that mandated effective storage for later consumption. The size of some structures is such that the amount of stored food could have accommodated relatively large groups for significant periods of time.

Grand Staircase Storage

At least two distinct storage strategies are evident in the Grand Staircase region during Basketmaker II times. One involved storage cists in large rockshelters or alcoves where there is minimal evidence of residential activities. This has been interpreted as "off-site" storage by groups living elsewhere who might not have monitored the stored resources at all times and who retrieved foods as needed (Figure 4.10). There is some evidence that large storage chambers were also constructed in open settings without associated residences, although this might be biased by the limited scope of the excavations undertaken at those specific sites.

Another strategy involved on-site storage where stored resources could be monitored and protected from predators, including other humans. This strategy was expressed in two forms. One involved small subsurface pits in the floors of Basketmaker II pithouses, often in considerable numbers. The small size of the facilities suggests that stored foods would need to be replenished regularly. The second form involved large cists or pits, usually located 8 to 10 meters from a pithouse in a pattern that foreshadows the large contiguous storage cists of Basketmaker III and Pueblo I times (cf. Dohm 1988), but occasionally these are found within the pithouse.

Figure 4.10: This slab-lined cist at Cave du Pont is a good example of off-site storage where there is no evidence that Basketmaker II people lived nearby to monitor their storage. This suggests loss of stored foods to raiders or thieves was not a serious concern.

Table 4.9

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Storage Type	Citations
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	2980 ±30	-10.4	BC 1291-1116	BC 1203	Beta 360453	F30.4 Bell Shaped Pit	On Site Bell Shaped Pit	Roberts 2018: Vol. 2: Chapter 6:9
42Ka6165	Eagles Watch	Kanab Creek	Zea Mays	2000 ±30	-11.2	BC 67-59 AD	AD 2	Beta 417361	F94 Bell-Shaped Pit	On Site Bell Shaped Pit	Roberts 2018: Vol. 3: Chapter 4:9
AR-030703-1085		Snake Gulch	Wood	1980 ±80	n/a	BC 186-213 AD	AD 14	Beta-51396	n/a	Off Site Granary	Kaibab NF Files
AR-030703-462	Pack Rat Cave	Southern Grand Staircase	Zea Mays	1810 ±70	-11.4	AD 64-375	AD 212	Beta-52397	n/a	Off Site Granary	Kaibab National Forest
42Ka1168	Cave du Pont	Cave Lakes Canyon	Zea Mays	1770 ±40	n/a	AD 143-371	AD 272	Beta-104597	Cist 30	Off Site Cist	Smiley and Robins 1997:169
42Ka1168	Cave du Pont	Cave Lakes Canyon	Zea Mays	1740 ±40	n/a	AD 184-385	AD 299	Beta-104596	Cist 30	Off Site Cist	Smiley and Robins 1997:169
42Ka3684		Johnson Canyon	Zea Mays	1690 ±80	n/a	AD 149-535	AD 350	Beta-140953	Mixed Surface	Off Site Cist	McFadden 2016:293
AR-030703-1042 (?)	Indian Hollow Shelter	Lower Kanab Creek	Matting	1675 ±49	-9.5 AMS	AD 254-520	AD 367	AA-66724	n/a	Not Specified	Kaibab National Forest Files
42Ka1576	Indian Canyon Pictographs	Indian Canyon	Wood	1670 ±110	n/a	AD 108-598	AD 369	RL-2086	Timber Outer Rings	Off Site Cist	McFadden 2016:288
42Ka4478		Kanab Creek	Charcoal	1670 ±40	-22.1	AD 263-509	AD 373	Beta-252928	F8 Cist	On Site Cist	Nash 2013:23
42Ka1576	Indian Canyon Pictographs	Indian Canyon	Zea Mays	1570 ±70	-9.3 AMS	AD 340-620	AD 486	Beta-128986	Disturbed Fill	Off Site Cist	McFadden 2016:288
42Ka4478		Kanab Creek	Charcoal	1570 ±40	-23.5	AD 411-573	AD 486	Beta-252929	F9 Hearth	On Site Cist	Nash 2013:33
42Ka6164	Paint Pot Village	Kanab Creek	Zea Mays	1550 ±30	-10.7	AD 428-574	AD 486	Beta-368068	F39 Cist	On Site Cist	Roberts 2018: Vol. 3: Chapter 3:9

Table 4.9: Basketmaker II-age radiocarbon dates from storage features in the Grand Staircase and Arizona Strip regions. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

The earliest storage facilities in the Grand Staircase region are typically described within the context of Basketmaker II farming and by inference crop surpluses.(Table 4.9). This does not preclude the possibility they were also used to store wild seeds. As we discuss later, many of these storage structures were later used as burial chambers. Examples of sites with off-site storage include:

- Some 35 slab-lined storage chambers were investigated at Cave du Pont northwest of Kanab. One undisturbed cist yielded 3.5 bushels of corn, another had 16 ears of corn, and yet another had a cache of seed corn (Kidder and Guernsey 1922). The Cave du Pont cists all tended to be round, the floors were paved with flat stone slabs, and the walls were constructed of a single course of large upright slabs apparently selected for their uniform size and shape. The gaps in the stones were sealed with mud, grass, and juniper bark. Nusbaum (1922) believed the tops of the cist walls were flush with or slightly below the ground surface. The larger cists would have been roofed with small timbers and covered with grass and juniper bark. The smaller cists were not roofed, but were covered with layers of grass and juniper bark. Two tree-ring dates and two radiocarbon dates from the maize itself confirm the cists were constructed in the early AD 200s.

- The Indian Canyon Pictograph Site, located in the South Fork of Indian Canyon west of Kanab, might also have featured Basketmaker II slab-lined cists without evidence of on-site residences. Local residents reported to McFadden (2016) the site once contained cists similar to those at Cave du Pont. Perishable artifacts were common, including 10-to-16-row corncobs. The site also featured a complex pictograph panel exhibiting a variety of anthropomorphic styles and rows of up to 10 figures. Wood from the exterior rings of a structural timber yielded a radiocarbon date of 1670 ±110 BP (AD 369 median probability), and maize from the disturbed fill returned a radiocarbon date of 1570 ±70 BP (AD 486 median probability).

Fremont River

Photo: Jerry D. Spangler

Figure 4.11: Storage structures by their very nature were intended to store surplus foods for future use. These structures take a multitude of forms from below-ground chambers called cists to above-ground ones called granaries.

- A few storage sites without associated residential architecture have been documented at open sites in the region. In one case, the cists had been excavated into the colluvium above a seep, but there was no evidence the alcove itself was used as a residence, although there was an abundance of red pictographs (McFadden 2016). A corncob fragment yielded a radiocarbon date of 1690 ±80 BP (AD 350 median probability).

On-site storage has traditionally been interpreted as a response to perceived threats to the stored resources, either from animals, insects, or humans, and the need to minimize losses. As mentioned above, Basketmaker II pithouses in the upper Short Creek area featured small, subfloor storage pits, often in significant numbers. The small storage pits had a combined capacity of about 4 bushels, which is only enough maize for one person for a few months (see Nielson 1998).

Large storage cists within or adjacent to a pithouse were also used at this time. In fact, the earliest date at Eagles Watch, at about 1200 BC, was from maize recovered from a bell-shaped storage pit inside a small pithouse. Many of the Basketmaker II pithouses in the Jackson Flat area had associated storage facilities, either bell-shaped pits, straight-sided pits, or slab-lined pits (Roberts 2018).

Researchers at Jackson Flat noted a shift from bell-shaped storage pits in the first half of the Basketmaker II period to larger slab-lined cists in the latter half. The increasing prevalence and size of storage structures after AD 250 was seen as evidence of population expansion and a need for increased storage capacity as site organization began to assume the typical Basketmaker pattern of storage structures to the north of the residences and middens to the south (Roberts 2018).

Most of the Jackson Flat radiocarbon data were derived from the pithouses themselves, but three Basketmaker II storage features were dated. Bell-shaped pits were common in the earliest Basketmaker II contexts at Eagles Watch, ranging in size from about 2 meters in diameter and more than a meter deep. Maize from one of these returned a radiocarbon date of 2000 ±30 BP (AD 2 median probability). Another storage structure returned a date of 1530 ±30 BP (AD 533 median probability), but this might be associated with a later Basketmaker III occupation at this site (Roberts 2018).

At nearby Paint Pot Village, maize from a large slab-lined storage structure returned a date of 1550 ±30 BP (AD 486 median probability). This cist, which was associated with three pithouses, outside hearths, and a midden, measured 2.5 meters in diameter and was 1.5 meters deep (Roberts 2018). Although there were no ceramics, the large size and construction style were similar to the large cists of later Basketmaker III times.

The pattern observed at Jackson Flat is also evident at other sites in the region. Several large cists and a bell-shaped pit were noted at the Little Jug Site (Thompson and Thompson 1978), but these were not subjected to radiocarbon analysis. A large, two-tiered cist found along Kanab Creek returned a radiocarbon date of 1670 ±40 BP (AD 373 median probability) that most likely was associated with a nearby residence (Nash 2013).

One site in Parunuweap Canyon and another in the Shinarump Cliffs area are Basketmaker III sites that also produced radiocarbon dates near the end of the Basketmaker II period. The storage cists at these sites, which were not dated, might have been constructed much earlier during Basketmaker II times and were later remodeled during Basketmaker III times (McFadden 2016). And in the Meadow Canyon area, several disarticulated storage cists were identified at large aceramic sites where pithouse residences were suspected (Spangler and Zweifel 2016b).

Bedrock storage cists are also common in Basketmaker II contexts elsewhere on the Colorado Plateau and they are commonly attributed to occupations after AD 1, although they are notoriously difficult to radiocarbon date due to the absence of organic materials. One such cist, which was subsequently used as a burial chamber, contained corncobs, one of which returned a radiocarbon date of

1790 ±70 BP (AD 236 median probability), confirming this form was utilized during Basketmaker II times (Edgar 1994).

The transition from Basketmaker II to Basketmaker III in this region occurred sometime between about AD 400 and 600, by which time remote storage at sites like Cave du Pont had been replaced by on-site storage cists. This shift might have been in direct response to increasing populations and/or the presence of non-kin-related groups that mandated greater vigilance to protect stored resources. Roberts (2018) believes the greater prevalence of bell-shaped pits in early Basketmaker II times reflected greater residential mobility by groups engaged in farming and foraging. The transition to large slab-lined cists, therefore, represents larger group sizes and greater sedentism.

In summary, storage structures found in the Grand Staircase region exhibit a variety of sizes, forms, and associated features. This variability was probably a contingency strategy intended to minimize the risk that all resources would be lost in the event that one approach failed. The large slab-lined cists at Cave du Pont are noteworthy because they are conspicuous and they resulted in excellent descriptions (Nusbaum 1922), but they probably represent one of many different strategies used at the same time to accommodate surplus resources.

Escalante River Storage

Storage facilities in the Escalante River Basin are noteworthy because of the remarkable variety in their shapes and sizes, and only rarely are they described within the context of contemporaneous Basketmaker II cists and pits. Five sites in the lower Escalante River area, were interpreted as possible Basketmaker II sites because of the occurrence of "jar-shaped hardpan cists" (Geib and Fairley 1986:166). And another site in the Waterpocket Fold area, which returned a radiocarbon date of 2040 ±50 BP (51 BC median probability), was described as "an early Basketmaker II storage pit" (Janetski et al. 2005:97).

In the Escalante River Basin, storage structures are more often labeled Early Agricultural or Ancestral Fremont. They were sometimes fully subterranean chambers, such as bell-shaped pits common in Basketmaker II contexts on Black Mesa (Smiley 1985) and in Fremont contexts farther north (Janetski 1993). Others were semi-subterranean and sometimes they were surface structures commonly referred to as granaries. Some were earthen structures, others were mud structures (Figure 4.12), and yet others were stone structures with adobe used to seal the gaps between the stones. Some featured coursed masonry or walls of vertical stone slabs or some combination of both. And some were buried baskets and others were hardpan cists akin to those in the Grand Staircase. They were sometimes quite large, although smaller chambers were more common.

Collectively, the variety of storage structures that have been documented defies attempts to identify anything other than general patterns as to the nature and distribution of storage structures. Most storage structures are conspicuous in alcoves and rockshelters that afforded greater protection from the elements. And most storage sites that have yielded Early Agricultural radiocarbon dates also had evidence of later Fremont and/or Ancestral Puebloan occupations. The nature of these storage sites suggests that (1) Ancestral Fremont peoples employed a variety of strategies to guard against the potential failure of one strategy; (2) different facilities were utilized for storage of different resources; and/or (3) the different types of structures represent changes in storage strategies through time (cf. Yoder 2005).

Most of the Early Agricultural radiocarbon dates in the Escalante River region were derived from corncobs, and it is not always clear whether or not the maize samples were directly associated with a storage facility (Table 4.10). Representative examples of Early Agricultural storage sites in the Escalante River Basin are briefly summarized:

- Triangle Cave, located in Harris Wash, consisted of two masonry structures and a series of seven slab-lined cists (Fowler 1963). Maize samples returned radiocarbon dates between 1770 ±90 (AD 260 median probability) and 1480 ±50 BP (AD 581 median probability). This might be a case of on-site storage by groups using the alcove as a temporary shelter during the growing season and as a cache for seeds for the next planting (Geib 1996a, 1996c).

- Dry Laid Heaven, also in Harris Wash, consisted of a dry-laid, semicircular structure and three slab-lined cists. National Park Service officials later recovered a corncob from the surface of the site, which returned a radiocarbon date of 1720 ±60 BP (AD 318 median probability) (Geib 1996a).

- Square Cist Alcove, located in upper Bowns Canyon, features a mixed assemblage of artifacts that included ceramics (predominantly grayware and whiteware), a Bull Creek point, corncobs, squash stems, yucca pods, and acorns. Fragments of a shallow parching tray with a single-rod-and-bundle weave and non-interlocking stitches were considered typical of Pueblo III basketry found elsewhere in the Glen Canyon region. A fragment of the basket, however, returned a radiocarbon date of 1720 ±140 BP (AD 309 median probability), suggesting the date is either erroneous or that Ancestral Puebloan weaving techniques were present in the Escalante River Basin area in Early Agricultural times (Geib 1996a).

- The Alvey Site discussed above also had evidence of three slab-lined storage cists with the joints sealed with cedar bark rather than adobe. There was also evidence that baskets, gourds, and pots were utilized as subterranean cists (Gunnerson 1959b). One corncob from this level returned a date of 1690 ±80 BP (AD 348 median probability). Like Triangle Cave, this alcove appears to have been a seasonal residence (Geib 1996a, 1996c).

- Pantry Alcove contained 13 cists of varying size and construction that collectively implied repeated occupations of the shelter. Most of the cists were slab-lined. Some were simply constructed but others featured prepared clay floors and twig-and-adobe roofs. Excavations of various storage cists revealed quantities of maize, squash, a single bean, and a cache of pinyon nuts (Fowler 1963:16-21). Corncobs from one cist later returned a radiocarbon date of 1640 ±80 BP (AD 412 median probability), and

Figure 4.12: Granaries like this one along the Escalante River are above-ground structures usually placed within sheltered locations. These became larger and more elaborate during Formative times. This style with sticks and mud is referred to as wattle-and-daub or jacal.

Table 4.10

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Storage Type	Citations
42Wn1975	Carcass Corners	Fremont River Valley	Charcoal	2310 ±70	Corrected	BC 711-205	BC 379	Beta-91330	Feature 14A	Cist	Lupo and Wintch 1998:39
42Ka0172	Alvey Site	Escalante River	Zea Mays	2260 ±90	-10.8	BC 673-82	BC 303	Beta-34944	Aceramic Level 1, Feature 47	Cists	Geib 1996c:58
42Ga3591		Circle Cliffs	Charcoal	2040 ±50	Corrected	BC 178-55 AD	BC 51	Beta-54183	Looted Cist	Cist	McFadden 2016:180, 300
42Ga6264	Spillway Site	Wide Hollow	Charcoal	1880 ±30	-22 AMS	AD 69-216	AD 120	Beta-379139	NST 7 Feature 10	Bell-Shaped Pit	Bond et al. 2014:114
42Ka0172	Alvey Site	Escalante River	Zea Mays	1830 ±50	-10	AD 81-322	AD 186	AA-10375	Aceramic Level 1, Feature 56	Cists	Geib 1996c:58
42Ga0288	Triangle Cave	Escalante River	Zea Mays	1770 ±90	-11.2	AD 69-484	AD 260	Beta-34941	Structure 2, Stratum I	Cists	Geib 1996c:58
42Ka0172	Alvey Site	Escalante River	Zea Mays	1755 ±50	-10	AD 141-387	AD 285	AA-10374	Aceramic Level 1, Feature 47	Cists	Geib 1996c:58
42Ka0172	Alvey Site	Escalante River	Zea Mays	1735 ±50	-10	AD 157-401	AD 302	AA-10373	Aceramic Level 1, Feature 47	Cists	Geib 1996c:58
42Ga0105	Dry Laid Heaven	Escalante River	Zea Mays	1720 ±60	-12	AD 156-475	AD 318	Beta-67495	Surface	Granary	Geib 1996a:20
42Ka2737	Square Cist Alcove	Escalante River	Basketry	1720 ±140	-23.5	BC6-592 AD	AD 309	Beta-31974	Basket in Cist	Cist	Geib 1996a:23
42Ka0172	Alvey Site	Escalante River	Zea Mays	1690 ±80	-11.1	AD 148-536	AD 348	Beta-34942	Level II, Feature 31	Cists	Geib 1996c:58
42Ga0103	Pantry Alcove	Escalante River	Zea Mays	1640 ±80	-12	AD 224-578	AD 412	Beta-34936	Cist 7	Cists	Geib 1996d:87
42Ga4521		Escalante River	Zea Mays	1610 ±120	-10.1	AD 146-637	AD 436	Beta-134611	Site Surface	Granaries	McFadden 2016:302
42Ga4540	Little Cathedral	Escalante River	Zea Mays	1610 ±40	-10.6	AD 360-539	AD 462	Beta-134614	Site Surface	Harpan Cists	McFadden 2016:302
42Ga4543		Escalante River	Zea Mays	1590 ±80	-9.8	AD 271-613	AD 472	Beta-134616	Site Surface	Granary	McFadden 2016:302
42Ga4655		Escalante River	Zea Mays	1580 ±40	-9.6	AD 404-562	AD 482	Beta-140954	Surface	Cists	McFadden 2016:302
42Ga0103	Pantry Alcove	Escalante River	Zea Mays	1570 ±70	-12.1	AD 339-621	AD 487	Beta-34937	Between Cists 7-8	Cists	Geib 1996d:87
42Ga0288	Triangle Cave	Escalante River	Zea Mays	1570 ±80	-10.1	AD 295-628	AD 486	Beta-34938	FS27.1 Stratum 2	Cists	Geib 1996c:58

Table 4.10: Early Agricultural-age radiocarbon dates from cists and granaries in the Escalante River Basin and Fremont River Valley regions. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

maize found between two other cists yielded a radiocarbon date of 1570 ±70 BP (AD 487 median probability) (Geib 1996a, 1996c).

The Escalante River storage data are primarily inferential and potentially problematic given the evidence of site utilization during subsequent periods. Given the consistency of the maize radiocarbon dates and the abundance of evidence for domesticated cultigens, it appears that a variety of storage facilities, in particular slab-lined cists and masonry granaries, were utilized in Early Agricultural times. As mentioned above, there is no evidence here of exceptionally large subterranean slab-lined cists that were common in the Grand Staircase region at this time.

Many of the storage sites also had evidence of temporary or seasonal residential activities. Residential activities appear to have been more substantial at the Alvey Site in Coyote Gulch, although this might be the result of repeated occupations over a much longer period of time. Collectively, these sites could be examples of on-site storage where farmers were present during much of the year to monitor and protect stored resources. In other instances, the storage structures were found without evidence of any other activities, suggesting off-site storage by groups living elsewhere.

The Escalante River structures are usually much smaller than the large Basketmaker II cists of the Grand Staircase, suggesting smaller social units. The near absence of any information regarding Early Agricultural residential patterns does not allow us to speculate as to whether the storage structures represent stored resources being monitored and protected by a resident population, or whether stored foods were left unattended for long periods of time. There is no evidence that storage structures were utilized as burial chambers at this time.

Ancestral Fremont storage structures are commonplace between about AD 250 to 500, and their forms and capacity changed little during later Formative times. It is assumed the chambers were used to store food crops because the radiocarbon data reported so far have come from maize remains. This does not preclude the possibility that some granaries and cists were used to store wild food resources.

Atlatls and Arrows: Changing Technologies

Unlike the origins of maize agriculture, which can be found in the southern Colorado Plateau, bow-and-arrow technology arrived in the GSENM region from the north and/or west. It appears to have been widely utilized by Ancestral Fremont groups in the Escalante River Basin, but there is, as yet, very little evidence that Basketmaker II groups in or near the Grand Staircase area embraced this new, much more efficient hunting technology as early as the Fremont did.

The incorporation of bow-and-arrow technology into Early Agricultural lifeways marked a radical shift in hunting strategies and an improvement in the efficiency of food procurement. As summarized by Frison (1991), arrow points could be manufactured from easily obtained quarry materials and were easier to make than atlatl darts. Arrow shafts were also easier to manufacture. In addition to added convenience, the bow had a longer range, the greater velocity of arrows allowed greater penetration of prey, hunters could reduce body movement and thereby facilitate greater stealth, and proficiency was more quickly attained than with atlatls.

Arrow points were considerably thinner and smaller than dart points, and as such they would have been more fragile and less serviceable as cutting tools. The continued use of atlatl darts by Early Agricultural and/or early Formative peoples, therefore, might have been a function of dart points serving as both projectile points and hafted knives, thereby reducing the tool kit necessary for hunting trips (Weder 1980).

The spread of bow-and-arrow technology throughout the Intermountain West was originally assigned to events beginning about AD 500 (Clewlow 1967; Hester 1973; Hester and Heizer 1973), although there has been impetus to push the origins back much farther into the past. Holmer (1986) placed the initial spread of the bow-and-arrow into the eastern Great Basin sometime after

AD 300, even though evidence of Hogup Cave at that time suggested it occurred several centuries earlier than that. More recent studies from the Great Basin, northwestern Plains, and northern Colorado Plateau suggest that bow-and-arrow technology actually predates the Formative by as much as 1,000 years (Webster 1980).

The accumulated data also suggest the bow-and-arrow did not replace preexisting atlatl technology. Rather, the bow-and-arrow and atlatl were utilized together during the latter part of the Early Agricultural period, although the importance of the atlatl to prehistoric hunters steadily decreased through time.

The bow-and-arrow might have arrived in southern Utah several centuries after its appearance in northern Utah, suggesting a north-to-south diffusion of this technology. Schroedl and Coulam (1994) assigned a temporal range of AD 100 to 250 to a Cowboy Cave level containing Rose Spring Corner-notched points and arrow shafts. And Geib and Bungart (1989) agreed there is a high probability the bow-and-arrow was used in the Glen Canyon area by about AD 200.

Evidence of early bow-and-arrow use south of the Colorado River remains extremely tenuous. As summarized by Geib (1996c:65), "the many cave excavations within the Kayenta region have uncovered no evidence of Basketmaker II bow use but abundant and varied evidence of atlatl use – dart points and preforms, dart foreshafts and mainshafts, foreshafts with dart points, atlatls and atlatl weights." In fact, atlatl technology is considered a hallmark of Basketmaker II occupations throughout the region. Geib (1996c:65) has argued the collective data support the "long-held conclusion that the bow was a Basketmaker III addition … adopted sometime after about AD 500."

Geib (2011) later had a change of heart, arguing the bow and arrow appeared in the Rainbow Plateau area between AD 220 and 350, a range consistent with a small arrow point at the Antechamber Site at Jackson Flat that was associated with a hearth that dated to about AD 240 to 380 (Janetski 2018). This suggests that some Basketmaker II groups had acquired bow-and-arrow technology at roughly the same time as Ancestral Fremont groups to the east, or that it occurred within a generation or two.

For the most part, Basketmaker II groups continued to use the atlatl at the same time Ancestral Fremont groups north of the Colorado River were using the bow-and-arrow. The Colorado River might have served as an effective barrier to the spread of bow-and-arrow technology to the south, but this possibility cannot explain why Basketmaker II groups north of the river in the Kanab, Arizona Strip, and St. George Basin areas did not embrace the improved efficiency the bow-and-arrow until some 200 to 400 years after they would have encountered their Ancestral Fremont neighbors using it.

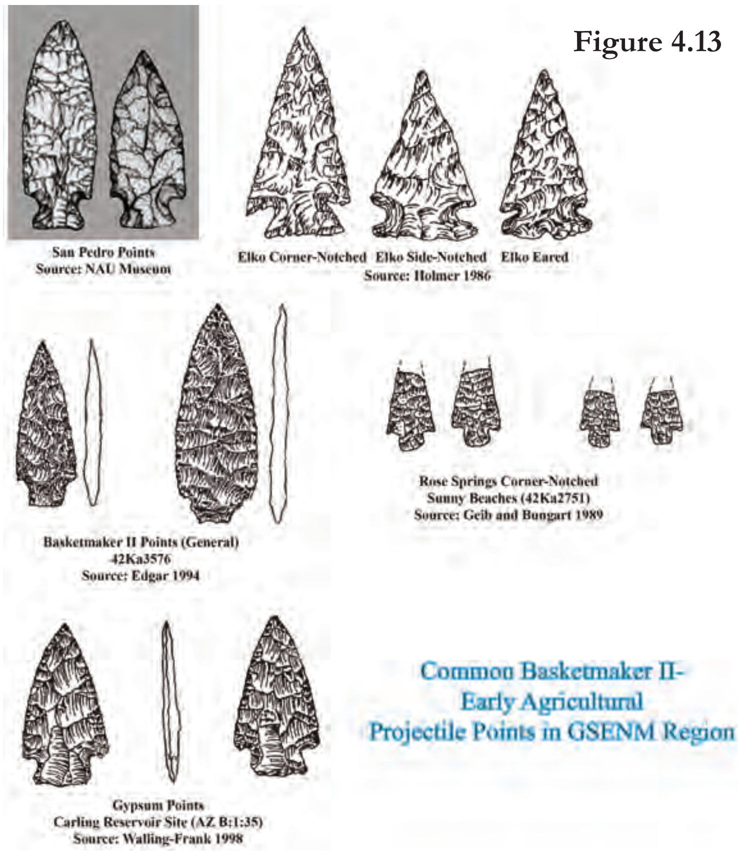


Figure 4.13

The bow-and-arrow was probably present in the Glen Canyon region by about AD 50 to 250, and this technology would have been known beyond that area. Geib and Bungart (1989:4) suggested the time lag for diffusion of bow-and-arrow technology to Basketmaker groups might be attributed to competitive relations between different ethnic groups, and "if Basketmaker II represents an influx of horticultural populations who spread across the Colorado Plateau filling in agricultural niches, then the bow might have been the competitive advantage that allowed local Proto-Fremont populations to maintain occupancy of their traditional territories."

This scenario offers an interesting insight into trade relationships at the time. The technologies and institutional knowledge required to grow maize – all originating among groups south of the Colorado River – were quickly embraced by Ancestral Fremont groups as far north as the Uinta Basin by about AD 200 to 300, but bow-and-arrow technologies that emerged about this same time were not embraced by contemporaneous Basketmaker groups until perhaps three centuries later. Projectile points described at Basketmaker II sites in the Grand Staircase area are typically dart points identified as Elko Series, San Pedro Side-notched, or Gypsum, or they are simply referred to "Basketmaker" points. Arrow points found in the Escalante River Basin at the same time are referred to as Rose Spring Corner-notched points (Figure 4.13).

For the most part, Basketmaker II groups continued to use the atlatl at the same time Ancestral Fremont groups north of the Colorado River were using the bow-and-arrow.

The best evidence for early bow-and-arrow use in the GSENM region comes from Sunny Beaches, a complex sand dune site in Bowns Canyon in the lower Escalante River country. The site was interpreted as a base camp for hunting and gathering activities during Early Agricultural times. A single cultural stratum contained Rose Spring points but without any associated ceramics. One hearth returned a radiocarbon date of 1800 ±100 BP (AD 224 median probability) and another hearth returned a date of 2260 ±230 BP (339 BC median probability), although the latter date was rejected (Geib and Bungart 1989).

Other sites in the Escalante River Basin with Rose Spring points have produced Early Agricultural radiocarbon dates, but these sites typically featured cultural deposits with later Formative diagnostics (e.g., Fremont graywares) and any direct association between the points and the dated feature is questionable. One exception is a site in the Circle Cliffs where two Rose Spring points were identified in an aceramic lower stratum that produced a radiocarbon date of 2030 ±120 BP (BC 52 median probability), a date comfortably in between the two Sunny Beaches dates (Janetski et al. 2005).

Utilization of the bow-and-arrow by Basketmaker II groups in the Grand Staircase is probably a lot more complicated than currently understood. Basketmaker farmers were undoubtedly in contact with Ancestral Fremont groups and were aware of the technology, but they seem to have preferred dart points for reasons that are not entirely clear.

It seems unlikely that Ancestral Fremont groups could have deprived their Basketmaker II neighbors of the bow-and-arrow for hundreds of years. And this presents two logical possibilities: (1) Basketmaker II groups in the Grand Staircase simply didn't want or need the technology and the improved hunting efficiencies that came with it, or (2) Basketmaker II groups actually did utilize the bow-and-arrow, but this has gone unrecognized or the evidence has consistently been rejected as intrusive from a later occupations of the same site.

There is some evidence for the latter possibility, although it is quite limited. At one site in the Kanab Creek drainage, a Rose Spring point might have been associated with a large Basketmaker II storage cist that produced radiocarbon dates of 1670 $\pm$40 BP (AD 373 median probability) and 1570 $\pm$40 years BP (AD 486 median probability) (Nash 2013). If the point and dated features are directly associated with one another, as McFadden noted (2016:32), "it might be the only arrow point recovered from a BMII site in the Grand Staircase."

Rose Spring points were also recovered at the Carling Reservoir Site near Colorado City and another site near Hildale (Nielson 1998), but their association with the dated features was considered tenuous. Both sites had significant Basketmaker II components, but both also had later occupations and the points might be unrelated to the earlier occupations. Particularly intriguing is evidence from a pithouse in the Corral Canyon tributary to Short Creek, one of a cluster of pithouses without any evidence of later Basketmaker III occupations One pithouse featured a double clay floor and a possible bench, and artifacts included a bone needle, a mano, bone awls, a small amount of lithic detritus, and the base of a Rose Spring point. The site was not radiocarbon dated, but the site was assumed to be Basketmaker II in age because ceramics were entirely absent and other pithouses in the same area produced Basketmaker II-age radiocarbon dates (Naylor 1996).

It should also be noted that a growing number of Basketmaker II sites in the Grand Staircase region have yielded points identified as Gypsum points, which appeared in this region in late Archaic times. These sometimes co-occur with Elko Series points, and occasionally with San Pedro Corner-notched and general Basketmaker II points, and in one instance with a Sand Dune Side-notched point. McFadden (2016) believes the continued use of Gypsum points at this time supports the idea that the Basketmaker II lifeway evident in the Grand Staircase region evolved from an Archaic base rather than from a migration into the area by farmers from southeastern Utah or northeastern Arizona.

Joel Janetski (in Roberts 2018) has recently called these Gypsum identifications into question, at least as far as they apply to Basketmaker II sites. None of the Basketmaker II points identified as Gypsum points exhibited narrow contracting stems or light serrations on the lower blades, although hafting techniques were similar. He suggested the term Far Western Basketmaker II points to delineate the unique style of contracting-stem points found at Basketmaker II sites from Kanab on the east to St. George on the west and Las Vegas on the southwest.

Death in the Grand Staircase

Mortuary practices have long played a central role in the study of social, cultural, chronological, ethnic, and racial issues (Chapman and Randsborg 1981). Archaeological studies have likewise used mortuary practices and burial attributes as a mechanism for interpreting cultural change and variability (Alekshin 1983; Bartel 1982; O'Shea 1981, 1984; Tainter 1978). Binford (1971:6) has argued "both the number and specific forms of the dimensions of the social persona commonly recognized in mortuary ritual vary significantly with the organizational complexity of the society as measured by different forms of subsistence practice." The dimensions of the social persona that are recognizable in mortuary practices are typically age, sex, social position, social affiliation, and location of death.

The comparatively rich funerary contexts associated with Basketmaker II burials reported from the Grand Staircase area might be reflective of increased social complexity, perhaps the aggregation of social units larger than a nuclear family. These burials are typically attributed to band- or tribal-level of social organization, which commonly denote only age and gender differences, economic roles, and personal achievement, whereas more complex ranked societies also mark social positions, social affiliations, rank, and status (Mowrer 2006:261; see also Binford 1971).

In her analysis of 138 Basketmaker II burials from Utah, Mower (2006:275-276) found the Utah sample to be comparable to those from other regions in the Southwest in that funerary practices reflected primarily age differentiation. Hunting tools, as well as rare or exotic items, were only associated with adult burials, whereas textiles were associated with infants (60 percent) far more than subadults (7 percent) and adults (12 percent). She concluded that burial items were indeed indicative of band- and tribal-level societies, and that these items reflected economic roles, achieved status, and ritual activities. Funerary objects associated with infants were more indicative of grief.

It is not always clear from the early reports which items were actually associated with interred individuals and those that may have been deposited in proximity to the burials before or after the burial event. The catalog of funerary items, however, appears to include elaborate woven baskets with intricate colored designs, skin bags, wooden trays, digging sticks, atlatls and dart points, leather and feather clothing, ceremonial implements, bone tubes and beads, and pouches with food items (see Guernsey 1931; Guernsey and Kidder 1921; Kidder and Guernsey 1919; Nusbaum 1922).

Evidence suggests that each cist usually contained more than one burial and in most instances two to four individuals were interred together. Occasionally, the number of interred individuals at some sites is much greater, indicating single-event burials of large numbers of people who had suffered violent deaths and repeated use of the same burial site over an extended period without traces of violence. Evidence of violence during Basketmaker II times is quite common elsewhere in the Southwest (see Cole 2009; Hurst and Pachak 1989; Kidder and Guernsey 1919; Morris

Figure 4.14: The remains of 17 individuals were recovered from these bedrock cists in Johnson Canyon.

1939; Turner and Turner 1999), but it is quite rare in the Grand Staircase region.

At least eight burial locales in the GSENM region would appear to fit the pattern described for "Basketmaker" burials reported elsewhere in southeastern Utah and northeastern Arizona. Whether these represent actual occupations by Southwestern Basketmaker peoples (i.e., evidence of Basketmaker migrations), or groups with similar mortuary practices (i.e., accretion of new funerary practices) has not been thoroughly addressed. What is evident is that complex mortuary practices appear suddenly and without precedent in the archaeological record perhaps as early as 100 BC (Zweifel et al. 2006). These include single interments, but more commonly they feature multiple burials, including 36 individuals at three different rockshelters in the Johnson Canyon area (Edgar 1994).

- The earliest formal burial in the Grand Staircase was documented at Hog Canyon Dune where a female 40 to 50 years old was associated with lithic tools, lignite beads, a bone pendant, and one-hand mano. The individual had been placed inside a burial cist formed by arranging large shale and sandstone blocks along two sides of a depression. Charcoal in direct association with the burial produced a radiocarbon date of 2530 ±110 BP (637 BC median probability). A second burial of an adolescent male 13 to 14 years old was not associated with a burial chamber and had no mortuary offerings. His cause of death may have been two traumatic blows to the skull (Schleisman and Nielson 1987:30-33).

- Excavations at the Tommy Turf site near Kanab revealed a single-episode burial of at least 10 individuals ranging in age from infants to elderly adults. Bone collagen produced two radiocarbon dates, one of 2060 ±60 BP (80 BC median probability) and the other of 2040 ±40 BP (48 BC median probability). Associated funerary objects included a kaolinite pipe, a bone whistle or flute, shell beads, a quartz crystal, and two pendants. This site is situated on a low, open ridge top, contrasting with other Basketmaker II multiple burials that were located in rockshelters and alcoves. The number of individuals, ages, and sex distributions suggest that more than one household was involved, and that it might be evidence of social aggregation into small villages at this time (Zweifel et al 2006).

- Edgar (1994:11) described one site in Dairy Canyon as "an ossuary consisting primarily of a shallow stone-lined cist dug into the floor of the shelter near the west wall contained a confusing jumble of bones. About 80 percent of the human remains recovered from this site came from inside the cist." A radiocarbon date of 1890 ±60 BP (AD 121 median probability) was reported from a piece of wood under a mummified right hand in the center of one burial chamber that contained the remains of at least 16 individuals. No mention was made of mortuary offerings, but corncobs were abundant. Either the maize was placed with the human remains as an offering, or the cist was used to store maize prior to its use as a burial chamber.

- Excavations at another site in Johnson Canyon identified the remains of 17 individuals, five of them adult males, four adult females, six juveniles and three adults of unknown sex. A total of 26 bedrock cists were located in the rockshelter, eight of which contained human remains representing one to six individuals per cist (Figure 4.14). Mortuary offerings included maize, white shell beads, and basketry. The most complex burial was that of a juvenile who was placed inside a box-like slab cist. A basketry mat was then laid inside the cist. The individual was tightly flexed and white shell beads had been placed around the neck. A capstone covered the box cist, which was then sealed (Edgar 1994:19). This site was not radiocarbon dated.

- Another site located in a rockshelter near Johnson Canyon featured a large pictograph panel and three cists. One cist contained a nest of shredded yucca with more than 50 cobs of 12-row maize. The largest of the three cists contained the remains of a young male and an infant. A roof had been constructed over the cist with five timbers that were still in place at the time of excavation. Investigators first thought the burials represented primary inhumations, but closer inspection revealed secondary reburial inasmuch as the bones had been placed in anatomically incorrect positions, and leg bones had been partially coated with a reddish pigment or stain. Logs from the cist roof yielded tree-ring dates prior to AD 400 (Edgar 1994), and a corncob from Cist 2 later returned a radiocarbon date of 1790 ±70 BP (AD 236 median probability) (McFadden 2016). No mention was made of mortuary offerings, although maize remains were abundant.

- Evidence from Cave du Pont also suggested that food storage cists were later used as burial chambers. Two burials were located in one cist, and four other burials were recovered in non-cist contexts. One burial consisted of bones that had been piled together with the leg bones crossed over the pelvic bones. It was then covered by a large, finely coiled basket. Other items placed with the burial included a pointed wooden stick, a small round stick, and a bundle of squaw bush wrapped in juniper bark (Nusbaum 1922).

- Recent investigations in the Jackson Flat area south of Kanab also revealed cemeteries with at least 55 individuals, 34 of which were believed to be Basketmaker II burials (radiocarbon dates were not obtained at the request of the tribes). The Basketmaker II individuals exhibited less cranial modification, greater dietary variety resulting in better dental health, and less evidence of infectious disease. These individuals were generally taller, more robust, and healthier than later Puebloans elsewhere in the Southwest (Roberts 2018).

> **The positioning of the bones around primary burials led researchers to suggest that some individuals might have been ritually killed and placed in the graves as "offerings."**

Most of the Basketmaker II burial data were derived from Eagles Watch, where a cemetery was identified next to an oversized pithouse. The burial chambers featured both primary and secondary burials in the same pit, even though they appeared to represent single events. One burial chamber contained the remains of nine individuals of all ages. The positioning of the bones around primary burials led researchers to suggest that some individuals might have been killed and placed in the graves as "funerary offerings" (Roberts 2018).

Given the poorer health of the human "offerings," they might have been individuals of lower social rank, such as servants or slaves, who had been dispatched to accompany the primary individual in the afterlife. Or they might have been relatives or servants who had died earlier and were exhumed to be placed with the primary burial. No evidence of perimortem trauma was identified. Other grave goods were rare, consisting of a few shell ornaments, bone gaming pieces, and pigments (Roberts 2018).

The Eagles Watch burial data are consistent with the patterns observed at the Johnson Canyon ossuaries (Edgar 1994), Cave du Pont (Nusbaum 1922), and Tommy Turf Site (Zweifel et al. 2006) in all respects except one: burial location. The Basketmaker II cemetery at Eagles Watch was associated with a permanent residence, whereas the other sites appear to have been dedicated burial locations unassociated with residences (or the residences were not identified or recognized at the time of the excavations). This raises the possibility that the other burial sites are actually located in close proximity to residences, but these have gone undetected.

It should be noted the Tommy Turf individuals exhibited characteristics related to iron deficiencies that probably reflect a predominately maize diet (Zweifel et al. 2006). But Edgar's analysis (1994:53) of the burials from the Johnson Canyon area identified no iron deficiencies, prompting her to suggest "an economy of hunting and gathering, supplemented by agricultural products." The Tommy Turf site also offered evidence that tuberculosis might have resulted in the deaths of multiple individuals at about the same time. No evidence of trauma was reported from any of the sites where multiple individuals shared the same burial chamber.

Collectively, the mortuary evidence suggests increased social complexity at the same time groups were aggregating into small hamlets and becoming increasingly dependent on maize. These mortuary practices including the re-use of storage cists as burial chambers, as evidenced by the Cave du Pont burials, and construction of dedicated burial cists, as evidenced by the Johnson Canyon ossuaries and perhaps the Tommy Turf site. And Eagles Watch might offer evidence of increased social stratification at this time.

It should be noted that the utilization of sub-surface storage pits as burial cavities is not unique to the Grand Staircase. It has also been documented in Basketmaker II contexts in the San Juan River country and in northern Arizona (Lipe 1993), in eastern Great Basin contexts (Wilde et al. 1986), and in the Uinta Basin (Talbot and Richens 1996).

There is some evidence that the more elaborate Basketmaker II burial practices evident in the Grand Staircase extended into the Glen Canyon corridor at the southern edge of the Kaiparowits Plateau. At Rock Creek Alcove, excavations revealed the partial remains of a male adult and two infants. Organic materials believed to be decomposed soft tissue from human burials returned a radiocarbon date of 2420 ±100 BP (557 BC median probability). Associated materials included a Basketmaker II dart point, two shell disk beads, and yucca cordage and fiber. Nickens et al. (1988) suggested the site was utilized during early Basketmaker II times specifically as a burial chamber. The Rock Creek Alcove data were consistent with suspected Basketmaker II burials at Sand Dune Cave (Lindsay et al. 1968), Bernheimer Alcove, and the Rehab Site, none of which were radiocarbon dated (Sharrock et al. 1963).

In summary, formal mortuary practices involving cemeteries or ossuaries seem to have appeared suddenly in the Grand Staircase region, perhaps at about 100 BC at the same time formal residential architecture appears in the region. Some of the burial sites share remarkable similarities to classic Basketmaker II burial sites to the east. Chambers were constructed specifically for burying the dead, and the same chambers were used for multiple burials, either in response to single events such as disease (e.g., Tommy Turf Site) or as a cemetery used repeatedly over a long period of time (e.g., Eagles Watch). Formal burial practices seem to coincide with the emergence of village life increasingly oriented toward maize farming.

Basketmaker II Imagery

Also relevant to this discussion is the prevalence of a distinct rock art tradition that might be related to Basketmaker II manifestations in the Cedar Mesa area far to the east. As we discussed in Chapter 3, the modern Puebloan descendants of the ancient ones of the GSENM region prefer that we use the term "rock markings," whereas the Southern Paiute prefer the term "rock writing" instead of rock art. We try to accommodate their wishes as much as possible here.

As discussed by Cole (1993, 2009), prehistoric images pecked and painted on the cliff walls are one complementary component of the archaeological record that, when integrated into the whole, has the ability to help explain the past. As such, they has the potential to shed light on the distribution, function, and meaning of associated material culture. Others have argued that iconography can shed light on ownership of key resources (Robins 1997), social boundaries (Geib 1996e), and manifestations of prestige and competition (Hayden 1998; Robins 2002).

At least two temporally overlapping and related styles have been defined for the northern Southwest: The San Juan Anthropomorphic Style, which is temporally exclusive to the Basketmaker II period (Figure 4.15,) and the more generally classified Basketmaker II-III style (Figure 4.16), which has stylistic traits that persist after Basketmaker II times. Both styles have been reported

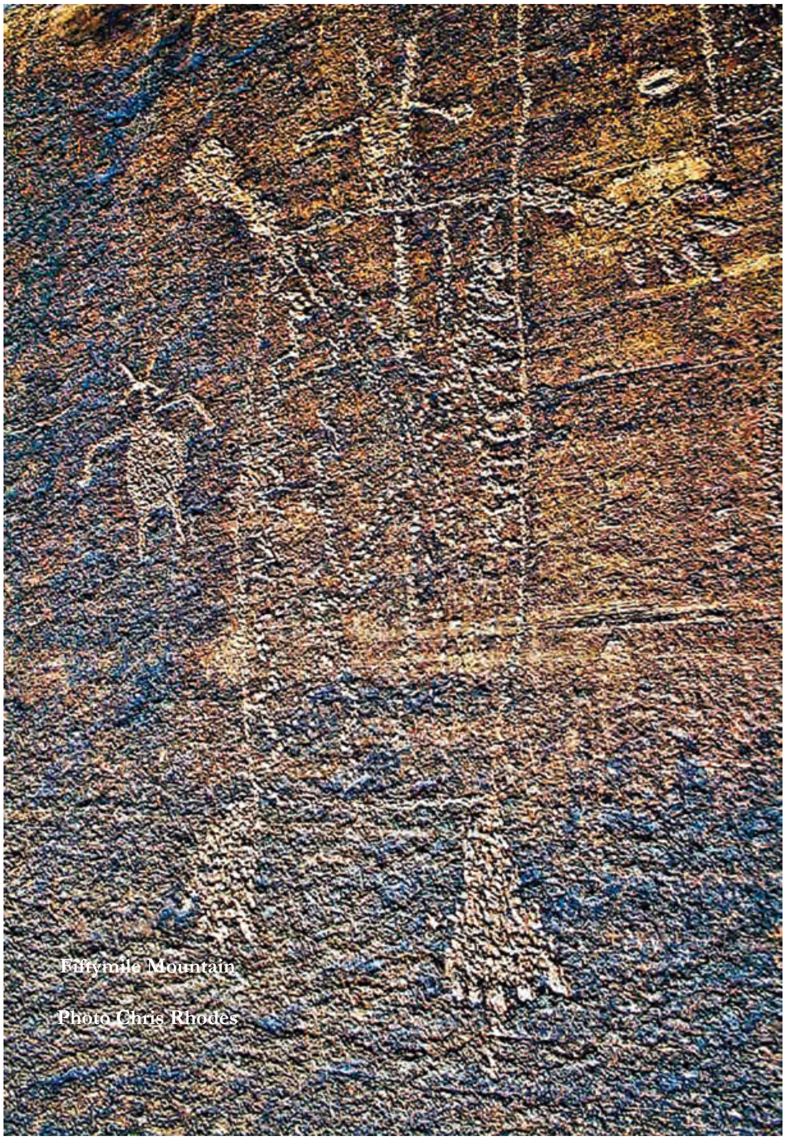


Figure 4.15: (left) The San Juan Anthropomorphic Style of Basketmaker II rock art was defined in southeastern Utah, but this style is found throughout the Monument. This site is located on Fiftymile Mountain on the Kaiparowits Plateau.

Figure 4.16 (below): The generalized Basketmaker II Style of rock art is common in the Grand Staircase. This site is located in the South Fork of Indian Canyon.

throughout GSENM, although the latter is much more common, especially in Kanab Creek, Cottonwood Creek, and Johnson Wash.

As defined by Schaafsma (1980:109-120), the San Juan Anthropomorphic Style depicts broad-shouldered figures with rectangular or trapezoidal torsos with elaborate ornamentation and decoration. One example of this style was identified in Hog Canyon (Castleton 1987:167). The more generalized Basketmaker II-III style also features broad-shouldered anthropomorphs with a variety of triangular, trapezoidal or rectangular torsos, often without the elaboration of the San Juan Anthropomorphic Style. Other images common to Basketmaker II imagery include representations of masks, faces, scalps, flute or whistle players, processional figures, copulating couples, bighorn sheep, bears, canines, snakes, and birds (Cole 2009; see also Charles and Cole 2006).

Basketmaker II motifs include ducks in profile, bird-headed anthropomorphs, anthropomorphs with exaggerated hands and feet, flute players, and upside-down anthropomorphs.

As described by Cole (1990:111-113), Basketmaker imagery are often representational and shows realistic details that afford the subjects a biographic quality that:

... feature broad-shouldered anthropomorphs, often elaborately appointed and supernatural in appearance. Bodies are rectangular, trapezoidal and triangular in shape and range from approximately 20 centimeters to 2 meters in length. Anthropomorphs are often presented in horizontal rows and are shown in outline with interior and exterior body decorations and as solid forms. Body decorations include necklaces, arm bands, belts and sashes, aprons, diaperlike clothing (probably menstrual aprons), bandoleerlike designs, and lines and dots. Heads are both rounded and rectangular, and faces frequently appear masklike and may be decorated.… Arms, legs and feet (if shown) generally hang down; hands and feet may be large. Objects resembling bags, crooks, atlatls, and feathered darts, and scalps are shown being held.

Robins (2002:396) has argued that the ritualism evident Basketmaker II imagery is associated with expressions of social power, especially when prominently displayed in association with productive agricultural lands. This is reflected in the artistic skill used to make the images and in the depiction of ceremonial clothing, hair ornamentation, and other paraphernalia that correspond to Basketmaker II mortuary evidence, including ritual scalping. Basketmaker II rock art in the Grand Staircase region has not yet been examined within this context.

Robins and Hays-Gilpin (2000) have argued that Basketmaker II imagery was focused around shamanistic rituals that emphasized the power and prestige of individuals, primarily men, but the iconography was not usually gender specific. Robins (1997) examined the spatial distribution of San Juan Anthropomorphic Style sites throughout the region, and noted that without exception, the larger panels of life-sized anthropomorphic figures in open settings correlated with areas suitable for floodplain or sub-irrigation agriculture. Robins and Hays-Gilpin (2000:235) later argued, "The association of the large San Juan Anthropomorphic panels with the … areas of apparent high agricultural productivity have important implications for social as well as economic uses of maize in emergent agricultural societies."

By AD 200, the imagery changed somewhat to reflect spatial homogeneity, references to puberty rites, and images of rebirth and emergence that reflected "new forms of ritual that allowed men to create ritual-based crosscutting relationships facilitating mobility between different natal communities and maintaining networks of social ties" (Robins and Hays-Gilpin 2000:247). The more generalized Basketmaker II style is commonplace in the Grand Staircase and is occasionally found in the Kaiparowits Plateau and Escalante River Basin.

Basketmaker imagery in the Grand Staircase region corresponds generally to the spatial distribution of Basketmaker II residential and storage sites, and the presence of rock art sites along the Vermilion Cliffs has prompted some researchers to suggest a prehistoric trail from the San Juan River Basketmaker heartland in southeastern Utah to the west through southern Utah and the Arizona Strip along the base of the Vermilion Cliffs and into the St. George Basin (Manning and Allen 2009). Perhaps related to this trail are very old "cup and channel" circular motifs on flat horizontal rock surfaces, usually where there is an excellent vista such as the edge of a canyon or on a hill top. These occur all across southwestern Utah, northwestern Arizona, and southeastern Nevada, and they are believed to date as early as 500 BC (Terlep 2012).

A majority of sites described as Basketmaker are located in or near the Kanab Creek drainage and along the base of the Vermilion Cliffs. In the Cottonwood Canyon area, Manning (1989) identified several Basketmaker sites based on motifs that included ducks in profile, bird-headed anthropomorphs, anthropomorphs with exaggerated hands and feet, flute players with phalluses, and upside-down anthropomorphs. The two flute players were associated with an "obviously pregnant female with arms outstretched toward a smaller figure - possibly a child" (Manning 1989:A-7). All of the elements were considered common to sites along the San Juan River that had been attributed to Basketmaker II peoples. Other Basketmaker rock art sites have been reported from the Cottonwood Creek drainage and Indian Creek areas (Schaafsma 1971) and along Kanab Creek and the Hog Canyon tributary (Castleton 1987).

Several of the sites discussed earlier in this chapter have co-occurring rock art imagery that are believed to correspond to the associated Basketmaker II radiocarbon dates. Basketmaker rock art was mentioned (but not described) at Cave du Pont on the shelter walls behind the storage cists (Nusbaum 1922) and in the South Fork of Indian Creek Canyon, where it was associated with suspected Basketmaker II storage cists (McFadden 2016). A large pictograph panel was mentioned at one of the Johnson Canyon burial sites, but it was not described or illustrated (Edgar 1994).

Other styles warrant a brief mention here. A unique style is found in Snake Gulch on the Arizona Strip is believed by some to date as early as 500 BC and within the range of early agricultural adaptations (Christensen et al. 2013), although convincing chronometric data is currently lacking for the Snake Gulch Style. Some have also attributed the Cave Valley Style to early Basketmaker groups, but recent radiocarbon data suggest this style is probably attributable to late Basketmaker III or early Pueblo I groups (Spangler and Zweifel 2012).

The florescence of a corresponding early Fremont rock art tradition during Early Agricultural times has not been thoroughly addressed, although several researchers have acknowledged similarities between Basketmaker and Fremont imagery, including shared techniques, forms, and subject matter (see Cole 2009 for an overview). Geib (1996e) acknowledged an early Fremont presence in the Escalante River Basin by about AD 100, but he maintained the distinctive Fremont petroglyph and pictograph tradition had not become entrenched until about AD 800. Cole (2009) tentatively allowed for a beginning date as early as AD 500. It should be noted, however, that several of the Escalante River rockshelter sites that produced Early Agricultural maize radiocarbon dates also had Fremont imagery, some without any evidence of later Fremont graywares. If Ancestral Fremont groups were cultivating maize by AD 100, as Geib suggests, then it is also reasonable that the origins of Fremont imagery so distinctive throughout the northern Colorado Plateau also emerged at about the same time. Fremont imagery and iconography is discussed in greater detail in Chapter 5.

General Summary

Maize agriculture, storage facilities, and pithouse architecture had all become firmly established in the Grand Staircase region perhaps as early as 100 BC and at numerous other sites north of the Colorado River by at least AD 200. Whether this represents a migration of Basketmaker II peoples into

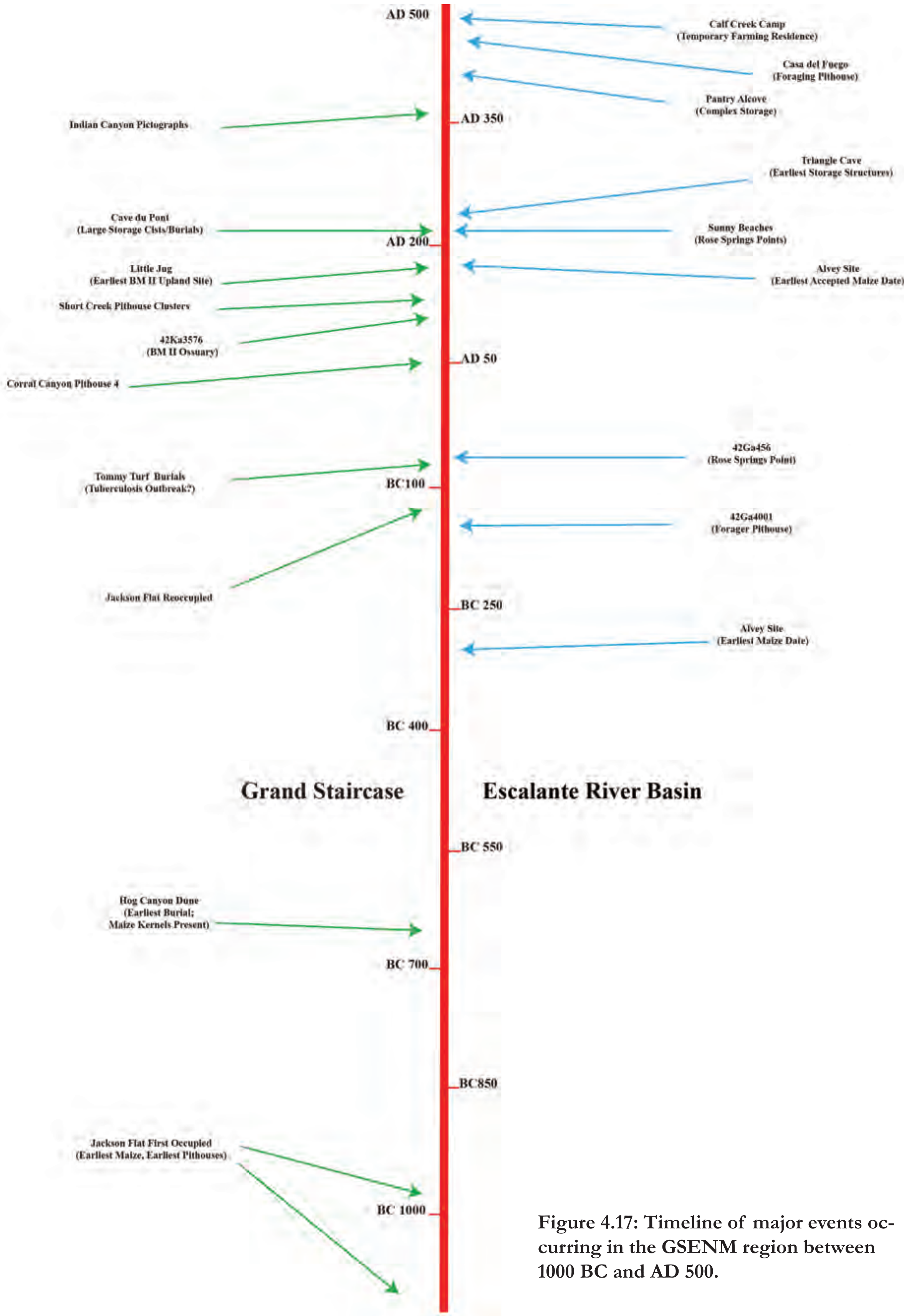


Figure 4.17: Timeline of major events occurring in the GSENM region between 1000 BC and AD 500.

the northern Colorado Plateau (Berry 1982; Coltrain 1994; Janetski 2017), the accretion of Basketmaker-like traits by indigenous Archaic peoples (Janetski 1993; McFadden 2016; Wilde et al. 1986), or some combination of both (Talbot 1998) remains unresolved, and there are persuasive arguments on all sides of the debate.

What has become increasingly clear is that three different adaptations are evident in GSENM at this time: (1) Basketmaker-like lifeways in the Grand Staircase that were focused predominantly on cultivation of maize and squash, increased population aggregation into small hamlets or villages, and complex strategies to store food surpluses; (2) a farmer-forager lifeway evident in the Escalante River Basin where the transition to sedentary lifeways was not fully consummated, but where farming was nonetheless successful, requiring implementation of complex storage strategies; and (3) a forager lifeway evident in the Kaiparowits Plateau region, which might have been a foraging region where Ancestral Fremont and Basketmaker II groups came into contact with one another.

Dependence on maize resources likely varied from group to group and from year to year. Studies of Basketmaker II peoples in the San Juan Basin suggest a reliance on maize in the range of 80 percent (Matson 1991), and in the Grand Staircase region maize dependence was estimated at 75 percent of the caloric intake (Martin 1999). This suggests that maize agriculture was generally successful in most years, although the subsistence system was probably dynamic enough that groups could revert to wild resource in the event of low crop yield or crop failure.

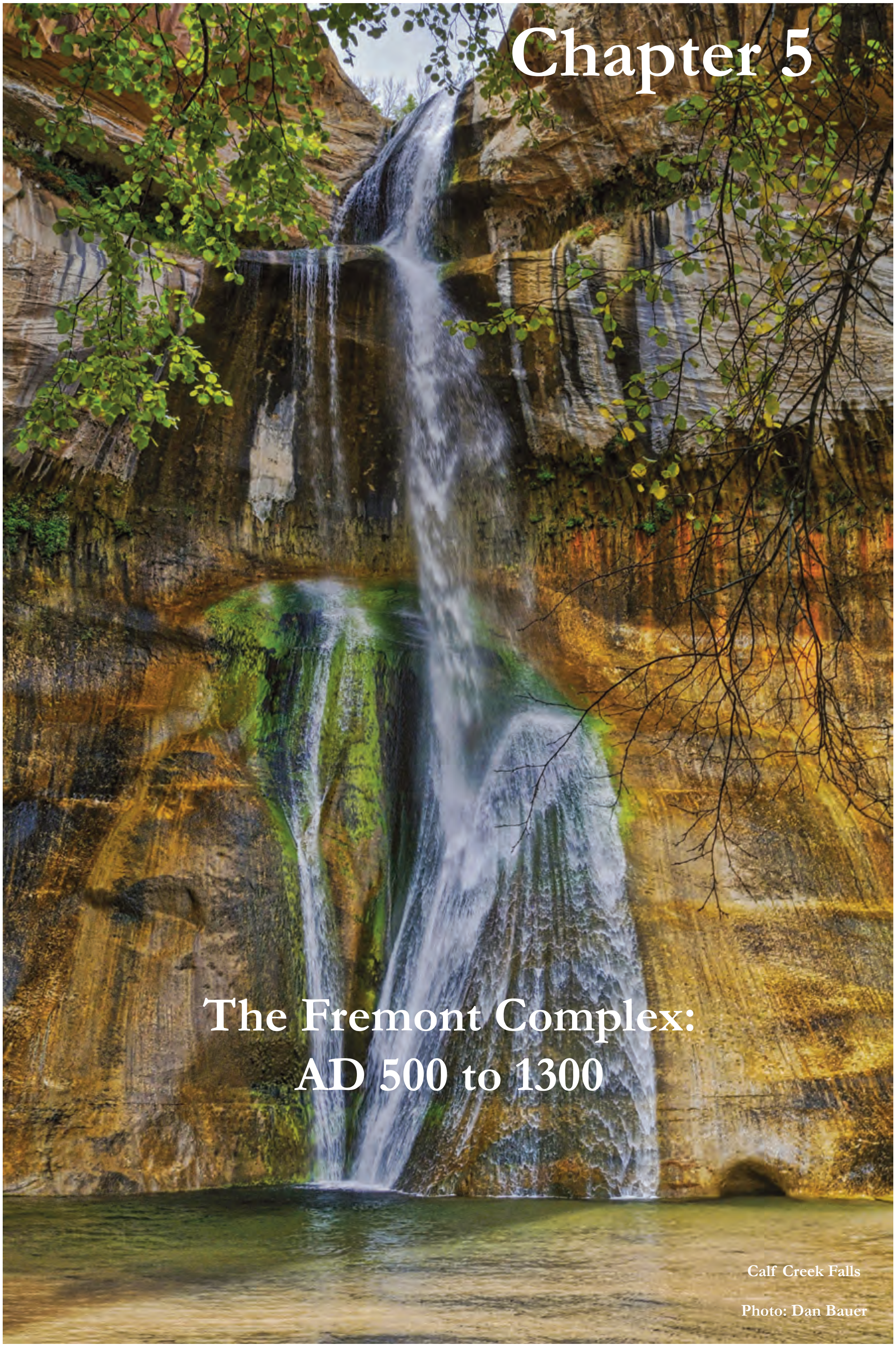
Roberts (2018) has made a compelling case that the first farmers arrived in the Grand Staircase region perhaps by about 1200 BC. They constructed formal pithouses and bell-shaped storage pits, and their architecture and artifacts were indistinguishable from those of the San Pedro culture in southern Arizona. The San Pedro farmers probably coexisted alongside Archaic foragers at this time, although there is minimal radiocarbon data from foraging sites at this time. After several centuries of successful agriculture, the Jackson Flat area was abandoned.

The Jackson Flat area was re-occupied by Basketmaker II farmers who might have arrived about 100 BC. The first Basketmaker II farmers were more dependent on wild resources and were therefore more mobile, as evidenced by the ephemeral nature of the residences, the prevalence of bell-shaped pits, and the rarity of maize compared to later times. Later groups became increasingly reliant on maize, constructed more permanent residences, and began to incorporate large slab-lined storage cists into their site layout, a harbinger of the later Basketmaker III occupations. Evidence of a coequal foraging lifeway at this time is actually quite rare in the Grand Staircase region and is limited to a few sites in the Grand Canyon, Snake Gulch, and Short Creek areas. The St. George Basin also had a coexistent farming and foraging tradition after about AD 100, or about two centuries after farming had taken root in the Grand Staircase.

Pithouses associated with Early Agricultural maize farming in the Escalante River Basin have not yet been documented, even though maize farming had become established there by about AD 200. The absence of residential architecture coequal to the pithouse tradition in the Grand Staircase is puzzling. This has been interpreted by some that Ancestral Fremont farmers were also foragers, and that the absence of permanent or semi-permanent residences reflects much higher mobility required to hunt and gather wild resources. The lack of Ancestral Fremont pithouses in the Escalante River region likely reflects the fact the pithouses are present but simply haven't yet been identified.

Generally, the period from 1000 BC to AD 500 can be characterized by a continuation of hunter-gatherer subsistence strategies by some groups at the same time other groups were becoming almost entirely dependent on maize. Some groups were increasingly sedentary, constructing residences that were occupied most of the year, whereas other groups moved seasonally between rockshelters and open camps, some of which had been favored for millennia.


Johnson Canyon
Photo: Jerry D. Spangler



Calf Creek Falls

Photo: Dan Bauer

Most traditional definitions of the Fremont Complex have relied heavily on artifact catalogs that emphasize figurines, stone balls, moccasins, and Utah-type metates, as well as the distinctive Fremont rock art tradition. But trait lists used to define the Fremont are, as Ambler (1970:7) observed, "so generalized as to be useless," and in fact, "there are actually rather few distinctive and typical traits that are found over the entire area usually considered to be Fremont." David Madsen (1979) emphasized that the Fremont culture is not a shared artifact tradition, nor can it be explicitly defined, and therefore it probably doesn't exist. Marwitt (1979:735) responded that the term Fremont does not have to imply an entity, "just a label for the sum of the variation among the differentially horticultural, variably sedentary, and perhaps separately derived populations located roughly north of the Colorado and Virgin Rivers."

For the purposes of this chapter, the label Fremont Complex is used as an umbrella term to describe adaptations manifest in the eastern portion of GSENM from about AD 500 to 1300. Generally, lifeways at this time are characterized by increased reliance on domesticated foods, increased sedentism, and increased socioeconomic interaction with Ancestral Puebloan groups to the south and west, as well as other Fremont groups to the north and northwest. The defining characteristic demarcating the beginning of the Formative is the appearance of a fully developed grayware ceramic tradition.

The Fremont were predominantly agricultural, but not all Fremont were fully committed farmers, or at the very least some of them were less successful at it, which warranted greater reliance on wild resources.

Agricultural lifeways sharing similar traits can be ascribed to groups adapted to the Escalante River and adjacent uplands, as well as the Dirty Devil drainage to the east, the Fremont River valley to the north, and the Kaiparowits Plateau to the west (Figure 5.2). These might have included seasonal farming of the Escalante River bottom during warmer months and winter residences elsewhere that were oriented toward seasonal migrations of large game (McFadden 2016), or it might have involved seasonal population dispersals from residential bases to exploit a wide variety of optimal lowland and highland environmental niches both for agricultural purposes and wild plant resources, followed by population aggregations in the Escalante Valley during the winter months (Jordan and Talbot 2002).

In this chapter, we discuss the Fremont Complex in terms of an early manifestation (AD 500 to 1050) and a later one (AD 1050 to 1300), with an emphasis on how Fremont adaptations changed through time. We emphasize that domesticated maize, squash, and probably beans constituted a significant part of the Fremont diet at this time, although the abundance of forager sites in the region suggest some groups might have depended on wild resources much more so than others, and certainly more than their Ancestral Puebloan neighbors to the west. All groups would have had access to pottery, but ceramics might have been a relatively minor part of the domestic tool kit among more mobile foragers in the area. And the proliferation of seasonal and permanent residences reflects a social structure characterized by nuclear or extended families with very little evidence of larger population aggregations that were common among Basketmaker III and Pueblo I groups living in the Grand Staircase at the same time.

We retain the label Fremont Complex inasmuch as the term "complex" is plural and therefore reflects the possibility of multiple adaptations operating within the limits of the local environment at any given point in time (heterogeneity), rather than a single uniform lifeway (homogeneity). More simply put, the Fremont were predominantly agricul-

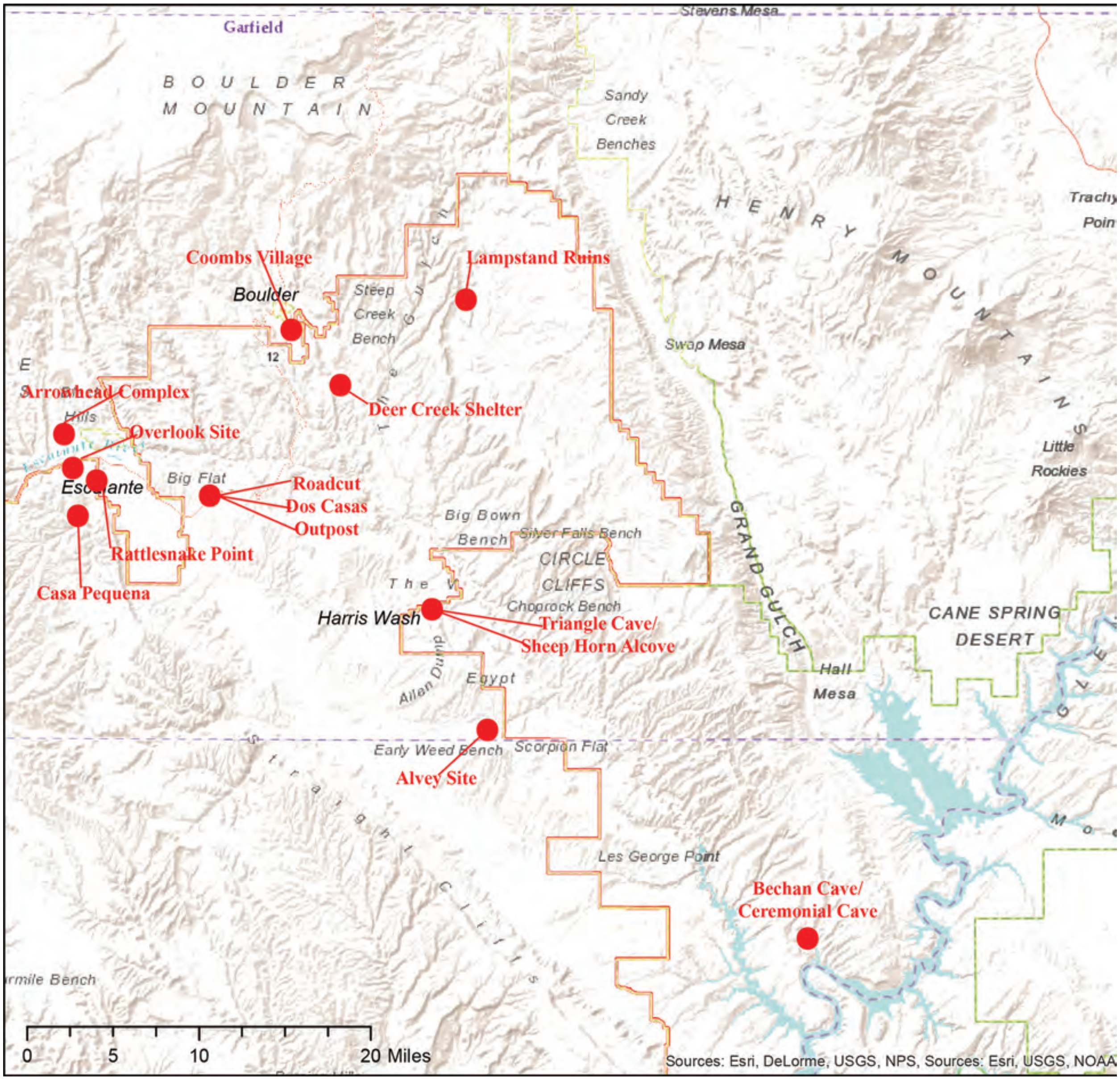


Figure 5.2: General location of Fremont sites discussed in this chapter.

tural, but not all Fremont were fully committed farmers, or at the very least some of them were less successful at it, which warranted greater reliance on wild resources to ameliorate crop failures.

The culture history of the Escalante River Basin Fremont can be summarized as follows:

- Ancestral Fremont groups were farming along the Escalante River for at least 300 years before the advent of ceramics, and farming was obviously a successful strategy, as evidenced by the large numbers of granaries and cists constructed for food surpluses (see Chapter 4).

- A fully developed grayware ceramic tradition appeared in the region about AD 500, characterized mostly by basalt tempering agents. These ceramics are largely indistinguishable from Fremont ceramics at sites farther to the north, but they are quite dif-

Figure 5.3: Fremont images are highly recognizable by the trapezoidal shape of the human bodies. In the Fremont River and Escalante River regions, these human figures are depicted with necklaces, headdresses, ear bobs, and other ornaments.

ferent from sand-tempered ceramics used by Ancestral Puebloan groups to the south and west at the same time.

- Some Fremont groups probably dispersed in the spring to farm maize in optimal niches in the Escalante River lowlands or along higher-elevation tributaries, and then they returned to winter residences after the harvest. Some might even have tried their hand at dry farming on the Kaiparowits Plateau.

- Early socioeconomic interactions were primarily oriented toward other Fremont groups to the north and northwest, suggesting a hard boundary between the Fremont and their Ancestral Puebloan neighbors. This boundary became more permeable after about AD 750 when Fremont groups began to embrace Ancestral Puebloan architectural styles and acquired minor amounts of Ancestral Puebloan ceramics.

- Boundaries might have collapsed altogether by about AD 1050 when the Fremont presence here became largely invisible in the wake of Ancestral Puebloan immigration with different ceramics and architecture. The Fremont signature resumed in the AD 1200s once the immigrants had left

The Fremont in Historical Context

Scholars a century ago commonly described Formative groups north of the Colorado River as country cousins of the better known Southwestern groups of the Four Corners region, or as Neil Judd (1926:152) put it, they were "definitely and directly related to those pre-Pueblo and Pueblo cultures represented by the prehistoric ruins of northern Arizona, New Mexico and Colorado."

By the late 1920s, scholars at the Peabody Museum at Harvard University began to recognize that ancient peoples on the so-called "Northern Periphery" were comparatively different (see Spangler and Aton 2018 for historical context). And in 1931, Noel Morss offered his classic definition of the Fremont culture based on his investigations in the Torrey area just north of GSENM. Morss' definition (1931:76-77), although based largely on artifact types, remains relevant to modern researchers:

> *Although the culture was partly and perhaps predominantly agricultural, the inhabitants of the Fremont region were also dependent in good part on the game supply. Small granaries apart from any dwellings show that the people moved about, in all probability living in flats in the summer and cultivating corn, and in the winter in sheltering canyons around the mountains and devoting themselves to hunting. In its general features, the culture remained at the Basketmaker III level, as shown by the pottery, the figurines, the absence of cotton and turkeys, the twined-woven mats, the fur cloth, the relative abundance of coiled basketry, the various forms of snares and traps, and the general shape of the anthropomorphic pictographs. Only in a few characteristics — the bow and arrow, mountain sheep pictographs, stone drills, and possibly head deformation — does the culture show traits in common with the early Pueblo culture with which it had contacts.*

"Small granaries apart from any dwellings show that the people moved about, in all probability living in flats in the summer and cultivating corn, and in the winter in sheltering canyons around the mountains and devoting themselves to hunting" — Noel Morss, 1931

Morss' monograph energized the debate on Formative manifestations north of the Colorado River. Julian Steward (1940:468-469) also described Formative manifestations as a cultural hybrid consisting "of a blend of Derived Basket Maker and Early Pueblo elements, which persisted with little change in the north." Burgh and Scoggin (1948:86-88) later referred to the Fremont as "static and uninspired" compared to those of the Southwestern cultures, suggesting a "passive acceptance of southern culture traits, and even downright indifference to the rapid and vigorous development of culture in the San Juan drainage."

Similar hypotheses were offered by Rudy (1953), Wormington (1955), and Jennings (1956), all of whom argued for diffusion of Southwestern traits into Utah where they were embraced by existing Archaic populations. These approaches were based largely on comparisons of artifact types and architectural features rather than behavioral differences. Jennings (1956:73) also argued that horticulture was "grafted onto an older life pattern," and that it persisted for a relatively short period of time before a resumption of hunting and gathering. Jennings believed that agriculture did not significantly alter the hunter-gatherer subsistence that had been practiced for millennia, and that "cultivated plants seem to have been regarded only as supplementary additions to the wild plant resources." Jennings assigned the term "Sevier Fremont" to Great Basin farming groups, while he retained the Fremont designation for those groups on the northern Colorado Plateau, although he believed that both the Fremont and the Sevier could even be referred to as the "Utah Anasazi" (1956:104).

Not all researchers were quick to embrace Jennings' hypothesis that the Fremont culture evolved through diffusion of various technologies from the Southwest. The rather sudden appearance of a fully developed farming lifeway with a fully developed ceramic tradition was interpreted by some as evidence of a northern migration of Southwestern peoples with existing ceramic, architectural, and horticultural traditions (Berry 1982; Berry and Berry 1986; Gunnerson 1969; Smiley 1985; Madsen and Berry 1975). As summarized by Gunnerson (1969:170), the "manifestations of the Fremont culture are remarkably similar throughout its time span, suggesting that this Puebloan complex entered the area after it was already developed, and as a unit. Such a phenomenon is more likely to be effected by a migrating population than by diffusion."

In the mid-1970s, researchers throughout Utah began to apply behavioral perspectives to Fremont research that eschewed traditional trait lists and material culture definitions. David Madsen (1979:720) described "at least two, and possibly three, separate groups sharing a thin veneer of traits, acquired perhaps through trade or through the spread of a cult characterized by figurines and rock art, [that] coexisted in areas north and west of the Colorado River." Similar to Jennings two decades before, he labeled Formative peoples of the Great Basin as the Sevier Culture, while those on the northern Colorado Plateau retained the Fremont designation; he also recognized an unnamed Plains-derived culture in northeastern Utah.

"We can properly conceive of the Fremont as a unique and spatially focused tradition that was not beyond the border but that rather, for well over a thousand years, was the northern border of the Southwest" — Richard Talbot

Madsen (1986:24-25; see also Madsen 1989) later expanded on this concept:

One clear characteristic of the Fremont people was that they lived in many different kinds of environmental settings and were flexible enough to adapt to all of them. As a result, there was apparently a wide degree of variation in behavior and there was no one set of material remains resulting from that behavior which we can identify as Fremont. The Fremont seem to have ranged from full-time settled farmers to full-time mobile hunter-gatherers with everything in between. This variation was not just regional, but also temporal, with village farmers growing corn, beans and squash one year and breaking up into small bands of wandering wild plant collectors and hunters the next.

This theme was echoed by Simms (1986, 1990, 1994a), who described the Fremont within the context of adaptive diversity, suggesting at least three basic farmer-forager strategies: (1) The Fremont might have been full-time farmers with low residential mobility who supplemented their annual diet with some foraged foods, (2) Fremont farmers might have relied heavily on farming, but switched agricultural settlements often by employing group fission and fusion to maintain a focus on farming or to incorporate a more productive mix of foraging and farming, and (3) Some Fremont groups might have practiced little or no farming, but maintained variable relationships with farmers.

The concept of different adaptations to different environments prompted many archaeologists to embrace the term Fremont Complex (cf. Madsen and Simms 1998) as the preferred nomenclature, rather than Fremont Culture which implied homogeneity across vast landscapes and different environments. Madsen (1979) and Madsen and Simms (1998) rejected traditional Fremont agricultural models offered by earlier generations of researchers in favor of one emphasizing adaptive diversity with a "complex" of predictable behaviors involving a continuum of foraging and farming that subsumed all non-farmers and farmers under the Fremont label.

Although behavioral ecology has remained a popular currency among many Fremont researchers, Fremont theory has evolved over the past two decades under the influence of scholars at Brigham Young University, who largely rejected "the cascade of assumptions and inferences" inherent in behavioral models. Instead, they have examined the Fremont from the perspective of interregional and intraregional systems, socioeconomic dynamics, ethnic boundaries and borderlands, and cultural commonalities across the northern Colorado Plateau and greater Southwest (Talbot 2012, 2018, 2019).

Their systems approach first emerged through landmark research at Five Finger Ridge near Richfield (Janetski et al. 2000; Talbot et al. 2000) and the Steinaker Gap Site in the Uinta Basin (Talbot and Richens 1994, 1996), which provided the impetus for subsequent Fremont research in Capitol Reef National Park (Janetski et al. 2005) and the Escalante River Basin discussed in this chapter.

Whereas Madsen and Simms (1998) had sought to divorce the Fremont from traditional agricultural models, BYU researchers re-examined the Fremont from a regional perspective wherein they are seen as distinctly Southwestern farmers who were integrated into regional networks (Talbot 2018, 2019). As summarized by Talbot (2002:288), "we can properly conceive of the Fremont as a unique and spatially focused tradition that was not beyond the border but that rather, for well over a thousand years, was the northern border of the Southwest."

Variants and Phases

Defining spatial and temporal frameworks for the Fremont proved problematic throughout the first four decades of Fremont scholarship, given the relative lack of radiocarbon and dendrochronological dates for the entire Fremont area. Many temporal frameworks were hypothesized with little or no corroborative evidence (e.g., Ambler 1969; Breternitz 1970; Gunnerson 1969), which created a paradigm wherein archaeologists first created artificial categories and then interpreted the archaeological record to correspond to those preconceived categories. The Fremont culture was conveniently described in the 1960s and early 1970s as a northern extension of Ancestral Puebloans of the Kayenta and/or Virgin River regions, who migrated into

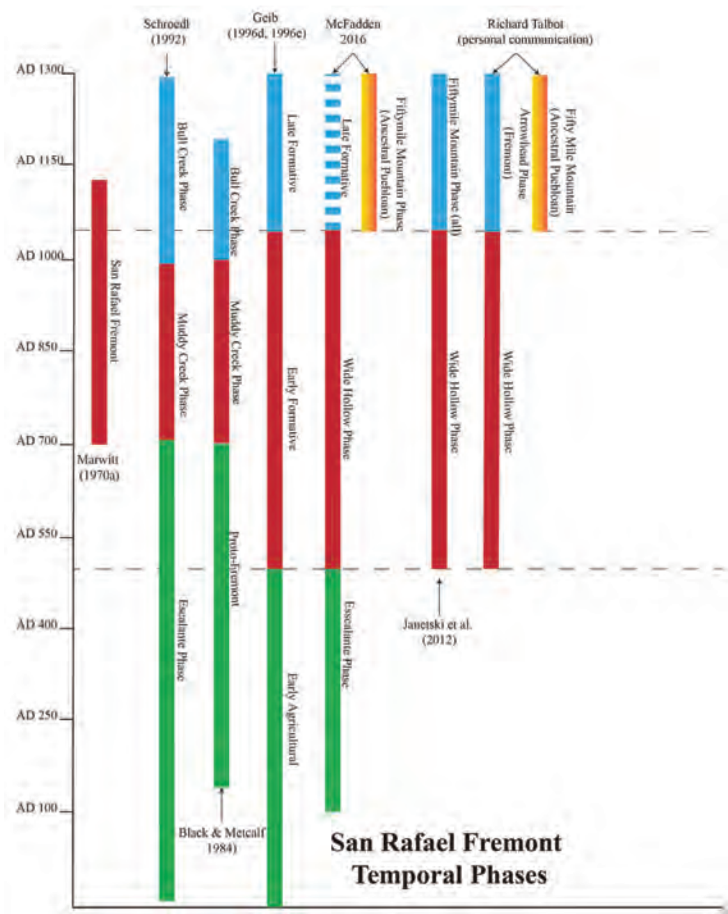


Figure 5.4: Organizing the Fremont into time periods has been a popular pastime among archaeologists for the past half century.

northern Utah during Pueblo II and Pueblo III times, bringing cultigens, ceramics, and sedentary lifeways with them.

Their argument that the Fremont culture was a late Formative manifestation has not withstood subsequent investigations. Hundreds of radiocarbon dates have now been reported (more than 90 in the Escalante River Basin alone) that demonstrate that Fremont groups occupied Utah continuously from about AD 500 to 1300, and that semi-sedentary lifeways ancestral to the Fremont Complex, focused to a greater or lesser degree on agriculture, had become entrenched by at least by AD 200, if not earlier (Talbot and Richens 1996). These adaptations were similar across broad regions, differing only in terms of farming strategies, ceramic temper preferences, and rock art styles.

How to spatially and temporally organize the Fremont dataset has enjoyed a long history of debate. Julian Steward (1933a, 1940) was perhaps the first to recognize Fremont cultural variability, identifying three broad variants within a "Northern Periphery," one centered in eastern Utah, another on the eastern shore of the Great Salt Lake, and the third in the Sevier Desert region of southern Utah. Others expanded on that idea, adding even more variants (Ambler 1966. 1967; Rudy 1953).

The concept of regional variants crystallized in the late 1960s and early 1970s, culminating in John Marwitt's (1970) scheme that formally defined five regional Fremont variants north of the Colorado River. Subsequent researchers have proposed additional Fremont variants or other taxonomic designations (Black and Metcalf 1986; Creasman 1981; Schaafsma 1971; Spangler 1993), but Marwitt's original scheme has proven quite resilient. In the GSENM region, Fremont lifeways are found exclusively in the Escalante River Basin, as well as the adjacent Kaiparowits Plateau, Waterpocket Fold, Circle Cliffs, and Fremont River areas. These are invariably included within the framework of what Marwitt (1970:143-145) described as the San Rafael Fremont (Figure 5.4).

Marwitt's definition (1970) of the San Rafael Fremont also noted the presence of wet-laid and dry-laid masonry architecture, slab-lined pithouses, greater amounts of Ancestral Puebloan trade ware, and a variety of projectile points with minimal diagnostic value. Village sites in the region were generally small and were located on high ridges, knolls, or buttes well above arable land, and a few might have been fortified. Additionally, small alcoves and rockshelters were utilized primarily for storage, as well as limited habitation that suggested temporary or intermittent hunting and gathering activities.

Several researchers have attempted to define temporal phases for the San Rafael Fremont. For example, Black and Metcalf (1986:13) suggested a Muddy Creek Phase (AD 700 to 1000) characterized by increased sedentism, a variety of small and dispersed dwellings, undecorated grayware vessels, and Rose Spring arrow points. The Bull Creek Phase (AD 1000 to 1200) was characterized by Ancestral Puebloan trade wares, Ivie Creek Black-on-white, decorated Emery Gray ceramics, coursed-masonry surface dwellings and storage structures, Bull Creek and Nawthis Side-notched points, and figurines. Generally, they suggested small Fremont sites were most common during the Muddy Creek Phase.

The validity of Fremont variants and phase sequences has provoked considerable debate about culture classifications and artificial constructs. On one extreme, Aikens (1972:64) argued that Fremont variants should be recognized as the taxonomic equivalents of various branches of Ancestral Puebloan groups (e.g. Kayenta, Mesa Verde, Chaco). On the other hand, Madsen (1979) and Madsen and Lindsay (1977) discarded the concept of Fremont variants altogether, drawing distinctions only between the generalized subsistence patterns exhibited by prehistoric inhabitants of the Great Basin and the Colorado Plateau.

Most efforts to refine the spatial and temporal context of the San Rafael Fremont have borrowed from or modified the sequences proposed by Black and Metcalf (1986) and Schroedl (1992). But earlier researchers rarely included specific Escalante River sites within their temporal or spatial analyses of the San Rafael Fremont, and the validity of their broad generalizations was questionable. This prompted Geib (1996c, 1996d) and McFadden

(2016) to propose temporal sequences specific to the upper and lower Escalante River regions, although both retained San Rafael Fremont as a generic descriptive term.

Geib (1996d) defined the Formative (AD 500-1300) as a stage of cultural development characterized by a strong reliance on agriculture, permanent or semi-permanent habitations, and pottery production. Since there were no reported dates for the earliest ceramics in the Escalante River drainage at the time he published his monograph, AD 500 was considered an educated guess – a date that seems more and more reasonable in light of a suite of radiocarbon dates are associated with grayware ceramics. This is two centuries earlier than the AD 700 date suggested by Rex Madsen (1977) for Emery Grayware, which is the most commonly occurring type in the Escalante River drainage.

Geib initially defined an Early Agricultural period to describe all agricultural adaptations in the region prior to the introduction of ceramics at about AD 500 and an Early Formative period from AD 500 to 1050 that encompassed Fremont occupations in the Escalante River country. McFadden (2016) applied the term Escalante River Phase to the Ancestral Fremont presence from about AD 100 to 500 (see discussion in Chapter 4) and he assigned the term Wide Hollow Phase to Fremont occupations from AD 500 to 1050.

The earliest Fremont sites are virtually indistinguishable from Early Agricultural sites in the same area, the only difference being that grayware ceramics were added.

The Wide Hollow Phase has become synonymous with the Fremont Complex in the Escalante River Basin, and as such it warrants additional discussion. McFadden (2016) defined the Wide Hollow Phase as a period when Fremont ceramics were introduced to the Escalante River drainage and surrounding uplands, agriculture contributed significantly to diet and settlement patterns, and residential architecture, even if seasonally occupied, became standardized. Fundamental to McFadden's Wide Hollow Phase hypothesis are the following concepts:

- Wide Hollow Phase sites are virtually indistinguishable from Early Agricultural sites, the only difference being "ceramics are simply inserted into an otherwise uninterrupted continuum of occupation" (McFadden 2016:202).

- Cultivation of maize and squash contributed significantly to the diet, but this subsistence pattern was oriented toward seasonal movements "between farming locations in the canyons and winter residential sites in the uplands that were near big game winter ranges" (McFadden 2016:203).

- Interaction with neighboring groups was limited prior to AD 1050, and the Escalante River drainage was exploited almost exclusively by Fremont groups (McFadden 2016:203-204), what Geib (1996e) referred to as "cultural boundedness."

Both Geib (1996e) and McFadden (2016) used the term Late Formative to describe Fremont adaptations between AD 1050 and 1300, a period of time when Fremont and Ancestral Puebloan occupations became indistinguishable, or when the Fremont were replaced by Pueblo II immigrants with different ceramics and architectural styles. McFadden has argued the Wide Hollow Phase ended at about AD 1050, after which sites always exhibit abundant Ancestral Puebloan ceramics. Because the Ancestral Puebloan sites after AD 1050 were markedly different than earlier Wide Hollow Phase sites, McFadden suggested the term Fiftymile Mountain Phase to delineate Ancestral Puebloan occupations that appear "abruptly as an adaptation employing [Ancestral Puebloan] ceramic, projectile point, and architectural types" (2016:215). He referred to Fremont sites at this time simply as Late Formative.

McFadden believes evidence is rather sparse that Fremont and Ancestral Puebloan populations co-occupied the region during Late Formative times, but others (Janetski et al. 2012) see growing evidence that both groups lived here at the same time, and that Fremont groups might have reoccupied certain sites after the Ancestral Puebloans abandoned the region. At Arrowhead Hill, Fremont potsherds were found on the floors of Ancestral Puebloan houses, and Ancestral Puebloan potsherds were found on the floors of Fremont pithouses, suggesting either the Fremont were living directly on site in the AD 1100s or they were living nearby. Richard Talbot believes the "two populations had a contemporaneous relationship closer than just trade partners," and the two cultural groups were likely co-residents in the Escalante Valley (personal communication 2018). And because both groups occupied the same area, Janetski et al. (2012:206-207) suggested the term Fiftymile Phase should apply equally to both groups.

Talbot has suggested a more consistent approach would be a phase name for Fremont adaptations after AD 1050, such as Arrowhead Phase or Coombs Phase, that is coequal to the Fiftymile Mountain Phase as used for the Ancestral Puebloan manifestation (personal communication 2018). This issue has not yet been resolved.

Figure 5.5: Fremont grayware pottery is defined by differences in the tempering agents added to the clay. In the Escalante River area, this is predominantly crushed basalt from outcrops that has eroded from Boulder Mountain.

Pots and Beans: An Overview

An investment in durable (and heavy) ceramics is further evidence that groups that once relied on mobility to compensate for resource shortfalls began to develop more reliable technologies for food production and processing (Mills 1989). This, in turn, is reflected in increased sedentism. Reed et al. (2000:219) have described a correlation between grayware ceramics and year-round occupation of Ancestral Puebloan sites by the AD 500s and early AD 600s that "supports a shift to household sedentism through which mobility for resource exploitation would have been achieved by task groups." This observation is intriguing for the Escalante River Basin because a similar grayware tradition is present, but there is minimal evidence, as yet, of year-round occupation.

A fully developed grayware tradition was evident by about AD 500 in both the Grand Staircase and Escalante River regions. The basalt-tempered grayware preferred by the Fremont is now referred to as Emery Gray.

A fully developed grayware tradition had appeared by about AD 500 in both the Grand Staircase and Escalante River Basin subregions of GSENM. Basketmaker III peoples of the Grand Staircase preferred sand-tempered graywares commonly referred to as North Creek Gray and Shinarump Gray, and Fremont groups of the Escalante River drainages preferred basalt-tempered grayware now referred to as Emery Gray. The appearance of grayware ceramics at the same time in both regions is probably not coincidental, but the reasons for this co-occurrence have not been adequately explored.

The production of ceramics is generally seen as evidence of increased sedentism that comes with increased dependence on domesticated food resources, in particular beans which require more durable containers that allowed cooking for extended periods. As Paul Reed (2000:8) observed, "With an earlier commitment to corn and bean agriculture and sedentary living than previously thought, the earlier production and use of durable ceramic containers are logical accompaniments, one of many technological changes necessary to meet the storage and processing needs of an agricultural, sedentary people," and that beans require nearly constant tending, and therefore they "were perhaps the final crop that made sedentism fully necessary."

If bean cultivation was the final step toward sedentism, as evidenced by the appearance of ceramic containers durable enough to boil beans, then it should also be noted that very few early Formative sites in the Escalante River Basin have yielded beans in firmly dated contexts. The best early evidence of beans comes from Bechan Cave in the lower Escalante River region (Agenbroad 1990b). A bean recovered from upper strata returned a radiocarbon date of 1310 ±100 BP (AD 730 median probability) and a fragment of squash returned a radiocarbon date of 1400 ±150 BP (AD 638 median probability).

Even if beans were a minor part of the Fremont diet, it is just as probable that ceramic vessels proved more efficient for cooking other foods, as well. A growing number of radiocarbon dates with median probability ages between AD 400 and 600, almost all of them derived from maize remains indirectly associated with grayware ceramics, have been reported (see Table 5.1).

● The most common early ceramic type is basalt-tempered Emery Gray (cf. Madsen 1977; Watkins 2009). The Escalante River samples all conform to traditional characteristics assigned to this type, and they always exhibit igneous tempering agents that are found on Boulder Mountain or the fluvial deposits of the Escalante River (Temper Variety A and Temper Variety B), and therefore they represent local production (Geib 1996d; Geib

Table 5.1

Site No.	Site Name	General Location	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Ceramic Types	Citation
42Ka172	Alvey Site	Coyote Gulch	1690 ±80	-11.1	AD 139-540	AD 348	Beta-34942	Level II-III	Snake Valley Gray, North Creek Gray	Geib 1996c:58
42Ga103	Pantry Alcove	Harris Wash	1640 ±80	-12	AD 235-595	AD 412	Beta-34936	Cist 7, Stratum 2	Emery Gray	Geib 1996c:87
42Ga4521		Escalante River	1610 ±120	-10.1	AD 142-652	AD 436	Beta-134611	Site Surface	Emery Gray	McFadden 2016:302
42Ga4543		Escalante River	1590 ±80	-9.8	AD 258-636	AD 469	Beta-134616	Site Surface	Emery Gray	McFadden 2016:302
42Ga4655	Sand Wash Alcove	Escalante River	1580 ±40	-9.6	AD 398-563	AD 482	Beta-140954	Surface	Emery Gray, Coombs Corrugated	McFadden 2016:302
42Ga103	Pantry Alcove	Harris Wash	1570 ±70	-12.1	AD 344-625	AD 487	Beta-34937	Between Cists 7-8	Not Specified	Geib 1996c:87
42Ga288	Triangle Cave	Harris Wash	1570 ±80	-10.1	AD 267-644	AD 486	Beta-34938	FS27.1 Stratum 2	Emery Gray Kayenta Gray/White	Geib 1996c:87
42Ga102	Sheep Horn Alcove	Harris Wash	1520 ±100	-11.5	AD 262-679	AD 518	Beta-34934	FS34.1 Structure 1	Emery Gray	Geib 1996c:87
42Ga3128	Deer Creek Shelter	Deer Creek	1460 ±40	AMS	AD 485-648	AD 602	CAMS-74937	Ash Lens F553	Emery Gray	Talbot et al. 2002:17
42Ga5169	Arrowhead Hill	Wide Hollow	1420 ±40	-10.4 AMS	AD 565-661	AD 623	Beta-194031	Storage Pit 2 Fill	Emery Gray	Janetski et al. 2012:194
42Ka0178	Gates Roost	Twentyfive Mile Wash	1420 ±70	-9.8	AD 565-661	AD 623	Beta-34945	FS17 Living Area	North Creek Gray	Geib 1996a:87

Table 5.1: Sites in the Escalante River Basin with early Formative radiocarbon dates and associated grayware ceramics. All dates are from maize except CAMS-74937 (pine cone scale). The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

and Lyneis 1996). Other Fremont graywares (Sevier Gray and Uinta Gray) are found, but are comparatively rare.

- Snake Valley Gray, a type tempered with a combination of quartz, feldspar, and biotite mica, are common at sites in the Escalante River region, but they are usually few in number at any given site. An analysis of the composition of Snake Valley Gray found at the Alvey Site revealed they were identical to those found in the Parowan region. As Geib (1996d:89) observed, “I have no doubt, therefore, that this type of pottery … is trade ware,” suggesting a socioeconomic connection to other Fremont groups to the northwest.

- The third early ceramic type was initially identified as North Creek Gray during the course of the Glen Canyon Project (Gunnerson 1959b). But Geib’s later analysis (1996d) led him to conclude they shared similarities to sand-tempered types of the Virgin Branch and Kayenta regions, but they were nonetheless different. He suggested they simply be called Sand Tempered Utility Ware. The presence of sand-tempered ceramics in a region where potters overwhelmingly preferred basalt tempering agents might suggest interaction with contemporaneous Ancestral Puebloan groups. There is also the possibility that graywares similar to North Creek Gray might actually represent local production by individuals knowledgeable of ceramic production techniques farther to the south and west.

We emphasize that none of the early radiocarbon dates from sites with grayware ceramics are firmly associated with the ceramics themselves. It is probable, given the cumulative data, that ceramics became part of the local tool kit by about AD 500, but it could have been a century later. McFadden (2016) believes the most convincing evidence is that from Sand Wash Shelter, where a corncob returned a radiocarbon date of 1580 $\pm$40 BP (AD 482 median probability).

Fremont ceramics are quite common in the Escalante River Basin, occasionally numbering in

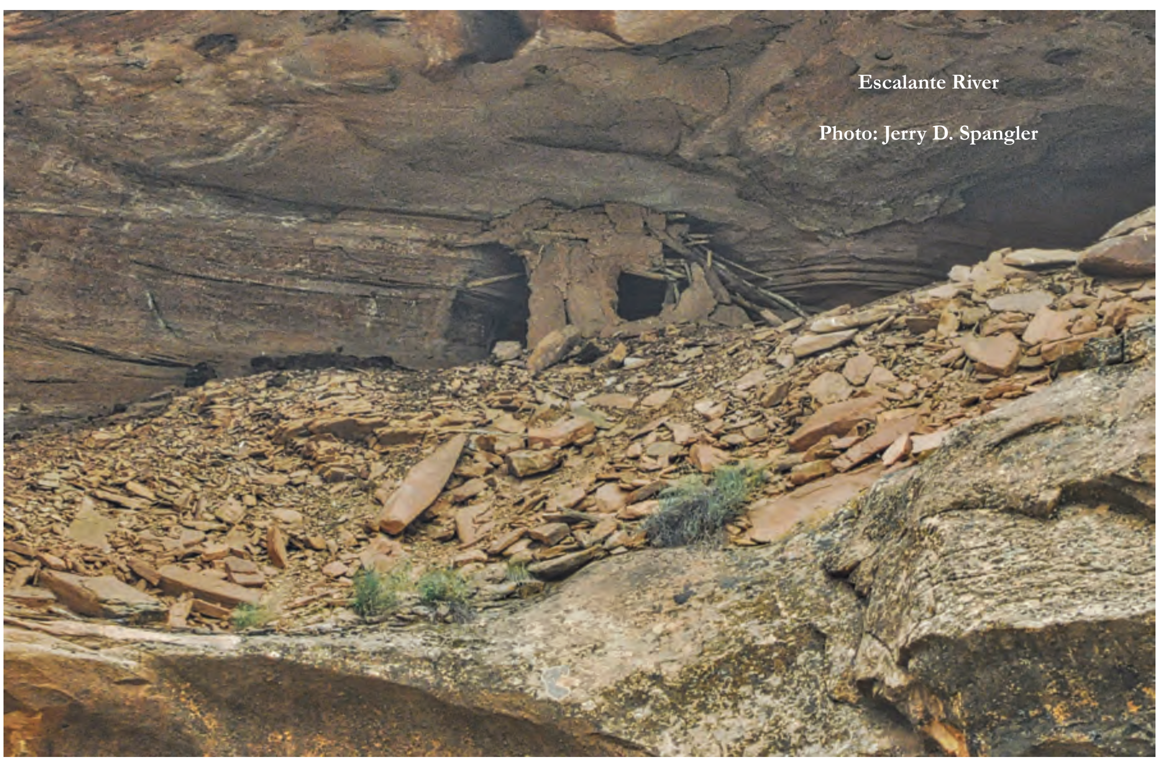


Figure 5.6: Masonry granaries are found throughout the Escalante River Basin, especially along the river itself. Almost all are attributed to Fremont farmers.

the hundreds at some open sites and in the thousands at some excavated sites. This stands in contrast to San Rafael Fremont sites farther to the north where Fremont ceramics are few in number even at the most complex sites. Noel Morss, whose 1931 monograph first articulated the Fremont Culture concept, later wrote (1932), "we found pottery so scarce in certain sites in the Fremont district as to suggest that perhaps there was a time when, if not entirely absent, it was perhaps not made locally."

There is a common assumption that locally made Fremont pottery in this region was exclusively and monotonously Emery Gray that was devoid of creative variation. Plain gray certainly dominates the ceramic assemblages, but there was apparently some experimentation with coloration, painting, and slipping. Lane Richens' (2014) analysis of the ceramic collection recovered from the Spillway Site near Escalante found Emery Gray potsherds with a red hematite wash, Emery Gray with a red hematite wash and yellow paint, Emery Gray with a red slip, Emery Red-on-gray, and Emery Black-on-gray. Additionally, Snake Valley Black-on-gray and Ivie Creek Black-on-white types were imported to the region from Fremont groups to the northwest.

The Fremont Database

McFadden's phase sequence has emerged as the prevailing temporal framework for Fremont adaptations in the region, and we therefore examine the relevant datasets within the context of his assumptions. Specifically, we discuss evidence of bi-seasonal mobility between home bases in the uplands and farming base camps in the river bottom, winter adaptations oriented toward mule deer procurement, and the nature of hard-versus-permeable boundaries with neighboring Ancestral Puebloan groups. Late Formative adaptations are briefly discussed within the context of Fremont displacement, assimilation, and co-residency, as well as the breakdown of cultural boundaries that characterized the entire northern Colorado Plateau between AD 900 and 1050 (cf. Geib 1996e; Madsen and Simms 1998; Talbot 2000).

We use two different datasets to address these questions. First, we cataloged all known radiocarbon dates with median probability ages between about AD 500 and 1300. This catalog includes dates from sites within GSENM, as well as contiguous areas of the Waterpocket Fold, Boulder Mountain foothills, the Fremont River valley, and Glen Canyon. These dates were then recalibrated and the results were tabulated and organized according the following site types, each with implications for the questions being asked: (1) open and sheltered artifact scatters with and without minor features such as hearths, alignments, and rock art that are probably indicative of seasonal occupations, either as field maintenance camps or foraging camps, (2) storage sites where there is minimal or no evidence of residential activities, suggesting remote storage strategies, and (3) open and sheltered residential sites with and without associated features, such as on-site storage, that suggest permanent or semi-permanent occupations.

Second, we cataloged all archaeological sites within GSENM where the state site forms referenced a Fremont presence. This dataset, which is highly subject to individual bias as to what constitutes a "Fremont" site, includes sites with Fremont ceramics in greater or lesser quantities, forager sites with Rose Spring arrow points, granaries and pithouses where the architectural style is consistent with Fremont structures elsewhere, and rock art styles generally considered to be Fremont based on the trapezoidal or triangular nature of the anthropomorphs. A Fremont designation was noted on more than 200 sites in the region. These sites were then organized according to the primary activity represented at the temporary/seasonal camps, storage sites, and semi-permanent residential sites.

Summer Camps

A fundamental component of McFadden's (2016) bi-seasonal settlement pattern for the Fremont Complex is spring population dispersals from upland winter residences to temporary residences along arable lands at lower elevations of the Escalante River and its tributaries. This model is similar to that proposed by Geib for the lower Escalante River and Glen Canyon areas where he identified three general site types: field stations, food storage, and residences. The summer residences along the Escalante River would have been, for the most part, field stations, which he noted (1996d:93), "were perhaps lived in temporarily and sporadically during the growing season, but probably rarely any length of time and not for overwintering. They could well have food storage features or perhaps features to hold next year's supply of crop seed."

In the lower Escalante River country, these field camps were situated in and around naturally occurring alcoves and rockshelters, which served short-term residential purposes, and these shelters were located in close proximity to the maize fields, as evidenced by the presence of corn stalks and corn husks that are rarely transported significant distances. They also exhibit evidence of repeated occupations, suggesting the same sites were re-occupied year after year. And most exhibit some evidence of on-site storage, usually subterranean cists, although these are usually quite small and might reflect storage of seeds for planting the following spring (Geib 1996d).

These lower elevations were well watered and had longer growing seasons that lessened risks of late spring and early fall frosts. But more recent research in the upper Escalante River Basin and on the east flank of Boulder Mountain has demonstrated the same pattern of seasonal residences situated along permanent water sources, but at elevations 1,000 to 2,000 feet higher than contemporaneous lowland sites (Janetski et al. 2005; Talbot et al. 2002). In other words, the length of the growing season was not a determining factor when deciding where to locate fields, but rather it was the presence of arable lands and permanent water. For our purposes, lowland sites are those below 5500 feet elevation and upland sites are above 5500 feet elevation, following Harris's (2009) Fremont site distribution analysis.

The term "field camp" is intended to describe a temporary residence used during planting, maintaining, and harvesting of cultivated food resources. Because the maize growing season is six to seven months, the idea these were temporary residences does not fit comfortably into definitions offered by Baer and Sauer (2003:147-148) and Harris (2005:98) for the Escalante River Basin. They described "long term residences" as occupations of at least half the year and with evidence for more substantial residential structures, and "seasonal residences" where there is evidence for occupations of several weeks up to two or three months and residences that were light brush structures with no evidence of depressions or masonry construction. As used here, field camps would have been occupied more than half the year (May to October) and therefore would have been "long term," but the residences themselves reflect expedient use of alcoves, rockshelters, and light brush structures and therefore would have been "seasonal."

The defining characteristics of the summer field camps can therefore be summarized as follows:

- Residences reflected expediency over permanence, and if residences were constructed, they were light-weight structures or windbreaks situated inside alcoves and rockshelters, or they were light brush structures on terraces and ridges adjacent to the floodplain.

- Field camps were exclusively warm-weather occupations, and fire hearths would have been few in number and limited primarily to food preparation.

- Residential trash would have been minimal in any given year, but repeated short-term occupations of favored locales over hundreds of years would have resulted in the accumulation of substantial middens in a few instances.

- Groups sizes would have been small, but large enough to have allowed forays to procure wild plant and animal resources by some individuals while others remained behind to maintain and protect cultivated resources.

- Given that the optimal planting time for maize is early-to-mid May, groups probably arrived in the lower Escalante River country in mid to late April to begin field preparations, and perhaps somewhat later at higher elevations. They all would have left by middle October upon completion of the harvest.

- The small size of the cists and granaries at these field camps suggests storage for immediate con-

Table 5.2

Site Number	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka2745	Meister Knapper	Bowns Canyon	4040	Charcoal	1525 ±130	n/a	AD 231-754	AD 508	GX-11336	Locus A	Bungart and Geib 1987:98
42Ga0102	Sheep Horn Alcove	Harris Wash	4800	Zea Mays	1520 ±100	-11.5	AD 298-670	AD 518	Beta-34934	Lower Fill FS34.1 Structure 1	Geib 1996:87
42Ga4561	White Sheep	Escalante River	4880	Zea Mays	1520 ±80	-9.6	AD 368-646	AD 525	Beta-134617	Site Surface	McFadden 2016:302
42Ga4561	White Sheep	Escalante River	4880	Zea Mays	1500 ±80	9.9	AD 395-657	AD 547	Brta-134618	Site Surface	McFadden 2016:302
42Ka2744	Sitio del Fuego	Bowns Canyon	4080	Charcoal	1500 ±70	n/a	AD 415-648	AD 551	Beta-16270	Lower Slab-Lined Hearth	Bungart and Geib 1987:96
42Ga4538		Escalante River	4900	Zea Mays	1490 ±70	-9.7	AD 421-653	AD 561	Beta-134613	Site Surface	McFadden 2016:302
42Ga0288	Triangle Cave	Harris Wash	4960	Zea Mays	1480 ±50	-11	AD 439-646	AD 580	Beta-34940	FS127.1 Stratum 3	Geib 1996:87
42Ka0178	Gates Roost	Twentyfive Mile Wash	4800	Zea Mays	1420 ±70	-9.8	AD 449-751	AD 618	Beta-34945	FS17 Living Area	Geib 1996:87
42Ka2546	Bechan Cave	Bechan Canyon	4200	Squash	1400 ±150	AMS	AD 328-946	AD 638	AA-4173	Culture Period IV	Agenbroad et al. 1989:344
42Ga0276	Red Feather	Harris Wash	4940	Zea Mays	1360 ±80	-21.3	AD 517-867	AD 671	Beta-78335	Feature 1	Geib 1996:114
42Ga4561		Escalante River	4880	Zea Mays	1320 ±70	-9.6	AD 603-877	AD 713	Beta-134619	Site Surface	McFadden 2016:302
42Ka02743		Bowns Canyon	4040	Charcoal	1315 ±75	n/a	AD 601-888	AD 718	GX-11340	Hearth	Bungart and Geib 1987:96
42Ka2546	Bechan Cave	Bowns Canyon	4200	Bean	1310 ±100	AMS	AD 557-947	AD 730	AA-4172	Culture Period IV	Agenbroad et al. 1989:344
42Ka2756	Co-op Site	Bowns Canyon	4120	Charcoal	1290 ±75	-25	AD 628-926	AD 740	GX-11338	Upper Lens, Locus B	Bungart and Geib 1987:78
42Ga0288	Triangle Cave	Harris Wash	4960	Zea Mays	1270 ±70	-11.2	AD 653-937	AD 751	Beta-34939	FS62.7 Stratum 2	Geib 1996:87
42Ka2546	Bechan Cave	Bechan Canyon	4200	Zea Mays	1240 ±180	AMS	AD 439-1158	AD 800	AA-4174	Culture Period IV	Agenbroad et al. 1989:344

Table 5.2 (continued)

Site Number	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ga1541		Escalante River	4840	Zea Mays	1230 ±60	-9.5	AD 676-945	AD 792	Beta-134608	Site Surface	McFadden 2016:299
42Ga1434	Escalante Canyon Alcove	Escalante River	5360	Zea Mays	1070 ±60	-9.4	AD 794-1115	AD 963	Beta-177171	Site Surface	R. Talbot, personal communication 2018
42Ka2756	Co-op Site	Bowns Canyon	4120	Charcoal	1060 ±80	-25	AD 778-1150	AD 972	Beta-16274	Hearth 4, Stratum 2	Bungart and Geib 1987:78
42Ga1541		Escalante River	4840	Zea Mays	1030 ±70	-9.9	AD 827-1159	AD 1007	Beta-134609	Site Surface	McFadden 2016:299
42Ka0172	Alvey Site	Coyote Gulch	4400	Zea Mays	970 ±100	-10.6	AD 821-1242	AD 1074	Beta-34943	Level II-III	Geib 1996:87
42Ka2731		Bowns Canyon	3960	Charcoal	950 +160	n/a	AD 737-1338	AD 1071	GX-11018	T2(b) Ash Layer	Agenbroad and Mead 1990:52
42Ga4518		Escalante River	5200	Zea Mays	950 ±80	-8.7	AD 922-1240	AD 1096	Beta-134610	Site Surface	McFadden 2016:302
42Ga3970		Halls Creek	5100	Charcoal	930 +60	-22	AD 1006-1221	AD 1106	Beta-161576	Feature 2 Hearth Fill	Janetski et al. 2005:65
42Ka2739	Ceremonial Cave	Bowns Canyon	4160	Paint Pigment	675 ±55	-25.4	AD 1249-1397	AD 1318	AA-5223	Rock Art	Geib and Fairley 1992:164

Table 5.2: Lower-elevation Fremont camp sites in the Escalante River Basin, Waterpocket Fold, and Fremont River Valley areas (below 5,500 feet elevation). The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

sumption during the growing season and/or the storage of seeds for their return the following spring. By inference, most of the harvested maize would have been transported to a winter residence or cached in isolated granaries elsewhere where it was retrieved as needed during the winter.

Lowland Field Camps

The Geib-McFadden models were constructed around the cumulative data from several sites in the lower Escalante River area that were first investigated during the course of the Glen Canyon Project (Gunnerson 1959b; Fowler 1963) and later re-examined by Geib (1996c, 1996d). Three sites are discussed here as representative of this site type, although several other similar sites have also contributed radiocarbon data. The radiocarbon data from lowland camps are briefly summarized in Table 5.2 above.

Typical of lowland field camp is the Alvey Site (42Ka178), an alcove site in the Coyote Gulch that was occupied periodically for a thousand years or more as evidenced by cultural materials 3.7 meters deep. The lowest non-ceramic level was about 2 meters thick and produced a series of four Early Agricultural radiocarbon dates (see discussion in Chapter 4). Level II and Level III represented repeated short-term occupations of the alcove during early and late Formative times. The presence of corn husks suggest maize farming occurred at or near the site. Corn husks and corn stalks have no nutritional or economic value, and therefore humans did not expend energy transporting those materials significant distances. When these items are observed in archaeological contexts, it is always assumed the fields are located nearby (Barlow and Metcalfe 1993).

Level II deposits at the Alvey Site were 60 to 90 centimeters thick and featured Snake Valley Gray and North Creek Gray potsherds, corner-notched arrow points (probably Rose Spring), unfired clay figurines, and three slab-lined storage cists constructed against the back wall of the alcove or next to large rocks. The cists were relatively small and featured seams sealed with cedar bark or adobe.

Level III deposits were easily distinguished from earlier deposits both in terms of a sterile sand layer separating the two occupations and by a different artifact assemblage. A large D-shaped stone-and-adobe house structure, perhaps with attached storage units, was believed to represent the end of this occupation. Most storage facilities were represented by buried pots, baskets, or gourds that sometimes extended into Level II deposits. Arrow points were exclusively triangular in shape (probably Bull Creek points), and there was abundant residential detritus and exotic items such as beads, gaming pieces, a wooden shovel, a wooden ball, and cotton textiles and yarn. The ceramic collection was dominated by Tusayan Grayware and Tsegi Orange types, and the prevalence of corrugated types suggested an occupation sometime after AD 1050 (Gunnerson 1959b). A corncob from this level later returned a radiocarbon date of 970 $\pm$100 BP (AD 1074 median probability) (Geib 1996d).

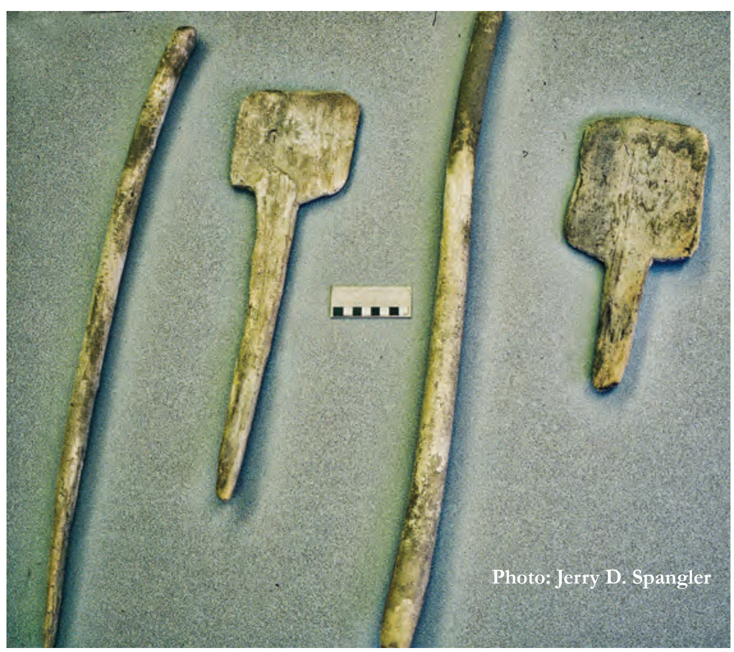


Figure 5.7: Cottonwood "shovels" seem to be unique to the Fremont of the northern Colorado Plateau. These implements from eastern Utah dated very late in the Formative.

Utilization of the alcove appears to have remained consistent through time, representing short-term occupations, probably during the maize growing season from May through October. Maize was farmed nearby, as evidenced by digging sticks and perhaps a wooden shovel (Figure 5.7). The presence of numerous snares indicates small animals were hunted, and a wide variety of tools were constructed of stone, bone, and wood. Wild plants were probably procured and processed at the alcove, as reflected in the abundance of baskets in several shapes and sizes.

The pattern observed at the Alvey Site is repeated at several other rock shelter sites in the lower Escalante River area, although with minor variations. At Gates Roost, six D-shaped structures 3.7 to 5.5 meters across and 30 to 90 centimeters high were interpreted as sleeping areas. Architectural features also included a trapezoidal-shaped slab-lined storage cist and a second semi-subterranean D-shaped cist with an adobe collar and a wooden pole, stone, and adobe matrix similar to above-ground Fremont granaries. Artifacts were generally sparse, consisting of North Creek Gray potsherds, five fragments of unfired clay figurines, an unfired clay bowl, and a moccasin fragment (Gunnerson 1959b). The identification of the potsherds as North Creek Gray inferred an Ancestral Puebloan occupation, but the unfired clay figurines, moccasin, and storage structures were consistent with a Fremont occupation. A corncob from the living area returned a radiocarbon date of 1420 ±70 BP (AD 618 median probability), also consistent with an early Fremont occupation (Geib 1996d).

At Triangle Cave the lowest level featured some cultigens that yielded two Early Agricultural radiocarbon dates, but no ceramics (see discussion in Chapter 4). The next layer corresponded to the earliest grayware ceramics, and the upper levels were associated with mixed Fremont and Ancestral Puebloan ceramics. One subterranean slab-lined cist was associated with the lowest level with ceramics, and five more with the upper level with mixed ceramics. Fowler (1963) did not attribute the upper occupations to Ancestral Puebloans, but rather to Fremont groups who had traded for Ancestral

Figure 5.8: Clay figurines are a hallmark of the Fremont Complex north and west of the Colorado River and they are one of only a handful of artifact traditions shared by Fremont groups regardless of geographic location.

Puebloan pottery. He cited the overwhelming prevalence of Emery Gray (almost 90 percent of the nearly 300 potsherds were Emery Gray), as well as the presence of the clay figurines and moccasins.

The lowest ceramic level contained exclusively Emery Gray potsherds, with the exception of one intrusive Tusayan white ware sherd from an upper level, and that this level represented the earliest Fremont occupation. This was supported by a cache of Fremont-style moccasins from the only storage cist at this level, and abundant unfired Fremont-style clay figurines (Figure 5.8). Corncobs later returned two radiocarbon dates, one of 1570 ±80 BP (AD 486 median probability) and the other of 1270 ±70 BP (AD 751 median probability) (Geib 1996d).

Although individual features were different, the basic nature of the Alvey Site, Gates Roost, and Triangle Cave occupations was identical. Small groups of Fremont farmers occupied the alcoves on a seasonal basis, probably during the maize farming season, and cached food and/or seeds for an anticipated return. Each occupation was temporary, but the repeated nature of these occupations resulted in the accumulation of sometimes deep cultural deposits. Evidence at all three sites indicated that farming was successful and was probably the main focus of the occupations, although hunting and gathering also occurred and probably represented logistical forays from the agricultural base camp.

Open settings in lowland environments were also utilized at this time, although there is confusion as to whether they were Fremont occupations. Excavations at the Co-op Site (42Ka2756), a lowland open camp located in Bowns Canyon, identified at least five different occupations, each separated by culturally sterile alluvium, representing late Archaic and Early Agricultural occupations. The upper deposits were attributed to Basketmaker III peoples based on two radiocarbon dates and the presence of Lino Black-on-gray potsherds. Remnants of maize implied the occupants were farming the canyon bottom, and thin charcoal layers on canyon bottom sediments might be evidence of using fire to clear fields (Bungart and Geib 1987:94-95). Of note, four bone fragments were identified as belonging to turkeys (*Melleagris gallopavo*), even though Glen Canyon is well outside the natural habitat for wild turkeys (1987:91).

In summary, lowland camps, whether foraging camps or farming camps, are abundant in the lower Escalante River country south of the Calf Creek confluence at elevations below 5,500 feet. Most of these are found in alcoves and rockshelters. These camps have produced 25 radiocarbon dates, 80 percent of which are attributable to early Formative times. Most exhibit abundant evidence of Fremont occupations, but mixed Fremont and Ancestral Puebloan diagnostics are common in later contexts. Sites in the extreme lower Escalante River country (Bechan Cave and the Co-op Site) have been described as Ancestral Puebloan occupations. If accurately identified, both groups were probably in close contact with one another from early Formative times.

Upland Field Camps

Both Geib (1996d) and McFadden (2016) argued that warm weather agricultural base camps or field stations represented lowland adaptations suited to take advantage of well-watered bottomlands along the Escalante River and its tributaries. But recent investigations in the upper Deer Creek area, in the foothills near Escalante, and along Oak Creek on the eastern flank of Boulder Mountain have demonstrated that seasonal residences oriented toward field maintenance are abundant in uplands in both sheltered and open settings. Upland camps that produced relevant radiocarbon dates are summarized in Table 5.3.

The best example of this pattern is Deer Creek Shelter in upper Deer Creek at 5,720 feet elevation. The shelter was described as too small for extended habitation, and researchers suggested it was probably used for temporary shelter, shade, and cultigen processing in conjunction with an ephemeral brush residence likely situated near fields along flat areas next to Deer Creek. Winter occupations were considered unlikely given the shelter was not south facing and there was minimal evidence of fire hearths (Talbot et al. 2002).

Table 5.3

Site Number	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ga3743	Haymaker Bench	Haymaker Bench	5760	Charcoal	1500 ±140	n/a	AD 230-834	AD 531	Beta-23058	F3 Hearth	McFadden 2016:301
42Wn2400		Teasdale Valley	7245	Zea Mays	1500 ±40	-11.7	AD 438-634	AD 567	Beta-154658	Hearth	Wintch and Springer 2001:21
42Wn2258	Basket Alcove	Pleasant Creek	6300	Zea Mays	1500 ±60	-10.3	AD 427-643	AD 556	Beta-124185	Alcove Surface	Janetski et al. 2005:231
42Ga0448	Morss Cave 27	Oak Creek	5820	Zea Mays	1470 ±60	-11.4	AD 437-654	AD 583	Beta-124190	Alcove Surface	Janetski et al. 2005:50
42Ga3128	Deer Creek Shelter	Deer Creek	5720	Pine Cone Scale	1460 ±40	AMS	AD 485-648	AD 602	CAMS-74937	Ash Lens F553	Talbot et al. 2002:24
42Ga3138	Horse Canyon Rockshelter	Circle Cliffs	5920	Charcoal	1380 ±70	n/a	AD 533-803	AD 651	Beta-35318	Hearth 2, Stratum 3	Geib 1996:21; Tipps 1992
42Wn2377		Teasdale Valley	7260	Charcoal	1360 ±70	n/a	AD 558-848	AD 670	Beta-160654	Interior Hearth 1	Boomgarden 2009:45
42Wn2002	Ackland Spring	Hartnet Draw	6000	Juniper Charcoal	1350 ±60	-20.9	AD 586-827	AD 677	Beta-108498	Alcove Test Pit	Janetski et al. 2005:132, 231
42Ga5088		Big Flat	6360	Charcoal	1290 ±50	-25	AD 659-863	AD 724	Beta-179652	Slab-Lined Pit	Schaub 2003:97
42Wn2151	Grumpy George	Teasdale Valley	7160	Charcoal	1290 ±80	n/a	AD 614-935	AD 743	Beta-181510	Hearth Dump	Boomgarden 2009:16, 45
42Wn2222		Pleasant Creek	5960	Salix	1290 ±90	-26.9	AD 597-947	AD 747	Beta-128681	Test Pit 1 Fill	Janetski et al. 2005:156, 231
42Ga4158	Birch Creek Shelter	Birch Creek	6600	Zea Mays	1240 ±80	-8.7	AD 661-964	AD 789	Beta-107648	FS-1	McFadden 2016:184
42Wn2151	Grumpy George	Teasdale Valley	7160	Charcoal	1190 ±70	n/a	AD 688-980	AD 831	Beta-181511	Clay Floor	Boomgarden 2009:19, 45
42Ga3128	Deer Creek Shelter	Deer Creek	5720	Pine Cone Scale	1180 ±40	AMS	AD 726-959	AD 843	CAMS-74936	Slab-Lined Feature F567	Talbot et al. 2002:18
42Wn2374		Teasdale Valley	7340	Charcoal	1180 ±60	n/a	AD 698-977	AD 843	Beta-160655	Stratum II Cleared Area	Boomgarden 2009:45
42Ga3660	Big Hill	Escalante Bench	6200	Charcoal	1160 ±60	n/a	AD 713-988	AD 867	Beta-93852	F7 Structure	McFadden 2016:186
42Wn1901		Pleasant Creek	6200	Zea Mays	1160 ±50	-9.2 AMS	AD 725-980	AD 867	Beta-161586	Alcove Surface	Janetski et al. 2005:231;
42Ga4443		Oak Creek	6160	Juniper	1140 ±60	-20.6	AD 729-1004	AD 893	Beta-128676	Hearth Fill	Janetski et al. 2005:103

Figure 5.3 (continued)

Site Number	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ga5863	North Creek Shelter	North Creek	6150	Zea Mays	1130 ±40	-10.3 AMS	AD 782-988	AD 919	Beta-261676	Stratum 7a	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	North Creek	6150	Zea Mays	1130 ±40	-10.2 AMS	AD 782-989	AD 918	Beta-261677	Stratum 6d	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	North Creek	6150	Zea Mays	1050 ±40	-11.6 AMS	AD 900-1048	AD 990	Beta-221411	Stratum 7b	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	North Creek	6150	Zea Mays	1030 ±40	-10.5 AMS	AD 907-1122	AD 1004	Beta-261678	Stratum 6c	Janetski et al. 2012:133
42Ga5171	Backyard Alcove	Wide Hollow	5840	Zea Mays	1000 ±40	-9.2 AMS	AD 973-1148	AD 1031	Beta-168968	107N 97E 20cm bpgs	Baer and Sauer 2003:64
42Wn2151	Grumpy George	Teasdale Valley	7160	Zea Mays	990 ±40	n/a	AD 986-1150	AD 1050	Beta-181512	Hearth	Boomgarden 2009:23, 45
42Wn2377		Teasdale Valley	7260	Charcoal	950 ±50	-22.3	AD 1006-1198	AD 1096	Beta-154655	FS-8 Feature 6 Charcoal Lens	Wintch and Springer 2001:21
42Ga5863	North Creek Shelter	North Creek	6150	Zea Mays	940 ±40	-15 AMS	AD 1025-1187	AD 1098	Beta-197358	Stratum 7a	Janetski et al. 2012:133
42Ga4445		Pleasant Creek	6120	Zea Mays	940 ±30	-10	AD 1030-1159	AD 1098	Beta-128677	Test Trench Midden	Janetski et al. 2005:107
42Wn2359		Polk Creek	5864	Pine Charcoal	930 ±40	-23 AMS	AD 1029-1199	AD 1101	Beta-161596	Feature 1 Floor	Janetski et al. 2005:170, 232
42Wn1097		Paradise Draw	7360	Charcoal	920 ±70	-24.3	AD 996-1244	AD 1113	Beta-108496	Hearth, Test Pit 2	Janetski et al. 2005:120, 232
42Ga5863	North Creek Shelter	North Creek	6150	Tooth Dentin	902 ±40	AMS	AD 1037-1214	AD 1122	AA-78631	Stratum 7c	Janetski et al. 2012:133
42Ga5863	North Creek Shelter	North Creek	6150	Zea Mays	890 ±40	-10.9 AMS	AD 1040-1230	AD 1138	Beta-195226	FS140	Janetski et al. 2012:133
42Ga3128	Deer Creek Shelter	Deer Creek	5720	Zea Mays	890 ±30	AMS	AD 1046-1213	AD 1145	CAMS-74939	F18 in F7 in F3; FS 435	Talbot et al. 2002:21
42Wn1926		Pleasant Creek	5850	Zea Mays	880 ±40	-9.9 AMS	AD 1045-1242	AD 1158	Beta-124184	Alcove Surface	Janetski et al. 2005:232;
42Ga3128	Deer Creek Shelter	Deer Creek	5720	Maize	860 ±40	AMS	AD 1051-1253	AD 1181	CAMS-74938	Occupation 3	Talbot et al. 2002:21
42Wn2377		Teasdale Valley	7260	Shrub Charcoal	860 ±60	-24.7	AD 1040-1261	AD 1172	Beta-154654	FS-8 Feature 6 Charcoal Lens	Wintch and Springer 2001:21
42Ga3123	Steep Creek Quarry	Circle Cliffs	6000	Charcoal	770 ±70	n/a	AD 1064-1376	AD 1240	Beta-20670	Hearth 1	Brown and Tipps 1987:34, Tipps 1992
42Ga3138	Horse Canyon Rockshelter	Circle Cliffs	5920	Charcoal	770 ±60	n/a	AD 1089-1370	AD 1243	Beta-20673	Hearth 5, Stratum 4	Brown and Tipps 1987:73; Tipps 1992

Table 3.3: Higher-elevation Fremont camp sites in the Escalante River Basin, Waterpocket Fold, and Fremont River Valley areas (above 5,500 feet elevation). The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

Three different occupation levels were identified, all of which were agricultural in nature (recovered Archaic points were considered to be curated items rather than indicative of an earlier Archaic occupation). In addition to the wild plants available along nearby Deer Creek, the faunal remains included mule deer, mountain sheep, rabbit, rodents, reptiles, birds, and even fish. Considered collectively, the deposits suggest the shelter was used repeatedly by Fremont groups beginning in early Formative times, and there was a limited Ancestral Puebloan presence at about AD 1150 to 1200, suggesting both groups co-occupied the area in late Formative times. The shelter might have been used initially as a hunting camp or logistical camp to exploit wild plants along the creek, but it later became a summer camp associated with the cultivation of maize and squash, a pattern that continued over several hundred years. Evidence of a seasonal residence was not identified near Deer Creek Shelter, but inventories in the same drainage identified several temporary residences and one pithouse (Baker et al. 2001).

The Deer Creek Shelter data are far from unusual. Other upland alcoves and rockshelters in the region are probably associated with farming activities, but without permanent residential architecture. These include Morss Cave 27 in Oak Creek (Janetski et al. 2005), North Creek Shelter in the foothills west of Escalante (Janetski et al. 2006; Richard Talbot, personal communication 2018), and perhaps Backyard Alcove in the Wide Hollow area, although this latter site was more likely associated with a permanent habitation that was later destroyed by modern development (Baer and Sauer 2003).

To date, at least 37 radiocarbon dates have been reported from upland camps, mostly in the Boulder Mountain foothills west of Waterpocket Fold. These upland camps exhibit predominantly Fremont diagnostics, and Ancestral Puebloan ceramics are quite rare and even more so at sites farther to the north in the Fremont River valley. Upland camps are found in rockshelters, most of which have evidence of earlier and later occupations, but open camps are much more common here, usually situated along stream terraces. Fremont ceramics and Fremont rock art are commonplace at most of these sites.

Jordan and Talbot (2002:161), summarizing their inventory in the uplands, observed that "We see seasonal occupation in Escalante Canyon by farmers probably living in alcoves or small temporary shelters in open sites, who probably farmed the river terraces and who stored their foods and other materials in granaries. This was not necessarily large groups doing this farming. It is very possible that small task groups from a larger village farmed this particular location while other task groups farmed other areas."

There is an inherent assumption in the pattern described above that summer field camps were logistical bases from which small task-oriented groups were dispatched to procure wild plants and animals, tool stone, and other resources. Because maize requires constant attention to reach maturity (cf. Coltrain 1994), there is also an assumption that some members of the group would have remained behind to ensure the cultigens were adequately watered and protected from animal predation. If these assumptions are valid, then there should be evidence of contemporaneous forager camps that were oriented toward procurement of naturally occurring resources within a reasonable range of the summer field camp. And because preferred resource patches were already known and had been exploited by earlier groups, it would be expected that these forager camps would offer mixed artifact assemblages with multiple temporal indicators.

The radiocarbon database offers little support for these assumptions. Only 10 Formative radiocarbon dates from nine forager camps have been reported, and there seems to be minimal evidence these sites were utilized in earlier times. There is also minimal evidence that ceramics were a significant part of the forager tool kit. The forager camps are split almost equally between upland and lowland settings, and these probably represent different seasons of use, such as early spring plant procurement in the lowlands and late spring and early summer exploitation of upland resources.

Figure 5.9: Stone implements for grinding maize and wild seeds became much more formalized during the Formative period. Some with shaped sidewalls and divots for resting the mano are referred to as Utah metates, although they are not unique to Utah nor to the Fremont Complex.

Foraging Camps

The radiocarbon database probably underrepresents the number of Formative foraging camps in the Escalante River Basin. Major inventory projects in the upper Circle Cliffs (Baadsgaard et al. 1998; Talbot et al. 2000), Deer Creek (Baker et al. 2001), Big Flat (Jordan and Talbot 2002), Escalante Valley (Baer and Sauer 2003), and Escalante River corridor (Harris 2005; Jordan and Talbot 2001; Keller 2000) have all identified significant numbers of forager camps of suspected Formative age, based on the presence of certain ceramic indicators.

To better understand the nature of Fremont temporary or seasonal camps in the region, we examined all GSENM site forms for all reference to the term "Fremont." We then organized the data by major site types and artifact classes. There are at least 132 non-architectural sites that have diagnostics identified as "Fremont" on the site forms, although in some instances these same artifacts (e.g., Rose Spring and Bull Creek points) were used by both Fremont and Ancestral Puebloan groups and must be considered poor cultural markers.

This number should be considered a minimum threshold given that all site forms prior to about 1980 did not offer enough detail about the diagnostic artifacts, and in many instances the handwritten site forms are no longer legible. The dataset considered here includes all GSENM sites documented during recent inventories, and the identification of features and diagnostic artifacts should be consistent and comparable to one another.

To organize the Fremont site data relevant to seasonal occupations, we asked a series of questions to arrive at catalog of sites that might be relevant to seasonal use of specific resources in the region, regardless of what those resources might have been (e.g., riparian plants, arable lands, cryptocrystalline outcrops). Site data were initially organized based on the following two questions: (1) Is the site located in an open or sheltered setting, and (2) is there evidence of constructed architectural features. This led to four general site categories: open architectural, open activity area (non-architectural), sheltered architectural, and sheltered activity area (non-architectural). Because rock imagery occurs in both open and sheltered settings, often at the same site, a fifth category was created for sites where there was no evidence of architectural features or associated artifacts.

A vast majority of Fremont foraging sites in the Escalante River region have exclusively Fremont ceramics.

Considered together, these 132 sites in the Escalante River Basin might represent Fremont occupations based on material culture evidence, mostly Emery Gray ceramics, rock art styles, and/or Rose Spring arrow points. These sites reflect a spectrum of site locations, although there was a preference for rockshelters, ridgelines, and benches with a view onto lower terrain. All but a handful of sites can be attributed to exclusively Formative occupations between AD 500 and 1300, and the vast majority have exclusively Fremont diagnostics. This suggests the pattern of foraging during the Formative, with a few exceptions, was different from that of earlier Archaic or later Late Prehistoric times. This might reflect reduced mobility and logistical foraging by task groups dispatched from a base camp in close proximity to wild resources being exploited. These base camps might also have been the summer field camps along the Escalante River and its tributaries.

The abundance of sites with ground stone tools suggests that plant procurement and processing was a major activity, and these were probably female tasks. This is also supported by the abundance of formal slab-lined pits that are probably roasting pits for plant processing (Schaub 2003). The chipped-stone waste at these sites suggests that stone tool maintenance and, in some instances, tool stone procurement, occurred at these sites, and these are generally viewed as male activities. The inventory data have not identified a robust hunting lifeway, although the presence of bifaces, drills, and scrapers suggest some meat processing occurred here. The rarity of ceramics at hunting sites might reflect (1) the unsuitability of ceramic containers to a more mobile hunting strategies involving longer distances, and/or (2) the seasonality of plant resources was inconsistent with migration patterns of large game. The small number of hunting sites might indicate intensive procurement of large game occurred at higher elevations outside GSENM and the dataset considered here is not representative of the seasonal round.

Many of the Fremont foraging sites have been documented in more upland settings near the town of Escalante where there is also an abundance of more permanent pithouses indicative of longer-term occupations. McFadden (2016) believed these more permanent sites were winter residences focused toward procurement of mule deer and situated to take advantage of abundant fuel wood. Harris (2009) instead found the more permanent occupations were actually focused on wild plant procurement and processing, probably pinyon nuts, juniper berries, prickly pear, and ricegrass.

These sites typically feature a low frequency of lithic flakes and stone tools that would be expected at hunting sites.

The relationship between high-investment foraging pithouses and low-investment forager camps in the same general area has not been satisfactorily explained. It might be that foraging camps represent procurement of resources that were available for only a few days each year (e.g., ricegrass), whereas more permanent sites reflect procurement of resources that can be harvested over a period of several weeks or even months (e.g. pinenuts, prickly pear).

As summarized by Harris (2009:122), "logistical sites (complex camps, plant processing camps, and hunting locations) are found in all landforms and at all elevations, situated to take advantage of a variety of resources in local environmental niches," and that "the Fremont lived in the valleys for much of the year in long-term residences, focusing their subsistence efforts primarily on agriculture but also spending significant periods of time in the mesas and in the canyons, hunting and gathering wild resources."

Fremont Storage Sites

The development of a complex storage strategy involving a variety of storage facilities is a hallmark of the Fremont Complex. As with residential architecture, storage facilities have traditionally been interpreted as evidence of agriculture and by inference increased sedentism. Consequently, the construction of storage structures, whether for food surpluses or seeds for future cultivation, implies a decision to adopt more-sedentary lifeways.

Storage practices have been categorized by biologists as falling within two broad strategies: (1) larder hoarding, or the concentration of stored re-

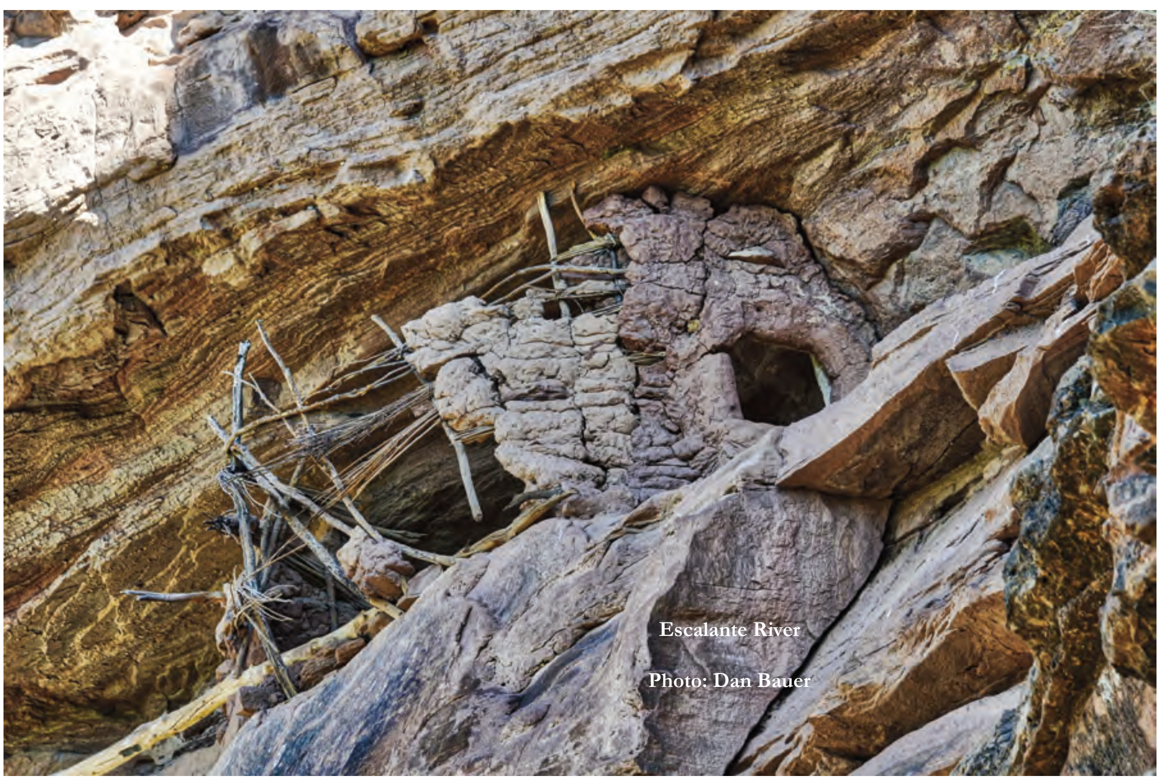


Figure 5.10: Fremont granaries are typically highly visible, but getting to them was especially inconvenient. Small granaries might have been used to store seed corn for the following spring, whereas larger ones were probably food caches retrieved as needed during the winter.

sources in comparatively large chambers by a resident population that effectively monitors and protects those resources from predators, and (2) scatter hoarding, or the distribution of stored resources in multiple locations by a non-resident population whereby storage facilities are concealed or placed in inaccessible locations, and the loss of some stored resources to predators was viewed as an acceptable risk in light of the preservation of the remaining resources (Vander Wall 1990). Both strategies are evident in the Escalante River Basin where there are abundant sites with small, concealed storage, suggesting a non-resident population and many others that are large, highly visible chambers that suggest a resident population was on hand (or nearby) to protect them.

Geib (1996d:93) designated food storage as one of three general site classes in the Escalante River Basin, noting they share the least in common with field camps and residential sites, and "seem to be the most functionally specialized." They are the most problematic site type in the region because food storage occurs both at seasonal field camps and at residential sites, and in many instances they are accessory features associated with different levels of sedentism.

A granary labeled Fremont by one researcher might be considered Ancestral Puebloan by another. Without diagnostic artifacts or radiocarbon dates, there will be uncertainty surrounding who built them and when they were built.

For our purposes, the term cist is used to describe storage facilities that are subterranean or mostly so, regardless of the method of or the materials used in the construction. These are primarily chambers used to conceal food resources by a population not always present to protect them. The term granary is used to describe all storage facilities constructed above ground or mostly above ground. These are usually larger, they are much more visible and therefore have a higher risk of human predation, and they are traditionally viewed as chambers from which food stores were retrieved as needed during the winter and early spring.

David Yoder (2005), who included the Escalante River Basin in his study of Fremont storage facilities, observed a direct correlation between the types of storage facilities and mobility. He observed that groups generally use subterranean and/or offsite storage when they are engaged in a mobile or semi-sedentary strategy of resource concealment. Sedentary groups, on the other hand, use above ground storage in close proximity to their residence.

In the Escalante River Basin specifically, he found that 96 percent of storage features utilized between AD 1 and 500 were off-site or subterranean, and from AD 500 to 900, the percentage was roughly the same at 94 percent. This suggested Fremont groups were practicing a highly mobile lifeway, "spending six months out of the year or less at a residential base" (Yoder 2005:42). But after AD 900, only 63 percent of Escalante River storage features were off-site or subterranean, suggesting an unprecedented shift toward increased sedentism.

Yoder also noted the use of bell-shaped pits and slab-lined cists steadily fell through time, while use of adobe surface structures increased through time, as did the size of the storage chambers. He believes this reflected decreased mobility and greater reliance on stored resources. He estimated that 50 to 60 percent of the total Fremont population had become entirely sedentary by AD 900.

At least three basic storage strategies are evident in the Escalante River Basin:

- Small storage facilities, usually subterranean or semi-subterranean, that were located in alcoves and rockshelters were probably associated with field maintenance activities. These represented storage of crop seeds and/or food resources needed by farming groups during the growing season. These are especially common at summer field camps associated with maize cultivation.

- Cliff granaries constructed of stone, adobe, and wooden poles that are typically situated on cliff ledges or in difficult-to-access small shelters in the cliff face. These are generally considered "off-site" storage chambers inasmuch as residential features are not directly associated with them. Most are individually small (<2 cubic meters), but they sometimes occur in clusters with much greater cumulative storage.

- Large subterranean pits located inside or just outside permanent pithouses and surface masonry structures located adjacent to pithouses that probably represent on-site food storage for winter consumption. These are evident at Arrowhead Hill and the Spillway Site, both located in the Wide Hollow area.

Cliff granaries are common in the Escalante River Basin and on the Kaiparowits Plateau, and they are typically described as Fremont when yielding radiocarbon dates prior to AD 1050 and Ancestral Puebloan after that time. In reality, archaeologists have not articulated any significant differences between Fremont and Ancestral Puebloan granaries in terms of architectural styles, site placement, or relative complexity. In other words, a granary labeled Fremont by one researcher might be considered Ancestral Puebloan by another, and without diagnostic artifacts or chronometric data, there is a high level of uncertainty surrounding the cultural and temporal context of such storage features.

Our discussion is further hampered by differences of opinions as to what constitutes "on-site" and "off-site" storage, and the inherent implications of those labels on group mobility. On-site storage has traditionally been interpreted as storage chambers immediately adjacent to a residence, or at most "no more than a stone's throw" from a residence (David Yoder, personal communication 2018). Off-site storage suggests a remote storage facility that is neither monitored nor protected at all times.

But is a granary really "off-site" and unprotected if happens to be 100 or 200 meters or even much greater distances from a residence, yet it is clearly visible from the residence? Arnold-Boomgarden (2008, 2009) used Digital Elevation Models to determine the viewspread of Fremont granaries in Range Creek, and she found that all 54 granaries in her sample were visible from the valley floor or from another site location, although some were hard to see because of distance or construction materials that made them blend into the background cliffs. She concluded that the large granaries were purposely not hidden from view, but rather were situated to allow their owners "to easily identify potential thieves approaching or attempting to access stored food." She observed (2009:18) that it would have been easy, given the rugged topography, for the Fremont to have concealed the granaries completely, but they intentionally chose not to do so.

Here, we examine Fremont storage facilities within the context of the radiocarbon database, which includes storage sites within and adjacent to GSENM, as well as the IMACS database of sites within GSENM specifically. All storage sites are discussed within the context of small cists, masonry granaries, and large subterranean structures directly associated with residences. The organization of these data was not always straightforward inasmuch as many sites have both subterranean cists and above-ground granaries, and the relationship between the dated material and a specific storage facility is not always clear. Storage structures appeared in the Escalante River region by about AD 200 and appears to have been concomitant with the emergence of maize agriculture.

Storage Cists

Geib (1996d) and McFadden (2016) believed that small storage cists located in alcoves and rockshelters were part of an agricultural lifeway wherein groups would re-occupy favored locations along the Escalante River and its tributaries during the maize growing season. There is an inherent assumption that these summer field camps were abandoned during non-growing seasons, and that the small cists might have been used to store seed corn for the following spring.

None of the cists are large enough to have satisfied food storage needs for any significant period of time. There are usually one to three cists at any given site, although there are exceptions like Pantry Alcove with 13 cists and another site with 28 cists. The cists are usually manifest as slab-lined facilities with the joints sealed with mud or clay, or as hardpan cists where a chamber was excavated into soft sandstone or a natural clay substrate. There are a few instances where the cist was lined with juniper bark or where ceramic vessels and baskets functioned as subterranean cists.

Twenty-nine radiocarbon dates have been reported from Fremont sites with subterranean cists (see Table 5.4). The age ranges of most of these dates are divided almost equally between Early Agricultural and Wide Hollow Phase times, but only four have median probabilities in Late Formative times. This would appear consistent with Yoder's observations (2005) that storage strategies reflected high mobility during early and middle Fremont times, but dramatically less so after AD 900 as populations increased and became more aggregated.

If storage cists are part of a seasonal farming strategy then there is also some support for the Geib (1996d) and McFadden (2016) models that farming groups were exploiting well-watered lower elevations, perhaps to take advantage of earlier plantings and longer growing seasons. All but three of the radiocarbon dates are from sites below 5,500 feet elevation, and 76 percent are located at or below 5,000 feet elevation. This is probably a statistical bias resulting from a small sample size of dated sites. The inventory data indicates that 88 percent of GSENM sites with storage cists are found at or above 5,000 feet elevation, with a median elevation of 5,380 feet.

The state database is actually quite limited in terms of storage cists, with only 16 site forms indicating the presence of slab-lined or hardpan cists. This low number is probably due to the nature of small subterranean cists that became covered with overburden through time and are not always visible through surface inspection alone. Half of these sites had Emery Gray ceramics, whereas Ancestral Puebloan ceramics were very rare. The presence of ceramics at sites that are exclusively or predominantly storage raises the possibility that pottery vessels were used as storage containers.

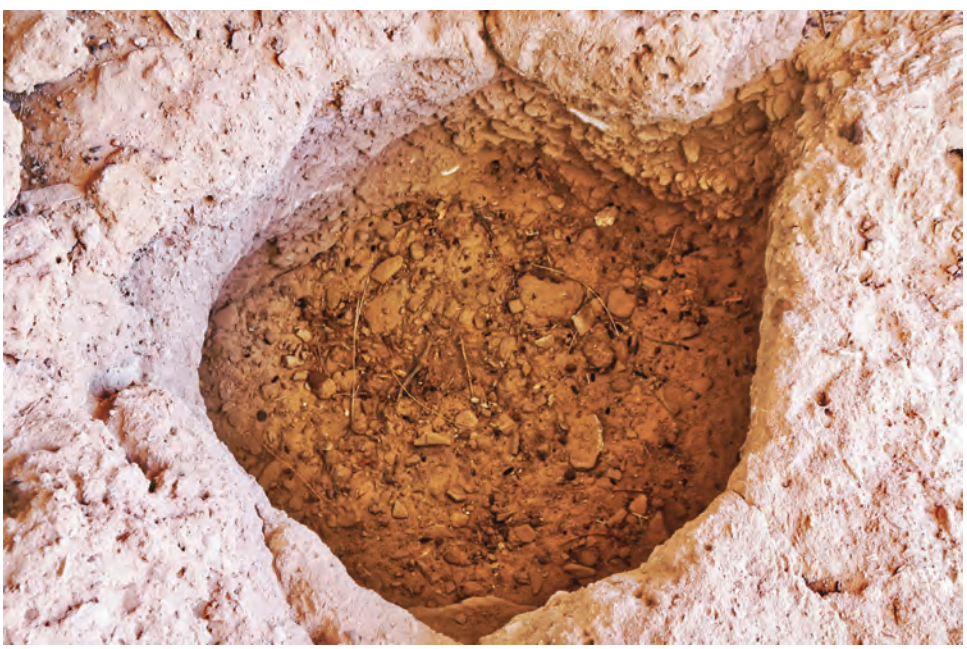


Figure 5.12: Hardpan cists were created by cutting into the sandstone or clay substrate. They are traditionally thought to be Late Archaic or Basketmaker II inventions, but they are actually quite common in Fremont contexts in the Escalante River country. Photo: Jerry D. Spangler

Table 5.4

Site Number	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Storage Type	Citation
42Ga3591		Boulder Creek	5600	Charcoal	2040 ±50	Corrected	BC 177-62 AD	BC 51	Beta-54183	1 Cist	McFadden 2016:180, 300
42Ga06264	Spillway Site	Wide Hollow	5930	Charcoal	1880 ±30	-22 AMS	AD 68-217	AD 120	Beta-379139	1 Cist	Bond et al. 2014:114
42Ga288	Triangle Cave	Harris Wash	4960	Zea Mays	1770 ±90	-11.2	AD 53-529	AD 260	Beta-34941	1 Granary, 1 Cist	Geib 1996:58
42Ga105	Dry Lad Heaven	Harris Wash	4780	Zea Mays	1720 ±60	-12	AD 135-426	AD 318	Beta-67495	Cists (?), 1 Granary	Geib 1996:20
42Ka2737	Square Cist Alcove	Bowns Canyon	4340	Basketry	1720 ±140	-23.5	AD 17-612	AD 309	Beta-31974	1 Cist	Geib 1996:23
42Ka172	Alvey Site	Coyote Gulch	4400	Zea Mays	1690 ±80	-11.1	AD 139-540	AD 348	Beta-34942	3 Cists, Floor Pits	Geib 1996:58
42Ga103	Pantry Alcove	Harris Wash	4800	Zea Mays	1640 ±80	-12	AD 235-595	AD 412	Beta-34936	13 Cists	Geib 1996:87
42Ga4521		Spencer Flats	5200	Zea Mays	1610 ±120	-10.1	AD 142-652	AD 436	Beta-134611	5 Granaries, 1 Cist	McFadden 2016:302
42Ga4540	Little Cathedral	The Gulch	4880	Zea Mays	1610 ±40	-10.6	AD 350-546	AD 462	Beta-134614	2 to 4 Hardpan Cists	McFadden 2016:302
42Ga4655		The Gulch	5600	Zea Mays	1580 ±40	-9.6	AD 398-563	AD 482	Beta-140954	3 Cists	McFadden 2016:302
42Ga103	Pantry Alcove	Harris Wash	4800	Zea Mays	1570 ±70	-12.1	AD 344-625	AD 487	Beta-34937	13 Cists	Geib 1996:87
42Ga288	Triangle Cave	Harris Wash	4960	Zea Mays	1570 ±80	-10.1	AD 267-644	AD 486	Beta-34938	1 Cist, Pits	Geib 1996:58
42Ga102	Sheep Horn Alcove	Harris Wash	4800	Zea Mays	1520 ±100	-11.5	AD 262-679	AD 518	Beta-34934	1 Granary, 1 Cist	Geib 1996:87
42Ga0288	Triangle Cave	Harris Wash	4960	Zea Mays	1480 ±50	-11	AD 439-646	AD 580	Beta-34940	3 Cists	Geib 1996:58
42Ka0178	Gates Roost	Twentyfive Mile Wash	4800	Zea Mays	1420 ±70	-9.8	AD 449-751	AD 618	Beta-34945	2 Cists	Geib 1996:87

Table 5.4 (continued)

Site Number	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Storage Type	Citation
42Wn2130	Sleeping Rainbow	Pleasant Creek	6000	Zea Mays	1360 ±70	-9.3	AD 559-844	AD 669	Beta-107656	1 Cist	Janetski et al. 2005:231
42Ga06264	Spillway Site	Wide Hollow	5930	Charcoal	1300 ±30	-11.5 AMS	AD 664-766	AD 707	Beta-379130	Bell-Shaped Pit	Bond et al. 2014:197
42Ga0288	Triangle Cave	Harris Wash	4960	Zea Mays	1270 ±70	-11.2	AD 653-937	AD 751	Beta-34939	1 Cist, Pits	Geib 1996:58
42Ga1541		Big Bown Bench	4840	Zea Mays	1230 ±60	-9.5	AD 676-945	AD 792	Beta-134608	3 Granaries, 2 Hardpan Cists	McFadden 2016:299
42Ga4054		Halls Creek	5000	Organics	1220 ±90	-22.1	AD 663-987	AD 809	Beta-161578	1 Cist	Janetski et al. 2005:231
42Ga4032		Halls Creek	4000	Zea Mays	1200 ±80	-8.6	AD 676-991	AD 827	Beta-161577	28 Hardpan Cists	Janetski et al. 2005:76, 231
42Ga0102	Sheep Horn Alcove	Harris Wash	4800	Zea Mays	1180 ±70	-11.9	AD 690-990	AD 842	Beta-34935	1 Granary, 1 Cist	Geib 1996:87
42Ga06264	Spillway Site	Wide Hollow	5930	Charcoal	1170 +30	-22.7 AMS	AD 776-954	AD 851	Beta-379141	Bell-Shaped Pit	Bond et al. 2014:197
42Ga4567		Halls Creek	4320	Zea Mays	1170 ±70	-9.2 AMS	AD 694-994	AD 853	Beta-161581	1 Cist	Janetski et al. 2005:231, 511
42Ga1434	Escalante Canyon Alcove	Sand Creek	5360	Zea Mays	1070 ±60	-9.4	AD 791-1114	AD 962	Beta-177171	6 Granaries, 1 Cist	R. Talbot, personal communication 2018
42Ga1541		Big Bown Bench	4840	Zea Mays	1030 ±70	9.9	AD 827-1159	AD 1007	Beta-134609	3 Granaries, 2 Hardpan Cists	McFadden 2016:299
42Ka0172	Alvey Site	Coyote Gulch	4400	Zea Mays	970 ±100	-10.8	AD 821-1242	AD 1074	Beta-34944	3 Storage Cits, Floor Pits	Geib 1996:58
42Wn2280		Pleasant Creek	6040	Zea Mays	890 ±60	-8.8	AD 1030-1249	AD 1136	Beta-128678	Bell-Shaped Pits	Janetski et al. 2005:164, 232
42Ga4567		Halls Creek	4320	Zea Mays	770 ±50	-9.4 AMS	AD 1165-1296	AD 1246	Beta-161580	1 Cist	Janetski et al. 2005:232, 511

Table 5.4: Radiocarbon dates from Fremont sites with storage cists in the Escalante River Basin, Fremont River, and Waterpocket Fold areas. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

Granaries co-occur with storage cists at six sites (38 percent), which is about the same ratio as found in the radiocarbon database. It cannot be stated, based on the limited data available, whether granaries and cists were used concurrently and reflect different storage facilities for different resources, or whether cists were used early in the agricultural sequence and were later replaced by above-ground granaries at the same site. Hardpan cists (Figure 5.12) are exceptionally common in the Escalante River Basin., and researchers have noted their similarities to hardpan cists in the San Juan River, Grand Staircase, and Green River Desert areas where they are typically associated with early Basketmaker or late Archaic sites.

Masonry Granaries

Archaeologists have long recognized that masonry granaries are especially common in the Escalante River Basin, and these are commonly attributed to Fremont farmers based on the presence of Emery Gray ceramics at some of these sites. They are found in shelters and alcoves throughout the Escalante River corridor, as well as tributaries such as Calf Creek. A few are quite large (>6 cubic meters), but the vast majority are quite small (<1 cubic meter). They have been traditionally interpreted as locations where cultivated food resources were stored for later retrieval.

Yoder (2005:6) categorized granary sites as “off-site storage in hard-to-find or hard-to-reach places” that he believed to be evidence of residentially mobile lifeways. Granaries, unlike subterranean cists that can be camouflaged and concealed, are actually quite visible and are therefore subject to greater human predation. This might have been an increasing problem later in the Formative as populations expanded and non-kin-related groups were living in closer proximity to one another. It would be expected that cliff granaries would be situated in closer proximity to permanent residences as the risk of theft increased. But there is minimal evidence for this. Only one site considered here has cliff granaries that are directly associated with a documented residence.

Twenty-four radiocarbon dates have been reported from Fremont granary sites in the region, most of them from corncobs believed to be associated with the granary (see Table 5.5). These are found between 4,780 and 6,440 feet elevation. They co-occur with cists early in the agricultural period, perhaps at about AD 200, but granary sites without cists do not appear until about AD 500, or about the same time that ceramics appeared in this region. Most of the radiocarbon dates (87 percent) reflect use during the Wide Hollow Phase and are considered to be evidence of Fremont storage practices.

There is minimal evidence of Late Formative granaries. One exception might be a complex of four granaries in the cliffs next to Lampstand Ruins, a late Pueblo II occupation. The granaries were assumed to be associated with the Ancestral Puebloan occupation, but maize from one of the granaries returned a radiocarbon date of 1200 $\pm$80 BP (AD 826 median probability), which is at least 200 years too early (Baadsgaard and Fergusson 1999). Rather than reject the date, McFadden (2016) raised the possibility the granaries were constructed by Fremont farmers and later modified and re-used by Lampstand Puebloan groups.

Another radiocarbon date has a median probability during the Late Formative, but it is noteworthy that the site, a complex of five granaries along the Escalante River, had Fremont ceramics, along with two unknown grayware potsherds with crushed sherd temper, perhaps North Creek Gray. This might indicate a co-occupation of the region by Fremont and Ancestral Puebloan groups during Late Formative times, or a persistence of Fremont lifeways that had otherwise become obscured by the robust Ancestral Puebloan presence in the region. There is no convincing evidence that Ancestral Puebloan groups were present here prior to about AD 1000 or that they practiced remote caching and concealment of food resources once they arrived.

At least 39 GSENM sites in the state database have one or more granaries. These are found in lowland settings as low as 4,840 feet elevation and in upland settings as high as 6,400 feet elevation, with a median elevation of 5,420 feet, or roughly

Table 5.5

Site Number	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Storage Type	Citation
42Ga288	Triangle Cave	Harris Wash	4960	Zea Mays	1770 ±90	-11.2	AD 53-529	AD 260	Beta-34941	1 Granary, 1 Cist	Geib 1996:58
42Ga105	Dry Laid Heaven	Harris Wash	4780	Zea Mays	1720 ±60	-12	AD 135-426	AD 318	Beta-67495	Cists (?), 1 Granary	Geib 1996:20
42Ga4521		Escalante River	5200	Zea Mays	1610 ±120	-10.1	AD 142-652	AD 436	Beta-134611	5 Granaries, 1 Possible Cist	McFadden 2016:302
42Ga288	Triangle Cave	Harris Wash	4960	Zea Mays	1600 ±50	10.3	AD 345-568	AD 469	AA-5224	1 Granary, 1 Cist	Geib 1996:58
42Ga4543		Escalante River	4860	Zea Mays	1590 ±80	-9.8	AD 258-636	AD 469	Beta-134616	1 Granary	McFadden 2016:302
42Ga102	Sheep Horn Alcove	Harris Wash	4800	Zea Mays	1520 ±100	-11.5	AD 262-679	AD 518	Beta-34934	1 Granary, 1 Cist	Geib 1996:87
42Ga4561	White Sheep	Escalante River	4880	Zea Mays	1520 ±80	-9.6	AD 388-658	AD 525	Beta-134617	1 Granary	McFadden 2016:302
42Ga4561	White Sheep	Escalante River	4880	Zea Mays	1500 ±80	-9.9	AD 399-662	AD 547	Beta-134618	1 Granary	McFadden 2016:302
42Ga4538		Escalante River	4900	Zea Mays	1490 ±70	-9.7	AD 421-652	AD 560	Beta-134613	1 Granary	McFadden 2016:302
42Ga4561	White Sheep	Escalante River	4880	Zea Mays	1320 ±70	-9.6	AD 603-877	AD 713	Beta-134619	1 Granary	McFadden 2016:302
42Wn2278		Fremont River	5160	Zea Mays	1270 ±60	-10.6	AD 661-891	AD 746	Beta 124187	3 Granaries	Janetski et al. 2005:231
42Ga1541		Escalante River	4840	Zea Mays	1230 ±60	-9.5	AD 676-945	AD 792	Beta-134608	3 Granaries, 2 Hardpan Cists	McFadden 2016:299
42Ga3750	Lampstand Granaries	Circle Cliffs	6440	Zea Mays	1200 ±80	n/a	AD 676-986	AD 826	Beta-117938	4 Granaries	Baadsgard and Janetski 2005:28
42Ga0102	Sheep Horn Alcove	Harris Wash	4800	Zea Mays	1180 ±70	-11.9	AD 690-990	AD 842	Beta-34935	1 Granary, 1 Cist	Geib 1996:87
42Ga3660	Big Hill	Escalante Bench	6200	Charcoal	1160 ±60	n/a	AD 713-988	AD 867	Beta-93852	1 Granary	McFadden 2016:186, 300
42Ga4126		Calf Creek	5600	Wood	1140 ±60	n/a	AD 726-1004	AD 891	Beta-106104	2 Granaries	McFadden 2016:186, 301

Table 5.5 (continued)

Site Number	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Storage Type	Citation
42Wn7		Fremont River	5600	Zea Mays	1100 ±40	-10.4 AMS	AD 812-1011	AD 943	Beta-161582	5 Granaries	Janetski et al. 2005:231
42Ga3907		North Creek	6280	Wood	1090 ±50	n/a	AD 793-1020	AD 946	Beta-93853	1 Granary	McFadden 2016:185, 301
42Ga4507		Escalante River	6240	Zea Mays	1070 ±70	-8.4	AD 781-1136	AD 959	Beta-125909	1 Granary	McFadden 2016:302
42Ga1434	Escalante Canyon Alcove	Sand Creek	5360	Zea Mays	1070 ±60	-9.4	AD 791-1114	AD 962	Beta-177171	6 Granaries, 1 Cist	R. Talbot, personal communication 2018
42Ga1541		Escalante River	4840	Zea Mays	1030 ±70	-9.9	AD 827-1159	AD 1007	Beta-134609	3 Granaries, 2 Hardpan Cists	McFadden 2016:299
42Ga1585	Overlook	Wide Hollow	6160	Charcoal	1010 ±40	-24.2 AMS	AD 925-1145	AD 1021	Beta-171923	2 Granaries	Baer and Sauer 2003:43
42Wn2381		Fremont River	6000	Zea Mays	960 ±60	-8.5 AMS	AD 978-1205	AD 1092	Beta-161600	2-3 Granaries	Janetski et al. 2005:231
42Ga4518		Escalante River	5200	Zea Mays	950 ±80	-8.7	AD 922-1240	AD 1096	Beta-134610	5 Granaries	McFadden 2016:302

Table 5.5: Radiocarbon dates from Fremont granaries in the Escalante River Basin, Fremont River, and Waterpocket Fold areas. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

the same as for storage cists. The biggest difference is that granaries are found at elevations some 600 feet higher than are storage cists. If we assume that granaries are an accurate indicator of successful harvests and that foods would be stored in relative close proximity to the point of production, then we can also assume that optimal maize growing environments will be found between about 4800 and 6400 feet elevation. Lower elevations allow for earlier planting and harvesting, whereas higher elevations would be more susceptible to late spring or early fall frosts that could diminish productivity if plants do not reach maturity. In summary:

- Sites with granaries and cists in this region are probably of Ancestral Fremont and Fremont origin, and they can be considered diagnostic of Fremont farmers in this area when found without corroborating diagnostic artifacts.

- Granaries and cists might reflect high residential mobility in that stored resources were left unattended for much of the year.

- Risk of human predation was probably low, suggesting lower populations and minimal competition with non-kin groups.

- Granaries and cists cannot be easily categorized as "on-site" or "off-site." During the growing season, they would have been on-site facilities used by a resident population. After the harvest, some resources were cached to be used the following spring and would have been "off-site" facilities during the period of abandonment.

- Overall, storage facilities are small, usually less than 1 cubic meter. The abundance of small facilities that are concealed or difficult to access probably reflects periodic abandonment.

- Large granaries are rare, but they do occur. If these reflect community storage for a larger group (e.g., larder hoarding), then a resident population would be expected in close proximity to monitor and protect those resources.

Exceptionally large storage pits at the Arrowhead Complex were all located in common spaces adjacent to residential features. But pithouses also had interior storage features, mostly small subfloor pits and occasionally larger ones.

On-Site Storage

A third storage strategy involved the construction of storage facilities at long-term residences, a practice that is actually quite rare among the Fremont. These storage facilities can take the form of above-ground jacal storage units attached or adjacent to a pithouse, or as subterranean pits within or adjacent to a pithouse. In both cases, the storage facilities reflect immediate access to abundant stored resources by a sedentary population that aggressively protected its food resources. The cumulative volume of on-site facilities could have accommodated much larger populations for a long period of time.

The rarity of on-site storage at Wide Hollow Phase residential sites is generally seen as evidence of high residential mobility that required splitting food resources among several smaller storage units that were concealed or situated to be difficult to access. Janetski et al. (2012) noted the only evidence of Fremont on-site storage in the Escalante River Basin was one possible surface storage unit at Rattlesnake Point and a few subterranean chambers at Arrowhead Hill. Additional examples not mentioned include the Overlook Site and the Spillway Site.

Arrowhead Hill is one of three important sites within 200 meters of one another on the west side of Wide Hollow that are probably part of a single complex of residential sites situated on parallel ridgelines and extending toward and probably onto the valley floor (Richard Talbot, personal communication 2018). For our purposes, the Arrowhead Hill site, the Barnson Site, and the Spillway Site are referred to as the Arrowhead Complex, which collectively have produced 19 radiocarbon dates, most of them assignable to the Wide Hollow Phase (Table 5.6). Convincing evidence of Fremont on-site storage was documented at both Arrowhead Hill (Yoder 2018) and the Spillway Site (Bond et al. 2014).

Although only a very small portion of the Arrowhead Complex components have been excavated and much of the research remains unreported, several observations are relevant:

- Large subterranean storage chambers were constructed here as early as AD 100, suggesting a transition to sedentary lifeways focused on agriculture began very early in the Early Agricultural period, and some groups might have become mostly sedentary at this time.

- This area was repeatedly and perhaps continuously occupied by Fremont groups, as evidenced by superimposed pithouses and associated features that have produced a series of uninterrupted radiocarbon dates between about AD 600 and 1000.

- Storage strategies included dozens of small subterranean pits, several very large subterranean chambers of exceptionally high volume, and perhaps surface storage units. These were located both within the pithouses themselves and within outside ramadas, antechambers, and ventilation tunnels.

- Storage practices evident at the Arrowhead Complex were ancillary to household activities by Fremont farmers, some of whom remained at this location the entire year, although logistical foraging probably occurred, as well.

The earliest documented sedentary occupation at the Arrowhead Complex is Feature 10 at the Spillway Site, a large bell-shaped storage pit that measured 1.75 meters deep, 2 meters wide at the mouth, and 2.35 meters wide at the floor. No artifacts were observed on the floor of the feature, but charcoal from this lowest level returned a radiocarbon date of 1880 $\pm$30 BP (AD 120 median probability). It was not directly associated with a pithouse residence, but there were large numbers of smaller pits, some of which were used for storage and others for roasting (Bond et al. 2014). This bell-shaped storage structure is not only the earliest bell-shaped pit in the region, but with more than 8 cubic meters of volume, it is the largest Early Agricultural storage facility of any kind yet reported in the Escalante River Basin.

Two side-by-side storage pits at Arrowhead Hill were similarly large. One storage pit had been excavated into dense red clays. The interior of the pit had been fire-hardened on all sides and partially plastered, and the structure was then capped with a sloping adobe roof. It measured 1.9 by 1.6 meters at the top, and about 0.6 to 1 meters deep, with at least 2.5 cubic meters of volume. As Yoder (2018:5) observed, "when one considers that there was at least one more of these features adjacent to it, and perhaps more to the west, the amount of storage available to the inhabitants of the site is quite remarkable." A corncob returned a radiocarbon date of 1420 $\pm$40 BP (AD 623 median probability) and another corncob returned a date of 1290 $\pm$40 BP (AD 717 median probability), both from a storage pit.

A second complex of five subterranean storage pits encompassed an area 2.2 by 5.4 meters. The dimensions of the individual storage pits were not offered, but they were described as very large and very deep. The pits were also cut into the compacted clays. They featured floors of puddled red clay, and they had roof and/or wall entry points. These were located in very close proximity to an Ancestral Puebloan pithouse constructed several centuries after the storage facilities were used.

The complexity of the Fremont on-site storage practices is illustrated by Structure 7/9 at the Spillway Site. Structure 7 was a large bell-shaped pit measuring 1.82 meters wide at the mouth, 2.35

Figure 5.13: This granary in Alvey Wash has two large, contiguous storage chambers. Dividing large chambers into smaller compartments was a contingency strategy. If rodents or insects breached one chamber, the food stored in the others might not be destroyed.

meters wide at the floor, and 1.4 meters deep, with roughly 6 cubic meters of volume. The interior featured discarded ground stone and two Fremont potsherds. Particularly intriguing was evidence for a jacal superstructure over the entrance to the pit that was defined by two concentric circles of postholes. Attached to this roof was a second jacal structure, perhaps a ramada. Charcoal from a posthole around the bell-shaped pit returned a radiocarbon date of 1170 $\pm$30 BP (AD 850 median probability), and charcoal from a posthole associated with the ramada returned a date of 1280 $\pm$30 BP (AD 719 median probability). Fremont pithouses were located in close proximity (Bond et al. 2014).

The exceptionally large storage pits described above were all located in common spaces adjacent to residential features, but not within them. But pithouses subjected to excavation also had interior storage features, mostly small subfloor pits, but occasionally larger ones. For example, a pithouse at the Spillway Site had at least three bell-shaped storage pits, one of which returned a radiocarbon date of 1260 $\pm$30 BP (AD 730 median probability). Interestingly, excavations revealed no ceramics whatsoever, prompting researchers to speculate the pithouse might actually represent a Basketmaker II preceramic occupation (Bond et al. 2014).

The Arrowhead Complex is impressive not only for the tremendous size of some of the subterranean storage pits, but the sheer number of smaller storage pits (>40). These are associated with pithouses, food processing areas, ramadas, and roasting pits. Fire pits and hearths are also abundant, suggesting cold weather occupations. Collectively, these storage facilities offer support for the idea of sedentary populations who remained here throughout the entire year, who constructed storage facilities of sufficient volume to accommodate a group size larger than a nuclear family, and who cultivated crops on the adjacent valley floor.

Table 5.6

Site No.	Site Name	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Temporal Affinity	Citation
42Ga6264	Spillway Site	Charcoal	1880 ±30	-22 AMS	AD 69-216	AD 120	Beta-379139	NST 7 Feature 10 Bell Shaped Pit	Early Agricultural	Bond et al. 2014:114
42Ga5169	Arrowhead Hill	Zea Mays	1420 ±40	-10.4 AMS	AD 565-661	AD 623	Beta-194031	Storage Pit 2 Fill	Fremont	Janetski et al. 2012:194
42Ga6264	Spillway Site	Charcoal	1330 ±30	-20.6 AMS	AD 653-761	AD 677	Beta-379133	Structure 6 Ramada F2 Post Hole	Fremont	Bond et al. 2014:186
42Ga5169	Arrowhead Hill	Zea Mays	1290 ±40	-10.8 AMS	AD 663-844	AD 717	Beta-255666	Storage Pit 2 Fill	Fremont	Janetski et al. 2012:194
42Ga6264	Spillway Site	Charcoal	1280 ±30	-21.1 AMS	AD 671-793	AD 719	Beta-379135	Structure 6 Ramada, F7, Post Hole	Fremont	Bond et al. 2014:186
42Ga6264	Spillway Site	Charcoal	1280 ±30	-20.3 AMS	AD 671-774	AD 719	Beta-379136	Structure 9, F7 Post Hole	Fremont	Bond et al. 2014:197
42Ga6264	Spillway Site	Charcoal	1260 ±30	-25.6 AMS	AD 678-853	AD 730	Beta-379131	Structure 4 Pithouse, F15 Cist	Fremont	Bond et al. 2014:178
42Ga6264	Spillway Site	Charcoal	1250 ±30	-21.8 AMS	AD 683-863	AD 738	Beta-379134	Structure 1 Pithouse, F2 Hearth	Fremont	Bond et al. 2014:159
42Ga5168	Barnson Site	Zea Mays	1240 ±40	-11 AMS	AD 683-880	AD 768	Beta-210474	Structure 2 Floor	Fremont	Janetski et al. 2012:194
42Ga6264	Spillway Site	Charcoal	1200 ±30	-20.4 AMS	AD 726-894	AD 825	Beta-379140	Structure 8 Surface	Fremont	Bond et al. 2014:162
42Ga5168	Barnson Site	Zea Mays	1200 ±40	-10.8 AMS	AD 707-941	AD 824	Beta-255665	Structure 3 Floor	Fremont	Janetski et al. 2012:194
42Ga6264	Spillway Site	Charcoal	1170 ±30	-22.6 AMS	AD 776-954	AD 849	Beta-379137	NST 3, F3 Roasting Pit	Fremont	Bond et al. 2014:105
42Ga6264	Spillway Site	Charcoal	1170 ±30	-22.7 AMS	AD 776-956	AD 850	Beta-379141	Structure 7 Bell-Shaped Pit	Fremont	Bond et al. 2014:197
42Ga5169	Arrowhead Hill	Zea Mays	1160 ±60	-10.6 AMS	AD 710-989	AD 865	Beta-189340	Structure 1 Fill	Fremont	Janetski et al. 2012:194
42Ga5169	Arrowhead Hill	Charred Grass Stems	1110 ±60	-12.3	AD 772-1021	AD 922	Beta-194029	Structure 3 Floor	Ancestral Puebloan	Janetski et al. 2012:195
42Ga5169	Arrowhead Hill	Zea Mays	1100 ±40	-10.9 AMS	AD 812-1011	AD 944	Beta-194032	Structure 2 Upper Floor	Fremont	Janetski et al. 2012:195
42Ga6264	Spillway Site	Zea Mays	1070 ±30	-11.4 AMS	AD 900-1016	AD 979	Beta-379129	Structure 1 Pithouse, Stratum 2	Fremont	Bond et al. 2014:159
42Ga5169	Arrowhead Hill	Human Bone	935 ±35	-8 AMS	AD 1029-1180	AD 1099	CAMS-114513	Structure 3 Pithouse, Subfloor Pit 1	Ancestral Puebloan	Janetski et al. 2012:195
42Ga5169	Arrowhead Hill	Charred Juniper-Pine	930 ±60	-24.4	AD 1008-1220	AD 1105	Beta-189341	Structure 4 Structure Fill	Ancestral Puebloan	Janetski et al. 2012:195

Table 5.6: Radiocarbon dates from three sites comprising the Arrowhead Complex, a probable year-round Fremont residential base in the Wide Hollow area that was occupied in late Formative times by Ancestral Puebloan immigrants. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

Fremont Residential Architecture

The third overarching site type identified by Geib (1996d:93) for the Escalante River Basin is residential, or those sites "having living structures and trash middens that imply some degree of permanence and duration of occupation." At the time of Geib's analysis, very few of these sites had been identified: Circle Terrace in Harris Wash, Rattlesnake Point near Escalante, Tombstone House in Twentyfive Mile Wash, and Junction House in Cow Canyon. Since that time, investigations in the Big Flat, Wide Hollow, and Little Desert areas have identified dozens of Fremont pithouses, several of which have now been excavated (Jordan and Talbot 2002).

The abundance of residential sites in more upland settings removed from the Escalante River corridor prompted McFadden (1998, 2016) to propose his model of bi-seasonal residential mobility wherein Fremont groups returned to upland residences for the winter that were ideally suited to take advantage of mule deer migration patterns and abundant fuel wood. According to McFadden's model, site distributions should reflect lowland occupations that are comparatively low-investment seasonal habitations, complex camp sites, short-term residences, or concealed storage sites that facilitated a mobile lifestyle. Upland sites should appear as high-investment, longer-term residential structures with evidence of substantial on-site storage and middens.

Formal Fremont pithouses oriented toward agriculture appeared in the Escalante River country in the AD 700s and these had ramped entryways, vent tunnels, and deflectors that imitated Ancestral Puebloan pithouses farther to the west.

As we discussed in Chapter 4, a robust tradition of pithouse architecture was evident in the Grand Staircase far to the west by at least AD 200, if not much earlier, and this has been described within the context of Basketmaker II farming strategies. An Ancestral Fremont pithouse tradition co-equal to the Basketmaker II pattern has not yet been identified in the Escalante River Basin. Instead, the earliest formal residences date no earlier than the AD 700s.

One exception might be a pithouse at the Spillway Site that had a number of features more commonly associated with Basketmaker II pithouses in the San Juan Basin, including a ramped entryway, a bench encircling about half the interior, and a deep bell-shaped pit below the floor. Charcoal from the bell-shaped pit returned a Wide Hollow Phase radiocarbon date of 1250 $\pm$30 BP (AD 730 median probability) that seems inconsistent with the aceramic nature of the pithouse.

It should be noted that encircling benches are extremely rare at Fremont sites, but these were noted at this pithouse, as well as another large pithouse where charcoal from a hearth returned a date of 1250 $\pm$30 BP (AD 738 median probability).The incorporation of benches into the Fremont pithouse style might be an example of what Talbot (2002:6, see also Talbot 2006) has referred to as an imitation of Ancestral Puebloan architectural traits, although their devotion to these new ideas, which included ramped entryways, vent tunnels, and deflectors, was "insincere" and "somewhat sloppy."

At least 40 Formative radiocarbon dates have now been reported from residential sites in the Escalante River Basin, whereas 53 residential sites have been documented within the political boundaries of the Monument. Talbot (2006:319) has argued that architecture is a passive form of cultural communication that reinforces group identity and promotes group solidarity. This passivity is reflected in a number of traits that are hardly unique to the

Fremont, but are universally consistent at Fremont sites on the northern Colorado Plateau.

We now review recent excavation data from several Fremont residential sites in GSENM within the context of McFadden's model of residential mobility (2016) and Talbot's statements about Fremont architectural conformity (2006). Janetski et al. (2012) have suggested organizing the residential site data by valley locations and upland settings, but in reality there are minimal elevation differences between the two. The categories might be more appropriately labeled "agricultural" and "non-agricultural," or "year-round" and "seasonal." We discuss the data within the context of long-term farming residences found in the Escalante Valley and short-term seasonal residences found elsewhere.

It should also be noted that the earliest Formative pithouse in the region is found at a site in the Bitter Creek area of the Waterpocket Fold. This structure is not oriented toward agriculture, but rather toward exploiting abundant chert outcrops for tool stone and perhaps expedient exploitation of locally available wild plants. The pithouse represents a light brush structure without any of the formal internal features associated with pithouses elsewhere in the Southwest at this time.

Valley Pithouses

Valley locations with permanent residences oriented toward agriculture and having large-capacity, on-site storage are limited in number (n=5), but these have produced most of the radiocarbon dates in the sample due to recent excavations at five sites, three of them in close proximity to one another in the Wide Hollow area (Arrowhead Complex). Generally, pithouses in this area date to the latter half of the Wide Hollow Phase, and based on ceramic assemblages they might date late in the Fremont sequence and could represent co-occupations with Ancestral Puebloan groups after about AD 1050.

Both Arrowhead Hill and the Spillway Site produced several radiocarbon dates early in Wide Hollow Phase times, but these were not directly associated with residences (the residences are probably there, but went undetected during the limited excavations). At both sites, the pithouses themselves returned radiocarbon dates beginning at about AD 750, suggesting that formal pithouse architecture might have been a later addition to Fremont settlement patterns (see Table 5.7), although more likely this reflects a sampling bias. As discussed below, all of the pithouses share traits with Ancestral Puebloan pithouses, including roofed ventilation tunnels that also functioned as entryways, deflectors and wing walls, subfloor storage pits, antechambers, external surface storage, and/or benches encircling at least part of the interior.

The earliest valley pithouses in this area were documented at the Spillway Site, which included three superimposed pithouses, as well as one or two other pithouses nearby. The lowest of the three pithouses was not investigated. One structure here was a roughly circular pithouse measuring about 6 meters in diameter that had been excavated into hard clay. It was about 70 centimeters deep and featured a clay-rimmed central fire pit, numerous subfloor storage pits, a bench area around the east side, a roof entryway evidenced by floor sockets for a ladder, and an adobe wall remnant that might have been a deflector. Charcoal from the central hearth returned a radiocarbon date of 1250 ±30 BP (AD 738 median probability). This was believed to represent the last occupation of the pithouse (Bond et al. 2014).

A second pithouse was located immediately below. It was smaller and more oval, measuring 3 by 3.8 meters with a floor 25 centimeters below Structure 1. It featured a 20-degree sloped entryway and ventilation tunnel, a central basin fire pit, and other subfloor pits. Charcoal from the pithouse floor returned a radiocarbon date of 1200 ±40 BP (AD 825 median probability), which is problematic because the date should have been older than the overlying pithouse (Bond et al. 2014).

A third house structure at the Spillway Site was a deep oval pithouse of unspecified size with multiple bell-shaped, circular, and basin subfloor pits. It featured a recessed area on the north, a ramped entryway and ventilation tunnel, a bench, and an interior mealing bin. Charcoal from bell-

Table 5.7

Site No.	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citation
42Ga6264	Spillway Site	Wide Hollow	5930	Charcoal	1330 ±30	-20.6 AMS	AD 653-761	AD 677	Beta-379133	Structure 6 Ramada F2 Post Hole	Bond et al. 2014:186
42Ga6264	Spillway Site	Wide Hollow	5930	Zea Mays	1300 ±30	-11.5 AMS	AD 664-766	AD 706	Beta-379130	Structure 7 Bell Shaped Pit Fill	Bond et al. 2014:197
42Ga6264	Spillway Site	Wide Hollow	5930	Charcoal	1280 ±30	-21.1 AMS	AD 671-793	AD 719	Beta-379135	Structure 6 Ramada, F7, Post Hole	Bond et al. 2014:186
42Ga6264	Spillway Site	Wide Hollow	5930	Charcoal	1280 ±30	-20.3 AMS	AD 671-774	AD 719	Beta-379136	Structure 9, F7 Post Hole	Bond et al. 2014:197
42Ga6264	Spillway Site	Wide Hollow	5930	Charcoal	1260 ±30	-25.6 AMS	AD 678-853	AD 730	Beta-379131	Structure 4 Pithouse, F15 Cist	Bond et al. 2014:178
42Ga6264	Spillway Site	Wide Hollow	5930	Charcoal	1250 ±30	-21.8 AMS	AD 683-863	AD 738	Beta-379134	Structure 1 Pithouse, F2 Hearth	Bond et al. 2014:159
42Ga5168	Barnson Site	Wide Hollow	6000	Zea Mays	1240 ±40	-11 AMS	AD 683-880	AD 768	Beta-210474	Structure 2 Floor	Janetski et al. 2012:194
42Ga6264	Spillway Site	Wide Hollow	5930	Charcoal	1200 ±30	-20.4 AMS	AD 726-894	AD 825	Beta-379140	Structure 8 Surface	Bond et al. 2014:162
42Ga5168	Barnson Site	Wide Hollow	6000	Zea Mays	1200 ±40	-10.8 AMS	AD 707-941	AD 824	Beta-255665	Structure 3 Floor	Janetski et al. 2012:194
42Ga6264	Spillway Site	Wide Hollow	5930	Charcoal	1170 ±30	-22.7 AMS	AD 776-956	AD 850	Beta-379141	Structure 7 Bell-Shaped Pit, F16 Post Hole	Bond et al. 2014:197
42Ga5169	Arrowhead Hill	Wide Hollow	5931	Zea Mays	1160 ±60	-10.6 AMS	AD 710-989	AD 865	Beta-189340	Structure 1 Fill	Janetski et al. 2012:194
42Ga5169	Arrowhead Hill	Wide Hollow	5931	Zea Mays	1100 ±40	-10.9 AMS	AD 812-1011	AD 944	Beta-194032	Structure 2 Upper Floor	Janetski et al. 2012:195
42Ga6264	Spillway Site	Wide Hollow	5930	Zea Mays	1070 ±30	-11.4 AMS	AD 900-1016	AD 979	Beta-379129	Structure 1 Pithouse, Stratum 2	Bond et al. 2014:159
42Ga1585	Overlook	Wide Hollow	6160	Charcoal	1010 ±40	-24.2 AMS	AD 925-1145	AD 1021	Beta-171923	Structure 1 D-Shaped Pithouse	Baer and Sauer 2003:43
42Ga0043	Rattlesnake Point	Alvey Wash	6010	Maize	660 ±80	-11.1	AD 1218-1417	AD 1331	Beta-171922	Structure 1 Vent Tunnel	Baer and Sauer 2003:28

Table 5.7: Radiocarbon dates from agricultural pithouse features in the Escalante River Basin. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

shaped storage pit returned a date of 1260 ±30 BP (AD 730 median probability), although researchers (Bond et al. 2014) suggested the lack of ceramics could indicate it was actually occupied prior to AD 500.

Two other dated structures at the Spillway Site were not residential, but instead were sheltered work and storage areas that reflect residential activities, specifically food preparation and food storage, that are assumed to be associated with nearby pithouses. One was a basin-shaped, oval feature with a central fire pit and postholes around the exterior edges. Charcoal from a posthole returned a radiocarbon date of 1280 ±30 BP (AD 719 median probability). Another structure was a ramada or surface shelter that provided a roof over a large bell-shaped storage pit and was joined to a jacal surface structure. Charcoal from the bell-shaped pit returned a date of 1300 ±30 BP (AD 706 median probability), and charcoal from the surface structure posthole returned a date of 1280 ±30 BP (AD 719 median probability), suggesting that all three of these features were contemporaneous (Bond et al. 2014).

Two pithouses at Arrowhead Hill appear to have been Fremont residences, whereas one other pithouse and a surface structure were attributed to Ancestral Puebloan occupations either subsequent to the Fremont occupation or concurrent with it. One Fremont house was a shallow, roughly oval pithouse measuring about 4 by 4.5 meters with well-defined earthen walls and a floor 40 centimeters below ground surface. The interior featured nine subfloor pits and 16 postholes, a small wall shelf, a clay-rimmed hearth, and interior wing walls extending from the hearth toward the pithouse walls. A single radiocarbon date of 1160 ±60 BP (AD 867 median probability) was consistent with the Emery Gray ceramics observed in the lower fill. The pithouse entrance might have been covered by a ramada that protected a bell-shaped storage pit found at the point the ramada wall connected to the pithouse wall.

A second structure to the west measured about 6 meters in diameter and had three superimposed floor areas, each with its own central fire pit. At least 10 subfloor pits were identified. A corncob found on the upper floor area returned a radiocarbon date of 1100 ±40 BP (AD 944 median probability). The pithouse also featured a 5-meter-long ventilation tunnel with two semi-subterranean storage structures next to the east wall of the tunnel. The southern end of the tunnel was enclosed by a ramada or antechamber.

The Spillway and Arrowhead Hill dates are consistent with two other pithouse dates from the Barnson Site, located on a ridge paralleling Arrowhead Hill. Three Fremont pithouses were excavated, but excavation data are not yet available. One of the pithouses was 7 meters in diameter and featured a clay-rimmed central fire pit, an unusual clay platform on the floor, and a room attached to the west side. A second, smaller pithouse was located on the east side of the larger one, and a third one was located just downslope. The latter one featured prominent wing walls and a possible ventilation tunnel. A corncob from the floor of one pithouse returned a radiocarbon date of 1240 ±40 BP (AD 768 median probability) and a corncob from the floor of a second returned a date of 1200 ±40 BP (AD 824 median probability) (Janetski et al. 2012; Talbot 2006).

Collectively, the pithouses at the Arrowhead Complex suggest pithouse architecture had emerged as the preferred residential form by about AD 750. With the exception of the aceramic pithouse at the Spillway Site, all of the pithouses described above were characterized by a predominance of Fremont ceramics, mostly graywares but also some exotic Fremont types. Ancestral Puebloan tradewares were present at Fremont pithouses, but they were comparatively few in number. Based on the presence of red wares and corrugated types, this might represent occupations after about AD 1050.

Relevant to this discussion are two residences at Arrowhead Hill that represent Ancestral Puebloan occupations, both of which bear on the question as to whether the Fremont occupants were displaced by Ancestral Puebloan immigrants sometime after AD 1050 or whether there was a coexistence of two different cultural entities.

Geib (1996d, 1996e) and McFadden (2016) have argued that a hard boundary existed during early Fremont times, with the Fremont having little if any contact with their Ancestral Puebloan neighbors to the south and west. Janetski et al. (2012), however, made a compelling case that the boundary between the two cultural entities was permeable, with Fremont groups adopting (or imitating) Ancestral Puebloan architectural traits while maintaining their own ceramic traditions. Ancestral Puebloan trade wares became more common, or at least more recognizable, by about AD 1000, suggesting direct socioeconomic contact between the two groups and perhaps co-occupation of the region.

It is also possible that interaction occurred since Early Agricultural times. Phil Geib's work on early Formative sites in the lower Escalante River Basin almost always described sites in close proximity to the Colorado River within the context of Basketmaker II and Basketmaker III occupations, each with material culture traits defined in the Kayenta or Mesa Verde regions. This would suggest that Ancestral Puebloan groups had already crossed the Colorado River by at least AD 200, and there would have been no physiographic barriers to prevent them from moving up the Escalante River where they would have come into contact with Fremont groups (Geib 1996d).

Separate cultural identities appear to have persisted for five centuries or more, but these boundaries appear to have collapsed sometime between AD 1050 and 1150 with the arrival of Ancestral Puebloan immigrants with different architectural and ceramic traditions. The collapse of a hard boundary would suggest Fremont groups were displaced, either by choice or force, whereas a longstanding permeable boundary might reflect acculturation of Fremont groups into an Ancestral Puebloan lifeway. As Janetski et al. (2012:204) observed, "The challenge is to determine if the occupations were contemporaneous or sequential."

Janetski et al. (2012) considered it likely that both groups co-occupied the Escalante River Basin after AD 1050. They point to the fact that Ancestral Puebloan ceramics appear more frequently at Fremont sites and Fremont ceramics are clearly evident at Ancestral Puebloan sites at this same time. Two sites in particular might indicate Fremont farmers were coexisting and interacting with Ancestral Puebloans.

The Overlook Site, located on a small mesa top above the Escalante River, consists of several boulder-lined structures, a granary in the cliff face just below the structures, rock art, and a substantial midden. In other words, it featured expedient access to arable lands along the river, on-site storage, and evidence of two pithouses suggesting long-term, perhaps year-round occupations (Baer and Sauer 2003). Fill from one pithouse floor returned a radiocarbon date of 1010 $\pm$40 BP (AD 1021 median probability), which is consistent with a Parowan Basal-notched point found there (Baer and Sauer 2003).

Overall, 1,258 potsherds were collected, 86 percent of which were Emery Gray, but also with minor amounts of Snake Valley Black-on-gray, Ivie Creek Black-on-white, North Creek Gray, North Creek Black-on-gray, North Creek Corrugated, Shinarump Gray, and red wares and white wares (Baer and Sauer 2003). This suggests the occupants here produced and utilized their own Fremont ceramics, but they were actively trading with Ancestral Puebloan groups.

The best evidence for co-occupation might be Rattlesnake Point, a complex of five structures, the largest being a pithouse 6 meters in diameter and a meter deep. It featured a long, wide ventilation tunnel with a large antechamber at one end, a clay-rimmed fire pit, a raised platform, and a wattle-and-daub wing wall. Given the site location on a terrace above Alvey Wash, the site was probably oriented toward agriculture on the nearby floodplain.

The site was initially excavated by Gunnerson (1959b) and later re-investigated by Brigham Young University (Baer and Sauer 2003; Talbot 2006). These excavations revealed an abundance of Fremont and Ancestral Puebloan ceramics, although Janetski et al. (2012) observed that the Ancestral Puebloan ceramics were almost all painted types rather than utilitarian wares, suggesting trade with but not occupation by Ancestral Puebloans.

A corncob from the ventilation tunnel returned a radiocarbon date of 660 $\pm$80 BP (AD 1331 median probability), indicating a very late Formative occupation, perhaps one that occurred after Ancestral Puebloan groups had abandoned the Escalante River Basin. On the other hand, the architectural style, the ceramic assemblage, and two non-cutting tree-ring dates of AD 1007 and AD 1000, both from the same ventilation tunnel, suggested an occupation in the AD 1000s or 1100s by Fremont groups with close trade relationships with nearby Ancestral Puebloan groups (Janetski et al. 2012).

Seasonal Residences

Valley residential sites were all oriented toward farming of the floodplains, but the seasonal pithouse sites appear to have been focused largely on the procurement of wild plants and animals and were therefore short-term, seasonal occupations. McFadden (2016) has suggested these were winter occupations. Talbot (2002:160) observed that if McFadden's model is valid, then residential sites in this area should exhibit evidence for long-term, cold-weather occupations, including significant middens, substantial food storage, significant quantities of large mammal bones, and seasonal indicators among large mammal remains.

Seasonal pithouses are similar to the valley pithouses in that most have ventilator shafts that functioned as entryways to the residence, they might have had deflectors or wing walls, and most had clay-rimmed central fire pits.

A cold-season occupation was suggested by the presence of deep pithouses with internal hearths, but other factors argued against long-term winter occupations. Middens were not extensive, there was no evidence for on-site storage, and mammal bones were not found in significant quantities. Instead, the abundant plant processing sites in the area appear to have been seasonal forays to acquire specific plant resources (Baer and Sauer 2003).

Although the sample size is small, the seasonal pithouses are similar to the valley pithouses in that most have ventilator shafts that functioned as entryways to the residence, they might have had deflectors or wing walls, and most had clay-rimmed central fire pits. But the forager pithouses are different in that subfloor storage pits are rare, large bell-shaped storage pits and surface storage structures are nonexistent, and outside features such as ramadas are quite ephemeral.

Six seasonal Fremont residential sites in the Escalante River Basin have produced seven Formative radiocarbon dates (see Table 5.8), five of them with median probabilities after AD 1000. These late sites, which have predominantly Emery Gray ceramics, might represent the persistence of the Fremont foraging lifeway even during the co-occupancy of the region with Ancestral Puebloan farmers who arrived about AD 1050. In light of the absence of any Ancestral Puebloan residential sites oriented toward procurement of wild plants and animals, these seasonal pithouses might be unique to the Fremont at this time.

Typical of the seasonal pithouse is the Roadcut Site, one of three excavated sites in the Big Flat area, which features a circular basin-shaped pithouse 4 meters in diameter that was burned upon or just after abandonment. The earthen walls sloped toward an unprepared earthen floor. Thirteen wooden beam fragments on floor radiating out as spokes of a wheel suggested a conical roof. Interior features included four jug-shaped subfloor pits and a slab-lined hearth, whereas a probable roasting pit was located just outside the pithouse. Corroborative diagnostics included Rose Spring points and 16 quartz-tempered grayware potsherds similar to early utility wares described elsewhere in the Escalante River Basin. Charcoal from a pithouse posthole re-

Table 5.8

Site No.	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citation
42Ga4095	Roadcut Site	Big Flat Mesa	6320	Charcoal	1250 ±60	-20.4	AD 670-933	AD 767	Beta-159904	Structure 1 Post Hole	Jordan and Talbot 2002:50
42Ga3102	Aprylls Bench	Boulder Creek	6820	Charcoal	1200 ±60	n/a	AD 688-968	AD 823	Beta-17182	NE Corner Structure	Jacklin 1988:23
42Ga3891	The Outpost	Big Flat Mesa	6440	Zea Mays	1030 ±40	-9.6 AMS	AD 907-1124	AD 1004	Beta-159900	Structure 1 Vent Shaft	Jordan and Talbot 2002:23
42Ga4086	Dos Casas	Big Flat Mesa	5800	Charcoal	1010 ±50	-20.6	AD 909-1150	AD 1024	Beta-159901	Structure 2 Pit 1	Jordan and Talbot 2002:40
42Ga4167	Hummingbird Hill	Birch Creek	6480	Charcoal	940 ±70	-25.5	AD 981-1229	AD 1101	Beta-171924	Structure 1 Fill	Baer and Sauer 2003:55
42Ga3244	Mafeetahot	Boulder Creek	6860	Charcoal	790 ±50	n/a	AD 1101-1282	AD 1234	Beta-22454	Jacal Structure Floor	Jacklin 1988:50
42GA3244	Mafeetahot	Upper Escalante River	6860	Charcoal	750 ±70	n/a	AD 1079-1382	AD 1257	Beta-22453	Structure Wall Post	Jacklin 1988:50

Table 5.8: Radiocarbon dates from seasonal pithouse features in the Escalante River Basin. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

turned a radiocarbon date of 1250 ±60 BP (AD 767 median probability) (Jordan and Talbot 2002).

The Outpost, also on Big Flat, consisted of a large, D-shaped and slab-lined pithouse 5.5 by 5.2 meters in size and 71 centimeters deep. Access was by way of a 3-meter-long ventilation tunnel 80 centimeters wide. The pithouse walls featured vertical stone slabs buttressed from behind with coursed masonry. The central clay-rimmed fire pit had been largely destroyed by vandals, and no mention was made of other subfloor features. (Jordan and Talbot 2002). A corncob recovered from the ventilation tunnel returned a radiocarbon date of 1030 ±40 BP (AD 1004 median probability), or near the end of the Wide Hollow Phase. Corroborative diagnostics included mostly Emery Gray ceramics (87 percent), along with a few Snake Valley Gray, North Creek Gray, and North Creek Corrugated potsherds, the latter suggesting an occupation after AD 1050.

The Dos Casas site consisted of two circular pithouses. One measured 6 meters in diameter, was 47cm deep, and featured vertical slabs around the base. The unprepared earthen floor with 22 subfloor pits also featured a wing wall or deflector that connected to a slab-lined hearth. Access was by way of a ventilator tunnel 1.8 meters long and 62 centimeters wide. A radiocarbon date of 1630 ±80 (AD 422 median probability) was much too early and was rejected. A second structure was a D-shaped pithouse with slab-lined walls. The pithouse measured 3.5 meters in diameter and access was by way of a ventilation tunnel 1.3 meters long. The unprepared earthen floor featured 14 subfloor pits, none of significant size. Charcoal from one of the floor pits returned a radiocarbon date of 1010 ±50 (AD 1024 median probability), which was considered an accurate indicator for the entire site. The site featured an abundance of Emery Gray ceramics (98 percent) and smaller amounts of Snake Valley Gray and North Creek Gray (Jordan and Talbot 2002).

Hummingbird Hill, located in Main Canyon near Escalante, consists of three pithouses, two side-by-side and another upslope (Baer and Sauer 2003; Talbot 2006). One was about 4 meters in diameter and featured lower walls of vertical stone slabs abutting an earthen floor. A large clay-rimmed fire pit measured 1 meter in diameter and 20 centimeters deep. Charcoal recovered from the structure fill returned a radiocarbon date of 940 ±70 BP (AD 1101 median probability). A second structure was also circular, measuring 4 meters in diameter and featuring a deeply set slab-lined wall, a ventilation tunnel 2.5 meters long, a shallow basin hearth, and two small subfloor pits. A third pithouse was smaller and somewhat oval in shape, measuring 2.3 by 2.5 meters in size and featuring a 2-meter-long ventilation tunnel, a possible wing-wall or deflector, and a central clay-rimmed fire hearth (Baer and Sauer 2003).

In summary, recent excavations at several Fremont residential sites have demonstrated two different settlement patterns. One involved residences in the Escalante Valley that are associated with long-term occupations, perhaps year-round ones, oriented toward maize agriculture. The other involved seasonal occupations oriented toward procurement of wild food resources. There are similarities in site structure and residential features regardless of setting or subsistence, but there are also important differences. Perhaps most noteworthy, there is a complete lack of substantial storage at seasonal residences, suggesting intent to reoccupy the pithouses, but the duration of those occupations was actually quite brief.

The current database is remarkably better than it was 20 years ago when Fremont residential architecture was suspected but there was very little chronometric evidence to establish any temporal or spatial context. There are currently at least 24 radiocarbon dates directly associated with Fremont residences and many more associated with ancillary features, such as storage, work areas, and roasting pits. This dataset is nonetheless quite small, and conclusions offered here remain quite speculative.

The state site form database is problematic and quite limited in the information contained on the site forms. In many instances, residential structures were not clearly visible on the site surface, but were suspected based on circumstantial evidence. Structure dimensions were rarely offered, and most site forms do not indicate the structure shapes or method of construction. At least 46

GSENM site forms indicate the presence of Fremont pithouses or surface structures. Due to the limited nature of the database, only general observations can be offered:

- Thirty-six sites (78 percent) had exclusively Fremont ceramics, mostly Emery Gray and Snake Valley Gray types. Three of the sites had no ceramics at all, and seven had predominately Fremont ceramics with a light scattering of Ancestral Puebloan types. The assemblages were dominated by utilitarian graywares.

- Clusters of three to six pithouses are found in the area, but these are not common (seven sites). Eighty-five percent of the residential sites have one or two residences, suggesting occupations by a nuclear or extended family.

- The median elevation of Fremont residential sites is 6,200 feet, reflecting the need for shelter and access to fuel wood during colder seasons.

Inventory data should be used cautiously when discussing Fremont settlement patterns or predicting site locations. Some of the most important Fremont residential sites discussed in this chapter (e.g., the Spillway Site and the Barnson Site) were initially documented as artifact scatters with associated charcoal staining, and residential features were not identified until after excavations were initiated.

> **There is no dispute that some groups were on the plateau in early Formative times and that some of them used basalt-tempered Fremont ceramics. But the overall rarity of Fremont ceramics on the plateau is quite striking.**

The rather sudden appearance of a formal pithouse tradition in the AD 700s is likely a result of the fact few sites have been investigated and the dataset is small. But one other possibility should be considered. Roberts (2018) has recently made a compelling case that late Basketmaker III residents at Eagles Watch near Kanab were violently displaced by Kayenta immigrants in the early AD 700s, something evidenced by the burning of the Basketmaker III pithouses and their replacement with new styles and accoutrements, and the restructuring of trade networks to reflect exotic items arriving from Arizona.

The sudden appearance of a pithouse tradition in the Fremont homeland, also in the AD 700s, has all the trappings of Basketmaker III pithouses at Eagles Watch. This might this reflect an in-migration of refugees, mostly males given that pithouse construction is typically a male endeavor. The small amount of North Creek Gray at Fremont sites at this time could, therefore, represent local production by Basketmaker III refugees, probably women given that ceramic manufacturing was typically a female activity. This is certainly speculative but worthy of further inquiry.

Fremont on the Fiftymile

The question of boundaries is especially relevant to the Formative adaptations on the Kaiparowits Plateau, which borders the Escalante River Basin on the west and was clearly within the range of Fremont groups. It also borders the Grand Staircase region farther to the west and would have been within the range of Ancestral Puebloan farmers there, although distances from major farming settlements to the high plateau country would have been much greater. In effect, the plateau was a formidable geographic landform that could have functioned as a natural barrier between groups.

As discussed in earlier chapters, the Kaiparowits Plateau is bordered on the west by the Cockscomb, on the east by the Straight Cliffs, and on the south by the Colorado River. The northern boundary is not so clearly defined but for our purposes is defined as the southern escarpment of the

Aquarius Plateau. The western portion of the Kaiparowits Plateau is characterized by rolling pinyon-juniper hills that rise steadily to the east and are downcut by a series of steep canyons that ultimately drain south to the Colorado River.

The eastern portion features a high plateau found mostly between 7,000 and 7,500 feet elevation that is pedestaled on the east, west, and south by steep cliffs. Access from the north is quite easy by way of Alvey Wash, an Escalante River tributary that trends north and northeast from the high country toward the modern community of Escalante. Fremont occupations are found the entire length of Alvey Wash, and to a limited extent on the top of the plateau and in west-trending canyons that border the high country. This high country, referred to as Fiftymile Mountain, is an area with much greater biodiversity than the adjacent canyons, that has abundant springs and at least one shallow lake or marsh.

Relevant to this section is the question as to whether the plateau was "Fremont territory" during early Formative times that was well suited to a Fremont farming and foraging lifeway (McFadden 2016), whether it was a "no-man's land" lightly exploited by foragers from both the Escalante River Basin and Grand Staircase, but where both groups would have come into contact with one another (Geib 1996e), or whether it was a shared territory where Ancestral Puebloan farmers exploited marginal agricultural niches alongside Fremont hunters and gatherers.

Current inventory data offer some support for all three scenarios, although there are comparatively few radiocarbon dates attributed to the early Formative, and distinctions based on sand-tempered graywares versus basalt-tempered gra wares are admittedly tenuous. Generally, the inventory data suggest:

- There are very few sites with exclusively Fremont ceramics that would indicate the plateau was part of a robust Fremont bi-seasonal farming and foraging strategy.

- The Fremont presence appears to be limited to a few alcoves and rockshelters with sheltered camps and granaries, usually located near springs.

- Fremont residential sites are rare, suggesting a more mobile farming strategy akin to the summer field camps along the Escalante River. Some Fremont pithouses are suspected, but these have not yet been excavated.

- Most Formative architectural sites with evidence of farming have ceramic assemblages defined in the Kayenta region to the south or the Grand Staircase to the west.

Wide Hollow Phase

McFadden (2003:47) has argued for cultural continuity on the plateau throughout the Formative, but with different farming strategies. "Wet" farming dominated during the Wide Hollow Phase (AD 500 to 1050), which was characterized by Fremont sub-irrigation farming around springs and riparian areas. And dry farming proliferated during the Fiftymile Mountain Phase (AD 1050 to 1200), which was characterized by Ancestral Puebloan occupations that borrowed liberally from earlier Fremont strategies. McFadden (2016) admitted that evidence of a substantial Fremont presence here is rather tenuous, and that Fremont utilization of the plateau was probably sparse, seasonal, and perhaps oriented more toward foraging than agriculture.

McFadden (2003, 2016) based his conclusions on a series of radiocarbon dates from maize and wood samples recovered from five granaries tucked under the rim of the plateau in the Steer Canyon area. These dates ranged from about AD 550 to 900 (the 95 percent probability ranges are actually somewhat broader, ranging from about AD 425 to 1000), all of which point toward high-elevation maize farming during Wide Hollow Phase times. Furthermore, the large size of the storage units suggested that farming must have been successful.

The high plateau country features an abundance of temporary field camps, some with Fremont grayware ceramics, that are found in both open plateau and sheltered alcove settings. These were interpreted as seasonal residences associated with field maintenance by a highly mobile population of Fremont farmer-foragers who planted around springs and wetlands. McFadden (2016:214) also observed that pithouses indicative of winter residences "are known to occur on the plateau above" and "would represent a complete annual cycle of residential mobility between summer camps and winter pithouses."

There is no dispute that some groups were on the plateau during early Formative times and that some of them used basalt-tempered Emery Gray ceramics characteristic of Fremont farmer-foragers in the Escalante River Basin. But some of the conclusions are problematic. For one, the winter residences "known to occur" on the plateau have not been formally excavated and their identification as Fremont winter pithouses remains speculative. And furthermore, the overall rarity of Fremont ceramics on the plateau is quite striking.

A review of the 16 Wide Hollow Phase radiocarbon dates from the Kaiparowits Plateau lends little support to the idea that Fremont foragers were farming around springs on the high plateau (Table 5.9). Only three dates are from sites that have Emery Gray ceramics, which were never found in significant quantities. None of the dates are from sites with Fremont residential features. Furthermore, half of the dates in the dataset are associated with lower-elevation foraging sites, not farming sites on Fiftymile Mountain.

The only excavation data relevant to the Wide Hollow Phase comes from Rich's Shelter, a rock shelter seasonally occupied throughout prehistory in upper Alvey Wash. Investigations here identified a granary, Fremont rock art, and a sheltered area with grinding slicks, an adobe layer, and a rock alignment or retaining wall. Two-thirds of the ceramics were Emery Gray and Snake Valley Gray

Table 5.9

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka04356	Broken Arrow Cave	Wahweap Creek	4040	Rabbitbrush Charcoal	1520 ±90	-22.8 AMS	AD 344-656	AD 524	Beta-111639	F10/14 in F9 Test Pit	Talbot et al. 1999:12
42Ka00879		West Steer Canyon	7400	Zea Mays	1510 ±60	-9.1	AD 420-640	AD 546	Beta-190932	FS-1 Surface	McFadden 2016:287
42Ka00265	Captains Alcove	Rock Creek	3640	Charcoal	1470 ±115	-25	AD 334-799	AD 564	Beta-1142	Test Pit 2	Tipps 1983:157
42Ka05902		West Steer Canyon	6600	Zea Mays	1440 ±50	-9.2	AD 474-661	AD 611	Beta-190933	FS-1 Surface	McFadden 2016:297
42Ka04535		Fourmile Canyon	5720	Zea Mays	1390 ±60	-10.5	AD 549-760	AD 643	Beta-121577	Site Surface	McFadden 2016:183, 295
42Ka03061		Weeses Canyon	4950	Twig	1380 ±80	-27.9	AD 472-844	AD 653	Beta-121576	Granary Roof Matrix	McFadden 2016:291
42Ka00877		West Steer Canyon	7560	Zea Mays	1280 ±90	-8.6	AD 612-955	AD 753	Beta-190930	FS-1 Surface	McFadden 2016:287
42Ka05902		West Steer Canyon	6600	Zea Mays	1230 ±50	-9.3	AD 682-931	AD 791	Beta-190934	FS-2 Surface	McFadden 2016:297
42Ka00854		West Steer Canyon	7440	Twig	1200 ±40	-25.8	AD 705-940	AD 824	Beta-190929	Granary Matrix	McFadden 2016:287
42Ka00878		West Steer Canyon	7480	Zea Mays	1160 ±50	-9	AD 727-979	AD 867	Beta-190931	FS-1 Surface	McFadden 2016:287
42Ka01991		Wahweap Bay	3780	Charcoal	1150 ±110	n/a	AD 677-1118	AD 873	Beta-6877	Trench 1B Hearth	Liestman 1986:43
42Ka07192		Straight Cliffs	7000	Wood	1120 ±30	-23.1	AD 812-984	AD 931	Beta-328998	Granary Matrix	McFadden 2016:184, 298
42Ga00882	Rich's Shelter	Alvey Wash	5600	Zea Mays	1080 ±80	-9.9	AD 742-1137	AD 946	Beta-165414	FS-2 Surface	McFadden 2016:299
42Ka02189		Rimrocks	4640	Yucca	1080 ±40	-11.5 AMS	AD 882-1017	AD 961	Beta-128987	Jar Strap Cache	McFadden 2016:291
42Ka02683		Lake Canyon	7120	Zea Mays	1060 ±60	-9.8	AD 798-1130	AD 975	Beta-132380	Site Surface	McFadden 2016:251, 291
42Ka01323	Tibbet Cave	Tibbet Canyon	4800	Bone Collagen	1030 ±40	-20.3	AD 906-1124	AD 1004	Beta-155678	Horn Flaker Site Surface	McFadden 2016:233, 287

Table 5.9: Wide Hollow Phase radiocarbon dates from the Kaiparowits Plateau region. Higher-elevation dates from Fiftymile Mountain are thought to be evidence of Fremont farming. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

Figure 5.15: The abundance and large size of the granaries tucked under the rim of Fiftymile Mountain attest to the success of farming on the Kaiparowits Plateau during Fremont times. Photo: Jerry D. Spangler

types and the rest were Ancestral Puebloan types, mostly red wares. The site was interpreted as a short-term food processing station (Harris 2005).

A Fremont utilization of the shelter was evidenced by the rock art and predominance of Fremont ceramics, but radiocarbon dates from two corncobs collected from the site surface are equivocal. One returned a late Wide Hollow Phase date of 1080 ±80 BP (AD 947 median probability) and might be associated with a Fremont occupation, and the other returned a date of 950 ±60 BP (AD 1096 median probability) at the transition between early and late Formative times. The mixed deposits did not allow for speculation as to whether the Fremont and Ancestral Puebloan occupations were sequential or were the result of co-occupation of the site in late Formative times (Harris 2005).

The more recent date at Rich's Shelter is identical to one from site in Fourmile Canyon at an elevation of 5,600 feet. This is a north-aspect alcove with abundant ground stone, more than a hundred corncobs and corn husks, burned juniper beams, and unspecified number of Emery Gray potsherds. The alcove was situated above a well-watered portion of the canyon, and the presence of corn husks indicated that maize farming occurred nearby. A corncob returned a radiocarbon date of 950 ±60 BP (AD 1097 median probability).

The only other Fremont evidence consists of a single Emery Gray potsherd found along with North Creek Gray potsherds at a granary in the West Steer Canyon area. A corncob returned a radiocarbon date of 1280 ±90 BP (AD 755 median probability), which would be consistent with an early Formative occupation. In all other instances, the radiocarbon dates were associated with Ancestral Puebloan ceramics or the sites had no diagnostic artifacts at all.

The dearth of Fremont diagnostic artifacts associated with Kaiparowits Plateau sites, most of which are granaries, raises the possibility that Ancestral Puebloan groups were actually farming the high plateau and that the Fremont presence here was limited to foraging forays and short-term camps in the alcoves and rockshelters. McFadden (2016) acknowledges this possibility, although he doesn't rule out that Fremont groups acquired Ancestral Puebloan trade wares or that sand-tempered graywares were of local Fremont manufacture.

The inventory data for the Kaiparowits Plateau would seem to support the idea of a rather sparse Fremont presence here, or at best one that was thoroughly blended with and indistinguishable from Ancestral Puebloan occupations. Our review of the inventory data related to 285 Kaiparowits Plateau sites documented during the course of the Glen Canyon Project found a total of 129 sites with

1,537 potsherds identified as either Emery Gray (1,248), Snake Valley Gray (128), Snake Valley Black-on-gray (23), Emery Black-on-gray (89), or Ivie Creek Black-on-white (1). In other words, 45 percent of all sites with ceramics had Fremont ceramics to a greater or lesser degree.

In the vast majority of instances, however, the number of Fremont potsherds constituted a very small percentage of the overall assemblage, usually 1 to 15 percent. Fremont potsherds constituted the majority of the catalog at only 16 sites (5.6 percent of the total), although these also do not occur in significant quantities (see Table 5.10). At three sites, Fremont ceramics were observed without any other Ancestral Puebloan temporal indicators, and at three other sites they co-occur with plain gray Ancestral Puebloan ceramics (sand-tempered), all of which might be indicative of Wide Hollow Phase occupations prior to AD 1050. At 10 sites, they co-occur with corrugated, white ware, red ware, and orange ware types characteristic of late Pueblo II to Pueblo III times. Most of these sites are open architectural residences, only one of which might have been a typical Fremont pithouse.

Considered collectively, the inventory data suggest a rather robust Ancestral Puebloan farming presence on the plateau after AD 1050. These groups certainly had access to Fremont ceramic vessels, but these constituted a very small percentage of the ceramics at any given site. Sites that appear to be exclusively Fremont or predominantly Fremont are actually very rare (n=16), and most of these (n=10) reflect residential activities after AD 1050 coequal to the Ancestral Puebloan farming adaptation on the plateau. The prevalence of surface masonry residences indistinguishable from Pueblo II residential sites elsewhere, as well as the predominance of Ancestral Puebloan ceramics, suggest that any ethnic boundaries had disappeared by that time (cf. Geib 1996e, Janetski et al. 2012).

Fiftymile Mountain Phase

The late Formative on the Kaiparowits Plateau has typically been described within the context of a Pueblo II expansion, although there is little agreement as to which region provided the impetus for that expansion. Aikens (1966c:56) attributed the expansion to Virgin Branch peoples of the Grand Staircase. However, Aikens and Fowler (1963) had earlier argued that Puebloan sites in the Fiftymile Mountain area resulted from a direct migration of Kayenta peoples from the Tsegi Canyon area. Most researchers today acknowledge a short-term expansion into the region by Kayenta groups or by groups imitating Kayenta pottery styles. But most of the ceramic evidence points to the Grand Staircase region as the primary impetus for the expansion into the Kaiparowits Plateau and upper Escalante River Basin (see Lyneis 1996; Geib 1996b).

More recently, McFadden (2016) suggested three "reasonable" scenarios: (1) Distinctive Fremont artifacts were replaced by Ancestral Puebloan artifacts through a process of acculturation, (2) the Fremont were replaced or displaced by Ancestral Puebloans, or (3) Fremont and Ancestral Puebloan groups co-existed on the plateau. Total replacement of entrenched groups well adapted to their local environment was considered unlikely, and McFadden was unconvinced there was evidence supporting the idea of co-existence of two different cultural entities. On the other hand, he noted that Ancestral Puebloan subsistence and settlement patterns were strongly influenced by the existing Fremont strategy, even as ceramics, projectile points, and architecture reflected an Ancestral Puebloan appearance.

Still unresolved is whether Fremont farmers or farmer-foragers were present on Fiftymile Mountain in late Formative times, or whether it was exploited by Ancestral Puebloan dry farmers in possession of a small amount of Fremont utility wares acquired in trade. Evidence from Casa Pequena in Alvey Wash, which is the most efficient access route to the Kaiparowits Plateau from the Escalante Valley, supports the idea of an actual Fremont presence in the area. This site consists of a small, rectangular masonry structure 2.5 by 3 meters situated on a promontory. The ceramic assemblage featured both Fremont and Ancestral Puebloan types. Harris (2005:38) suggested the site was used to process and store foods "and was perhaps a seasonal habitation overlooking agricultural fields located on the flat valley lands below," in effect functioning as a sum-

Table 5.10

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ga0882	Rich's Shelter	Alvey Wash	5600	Zea Mays	950 ±60	-10.1	AD 990-1210	AD 1097	B-165413	FS-1 Surface	McFadden 2016:299
42Ka1502		Fourmile Canyon	5600	Zea Mays	950 ±60	-10.7	AD 992-1211	AD 1097	B-107649	FS-1 Surface	McFadden 2016:287;
42Ka2580		Left Hand Collet Canyon	5800	Zea Mays	920 ±60	-9.8	AD 1014-1235	AD 1113	B-134477	Granary Structure 1	McFadden 2016:251
42Ka3383		Harveys Fear	7000	Zea Mays	900 ±70	-9.4	AD 1019-1252	AD 1129	B-132381	Site Surface	McFadden 2016:292
42Ka6941	Don't Look Down	Straight Cliffs	7500	Wood	900 ±30	-25.3	AD 1042-1206	AD 1122	B-358242	FS-3, Granary 4	McFadden 2016:258, 298
42Ka4416		Monday Canyon	7120	Zea Mays	890 ±60	-10.5	AD 1030-1251	AD 1137	B-107650	Granary Site Surface	McFadden 2016:184
42Ka6941	Don't Look Down	Straight Cliffs	7500	Wood	890 ±30	-22.3	AD 1046-1213	AD 1146	B-358240	FS-1 Granary Surface	McFadden 2016:258, 298
42Ka4750		Paradise Bench	6020	Juniper Seed	880 ±40	21.8 AMS	AD 1045-1240	AD 1158	B-144227	F6 Test Unit	Geib et al. 2001:109, 127
42Ka4876		Straight Cliffs	6840	Zea Mays	880 ±40	-13.6	AD 1044-1242	AD 1158	B-134479	Site Surface	McFadden 2016:255, 297
42Ka1248		Reese Canyon	6320	Juniper Bark	860 ±100	-21.1	AD 992-1294	AD 1158	B-134475	Granary Beam	McFadden 2016:254, 287
42Ka4794	Rose Shelter	Jack Riggs Bench	5440	Arrow Shaft	860 ±40	-24.8	AD 1052-1252	AD 1181	B-155679	Stratum 2	Geib et al. 2001:114, 127
42Ka6941	Don't Look Down	Straight Cliffs	7500	Wood	860 ±30	-24.1	AD 1058-1244	AD 1186	B-358241	FS-2 Granary 3	McFadden 2016:258, 298
42Ka4865		Left Hand Collet Canyon	6240	Twig	780 ±70	-23.8	AD 1059-1371	AD 1233	B-132383	Wall Peg, Residence	McFadden 2016:251, 297

Table 5.10: Fiftymile Mountain Phase radiocarbon dates from the Kaiparowits Plateau region. Higher-elevation dates from Fiftymile Mountain are thought to be evidence of Ancestral Puebloan farming during Pueblo II-III times. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

mer field house but with high investment in residential architecture.

As with Rich's Shelter (42Ga882), also in Alvey Wash, two-thirds of the ceramic assemblage consisted of Fremont types, mostly Emery Gray but also with some Uinta Gray, whereas the remainder were Ancestral Puebloan types. The Ancestral Puebloan ceramics, however, were almost entirely painted types, with utilitarian wares comprising less than 5 percent of the Ancestral Puebloan assemblage. This suggested the occupants were Fremont farmers who acquired the painted vessels through trade with Ancestral Puebloan groups in late Formative times (Janetski et al. 2012:205).

Thirteen late Formative radiocarbon dates have been reported from the Kaiparowits Plateau region, most of which had median probabilities narrowly defined within about 100 years between about AD 1125 and AD 1230 and are from granary and residential sites on Fiftymile Mountain (Table 5.10). Five additional sites have produced tree-ring dates with outside rings dating between AD 980 and 1189, although most of these are questionable due to missing or erratic growth rings (see Table 5.11). All of these tree-ring dates were associated with large architectural sites (perhaps residences) in sheltered settings and all were associated with Ancestral Puebloan ceramic assemblages defined in the Grand Staircase region, but with some Kayenta types, as well.

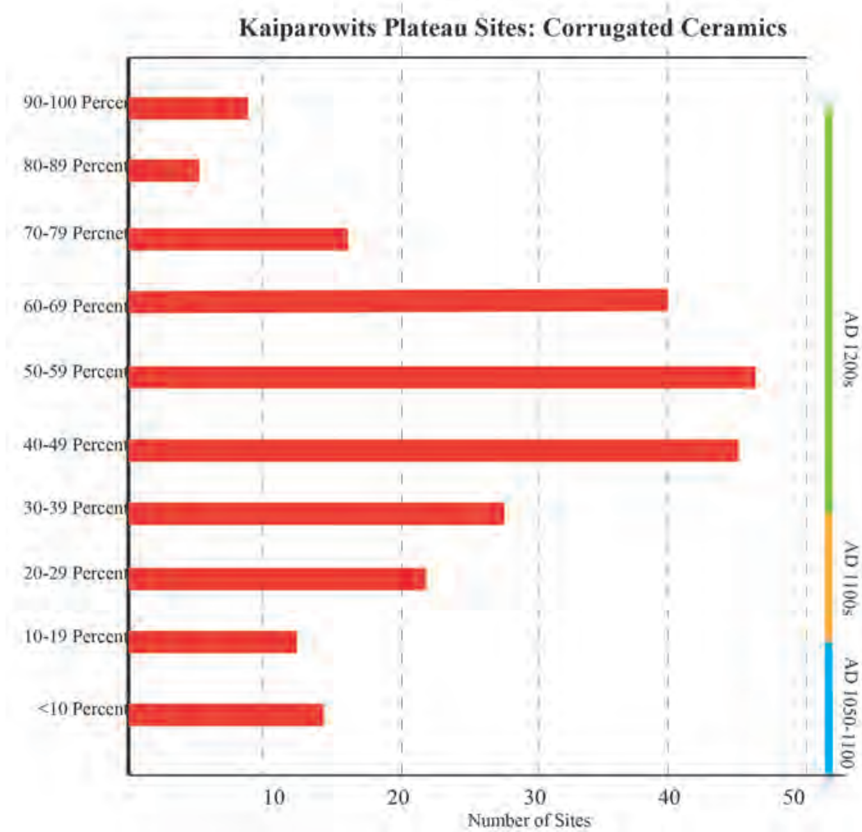
A late Fremont occupation of the high plateau country above Rich's Shelter and Casa Pequena is limited to a single tree-ring date, and there is minimal evidence that Fremont groups ventured into the more arid lower terrains to the west. Geib

Table 5.11

Site No.	Location	Lab No.	Inside Date	Outside Date	Material Dated	Site Type	Corroborative Diagnostics
42Ka1456	Harveys Fear	UUM-198	079 2p	980 vv	Pinyon	Sheltered Residential and Other Structures	Moenkopi Gray
42Ga3728	Collet Canyon	UUM-211	0953 p	1156 g	Juniper	Sheltered Residential and Other Structures	Moenkopi Gray
42Ga3728	Collet Canyon	UUM-213	0865 ±p	1149 +v	Juniper	Sheltered Residential and Other Structures	Moenkopi Gray
42Ga3728	Collet Canyon	UUM-214	1031 p	1157 +v	Juniper	Sheltered Residential and Other Structures	Moenkopi Gray
42Ka1625	Mudholes Canyon	UTM-75	0991 ±p	1120 +vv	Juniper	Sheltered Residential and Other Structures	Moenkopi Corrugated, Tusayan Corrugated, Tsegi Orange, Dogoszhi B/W, Shinarump Corrugated.
42Ka1625	Mudholes Canyon	UTM-77	0955 ±p	1139 +vv	Juniper	Sheltered Residential and Other Structures	Moenkopi Corrugated, Tusayan Corrugated, Tsegi Orange, Dogoszhi B/W, Shinarump Corrugated.
42Ka2683	Spencer Point	UAM-29	0960 p	1143 ++g	Juniper	Sheltered Residential and Other Structures	Tsegi Orange, Tusayan B/R, Moenkopi Corrugated, Lino Gray
42Ka2683	Spencer Point	UAM-59	0842 p	1152 ++vv	Juniper	Sheltered Residential and Other Structures	Tsegi Orange, Tusayan B/R, Moenkopi Corrugated, Lino Gray
42Ka2683	Spencer Point	UAM-61	1078 p	1174 vv	Pinyon	Sheltered Residential and Other Structures	Tsegi Orange, Tusayan B/R, Moenkopi Corrugated, Lino Gray
42Ka2683	Spencer Point	UAM-62	1010 ±p	1164 vv	Juniper	Sheltered Residential and Other Structures	Tsegi Orange, Tusayan B/R, Moenkopi Corrugated, Lino Gray
42Ka2683	Spencer Point	UAM-63	979	1056 vv	Juniper	Sheltered Residential and Other Structures	Tsegi Orange, Tusayan B/R, Moenkopi Corrugated, Lino Gray
42Ka0547	Mudholes Canyon	UUM-85	1050 p	1189 v	Unknown	Sheltered Structures (Unknown)	Tusayan Corrugated, Moenkopi Corrugated, Kiet Siel Gray, B/W, Emery Gray (2)

Table 5.11: Tree-ring dates from Fiftymile Mountain sites. All dates believed to be associated with Ancestral Puebloan storage and residential activities. All dates are reported in McFadden (2016).

Figure 5.16



et al. (2001) found Fremont ceramics to be quite rare in the mid-range elevations of the Kaiparowits Plateau, occurring at only 14 sites and almost always without any associated Ancestral Puebloan types. The igneous sources for the Emery Gray potsherds were Boulder Mountain and the upper drainages of the Escalante River.

The predominance of corrugated ceramics, identified mostly as Tusayan and Moenkopi types, also offer some clues as to the temporal nature of the late Formative occupation of the plateau. Traditionally, this occupation has been viewed as short-lived, lasting from about AD 1050 to 1150. But Allison (2008:29; see also Janetski et al 2012), building upon his extensive work in the Arizona Strip region just west of GSENM, argues that corrugated pottery gradually becomes more common after its introduction at about AD 1050. Allison observed, "The percentage of corrugated pottery thus serves as a rough proxy measure of occupation date," with sites with low percentages dating to the inception of corrugated ceramics at about AD 1050, sites with about 20 percent corrugated pottery probably dating in the AD 1100s, and those sites with 40 percent or more corrugated pottery probably dating to the AD 1200s.

The dataset of Glen Canyon Project sites recorded by Gunnerson (1959a) and Fowler and Aikens (1963) reveals 240 sites on the Kaiparowits Plateau with corrugated ceramics. Of these, 27 sites (11 percent) had ceramic catalogs where corrugated types constituted a minor part of the overall assemblages that might be considered "early" in the Late Formative sequence. At another 50 sites (21 percent), the corrugated potsherds accounted for 20 to 39 percent of the overall catalog at each site. These might date to the AD 1100s. A total of 163 sites (68 percent) had ceramic collections where the percentage of corrugated types was 40 percent or greater. Under Allison's formula, these sites might date to the AD 1200s (see Figure 5.16).

Futility of Farming the Fiftymile

The Kaiparowits Plateau features a number of unique environmental variables that undoubtedly influenced (or constrained) human adaptive strategies throughout prehistory. As demonstrated by the recent pollen core analyses in the Lake Pasture area (D'Andrea 2015), high frequency fire events increased about AD 400, which corresponds to the florescence of early agriculture elsewhere on the northern Colorado Plateau. Fire events in the Kaiparowits Plateau area might, therefore, represent anthropogenic fires associated with removal of the juniper forests for agricultural purposes and subsequent burning for field preparation. These events continued until about AD 1250, or the entire span of the Formative in this region. Once agriculturalists abandoned the plateau, juniper forests began to regenerate and a pattern of low frequency natural fire events returned.

Maize farming at 7,200 to 7,500 feet elevation would certainly have been risky, but it is not without precedent.

The high elevation here features increased precipitation over lower elevations, but higher elevations also shortens the growing season and makes agriculture extremely risky (some might argue impossible). Yet agriculture appears to have been practiced here, perhaps as early as AD 400. This statement is based on three important lines of evidence:

- Sediment cores from Lake Pasture suggest a high probability of anthropogenic vegetation manipulation beginning about AD 400. These fire events might reflect clearing of fields by prehistoric agriculturalists (D'Andrea 2015).

- The cliff escarpments just under the rim of the plateau feature an abundance of masonry storage structures, some of them quite large. McFadden (2016:207) obtained a suite of six radiocarbon dates, five from corncobs, with 95 percent probability ranges of ca. AD 425 to 1000. This suggests that agriculture, perhaps using a modified irrigation strategy involving diversion of springs, remained a viable strategy for 500 to 600 years.

- The majority of sites in the area with temporally diagnostic artifacts can be assigned to late Pueblo II times, or about AD 1050 to 1250. These sites, which include farmsteads, small pueblos, and a range of field camps, are typically located on small rises, benches, and ridges with a view of potentially arable sagebrush flats. This proliferation in late Pueblo II times is seen as an in-migration of Ancestral Puebloan dry farmers.

If we assume that maize farming was being practiced in Early Formative times and it was a successful strategy spanning many centuries, then local environmental conditions must have been amenable to high-elevation agriculture. Farming at 7,200 to 7,500 feet elevation would certainly have been risky, but it is not without precedent; in fact, maize farming can be viable in some areas as high as (ca.) 10,000 feet elevation (Benson 2010). It is not known what maize varieties were cultivated in the region, but they were most certainly hybrids adapted to short growing seasons. Recent experiments with heirloom Native American varieties have shed important insights into this issue (see Adams et al. 2006; Arnold-Boomgarden 2015).

The viability of all maize farming is dependent on three critical environmental conditions: (1) the length of the growing season and corresponding temperatures during the growing season, (2) the amounts and timing of precipitation, and (3) soil characteristics, including the proper types of nutrients and proper soil texture that allows for root development and water retention (Benson 2010;

Benson et al. 2013; McMaster and Wilhelm 1997; Muenchrath 1995; Muenchrath and Salvador 1995). All three conditions must be present for successful maize farming, and in some cases there are minimum thresholds.

Spangler and Zweifel (2016a), using limited weather station data from the Kaiparowits Plateau, and as well as comparative data from Navajo Mountain, Bryce Canyon, and Boulder weather stations (Ashcroft et al. 1992), examined the potential of the Kaiparowits Plateau for successful dry farming using these three conditions as they relate to modern environmental proxy data. This analysis was based on the assumption that higher elevations receive more annual precipitation but these areas also suffer from lower temperatures and hence shorter growing seasons.

Prehistoric climates must have been more predictable with less risk of late spring frosts and early fall freezes, with strong summer monsoons that delivered adequate rainfall at critical points in the growing season.

It is also well-established that the length of the growing season alone does not determine the viability of maize plants. Rather it is the length of the growing season and surface temperatures that allow maize seeds to germinate and reach maturity within a period of time between the last spring frost and the first freeze in the fall (Neild and Newman 1990), referred to as Frost Free Days (FFD). Maize plants will not grow in temperatures lower than 50 degrees Fahrenheit, and growth all but ceases once maximum temperatures exceed 86 degrees Fahrenheit (Adams et al. 2006:22; Arnold-Boomgarden 2015:92-93).

Development of maize plants (indeed most plants) is linked to the number of heat units or Growing Degree Days (GDD) that are accumulated during the growing season. The cumulative number of heat units (CGDD) in a growing season (FFD) must meet minimum thresholds for the plants to fully mature. Modern maize hybrids require (ca.) 2,700 CGDD to reach maturity, whereas a study of native maize varieties adapted to more arid conditions required (ca.) 2,200 CGDD (see Adams et al. 2006:26).

The growing season and temperature regimes currently evident in the region are sufficient to produce mature maize plants under optimal conditions, such as warmer temperatures in early May and a fall frost delayed until mid- or late October. At a minimum, a 140-day growing season is required at these higher elevations. It also appears there is a high risk, perhaps as much as 50 percent of the time, of late spring frosts and/or early fall freezes that shorten the growing season to 120 days and lowers the GDD to levels where maize crops would not be expected to mature (green corn might still be harvested and consumed under these conditions, but it could not be stored for later consumption).

Precipitation is also a critical factor in the cultivation of maize, especially for dry-farmers who were dependent on the unpredictable nature of rainfall patterns and who do not have irrigation as a contingency. The advantages of higher rainfall can be outweighed by the cooler temperatures and shorter frost-free seasons. The typical minimum precipitation threshold for dry maize farming is at least 30 centimeters (12 inches) of annual precipitation, with at least 15 centimeters (6 inches) of that coming during the growing season (Arnold-Boomgarden 2015; Benson et al. 2013; Benson 2010; Shaw 1988).

Winter precipitation is essential as it is the source of soil moisture required at the time of planting to allow for germination and plant emergence. Likewise, maize plants require certain amounts of moisture at critical growth periods during the plant's life cycle, in particular emergence, the weeks surrounding the pollen shed and silking (anthesis), and the period during which the grains are filling. Water stress at specific times of the plant's lifecycle can reduce the number of spikelet pairs that develop into rows of kernels, reduce the number kernels rows or number of kernels, reduce the size of the ears, and/or reduce the kernel weight or simply cause the ear to shed the kernels altogether (Adams et al. 2006:7).

On the Kaiparowits Plateau, the optimal time for planting on the Kaiparowits Plateau might have been about May 15, and all plants would have emerged by about May 27. In effect, the first critical period for moisture, if soils were not already saturated by melting snowpack, would have been the second half of May. Pollination and silking would have begun between July 5 and 15, and would have continued through the end of August or the first part of September. Therefore, the second and perhaps most critical period for moisture would have been July and August, and perhaps the first two weeks of September. To reach full maturity, or black layer formation when kernels are at full weight and ready to grind or store, would have required another five weeks. In other words, a harvest of fully mature maize would not have occurred until about October 21, or a growing season of 158 days.

The third component of viable maize dry farming actually consists of multiple variables that are herein subsumed within the inclusive term soil qualities, although many of these variables include anthropogenic manipulations of soils to enhance soil quality. These variables include the presence and renewability of nitrogen in the soils, mulching to slow runoff and inhibit evaporation, depth of soils for proper rooting and water retention in the root system, erosion control and retention of nutrient-rich soils, pH content and renewability in the soils, rates of plant decomposition, inhibiting salinization, and weed and pest control. Unfortunately, these variables are not known for the Kaiparowits Plateau.

Given the archaeological evidence that maize farming occurred (corncobs are abundant) and that it was successful (granaries were constructed for surplus production), it can be assumed that prehistoric climates were more predictable with less risk of late spring frosts and early fall freezes, and a strong summer monsoon pattern delivered adequate rainfall at critical points in the growing season. In general, climates must have been warmer and wetter than at present. A warmer/wetter climatic regime might have been necessary to increase CGDD within a shorter period of time to minimize the vagaries of spring frosts and fall freezes. Based on limited proxy data, maize farming on the Kaiparowits might have been successful only about 50 percent of the time under current climatic conditions.

One possible explanation, argued convincingly by Benson (2010), is centered on cyclical weather events referred to as the Pacific Decadal Oscillation (PDO). During positive phases of the PDO, the Southwest tends to be wetter than average and during negative phases it tends to be drier than average. The PDO has a cycle ranging from 50 to 70 years. If such climatic events were influencing factors in prehistoric, high-elevation agriculture, then Kaiparowits Plateau high-elevation farming might also have been cyclical, occurring only during positive phases of the PDO (wetter) and then retracting during negative events (drier).

Fremont Rock Images

The Escalante River Basin, and to a much lesser extent the Kaiparowits Plateau, have a rich catalog of Fremont rock art images. By and large, this assignation was based on the presence of anthropomorphs with trapezoidal or triangular torsos, although many rock art enthusiasts and even some archaeologists apply a much broader standard as to what constitutes Fremont iconography. Differences of opinion, nomenclature, and research methods have led to 50 years of squabbling over what is and is not Fremont rock art and how it should be classified, organized, and cataloged.

We agree with Francis (2001) that assigning cultural affiliation or "style" to rock art images is highly subjective and fraught with assumptions and speculations that cannot be demonstrated archaeologically. Quite simply, there is no way to know with any confidence that all images in an individual group are contemporaneous and whether diagnostic artifacts at rock art sites are contemporaneous with the images themselves. In most instances, it is impossible to classify iconography beyond certain distinctive anthropomorphs, and there is no consistent way to classify non-diagnostic, non-anthropomorphic figures.

The iconic trapezoidal anthropomorph, whether pecked or painted, is widely regarded as a good indicator of Fremont affiliation, and this motif is well documented in the Escalante River corridor and its tributary canyons (Clements 2002; Raymond and Harris 2005). And a few Fremont rock art sites have been documented on the Kaiparowits Plateau, although Sally Cole believes these might represent a "Figurine Style" that postdates the Fremont-Ancestral Puebloan interface (in McFadden 2016:209).

Cole (2009) has characterized Fremont rock art generally as depicting broad-shouldered, inverted triangular or trapezoidal anthropomorphs that are sometimes adorned with elaborate feather-like or horn-like headdresses. In the Escalante River area and the Fremont River area to the north, they may also be wearing elaborate jewelry or clothing or have interior body decorations such as lines, dots, circles, or spirals, and in some instances jewelry and other accoutrements are recognizable.

The origin of this rock art style is probably rooted in Archaic rock art traditions. As discussed by Tokioka (1992:90), the Escalante River drainage region was a regional transition zone between two different styles of late Archaic rock art, the Glen Canyon Linear and Barrier Canyon styles (see discussion in Chapter 4). The Glen Canyon Linear Style is seen as antecedent to Ancestral Puebloan styles and the Barrier Canyon Style as ancestral to Fremont styles. Both late Archaic styles are found in abundance in the Escalante River country, sometimes at the same site.

It is noteworthy that Ancestral Puebloan rock art is extremely rare in the Escalante River

Fremont Images

Photo: Dan Bauer

Basin and almost non-existent on the Kaiparowits Plateau. Geib (1996e) sees this as evidence of a hard boundary between different ethnic groups with rock art serving as an expression of social identity (see also McFadden 2016:217).

Brigham Young University inventories identified two specific Fremont styles in the Escalante River Basin: Southern San Rafael Style and Sevier A Style. The Southern San Rafael Style is characterized by a broad-shouldered trapezoidal anthropomorph with necklaces represented by dots or yokes, very large ornamental earrings or "hairbobs," and sashes. Facial features are common, and feet usually point out to sides and the fingers are splayed (Schaafsma 1971). The "Sevier A" style was first identified in the Clear Creek Canyon area of central Utah, and is characterized by "arrangements of small, well executed figures; including quadrupeds, geometric shapes, and abstract curvilinear and solid elements" (Baker and Billat 1999).

The age of Fremont rock art is justifiably debatable given that there are few methods to directly date the images, and relative methods like superimposition and differential patination are imprecise, at best. If the Southern San Rafael Style had its origins in the Archaic Barrier Canyon Style (cf. Tokioka 1992), then there should be relative continuity between Archaic and Formative expressions, with transitional elements appearing as the more fluid nature of Barrier Canyon imagery gave way to the rigid geometric forms in Fremont forms.

Cole (2009) has long argued the Fremont rock art tradition can be dated to about AD 700, which reflects traditionalist views that ceramics did not appear until about AD 700 (cf. Madsen 1977; Schroedl 1992). This date seems suspect in light of the entrenched Ancestral Fremont and early Fremont farmers who had been in the area nearly 500 years before that. Recent efforts to date Barrier Canyon rock art, however, suggest that the Barrier Canyon is not nearly as ancient as traditionally thought. Pederson et al. (2014:1) have argued the Barrier Canyon Style "coincides better with the transition to and rise of the subsequent Fremont culture." In other words, the Barrier Canyon Style would be evidence of more-mobile, Early Agricultural occupations and the Fremont style would reflect changes resulting from increased sedentism.

It is not known when the distinctive Fremont anthropomorphs first appeared in the region, but two sites in the lower Escalante River region bear directly on the temporal placement of Fremont images. The Dios Blancos Site located in Bowns Canyon, is a large, largely inaccessible alcove with a series of white anthropomorphs, abstract figures, lines, and other elements, which according to Geib and Fairley (1992:163) were "symbolic elements of the overall composition" that characterizes the high variability found in San Rafael Fremont rock art. A worked stick inside the cairn returned a radiocarbon date of 1200 $\pm$80 BP (AD 827 median probability). It is always possible the cairn and stick were placed there during a later pilgrimage, but Geib and Fairley (1992) believed the composition represented a solitary event that was accomplished by an individual who pecked hand-and-toe holds into the cliff face to reach the alcove.

Charcoal pigment from one of 26 classic Fremont anthropomorphs at Ceremonial Cave, also located in an alcove in Bowns Canyon, returned a date of 675 $\pm$55 BP (AD 1318 median probability), suggesting a Fremont re-occupation of the region after it was abandoned by Ancestral Puebloan farmers. This alcove, located above an arable floodplain, had light residential detritus (see state IMACS form), and it might have been a summer field camp. A Fremont cultural affiliation was assigned to many of the rock art images identified in the upper Escalante River drainage, based in part on the presence of diagnostic artifacts, although researchers have struggled with questions of whether or not the artifacts were contemporaneous with the images themselves, how to resolve superimposition of rock art images, different levels of patination, and different recognizable styles within the same cluster (Clements 2002; Raymond and Harris 2005). Simply put, the images are probably Fremont, but it is impossible to know for sure.

A review of the state site form database revealed at least 59 rock art sites in the Escalante River Basin and Kaiparowits Plateau were identified as Fremont, Ancestral Puebloan, or late Archaic (Barrier Canyon or Glen Canyon Linear). In many instances, cultural affiliations were based on the presence of diagnostic artifacts that might not be related to the rock art itself, and in many other cases the identification was merely an educated guess.

- Thirty-four sites were identified as Fremont based on diagnostic Fremont iconography, primarily trapezoidal anthropomorphs. Eleven sites had Barrier Canyon images and might be considered ancestral to the Fremont images.

- Ancestral Puebloan rock art sites are quite rare. Only seven sites were specifically identified as Ancestral Puebloan, and only five sites had Glen Canyon Linear elements, which might be attributed to Late Archaic people ancestral to the Basketmakers in the region.

- Rock art sites in the Escalante River Basin exhibit a much greater frequency of pictographs or combinations of pictographs and petroglyphs than in other regions occupied by the San Rafael Fremont. This higher frequency might be the result of greater preservation afforded by the numerous large alcoves in the area.

- Fremont rock art rarely co-occurs with Ancestral Puebloan rock art, and Barrier Canyon and Glen Canyon Linear rock art co-occurs at only two of 14 sites where these styles are found.

- Most sites with rock art (61 percent) exhibit relatively few images (<20), suggesting a single-episode or short-term event with low investment of time and energy. Twelve sites were quite complex with more than 40 images, often in the hundreds, that might represent long-term events or repeated visits to augment existing rock art clusters.

In summary, about two-thirds of the rock art sites found in the Escalante River Basin appears to be of possible Early Agricultural or Fremont origin, based on the presence of diagnostic anthropomorphic figures or the presence of Fremont ceramics. The rich Fremont imagery tradition does not appear to have been replicated by Ancestral Puebloan groups who later occupied this same region.

General Summary

As stated at the beginning of this chapter, we wanted to examine the Fremont dataset within the context of McFadden's (2016) model of bi-seasonal residential mobility. We therefore framed this discussion around certain assumptions and expectations articulated by Talbot (2002). Among the assumptions inherent in McFadden's model:

- Fremont groups dispersed in the spring to cultivate lowland areas along the Escalante River and its tributaries.

- Summer residences should be low-investment occupations, perhaps brush structures near fields and temporary use of alcoves and rockshelters.

- Summer field camps were periodically abandoned, and therefore storage should be limited to small, subterranean storage cists that could be easily concealed.

- Fremont groups returned to upland areas after the fall harvest, and their winter residences were then situated to take advantage of abundant fuel wood and mule deer migrations.

- Winter residences should have significant middens reflecting cold-weather occupations at a single location. They should exhibit high investment in permanent residential architecture, as evidenced by deeper pits, multiple fire hearths, and substantial superstructures.

- Winter residences should exhibit on-site food storage sufficient to accommodate the group through the entire winter and early spring.

Farming of lower elevation environments had become established by at least AD 200, and it continued to be viable throughout the Wide Hollow Phase, as evidenced by a suite of continuous radiocarbon dates on maize samples recovered from shelters along the river (Geib 1996d; Keller 2000). But this strategy was not restricted to lowland environments with longer growing seasons. Summer field camps or field stations were also characteristic of higher-elevation farming at this same time (Talbot et al. 2002). And some Fremont groups did not participate in the spring migrations to optimal farming niches, instead remaining at a permanent base to farm the adjacent river bottoms (Bond et al. 2014; Yoder 2018).

There is no evidence of any investment in substantial residential architecture at any of the summer field camps. And evidence of even light brush residences is limited to a few alcove sites in the lower Escalante River country (Geib 1996d; Keller 2000) and a single brush structure along Calf Creek (Harris 2005).

Small storage cists are commonplace in the lower Escalante River region, but they are quite rare at higher-elevation field camps. This might be a sampling bias in that fewer upland field camps have been investigated. Some field camps have both subterranean storage and above-ground storage. It remains unresolved whether cists and granaries were used at the same time as part of a diverse single storage strategy, or whether these represent changes from below-ground storage to above-ground storage through time (see Yoder 2005).

Large numbers of Fremont pithouses have been identified in the Big Flat are east of Escalante. This area features a pinyon-juniper canopy and is modern winter range for mule deer. But these might not have been occupied during the winter and there is minimal evidence of mule deer hunting and meat processing at sites in that area. The sample of excavated sites on Big Flat is small (n=3), but the four pithouses investigated were not especially deep and the central fire pits were not particularly large or deep. Roof superstructures supported by posts and beams suggests the roof matrix was substantial and intended for thermal retention, supporting the idea of cooler weather occupations (Jordan and Talbot 2002). By comparison, Fremont pithouses in the Wide Hollow area (Arrowhead Complex) are much deeper, there is greater evidence of large interior hearth features and multiple exterior hearths, and roof superstructures might have supported much greater weight (Bond et al. 2014).

Middens at all three Big Flat sites were described as "not extensive" and perhaps more reflective of "cool season" occupations in the early spring or late fall, rather than cold, winter occupations (Talbot 2002:160). This is supported by the presence of large slab-lined features, probably plant roasting features (Schaub 2003). None of the artifact assemblages were especially large or diverse. By comparison, the Wide Hollow sites (Arrowhead Complex) feature expansive middens covering thousands of square meters with tens of thousands of artifacts representing a diverse array of household activities (Bond et al. 2014; Yoder 2018).

There is only limited support for the idea that the Big Flat pithouses might have been home bases for deer hunting. At the Outpost, 87 percent of the 283 bone fragments were from unidentified large game animals. At Dos Casas (42Ga4086), the percentage is only 21 percent, and at the Roadcut Site (42Ga4095), none of the 15 bone fragments could be identified (Jordan and Talbot 2002). The relative lack of abundant deer remains at Big Flat pithouse sites does not necessarily contradict the idea these sites were hunting bases, only that the deer were not processed there in significant quantities. It is just as likely that procured game animals were transported to winter residential bases elsewhere. At the Spillway Site, which is part of the Arrowhead Complex at Wide Hollow, some 50 percent of the 1,691 animal bones were identified as large game animals (Bond et al. 2014).

None of the three excavated sites on Big Flat had any significant on-site storage. The few small sub-floor pits within the pithouses themselves suggest extremely short-term storage, if the pits are even storage features. By comparison, the Arrowhead Complex featured numerous large subterranean, semi-subterranean, and perhaps surface storage facilities, some with individual storage capacities exceeding 6 cubic meters (Bond et al. 2014; Yoder 2018).

In summary, McFadden's model is partially verified by recent excavations in the region, but some aspects should be revisited. There is considerable support for the idea that Fremont populations dispersed in the spring to lower-elevation niches suitable for floodplain farming along the Escalante River. But McFadden's model should be expanded to including summer farming camps at upper elevations, as well.

There is no evidence that the Big Flat pithouses were winter residences focused on deer hunting. The three excavated sites revealed pithouses that were likely occupied in the early spring to procure early tubers and bulbs, and/or the fall to procure pinyon nuts, cacti, and perhaps a few mule deer. Instead, the winter occupations might be found in the Wide Hollow area where pithouses, all located in a valley setting, might have been year-round residences that represent larger population aggregations during the winter months. Winter occupations are supported by the large number of on-site storage facilities and the abundance of hearths, roasting pits, and other extramural features indicative of longer-term residential activities.

We also wanted to examine the cumulative residential data from the perspective of cultural boundaries, specifically whether the architectural evidence supports the idea of hard boundaries (cf. Geib 1996e; McFadden 2016) or permeable boundaries (Janetski et al. 2012). There is a high likelihood that Ancestral Puebloans came into contact with Fremont groups in Early Agricultural times. Numerous sites in the lower Escalante River country have been described as Basketmaker II based on the distinctiveness of certain artifacts, suggesting that some Basketmaker II groups had already crossed the Colorado River by about AD 200 or earlier (see Geib 1996c, 1996d). This might have been part of a northern micro-migration of Kayenta- or Mesa Verde-area farmers with existing agricultural and storage technologies (Talbot and Richens 1996).

Early Formative sites in the Escalante River corridor have predominately basalt-tempered Emery Gray ceramics, a tempering preference that persisted for at least 500 years. But there are numerous sites that also have sand-tempered graywares more characteristic of early Ancestral Puebloan graywares. Geib (1996d) raises the possibility this is a locally produced grayware (not trade ware). This would suggest that some Fremont groups learned pottery techniques from Ancestral Puebloan neighbors or that they traded with them to acquire sand-tempered utility wares.

Snake Valley Gray and Snake Valley Black-on-gray are much more common at sites dominated by Emery Gray, although these are few in number compared to Emery Gray potsherds. Petrographic analysis (Geib 1996d) indicates these are identical to Snake Valley types produced at Median Village in the Parowan Valley, and therefore represent socioeconomic networks linking Escalante River groups to other Fremont groups to the north and northwest. This would support the idea that the Fremont of the Escalante River Basin shared a social and perhaps ethnic identity with groups farther to the north.

An early Fremont pithouse tradition has not yet been documented in the Escalante River Basin. Fremont groups elsewhere on the northern Colorado Plateau incorporated pithouse architecture into agricultural lifeway perhaps hundreds of years before the advent of ceramics, as did Ancestral Puebloan groups in the Grand Staircase, San Juan Basin, St. George Basin, and Kayenta regions (see Chapter 4). If Ancestral Fremont and early Fremont groups in the Escalante River Basin interacted with their neighbors, then their failure to embrace the functional advantages of pithouse architecture becomes even more perplexing. It also suggests there was minimal contact with any group outside their own social network.

Based on current radiocarbon data, a fully developed pithouse tradition was established here between AD 700 and 800. Fremont pithouses in the Escalante River Basin exhibit interior features that are common at contemporaneous Ancestral Puebloan sites, but are rare at other Fremont sites farther to the north. These traits include lateral entryways that also functioned as ventilation tunnels, deflectors and wing walls, benches, roofed antechambers attached to the entrance, large-capacity storage both inside and outside the residence, wall niches and shelves, and raised adobe platforms. This suggests Ancestral Puebloan pithouse forms and features were absorbed into the Fremont lifeway about AD 700 or 800 (cf. Talbot 2002, 2006).

Unlike Ancestral Puebloan pithouses, Fremont pithouses in the Escalante River Basin are not standardized. They are mostly circular, but they are also oval, quadrilineal, and rectangular. They often feature a wall base of vertical stone slabs, but earthen walls and boulder alignments are also common. Superstructures feature both interior and exterior roof supports. Lateral entrances through a ventilation tunnel are commonplace, but entry through the roof by way of a ladder over the central fire pit have also been documented. Some pithouses feature large interior storage and others do not. Some have antechambers with ramadas and attached storage and others do not (Bond et al. 2014; Yoder 2018). Collectively, this suggests that Fremont pithouses might have shared a veneer of traits with Ancestral Puebloan pithouses.

By about AD 750, Fremont groups had unenthusiastically embraced some Ancestral Puebloan architectural patterns, suggesting increasing contact and exchange with their neighbors.

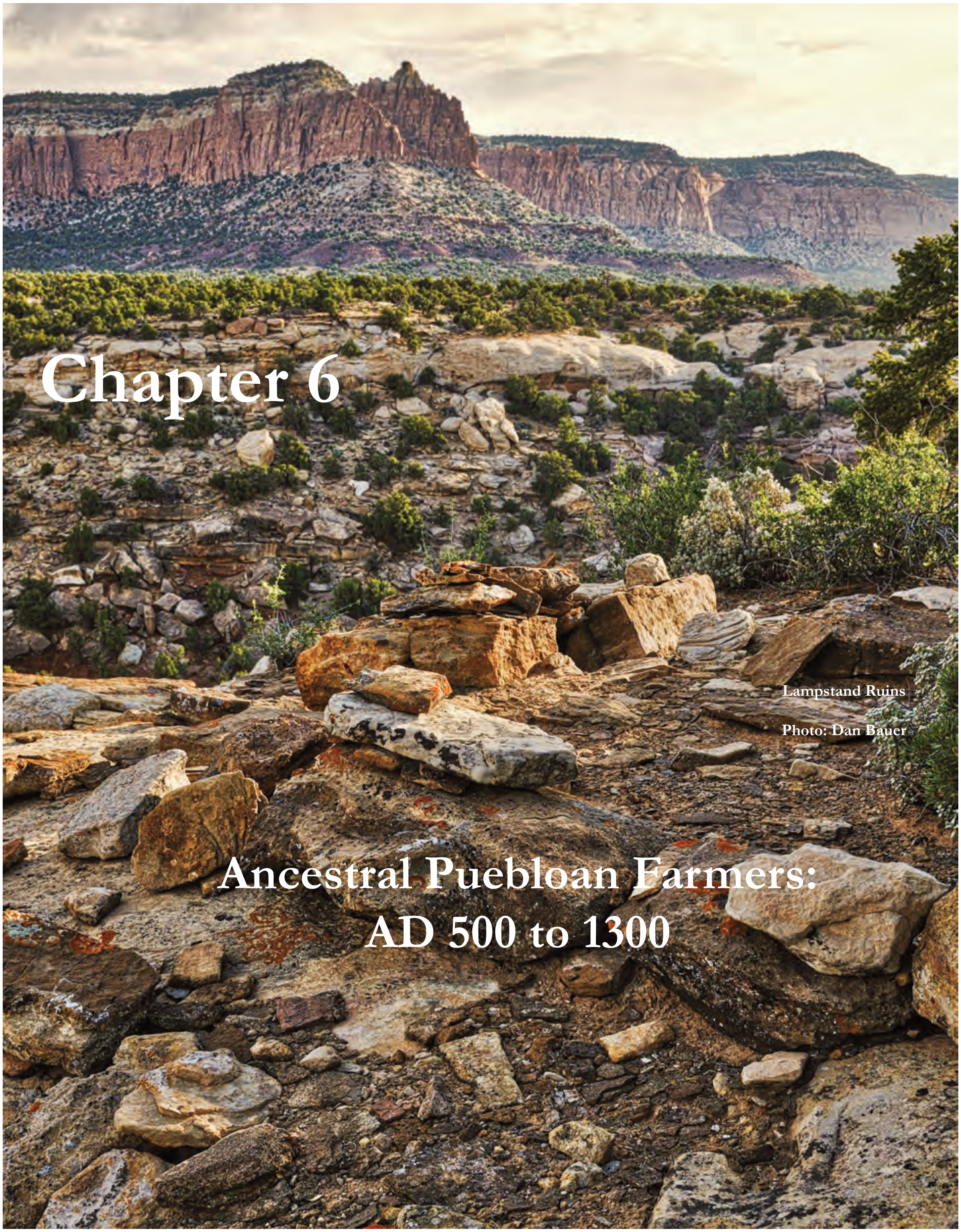
Fremont summer field camps that date between about AD 500 and 750 have almost exclusively Fremont ceramic assemblages (>90 percent). The few non-Fremont ceramics were typically labeled North Creek Gray, an Ancestral Puebloan utilitarian ware used throughout the Formative that is relatively useless as a temporal marker and might reflect later re-occupations. Residential sites that date between AD 750 and 1000 have predominately Fremont ceramics (>75 percent), but the non-Fremont assemblage increased through time. This suggests a hard boundary that became increasingly permeable, eventually collapsing at about AD 1050.

Fremont pithouse sites that date toward the end of the Formative (Overlook Site and Rattlesnake Point) have predominantly Fremont ceramics along with Ancestral Puebloan painted types, but without much evidence of Ancestral Puebloan utilitarian wares. This suggests that Fremont groups maintained their separate identity throughout the Ancestral Puebloan co-occupation, that Ancestral Puebloan pottery makers were no longer producing utilitarian wares locally by the end of the Formative and they might have already left the area, and Fremont groups maintained trade relationships with their former neighbors from whom they acquired painted ceramics while producing their own basalt-tempered utilitarian ceramics (see Janetski et al. 2012:205).

In summary, evidence of a hard boundary between Fremont and Ancestral Puebloan cannot be convincingly demonstrated, nor can it be rejected outright. Fremont groups might have maintained some socioeconomic relationships with their Ancestral Puebloan neighbors since Early Agricultural times, even as they vigorously held to their own ceramic and (non) architectural traditions. By about AD 750, Fremont groups had unenthusiastically embraced some Ancestral Puebloan architectural patterns, suggesting increasing contact and exchange with their neighbors. And by about AD 1050, there were no discernible boundaries as both groups co-occupied the same region.

In effect, boundaries became more permeable through time, with Fremont groups adopting Ancestral Puebloan architectural patterns and embracing Ancestral Puebloan trade wares, especially after AD 1000, even though "site plans and grayware ceramics remain distinctively Fremont" (Janetski et al. 2012:206). The Fremont presence in the Escalante River Basin had disappeared by the late AD 1200s or early AD 1300s. The impetus for the abandonment of Fremont lifeways that had proven remarkably resilient for a millennium are poorly understood, but it might have been in response to a horrific region-wide drought in the AD 1280s. There is only minimal evidence that any of the Fremont or Ancestral Puebloan farmers remained in this region after AD 1300.

Chapter 6



Lampstand Ruins

Photo: Dan Bauer

Ancestral Puebloan Farmers: AD 500 to 1300

The beginning of the Formative in the American Southwest is generally marked by the appearance of a fully developed grayware ceramic tradition with a variety of names depending on different tempering agents and where it was made. In the GSENM region, this probably occurred about AD 500 and it probably occurred simultaneously across southern Utah and northern Arizona. But the AD 500 beginning date, as used here, is merely an organizational convenience that distorts the reality that non-pottery-using Basketmaker II groups were remarkably similar in every regard to pottery-using Basketmaker III peoples.

In fact, changes to settlement and land-use patterns, architecture, and material culture were gradual, with new innovations and practices being grafted onto older lifeways, but with the old patterns never entirely disappearing. This continuity is a defining characteristic of Virgin Branch Puebloans throughout all upland environments of the Grand Staircase and Arizona Strip. Evidence of this continuity includes:

- Farming strategies during the Basketmaker III period (AD 500 to 700) and Pueblo I period (AD 700 to 900) were not substantially different from earlier Basketmaker II times, with a preference for well-watered drainages (floodplain farming), but with limited utilization of higher-elevation mesa tops (dry farming).

New innovations were grafted onto older patterns, but the old ones never entirely disappeared — this is a defining characteristic of all Virgin Branch Puebloans.

- Settlement patterns were essentially the same from pre-ceramic times to later periods, and were usually characterized by one or two pithouses in close proximity to arable lands, but with a few larger population aggregations that can be characterized as hamlets or small villages.

- Some Basketmaker II sites continued to be occupied into Basketmaker III times, and some Basketmaker III sites continued to be occupied into Pueblo I times, suggesting that some local culture histories were continuous over many centuries, even as individual sites were occupied, abandoned, and later reoccupied.

The AD 500 date for the beginning of the Formative follows the temporal framework offered in McFadden's (2016) synthesis of Ancestral Puebloan peoples of the Grand Staircase, and is herein intended to reflect a time when grayware ceramics were widely utilized throughout the region. It is also possible that technologies behind ceramic production might have appeared a century or more before AD 500, part of widespread regional brown ware tradition (Wilson and Blinman 1993), which is referred to in the Kayenta and Grand Staircase areas as Obelisk Utility (Geib and Spurr 2000).

In the following summary, we discuss Formative manifestations in the Grand Staircase sub-region of GSENM, as well as brief late Pueblo II-Pueblo III expressions in the Kaiparowits Plateau and upper Escalante River Basin, within the context of two datasets: (1) radiocarbon and tree-ring dates from sites within and adjacent to the Monument, which allow for temporal placement within the traditional Pecos nomenclature, and (2) the a state site database of all sites within the Monument itself, where the presence of ceramics (and to a lesser extent architecture) allow us to organize the data by "early," or before AD 1050, and "late," or after AD 1050 when corrugated ceramics appeared and certain painted types became commonplace.

McFadden's (2016) recent synthesis of his decades of research in the region offers considerable insight to Ancestral Puebloan architecture and changes to site structure through time, and this should be consulted for a more thorough discussion of the relevant data. To avoid repetition, we instead discuss the GSENM site data from a broader re-

Figure 6.2: Ceramics are sensitive temporal markers that allow archaeologists to assign date ranges to specific sites. They are also irresistible to collectors.

gional context, in effect comparing Ancestral Puebloan adaptations in the Grand Staircase to contemporaneous ones in contiguous regions.

We also discuss the Virgin Branch of Ancestral Puebloan prehistory within the context of upland adaptations to the high plateaus of the Grand Staircase physiographic province located between the Colorado River on the south and Bryce Canyon on the north, mostly above 3,500 feet elevation. We further organized these data to compare northern adaptations that are within and immediately adjacent to GSENM, which we call "northern Grand Staircase," to those on the Arizona Strip and contiguous areas south of the Vermilion Cliffs, which we refer to here as the "southern Grand Staircase."

We then compare these upland adaptations to contemporaneous lowland adaptations found in the St. George Basin and lower Virgin River (mostly below 3,500 feet elevation). This delineation follows Lyneis (1995), although she considered the St. George Basin to be intermediate between the high plateaus and the lower Virgin River country. This upland-lowland distinction is analogous to what some have traditionally referred to as "Eastern Virgin Branch" and "Western Virgin Branch." We prefer the "upland" and "lowland" designations as more representative of Formative adaptations to different environments, although this distinction does not preclude the likelihood that some groups exploited both upland and lowland environments at this time.

Similar but Different: A Historical Perspective

Scholarly interest in the Ancestral Puebloan peoples of the American Southwest is firmly rooted in the history of archaeological thought as it evolved in the late 1800s and early 1900s. The initial interest was focused primarily on spectacular sites such as Mesa Verde and Chaco Canyon, among others, that yielded rich catalogs of artifacts remarkably preserved in the arid desert environment. These artifacts fueled unprecedented public interest in the so-called "Cliffdwellers" and

"Basketmakers," a curiosity that resulted in the pillaging of Ancestral Puebloan sites for museum collections around the world.

Early research in the Grand Staircase was generally offered within the comparative context of Puebloan developments elsewhere in the Southwest. These observations were influenced greatly by the pioneering research of Alfred V. Kidder, whose work at sites in the Marsh Pass, Alkali Ridge, and Pecos Pueblo established a relative temporal sequence for prehistoric Southwestern peoples (Kidder 1924, 1927). Neil Judd then applied Kidder's chronology to his observations of the prehistory of southwestern Utah. Conversely, Kidder liberally incorporated Judd's observations from southern Utah into his discussion of the "Northern Periphery," a region with archaeological resources that Kidder believed (1962:249-251) were:

... surely Puebloan, as is proved by the evident permanence of the settlements, the pottery, the corn, and the use of the metate. Their age, relative to that of more southern ruins, is hard to estimate. The simple nature of the houses, and the primitive appearance of the kiva-like structures, might seem to indicate that they were actually pre-Puebloan; but the black-on-white and corrugated pottery are certainly of Pueblo types. This would appear to show that they were built during the first part of the Pueblo period, when vigorous early culture of the San Juan was spreading out and exerting its influence far and wide, but before the highly specialized subcultures of that region.

From its initial delineation within the Pecos Classification's "plateau division," the term Northern Periphery came to mean different things to different researchers (cf. Judd 1940; Kidder 1924; Roberts 1935a, 1935b; Steward 1936, 1940, 1941; Wormington 1955). Scholars were repeatedly frustrated in their attempts to place "Northern Periphery" archaeology within the neat categories established at the Pecos Conference, and all of them recognized that prehistoric occupations "become progressively less Puebloan" in direct proportion to the distance north and west from the Colorado River, and that parallels with Puebloan "standards" were evident only in that area from the Grand Canyon north to the Kanab region (Judd 1940:426).

Judd (1940:428-429) believed a northwestward diffusion of Puebloan traits from the San Juan region could not account for "the general absence throughout the Northern Periphery of those economically desirable and easily transportable traits" like sandals, cotton cloth, domesticated turkeys, grooved axes, banded-neck pots, scoop ladles, and canteens. Collectively, these differences suggested "something besides diffusion."

It was also during this period that Julian H. Steward (1941) conducted a broad reconnaissance of the Kanab and Glen Canyon regions specifically to understand the relationship between Pueblo-like manifestations north of the Colorado and Ancestral Puebloans south of the river. He was among the first to recognize the extreme variability in the archaeological record north and west of the Colorado River, and he was the first to implement a model for regional variation based on material culture traits. As Janetski observed (1997a), it is a scheme that has been adopted and altered by several but remains largely intact, although the implications and conclusions have changed.

The "similar but different from" concept articulated by Judd and Steward influenced subsequent generations of researchers in northern Arizona, southern Utah, and southern Nevada, who later expanded on that idea and defined Ancestral Puebloans of the region as the Virgin Branch. Although questions remain as to whether this was a local development or one inspired by immigrants into the region, most researchers today recognize the Virgin Branch as a farming adaptation uniquely suited to high plateaus on the east and the Virgin River lowlands on the west. It borrowed liberally from contemporaneous groups south and east of the Colorado River, all while local groups maintained their own identity "similar but different from" their contemporaries across the river.

Beginning in the 1930s, archaeologists working in the Virgin River Basin began offering locally and regionally distinct temporal schemes to distinguish adaptations north and west of the Colorado River from those to the south and east (Figure 6.3). The early attempts, all of which used the Pecos Classification system to some extent, re-

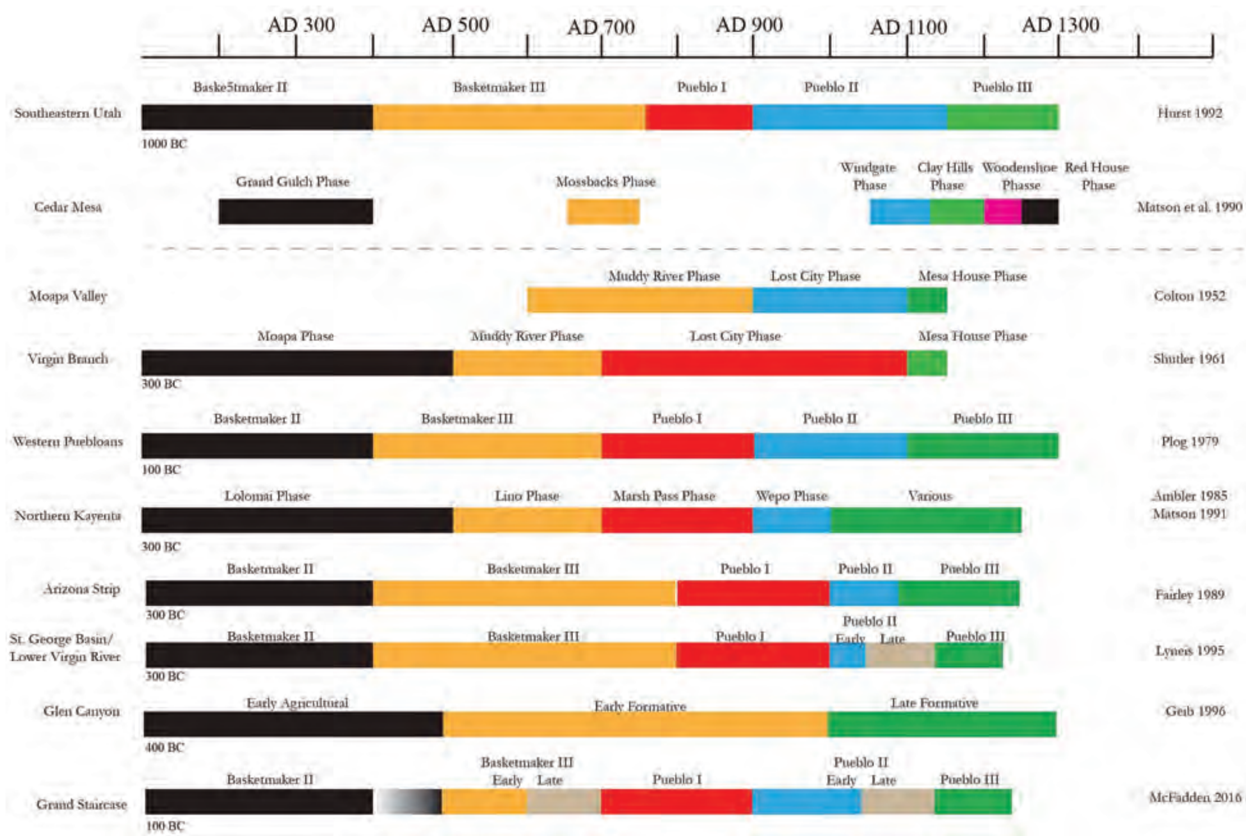


Figure 6.3: Various temporal schemes proposed for Ancestral Puebloan peoples of the Grand Staircase and Virgin River regions.

lied exclusively on ceramic assemblages as temporal markers. Gladwin and Gladwin (1934) originally proposed a "Nevada branch" that had split from Kayenta groups in early Pueblo II times. Colton (1942, 1943, 1952) objected to the narrow temporal implications of that idea, suggesting instead a distinct "Virgin branch" that spanned the entire Ancestral Puebloan developmental sequence and was equivalent in all respects to the Kayenta, Mesa Verde, and Chacoan branches (see Fairley 1989 for a more detailed history).

An array of temporal schemes has since been proposed and modified for Ancestral Puebloan manifestations in the region, some of them broad-scale in approach and others narrowly focused on specific sub-regions. Richard Shutler's work in the Moapa Valley (1961) proved to be particularly influential not only in southern Nevada as he intended, but throughout the St. George Basin and Arizona Strip. Important revisions based on cumulative research were later offered by Fairley (1989) for the Arizona Strip, Lyneis (1995) and Roberts and Ahlstrom (2012) for the Virgin/Muddy River country, and McFadden (2016) for the Grand Staircase.

Shutler (1961) believed the Ancestral Puebloan occupation of southern Nevada was continuous from Basketmaker II to Pueblo III times. His Moapa Phase (300 BC to AD 500) was considered coequal with Basketmaker II manifestations elsewhere in the Ancestral Puebloan world, and was characterized by pithouses ranging in size up to 6 meters in diameter and 1.8 meters in depth, storage cists in rockshelters and alcoves, corner-notched atlatl dart points, and perishable artifacts similar to those from Cave du Pont in the Grand Staircase.

The Muddy River Phase (AD 500 to 700) was equivalent to Basketmaker III manifestations elsewhere in the Southwest. These sites consisted of clusters of one to four pithouses located on high mesa rims or on low knolls within the valley, suggesting these people were beginning to farm the valley floor. The spatial arrangement of structures exhibited no community structure or planned village layouts. Pithouses were round with plastered floors and slab-lined or clay-rimmed hearths. Storage bins and cists were located in the open and in sheltered locales. Plain gray pottery was manufactured, and small stemmed and notched points indicated the bow-and-arrow was in use by this time. Artifacts included slab and basin metates, clay pipes, figurines, fur cloth, and coiled and twined basketry (Shutler 1961).

The Lost City Phase (AD 700 to 1100) encompassed both the Pueblo I and Pueblo II periods of the Pecos Classification. This phase was characterized by the greatest population density, and sites were located on low knolls within the valley and in proximity to arable lands. Corn, beans, squash, and cotton were cultivated, and villages consisted of pithouses and surface rooms arranged in U-shaped or linear patterns, or in clusters of rooms forming blocks. The ceramic assemblage continued to be dominated by plain graywares, but painted and decorated types were also manufactured (Shutler 1961).

The Mesa House Phase (AD 1100 to 1150) was characterized by a population decline, and sites were located in defensive postures on ridges high above the valley floor. Site layouts were more enclosed with rooms surrounding a central courtyard or plaza. There was an increase in the use of corrugated ceramics, although chipped stone and ground stone tools, as well as perishable artifacts, remained the same from the earlier Lost City Phase. Abandonment occurred about AD 1150 (Shutler 1961).

Shutler's temporal scheme was intended to divide material culture traits into specific periods of time, but he acknowledged that, "Characteristic of the Virgin Branch, indeed of the whole Northern Periphery, is the continued use of early forms of architecture, pottery, and artifacts into later times and along with newer forms" (1961:66). This would become a common theme in Virgin Branch archaeology in the decades to follow (see Roberts and Ahlstrom 2012; Fairley 1989; Lyneis 1995; McFadden 2016; Thompson 1986). Shutler's sequence proved extremely popular among archaeologists throughout the Virgin Branch area, even though it was developed specifically for the Moapa Valley.

Helen Fairley's subsequent reanalysis (1989; see also Lyneis 1995) of the cumulative data from the Arizona Strip also used Pecos Classification nomenclature, although she rejected the cultural implications of the terms. Fairley recognized a Basketmaker II period from BC 300 to 400 AD that was characterized by mixed farming and foraging, but before the advent of ceramics or permanent villages. Basketmaker II manifestations of this region were similar, if not identical, to those described elsewhere in northern Arizona and southern Utah.

Fairley (1989:112) also recognized a Basketmaker III period from about AD 400 to 800 that she believed was a direct outgrowth of the preceding Basketmaker II lifeway. Two-handed manos and trough metates came into use, the bow-and-arrow replaced the atlatl, and plain gray pottery tempered with sand, sometimes decorated with black carbon paint, made its first appearance. Large ceramic vessels may have provided an alternative to storage cists in alcoves for storage of seeds and perishable items. Basketmaker III sites generally consisted of an informal arrangement of one to five pithouses with associated external cists, but "as far as fundamental cultural patterns are concerned, however, the distinction between the Basketmaker II and III periods is relatively insignificant, at least in the eastern part of the Strip."

The Pueblo I period from AD 800 to 1000 was described as a continuation and elaboration of Basketmaker III lifeways. Fairley (1989:118) argued that traditional definitions of Pueblo I overemphasized change when, in fact, "there seem to be more similarities between Basketmaker III and Pueblo I sites in terms of settlement distributions and technology than there are differences." The changes evident in the archaeological record are primarily ceramics, site layouts, and architectural patterns. New ceramic vessel forms were added, and pithouses were round, slab-lined, and featured benches. Slab-lined storage cists in a contiguous arc pattern were evident at some sites, but linear roomblocks appeared at other sites.

The Pueblo II period from AD 1000 to 1150 was characterized by population increases and/or migrations from the Kayenta region, improved climatic conditions that allowed farming of upland mesas, and increased sophistication in agricultural practices as attested by the prevalence of garden plots, terraces, check dams, and other water control devices. Pueblo II sites range from a single, round semi-subterranean pithouse with associated storage structures to more formal arrangements consisting of a row, often in the shape of an arc, of contiguous sub-rectangular storage structures with a pithouse attached to one end. Many sites in the region feature combinations of both patterns (Fairley 1989).

Fairley's (1989) Pueblo III period from AD 1150 to 1200 or 1250 differed from late Pueblo II times only in terms of certain ceramic types evident in surface contexts. The limited evidence suggested the region had been abandoned by AD 1200 or 1250. Fairley's organizational scheme, developed specifically for the Arizona Strip, was commonly applied to Ancestral Puebloan occupations of the Grand Staircase region until Doug McFadden began synthesizing his decades-long research in the area. McFadden's organizational scheme (2016), addressed in greater detail throughout this chapter, differs only slightly from Fairley's model, but it offers greater temporal precision based on chronometric data that were not available to Fairley.

Ceramics Semantics

Ceramics are sensitive temporal markers, and as such a brief review is offered here following Allison 2008, Collette 2009, Lyneis 2008, and McPeek 2017 (see also Figure 6.4). Ceramics found in the Grand Staircase are overwhelmingly Tusayan

Gray Wares Summary

Tusayan Grayware/ Virgin Series	Shinarump Gray Ware	Moapa Gray Ware	Logandale Gray Ware	Shivwits Ware
North Creek Gray (AD 500-1250)	Shinarump Plain (AD 500-1250)	Boulder Gray (AD 500-1250)	Logandale Gray (AD 500-1250)	Shivwits Plain (AD 500-1250)
North Creek Corrugated (AD 1050-1250)	Shinarump Corrugated (AD 1050-1250)	Moapa Corrugated (AD 1050-1250)	Logandale Corrugated (AD 1050-1250)	Shivwits Corrugated (AD 1050-1250)

White Wares Summary

Tusayan White Ware/ Virgin Series	Shinarump White Ware	Moapa White Ware	Logandale White Ware	Kayenta Parallels
Mesquite B/G	None	Boulder B/G	Logandale B/G	Lino B/G (AD 640-820)
Washington B/G	None	Boysag B/G	None	Kana-a B/W (AD 800-1050)
St. George B/G	Wahweap B/W	Trumbull B/G	None	Black Mesa B/W (AD 900-1160)
North Creek B/G	Wygaret B/W	Moapa B/G	None	Sosi B/W (AD 1050-1200)
Hildale B/G	Vermilion B/W	Slide Mountain B/G	None	Dogoszhi B/W (AD 1050-1190)
Glendale B/G	Cottonwood B/W	Poverty Mountain B/G	None	Flagstaff B/W (AD 1130-1230)

Red Wares Summary

Shinarump	San Juan	Tsegi
	Abajo R/O (AD 700-850)	
Kanab B/R (AD 1050-1250)	Deadmans B/R (AD 780-1040)	Medicine B/R (AD 1040-1170)
Middleton B/R (AD 1050-1250)	Deadmans B/R Dogoszhi Style (AD 1050-1190)	Tusayan B/R (AD 1045-1240)
Middleton Polychrome (AD 1050-1250)	None	Cameron Polychrome (AD 1040-1170)
Nankoweap Polychrome (AD 1050-1250)	None	Citadel Polychrome (AD 1040-1200)

Figure 6.4: Chart outlining the ceramic types found in the Virgin Branch region and their temporal ranges. Image modified from McPeek (2017).

Grayware (Virgin Series) and Shinarump Grayware, although Moapa Grayware is occasionally reported. Likewise, whitewares are almost exclusively Tusayan Whiteware (Virgin Series) and Shinarump Whiteware. Redwares are predominantly locally produced Shinarump Redware, although imported San Juan Redware from the San Juan Basin and Tsegi Orange Ware from the Kayenta region are common.

The AD 500 beginning date for Basketmaker III is admittedly subjective, and it might be much too conservative. As discussed above, a brown ware ceramic tradition referred to as Obelisk Utility Ware might have been present by AD 400, although it was not common. Fairley (1989) preferred an AD 400 advent for ceramics, and McFadden (2016) also allowed for that possibility, although he believed widespread use of ceramics is not evident until AD 500. Roberts (2018) allowed for an AD 500 advent, but noted graywares are not common until AD 600. Ceramics also appear elsewhere in the Ancestral Puebloan world at about AD 500, although this is actually a comfortable midpoint between those supporting an AD 400 or 450 advent (cf. Hurst 1992) and others suggesting a beginning date of AD 550 or 575 (cf. Ortman et al. 2005).

The AD 500 date used here for the advent of ceramics actually reflects a comfortable mid-point between those who believe it occurred about AD 400 and others who argue for an AD 600 date.

Exactly when ceramics were introduced into Virgin Branch lifeways is complicated by a series of six radiocarbon dates from the Little Jug Site near Mount Trumbull (Thompson and Thompson 1974, 1978). These dates, all obtained from pithouses with plain gray ceramics, had an averaged calibrated age of about AD 290. This raises the possibility that ceramics appeared in the Grand Canyon region 200 years earlier than has been documented anywhere else in the Ancestral Puebloan world. The Little Jug data have provoked considerable debate with advocates for and against the validity of the dates. Recent investigations at Jackson Flat, however, suggest the Little Jug dates are probably not valid. A series of fine-scale radiocarbon dates from cultigens indicate ceramics did not appear prior to about AD 500, and they did not become an important part of local lifeways until much later (Roberts 2018).

Virgin Branch graywares relevant to this discussion include plain gray types defined at the 2007 Prehistoric Pueblo Pottery North and West of the Colorado River Conference at Northern Arizona University. These include Boulder Gray, North Creek Gray, Shinarump Gray, Shivwits Plain, and Logandale Gray. Some of these have whiteware corollaries (black-on-white or black-on-gray types). Shivwits Plain and Logandale Gray have not been identified as such at any GSENM site and these are not considered further in this chapter. Grayware types relevant to the Grand Staircase region include:

- North Creek Gray is common in all Virgin Branch areas, and it is especially common in the Grand Staircase. It is light to medium gray in color and features sand temper with occasional quartz, feldspars, and other minerals. It can also include basalt inclusions in areas with igneous outcrops. This type had appeared by about AD 500, became commonplace by AD 600, and was utilized throughout the entire Formative sequence.

- Shinarump Plain (also referred to as Shinarump Gray and Shinarump Brown) is found mostly east of Kanab Creek and it is especially common in the Grand Staircase. It features an iron-rich clay that fires dark gray to purple or red in color depending on the firing conditions, and the sand tempers range from fine to coarse and they are often visible on the surface. This type appeared by AD 500 and was utilized throughout the entire Formative sequence.

● Boulder Gray is quite rare in the Grand Staircase. It is recognizable by its green olivine temper derived from xenoliths (igneous inclusions) found in the Mount Trumbull area. It is considered a trade ware when found outside the Mount Trumbull area. It was the most common ceramic type at the Little Jug Site (Thompson and Thompson 1974) and might date as early as about AD 290. It was also utilized throughout the Formative sequence.

Graywares are poor temporal markers with the exception that the shape of jar rims changed through time. In Basketmaker III times, the rims were vertical or nearly so. By Pueblo I times, they were slightly flared, and by Pueblo II times they were extremely flared or everted. In effect, the rim sherds can help place sites into broad temporal contexts even if there are no other diagnostics present.

In summary, grayware ceramics probably appeared in the Grand Staircase about AD 500 ($\pm$100 years), and they are therefore a convenient temporal indicator of Formative occupations. Plain graywares changed little, if at all, over the next 800 years, making them poor temporal diagnostics based on compositional qualities alone. But the vessel forms changed through time, which allows general temporal placement whenever rim potsherds are present.

Corrugated graywares are also useful temporal indicators. Corrugated ceramics appeared in the Chaco Canyon region about AD 1000, and within 50 years they had spread throughout the entire Southwest. Christensen (1994) placed the arrival of corrugated types in the Kayenta heartland at AD 1020, whereas Pierce (1999) placed it at about AD 1030 in the Kayenta region and about AD 1050 in the Virgin Branch region.

Corrugated graywares became the dominant ceramic types found throughout most of the Ancestral Puebloan world, but not in the Virgin Branch area. Here, graywares continued to predominate, although corrugated types became more and more common through time, and by the AD 1200s they comprised 40 percent or more of the collections at any given site (Allison 2008).

Corrugated types vary by GSENM sub-region. In the Grand Staircase, they are commonly labeled North Creek Corrugated (Virgin Series) and Shinarump Corrugated. On the Kaiparowits Plateau, they are typically Tusayan and Moenkopi

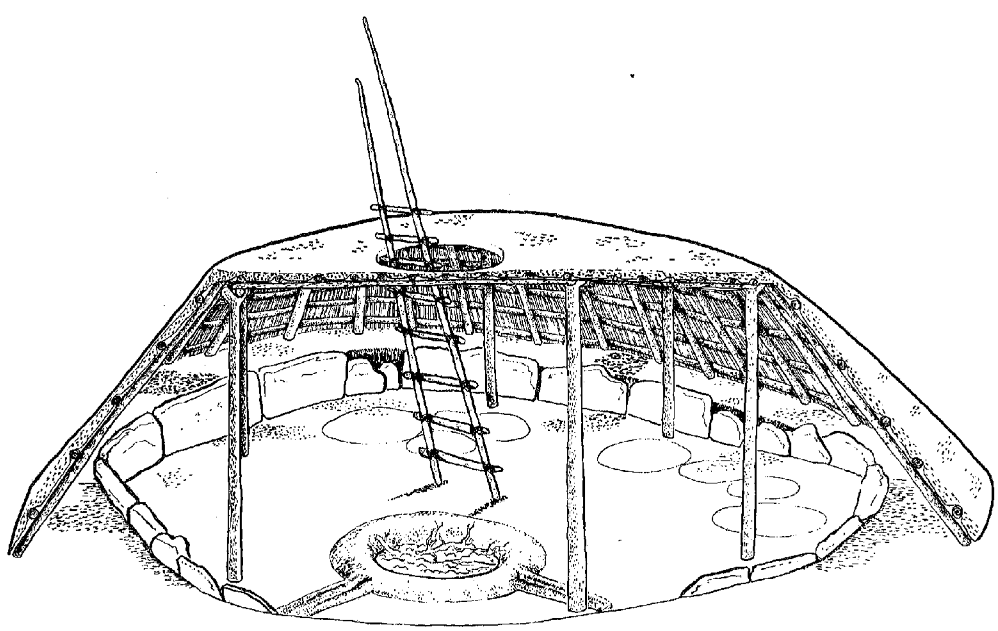


Figure 6.5: Sketch drawing of what a typical Basketmaker III pithouse probably looked like. Image modified from Jennings (1978:108).

types, a reference to the two most common Tusayan Graywares found in the Kayenta heartland. In the Escalante River Basin, corrugated types are invariably labeled as all of the above, although a locally produced ware is referred to as Coombs Variety or Coombs Corrugated.

Whitewares and redwares, although not nearly as common as graywares, have much narrower temporal ranges and, therefore, these types allow better temporal precision as to the age of a particular site. These age ranges were based on tree-ring dates from sites in the Kayenta heartland (see Ambler 1985 and Christensen 1994), and it is assumed that similar age ranges are applicable to the Virgin Branch region where locally produced pottery exhibits many of the same characteristics and designs as those found in the Kayenta region.

In this chapter, we use the presence of certain ceramics as broad temporal indicators. Sites with plain graywares but no corrugated wares might be "early" sites, whereas sites with corrugated graywares are probably "late" sites. Graywares without everted rims are probably "early," whereas those with extreme flaring are probably "late." A review of GSENM site forms found 1,282 sites with Ancestral Puebloan ceramics. Most of these sites are located in the Grand Staircase (n=707) and Kaiparowits Plateau (n=503). Roughly three out of every four Ancestral Puebloan sites with ceramics have temporal diagnostics indicating occupations after AD 1050.

Corrugated ceramics appeared in the Virgin Branch world at about AD 1050 and therefore these potsherds serve as useful temporal markers.

Basketmaker III: AD 500 to 700

Basketmaker III potsherds are readily identifiable at pithouse sites throughout the Southwest, and hence they are convenient temporal markers whereby sites can be assigned to this particular period of time. As initially defined at the Pecos Conference (Kidder 1927), this cultural stage was characterized by residential sites with pithouses, but no contiguous or substantial surface structures; the widespread use of domesticated crops such as corn and beans; the presence of new technologies such as plain pottery and the bow-and-arrow; and a population that did not practice cranial deformation. Research spanning almost eight decades has refined archaeologists' understanding of Basketmaker III chronology and technological change, which has spurred more thinking about settlement patterns and social changes. The majority of the excavated Basketmaker III sites in the region are habitations that date between about AD 590 to 720 (Wilshusen 1999a).

Basketmaker III sites are generally dispersed, single pithouses that were probably oriented around nuclear families, although there is evidence of population aggregations in some areas. As many as 20 pithouses were found at some Basketmaker III villages, although hamlets of three or four residences were more common. Residential structures were typically deep, circular pithouses that were more substantial than in earlier times. As discussed by Hurst (1992:47-48), pithouses were similar in layout to Basketmaker II pithouses, but by the early AD 600s, the addition of an antechamber to the south or east of the main chamber "is almost an ubiquitous feature." Also common were floor ridges extending from the fire pit to the walls, four primary interior roof support posts, and interior storage bins (see Figure 6.5 above).

Basketmaker III pithouses in the greater Southwest are typically circular or oval in shape, ranging from 0.5 to 1.5 meters in depth, and they become somewhat rectangular with rounded corners later in the period (Hurst 1992:47-48). When two or more pithouses are present, they are typically contiguous in that they share a common wall. In some cases, there is greater site organization with the addition of formal work areas, ramadas, storage structures, and perhaps kivas. Residences were generally deeper and more spacious than Basketmaker II pithouses, and they typically featured wooden roofs covered with earth that were supported by four posts and crossbeams. These pithouses usually featured storage bins, benches, and a central fire pit. Entry was made by ladder through a hole in the roof or a lateral side entrance.

Agricultural fields were located near villages, and check dams might have been utilized to control water flow. Beans were added to the diet by about AD 600 (perhaps earlier), and turkeys might have been domesticated about this same time, although recent investigations suggest this occurred during Basketmaker II times (Matson 2018). Cotton also came into use near the end of this period. Baskets, textiles, and sandals continued to be manufactured, but with greater elaboration. Evidence of long-distance trading networks is evidenced by exotic materials such as turquoise, ocean shells and azurite (Brody 1990; Neily 1982).

Figure 6.6: Mesquite Black on gray is highly recognizable by the black designs on a gray background. Photo: GSENM

As discussed above, there is little consensus as to when the Basketmaker III period began (e.g., when ceramics were introduced). Likewise, there is little agreement as to the appropriate indicator to distinguish this period from the subsequent Pueblo I period. In southeastern Utah, Hurst (1992) argued the appearance of Abajo Red-on-orange pottery at about AD 750 is convenient marker for the beginning of the Pueblo I period. Abajo Red-on-orange, which was traded widely throughout the Southwest, is rare in the Virgin Branch region, and hence is a poor temporal indicator in GSENM.

A growing body of data from the greater Southwest suggest much greater social complexity during Basketmaker III times, including large villages, large storage facilities, and great kivas or oversized pithouses arranged around plazas (Reed 2000:13). The function of large subterranean structures during Basketmaker III times at several sites in the Southwest has evoked some disagreement. Some researchers have argued that such large structures were great kivas or community structures antecedent to the great kivas of Pueblo I to Pueblo III times, while others maintain there is no clear connection between the Basketmaker III structures and later kivas.

Grand Staircase Basketmaker III

In the high plateaus of the Grand Staircase region, the transition from aceramic Basketmaker II lifeways to ceramic Basketmaker III lifeways was apparently a slow, conservative process. Sometime between AD 400 and AD 600, residential sites began to exhibit greater on-site storage, presumably long-term storage by individual households; pithouses were moderately deep and featured benches, antechambers, and interior support posts in a consistent pattern; and the bow-and-arrow and ceramics were added to the local toolkit. Some Basketmaker II residential sites continued to be occupied into Basketmaker III times, and many sites occupied during late Basketmaker III times continued to be occupied into Pueblo I times (Roberts 2018).

McFadden (2016:141) recognized an early Basketmaker III period from about AD 500 to AD 600, and a late Basketmaker III period from AD 600 to 700. The early sites were characterized by pithouses with abundant on-site storage, and some "sites may appear to be village-sized, with several dozen cists and numerous pithouses; however, contemporaneity between these household clusters has not been demonstrated." McFadden's late Basketmaker III was characterized by the appearance of black-on-gray ceramics with Lino-like designs common in the Kayenta area (Lyneis 2008). Mesquite Black-on-gray is a Tusayan Whiteware (Virgin Series) identical in color and temper to North Creek Gray, but with the addition of black designs (Figure 6.6). It is common in the Grand Staircase, as it is in all Virgin Branch areas, and it is unique to late Basketmaker III times. Late Basketmaker III sites are also noteworthy because they are found at a wide variety of elevations and environmental niches across the Grand Staircase.

The Basketmaker III radiocarbon database is substantial, although it is hampered by inconsistencies. Some sites with Basketmaker II dates actually appear to be more recent Basketmaker III sites and could reflect the burning of old wood. And some of the sites with Basketmaker III dates actually appear to be Pueblo I sites, also a reflection of burning old wood. In all, there are 48 radiocarbon dates that might be attributed to Basketmaker III occupations in the northern Grand Staircase, 16 of which are "transitional" in that the probability ranges include the end of the Basketmaker II period and 14 of the dates are consistent with early Basketmaker III times (Table 6.1). And 18 are consistent with the late Basketmaker III period (see Table 6.2), although 95 percent probability ranges suggest that early sites might be late ones and late ones might be early ones.

More important, the radiocarbon database demonstrates that (1) there is continuity between the Basketmaker II and Basketmaker III periods, and between the Basketmaker III and Pueblo I periods, and (2) many areas occupied in Basketmaker II times continued to be preferred in Basketmaker III times. Specifically, the vast majority of radiocarbon dates come from sites along Kanab Creek and Short Creek, two areas with reliable permanent water even in drought conditions. There are a handful of radiocarbon dates from upland mesa sites and in drainages without permanent water, suggesting that multiple farming strategies were employed.

One site in the Shinarump Cliffs area is Basketmaker III hamlet or village site in a dry-farming setting overlooking Seaman Wash. Excavations of a vandalized pithouse revealed architectural features commonly found in later Pueblo I pithouses, including an encircling bench with six to eight symmetrically placed support posts, a slab-lined interior pit, floor vaults, and a clay-rimmed hearth. A shallow antechamber appears to have functioned as a use area, ventilator, and entryway. The structure lacked the sand-filled subfloor pits of later pithouses. The site itself contained abundant North Creek Gray potsherds (including miniature vessels) and 14 stemmed and corner-notched Rose Spring arrow points on the bench (McFadden 2016).

Two radiocarbon samples taken from the outer rings of structural timbers found in the disturbed fill of the pithouse yielded radiocarbon dates of 1660 ±90 BP (AD 386 median probability) and 1610 ±60 BP (AD 456 median probability). These two dates are among the earliest yet reported for a pithouse with ceramics in the Grand Staircase, and at first blush they would seem to support the idea that ceramics were incorporated into local farming lifeways at about AD 400. More likely, the beams were harvested from earlier structures and reused in later pithouses. Additional radiocarbon dating in 2001 of a large mammal bone from the pithouse floor returned a date of 1390 ±40 BP (AD 644 median probability), which supports the idea the two early dates are from old wood. As McFadden (2016:35) observed, "If the bone was from pithouse fill, it is evidence for continued occupation on site into late Basketmaker times."

Another site in the upper Virgin River country on the rim of Parunuweap Canyon was also located in a dry-farming setting. It consisted of at least 50 slab-lined storage cists in three clusters

Table 6.1

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka2780		Seaman Wash	5400	Wood	1660 ±90	n/a	AD 156-581	AD 386	Beta-16080	FS37 Pithouse Timber	McFadden 2016:35
42Ka6164	Paint Pot Village	Kanab Creek	4880	Zea Mays	1660 ±30	-8 AMS	AD 277-487	AD 388	Beta-368070	F25.1 Pithouse Hearth	Roberts 2018: Vol. 3: Chapter 3:9
42Ka6164	Paint Pot Village	Kanab Creek	4880	Zea Mays	1650 ±30	-10 AMS	AD 334-518	AD 398	Beta-368069	F46 Pithouse Floor	Roberts 2018: Vol. 3: Chapter 3:9
42Ka6163	Antechamber Site	Kanab Creek	4850	Charcoal	1640 ±30	-12.3 AMS	AD 346-525	AD 407	Beta-390947	F12 Surface Ramada	Roberts 2018: Vol 4: Chapter 1:13
42Ws4268		Short Creek	4865	Charcoal	1620 ±50	-25	AD 312-548	AD 444	Beta-169741	Central Fire Pit in F19 Pithouse	Berg et al. 2003:189
42Ws2195		Short Creek	5100	Charcoal	1610 ±110	n/a	AD 170-630	AD 436	Beta-28334	Slab-Lined Feature 14	Nielson 1998:7.2
42Ka2780		Seaman Wash	5400	Wood	1610 ±60	n/a	AD 292-572	AD 456	Beta-16079	FS7 Pithouse Timber	McFadden 2016:35
42Ka6160	Ravens Roost	Kanab Creek	4855	Zea Mays	1610 ±30	-8.2 AMS	AD 393-533	AD 463	Beta-368071	F21 Pithouse Hearth	Roberts 2018: Vol. 3: Chapter 2:7
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1580 ±30	-10.3 AMS	AD 415-545	AD 483	Beta-360454	2006.2 Pithouse Floor Pit	Roberts 2018: Vol. 3: Chapter 4:9
42Ka7715		Kanab Creek	5080	Charcoal	1570 ±30	-23.5 AMS	AD 421-553	AD 483	Beta-413697	Feature A House Floor	Patterson et al. 2016:44
42Ka4478		Kanab Creek	5115	Charcoal	1570 ±40	-23.5 AMS	AD 411-573	AD 486	Beta-252929	F9 Hearth	Nash 2013:33
42Ka1576	Indian Canyon Pictographs	Cottonwood Canyon	6120	Zea Mays	1570 ±70	-9.3 AMS	AD 340-620	AD 486	Beta-128986	Disturbed Fill on Surface	McFadden 2016:288
42Ka6165	Eagles Watch	Kanab Creek	4890	Zea Mays	1570 ±30	-9.6 AMS	AD 421-553	AD 483	Beta-362337	Locus 3 F1000 Pithouse Hearth	Roberts 2018: Vol. 4: Chapter 4:16
42Ka6164	Paint Pot Village	Kanab Creek	4850	Zea Mays	1550 ±30	-10.7	AD 428-574	AD 486	Beta-368068	Locus 2, F39 Cist	Roberts 2018: Vol. 3: Chapter 3:9
42Ka6163	Antechamber Site	Kanab Creek	4850	Zea Mays	1550 ±30	-9.2	AD 429-574	AD 487	Beta-362329	F39.1 Pithouse Hearth	Roberts 2018: Vol. 4, Chapter 1:13
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1550 ±30	-8.6	AD 428-573	AD 485	Beta-390952	Locus 3, F1400 Pithouse Hearth	Roberts 2018: Vol. 4: Chapter 4:16

Table 6.1 (continued)

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka4859	Road Kill	Kitchen Corral Wash	5620	Charred Material	1540 ±80	-25	AD 346-640	AD 508	Beta-167437	FS 71	McFadden 2016:296
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1530 ±30	-9.3	AD 433-595	AD 533	Beta-417359	Locus 3, F404 Floor	Roberts 2018: Vol. 4: Chapter 4:16
42Ws2195		Short Creek	5100	Charcoal	1520 ±60	n/a	AD 416-636	AD 535	Beta-28333	Pit Structure 3	Nielson 1998:7.2
42Ka6164	Paint Pot Village	Kanab Creek	4850	Zea Mays	1510 ±30	-10.6	AD 439-613	AD 560	Beta-368067	F19 Pithouse Floor	Roberts 2018: Vol. 3: Chapter 3:9
42Ka1796		Parunuweap Canyon	5760	Structure Wood	1510 ±110	n/a	AD 294-720	AD 530	Beta-6284	Pithouse	McFadden 2016:39
42Ka2574	Hog Canyon Dune	Kanab Creek	5073	Roof Beam	1500 ±60	n/a	AD 423-643	AD 555	Beta-8785	Aceramic Structure 1	Schleisman and Nielson 1987:48
42Ws2195		Kanab Creek	5100	Charcoal-Sand	1480 ±70	n/a	AD 423-657	AD 569	Beta-28330	Slab-Lined Cist F15	Nielson 1998:7.2
42Ka4859	Road Kill	Park Wash	5720	Charcoal	1480 ±60	-25	AD 433-650	AD 574	Beta-167441	Room 1 FS-205 Hearth Fill	McFadden 2016:63
AZ A:1:071 ASM		Short Creek	4941	Charred Material	1470 ±40	-13.2 AMS	AD 462-645	AD 594	Beta-169744	Slab-Lined Hearth	Berg et al. 2003:195
42Ka6165	Eagles Watch	Jackson Flat	4850	Zea Mays	1470 ±30	-9	AD 547-640	AD 596	Beta-362336	Locus 3, F1375 Pithouse Hearth	Roberts 2018: Vol. 4: Chapter 4:16
42Ka6165	Eagles Watch	Jackson Flat	4850	Zea Mays	1470 ±30	-25	AD 547-641	AD 595	Beta-390946	Locus 1, F1500 Pithouse Floor Zone	Roberts 2018: Vol. 4: Chapter 2:6
42Ka1969	Kanab Site	Kanab Creek	4820	Charcoal	1460 ±120	Uncorrected	AD 327-840	AD 576	RL-1398	Aceramic Midden	Nickens and Kvamme 1981:34
42Ka6165	Eagles Watch	Jackson Flat	4850	Zea Mays	1460 ±30	-10.8	AD 554-644	AD 604	Beta-368073	Locus 3, F575 Pithouse Floor	Roberts 2018: Vol. 4: Chapter 4:16
42Ka6293		Kanab Creek	5720	Charred Beam	1460 ±40	-20.3	AD 481-647	AD 601	Beta-252924	Ramada F2	Nash 2013:59

Figure 6.1: Early Basketmaker III radiocarbon dates from the Vermilion Cliffs region (northern Grand Staircase). The 95 percent probability ranges were obtained using the Behron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

Table 6.2

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka6163	Antechamber Site	Kanab Creek	4850	Zea Mays	1450 ±30	-8.7	AD 562-547	AD 613	Beta-362330	Locus 1, F9 Pithouse Floor	Roberts 2018: Vol. 4: Chapter 1:13
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1450 ±30	-10.2	AD 561-647	AD 612	Beta-360449	Locus 2, F2008 Pot on Pithouse Floor	Roberts 2018: Vol. 4:Chapter 3:11
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1450 ±30	-9.9	AD 560-646	AD 612	Beta-368075	Locus 3, F850 Pithouse Hearth	Roberts 2018: Vol. 4: Chapter 4:16
42Ka4280	Park Wash Site	Park Wash	5680	Wood	1450 ±40	-23.6	AD 543-651	AD 609	Beta-125911	F5 Pithouse Bench	Ahlstrom 2000:22
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1420 ±30	-13	AD 582-656	AD 629	Beta-368074	Locus 3, F1012 Pithouse Hearth	Roberts 2018: Vol. 4: Chapter 4:16
42Ka2574	Hog Canyon Dune	Kanab Creek	5073	Wood	1410 ±50	n/a	AD 555-688	AD 628	Beta-8784	Roof Beam Structure 1	Schleisman and Nielson 1987:48
42Ka4859	Road Kill	Park Wash	5720	Charcoal	1400 ±80	-25	AD 450-804	AD 634	Beta-167442	Room 1 FS-204 Hearth Fill	McFadden 2016:63
42Ka4859	Road Kill	Park Wash	5720	Charcoal	1400 ±60	-25	AD 537-755	AD 634	Beta-167444	FS-214 F41 Pit Fill, Room 2	McFadden 2016:63
42Ka1819	Trail Canyon Alcove	Kanab Creek	5920	Zea Mays	1390 ±70	-9.8	AD 484-770	AD 643	Beta-161896	FS2	McFadden 2016:289
42Ka2780		Seaman Wash	5400	Bone Collagen	1390 ±40	n/a	AD 585-697	AD 644	Beta-157843	FS-36 Pithouse Fill	McFadden 2016:35
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1360 ±30	-11.5	AD 628-751	AD 660	Beta-362335	Locus 3, F950 Pithouse Hearth	Roberts 2018: Vol. 4: Chapter 4:16
42Ka4309	Hog Canyon Alcove	Kanab Creek	5520	Zea Mays	1340 ±40	-12.3	AD 634-763	AD 675	Beta-194328	In Mortar	McFadden 2016:51
42Ka6293		Kanab Creek	5075	Charcoal	1340 ±40	-25.9	AD 633-763	AD 675	Beta-252925	Storage Cist 2 F4	Nash 2013:72
42Ka6293		Kanab Creek	5075	Zea Mays	1340 ±40	-9.8	AD 634-763	AD 676	Beta-252927	Roasting Pit 3, F7	Nash 2013:67
42Ka4859	Road Kill	Park Wash	5720	Seed	1340 ±40	-10.3	AD 632-763	AD 675	Beta-179631	F25 Hearth in F11 Room 2	McFadden 2016:63
42Ka4859	Road Kill	Park Wash	5720	Charcoal	1330 ±80	-25	AD 571-882	AD 703	Beta-167438	FS-105 F25 Hearth Room 2	McFadden 2016:63
42Ka6165	Eagles Watch	Kanab Creek	4850	Squash Seeds	1320 + 30	-10.9	AD 657-763	AD 685	Beta-360442	Locus 2 F45 Pithouse Floor	Roberts 2018: Vol. 4:Chapter 3:11
42Ka1499	Deer Creek Pictographs	Paria River	5400	Zea Mays	1310 ±40	-9	AD 656-774	AD 703	Beta-132378	Site Surface	McFadden 2016:45, 287

Figure 6.2: Late Basketmaker III radiocarbon dates from the Vermilion Cliffs region (northern Grand Staircase). The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

grouped around suspected pithouses. Ceramics were rare, consisting of North Creek Gray with no painted designs. In 1977, a pithouse in the central cluster was excavated, revealing a circular residence with an encircling bench, symmetrically placed roof support posts, a clay-rimmed central hearth, a clay floor, a stone slab alignment that partitioned part of the interior, and a shallow U-shaped antechamber. No sand-filled pits were noted in the floor. A cluster of 12 slab-lined cists was identified a few meters to the north of the pithouse. A radiocarbon sample from the outer rings of a post, presumably from the pithouse, yielded a date of 1510 ±110 BP (AD 530 median probability).

The best evidence of a transitional Basketmaker II-early Basketmaker III presence in the region comes from two sites in the Jackson Flat area along Kanab Creek, where radiocarbon dates on cultigens from carefully controlled contexts has allowed greater precision on architectural changes and site patterning through time. Excavations at the Antechamber Site, a cluster of three pithouses believed to have been occupied sequentially between AD 235 and 650, revealed evidence of increased architectural complexity through time as antechambers and interior benches were added to the pithouses. Only a few pieces of North Creek Gray pottery were observed, and researchers believed they might have been intrusive given that most of the site was aceramic. The bow-and-arrow was in use at this time as evidenced by the presence of Anasazi stemmed, Rose Spring, and Bull Creek points, although the latter type dates much later in this region. This suggested that bow-and-arrow technology was embraced prior to the widespread use of ceramics in the area (Roberts 2018).

The earliest Basketmaker III pithouses were deep and had well-plastered walls, slab-lined central hearths, and a four-post roof support system. Later in the period, antechambers were appended to the southeast edge of the pithouses, slab-lined benches encircled the interior of the living area, and the roof support system was modified to include posts around the perimeter of the bench.

On-site storage at the Antechamber Site was dominated by four large, circular, semi-subterranean cists that ranged in size from 2.5 meters to more than 3 meters in diameter. These featured a benched area on the southeast side, and in three instances, the interior walls and floors had been lined with thin stone slabs and then plastered. One additional structure was slightly bell-shaped, was entirely subterranean, and had a puddled-adobe roof. The storage features were not radiocarbon dated, but they suggested increased dependence on stored resources, and by inference, less seasonal mobility by some members of the group who would have remained behind during seasonal forays for hunting and foraging (Roberts 2018). Four radiocarbon dates between 1740 ±30 (AD 298 median probability) to 1450 ±30 (AD 613 median probability) represent continued use of the same location throughout the Basketmaker period.

A major Basketmaker III component was also identified at Eagles Watch, which also had a robust Basketmaker II presence. The Basketmaker III components at Locus 1 included seven pithouses (two of them large and deep), storage pits, and numerous extramural features. The pithouses were well defined, and some featured slab-lined walls and formal slab-lined fire pits. Ceramics were abundant. The assemblage was dominated by North Creek Gray, along with a few examples of Shinarump Gray and Boulder Gray. The presence of a few Mesquite Black-on-gray potsherds hinted at a later Basketmaker III occupation, whereas the presence of Parowan Basal-notched and Bull Creek points suggested a much later occupation, as well (Roberts 2018). Burned wood from one pithouse floor returned a radiocarbon date of 1470 ±30 BP (AD 595 median probability).

Locus 2 at Eagles Watch consisted of four additional Basketmaker III pithouses, five slab-lined storage cists, and various extramural features, all of which were assigned a temporal range of AD 550 to 720. In two instances, later Pueblo I pithouses had been constructed over the top of the earlier residences. Researchers noted distinct architectural changes over time. The earliest Basketmaker III pithouse was deep, and it had well-plastered walls, slab-lined central hearths, and a four-post roof support system typical of earthen lodges. Later in the period, ceramics were added to a minor degree, antechambers were appended to the southeast edge of the pithouses, slab-lined benches encircled the interior of the living area, and the roof support system was modified to include posts around the perimeter of the bench. Massive slab-lined storage structures were constructed late in Basketmaker II times, and these were modified and reused during Basketmaker III times (Roberts 2018). Maize on one pithouse floor returned a date of 1450 ±30 BP (AD 612 median probability) and squash seeds on the floor of another returned a date of 1320 ±30 (AD 738 median probability).

A large communal structure was added sometime between AD 420 and 560. It might have been used for ceremonies, social gatherings, and conflict resolution.

Locus 3, the largest of the Basketmaker III components, consisted of 12 pithouses, an unusual slab-lined structure interpreted as a kitchen with attached storage, and numerous small-to-very-large storage pits. Ceramics were dominated by North Creek Gray, along with a scattering of Washington Black-on-gray potsherds that suggested the site was also occupied in early Pueblo I times, something supported by two of the radiocarbon dates (Roberts 2018). Eight radiocarbon dates ranged from 1550 ±30 BP (AD 485 median probability) to 1360 ±30 BP (AD 660 median probability).

Late Basketmaker III radiocarbon dates from other sites are largely equivocal in that Basketmaker evidence is obscured by later Pueblo I and/or Pueblo II occupations. Basketmaker occupations are suggested by the presence of Mesquite Black-on-gray potsherds, whereas supporting radiocarbon dates are, in most instances, hampered by the potential that the charcoal samples represent the burning of old wood and/or reuse of construction beams. This appears to be the case at the Park Wash Site (Ahlstrom 2000) and the Road Kill Site (McFadden 2016), both of which had Mesquite Black-on-gray ceramics that hinted at an underlying Basketmaker III occupation.

In summary, the Basketmaker III presence in the Grand Staircase, once the problematic dates are removed from the dataset, is defined primarily by sites in the Kanab Creek area. Jackson Flat researchers (see Roberts 2018) summarized the Basketmaker evidence as follows:

- From 200 BC to AD 200, residential architecture was dominated by light, brush structures with conical roofs, probably summer field houses, although a couple of substantial pithouses were probably winter habitations. The most substantial was constructed about AD 130. Populations were sparse, pithouses were only loosely clustered, and there was a preference for bell-shaped storage pits. Six house structures dated to this period.

- From AD 250 to 550, the local population increased substantially, something accompanied by the appearance of very large slab-lined storage pits that became more conspicuous through time. Eleven pithouses dated to this period, some of which were shallow pithouses with unlined central hearths and postholes around the house perimeter. Others were larger and deeper, and sometimes they featured encircling benches, slab-lined hearths, and a four-post roof support system. Small triangular or V-shaped antechambers that served as entryways were added about AD 400. Ceramics are entirely absent at this time.

- An over-sized sub-rectangular pithouse, possibly a communal structure integrating the larger community, was added sometime between AD 420 and 560. It was 9 meters in diameter and had a floor 2 meters below the prehistoric ground surface (Figure 6.7). It had a steep, ramped entryway, a four-post roof support, floor vaults, and a bench. It might have been used for ceremonies, social gatherings, and conflict resolution. It was constructed next to a Basketmaker cemetery.

- By AD 550, larger populations were reflected in the increased size and greater clustering of pithouses, with as many as five occupied at the same time. Some of the storage pits reached massive proportions, suggesting larger populations and longer residency. The architectural traits evident in late Basketmaker II times continued with minimal change.

The dominant residence was a deep, earthen-style pithouse. Light brush structures were almost absent, suggesting settlement patterns had shifted from predominantly summer field houses to mostly winter residences in close proximity to the large storage pits. Grayware ceramics appeared in very small quantities. Eleven pithouses dated between AD 550 and 700.

The GSENM inventory data suggest there is an abundance of sites attributable to this period

Figure 6.7: This oversized pithouse at Eagles Watch was far larger than anything constructed before or after. It might have been a community structure used for religious ceremonies, conflict resolution, and social activities much as kivas did in later times. Photo: Brigham Young University

of time, especially in the Seaman Wash, Kitchen Corral Wash, and Park Wash areas. Our review of the state site database found that 90 sites might have Basketmaker III components based on the presence of vessel rims that were not flared or everted and/or the presence of Mesquite Black-on-gray. These include sites where the ceramics were identified as “Lino” or “Lino-like.” Of these 90 sites, 52 of them feature Basketmaker III ceramics without artifacts from later Formative occupations. Thirty sites had mixed artifact assemblages, eight of them representing occupations prior to AD 1050, and 22 after that time.

Regional Comparisons

Investigations at upland sites in the northern Grand Staircase have convincingly demonstrated that Basketmaker III groups were farming along permanent water sources like Kanab Creek and Short Creek and on the mesa tops, as evidenced by large sites on the canyon rims above Parunuweap Canyon and Seaman Wash. These sites are representative of multiple farming strategies, including stream diversion, floodwater manipulation, and dry farming. Residences had already assumed stylized characteristics of later pithouses in that they exhibited benches, predictable interior support posts, interior storage bins, and exterior slab-lined storage cists that foreshadowed later site layouts.

Similar farming strategies and site layouts have not yet been convincingly documented in adjacent upland environments in the southern Grand Staircase, although a number of Basketmaker III radiocarbon dates have been reported (see Table 6.3). Instead, the Basketmaker III presence here is represented by hunter-gatherer encampments, base camps used repeatedly throughout prehistory, and possibly granaries (residential sites in the Short Creek area are considered to be northern Grand Staircase under our organizational scheme). In fact, the only possible evidence of upland farming of the southern Grand Staircase at this time was found at the Little Jug Site (Thompson and Thompson 1974, 1978) discussed above.

In other words, the most convincing evidence of Basketmaker III farming adaptations is found along the base of Vermilion Cliffs and in


The Flats

Photo: Dan Bauer

drainages north of the Vermilion Cliffs. It is tempting to argue that the southern plateaus were used by northern groups for hunting and gathering purposes, but this is far too simplistic. There is a greater likelihood that Basketmaker III farming sites are present in the uplands south of the Vermilion Cliffs but these have not yet been investigated. Circumstantial evidence of this is found in several sheltered granaries in the lower Kanab Creek drainage where maize samples have returned Basketmaker III dates. If maize was being stored there, there is a good chance the residences are located nearby (Connie Reid, personal communication 2018).

Less convincing is the series of Basketmaker III dates from residential sites along the Colorado River (Miller 2005; Schwartz et al. 1980) and on the Shivwits Plateau (Allison 2010; Harry 2008). In those instances, the dates are inconsistent with the ceramic assemblages indicating Pueblo I and Pueblo II occupations. In fact, almost half of the Basketmaker III dates reported from sites in the southern Grand Staircase are from residential sites where they are probably "old wood" dates that do not accurately represent when the site was occupied.

Particularly intriguing is the comparative abundance of southern Grand Staircase radiocarbon dates associated with temporary camps, repeatedly occupied foraging and food processing camps, and at least one base camp. One radiocarbon date from Rock Canyon Shelter suggests this camp continued to be used for plant and small mammal procurement into Formative times much as it had in earlier Archaic times (Janetski et al. 2013). By comparison, none of the Basketmaker III radiocarbon dates from the northern Grand Staircase can be confidently assigned to hunting and foraging sites.

Basketmaker III occupations of lowland environments in the St. George Basin and lower Virgin River country were quite similar to those on the northern Grand Staircase, based on the frequency of radiocarbon dates. The nature of these sites, however, is quite different with lowland groups more tethered to permanent water sources along the Virgin River and its tributaries. In effect, there is little or no evidence of dry farming on mesa tops or floodwater manipulation in drainages without permanent water.

Typical of the lowland sites is Roadrunner Village, a large habitation and storage site located along the Virgin River that consisted of four pithouses, 23 storage cists, two firebox features, a midden, and a work area. Calibrated radiocarbon dates suggested occupations between AD 600 and AD 775; the dates were consistent with the projectile point styles and ceramic collections, although the black-on-gray types normally present on sites this late were virtually absent (Billat et al. 1992). Three older dates were reported, but these were dismissed as evidence of "old wood," although McFadden (2016:44) suggested "an earlier occupation on such a site, however, would not be surprising."

The Hurricane Ridge Site, located along the Virgin River near Grafton, featured Basketmaker III storage structures, but apparently no permanent residential structures. Buck and Parry (1999:479) reported eight radiocarbon dates with a calibrated average of AD 650. Additional evidence was reported from another site that featured lightly constructed "summer structures" associated with Basketmaker III storage cists, although two of the three radiocarbon dates were much earlier (Dalley and McFadden 1988). McFadden (2016) also suggested another site near Hurricane is a Basketmaker III site, although the radiocarbon dates support a Pueblo I occupation.

Collectively, the St. George Basin sites are indicative of farming groups living along the Virgin River who either planted crops along the river bank (sub-irrigation), a risky strategy in light of periodic flooding, or who diverted river flows onto floodplains where water could be redirected toward fields (irrigation), a strategy that involves diversion dams and irrigation ditches that have not yet been documented (Dalley and McFadden 1985).

In the lower Virgin River and Moapa Valley country, Roberts and Ahlstrom (2012:132) describe a late Basketmaker III presence with architectural characteristics "commonly found in contemporaneous (i.e., Basketmaker III) Virgin Puebloan pit-

Table 6.3

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
AZ C:13:384		Colorado River	Charcoal	1490 ±80	n/a	AD 404-662	AD 557	Beta-45828	Isolated Hearth	Hereford et al. 1993:11
AZ A:10:29 BLM		Shivwits Plateau	Charcoal	1480 ±70	-21.6	AD 423-657	AD 569	Beta-221400	Test Pit	Allison 2010:19
AZ A:16:1	Whitmore Wash Site	Colorado River	Charcoal	1450 ±145	n/a	AD 269-887	AD 584	GX-4994	Feature 2, Lower Midden	Grand Canyon-NPS Files
UN-14		Colorado River	Charred Post	1450 ±90	n/a	AD 418-755	AD 587	I-3046	NW Corner Surface Room 2	Schwartz et al. 1980:59
AR-0307-03-2623		Lower Kanab Creek	Zea Mays	1430 ±40	-9.6	AD 558-657	AD 620	Beta-284179	Shelter Surface	Kaibab NF Files
AZ A:10:24 BLM		Shivwits Plateau	Roof Beam	1390 ±50	-20.6	AD 568-752	AD 643	Beta-221396	Pithouse Roof Beam	Allison 2010:19
AR-030703-0327	White Man Cave	Lower Kanab Creek	Zea Mays	1390 ±90	-10.8	AD 446-857	AD 643	Beta-51395	Not Specified	Kaibab NF Files
AZ C:13:384		Colorado River	Charcoal	1390 ±90	n/a	AD 446-855	AD 645	AA-9525	Isolated Hearth	Hereford et al. 1993:11
AZ A:10:29 BLM		Shivwits Plateau	Charcoal	1370 ±70	-22.3	AD 543-824	AD 659	Beta-221397	Test Pit	Allison 2010:19
AR-030703-1500		Lower Kanab Creek	Zea Mays	1352 ±35	-9.6	AD 629-758	AD 666	AA-66729	Granary	Kaibab NF Files
UN-25		Colorado River	Rotted Post	1350 ±170	n/a	AD 346-1015	AD 691	I-3779	Storage Room Roof Material	Schwartz et al. 1980:59
UN-1		Colorado River	Rotted Post	1350 ±100	n/a	AD 469-917	AD 688	I-3040	NE Corner Surface Room 8/20	Schwartz et al. 1980:59

Table 6.3: Basketmaker III-age radiocarbon dates from the Arizona Strip region. All except the Kaibab National Forest maize dates and two charcoal dates from Grand Canyon forager camps are considered highly questionable. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

houses that are located on the plateaus that lie to the north of the Grand Canyon." Most ceramic and radiocarbon data from sites in the lower Virgin River-Moapa Valley region suggest that occupations were, with a few very minor exceptions, indistinguishable between about AD 650 and 1000. This homogeneity has prompted some researchers to describe this entire period simply as Basketmaker III/Pueblo I (see Ahlstrom 2008; Roberts and Ahlstrom 2012; Harry et al. 2008; Myhrer 1989; Roberts and Lyon 2011).

Different environmental variables would also have mandated different farming practices in the Virgin River-Moapa Valley region. Lyneis (1995:208) observed "the Moapa Valley is too far west to receive dependable summer rainfall that would bring maize to maturity," and that farmers by necessity would have relied on diverted river water or on floodwaters that overflowed the riverbanks onto the fields. A similar pattern has been suggested for the St. George Basin (Jenkins 1981), and given the propensity for summer flooding along permanent water sources in the Grand Staircase, the same strategy might have been practiced along Kanab Creek and Johnson Canyon, as well.

In summary, farmers were present throughout the Virgin Branch region during Basketmaker III times, although the southern Grand Staircase (Arizona Strip) is under-represented in the current dataset. These groups had shared preferences related to residential architecture and ceramics, but there were subtle differences. Pithouses with encircling benches, predictable roof supports patterns, central fire pits, and subfloor pits are common across the entire Ancestral Puebloan world at this time, and these groups all embraced grayware ceramics that differed only in terms of local tempering preferences.

In the upland Virgin Branch region, at least three farming strategies might have been practiced concurrently, and it is not clear from the existing database whether one type was preferred over others. Basketmaker III dry-farming of the mesa tops in upland settings is suggested by sites perched on cliff tops high above water sources. Thompson and Thompson (1974, 1978) have suggested the Little Jug Site near Mount Trumbull was oriented toward dry-farming at this time (and earlier). And survey data from Little Creek Mountain (Heid 1979, 1982) also support the idea of Basketmaker III dry-farming in that area.

Floodwater farming, as suggested by Matson (1991), has not been demonstrated by excavation data, but the large number of Basketmaker III sites in Finn Little Wash, Seaman Wash, and Kitchen Corral Wash, all drainages without permanent flowing water, support the possibility that intermittent flooding was manipulated onto fields along the canyon bottoms through various water control measures. Check dams, trincheras, and other water control features have not yet been documented in archaeological contexts in the Grand Staircase, although some have been found farther south in the House Rock Valley (McFadden 2004).

And manipulation of flowing water sources, either through diversion or floodwater overflows, might have been successful along Kanab Creek since Basketmaker II times, as evidenced by a long sequence of radiocarbon dates from Basketmaker II to Pueblo II times. This strategy might also have been effective in Johnson Canyon and along the Paria River, although the latter is notoriously difficult to control. In effect, multiple farming strategies would have minimized the risks associated with the failure of any single strategy.

Basketmaker III Iconography

Two rock art styles might be attributed to Basketmaker III times, although neither have been directly dated. Schaafsma indicated (1971:116-117) the Cave Valley Style "displays a complex of figures readily distinguishable from the Eastern Virgin Kayenta Style" that is characterized by anthropomorphic figures rendered in a wide variety of colors, including red, black, yellow, green, pink, and white (Figure 6.9). The dominant figures in these panels are large anthropomorphs that:

... may be larger than and somewhat dominant over the other figures in a given panel. In spite of having a triangular or tapering torso, this figure has characteristically a rather pudgy appearance. Arms and legs are generally short

Figure 6.9: Cave Valley Style figures are found throughout the Grand Staircase and upper Virgin River areas, usually along permanent water sources. This image is from Red Reef Shelter in the St. George Basin, the westernmost extension of this style yet documented. Photo: Jerry D. Spangler

and may occur as thick lines or be triangular in form. The depiction of the legs, which often extend at right angles from the body base, resembles the basal element noted on western Fremont anthropomorphs. Fingers and toes are shown in only a few instances, usually being absent altogether. Heads vary in shape from bucketlike to triangular or round.

Numerous Cave Valley rock art sites have been described in the Kanab Creek and upper Virgin River drainages (Castleton 1987), as far west as the Deer Creek tributary just above its confluence with the Paria River (Spangler and Zweifel 2012), and as far west as Red Reef in the St. George Basin (Spangler et al. 2020). Maize from one alcove near the confluence of Deer Creek and the Paria River produced a radiocarbon date of 1310 ±40 BP (AD 703 median probability). And wood from a small storage feature in another nearby shelter produced a radiocarbon date of 1250 ±30 BP (AD 738 median probability). Both dates support the idea of a late Basketmaker III-Early Pueblo I occupation of the Deer Creek confluence area where Cave Valley Style rock art is found. The association of the dates and the rock art remains tenuous.

The Snake Gulch rock art style is unique to the upland areas north of the Colorado River and south of the Vermilion Cliffs. Christensen et al. (2013) placed the beginning of the style at about AD 1, based on the depictions of what they interpreted as atlatls and darts, although corroborative chronometric evidence is largely lacking. The style exhibits remarkable similarities to Fremont styles in that anthropomorphs are trapezoidal, front-facing, and static, and they commonly depict highly detailed earbobs, necklaces, and feather headdresses on round or bucket-shaped heads. The depiction of scalps or trophy heads is a motif shared with the Fremont of northeastern Utah (Spangler 2002).

Most Snake Gulch Style images are centered on a prominent, highly stylized anthropomorph or pair of anthropomorphs that are sometimes up to a meter in height (Figure 6.10). Smaller images include other anthropomorphs, quadrupeds, and abstract designs were apparently placed in random fashion around the central figure. Motifs common to this style include "elbow feathers," flute players in supine positions, large water-fowl or turkeys, and hunting scenes. Some images are pecked or abraded, but most are painted in multiple shades of red, white, black, gray, yellow, and green (Christensen et al. 2013).

A Basketmaker II origin for this style cannot be dismissed entirely. Two Basketmaker II radiocarbon dates have been reported from the Snake Gulch region. Wood from one site returned a date of 1980 ±80 BP (AD 14 median probability), and matting from a sheltered storage area in the Indian Hollow area returned a date of 1675 ±75 (AD 368 median probability). There is no evidence the dated materials were associated with Snake Gulch Style images.

Given the abundance of granaries in the Snake Gulch area, it is also possible the rock art style can be attributed to more sedentary farmers beginning in late Basketmaker II and Basketmaker III times. The earliest maize dates in the area are samples dated to 1590 ±70 BP (AD 471 median probability) and 1390 ±90 BP (AD 645 median probability). Most of the Snake Gulch radiocarbon data come from storage sites that suggest farming activities during Pueblo I and early Pueblo II times.

Figure 6.10: The Snake Gulch Style of rock art is strikingly similar to Fremont rock art hundreds of miles to the northeast in the Uinta Basin. The style seems to be unique to the Arizona Strip. Photo: Kaibab National Forest

Snake Gulch Style images are probably present in GSENM, but they have yet to be identified as such on any of the Utah site forms.

Pueblo I: AD 700 to 900

Researchers have long struggled with definitions that describe changes in human behavior during that period of time when Southwestern populations shifted from primarily pithouse occupations to above-ground pueblos. Traditional organizational schemes have defined three sequential periods (Pueblo I, Pueblo II, and Pueblo III) with an implied progression from simple to complex (see Kidder 1927).

More recent research has emphasized the tremendous variability in adaptive responses, settlement and land-use patterns, and site structure through all three periods. Some discussions offer no distinctions between the Pueblo I period and early Pueblo II times, and others consider the late Pueblo II and Pueblo III periods to be coequal. Still others have resorted to more inclusive and temporally overlapping terms like "Developmental Pueblo" to describe the shift to surface masonry pueblos that occurred between AD 700 and 1000, and "Classic Pueblo" to describe population aggregations from AD 1000 to 1300 (Brody 1990). Collectively, this period of time can be characterized as a time of enhanced social, political, and economic complexity among some but not all groups. In general, the Pueblo periods can be characterized by a pan-regional pattern of population aggregations, dispersal, abandonment and, in some cases, reoccupation. As summarized by Brody (1990:110),

> *Despite the material evidence for greatly increased complexity of religious, political, economic and social systems, many of which were analogous to those of the historic pueblos, there are surprisingly few entirely original innovations. Water management systems were more sophisticated, but for the most part elaborated on earlier [Ancestral Puebloan] methods, and, while pottery and many other arts and manufactures burgeoned, these were mainly refinements and variations upon older themes and technologies. Similarly, the elaborate calendrical and ritual concerns evidenced by solstice markers and Great Kivas had much older prototypes. Virtually all the technological and intellectual aspects of Classic Pueblo culture appear to have had their origins in earlier ... practices.*

It should be noted that the beginning of the Pueblo I period in the Four Corners region is typically placed at about AD 750 (Hurst 1992; Lipe and Varien 1999a, 1999b; Wilshusen 1999b), whereas a Pueblo I beginning date of AD 700 has been proposed for the upland Virgin Branch (McFadden 2016), something supported by recent excavations at Jackson Flat. The Pueblo I period in the Southwest generally encompasses that period of time when some populations aggregated into large villages with integrating community architecture. Hurst (1992) sees the appearance of widely traded Abajo Red-on-orange as a convenient temporal marker denoting the beginning of this period. Population aggregations are also evident in the Grand Staircase, but without integrating community architecture.

"Natural settings for both large and small sites during Pueblo I are among the most exotic of any period" — Doug McFadden

Most of the defining traits of the Pueblo I period in the Four Corners were actually present during late Basketmaker III times. These included population aggregations into villages or hamlets, some of which featured defensive stockades, and the use of exceptionally large pithouses or kivas (see Varien et al. 1996; Wilshusen 1999b, 2006; Wilshusen and Ortman 1999). There was a continued preference for subterranean circular structures, but with the addition of contiguous above-ground storage units of true masonry that were joined together through accretion into blocks of rooms.

Plain-gray pottery was prevalent (Mancos Gray, Moccasin Gray, Kana-a Gray) that featured vessel necks decorated with a band of corrugations. Painted pottery appeared in the form of whitewares such as Piedra Black-on-white and Kana-a Black-on-white, and redwares such as Abajo Red-on-orange, Bluff Black-on-red, Deadman Black-on-red, and Abajo Polychrome. Agricultural intensification might have increased, as evidenced by terracing, irrigation, and field grids.

The distribution of known Pueblo I sites across the Four Corners area suggests a shift from middle-mesa locations utilized during Basketmaker III times to more upland settings above 6,000 feet elevation and into major drainages. A pronounced clustering of Pueblo I sites at higher elevations and along major drainages has been interpreted as responses to episodic droughts that rendered the lower and middle-elevation mesa tops unsuitable for farming (Hurst 1992).

These higher elevations, while featuring greater effective moisture, would have been susceptible to shorter growing seasons, with killing frosts later in the spring and earlier in the fall. Plog (1979) has also argued this period was the first to reflect political and economic alliances that linked diverse Ancestral Puebloan populations throughout much of the Colorado Plateau. As summarized by Brody (1990), the need for large and secure storage spaces, for mutual aid during lengthy periods of drought, and for cooperative labor forces encouraged development of ever larger communities and of alliances among neighboring groups.

Grand Staircase Pueblo I

Large-scale population aggregations have not yet been demonstrated for the high plateaus of the Grand Staircase region, although there were some smaller aggregations, and most certainly the spatial range of Pueblo I groups expanded. As McFadden (2016:143) observed, "Natural settings for both large and small sites during Pueblo I are among the most exotic of any period." These up-

Figure 6.11: Park Wash and Deer Spring Wash are ephemeral drainages that have flowing water in the spring but they are otherwise dry. Yet this area has one of the highest concentrations of Formative sites anywhere in the Monument, including some the largest pueblos yet documented in the region.

land settings often included isolated buttes or knolls that might have afforded protection, which would suggest increased competition for limited resources involving non-kin-related groups, perhaps in response to persistent droughts. An increased utilization of higher elevations with greater effective moisture is evident in the Grand Staircase at this time, but mid-elevation settings continued to be occupied (McFadden 1996).

Pueblo I sites range in size from nuclear family-sized units consisting of a pithouse with several storage cists, to extensive layouts of aligned storage features with detached pithouses to the south that might appear as aggregations of family-sized units. These aggregations were quite small compared to the villages found in the Four Corners region. The larger size might be attributed either to greater populations or sequential construction over the course of a 200-year period. For example, 17 Pueblo I pithouses were identified at two sites in the Jackson Flat area, but no more than six or seven were occupied at any one time (Roberts 2018).

Population aggregations were quite small compared to the villages found in the Four Corners region. For example, 17 Pueblo I pithouses were identified at two sites in the Jackson Flat area, but no more than six or seven were occupied at any one time.

Good examples of Pueblo I upland sites have been documented in Seaman Wash, Shinarump Bench, and Johnson Canyon in the Grand Staircase; Harris Mountain, Pipe Springs, and Yellowstone Mesa on the Arizona Strip; and on Little Creek Mountain above the upper Virgin River and its tributaries (McFadden 1996, 2016). Limited numbers of Pueblo I sites have been documented in the Paria Plateau, Kaibab Plateau, Walhalla Plateau, Shivwits Plateau, Mount Trumbull, and inner Grand Canyon areas, although these have been interpreted as short-term occupations or evidence of specialized activities rather than habitations (Fairley 1989).

Just as Hurst (1992) saw the appearance of Abajo Red-on-orange as a convenient marker for the beginning of the Pueblo I period in the Four Corners, McFadden (2016) sees the appearance of Washington Black-on-gray, as a convenient temporal marker for Pueblo I in the Grand Staircase. Recent evidence suggests this type might not have been produced locally, but rather it represents a trade ware from the St. George Basin (Roberts 2018). A Shinarump Whiteware analog has not yet been identified.

Washington Black-on-gray is a Tusayan Whiteware (Virgin Series) that features the same clay and sand temper characteristics as described above for North Creek Gray, but with easily identifiable designs that distinguish it from earlier and later types. This type is common in the Grand Staircase, especially at the Park Wash Site (Ahlstrom 2000).

Washington Black-on-gray shares a similar temporal range with Kana-a Black-on-white defined in the Kayenta region. Stylistically, however, Walling et al. (1986) and Shutler (1961) have described subtle differences between the two, and McPeek (2017) has argued the two types are actually very dissimilar. Olivine-tempered Boysag Black-on-gray is found in the western Virgin Branch region, although we found no references to it on GSENM site forms.

McFadden (2016) has also argued that certain architectural characteristics are also diagnostic of Pueblo I times. Pithouses with the characteristic bench and a peripheral post-support system continued during the Pueblo I period, whereas the shallow antechambers of Basketmaker III times were replaced by slab-lined vent

Table 6.4

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka4859	Road Kill	Park Wash	5720	Seed	1300 ±40	-11.6	AD 659-820	AD 710	Beta-179632	F21 Hearth in F15 Room 2	McFadden 2016:63
42Ka4859	Road Kill	Park Wash	5720	Seed	1300 ±40	-10.9	AD 660-814	AD 710	Beta-179633	F12 Isolated Hearth	McFadden 2016:63
42Ka1811	Nipple Alcove	Nipple Lake	5800	Wood	1290 ±50	n/a	AD 659-865	AD 723	Beta-109805	Adobe Rubble-Pithouse	Steward 1941; McFadden 2016:72
42Ka1695	Hell Dive Alcove	Cottonwood Canyon	6200	Zea Mays	1290 ±60	-10.4	AD 652-878	AD 731	Beta-150671	FS1 Granary	McFadden 2016:52
42Ws4208		Short Creek	4850	Charred Material	1290 ±90	-25	AD 597-949	AD 747	Beta-169743	Feature 1 Room 2 (Storage)	Berg et al. 2003:64
42Ws2722		Vermilion Cliffs	4760	Charcoal	1270 ±130	-25.0	AD 512-1009	AD 771	Beta-94771	Pithouse	James Allison, personal comm. 2018
42Ka3360		Rock Springs Bench	5940	Charcoal	1270 ±110	n/a	AD 585-986	AD 769	RL-2084	Vandalized Room	McFadden 2016:66, 292
42Ka5062	Maces Cave	Cottonwood Canyon	5730	Zea Mays	1270 ±30	-9.3	AD 675-836	AD 725	Beta-503044	Site Surface	State IMACS Form
AZ B:1:035	Carling Reservoir	Short Creek	5000	Wood	1250 ±80	n/a	AD 657-960	AD 775	Beta-33810	Pithouse Structure 12 Fill	Nielson 1998:7.1
42Ka5058	Riggs Cave	Cottonwood Canyon	5800	Wood	1250 ±70	n/a	AD 663-947	AD 769	Beta-140951	Twig in Adobe, Room 1(?)	Judd 1926; McFadden 2016:74
42Ka7151		Paria River	5340	Wood	1250 ±30	-24.7	AD 684-865	AD 738	Beta-317153	FS-1 Storage Cist	Spangler and Zweifel 2012:67
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1250 ±30	-10.8	AD 684-866	AD 738	Beta-360451	F69.3 Pithouse Hearth	Roberts 2018: Vol. 5: Chapter 3:14
42Ka5058	Riggs Cave	Cottonwood Canyon	5800	Wood	1250 ±70	n/a	AD 663-947	AD 769	Beta-140951	Twig in Adobe, Storage Room 1(?)	Judd 1926; McFadden 2016:74
AZ B:1:035	Carling Reservoir	Short Creek	5000	Wood	1250 ±80	n/a	AD 657-960	AD 775	Beta-33810	Pithouse 12 Fill	Nielson 1998:7.1
42Ka7151		Paria River	5340	Wood	1250 ±30	-24.7	AD 684-865	AD 738	Beta-317153	FS-1 Storage	Spangler and Zweifel 2012:67
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1250 ±30	-10.8	AD 684-866	AD 738	Beta-360451	F69.3 Pithouse Hearth	Roberts 2018: Vol. 5: Chapter 3:14
42Ka4280	Park Wash Site	Park Wash	5680	Zea Mays	1240 ±40	-11.2	AD 682-881	AD 766	Beta-131667	Pithouse Hearth	Ahlstrom 2000:37
42Ka4859	Road Kill	Park Wash	5720	Charred Seed	1230 ±40	-10.8	AD 687-886	AD 787	Beta-179630	F40 Hearth in F37 Profile	McFadden 2016:63
42Ka0110	Neaf Spring Alcove	Johnson Lakes Canyon	6200	Zea Mays	1220 ±70	-8.5	AD 674-966	AD 804	Beta-125910	Site Surface	McFadden 2016:290
42Ka1969	Kanab Site	Kanab Creek	4820	Artiodacty l Bone	1220 ±40	n/a	AD 692-907	AD 803	Beta-157845	Pithouse Midden	; McFadden 2016:289
42Ka6164	Paint Pot Village	Kanab Creek	4850	Zea Mays	1220 ±30	-10.3	AD 700-881	AD 806	Beta-362333	F55.1 Pithouse Hearth	Roberts 2018: Vol. 5: Chapter 1:11

Table 6.4 (continued)

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1220 ±30	-12.1	AD 700-881	AD 806	Beta-360445	F2024 Hearth in F26 Pithouse Fill	Roberts 2018: Vol. 5: Chapter 3:14
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1210 ±30	-10.3	AD 713-885	AD 818	Beta-360450	F2009.1 Pithouse Hearth	Roberts 2018: Vol. 5: Chapter 3:14
42Ws1365		Little Creek Mountain	5445	Charcoal	1210 ±50	n/a	AD 690-949	AD 814	Beta-10845	Pithouse FS14 F8 Fill	Barb Frank, personal communication. 2018
42Ka4859	Road Kill	Park Wash	5720	Charcoal	1210 ±70	-25	AD 676-971	AD 815	Beta-167443	FS-153 Cist 1 Fill	McFadden 2016:63
42Ka4860		Park Wash	5800	Wood	1200 ±40	-24.3	AD 704-940	AD 823	Beta-134478	Twig in Storage Structure Adobe	McFadden 2012:66
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1190 ±30	-11	AD 736-934	AD 832	Beta-390949	F2003 Activity Surface	Roberts 2018: Vol. 5: Chapter 3:14
42Ws2195		Short Creek	5100	Charcoal	1190 ±70	n/a	AD 688-982	AD 835	Beta-28335	Roasting Pit	Nielson 1998:7.2
42Ka6164	Paint Pot Village	Kanab Creek	4850	Zea Mays	1180 ±30	-10.6	AD 773-944	AD 838	Beta-362332	F23.1 Pithouse Hearth	Roberts 2018: Vol. 5: Chapter 1:11
42Ka6164	Paint Pot Village	Kanab Creek	4850	Zea Mays	1180 ±30	-10.5	AD 772-943	AD 836	Beta-362331	F49.2 Pithouse Hearth	Roberts 2018: Vol. 5: Chapter 1:11
42Ka6164	Paint Pot Village	Kanab Creek	4850	Zea Mays	1180 ±30	-10.7	AD 772-942	AD 838	Beta-362334	F35.1 Pithouse Hearth	Roberts 2018: Vol. 5: Chapter 1:11
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1170 ±30	-10	AD 776-956	AD 849	Beta-390945	F1200 Pithouse Hearth	Roberts 2018: Vol. 5: Chapter 4:6
42Ka1969	Kanab Site	Kanab Creek	4820	Turkey Bone	1170 ±40	n/a	AD 733-964	AD 853	Beta-157844	Pithouse Midden	McFadden 2016:289
42Ka6293		Kanab Creek	5075	Zea Mays	1170 ±40	-11.2	AD 734-965	AD 853	Beta-252926	Ramada F2	Nash 2013:59
42Ka8053		Parunaweap Canyon	5900	Rabbitbrush	1170 ±30	-23.8	AD 776-954	AD 849	Beta-416382	Granary Mortar	GSENM Files
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	1150 ±70	-25	AD 706-1008	AD 876	Beta-77111	Pithouse PS2 Floor Unit D	McFadden 2012:71
42Ka1811	Nipple Alcove	Nipple Lake	5800	Rabbitbrush Twigs	1150 ±40	n/a	AD 777-977	AD 887	Beta-109804	Pithouse Steward Room B	Steward 1941; McFadden 2016:72
42Ka6165	Eagles Watch	Kanab Creek	4850	Zea Mays	1150 ±30	-10.4	AD 780-969	AD 891	Beta-368072	F50.1 Pithouse Hearth	Roberts 2018: Vol. 5: Chapter 3:14
42Ka1504		Cottonwood Canyon	6000	Charcoal	1140 ±70	n/a	AD 713-1013	AD 889	Beta-26730	Pithouse Floor	Judd 1926; Tipps 1989:53
42Ws920		Little Creek Mountain	5720	Charcoal	1140 ±60	n/a	AD 729-1005	AD 890	Beta-18541	F-148 Pithouse	Barb Frank, personal communication 2018
42Ws920		Little Creek Mountain	5720	Charcoal	1130 ±70	n/a	AD 719-1015	AD 899	Beta-18539	F71 Kiva or Pithouse	Barb Frank, personal communication 2018
42Ka2594		Kitchen Corral Wash	5640	Charcoal	1130 ±120	n/a	AD 674-1147	AD 891	Beta-8422	Feature 1 Pithouse	Westfall 1985:112

Figure 6.4: Pueblo I radiocarbon dates from the Vermilion Cliffs region (northern Grand Staircase). The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

tunnels. Also added were unique floor features, including sand-filled pits sealed with floor clay. After AD 900, perhaps as late as AD 1050, changes in pithouse architecture were too conservative to be temporally diagnostic.

The distribution of Pueblo I sites suggests at least two separate settlement patterns. The dominant, or at least the most obvious pattern, was characterized by aggregations of residences atop knolls in environmentally optimal settings suitable for large-scale agriculture. The lack of integrating architecture at these sites, such as kivas or large communal structures, argues against increased social complexity that is commonplace in the Kayenta and San Juan Basin regions. The large late Basketmaker II-early Basketmaker III communal structure at Eagles Watch had long since been replaced by smaller pithouses.

The second pattern was less formal and possibly opportunistic in that it featured temporary use of widely dispersed small sites in a variety of settings. Among these sites were alcove storage locations with deep circular-to-oval slab-lined cists with masonry walls that buttressed the back of the slabs and extended well above them. Some were large enough to have functioned as temporary residences. Bedrock cists similar to those of Basketmaker II times were also used, but with the addition of masonry walls that encircled the top of the cist. McFadden (2016) suggested these were Basketmaker II cists that had been later modified.

The Pueblo I chronometric database for the northern Grand Staircase is comprised of 42 radiocarbon dates with median probabilities between AD 700 and 900. Several earlier dates are probably associated with Pueblo I occupations where Pueblo I groups were burning or reusing old wood, or they could reflect continuous occupation from late Basketmaker III times into Pueblo I times. And several of the Pueblo I dates might actually be indicative of early Pueblo II and late Pueblo II occupations (see Table 6.4 above). The Pueblo I dates were derived from farming sites in a broad array of mesa top and canyon bottom environmental settings, from the uplands of Little Creek Mountain on the west to Johnson Canyon on the east. The diversity of site settings is in sharp contrast to Basketmaker III times when the best evidence was found at sites along permanent water sources, primarily Kanab Creek.

McFadden (2016) has emphasized the predictability found in Pueblo I pithouse floor features, most of which are visible only upon excavation. Current excavation data from the Grand Staircase, however, suggest considerable variability in residential structures at this time. In fact, very few excavated sites have produced descriptions in line with a classic Pueblo I pithouse.

The evidence most consistent with McFadden's "classic" Pueblo I pithouses comes from the Park Wash Site, which consisted of slab uprights and a scatter of tabular sandstone indicative of storage cists randomly distributed across a ridge top. Two superimposed pithouses were identified in an adjacent roadway. A few North Creek Gray and Mesquite Black-on-gray potsherds were observed in association with the cists, which initially suggested a Basketmaker III occupation. Excavation of the pithouses, however, revealed Washington Black-on-gray ceramics and Pueblo I architecture (Ahlstrom 2000).

The lower pithouse was almost a meter deep and had been cut into bedrock. The interior of the structure featured a bench encircling the interior, but no antechamber or obvious means of entry. Numerous artifacts were found on the floor, including one- and two-handed manos, six to seven restorable jars, and several short-stemmed Rose Spring and/or Abajo points. Floor features included a shallow clay hearth and a poorly defined ash pit. An AMS date on a small wooden pole on the bench of the pithouse yielded a radiocarbon date of 1450 ±40 BP (AD 609 median probability), which probably represents reuse of older beams. Two pinyon timbers from this structure both yielded non-cutting dates of AD 725 (vv). These tree-ring dates provide a lower temporal limit for construction of the structure. McFadden (2016) argued the identical dates suggest that AD 725 is close to the actual construction date of the pithouse.

A second residential structure (F1) was a shallow, slab-lined and benched pithouse with a recess oriented to the southeast. It featured a narrow slab-lined vent tunnel and floor features that included a deep, straight-sided clay hearth, a shallow ash pit just inside the recess, and a series of three sand-filled pits, all arranged in an arc in front of the bench. Very few artifacts were found on the floor, although the upper fill of the structure contained Pueblo I ceramics. Charred maize from a hearth yielded an AMS date of 1240 ±40 BP (AD 766 median probability). This date was considered consistent with the Pueblo I architectural style and the Pueblo I ceramics (Ahlstrom 2000).

The Road Kill Site, located in the same Park Wash area, consists of lightly constructed summer residences abutting an alignment of seven or eight storage cists. A suite of 11 radiocarbon dates suggested continuous occupations from late Basketmaker III through Pueblo I times. This was supported by the ceramic evidence, which was mostly Washington Black-on-gray, but with some earlier Mesquite Black-on-gray and later St. George Black-on-gray (McFadden 2016).

The Pueblo I period in the Grand Staircase might have included a hostile incursion by groups from the southeast who brought different tools, trading networks, architecture, and mortuary practices.

Another site located on Rock Springs Bench consisted of a 15-meter-long alignment of slab-lined rooms. A midden and suspected pithouse were located to the southeast. A dense scatter of North Creek Gray and a few Washington Black-on-gray potsherds were observed. Charcoal from timber recovered in a looted room returned a radiocarbon date of 1270 ±110 BP (AD 769 median probability), a date McFadden (2016:66) believes "confirms the initial impression, based on architecture and ceramics, that the site was occupied during the Pueblo I period."

The Kanab Site, located along Kanab Creek, has long been considered a good example of an early Pueblo II residential site, based on the classic pithouse design and abundance of St. George Black-on-gray ceramics (Nickens and Kvamme 1981). A recent re-examination of animal bone collected from a midden, however, suggests an earlier Pueblo I occupation. Large mammal bone returned a radiocarbon date of 1220 ±40 BP (AD 803 median probability) and turkey bone returned a date of 1170 ±40 BP (AD 853 median probability). This prompted McFadden (2016:82) to argue "these new dates reinforce the long-term, multi-component nature of early Puebloan occupation along Kanab Creek."

Another site along Kanab Creek was described as a typical Puebloan farmstead with a pithouse, an alignment of storage cists, a ramada, roasting pits, and hearths. The pithouse was atypical in that it had no encircling bench or subfloor pits, but it did have a ventilator tunnel and wing walls or clay ridges that extended from the central fire pit to the structure walls. The predominance of St. George Black-on-gray ceramics, as well as tree-ring dates, suggested an early Pueblo II occupation, but the radiocarbon data indicated a much broader temporal span, with three dates in Basketmaker III times and one date of 1340 ±40 BP (AD 675 median probability) in Pueblo I times. This latter date is supported by the small amount of Washington Black-on-gray potsherds (Nash 2013).

The Pueblo I component at Paint Pot Village at Jackson Flat consisted of seven pithouses, a slab-lined cist with smaller appended cists, a midden, and various extramural pits and hearths. The pithouses were not all occupied at the same time, and in one instance the pithouse was reconstructed three times, each inside the other with the oldest of the three being a probable Basketmaker III pithouse. The next oldest pithouse, which was occupied between AD 690 and 890, contained a ventilator or passageway that extended from a detached antechamber. This structure burned in a catastrophic event while still in use (Roberts 2018). The last of the three occupations was a smaller pithouse that lacked a ventilator or antechamber, although it contained a series of small floor pits that are characteristic of the Pueblo I in this area.

The other three habitations were shallow structures with minimal complexity, one of which was probably a seasonal pole-and-brush structure. The presence of Mesquite Black-on-gray ceramics supported the idea of a late Basketmaker III presence, with continued use during the Pueblo I period, as evidenced by Washington Black-on-gray potsherds. Turquoise was also present. Four radiocarbon dates ranged from 1220 $\pm$30 BP (AD 806 median probability) to 1180 $\pm$30 BP (AD 838 median probability), reflecting a rather narrow temporal range that stands in contrast to what appears to be a long sequence of occupations.

Eagles Watch Locus 2 featured five pithouses, five slab-lined storage cists, a midden, and various hearths, pits, and activity areas. This area was occupied between AD 680 and 890, although one structure dated somewhat later. The slab-lined cists were constructed in earlier Basketmaker times and were remodeled during Pueblo I times. The pithouses exhibited new features, including detached antechambers connected to the pithouse by a long ventilator or passageway, floor ridges, and formal floor vaults, all of which reflect abrupt and dramatic changes in architectural style. Two of the pithouses were constructed over the top of older burned ones. There was a trend towards decreased complexity later in the Pueblo I period (Roberts 2018).

Ceramic artifacts included Tallahogan Redware, a Kayenta type that typically dates to the late Basketmaker III period, as well as Mesquite Black-on-gray and Washington Black-on-gray. Arrow point preferences had by this time shifted from Rose Spring to Parowan Basal-notched types, with the latter type becoming the dominant type between AD 680 and 870, or one or two centuries earlier than the AD 900 date typically assigned (cf. Justice 2002a, 2002b). Five radiocarbon dates from cultigens ranged from 1250 $\pm$30 BP (AD 738 median probability) to 1150 $\pm$30 BP (AD 891 median probability) (Roberts 2018).

Eagles Watch Locus 3 was the smallest of the Pueblo I components, with two pithouses and a complex of surface structures. Supporting evidence included Washington Black-on-gray and Parowan Basal-notched arrow points. A single radiocarbon date of 1170 $\pm$30 BP (AD 849 median probability) was reported from one of the pithouses. The pithouses were consistent with others in the general area in that they featured long, slab-lined ventilation tunnels, adobe-rimmed hearths, and wing walls extending from the hearth. As with Paint Pot Village, construction beams were harvested for use elsewhere (Roberts 2018).

The Jackson Flat data are considered more reliable because the dates were derived from cultigens rather than construction beams that might have been harvested from earlier structures. As discussed in Roberts (2018), the Pueblo I presence here stands in sharp contrast to earlier Basketmaker architecture and material culture, even if some of the constructed features of earlier times were modified and reused, and some of the earlier traits continued, such as benches on the pithouse interiors. Antechambers were "detached" from the main living area and connected to the pithouse by a passageway. Ventilators initially provided access, but later were used only for ventilation and possibly storage. Floor vaults and pits became common, the latter of which replaced the former late in the period.

The pithouses were arranged in clusters, maybe two or three at Paint Pot Village and four-to-six at Eagles Watch. Some of the pithouses might have been ritually closed: Floor features had been sealed with clay, ceramics were left around the hearth, ground stone was left at the entryway, and finished stone tools and bone artifacts were left on the floor, in the vaults, or on the benches. Antechambers were later used for burials.

Roberts (2018) suggested the Pueblo I presence at Jackson Flat represented an actual population intrusion from the Kayenta region based on the following factors:

- New architectural features, such as detached antechambers, floor vaults, and floor ridges, constituted additions without local antecedents. They had appeared in the San Juan and Kayenta regions in late Basketmaker III times.

- Pueblo I structures were associated with new types of artifacts, in particular Parowan Basal-notched points, turquoise, and Tallahogan Redware, the latter of which has been defined in the Kayenta region and is extremely rare north of the Colorado River.

- One and possibly two Basketmaker III sites were destroyed by fire while still occupied, and these were replaced by Pueblo I pithouses. This appears to have been a hostile act.

- The shell and mineral acquisition patterns shifted from California and the Great Basin, which had characterized earlier occupations, to Arizona and Baja California in Pueblo I times. Obsidian was dominated by the RS Hill and Partridge Creek sources near Flagstaff, and turquoise found in southern Arizona became common place.

- Mortuary practices changed from multiple primary and secondary burials in a cemetery area in Basketmaker times to single, primary inhumations in Pueblo I times.

- Turquoise, pottery, and ground stone became typical mortuary offerings, and cranial modification was practiced for the first time. There appears to be an increased trend from attained or earned status in Basketmaker times to inherited status in Pueblo I times, as evidenced by abundant exotic artifacts with burials of children.

A robust Pueblo I presence has also been documented in the Short Creek and Little Creek

Figure 6.12: In the Grand Staircase region, current evidence suggests turkeys were domesticated by late Pueblo I times. Rock art images that seem to depict turkeys and turkey tracks are fairly common.

Mountain areas. As discussed in Chapter 4, considerable evidence of Basketmaker II occupations was documented in the upper Short Creek area near Hildale and Colorado City (Berg et al. 2003; Naylor 1996; Nielson 1998), but there was comparatively less evidence for a subsequent Basketmaker III occupation. This seems to have changed in Pueblo I times with a proliferation of sites with distinctive Washington Black-on-gray ceramics associated with an arc of contiguous storage cists and a pithouse that are all consistent with a traditional Pueblo I and Pueblo II site layout. Three pithouse sites have produced radiocarbon dates between 1290 $\pm$90 BP (AD 747 median probability) and 1190 $\pm$70 BP (AD 835 median probability). These sites all continued to be occupied through early Pueblo II times, as evidenced by radiocarbon dates and St. George Black-on-gray ceramics.

Dry-land farming of upland mesas is represented by small pueblos in the Little Creek Mountain area where excavations at one site revealed a roomblock and pithouse with a typical Pueblo I-Pueblo II layout (Lyneis and Thompson 1979; Heid 1979, 1982). The pithouse featured a bench encircling the interior of the structure, a central clay-rimmed fire hearth, a tunnel entryway or ventilator, a vault aligned with the fire hearth, and five subfloor pits or bins that had been filled with sterile sand and sealed with floor clay. Charcoal recovered at floor level returned a radiocarbon date of 1210 $\pm$50 BP (AD 814 median probability), which was consistent with the ceramics. The pithouse here was most similar to the superimposed pithouses at the Park Wash Site, although the environmental setting was quite different.

In summary, the existing chronometric database suggests a significant and apparently widely dispersed Pueblo I presence in the northern Grand Staircase region, although no single settlement pattern predominated. Some open pithouses had formalized characteristics consistent with pithouses elsewhere (Ahlstrom 2000), but the suite of expected residential features is notable incomplete at other sites (Nash 2013; Westfall 1985). The construction of permanent architecture in large alcoves, such as Nipple Alcove and Riggs Cave, suggest residential choices were variable. The Pueblo I settlement pattern exploited both open and sheltered settings at lower elevations (4,820 feet at the Kanab Site) and in higher canyon environments (5,800 feet at Riggs Cave). Pueblo I sites are found along permanent waterways, such as Kanab Creek and the Paria River, as well as in areas without permanent water, such as Kitchen Corral Wash and its tributaries. And some are found on buttes and mesa tops with difficult, or at least inconvenient access.

Pueblo I Rock Imagery

Iconographic expressions throughout the greater Ancestral Puebloan world experienced fundamental changes during Basketmaker III to Pueblo I times, not so much in "style" as in compositional qualities. As discussed by Cole (2009:173), "it is likely that the role of rock art shifted from a (probably the) primary method of graphic group communication during Archaic and Basketmaker II times to one of several choices available to communities of hamlets and villages." Earlier rock art sites continued to be used, and there is continuity in imagery, but "powerful places" like springs, shrines, and ancestral villages assumed greater importance as rock art imagery served to reinforce oral traditions and connect the past to the present. Motifs that appeared or assumed greater importance in the pantheon of Ancestral Puebloan imagery at this time include realistic humans with horned and feathered headdresses, processions of backpackers, slender flute players, pendant-like images, and handprints, footprints, and sandal forms, as well as abstract and geometric designs that are similar to designs on pottery, basketry, and textiles.

As mentioned earlier, the Cave Valley Style is believed to be associated with late Basketmaker III or early Pueblo I occupations in the region. This style features stocky, triangular anthropomorphs that are fundamentally different from later Ancestral Puebloan. These images, usually painted, feature static, broad-shouldered figures with flat heads, dotted crowns, and earrings, and occasionally triangular pendants and hair bobs (Cole 2009; Schaafsma 1971). In other words, they are noticeably different than traditional Ancestral Puebloan images.

Figure 6.13: Sketch of Ancestral Puebloan rock art at a Pueblo I site along the Paria River very near to Cave Valley Style images. These images are dramatically different than the Cave Valley Style (compare to Figure 6.9 above), suggesting Cave Valley images are unrelated to the Pueblo I expression here. Image: CPAA

If the late Basketmaker III-Pueblo I age estimates are accurate for this style, then Cave Valley Style images should also be found in close proximity to archaeological features that are also diagnostic of the same period. Potentially relevant to this discussion is a site along the Paria River that is a typical Pueblo I hamlet with suspected pithouses, contiguous storage cists, and other features situated around a prominent butte. Washington Black-on-gray potsherds were present, but they were not especially abundant. There is also no surface evidence of any earlier or later occupations (Spangler and Zweifel 2012).

This site is also relatively close to the Deer Creek confluence sites with Cave Valley images. But the rock art at this Pueblo I hamlet site does not share any affinities with the Cave Valley Style. Instead, the images depict a series of parallel lines, globular shapes, and stick-figure anthropomorphs and quadrupeds that are more characteristic of later Pueblo styles (Figure 6.13). Given that the site appears to be exclusively a Pueblo I occupation, and based on our assumptions that rock art served as a means of group communication, several possibilities should be considered:

- Pueblo I rock art is stylistically unrelated to Cave Valley Style rock art found nearby, and therefore the Pueblo I imagery represents stylistic continuity with later Puebloan iconography but not earlier forms.

- Cave Valley Style images predate the Basketmaker III-Pueblo I period, or they are representative of different groups with different iconography.

- The rock art images at the Paria River hamlet site represent pilgrimages to an "ancestral village" by subsequent generations to reinforce their oral tradition, and therefore the images found there are temporally unrelated to the Pueblo I occupation.

- Pueblo I peoples embraced multiple rock art styles at the same time, perhaps as a means to maintain separate group identities.

Regional Comparisons

What appears to be an increase in Pueblo I occupations in the northern Grand Staircase region, based on an increase in the number of radiocarbon dates, might be biased by the fact that a few sites produced multiple dates. But the regional chronometric data also point to an increase in Pueblo I occupations in the adjacent uplands of the southern Grand Staircase, where at least 25 radiocarbon dates have now been reported for this period of time (see Table 6.5). These sites appear to reflect a variety of residential activities associated with upland farming, especially on the Shivwits Plateau, as well as foraging camps that are quite rare in the northern Grand Staircase at this time.

Dryland farming of the southern high plateaus of the Arizona Strip probably started during Basketmaker III times, but it became much more conspicuous in Pueblo I times.

Whereas the northern Grand Staircase sites are primarily pithouses and granaries, the upland sites to the south and west appear to reflect a much broader range of Pueblo I activities in a variety of different environments. There are upland hamlets on Little Creek Mountain (Lyneis and Thompson 1979; Heid 1979, 1982; Landon 2010) and the Shivwits Plateau (Allison 2010; Harry 2008) where dry-farming would have been required.

Farmers also settled in narrow canyon tributaries to lower Kanab Creek (Reid and Betenson 2010) and along the north bank of the Colorado River (Jones 1986b; Schwartz et al. 1980), something that would have required increasingly sophisticated floodwater control measures to direct runoff from convectional thunderstorms to fields on the nutrient-rich alluvium along the river and canyon bottoms. And foraging appears to have continued unabated, as evidenced by temporary camps along the Colorado River (Hereford et al. 1993) and continued use of Rock Canyon Shelter and Antelope Cave base camps in the lower Short Creek country (Janetski et al. 2013).

In the Hidden Hills area of the Shivwits Plateau, Allison (2010) identified six Pueblo I occupations, an assessment supported by a series of radiocarbon dates, ceramics, and distinctive blocks of rooms in a typical Pueblo I pattern. Even though water is scarce there, the occupations appear to have been intense, resulting in large sites and massive middens. The predominance of Moapa Series ceramics suggested these occupations were oriented toward the Las Vegas region rather than the Kanab area.

In the Mt. Dellenbaugh area of the Shivwits Plateau, Harry (2008, 2013) also documented a robust dry-farming adaptation with typical Pueblo I architectural configurations and ceramics. At the Lava Ridge Site, the pueblo also featured either an unusually large residence or a communal structure, suggesting these sites were much more complex than mere summer field houses.

Permanent residential sites in the rugged canyon tributaries to lower Kanab Creek are poorly represented. One exception is an open residential site in White Pockets Canyon exposed by a wildland fire. Limited testing revealed a minor amount of late Pueblo II ceramics, although the flaring of jar rims also suggested a late Basketmaker III or early Pueblo I occupation. One charcoal sample recovered just above a plain gray pot returned a date of 1210 ±40 BP (AD 805 median probability) and another from just below the pot returned a date of 1220 ±40 BP (AD 814 median probability), or well within the Pueblo I time period (Reid and Betenson 2010).

Current models for the upland Puebloans have emphasized the predominant role of agricul-

Table 6.5

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
AZ A:10:24 BLM		Shivwits Plateau	Charcoal	1300 ±60	-20.8	AD 644-873	AD 723	Beta-221394	FS 417 Test Pit	Allison 2010:19
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	1290 ±70	n/a	AD 635-911	AD 738	Beta-130605	F10, Unit 2, Level 3 Hearth	Miller 2005:94
12-034	Petes Pocket	Shivwits Plateau	Charcoal	1280 ±30	-21.9	AD 671-781	AD 718	Beta-335807	F6, Test Unit 1, Semi-Sub. Room Fill	Harry 2015:23
AZ A:3:20 BLM	Rock Canyon Shelter	Uinkarets Plateau	Pooled Charcoal	1270 ±60	n/a	AD 662-888	AD 746	Beta-14602	Hearth 4	Janetski et al. 2013:126
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	1270 ±60	n/a	AD 660-893	AD 746	Beta-130613	Feature 26 Slab-Lined Cist	Miller 2005:94
AZ A:14:050	Lava Ridge	Shivwits Plateau	Juniper Seed	1270 ±40	-20.4	AD 670-863	AD 732	Beta-255311	Feature 24 Semi-Sub. Storage	Harry 2008: Appendix B
AZ A:3:1 ASM	Antelope Cave	Uinkarets Plateau	Yucca Sandal	1241 ±36	n/a	AD 684-876	AD 762	AA-80803	MNA Collection	Yoder 2013:120
AZ A:3:1 ASM	Antelope Cave	Uinkarets Plateau	Yucca Sandal	1237 ±42	n/a	AD 683-882	AD 772	AA-80801	MNA Collection	Yoder 2013:120
AZ A:10:25 BLM		Shivwits Plateau	Zea Mays	1230 ±40	-11.1 AMS	AD 687-888	AD 786	Beta-271567	F172 Test Pit	Allison 2010:19
AZ A:3:1 ASM	Antelope Cave	Uinkarets Plateau	Yucca Sandal	1228 ±36	n/a	AD 690-882	AD 792	AA-80802	MNA Collection	Yoder 2013:120
AR-030703-355		Lower Kanab Creek	Charcoal	1220 ±40	-20.3	AD 692-901	AD 805	Beta-257504	Pithouse Unit 2 Level 6 Under Pot	Reid and Betenson 2010:37
12-034	Petes Pocket	Shivwits Plateau	Charcoal	1220 ±30	-22.2 AMS	AD 699-881	AD 806	335808	Feature 5, Test Unit 2, Room Fill	Harry 2015:22
AR-030703-355		Lower Kanab Creek	Charcoal	1210 ±40	-20.7	AD 698-933	AD 814	Beta-257503	Unit 2 Level 4 39-42 BGS Above Pot	Reid and Betenson 2010:37
AZ C:13:010	Furnace Flats Site	Colorado River	Carbon	1210 ±40	n/a	AD 698-933	AD 814	Beta-180467	West of Feature 49, Aeolian Deposits	Grand Canyon-NPS Files
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	1200 ±50	n/a	AD 695-955	AD 822	Beta-130612	Feature 25 Slab-Lined Cist	Miller 2005:94
AZ C:13:384		Colorado River	Charcoal	1190 ±90	n/a	AD 673-1005	AD 836	Beta-45826	Isolated Hearth	Hereford et al. 1993:11

Table 6.5 (continued)

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
AZ A:3:1 ASM	Antelope Cave	Uinkarets Plateau	Zea Mays	1190 ±110	n/a	AD 659-1046	AD 837	A-3510	Stratum 3 Test 5	Janetski et al. 2013:24
AZ A:10:24 BLM		Shivwits Plateau	Zea Mays	1170 ±40	-10.7 AMS	AD 734-964	AD 853	Beta-271564	F822 Test Pit	Allison 2010:19
AZ A:14:050	Lava Ridge	Shivwits Plateau	Charcoal	1170 ±40	-21.8 AMS	AD 739-966	AD 855	Beta-250685	Feature 8 Residence-Communal	Harry 2008: Appendix B
AZ A:3:1 ASM	Antelope Cave	Uinkarets Plateau	Cob/Sandal Fragment	1160 ±100	n/a	AD 678-1086	AD 862	A-3511	Stratum 2 Test 5	Yoder 2013:120
AR-030703-1049	Big Granaries	Colorado River	Plant Material	1160 ±80	-20.9	AD 690-1012	AD 864	Beta-52396	n/a	Kaibab NF Files
AZ A:10:24 BLM		Shivwits Plateau	Zea Mays	1160 ±40	-10.8 AMS	AD 771-971	AD 871	Beta-271566	F918 Test Pit	Allison 2010:19
AZ A:14:050	Lava Ridge	Shivwits Plateau	Mixed Plants	1160 ±40	-21.2 AMS	AD 769-970	AD 868	Beta-255310	Feature 8 Residence-Communal	Harry 2008: Appendix B
UN-1		Colorado River	Rotted Post	1140 ±90	n/a	AD 696-1090	AD 883	I-3042	NE Corner Feature 35	Schwartz et al. 1980:59
AZ B:16:424		Bright Angel Creek	Charred Material	1140 ±50	-24 AMS	AD 771-995	AD 896	Beta-147225	Roasting Pit	Grand Canyon-NPS Files

Table 6.5: Pueblo I radiocarbon dates from the Arizona Strip region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

ture in local lifeways to the near exclusion of wild plants and animals. In fact, foraging base camps have not yet been documented in the northern Grand Staircase region (McFadden 2016). The importance of wild plants and animals to the overall diet is debatable, although pollen and macrofloral analysis of upland agricultural sites in the Short Creek (Berg et al. 2003; Nielson 1998), Kanab Creek (Nash 2013; Patterson et al. 2016), and Little Creek Mountain (Landon 2010) areas all identified wild plant remains.

Exploitation of wild resources was also unmistakable at Rock Canyon Shelter and Antelope Cave, both in the extreme lower Short Creek area, which have collectively produced six Pueblo I radiocarbon dates. In fact, the highest intensity occupations of Antelope Cave occurred during Pueblo I times (Janetski et al. 2013). These data suggest that some subsistence activities evident in Archaic times, such as communal rabbit drives, continued to be important in Puebloan times, and these later activities could represent procurement of resources that were otherwise not abundant enough at home-base pueblos (e.g., rabbit skins for blankets, cordage, and clothing).

In summary, upland sites attributed to the Pueblo I period represent adaptations to a wide variety of environmental settings, including pinyon-juniper forests of the plateaus above the Vermilion Cliffs; riparian environments along Kanab Creek, Short Creek, and the Paria River; and floodplains along the Colorado River. Heid (1982), using inventory data from Little Creek Mountain, suggested a shift in settlement patterns from the mesa rims to the central mesas during Pueblo I times.

Fairley (1989:121) interpreted the cumulative data as possible evidence of fall-winter occupations of upland environments followed by a spring-summer occupation of lower-elevation sites adjacent to river bottoms. She suggested,

Although a winter upland, summer lowland settlement pattern might seem inconsistent with annual climatic patterns, it makes sense in terms of maximizing subsistence output and the seasonal availability of critical resources such as fuel and water. Wintering in the wooded uplands provides protection from the weather and an abundant, handy supply of fuel wood; potable water is no problem at this time of year since snow can be melted, and natural catchments are constantly replenished. Movement to the valley bottoms in early spring, after the winter food supply has been exhausted, provides a ready supply of spring greens and water to tide the population over through the spring drought.

This model is similar to that proposed by Geib et al. (1987) for the Glen Canyon region and by McFadden (2016) for the Fremont in the Escalante River Basin. If the Virgin Branch Puebloans in the St. George Basin employed a similar strategy,

Figure 6.14: This image, located in a tributary to the Paria River, is thought to date to Basketmaker III or Pueblo I times. Photo: Jerry D. Spangler

then the upland sites on Little Creek Mountain might represent winter occupations by farmers of the Virgin River country, who returned to the river bottoms in the spring (Dalley and McFadden 1985).

Pueblo I settlement patterns in the St. George Basin appear similar if not identical to those of earlier Basketmaker III times. Farming populations were largely tethered to permanent water sources with arable floodplains, and because such environments are spatially limited, residential activities continued to be focused on those locations. Dalley and McFadden (1985:158), drawing on excavation data from the Red Cliffs Site, observed that it is impossible to practice agriculture in this area without access to manageable water, which is why Ancestral Puebloan sites are always "located along the perennial water courses and essentially nowhere else."

Differences between Basketmaker III and Pueblo I sites in the St. George Basin are defined mostly by subtle changes in architectural forms and ceramics rather than substantive changes in adaptive strategies. Most Pueblo I activities were centered on a pithouse with standardized internal features such as encircling benches, ramp entryways, central fire pits, predictable roof support patterns, and interior bins and floor pits. External site patterns included rows of storage cists attached to or in close proximity to the pithouse (Billat et al. 1992; Dalley and McFadden 1985, 1987; Walling et al. 1986).

Pueblo I settlement and architectural patterns in the lower Virgin River country were identical to those observed in earlier Basketmaker III times, and like the St. George Basin, there was a tethering to permanent river systems. Researchers in that region frequently conflate those two periods of time, noting minimal differences over a period of 500 or 600 years (Roberts and Ahlstrom 2012; see also discussion above under Basketmaker III).

Architectural patterns in the Grand Staircase are quite similar to those observed in the St. George Basin and lower Virgin River regions in that they exhibit continuity from Basketmaker III to early Pueblo II times. Older structures were remodeled, repaired, and re-floored, and new structures were added, often using the construction timbers from older structures. A greater variety of environments on the Grand Staircase, however, might have allowed greater movement of populations within ecotones in response to changing climates. Some groups remained tethered to Kanab Creek, Short Creek, and the Paria River, much in the same manner that contemporaneous groups were tethered to the Virgin River and Muddy River. But other upland groups might have moved between different environmental niches, perhaps responding to drought by moving to higher elevations, or to soil nutrient depletion by shifting their farms to a different part of the same microenvironment. In short, the uplands afforded more and better opportunities to respond to less-than-optimal farming conditions.

Early Pueblo II: AD 900 to 1050

The Pueblo II period has been divided by some researchers, including many in the Virgin Branch region, into an early Pueblo II from about AD 900 to 1050, and a later period from AD 1050 to 1150 (cf. Roberts and Ahlstrom 2012; Lipe and Lekson 1990; Lipe and Varien 1999a; Lyneis 1995; McFadden 2016). The early Pueblo II, as used throughout the Four Corners region, is merely an organizational convenience to discuss Ancestral Puebloan adaptations leading up to the onset of unprecedented socioeconomic complexity that accompanied the Chaco Phenomenon in the San Juan Basin with its highly recognizable accoutrements, including great houses, great kivas, and road networks.

Early Pueblo II sites are rare in the Four Corners region, whereas late Pueblo II sites are abundant (Matson et al. 1990), and some researchers have suggested a population dispersal at the end of Pueblo I times (Lipe and Varien 1999a). Early Pueblo II habitation sites usually consisted of one or two unit-type pueblos that included a kiva, a small number of associated surface rooms of jacal or masonry construction, an occasional small pit structure used as a food processing room, and a trash midden. These unit pueblos are typically dispersed, and they occur in isolation or are loosely clustered.

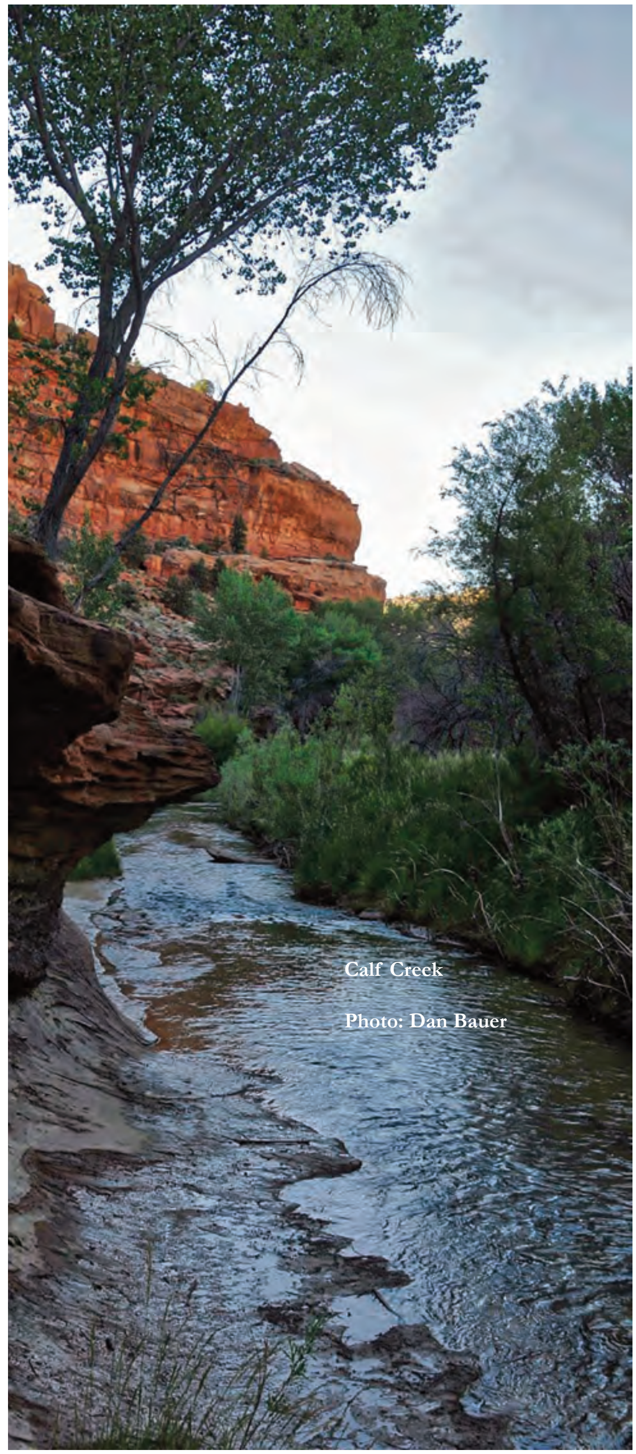
In general, the early Pueblo II period in the Four Corners is less conspicuous than the earlier Pueblo I period, which featured major population aggregations at high elevations and along permanent waterways. From about AD 1000 to 1050, communities throughout the Four Corners began to exhibit greater clustering, and some were large, foreshadowing major changes in social structure that emerged about AD 1050 (Lipe and Varien 1999a).

Grand Staircase Early Pueblo II

Major Pueblo I population aggregations evident in the Mesa Verde and Kayenta regions have not yet been documented in the Grand Staircase or anywhere else in the Virgin Puebloan world, and hence there was no discernible population dispersal at about AD 900. Instead, site structure remained the same throughout the Basketmaker III to early Pueblo II sequence, characterized by one or two pithouses and occasionally small hamlets with three or four pithouses, all associated with storage features attached to or in close proximity to the residences. This did not change markedly during early Pueblo II times. In fact, the transition from Pueblo I to early Pueblo II was marked by only subtle changes.

As discussed by McFadden (2016:148), storage architecture during this period shifted from deep cists to shallow, rectangular slab-lined units, often with jacal superstructures. These storage rooms were contiguous, but were constructed separately without common walls, and the roomblocks were created through accretion. Residential rooms were not incorporated into the roomblock during this period, but sheltered work areas were. Pithouses remained the primary residential form, and they were typically located to the south of the roomblock or adjacent to the end of the roomblock. Pithouse architecture exhibited a four-post support system for the superstructure, along with a pit outline that was more quadrilinear than round. The slab-lined ventilator shaft was replaced in some instances by a small bulbous recess, but "the distinctive pattern of floor features that first appear during Pueblo I are identical during the early Pueblo II period, a continuity that persists for over three hundred years."

Although early Pueblo II sites are rare in the Four Corners region, this does not appear to be the case in the Grand Staircase, where such sites are relatively abundant (>100 sites in GSENM alone), and several of these sites have been excavated (Nash 2013; Nickens and Kvamme 1981; Patterson et al. 2016; Walling and Thompson 2004), contributing



Calf Creek

Photo: Dan Bauer

significantly to the concept of continuity. As discussed by McFadden (2016:149), "the Early Pueblo II Period may be viewed as the end of a long conservative sequence that began during Basketmaker times and was largely unaffected by people and events south of the Colorado River until sometime after A.D.1050/1100."

Distinguishing early Pueblo II architecture based on surface evidence alone is rather futile, although diagnostic artifacts visible on site surfaces can assist in these identifications. These include St. George Black-on-gray ceramics and a distinctive everted rim form on plain gray jars. Traditionally, the proliferation of Parowan Basal-notched arrow points is seen as a hallmark of the early Pueblo II. As we discussed above, this point type, which might be modifications of earlier point types rather than a sudden appearance of a new type, actually appeared in Pueblo I times.

The most visible diagnostic specific to this period is St. George Black-on-gray, a Tusayan Whiteware (Virgin Series) that is ubiquitous throughout the Grand Staircase. Trumbull Black-on-gray of the Moapa Whiteware series and Wahweap Black-on-gray of the Shinarump Whiteware series appear at this time, although the latter is extremely rare, and McFadden (2016:148) argues Shinarump pottery "rarely, if ever, has painted designs" at this time.

All of these local whitewares are considered analogous to the Black Mesa Black-on-white of the Kayenta region, which has a temporal range of AD 900 to 1160, or well into late Pueblo II times. The same North Creek Gray and Shinarump Plain graywares of earlier periods continue to dominate ceramic assemblages, although the jar rims are everted or extremely flared, allowing for easier temporal assignations during field inspections.

St. George Black-on-gray features the same compositional qualities as other Tusayan Whitewares (Virgin Series), the only difference being the emergence of bolder designs, often with checker-

Figure 6.16: Highly recognizable St. George Black-on-white is diagnostic of early Pueblo II times in the Monument. Photo: GSENM

Table 6.6

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka2667	Dead Raven	Johnson Canyon	5730	Charcoal	1120 ±70	n/a	AD 727-1023	AD 908	Beta-23054	Pithouse 1 Floor	Walling and Thompson 2004:35
42Ws4214		Short Creek	4950	Charcoal	1120 ±70	-25	AD 728-1025	AD 910	Beta-169732	Feature 2 Pithouse Roof Fall	Berg et al. 2003:104
42Ka5609		Hackberry Canyon	5400	Zea Mays	1110 ±80	-10.6	AD 720-1105	AD 915	Beta-150670	FS-1 Activity Area Surface	McFadden 2016:77, 297
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	1110 ±70	-25	AD 735-1043	AD 918	Beta-77114	Pithouse PS-2 Hearth Unit D	McFadden 2012:71
42Ka2594		Kitchen Corral Wash	5640	Charcoal	1100 ±50	n/a	AD 786-1015	AD 936	Beta-8423	F4 Slab Roasting Pit	Westfall 1985:112
42Ka2664	Cutbank Site	Kitchen Corral Wash	5360	Charcoal	1080 ±140	n/a	AD 682-1217	AD 947	Beta-23056	F3 Burial CS240	McFadden 2016:107
42Ws1319		Little Creek Mountain	5320	Charcoal	1070 ±50	n/a	AD 824-1048	AD 967	Beta-7730	F141 Pithouse Floor	Barb Frank, pers. comm. 2018
42Ka1811	Nipple Alcove	Nipple Lake	5800	Zea Mays	1060 ±50	n/a	AD 860-1107	AD 976	Beta-109803	FS-1 Surface	McFadden 2016:72;
42Ka7714		Kanab Creek	5105	Charcoal	1040 ±30	-21.6	AD 912-1027	AD 1000	Beta-380906	Feature A Crematorium	Patterson et al. 2016:36
42Ka2147	Johnson Canyon Overlook	Johnson Canyon	5640	Charcoal	1020 ±200	n/a	AD 649-1326	AD 998	Beta-6285	Pit Bin Pithouse FS18	McFadden 2016:49
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	1020 ±50	-25	AD 903-1146	AD 1013	Beta-77113	Pithouse PS-1 Floor Unit B	McFadden 2012:71
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	1020 ±50	-25	AD 904-1146	AD 1014	Beta-66334	Pithouse PS-1 Hearth Unit B	McFadden 2012:71
42Ka2667	Dead Raven	Johnson Canyon	5730	Charcoal	1010 ±60	n/a	AD 902-1160	AD 1027	Beta-23055	Pithouse 1 Hearth	Walling and Thompson 2004:83
42Ka1969	Kanab Site	Kanab Creek	4820	Charcoal	990 ±110	Corrected	AD 788-1242	AD 1048	RL-1396	Open Hearth Next to Patio	Nickens and Kvamme 1981:34

Table 6.6: Early Pueblo II radiocarbon dates from the Vermilion Cliffs (northern Grand Staircase) region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

board patterns and elongated triangles (Figure 6.16). It is quite common in the Grand Staircase region, especially at the Dead Raven Site (Walling and Thompson 2004), the Kanab Site (Nickens and Kvamme 1981), and another site along Kanab Creek (Nash 2013).

Wahweap Black-on-gray is the earliest Shinarump Whiteware (see Collette 2009), and it is also similar to Black Mesa Black-on-white. Given that its production area was east of Kanab Creek, it should be commonplace in the Grand Staircase. We found this type is rarely identified as such on state site forms, suggesting it is either quite rare or that archaeologists are unable to distinguish it from St. George Black-on-gray during field inspections.

Trumbull Black-on-gray is even less common in the Grand Staircase, and it could just as easily be said it is not found there at all. However, numerous Trumbull Black-on-gray potsherds were identified at the Spillway Site near Escalante a considerable distance east of the Grand Staircase (Richens 2014). If Moapa Whitewares were being traded as far as the Escalante Valley, then they are probably present in the Grand Staircase.

Early Pueblo II sites are found in most northern Grand Staircase environmental settings that were utilized in earlier times, and there might have been expansion into settings up to 7,000 feet elevation in the highlands above the Virgin River. Most well-controlled excavation data, however, were derived from only six sites, three along Kanab Creek, another in Johnson Canyon, one in the upper Short Creek area, and another on Little Creek Mountain. Most of the other dates attributed to this period are problematic "old wood" dates or lack chronometric precision or corroborative artifacts that allow temporal placement with any confidence (see Table 6.6).

Excavations at the Kanab Site, located along Kanab Creek in an optimal setting for floodwater farming, revealed a slab-lined pithouse measuring about 5 meters in diameter that featured an encircling bench, a recess on the southeast, an antechamber, a ramp entryway, a clay-rimmed central hearth, and five subfloor bins. To the northwest were slab-lined storage cists and slab pavements termed "work patios." In effect, the residence was a "typical" Virgin Branch pueblo (Nickens and Kvamme 1981). More than 11,000 potsherds were recovered, 84 percent of which were identified as North Creek Gray and another 11.5 percent of which were labeled St. George Black-on-gray. There was a complete absence of corrugated types and Kayenta types dated after AD 1050 (Nickens and Kvamme 1981:63).

A roughly circular pithouse was discovered about 1.5 meters below the surface. The pithouse occupation was defined by the presence of a wall base of vertical slabs, an interior bench area, a basin-shaped clay floor, an antechamber and associated ramp, a series of subfloor bins or basins, holes for roof support beams and an access ladder, and a clay-rimmed fire hearth. Artifacts consisted of a few potsherds, lithic flakes, two projectile points, and a limestone bird fetish, a small total that suggested "that the pithouse was abandoned and cleared out in an orderly fashion" (Nickens and Kvamme 1981:31).

Of note, the Kanab Site yielded evidence that turkeys were "seemingly kept at the village since bones of both immature and adult birds were recovered. Additionally, numerous pieces of eggshell were found in the midden" (Nickens and Kvamme 1981:65; see also Emslie 1981). Excavations revealed three partial turkey skeletons that might have been intentionally buried, perhaps as part of sacrificial rituals. As discussed above in the Pueblo I section, McFadden (2016) later submitted turkey bone from this site for radiocarbon dating, and it returned a date of 1170 $\pm$40 BP (AD 853 median probability), the earliest date yet reported in the northern Grand Staircase for domesticated turkeys.

The Dead Raven Site, located in Johnson Canyon, was initially identified in a road cut that exposed portions of a roomblock (Walling and Thompson 2004). The site is one of a cluster of early Pueblo II sites concentrated in the upper reaches of the drainage just below its confluence with Skutumpah Canyon. Excavations subsequently produced two early Pueblo II radiocarbon dates, one of 1120 $\pm$70 BP (AD 908 median probability) from the floor of a pithouse and another of 1010 ±60 BP (AD 1027 median probability) from a hearth in the same pithouse. The site was interpreted as a typical early Pueblo II occupation area characterized by a storage cist alignment, a workroom, pithouses, and exterior hearths, all resulting from a prolonged period of occupation. Characteristic features included the alignment of storage cists opening to the southeast and a pithouse located southeast of the arc but not attached to it. The pithouses featured benches, probable jacal outer walls, and clay-coped hearths. Particularly notable was the presence of sand-filled basins on the floors.

One pithouse featured a bench, but there was no evidence of interior posts or a ventilator shaft. A second pithouse had a ventilator shaft, along with a possible antechamber. Three of the four storage cists at the Dead Raven site were semi-subterranean, oval, and slab-lined; the fourth might have been a surface structure. All of the aligned structures appear to have been utilized at the same time. Shinarump Gray, North Creek Gray, and St. George Black-on-gray types dominated the ceramic collection, and corrugated pottery was absent. Among the recovered projectile points were Abajo, Rose Spring, Eastgate, and Parowan Basal-notched types. Other artifacts included remnants of corn and beans (Walling and Thompson 2004).

Another excavated site along Kanab Creek appears to be a typical early Pueblo II farmstead with a pithouse, storage cists, and an outdoor activity area with roasting pits, a ramada, and a hearth. Most of the diagnostic ceramics were St. George Black-on-gray, but there were some Washington Black-on-gray ceramics, as well as radiocarbon dates, that suggested an earlier Pueblo I occupation, and a few North Creek Black-on-gray potsherds that hinted the occupation might have persisted into late Pueblo II times. An early Pueblo II occupation was also supported by two tree-ring dates of AD 1009+vv from a pithouse post and AD 1023+vv from a ramada post (Nash 2013).

Early Pueblo II residents of the Grand Staircase raised turkeys, had access to cotton, and engaged in a wide-ranging trade network that brought ocean shells and obsidian from distant lands.

The pithouse here was different than those described at the Kanab Site or Dead Raven, although it was roughly the same size. It did not have the expected encircling bench, antechamber, or floor pits, but it did have deep plastered walls more characteristic of late Pueblo II times. As McFadden (2016:19) observed, “it incorporates some early Puebloan traits, lacks others, and displays some that are common in late Pueblo II times,” and as such might be considered a “transitional site.”

The site was interpreted as a summer residence oriented toward farming along Kanab Creek, one of a series of sites in this stretch of the canyon representative of all Formative periods. Subsistence activities also included collecting wild plants and consuming large game. They also raised turkeys and had access to cotton. The presence of ocean shells, cotton seeds, and obsidian suggested the local residents were involved in long-distance trade networks to acquire exotic materials (Nash 2013).

One of the most interesting early Pueblo II sites in the Grand Staircase region was identified along Kanab Creek during highway improvement monitoring. Investigations initially identified charcoal and burned bone, and subsequent excavations revealed a saucer-shaped depression filled with hundreds of burned and calcined human bone fragments, mostly cranial fragments from an adult male. A charcoal sample returned a radiocarbon date of 1040 ±30 BP (AD 1000 median probability). Patterson et al. (2016:36-37) concluded the fragments were consistent with blunt force trauma inflicted on the victim prior to his death and subsequent cremation, noting that, "Burning of the human remains recovered from the feature appears to be the primary function of the thermal feature. The general lack of artifacts and the seemingly isolation of the feature from other activity areas, suggests the purpose of the fire was solely for the burning of the remains."

Archaeological evidence of extreme violence is rare in the Southwest prior to late Pueblo II times (cf. Turner and Turner 1999), and it is extremely rare in the Grand Staircase region during any period. One possible exception might be a burial at nearby Hog Canyon Dune, where a teenaged individual exhibited skull trauma that could have contributed to his or her death in Basketmaker II or Basketmaker III times (Schleisman and Nielson 1987). The teenager's injuries might have been accidental, whereas the adult male represented at the Kanab Creek site appears to have been bludgeoned to death. Given the small size of the saucer-shaped pit, he might also have been dismembered before he was cremated.

Based on the chronometric database alone, it might be tempting to argue that early Pueblo II occupations were focused almost exclusively on permanent water sources like Kanab Creek and Johnson Canyon. The state site database, however, suggest occupations at this time were distributed across a wide variety of environmental settings, based on the presence of St. George Black-on-gray potsherds, although general site locations were not appreciably different from earlier periods. Some 115 sites within the GSENM boundaries have early Pueblo II ceramics, 26 percent of which have no other temporal indicators.

It is not uncommon for early Pueblo II diagnostics to also be associated with Basketmaker III and/or Pueblo I artifacts. At least 19 sites have some combination of earlier artifacts without a late Pueblo II presence; this pattern is also particularly evident on the Glendale Bench. But without question, St. George Black-on-gray ceramics are more commonly found in association with late Pueblo II ceramics or in some combination of mixed contexts with earlier and later ceramics (n=66 sites).

Regional Comparisons

An early Pueblo II expression on the high plateaus of the southern Grand Staircase also supports the idea that populations continued to exploit a variety of environmental settings as they had done in Pueblo I times. Sites in this region have produced a robust catalog of at least 27 radiocarbon dates attributable to early Pueblo II times (see Table 6.7), and the types of sites represented include upland pueblos oriented toward dry farming, lowland pueblos along the Colorado River, and a variety of storage and foraging sites in between. In fact, the catalog of early Pueblo II radiocarbon dates is greater in the Arizona Strip region than in the northern Grand Staircase for the first time since the advent of agriculture at about BC 1000.

The radiocarbon database seems to suggest population expansion during early Pueblo II times as sites became larger and more complex. Dry-land farming sites are abundant in the Shivwits Plateau area (Allison 2010; Harry 2008, 2013, 2018). And a series of six early Pueblo II radiocarbon dates have been reported from the lower Kanab Creek region, mostly in Snake Gulch, in areas where permanent water is limited to scattered springs (Connie Reid, personal communication 2018). The large number of granaries in this area suggests that farming was successful, something that would probably have required the capture and manipulation of runoff from convectional thunderstorms.

There was also a florescence of increasingly complex farming communities along the Colorado River corridor at this time. The Furnace Flats Site (Jones 1986b) and UN-52 in the Unkar Delta area (Schwartz et al. 1980) grew in size during early Pueblo II times as new rooms were added. Black Mesa Black-on-white ceramics, the analog to St. George Black-on-gray farther north, were observed at both sites, which supports three radiocarbon dates in the latter part of the early Pueblo II period. Farming in this area would have involved capturing and diverting runoff to fields along the river floodplain. These pueblos appear to be much larger than Virgin Puebloan residences farther north, although this might be the

Table 6.7

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
AR-030703-0061		Lower Kanab Creek	Zea Mays	1135 ±48	-10.7	AD 776-992	AD 905	AA-66721	Granary Surface	Kaibab NF Files
AZ A:14:050	Lava Ridge	Shivwits Plateau	Charcoal	1130 ±40	-22.3 AMS	AD 782-989	AD 918	Beta-250681	Feature 11 Storage	Harry 2008: Appendix B
AZ A:3:1 ASM	Antelope Cave	Uinkarets Plateau	Yucca Sandal	1110 ±50	n/a	AD 782-1012	AD 929	Beta-229134	MNA Collection	Yoder 2013:120
AZ A:14:050	Lava Ridge	Shivwits Plateau	Juniper Seeds	1110 ±40	-22.2 AMS	AD 793-1007	AD 933	Beta-255308	Feature 25 Pit Feature	Harry 2008: Appendix B
AZ A:10:24 BLM		Shivwits Plateau	Charcoal	1090 ±80	-22.5	AD 734-1129	AD 934	Beta-221395	F439 Test Pit	Allison 2010:19
AZ A:14:050	Lava Ridge	Shivwits Plateau	Charcoal	1090 ±40	-21.5 AMS	AD 840-1014	AD 953	Beta-251534	Feature 25 Pit Feature	Harry 2008: Appendix B
AZ C:13:291	Ivo's Site	Colorado River	Burned Roof Material	1070 ±50	n/a	AD 820-1066	AD 966	Beta-180946	Feature 7 Room Beam	Grand Canyon-NPS Files
AZ A:10:24 BLM		Shivwits Plateau	Zea Mays	1050 ±40	-10.4	AD 900-1044	AD 990	Beta-271565	Pithouse Floor	Allison 2010:19
AZ A:14:082	Coyote Site	Shivwits Plateau	Burned Beam	1050 ±30	-22 AMS	AD 906-1022	AD 996	Beta-292893	Feature 2 Ramada	Harry 2013:8
AZ A:10:24 BLM		Shivwits Plateau	Zea Mays	1050 ±40	-10.4	AD 900-1044	AD 990	Beta-271565	Pithouse Floor	Allison 2010:19
AZ A:14:82	Coyote Site	Shivwits Plateau	Burned Beam	1050 ±30	-22	AD 906-1022	AD 996	Beta-292893	Feature 2 Ramada	Harry 2013:8
AZ:A14:46	Granary House	Shivwits Plateau	Charcoal	1040 ±40	22.8	AD 903-1111	AD 998	Beta-250679	Feature 2 Storage	Harry 2008:43
AR-030703-1158		Snake Gulch	Zea Mays	1028 ±66	-10.7	AD 856-1156	AD 1006	AA-66725	Midden	Kaibab NF Files
AR-030703-0891		Snake Gulch	Cordage	1027 ±47	-11.5	AD 903-1144	AD 1007	AA-66723	n/a	Kaibab NF Files
AR-030703-1158		Snake Gulch	Cordage	1022 ±35	-10	AD 919-1122	AD 1010	AA-66726	Midden	Kaibab NF Files
AZ:A14:50	Lava Ridge	Shivwits Plateau	Juniper Seeds	1020 ±40	-22.4	AD 911-1141	AD 1012	Beta-255309	Feature 3 D-Shaped Habitation	Harry 2008:Appendix B

Table 6.7 (continued)

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
AZ:A14:50	Lava Ridge	Shivwits Plateau	Zea Mays	1020 ±40	-20.5	AD 912-1142	AD 1012	Beta-255313	Feature 23 Semi-Sub. Storage	Harry 2008:Appendix B
AR-030703-1158		Snake Gulch	Zea Mays	1019 ±96	-9.5	AD 782-1208	AD 1017	AA-66722	Midden	Kaibab NF Files
AR-030703-1923		Kane Canyon	Zea Mays	1019 ±94	-11.7	AD 787-1206	AD 1017	AA-66730	n/a	Kaibab NF Files
UN-52		Colorado River	Charred Willow	1000 ±90	n/a	AD 809-1216	AD 1044	I-3780	Room 6 Roof/Fill	Schwartz et al. 1980:59
AZ C:13:010	Furnace Flats	Colorado River	Charcoal	1000 ±50	n/a	AD 918-1154	AD 1039	Beta-130615	Feature 9, Level 5, Room 2	Miller 2005:94
AZ A:14:083	To'tsa	Shivwits Plateau	Zea Mays	1000 ±40	-10.5	AD 973-1148	AD 1032	Beta-255312	Feature 21 Semi-Sub Storage	Harry 2008:Appendix B
AZ:A14:46	Granary House	Shivwits Plateau	Wood Beam	990 ±30	-19.8	AD 995-1146	AD 1036	Beta-376470	Feature 4 Semi-Sub. Storage	Harry 2015:66
AZ C:13:010	Furnace Flats	Colorado River	Charcoal	990 ±130	Corrected	AD 748-1256	AD 1043	WSU-3052	Feature 18 Kiva Ash Box	Jones 1986b:105
AZ A:15:030		Colorado River	Juniper	990 ±50	-25	AD 953-1162	AD 1059	Beta-106108	Roasting Pit Fill	Yeatts 1998:53-62
AZ C:13:010		Colorado River	Charcoal	990 ±50	n/a	AD 949-1161	AD 1057	Beta-130603	F38 Level 5 Open Structure	Miller 2005:94
AZ A:10:26 BLM		Shivwits Plateau	Zea Mays	990 ±40	-10.2	AD 986-1151	AD 1049	Beta-251828	FS141 Midden	Allison 2010:19

Table 6.7: Early Pueblo II radiocarbon dates from the Arizona Strip region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

result of architectural additions during later Pueblo II times.

There is also some evidence that foraging sites preferred in earlier times continued to be exploited for wild plant and animal resources. Antelope Cave continued to be used as a base camp for rabbit drives, presumably in the fall when rabbits are in optimal condition. There is also abundant evidence of wild plant remains. But this site might also have been a semi-permanent base camp, with groups actually farming maize in this extremely marginal environment, as evidenced by the presence of corn husks and corn stalks that are rarely, if ever, transported any significant distance from where they are cultivated. An early Pueblo II presence here is supported by a single radiocarbon date of 1110 ±50 BP (AD 929 median probability), as well as the presence of St. George Black-on-gray ceramics and Parowan Basal-notched arrow points (Janetski et al. 2013).

In summary, Virgin Puebloan upland adaptations at this time were focused predominantly on maize farming using at least three different strategies, all of which had become established in earlier Basketmaker III and Pueblo I times. Early Pueblo II sites typically feature one or two pithouses with an associated alignment of three or more storage cists and outdoor work areas. Large aggregations or villages with five or more pithouses have not yet been convincingly demonstrated.

Residences are found along permanent water sources such as Short Creek, Kanab Creek, and Johnson Wash where farming involved sub-irrigation and/or stream diversion. In dry-land farming settings like Little Creek Mountain and the Shivwits Plateau, residences are loosely distributed across the mesa tops. And floodwater manipulation for agricultural purposes is evident in the tributaries to lower Kanab Creek and along the Colorado River, and perhaps in extremely marginal environments like the lower Short Creek area (Antelope Cave).

Traditional views hold that population pressures after AD 1050 resulted in expansion into increasingly marginal environments where agriculture was possible only under optimal conditions, and that the extreme risk and persistent failure of this strategy resulted in the abandonment of marginal areas by about AD 1150. The cumulative radiocarbon data from Pueblo I and early Pueblo II sites in upland plateau areas (117 dates), however, suggest extremely marginal environments were already being exploited one or two centuries before the onset of dramatic population increases of late Pueblo II times.


Paria River

Photo: Dan Bauer

Also noteworthy, a kiva might have been constructed at one early Pueblo II site considered here. At one site on Little Creek Mountain, charcoal from a kiva structure returned a date of 1130 $\pm$70 BP (AD 899 median probability). The Little Creek Mountain kiva date might represent burning of old wood. It is also possible that early Pueblo II populations began to incorporate ceremonial and community architecture into local settlement patterns prior to the population increases that characterized late Pueblo II times. There are hints of this on the Shivwits Plateau where large communal architecture was constructed during Pueblo I times (Harry 2008). Pueblo I and early Pueblo II kivas are ubiquitous in the Kayenta and San Juan regions. If Virgin Puebloan groups were involved in pan-regional social and economic networks at this time (Nash 2013), then integrating community architecture would be expected at sites north and west of the Colorado River.

Virgin Puebloan adaptations in the upland plateaus exhibited a variety of farming adaptations, perhaps contingency strategies to minimize the risk of crop failures. The same adaptive flexibility is not evident in the St. George Basin or the lower Virgin River-Muddy River regions, where early Pueblo II farming strategies reflected continued tethering to permanent river systems. Sites occupied during early Pueblo II times had been occupied during earlier generations, reflecting continuity and accretion of new features. Early Pueblo II sites have been documented along the Virgin River (Walling et al. 1986), but well-controlled excavations that resulted in corroborative St. George Black-on-gray ceramics are actually quite rare at lowland sites. It should be noted that archaeologists in the lower Virgin River and Moapa Valley areas limit the early Pueblo II period to a 50-year period beginning about AD 1000 when San Juan Redware appears in small quantities (see Roberts and Ahlstrom 2012).

> **A late Pueblo II florescence is also evident in the Escalante River and Kaiparowits Plateau regions, although it lasted less than two centuries in both areas.**

Late Pueblo II: AD 1050 to 1150

A late Pueblo II florescence throughout the Southwest is characterized generally by a proliferation of small habitations with the traditional roomblock and associated kiva, the appearance of great houses that were the central focus of community activities, and the aggregation of some populations into villages. Community centers were more visible because of the presence of a great kiva, a great house, an aggregation of residential structures, or some combination of all of these features (Lipe and Varien 1999a:).

The unit-type pueblo characteristic of earlier times continued to be the dominant site type, although multi-unit pueblos became more common. Upland dry farming was the preferred agricultural strategy, but a variety of strategies were evident, sometimes within the same community (Lipe and Varien 1999a). The increase in the site density and expansion into previously unoccupied areas is seen both as an actual population increase (Euler 1988) and to some extent a dispersal of large Pueblo I communities into smaller single-unit or multi-unit pueblos reflecting isolated settlements and community clusters (Eddy et al. 1984).

A late Pueblo II florescence is evident in all three sub-regions of GSENM. In the Escalante River Basin, Ancestral Puebloan groups appear to have migrated into the Circle Cliffs region where a population center was established at Coombs Village and outlier pueblos characterized by Lampstand Ruins and perhaps the Arrowhead Complex. On the Kaiparowits Plateau, there is a proliferation of unit pueblos and field houses at elevations between 7,000 and 7,500 feet. And in the Grand Staircase, population densities might have reached their highest level as every environmental niche was exploited to a greater or lesser degree.

Although climatic reconstructions are sometimes contradictory, the early Pueblo II is generally characterized by high climatic variability with a general trend toward increased effective precipitation, aggrading arroyos, and higher water tables. In contrast, the late Pueblo II period appears to have featured low climatic variability, high effective precipitation, high water tables, and cooling (Petersen 1986; see also Plog et al. 1988). These conditions are believed to have greatly expanded agricultural productivity and led to the colonization of areas that had been sparsely populated prior to that time (Matson et al. 1990; Petersen 1986).

The cooling trend and consequent shorter growing season at higher elevations might have forced abandonment of some higher elevation areas that had been intensively occupied during Pueblo I times (Kane et al 1982; Kane 1983; Schlanger 1987), although other high-elevation settings experienced dramatic and unprecedented increases in the number of small habitation sites in late Pueblo II times, as was evident on the Rainbow Plateau (Geib 2011; Lindsay et al 1968), Cummings Mesa (Long 1966), and the Kaiparowits Plateau (Jennings b). The apparent population increase during late Pueblo II times was accompanied by the appearance of (or elaboration on) a variety of water and soil conservation features (Brooks 1974; Davis et al. 1986; Plog and Garrett 1972; Rohn 1977), including arroyo check dams (trincheras), linear borders, reservoirs, slope terracing, field grids, and irrigation ditches (Schroeder 1968; Vivian 1970, 1974; Winter 1976a, 1976b).

Winter (1983) also found widespread use of floodwater farming in drainage bottoms without any remaining evidence of durable conservation features, although earthen ditches and dikes might have eroded to be unrecognizable. Such conservation features are seen as attempts to increase the carrying capacity of the land in response to population pressure in core areas and subsequent dispersal of small farming groups into marginal environments. Water control features are surprising rare anywhere in the upland Virgin Puebloan region with the exception of Houserock Valley (McFadden 2004) and the Grand Canyon region (Jones 1986a; Schwartz et al. 1981).

The Chaco Phenomenon

The late Pueblo II period is typically described within the context of the "Chaco phenomenon" in northwestern New Mexico, which was characterized by the construction of massive structures and population aggregations. As summarized by Lipe and Varien (1999a:258), the major episodes of great house construction at Chaco Canyon began about AD 1040 and reached a peak between AD 1080 and 1100, after which construction declined in the early AD 1100s.

The center of the Chacoan system may have shifted north to the Animas River area where construction at great houses, begun about AD 1080, accelerated after AD 1100 and continued through AD 1130 (McKenna and Toll 1992). Collectively, these data suggest the Chacoan phenomenon flourished between about AD 1040 and 1130, or most of the late Pueblo II period as traditionally defined.

The rise of the Chacoan system and its role in integrating distant Pueblo II communities has been the subject of considerable debate. On one hand, Cordell (1984) argued that most of the Southwest was not incorporated into a hierarchy centered on Chaco Canyon, but rather a pattern of local development continued. She suggested that population density increased in many areas, soil- and water-control features were constructed, some villages became quite large, and regionally distinct ceramic styles developed. On the other hand, the subsequent identification of numerous great houses with Chacoan-like features, great kivas, and road networks throughout the Four Corners area suggest instead the Chacoan sphere of influence, characterized by large architectural features denoting substantial status differentiation, was actually ten times broader than originally believed (Lekson 2006; Lekson et al. 1988).

As summarized by Hurst (1992:63), "whatever the nature of the so-called Chaco system, we can be sure that some kind of extensive system was in operation in the Four Corners area during the tenth and eleventh centuries, that the central Chaco was heavily if not centrally involved in it, and that it figured importantly in the world of the [Ancestral

Puebloans].” Whether the Pueblo II is discussed within the framework of a Chaco alliance (Plog 1983) or Chaco phenomenon (Vivian 1990), this period is marked by the appearance of large, distinct architecture.

Turner and Turner (1999) postulated that the Chaco phenomenon represents the emergence of a political elite, perhaps stimulated by Toltec immigrants, who used public violence, mutilation, and cannibalism as a political mechanism to control local populations, and that Chacoan hegemony subsequently spread to distant regions in Utah, Arizona and Colorado. Evidence of extreme violence is indisputable, although Lipe and Varien (1999a) have convincingly questioned the Turners' conclusion of Chacoan state-sponsored terror as a means of political control, pointing out that most cases of extreme violence post-date the period of Chacoan great house construction, some by more than 100 years.

As discussed by Lipe and Varien (1999a:286), cases of extreme violence occur at or about the time of the onset of a profound drought in the mid AD 1100s, and “rather than being products of the expansion of terrorist social control by a powerful and ruthless elite, these particular cases seem more likely to be associated with the breakdown of what political institutions the Chaco system had to offer and/or with the failure of crops due to a widespread drought.” Hence, the cannibalism, if it indeed occurred, could represent the settling of old feuds, famine, breakdown of social control, inter-community warfare, mortuary treatments, or the killing of suspected witches (Bullock 1998). As we mentioned above, the only example of extreme violence in the Grand Staircase region might actually predate the Chacoan florescence in the Four Corners.

Virgin Branch farmers of late Pueblo II times were never full participants in the Chaco-inspired events occurring in the Kayenta heartland and the San Juan River country. No great houses or road networks have yet been documented here.

By the middle AD 1100s, the Chaco Canyon great houses and many of the outlying communities in the San Juan Basin had been abandoned, or at least new construction and maintenance had ceased, probably reflecting a collapse of the system they represented. Population increases have been documented at that time in upland areas (Lipe and Lekson 1990), perhaps reflecting migration of Chacoan populations (Stuart and Gauthier 1981). Other areas of the Southwest such as the Defiance Plateau and Black Mesa (Euler 1988) saw population declines in upland areas and corresponding increases in the lower drainages. In the Cedar Mesa area, a withdrawal of Kayenta populations and resurgence of Mesa Verdean influences was observed (Matson et al. 1990).

The collapse of the Chacoan communities and the subsequent shift of populations northward at about AD 1150 approximate the end of the Pueblo II period of time in the greater Southwest. This same date is used here to demarcate the end of the Pueblo II period in the Virgin Puebloan world. At this time, Kayenta influences on local populations ebbed and widespread population declines occurred throughout the region, as evidenced by the abandonment of sites that had been occupied in earlier periods.

In many respects, the Virgin Puebloans north and west of the Colorado River were not full participants in the late Pueblo II events occurring in the Kayenta heartland and in the San Juan Basin.

Great houses, great kivas, large-scale community architecture, and integrating road systems have not yet been documented, and kivas of any kind are so rare as to be noteworthy whenever they are found. But the events occurring elsewhere undoubtedly had ripple effects felt throughout the Virgin Puebloan region, most notably population increases and expansion of farming communities into marginal environments that were previously unoccupied, followed by abandonments that coincided with the collapse of social systems that integrated local populations into the larger Puebloan world.

Grand Staircase Late Pueblo II

Generally, the late Pueblo II remains the most thoroughly documented period of prehistory in the Virgin Branch area, in large part because sites attributed to this period are more conspicuous. Small Pueblo II sites range from the single, round semi-subterranean pithouse with associated storage structures to more formal arrangements consisting of a row of contiguous sub-rectangular storage structures with a pithouse attached to one end, often in the shape of an arc. Many sites in the region feature combinations of both patterns (Jones 1986a; Walling et al. 1986; Westfall 1987b). Larger sites containing more than 10 rooms, often up to 30 rooms, are relatively abundant in the region, but they are not as common as the smaller sites. The larger sites were usually configured in C or U shapes, but some were linear, L-shaped, E-shaped, or V shaped.

The exploitation of upland environments during late Pueblo II times has generally been attributed to improved climatic conditions (Dean et al. 1985; Euler et al. 1979) and the introduction of new, heartier strains of maize adapted to shorter growing seasons (Martin and Plog 1973). The influx of Kayenta traits at about AD 1050 has been interpreted by some as evidence of an actual migration into the Virgin Branch area from northern Arizona, whereas others see the prevalence of Kayenta traits at this time as evidence of robust socioeconomic trade networks that reached their maximum spatial extent.

McFadden (2016) has suggested the late Pueblo II period can be distinguished from the early Pueblo II by the "introduction of exotic material" that he sees as evidence of a brief expansion into the Grand Staircase. Late Pueblo II ceramics in the Virgin Branch area closely parallel those found in the northern Kayenta area during the Klethla Phase (AD 1090-1170), as described by Ambler (1985). Whitewares included Sosi, Dogoszhi, and Flagstaff types, all of which have analogs in locally produced Tusayan Whiteware (Virgin Series) and Shinarump Whiteware types (Figure 6.18). Kayenta orange wares included Tusayan Black-on-red, Medicine Black-on-red, and Citadel and Tusayan polychromes, all of which have analogs in the Shinarump Redware series. Bull Creek arrow points were introduced, although Parowan Basal-notched points continued to be the most common point.

Large linear pueblos first appear in late Pueblo II times. Excavated sites reveal they were constructed in traditional Virgin Puebloan fashion, room by room or segment by segment. Another structural form was a small north-south roomblock measuring about 8 by 2 meters. These structures occurred as the primary feature at a site or as a secondary roomblock. Although much smaller, they appear to have been constructed during a single construction episode. Masonry and jacal roomblocks were primarily used for storage, but residential rooms with hearths were sometimes incorporated into them. In addition, it was also common for these sites to have fully subterranean pit structures located to the southeast of the roomblock (McFadden 2016).

Whether fully subterranean pit structures functioned as kivas or as winter residences has not been resolved. The occurrence of kivas in the Virgin Branch area might suggest increased social and ideological complexity, as well as contact with or migration from the Kayenta region (McFadden 2016). Although many of these subterranean structures have been labeled kivas, most lack some features typically associated with kivas elsewhere in the Southwest. Based on ceramic cross-dating and a few radiocarbon and tree-ring dates, McFadden (2016:154) suggested that kivas appeared about AD

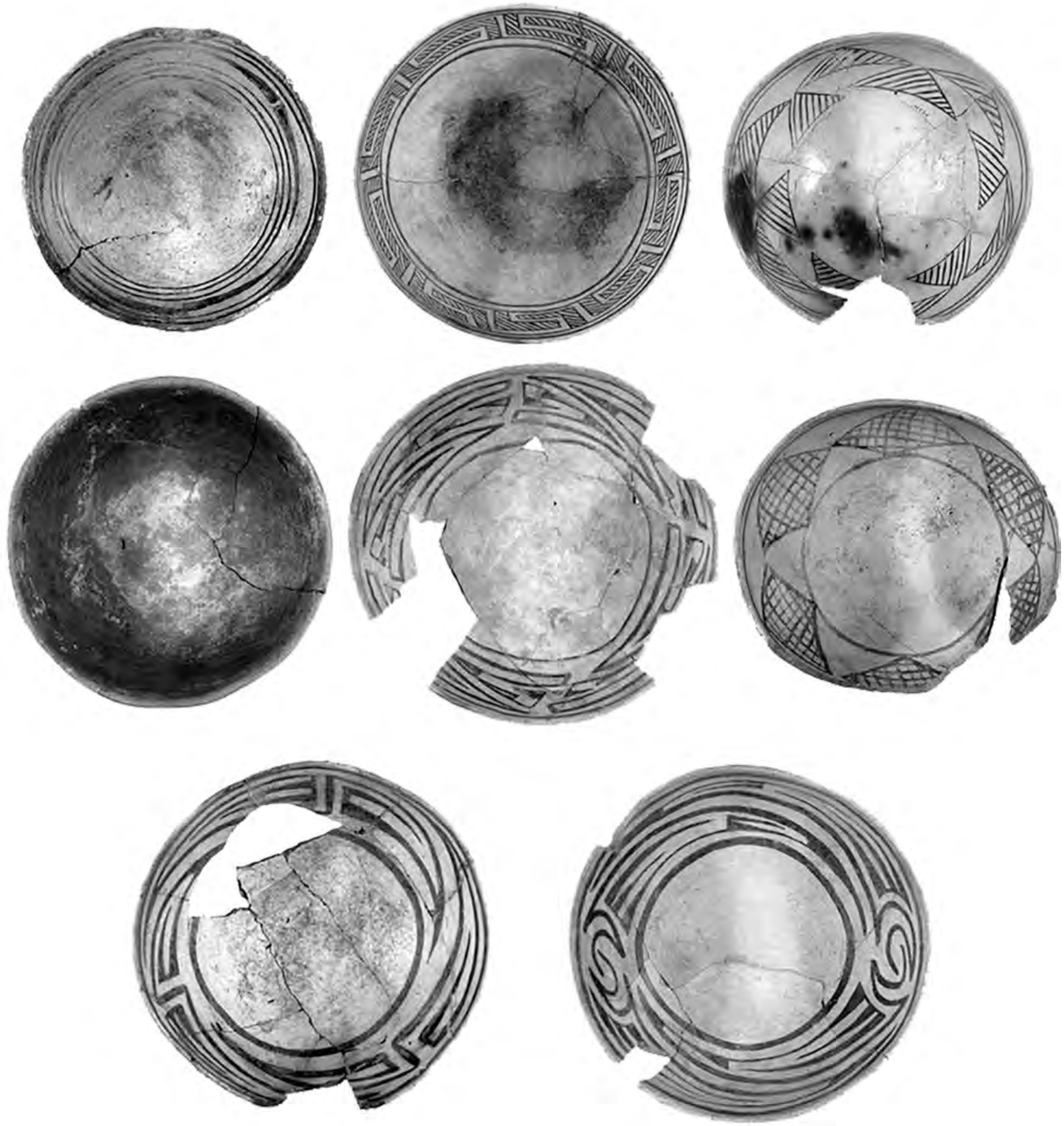


Figure 6.18: Examples of black-on-white bowls recovered from the Arroyo Site within the Monument. These styles first appeared in late Pueblo II times and continued to be used into Pueblo III times with little change. Photo: GSENM

1100 "along with the constellation of traits associated with the Pueblo II expansion." He suggested kivas never became an important feature at most Virgin Branch sites, and after their initial introduction they might have played a more secular role as winter residences.

Aikens (1965a:56) argued that Pueblo II expansion was the result of local population growth, but others have proposed the expansion included actual population shifts. Lyneis (1996:11) argued "the area east of the Kanab Creek drainage seems to show the effects of the Kayenta expansion that began around AD 1050, resulting in the establishment of Kayenta populations in the Kaiparowits and Paria Plateaus, the Inner Canyon, and Walhalla Glades." McFadden (2016) agreed, suggesting the late Pueblo II period "is very much a manifestation of the Pueblo II expansion. Although it is possible that the actual migration was limited, its effects through diffusion of material culture was felt throughout the Virgin culture area." McFadden placed this expansion at about AD 1100.

The late Pueblo II (AD 1050 to 1150) saw a proliferation of different painted and corrugated pottery types that are temporally sensitive markers, based on tree-ring dates from the Kayenta region. Most prevalent are corrugated types that appeared in this region about AD 1050 (Pierce 1999). In the Kayenta region, corrugated potsherds outnumber plain ware ceramics more than 10 to one after about AD 1050. In the Virgin area, plain wares almost always outnumber corrugated potsherds, although there was a steady increase in corrugated ceramics through time (Allison 2008; Jenkins 1981; Lyneis 1986a, 1986b). North Creek Corrugated and Shinarump Corrugated are commonplace in the Grand Staircase region, whereas Moapa Corrugated, Logandale Corrugated, and Shivwits Corrugated are extremely rare or have not yet been reported.

This period also featured the appearance of Dogoszhi Black-on-white and Sosi Black-on-white at sites north and west of the Colorado River, as well as locally produced whitewares that resembled or imitated the Kayenta types. Tsegi Orange Wares are found in the Grand Staircase region, but these were replaced by locally made Shinarump Redwares after a short time (Allison 2008).

Dogoszhi-style ceramics are found throughout the Grand Staircase region, but never in significant quantities. Dogoszhi Black-on-white was manufactured in the Kayenta heartland between AD 1050 and 1190 (Ambler 1985; Christensen 1994). Hildale Black-on-gray is the Tusayan Whiteware (Virgin Series) analog to Dogoszhi Black-on-white. It is fairly common throughout the Grand Staircase region, but it usually represents only about 1 percent of the ceramics at any given site. Vermilion Black-on-white is the Shinarump Whiteware analog to Dogoszhi Black-on-white. This type appears to be quite rare or it was not identified as such on state site forms. Given the production area was somewhere east of Kanab Creek, it should be fairly common in GSENM. Slide Mountain Black-on-gray, the Moapa Whiteware analog to Dogoszhi Black-on-white, has not been reported in the Grand Staircase.

Sosi-style ceramics are more common in the Grand Staircase area, but these also constitute a small percentage of the overall collections. Sosi Black-on-white was manufactured in the Kayenta heartland between AD 1050 and 1200 (Ambler 1985; Christensen 1994). It is common at sites on the eastern Grand Staircase, and it is also found on the Kaiparowits Plateau and upper Escalante River Basin. North Creek Black-on-gray is the Tusayan Whiteware (Virgin Series) analog to Sosi Black-on-white. It is the most commonly reported whiteware in the Grand Staircase region (and elsewhere in the Virgin Branch region). Wygaret Black-on-white is the Shinarump Whiteware analog to Sosi Black-on-white. This type appears to be quite rare or it was not identified as such on state site forms. Given the production area was east of Kanab Creek, it should also be fairly common in GSENM. Moapa Black-on-gray is the Moapa Whiteware analog to Sosi Black-on-white, and it is fairly common on the western Arizona Strip, but it is extremely rare east of Kanab Creek.

Redwares are also important late Pueblo II indicators, whether they were Kayenta types produced elsewhere or locally produced types that share design characteristics with the Kayenta types. The Kayenta redwares are subsumed within types defined as Tsegi Orange Ware, which was manufactured in the Kayenta heartland between AD 1050 and 1300 (Ambler 1985; Christensen 1994). Types found in the Virgin Branch area include Medicine Black-on-red, Tusayan Black-on-red, Cameron Polychrome, and Citadel Polychrome.

Redwares produced in the Grand Staircase region have been assigned to the Shinarump Redware series, which was "tempered with mostly sand or crushed sandstone and made with high-iron clay that, when fired in a reducing atmosphere, often vitrify to a dark gray color that many analysts describe as having a purplish tint" (Allison 2008:21). Shinarump Redware is far more common in the Grand Staircase area than Tsegi Orange Ware, and it is also common at sites in the Kaiparowits Plateau and upper Escalante River regions.

Some researchers see the appearance of Tsegi Orange Ware north of the Colorado River as either trade wares or locally produced wares made by Kayenta immigrants between AD 1050 and 1150. This was followed by the similar-but-locally-produced Shinarump Redware after AD 1150, which is seen as imitation of the earlier designs (McFadden 2016). Four Tsegi Orange Ware types have analogs in the Shinarump Redware series:

- Medicine Black-on-red is a Tsegi Orange Ware manufactured in the Kayenta heartland between AD 1040 and 1170 (Ambler 1985; Christensen 1994). The Shinarump Redware analog is Kanab Black-on-red, which is found at late Pueblo II sites in the Grand Staircase region.

- Tusayan Black-on-red is a Tsegi Orange Ware manufactured in the Kayenta heartland between AD 1045 and 1240 (Ambler 1985, Christensen 1994). The Shinarump Redware analog is Middleton Black-on-red, which is also similar to Deadman's Black-on-red but with a Dogoszhi style.

- Cameron Polychrome is a Tsegi Orange Ware manufactured in the Kayenta heartland between AD 1040 to 1170 (Ambler 1985; Christensen 1994). The Shinarump Redware analog is Middleton Polychrome, which is assumed to have a similar temporal range.

- Citadel Polychrome is a Tsegi Orange Ware manufactured in the Kayenta heartland between AD 1040 to 1200 (Ambler 1985; Christensen 1994). The Shinarump Redware analog is Nankoweap Polychrome, which features wide red bands outlined by thin black lines.

All of these late Pueblo II ceramics, along with corrugated ceramics regardless of type, are

Figure 6.19: Masonry residences erected in alcoves, popularly referred to as cliff dwellings, are not all that common in the Grand Staircase and are limited to a few canyons west of the Monument, such as this one in Cottonwood Canyon northwest of Kanab. A few are also found in the lower Escalante River and Fiftymile Mountain areas. Neil Judd Photo: Smithsonian Institution (digital scan courtesy of GSENM).

Table 6.8

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ws0920		Little Creek Mountain	5720	Charcoal	990 ±80	n/a	AD 876-1212	AD 1058	Beta-18538	F50 Pithouse	Barb Frank, personal communication. 2018
42Ka1978	Gnatmare	Cottonwood Wash	5010	Charcoal	980 ±75	Uncorrected	AD 903-1209	AD 1071	UGA-3751	Hearth Level I, Structure II Pithouse	Metcalfe 1982:47
42Ka1819		Kanab Creek	5920	Zea Mays	980 ±60	-8.4	AD 939-1192	AD 1076	Beta-161895	FS1	McFadden 2016:99
42Ka1557		Seaman Wash	6000	Wood Shavings	980 ±40	-21.2	AD 994-1154	AD 1078	Beta-132379	Granary Door Shaving	McFadden 2016:105
42Ka5628		Park Wash	5720	Zea Mays	960 ±70	-10.8	AD 943-1215	AD 1089	Beta-150669	FS-2 Surface	McFadden 2016:78
42Ka2584		Kitchen Corral Wash	5560	Charcoal	960 ±50	n/a	AD 997-1189	AD 1092	Beta-8419	F1 Pithouse Floor	Westfall 1985:110
42Ka1520	Bay Bill Granaries	East Fork Virgin River	5320	Riparian Twig	950 ±70	-25	AD 966-1220	AD 1097	Beta-134476	D-Shaped Granary	McFadden 2016:78
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	950 ±60	-25	AD 991-1210	AD 1096	Beta-77110	Resid. Room 1 Floor Unit A	McFadden 2012:71
42Ws2195		Short Creek	5100	Charcoal	950 ±60	n/a	AD 990-1208	AD 1096	Beta-28332	Pithouse 1 Hearth	Nielson 1998: 7.2
42Ws0920		Little Creek Mountain	5720	Charcoal	950 ±60	n/a	AD 990-1208	AD 1096	Beta-18540	F59 Structure Timber	Barb Frank, personal communication 2018
42Ws920		Little Creek Mountain	5720	Charcoal	950 ±110	n/a	AD 838-1259	AD 1090	RL-2083	Structure Timber	Barb Frank, personal communication. 2018
42Ka1568	Pottery Knoll	Park Wash	5660	Charcoal	930 ±60	n/a	AD 1005-1222	AD 1107	Beta-55079	Roomblock Roof Trench 7	Morley 1993:161
42Ka1819		Kanab Creek	5920	Bark	920 ±40	-21.1	AD 1031-1203	AD 1106	Beta-161897	FS-3 Kiva Post	McFadden 2016:99
42Ka3831		Kanab Creek	4920	Bone Collagen	920 ±40	-8.5 AMS	AD 1032-1204	AD 1106	Beta-243765	Burial in Midden	McFadden 2016:109
42Ka6897	Road Grade Site	Kanab Creek	4910	Zea Mays	900 ±30	-11.6 AMS	AD 1043-1207	AD 1123	Beta-390953	F31 Storage Room	Roberts 2018: Vol. 6: Chapter 1:12
42Ka1812	Kiva Cave	Cottonwood Canyon	6000	Riparian Twig	890 ±50	n/a	AD 1036-1242	AD 1136	Beta-168673	Resid. Room 2 Roof Matting	McFadden 2016:94

Table 6.8: Late Pueblo II radiocarbon dates from the Vermilion Cliffs (northern Grand Staircase) region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

Table 6.9

Site No.	Lab No.	Inside Date	Outside Date	Material Dated	Site Type	General Location	Citations	Corroborative Indicators
42Ka1504	UTM-11	944p	1111vv	Juniper	Sheltered Residential	Cottonwood Canyon	Tipps 1989	Architecture (Kiva)
42Ka1504	UTM-13	1052p	1099r	Juniper	Sheltered Residential	Cottonwood Canyon	Tipps 1989	Architecture (Kiva)
42Ka1504	UTM-14	1013p	1101r	Juniper	Sheltered Residential	Cottonwood Canyon	Tipps 1989	Architecture (Kiva)
42Ka1504	UTM-15	921+p	1054vv	Juniper	Sheltered Residential	Cottonwood Canyon	Tipps 1989	Architecture (Kiva)
42Ka1504	UTM18	922+p	1101rb	Juniper	Sheltered Residential	Cottonwood Canyon	Tipps 1989	Architecture (Kiva)
42Ka1504	UTM-19	982p	1099+rb	Juniper	Sheltered Residential	Cottonwood Canyon	Tipps 1989	Architecture (Kiva)
42Ka1504	UTM-20	963p	1099+rb	Juniper	Sheltered Residential	Cottonwood Canyon	Tipps 1989	Architecture (Kiva)
42Ka1520	UTM-099	1046+p	1147vv	Juniper	Sheltered Storage	Parunuweap Canyon	McFadden 2016	None
42Ka1520	UTM100	1030+p	1148+b	Juniper	Sheltered Storage	Parunuweap Canyon	McFadden 2016	None
42Ka1520	UTM101	1047+p	1150+v	Juniper	Sheltered Storage	Parunuweap Canyon	McFadden 2016	None
42Ka1520	UTM-102	1057+p	1149+v	Juniper	Sheltered Storage	Parunuweap Canyon	McFadden 2016	None
42Ka1520	UTM103	1050p	1150+rb	Juniper	Sheltered Storage	Parunuweap Canyon	McFadden 2016	None
42Ka1520	UTM-104	1044p	1149+vv	Juniper	Sheltered Storage	Parunuweap Canyon	McFadden 2016	None
42Ka1520	UTM-105	1075p	1118vv	Juniper	Sheltered Storage	Parunuweap Canyon	McFadden 2016	None
42Ka1520	UTM-106	1052p	1149+v	Juniper	Sheltered Storage	Parunuweap Canyon	McFadden 2016	None
42Ka1520	UTM107	1051p	1138vv	Juniper	Sheltered Storage	Parunuweap Canyon	McFadden 2016	None
42Ka1696	UTM-33	785+	1111++vv	Juniper	Sheltered Residential	Kanab Canyon	McFadden 2016	Ceramics
42Ka5571	UTM-108	993p	1150+rb	Pinyon	Sheltered Storage	Parunuweap Canyon	McFadden 2016	Ceramics
42Ka6293	n/a	n/a	1023+vv	n/a	Open Residential	Kanab Canyon	Nash 2013	Ceramics
42Ka6293	n/a	n/a	1009+vv	n/a	Open Residential	Kanab Canyon	Nash 2013	Ceramics
AZ B:1:102	ABM-31	1016	1096vv	Juniper	Open Residential	Short Creek	Kanab BLM	Ceramics-Architecture
AZ B:1:102	ABM-33	968	1148++v	Juniper	Open Residential	Short Creek	Kanab BLM	Ceramics-Architecture

Table 6.9: Tree-ring dates from the Vermilion Cliffs (northern Grand Staircase) region.

convenient temporal markers. Not surprising, the number of sites attributed to this period of time is considerably greater than any earlier period. Less certain is whether this assessment reflects bias in that sites attributed to earlier periods are not so easily identifiable based on surface artifacts, and whether or not field identifications accurately identified ceramic types. This conundrum is illustrated by different reports from the Glen Canyon Project where Gunnerson (1959a, 1959b) recognized locally produced Virgin Series ceramics, whereas Fowler and Aikens (1963), who revisited the same sites, saw a Kayenta origin and applied Kayenta names to the ceramic types.

The ceramic evidence supports the chronometric database that includes 16 radiocarbon dates between AD 1050 and 1150 (Table 6.8) and another 18 tree-ring dates (Table 6.9). The 95 percent probability ranges of the radiocarbon dates span the early Pueblo II and Pueblo III periods, but the tree-ring dates are much more precise. None of the tree-ring dates reported by McFadden (2016) have cutting dates after AD 1150, suggesting new construction in the northern Grand Staircase region had ceased by that time.

One of these was Cottonwood Cliff Dwelling, described as "the largest cliff-dweller settlement" north of the Colorado River (Judd 1926:114; see also Figure 6.19). Betsy Tipps (1989:9) later conducted excavations at the site, identifying as many as 18 rooms, including residences, storage structures, and an earthen kiva. She observed the ratio of living rooms to storage facilities was 1 to 1.76, reflecting the importance of storage to prehistoric inhabitants.

There was also clear indication of additional buried rooms and features, as well as non-architectural features such as rock art and sharpening grooves. Charcoal from the kiva hearth returned a

Figure 6.20: Puebloan rock art styles commonly depict the same geometric designs found on ceramics. Also common are clan symbols readily recognizable to modern descendants. Photo: Jerry D. Spangler

date of 840 ±80 years BP (AD 1180 median probability). Additionally, seven tree-ring dates were obtained with outside rings dating from AD 1054 to AD 1111. These dates were consistent with the predominance of North Creek Black-on-gray and Hildale Black-on-gray ceramics (Kayenta types were not especially common).

Another site in Cottonwood Canyon initially investigated by Neil Judd in 1919 is similar to Cottonwood Cliff Dwelling in that it featured a well-constructed masonry residence, separate masonry storage rooms, and a kiva 4.1 meters in diameter (Judd 1926:98). A riparian twig from the roof matrix of the residence later returned a radiocarbon date of 890 ±50 BP (AD 1136 median probability), a date consistent with what McFadden (2016) identified as Dogoszhi Black-on-white and Tusayan Corrugated potsherds. An earlier occupation was suggested by the presence of early Pueblo II potsherds.

Trail Canyon Alcove is located in a small tributary to Kanab Creek It features a masonry architecture in an alcove setting, including storage rooms built accretionally over time, and a possible kiva nearly 6 meters in diameter. The site produced two late Pueblo II radiocarbon dates of 980 ±60 BP (AD 1076 median probability) and 920 ±40 BP (AD 1106 median probability), both of which were consistent with corrugated ceramics at the site. The presence of Basketmaker III and early Pueblo II rim forms suggested earlier occupations, something consistent with a maize radiocarbon date that reflected a possible Pueblo I occupation (McFadden 2016).

Another site in the Bay Bill tributary to Parunuweap Canyon consisted of three storage structures located in two small rockshelters. Structure 1 was a large D-shaped masonry granary measuring 2 by 1.4 meters with an interior height of 1.5 meters. It featured a rectangular entry with a sandstone slab lintel and threshold. A worked riparian twig collected from the interior fill yielded a radiocarbon date of 950 ±70 BP (AD 1097 median probability). A single St. George Black-on-gray potsherd and a few North Creek Gray potsherds were observed, suggesting an early Pueblo II occupation. Nine tree-ring dates, however, were clustered tightly between AD 1147 and AD 1150, suggesting the beams were cut at the same time and perhaps stored in anticipation of future construction that never happened (McFadden 2016).

Nipple Spring Alcove was initially described by Julian Steward (1941:283) as a "masonry cliff house," although subsequent investigations (McFadden 2016:104) identified only granaries and wall remnants. A well-preserved timber indicated a cutting date of AD 1150 or AD 1151, suggesting the construction occurred at this dry-farming site during a severe drought.

In summary, the late Pueblo II chronometric data is weighted heavily toward sheltered sites that exhibit often-exceptional masonry construction. Most of these sites have evidence of earlier occupations, based on ceramic and chronometric evidence, and the late Pueblo II expression found here appears to represent accretion of new architectural traits rather than a replacement of earlier architecture.

Reoccupation of older sites is also evident at sites identified during the course of inventories. According to the state site database, 30 sites with Basketmaker III ceramics also had late Pueblo II ceramics, 29 sites with Pueblo I ceramics also had late Pueblo II ceramics, and 55 sites with early Pueblo II ceramics also had late Pueblo II ceramics. In other words, 114 sites occupied during earlier periods were utilized to a greater or lesser extent in late Pueblo II times. This compares to 112 sites with late Pueblo II whitewares but without indicators of earlier occupations.

The actual number of sites attributed to this period of time is much greater than indicated by those sites with identifiable whiteware ceramics. Another 247 sites had corrugated ceramics and/or unidentified whitewares and redwares that are probably attributed to this period of time. The sheer number of late Pueblo II sites (ca. 500) is two to three times greater than any earlier period of time, which would seem to support the idea of larger populations after about AD 1050. This might also reflect bias in that these ceramics are much more temporally sensitive and recognizable.

Fiftymile Mountain Phase

The late Formative on the Kaiparowits Plateau and upper Escalante River Basin, discussed in Chapter 5, is commonly referred to as the Fiftymile Mountain Phase, a reference to the proliferation of late Pueblo II sites on the Kaiparowits Plateau. It begins about AD 1050 and concludes when Ancestral Puebloan groups and/or influence disappeared from the region sometime between AD 1150 to AD 1250. This period of time in both the Escalante River and Kaiparowits Plateau regions has typically been described within the context of a Pueblo II expansion, although there is little agreement as to which region provided the impetus for that expansion and whether or not it involved a displacement or assimilation of existing Fremont groups. Most researchers today acknowledge a short-term expansion into the region by Kayenta groups or by groups imitating Kayenta pottery styles.

Twenty-five late Formative radiocarbon dates have been reported from 15 sites in the Kaiparowits Plateau and Escalante River regions that might be attributed to this Pueblo II expansion (see Table 5.11 in Chapter 5). These dates were derived from sites that either have distinctive Pueblo II architecture or the sites have distinctive late Pueblo II ceramics. Some of these sites might represent occupations by Fremont farmers who had close social and economic relationships with their Ancestral Puebloan neighbors

In addition, eight sites in the region have produced 25 tree-ring dates with outside rings dating between AD 980 and 1189 (see Table 5.12 in Chapter 5). All of these tree-ring dates were associated with large residential sites in both open and sheltered settings and with storage locales in sheltered settings. All but one were associated with Ancestral Puebloan ceramic assemblages defined in either the Grand Staircase or Kayenta regions.

Figure 6.21: The alcoves below the rim of Fiftymile Mountain contain an abundance of granaries and several large residences or cliff dwellings occupied during late Pueblo II and early Pueblo III times.

The idea of an actual migration of some Kayenta farmers into the region is also supported by excavations at two sites in the Circle Cliffs region. The Coombs Site, located on Boulder Creek in the Boulder Mountain foothills, consisted of an abundance of surface and subsurface living and storage structures oriented around a plaza in a typical Kayenta configuration. The site yielded four radiocarbon dates, as well as a wealth of tree-ring dates that seem to support the hypothesis that Puebloan farmers migrated into the region in late Pueblo II times. About 5 percent of the ceramics at the Coombs Site were classified as Fremont, implying at least some coexistence of existing Fremont populations and Ancestral Puebloan immigrants.

Latady and Prince (1994) and Lister and Lister (1961) observed the abundance of animal bones suggested the importance of meat and the use of hide, bones, antler and sinew for clothing and tools. Mule deer were the most common faunal remains, followed by bighorn sheep. Lister and Lister (1961) suggested that entire animals were being transported to the site for processing. McFadden (2016) suggested Coombs Village was not just an agricultural oasis, but was also situated to take advantage of big game migrations during winter similar to earlier Fremont patterns. Initially, Coombs Village could have been a typical Kayenta agricultural pueblo, but later it became primarily a winter occupation focused on hunting, but with outlying agricultural sites occupied during the summer. In other words, Coombs Village represented a winter aggregation focused on hunting and nearby Lampstand Ruins might have represented a dry farming locale occupied during the summer.

Most of the chronometric data suggest that Coombs Village was constructed and occupied very late in late Pueblo II times, and that it persisted less than 100 years. Four radiocarbon dates ranged from 1115 $\pm$85 BP (AD 907 median probability) to 785

±80 BP (AD 1225 median probability), although the earliest date was considered much too early. The tree-ring evidence also supports construction of the site in the mid-AD 1100s (Bannister et al. 1969; Robinson and Cameron 1991). Of note, McFadden (2016) reported two additional tree-ring dates of AD 1095 (+vv) and AD 1165 (+vv).

The size and complexity of Coombs Village is certainly unusual in the GSENM region, but the aggregation of populations into small pueblos during late Formative times is hardly unique in the Southwest. The large size of the pueblo suggests it might have been a focus of socioeconomic activities in the upper Escalante River region at this time.

The size of Coombs Village undoubtedly had significant socioeconomic and political implications for surrounding communities. This is certainly evident at Lampstand Ruins, a small pueblo with numerous outlier field houses in upland mesa settings without permanent water. Described as a Kayenta settlement, Lampstand Ruins is actually a concentration of at least seven residential and storage sites that were clustered primarily in a group of upper ruins with three distinct roomblocks and smaller features on the eastern edge of a high mesa, and a lower set of ruins below the mesa rim.

Excavations of the northern and central roomblocks revealed a series of linear roomblocks with masonry storage and residential structures, abundant late Pueblo II ceramics, and off-site granaries. Crews also identified a larger jacal structure described as a residential structure, although it lacked a hearth. Eight radiocarbon dates ranged from 1300 ±60 BP (AD 722 median probability) to 890 ±70 BP (AD 1137 median probability), although four or five of the dates were much too early and were inconsistent with the ceramic collections (Baadsgaard and Fergusson 1999; Janetski and Talbot 1998). A tree-ring date of AD 1083 (++vv) was later reported from one of the pueblos in the Lampstand complex (McFadden 2016).

Lampstand Ruins were probably indicative of a small population closely related to those living at Coombs Village. All ceramic and architectural evidence suggests a brief occupation, perhaps 20 to 50 years, by dry farmers without immediate access to permanent water. As a whole, Lampstand Ruins was about one-fourth the size of Coombs Village, but the sheer number of small pueblos or field houses on nearby mesa rims suggested a larger population than was evident at the pueblo itself. The presence of surface roomblocks would appear to fit the pattern described above for population aggregation, changing storage needs, and reduced mobility.

An analysis of inventory data in the areas around Coombs Village and Lampstand Ruins identified 55 sites attributed to Kayenta immigrants. Wright (2001:105) found that these sites were generally clustered in close proximity to either Coombs Village or Lampstand Ruins, that logistical use of the lowlands was not intensive, and that late Pueblo II populations "relied extensively on dry farming and, therefore, did not stray far from their established settlements."

The temporal and spatial relationship between Coombs Village and Lampstand Ruins, as well as the peripheral sites around them, appears quite convincing, but it also might reflect only one aspect of late Pueblo II adaptations in the region. As we discussed in Chapter 5, evidence from the Arrowhead Complex at Wide Hollow, located just above the Escalante River, suggest that Ancestral Puebloan groups moved into that area, either displacing, assimilating, or coexisting with Fremont groups who had lived there for five centuries or more. Two deep pithouses at Arrowhead Hill were similar to those excavated at Coombs Village, but the limited field work did not identify roomblocks, courtyards, or kivas that would be expected at late Pueblo II sites.

In summary, the upper Escalante River country, which had been home to Fremont and Ancestral Fremont groups since at least AD 200, experienced an influx of Ancestral Puebloan immigrants sometime between AD 1050 and 1100. These immigrants exploited highland environments between 6,000 and 7,500 feet elevation where precipitation might have been greater, but shorter growing seasons would have made agriculture much riskier.

Dry farming in marginal environments suggests that climatic conditions were amenable to risky farming strategies, even if only for short periods. Fine-scale paleoenvironmental reconstructions are not available for the Kaiparowits Plateau and upper Escalante River Basin, but proxy tree-ring data from the greater Southwest suggest an abnormally wet period from AD 1040 to 1129, followed by a mega-drought from AD 1130 to 1177. This, in turn, was followed by a wet cycle from AD 1193 to AD 1269, and then another mega-drought from AD 1273 to 1297 (Benson and Berry 2009:100).

The first of the two wet periods coincides nicely with the beginning of the late Pueblo II period and the expansion of Ancestral Puebloan farming groups into all three sub-regions of GSENM, as well as the Arizona Strip. Increased precipitation might have made higher elevations agriculturally productive, but only if accompanied by warmer temperatures that extended growing seasons at higher elevations, or if maize hybrids had been developed that were adapted to shorter growing seasons.

Most of the tree-ring dates from Escalante River and Kaiparowits Plateau regions suggest construction episodes at about AD 1130 or later. This would place the occupations of both regions at the onset of the first mega-drought. It seems counterintuitive that farming groups would expand into high-risk environments during periods of climatic deterioration. Lampstand Ruins, Coombs Village, and the Kaiparowits Plateau sites are all at very high elevations between 6,500 and 7,500 feet elevation. Farming at higher elevations with greater precipitation can be an appropriate response to drought conditions at lower elevations (Arnold-Boomgarden 2015), and it was one that proved particularly effective during Pueblo I times in the Four Corners region (Hurst 1992; Lipe and Varien 1999a, 1999b). It is also interesting to note the latest tree-ring cutting date in either region is AD 1189, or just before the onset of another abnormally wet cycle.

As summarized by Benson and Berry (2009:112), long-term drought intervals of 20 years or more would have inevitably exceeded maize storage limits, and "when this occurred, people had to move, either laterally outside the drought-stricken region or vertically to wetter and cooler elevations." If climatic reconstructions elsewhere in the Southwest can be applied to the Kaiparowits Plateau and upper Escalante River country, and the tree-ring dates are accurate indicators of construction episodes, then two possibilities must be considered:

- The proliferation of high-elevation sites in late Pueblo II times might represent a vertical response by local groups to drought conditions at lower and mid-range elevations beginning about AD 1130. Once drought conditions ameliorated at lower elevations, the upland farmers returned to their earlier farms at the lower locations.

- High-elevation sites could represent lateral movement of groups from distant regions (e.g., the Kayenta region) fleeing drought conditions farther to the south. Once drought conditions ameliorated south of the Colorado River, they simply returned to their Kayenta homeland.

Regional Comparisons

The same pattern of rapid population increases, the emergence of linear and C-shaped pueblos, and the expansion of farming into extremely marginal upland environments is repeated throughout the high plateaus south and west of GSENM, especially the Paria Plateau, Shivwits Plateau, Kanab Plateau, Little Creek Mountain, and Kaibab Plateau (Harry 2008, 2013, 2015; Huffman et al. 1990; Moffitt and Chang 1978; Thompson and Thompson, 1974, 1978; Westfall 1987b), as well as lower Colorado River environments like the Unkar Delta and Furnace Flats where population aggregations reached unprecedented levels (Jones 1986a, 1986b; Schwartz et al. 1990).

Lyneis (1995) suggested that areas east of Kanab Creek experienced an actual Kayenta migration into those areas, whereas groups to the west of Kanab Creek were influenced by the migration, but were never full enveloped by it. The concept of a boundary between Kayenta and Virgin populations is supported by three lines of ceramic evidence:

- Actual Kayenta whitewares and redwares are found east of Kanab Creek throughout the north-

Table 6.10

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
AZ G:03:020		Colorado River	Charcoal	980 ±70	n/a	AD 911-1208	AD 1073	Beta-158806	Feature 8 Hearth	Grand Canyon-NPS Files
AZ:A14:46	Granary House	Shivwits Plateau	Charcoal	980 ±50	22.7	AD 977-1168	AD 1077	Beta-250678	Feature 2 Storage	Harry 2008:43
12-034	Petes Pocket	Shivwits Plateau	Burned Beam	970 ±30	-21.2	AD 1017-1150	AD 1090	Beta-335809	Feature 6, Test Unit 1, Room Fill	Harry 2015:23
AZ B:6:44	Pinenut Site	Kanab Plateau	Burned Beam	970 ±80	n/a	AD 903-1220	AD 1078	Beta-639	Room E Pithouse Floor	Westfall 1987b:58
AR-030703-0865		Houserock Valley	Zea Mays	960 ±40	-11.8	AD 1012-1164	AD 1093	Beta-284178	Shelter Surface	Kaibab NF Files
AZ C:13:384		Colorado River	Charcoal	950 ±70	n/a	AD 958-1222	AD 1097	Beta-45827	Isolated Hearth	Hereford et al. 1993:11
AZ C:13:384		Colorado River	Charcoal	950 ±80	n/a	AD 913-1238	AD 1097	W-6309	Isolated Hearth	Hereford et al. 1993:11
AZ A:14:083	To'tsa	Shivwits Plateau	Plant Tissue	950 ±30	-20.4	AD 1027-1155	AD 1097	Beta-410059	Feature 6 Semi-Sub. Structure	Harry 2015: Appendix C
AR-030703-1500		Lower Kanab Creek	Yucca Sandal	945 ±35	-10.9	AD 1026-1166	AD 1097	AA-66728	Not Specified	Kaibab NF Files
AZ:A14:50	Lava Ridge	Shivwits Plateau	Charcoal	940 ±40	-21.7	AD 1024-1188	AD 1097	Beta-250683	Feature 3 D-Shaped Habitation	Harry 2008: Appendix B
AZ A:14:083	To'tsa	Shivwits Plateau	Plant Tissue	940 ±30	-19	AD 1029-1159	AD 1098	Beta-469421	Feature 6 Semi-Sub. Structure	Harry 2015: Appendix C
UN-2		Colorado River	Roof Matting	925 ±100	n/a	AD 903-1261	AD 1110	I-3044	Kiva Roof	Schwartz et al. 1980:59
AZ B:8:7	Crane Lake Site	Kaibab Plateau	Charcoal	910 ±60	n/a	AD 1022-1238	AD 1120	Beta-24069	Locus D, Strata IVa-V	Schroedl 1988:57
AZ C:13:384		Colorado River	Charcoal	900 ±80	n/a	AD 996-1258	AD 1129	W-6308	Isolated Hearth	Hereford et al. 1993:11
AZ C:09:0027	Anasazi Bridge	Colorado River	Wood	900 ±125	n/a	AD 870-1299	AD 1122	GX-5006	Platform/Bridge	Grand Canyon-NPS Files
AZ C:13:010		Colorado River	Charcoal	890 ±50	n/a	AD 1036-1245	AD 1137	Beta-130614	Feature 9, Room 1	Miller 2005:94
AZ:A14:50	Lava Ridge	Shivwits Plateau	Charcoal	890 ±40	-23.2	AD 1040-1226	AD 1136	Beta-250682	Feature 18	Harry 2008:Appendix B

Table 6.10: Late Pueblo II radiocarbon dates from the Arizona Strip region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

ern Grand Staircase, the Kaiparowits Plateau, and Escalante River Basin, but they are comparatively rare west of Kanab Creek.

- Olivine-tempered Moapa Grayware and Moapa Whiteware, believed to have been manufactured in the Mt. Trumbull area, are commonplace west of Kanab Creek, but they are rarely documented at sites east of Kanab Creek.

- The emergence of a distinct Shinarump Redware tradition, probably in the Vermilion Cliffs area near Johnson Canyon or the Paria Plateau, is a locally produced analog of Kayenta redwares, suggesting close interaction with Kayenta groups. It is especially common east of Kanab Creek, although it was traded widely among groups to the west. It is the only locally produced redware found among Virgin Branch groups.

In most respects, however, this late Pueblo II boundary is an artificial construct based on certain ceramic characteristics. Settlement patterns, demographic trends, increased agricultural intensification, enhanced regional trade networks, and architectural patterns are indistinguishable whether east or west of Kanab Creek. In fact, the entire Virgin Branch region appears to reflect differences specific to unique local environmental variables, such as the availability of quality building stone, the location of manageable water, and availability of certain faunal resources like rabbits and tortoises.

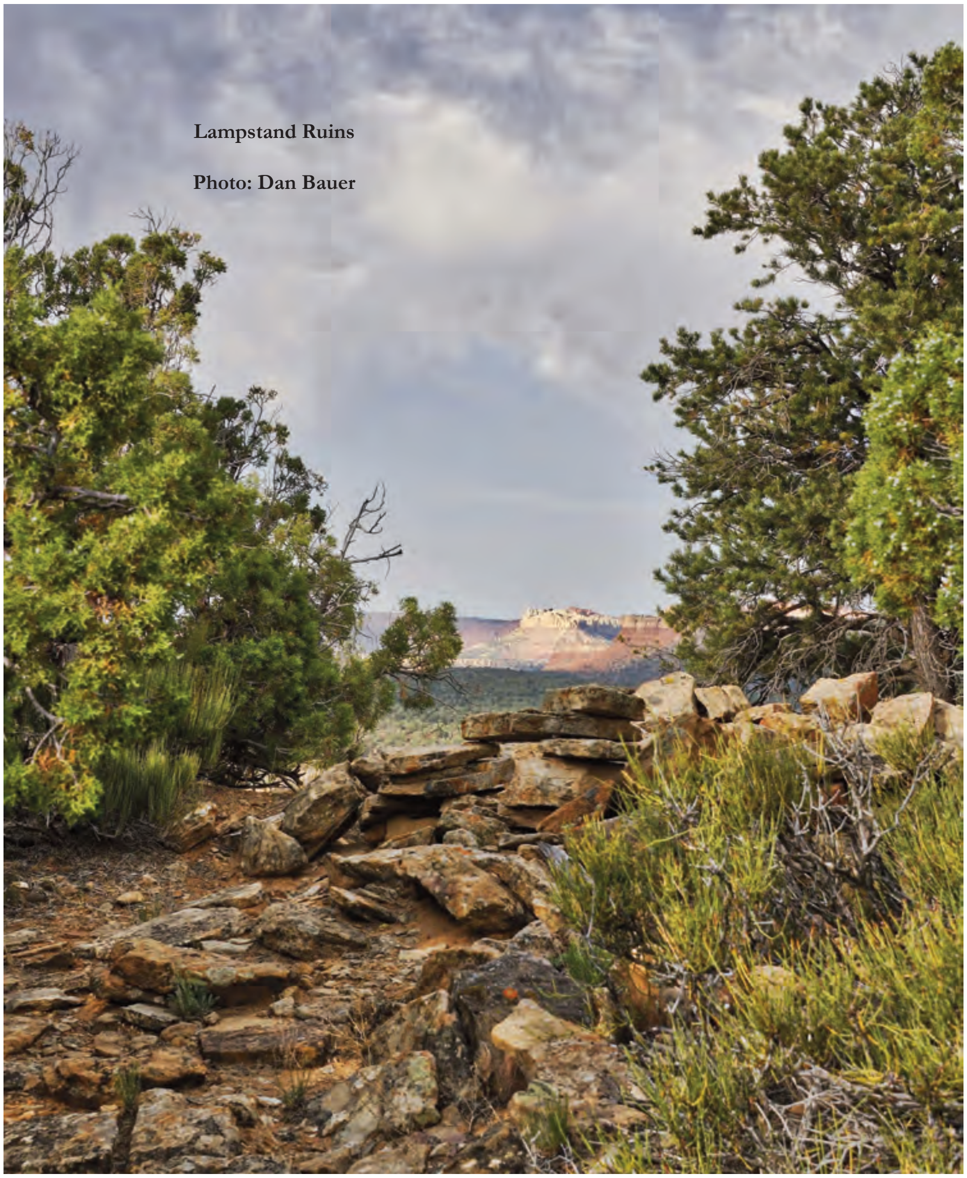
Subtle east-to-west and west-to-east differences have been identified that might have pan-regional significance (see Richard Ahlstrom's *Puebloan Culture Identity*, in Roberts 2018). But regional similarities far outweigh differences at this point in time. Throughout the region, there was a proliferation of small- and medium-sized pueblos, and there was a shift to above-ground residences even though pithouses continued to be used. A few larger sites like Coombs Village, Pottery Knoll, and Main Ridge might have integrated smaller, dispersed communities into a larger social and resource redistribution network, and all groups engaged in pan-regional trade in exotic materials such as turquoise, stone pipes, and ocean shells, as well as more mundane household items such as rabbit-skin robes, yucca sandals, and food. All groups were overly dependent on maize, which they supplemented with squash, beans, turkeys, and disturbance plants such as sunflowers. And all groups were dependent on large-scale storage capabilities to ameliorate resource shortfalls from one year to the next.

Lyneis (1995) referred to the late Pueblo II settlement pattern as co-residential "courtyard groups," where residences were incorporated into a curvilinear or rectilinear alignment of storage rooms that defined and sheltered a courtyard. Courtyard groups were small in size, housed no more than a few families in a 'face-to-face" community, and had no integrating community architecture like kivas. For the most part, this pattern is consistent across the Virgin Branch world.

As in earlier times, the biggest difference between upland and lowland Virgin Branch adaptations was that upland groups exploited a wider variety of environmental niches, each of which required different agricultural approaches, from irrigation and sub-irrigation farming along permanent water sources, to rainfall management and manipulation in those drainages without permanent water, to dry farming of the mesa tops. Each was probably an adjunct to the other and each probably served as a contingency in the event other strategies failed.

By comparison, lowland farmers were still tethered to the Virgin River, as well as a handful of tributaries like the Santa Clara River and Muddy River. As discussed by Lyneis (1995), some of these water sources are slow and sluggish and can be diverted onto fields along the floodplain. Other water sources are vulnerable to spring flooding, but the retreat of the floods would have left the river banks moist and suitable for sub-irrigation. And the scattering of springs might have allowed for garden plots in some areas.

A hallmark of late Pueblo II times elsewhere in the Southwest is the increased reliance on water and soil control measures to increase the amount and quality of arable lands and to maximize soil moisture in areas where trans-evaporation is high. A few examples of check dams, terracing, and field borders have been reported from the high



Lampstand Ruins

Photo: Dan Bauer

plateaus (Moffitt and Chang 1978; Westfall 1987b), as well as Houserock Valley (McFadden 2004) and the Colorado River corridor and adjacent Walhalla Plateau (Jones 1986a; Schwartz et al. 1980, 1981), but overall there is minimal evidence for these strategies in upland or lowland settings at this time.

Of particular interest is Lyneis' observation (1995:218) that "kivas do not seem to have been part of the Lowland Virgin occupation," whereas evidence is common that kivas or kiva-like structures were common in upland settings at this time. As we discussed earlier, kivas are well represented in the Cottonwood Canyon and Kanab Creek drainages (Judd 1926; McFadden 2016) and in the Colorado River corridor (Jones 1986b; Schwartz et al. 1980). Possible kivas were also identified at Bonanza Dune (Aikens 1965), the Gnatmare Site (Metcalfe 1982), and Coombs Village (Lister and Lister 1961), although these might have been unusually deep pithouses.

Kivas were also reported at the mouth of Flood Canyon, on Little Creek Mountain, and at the Corn Grower Site in the upper Short Creek area. The latter site is unusual in that the D-shaped roomblock fully encloses a plaza that features a slightly off-center kiva. Tree-ring samples from the kiva vent shaft indicated a construction date at about AD 1150.

Upland occupations on the southern Grand Staircase reflect adaptations to a broad range of environments and elevations, as well as different resource procurement activities. This is supported by 18 late Pueblo II radiocarbon dates (see Table 6.10 above). These dated sites are representative of simple and complex residences, as well as foraging, and storage activities.

Pueblo III: AD 1150 to 1300

The Pueblo III period in the Virgin Branch region is problematic because of various definitions used to delineate it from earlier and later periods. And depending on the definition, it might not have existed at all. As traditionally defined in the greater Southwest, the Pueblo III period is marked by the appearance of certain ceramic indicators and architectural characteristics, none of which are evident in GSENM or surrounding areas. But if the period is more loosely defined as Ancestral Puebloan organizational responses that followed the collapse of the Chacoan system, then Pueblo III becomes a period of time rather than a catalog of material culture traits. We prefer the latter approach in this chapter.

> **The absence of Kayenta Pueblo III ceramics anywhere in the Monument suggests that contact with Kayenta groups south of the Colorado River ceased after AD 1150.**

Also complicating a discussion of Pueblo III adaptations in GSENM and elsewhere in the Virgin Branch region is the appearance of Ancestral Paiute groups, perhaps as early as AD 1000 but certainly by AD 1200. The co-existence of two different cultural traditions is most pronounced in the Arizona Strip, St. George Basin, and lower Virgin River country (see Chapter 7).

In the Southwest generally, the Pueblo III period of time from AD 1150 to 1300 is characterized by the sociopolitical ramifications of the decline of major Chacoan centers in the San Juan Basin. These included the development of large aggregated settlements in areas peripheral to the San Juan Basin, a retraction of the overall area occupied by Pueblo II farmers, changes in community patterns from clusters of dispersed settlements with occasional aggregates to the use of large, plaza-oriented villages, new configurations for exchange of information and materials, and, by the end of the period, the emergence of the Kachina cult and kiva complex resembling historic patterns (Lipe and Lekson 1990; Lipe and Varien 1999b).

At the same time, the period is also characterized by abandonment of some areas and population shifts to others; a decrease in the number of sites, but an increase in their size; widespread intensification of water and soil conservation strategies that had appeared during Pueblo II times; the florescence of distinct architectural and ceramic complexes; and the widespread occupation of defensible locations with dependable water sources during the decades preceding abandonment. These sites are most recognized by the public at places such as Mesa Verde and Betatakin.

A review of the voluminous archaeological literature related to this period is beyond the scope of this chapter (see Lipe and Varien 1999b for a superb overview of Pueblo III period research). As discussed above, the end of the Pueblo II period (AD 1150) was marked by dramatic population declines in large geographic areas across the Southwest, including much of southwestern Utah and northwestern Arizona. Other areas experienced population increases, including the Long House Valley (Dean et al. 1978), Canyon de Chelly (McDonald 1976, Morris 1983), and the Mesa Verde heartland in the McElmo and Montezuma Creek drainages (Lipe and Lekson 1990; Lipe and Varien 1999b).

Dispersed farmsteads in the hinterlands were abandoned in early Pueblo III times in favor of fewer, larger settlements consisting of large blocks of contiguous rooms or multi-unit pueblos. Later in the period, there is a noticeable shift toward cliff dwellings and canyon rim towers directly associated with dependable water (Eddy et al. 1984; Lipe and Lekson 1990, Lipe and Varien 1999b; Varien et al. 1996). This latter shift is generally thought to represent a defensive response during late Pueblo III times, as evidenced by settlements and towers on rock prominences, inaccessible mesas, escarpments, and precarious cliff ledges throughout the Four Corners region. As discussed by Hurst (1992:68), access to many of the sites is "particularly inconvenient, and defensible locations may have served exclusively as defensive citadels for use only during crises, rather than as full-time habitations."

This defensive response also coincided with a sharp distinction between the Kayenta and Mesa Verde Puebloans, as evidenced by a divergence of ceramic and architectural styles. Hurst noted (1992:69) that Mesa Verde and Kayenta potters were producing similar ceramics and trading them extensively with one another during Pueblo II times. But by Pueblo III times, the two areas were producing unmistakably different whitewares, "the most distinct in their history ... and virtually none was passing between them." McFadden (2012:205) made a similar observation in the Grand Staircase, where the absence of Kayenta Pueblo III ceramics "suggests that after AD 1150, contact with the Kayenta south of the Colorado River ceased."

The great houses, great kivas, roads, and other associated features evident in southeastern Utah persisted well into Pueblo III times, and indeed these may have been defining characteristics of the Pueblo III period in southeastern Utah (Hurst and Till 2002; Severance 1999, 2003, 2004). In some instances, earlier great houses were remodeled or rebuilt, obscuring or obliterating remnants of the earlier construction. This period was also characterized by the appearance of large masonry towers at the heads of canyons, usually above reliable water sources, that might have functioned as forts or symbols of ownership of the water sources (Severance 2003:29). None of these architectural traits have yet been documented in GSENM.

Grand Staircase Pueblo III

The Pueblo III period in the Virgin Branch region remains poorly understood, and the timing of events leading to abandonment appear to have varied from one sub-region to another. Some researchers originally argued for a general abandonment of the region by about AD 1150. But more recent research suggests that a few Puebloan groups remained in the region for the next century, some living in small communities in optimal environmental niches (McFadden 2012; Metcalfe 1982; Westfall 1987b) and others aggregating into comparatively large pueblos (Jones 1986b; Morley 1993; Schwartz et al. 1980), although none of these approached the size and complexity of pueblos in the Four Corners region.

One of the most perplexing aspects of post-AD 1150 occupations is the rarity of true Pueblo III ceramics types anywhere in the Virgin Branch world. Dogoszhi and Sosi whitewares have a comparatively long period of production that extended into Pueblo III times. Flagstaff Black-on-white was manufactured in the Kayenta heartland between AD 1130 and 1230, and as such it is a good Pueblo III indicator. But we found few references to actual Flagstaff Black-on-white in the IMACS database. Two locally produced types are very similar, but these are also rare:

- Glendale Black-on-gray is the Tusayan Whiteware (Virgin Series) analog to Flagstaff Black-on-white. It is not particularly common in the Grand Staircase, but there are a few references to it.

- Cottonwood Black-on-white is Shinarump Whiteware analog to Flagstaff Black-on-white. This type appears to be quite rare or it is not identified as such on state IMACS forms. Given the production area was east of Kanab Creek, it should be fairly common.

Twenty-five Pueblo III radiocarbon dates have been reported from Ancestral Puebloan sites on the northern Grand Staircase with median probability ages between AD 1150 and 1300 (Table 6.11), most of which were derived from three complex residential sites: Arroyo Site, Pottery Knoll, and Gnatmare. Five additional radiocarbon dates associated with Ancestral Paiute occupations at this time are discussed in Chapter 7.

The Gnatmare Site, located in the Cottonwood Wash area on the extreme eastern periphery of the northern Grand Staircase, consisted of a single-room rectangular masonry structure and a subterranean circular pit structure almost 2 meters in depth. The rectangular structure measured 5.5 by 5.9 meters east to west and 5 by 5.4 meters north to south. It featured walls constructed of sandstone slabs set in adobe mortar and chinked with smaller, irregularly shaped stones. A radiocarbon date of 720 ±65 BP (AD 1280 median probability) was reported from the roof fall of this structure (Metcalfe 1982).

The circular structure, located about 6 meters away, measured about 3.7 meters in diameter. The floor area was 1.9 meters below ground level and featured a central basin-shaped hearth. Possible remains of a ventilator shaft were observed in the southwestern wall. Three vertical wooden poles were also located just inside and resting against the walls of the structure. A masonry bench was located along the northwestern quarter of the interior wall. Charcoal from the hearth area returned a radiocarbon date of 980 ±75 BP (AD 1071 median probability). Metcalfe (1982:76) observed it "is tempting to apply the term kiva to a subsurface structure almost two meters deep with a possible ventilator shaft and a masonry bench [but] the lack of other known contemporaneous structures at the site argues that it was a domestic dwelling."

The large amount of cultural debris associated with the later occupation suggested the abandonment of the structure was not planned, but rather forced upon the occupants by the fire that destroyed the roof. A radiocarbon sample from the roof returned a radiocarbon date of 835 ±65 BP (AD 1193 median probability), a date considered statistically consistent with the ceramic evidence and the occupation of the rectangular structure (Metcalfe 1982).

Pottery Knoll, a large late Formative residential site at the confluence of Deer Springs Wash

Table 6.11

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	870 ±80	-13.7	AD 1021-1269	AD 1155	Beta-100262	Pithouse PS-1 Fill Unit B	McFadden 2012
42Ws0881		Little Creek Mountain	5480	Charcoal	870 ±70	n/a	AD 1030-1263	AD 1158	Beta-40333	F41C Residential-Work Room Post	Barb Frank, personal communication 2018
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	860 ±50	-25	AD 1045-1257	AD 1177	Beta-66335	Resid. Room 1 Floor Unit A	McFadden 2012:71
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Zea Mays	850 ±30	-9.2 AMS	AD 1066-1251	AD 1196	Beta-117941	Pithouse PS-2 Hearth Unit D	McFadden 2012:71
42Ka2584		Kitchen Corral Wash	5560	Charcoal	840 ±50	n/a	AD 1051-1264	AD 1196	Beta-8420	F1 Pithouse Floor	Westfall 1985:110
42Ka1504		Cottonwood Canyon	6000	Charcoal	840 ±80	n/a	AD 1033-1283	AD 1180	Beta-24402	Kiva Hearth	Tipps 1983:53
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	840 ±50	-25	AD 1052-1265	AD 1195	Beta-77116	Pithouse PS-4 Floor Unit C	McFadden 2012:71
42Ka1978	Gnatmare	Cottonwood Wash	5010	Charcoal	835 ±65	Uncorrected	AD 1046-1273	AD 1193	UGA-4003	Roof Fall, Level II, Structure II	Metcalfe 1982:47
42Ws2195		Short Creek	5100	Hearth Fill	820 ±70	n/a	AD 1046-1282	AD 1202	Beta-28331	Occupation Surface 2	Nielson 1998:7.2
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	820 ±60	-25	AD 1052-1276	AD 1208	Beta-77117	Storage Room 1 Floor Unit A	McFadden 2012:71
42Ka1969	Kanab Site	Kanab Creek	4820	Charcoal	810 ±110	Uncorrected	AD 1016-1379	AD 1196	RL-1397	Pithouse Hearth	Nickens and Kvamme 1981:34
42Ka1568	Pottery Knoll	Park Wash	5660	Zea Mays	810 ±50	-10	AD 1066-1274	AD 1222	Beta-55076	Room 1	Morley 1993:161
42Ka3328		Seaman Wash	5560	Charcoal	810 ±60	n/a	AD 1055-1280	AD 1217	Beta-40331	F4 Floor Contact	McFadden 2016:128
42Ka1568	Pottery Knoll	Park Wash	5660	Charcoal	800 ±70	n/a	AD 1051-1320	AD 1218	Beta-55080	Roof Material, Room 12	Morley 1993:161
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Zea Mays	800 ±30	-10	AD 1177-1269	AD 1237	Beta-117940	Pithouse PS-1 Hearth Unit B	McFadden 2012:71
42Ka1568	Pottery Knoll	Park Wash	5660	Charcoal	800 ±70	n/a	AD 1051-1320	AD 1218	Beta-55080	Roof Material, Room 12 Roomblock	Morley 1993:161

Table 6.11 (continued)

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Zea Mays	800 $\pm$30	-10	AD 1177-1269	AD 1237	Beta-117940	PS-1 Hearth Unit B Pithouse	McFadden 2012:71
42Ka1568	Pottery Knoll	Park Wash	5660	Charcoal	790 $\pm$50	n/a	AD 1127-1282	AD 1235	Beta-55078	Roof Material, Trench 3 Roomblock	Morley 1993:161
42Ka3694		Hog Canyon	5600	Wood	780 $\pm$70	-24.7	AD 1059-1371	AD 1233	Beta-163063	Twig in Granary Adobe	McFadden 2016:119
42Ka1568	Pottery Knoll	Park Wash	5660	Zea Mays	770 $\pm$50	-9.6	AD 1163-1295	AD 1247	Beta-55077	Room 1 Roomblock	Morley 1993:161
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Charcoal	760 $\pm$60	-25	AD 1121-1374	AD 1250	Beta-77112	F40 Surface Unit C	McFadden 2012:71
42Ka1798	Gnatmare	Cottonwood Wash	5010	Charcoal	720 $\pm$65	Uncorrected	AD 1175-1389	AD 1280	UGA-3749	Roof Fall Structure 1	Metcalfe 1982:47
42Ka3976	Arroyo Site	Kitchen Corral Wash	5560	Wood	700 $\pm$50	-25	AD 1228-1388	AD 1293	Beta-77115	F10 PS-3 Post Unit C Pithouse	McFadden 2012:71
AZ B:1:35	Carling Reservoir	Short Creek	5000	Wood	670 $\pm$90	n/a	AD 1178-1420	AD 1319	Beta-33812	Pithouse Pit 13, Level 1 Fill-Floor	Nielson 1998:7.1
42Ka2605		Kitchen Corral Wash	5660	Burned Wood	640 $\pm$60	n/a	AD 1270-1411	AD 1346	Beta-8421	Hearth 1A	Westfall 1985:96

Table 6.11: Pueblo III radiocarbon dates from the Vermilion Cliffs (northern Grand Staircase) region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

and Park Wash, consisted of 57 rooms with continuous walls surrounding the pueblo. The pueblo was described as C-shaped, but unusual in the sense the courtyard was dissected by an L-shaped roomblock that divided the courtyard into two sections. Five radiocarbon dates ranging from 930 ±60 BP (AD 1107 median probability) to 770 ±50 BP (AD 1247 median probability) were reported.

Morley (1993) argued that Pottery Knoll "does not fit the model usually used to describe the Virgin Branch," a conclusion she based on masonry style and the complexity of the pueblo that included the presence of two plazas and probably a kiva. The frequency of corrugated potsherds, the presence of polychrome potsherds, and the maximum range of the radiocarbon dates extending into Pueblo III times also supported this assessment. McFadden (2016) has questioned whether the ceramics were accurately identified, suggesting they are actually all Pueblo II types.

Morley (1993:160-165) suggested the size and complexity of the site was due to involuntary aggregation "by survivors of food scarcity, intensification of regional interchange, and competition or warfare. However, since climatic, demographic and social factors could initiate any or all of these responses and the responses are interrelated, it is probable that aggregation was not caused by a single response."

The Arroyo Site, a late Pueblo II and Pueblo III farmstead located along Kitchen Corral Wash, was described as "typically Virgin" in that it featured episodes of construction followed by abandonment and reoccupations, each of which involved re-flooring and remodeling earlier features (McFadden 2012, 2016). Most of the site's radiocarbon dates supported the idea of repeated occupations between about AD 1050 and 1250; earlier radiocarbon dates were probably the result of burning old wood. Artifacts were abundant and included a diverse chipped-stone tool assemblage, spindle whorls, bone tools, remains of turkeys and dogs, and more than 13,000 potsherds, none of which were Pueblo III types found south of the Colorado River.

McFadden observed (2016:123) that the Arroyo Site was an "intensively, if intermittently, occupied farmstead" where subsistence was based largely on agriculture, but augmented by "abundant, locally available big game." Final abandonment of the site after about AD 1270 might have been precipitated by regional climatic deterioration (cf. Benson and Berry 2009) that restricted long-established patterns of population shifts among multiple agricultural options. McFadden (2012:206) argued that "overextension of the Virgin agricultural strategy that had been practiced since Basketmaker times, in combination with climatic deterioration, may have led to collapse of the subsistence economy and rapid depopulation of the Grand Staircase during the 13th century."

Collectively, these three sites are perplexing and in some respects contradictory. Pottery Knoll appears to represent an involuntary aggregation of dispersed, small farmsteads during a time of environmental stress, food shortages, and increased competition. Yet Gnatmare and the Arroyo Site appear to represent dispersed farming settlements with one or two families. If some farmers found it advantageous to aggregate for mutual support and protection (cf. Morley 1993), apparently others did not perceive threats at this time. Evidence of Pueblo III violence or warfare is generally lacking in this region, although the deep pithouse at the Gnatmare Site was burned while still in use (Metcalfe 1982).

Regional Comparisons

Evidence of Pueblo III-age occupations in the northern Grand Staircase is limited mostly to a handful of residential sites that have produced comparatively few dates. The chronometric database on the southern Grand Staircase, on the other hand, is considerably greater (n=45 dates), although some of these dates might represent subsequent reuse of pueblo sites by Ancestral Paiutes. Considered collectively, the southern Grand Staircase appears to have experienced a far greater Puebloan presence after AD 1150 than upland areas to the north, and this might have lasted into the early AD 1300s (see Table 6.12). There are several perplexing dates from Puebloan sites, including one from maize (Harry 2015), that raise the possibility that pueblos were being occupied almost until the time of historic contact.

These southern Grand Staircase sites at this time include large pueblos along the Colorado River (Jones 1986b; Miller 2005; Schwartz et al. 1980), small pueblos in the Mt. Trumbull, Shivwits Plateau, and Kanab Plateau areas (Allison 2010; Harry 2008, 2013, 2015; Thompson and Thompson 1974), and repeatedly-occupied seasonal foraging camps characterized by clusters of roasting pits (Hereford et al. 1993; Neff et al. 2016; Reid and Betenson 2013).

In fact, the cumulative chronometric database supports the idea that (1) there is no evidence of complete abandonment by AD 1150; (2) farming communities large and small remained viable after AD 1150 even if socioeconomic interaction with Kayenta groups waned or disappeared; and (3) the mega-drought of ca. AD 1280 (cf. Benson and Berry 2009) might have been the impetus for regional abandonment, as was the case elsewhere in the Southwest. Even then, the 95 percent probability ranges of dates from the Pinenut and Furnace Flats sites, among others, suggest that some remnant populations might have persisted well into the AD 1300s.

The evidence suggests that the southern Arizona Strip region was much more intensively occupied during Pueblo III times than was the northern Grand Staircase, perhaps reflecting north-to-south population shifts in Pueblo II-III times.

In the Unkar Delta area, Schwartz et al. (1980) suggested a shift in settlement patterns from river terraces to talus slopes and sand dune locations. This adjustment might have been in response to a shortage of arable lands compared to earlier times (Effland et al. 1981), although climate change accompanied by erosion is commonly cited as the primary cause (Dean et al. 1985; Schwartz et al. 1980). Evidence from Walhalla Glades, Powell Plateau, and Kanab Plateau suggests horticultural intensification that occurred in the late AD 1000s or early 1100s might have prompted population growth that exceeded the carrying capacity of marginal plateau environments (Jones 1986a; Schwartz et al. 1981). Three sites in particular offer intriguing evidence of a late (sometimes very late) Puebloan presence on the southern Grand Staircase.

The Pinenut Site, located in lower Kanab Creek, consists of a series of well-preserved architectural features, including a linear roomblock with six contiguous rooms, a slab-lined pithouse, an isolated cist, and a trash midden. These features returned a suite of radiocarbon dates ranging from 970 ±80 BP (AD 1078 median probability) to 590 ±85 BP (AD 1334 median probability), suggesting intermittent occupations throughout the entire late Pueblo II and Pueblo III periods (Westfall 1987b).

Collectively, the architectural attributes were considered typical of the Virgin Branch with the "accretion of rooms generally proceeding along a gentle arc, open to the east. This general layout is typical of Virgin [Puebloan] settlements and contrasts with the neat, linear-to-angular room alignments of Kayenta room blocks and pueblos" (Westfall 1987b:87). Construction stones were limestone blocks that were minimally shaped or not shaped at all. These were set vertically around the perimeter of individual rooms to form the basal footings for upper walls comprised of horizontal slabs.

Two construction episodes were evident. Initial occupation of the site was from about AD 1050 to 1100, which featured construction of the pithouse, slab-lined cist, and a block of two stone rooms utilized for storage. The second occupation

Table 6.12

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
AZ:A14:46	Granary House	Shivwits Plateau	Juniper Seeds	880 ±40	-21.3	AD 1044-1239	AD 1158	Beta-255307	Feature 4	Harry 2008:Appendix B
AZ B:6:44	Pinenut Site	Kanab Plateau	Burned Wood	870 ±60	n/a	AD 1036-1257	AD 1161	Beta-633	Stratum C, Room B	Westfall 1987b:44
AZ C:13:010		Colorado River	Roof Beam	870 ±60	n/a	AD 1036-1257	AD 1161	Beta-147227	Feature 9, Room 2	Grand Canyon-NPS Files
AZ A:15:30		Colorado River	Charred Wood	870 ±50	-25	AD 1042-1254	AD 1165	Beta-106107	Roasting Pit Fill	Yeatts 1998:53-62
AZ B:6:44	Pinenut Site	Kanab Plateau	Burned Wood	860 ±90	n/a	AD 1009-1278	AD 1160	Beta-637	Feature 2 Pithouse	Westfall 1987b:77
AZ A:14:083	To'tsa	Shivwits Plateau	Juniper Seeds	860 ±30	-22	AD 1058-1245	AD 1187	Beta-469420	Feature 4	Harry 2015:66
UN-2		Colorado River	Roof Matting	855 ±90	n/a	AD 1020-1284	AD 1165	I-3043	Kiva Roof Fall/Floor	Schwartz et al. 1980:59
AZ A:10:10 BLM		Shivwits Plateau	Charcoal	850 ±40	-22.7	AD 1055-1256	AD 1191	Beta-221391	FS3 Test Pit	Allison 2010:19
GC-671		Mt. Trumbull	Charcoal	840 ±110	n/a	AD 987-1369	AD 1172	RL-80	Structure 3 Pithouse	Thompson and Thompson 1974:19
AZ A:14:083	To'tsa	Shivwits Plateau	Wooden Beam	840 ±30	-20	AD 1084-1255	AD 1205	Beta-376469	Feature 2	Harry 2015:66
AZ C:13:384		Colorado River	Charcoal	840 ±70	n/a	AD 1040-1273	AD 1185	W-6404	Isolated Hearth	Hereford et al. 1993:11
AZ A:10:20 BLM		Shivwits Plateau	Zea Mays	840 ±40	-11.2	AD 1060-1260	AD 1201	Beta-271563	Test Pit	Allison 2010:19
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	830 ±50	n/a	AD 1055-1267	AD 1204	Beta-130611	Feature 9, Level 2, Room 2, North Unit	Miller 2005:94
AZ A:10:27 BLM		Shivwits Plateau	Charcoal	830 ±60	-20.5	AD 1048-1272	AD 1198	Beta-221399	FS171 Test Pit	Allison 2010:19
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	810 ±60	n/a	AD 1055-1280	AD 1217	Beta-130609	Feature 9, Level 2, Room 1	Miller 2005:94
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	810 ±50	n/a	AD 1066-1274	AD 1222	Beta-130608	Feature 9, Level 2, Room 1	Miller 2005:94

Table 6.12 (continued)

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
AZ:A14:56	Corn Cob	Shivwits Plateau	Charcoal	810 ±40	-21.1	AD 1190-1273	AD 1243	Beta-469418	Feature 1	UNLV Anthro Files
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	800 ±50	-25	AD 1072-1277	AD 1229	Beta-130606	Feature 9, Room 2, Level 2, Beam 2	Miller 2005:94
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	800 ±50	n/a	AD 1072-1277	AD 1229	Beta-130606	Feature 9, Room 2, Level 2, Beam 2	Miller 2005:94
AZ C:1:17 BLM		Paria Plateau	Zea Mays	790 ±40	-11.7	AD 1170-1276	AD 1239	Beta-260648	Corncob in Packrat Midden	McFadden 2016:160
AZ A:15:063	Bart Site	Shivwits Plateau	Unknown Plant	790 +30	-21.1 AMS	AD 1190-1273	AD 1243	Beta-469418	Feature 1 Pithouse	UNLV Dept. of Anthropology Files
UN-19		Colorado River	Charred Mesquite Pods and Zea Mays	785 ±85	n/a	AD 1049-1378	AD 1224	I-3045	Basket Storage Bin 8 Floor	Schwartz et al. 1980:59
GC-671		Mt. Trumbull	Charcoal	780 ±105	n/a	AD 1034-1387	AD 1220	RL-79	Structure 3 Pithouse	Thompson and Thompson 1974:19
AZ G:03:020		Colorado River	Charred Material	770 ±80	-25	AD 1057-1377	AD 1236	Beta-147233	Feature 7, Unit 2, Level 2	Dierker and Downum 2002:36
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	760 ±70	n/a	AD 1073-1379	AD 1247	Beta-130607	Feature 9, Level 2, Room 2, Beam 2	Miller 2005:94
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	760 +60	n/a	AD 1121-1374	AD 1250	Beta-130610	Feature 9, Level 2, Room 2, North Unit	Miller 2005:94
UN-4		Colorado River	Corn Stalk	755 ±95	n/a	AD 1052-1392	AD 1248	I-3778	Fire Pit Fill Surface Room	Schwartz et al. 1980:59
AZ A:10:0020 BLM		Shivwits Plateau	Charcoal	750 ±40	-21.2	AD 1210-1298	AD 1263	Beta-221393	Test Pit	Allison 2010:19
AZ B:15:138		Colorado River	Charred Material	720 ±30	-25.9	AD 1247-1374	AD 1278	Beta-300490	Feature 38 Level 5 Hearth	Neff et al. 2016:A.3
GC-671		Mt. Trumbull	Charcoal	720 ±100	n/a	AD 1063-1407	AD 1276	RL-50	Structure 1 Pithouse	Thompson and Thompson 1974:19
AZ B:6:44	Pinenut Site	Kanab Plateau	Charcoal	715 ±55	n/a	AD 1208-1387	AD 1283	K-650	Feature 2 Pithouse	Westfall 1987b:77
AZ A:16:1	Whitmore Wash Site	Colorado River	Charcoal	705 ±75	Corrected	AD 1171-1400	AD 1293	WSU-3040	Fire Pit Fill, Feature 2	Jones 1986b:106

Table 6.12 (continued)

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
AZ B:6:44	Pinenut Site	Kanab Plateau	Burned Wood	705 ±55	n/a	AD 1220-1390	AD 1290	K-641	Room F Storage	Westfall 1987b:62
AZ C:13:010	Furnace Flats Site	Colorado River	Charcoal	700 ±90	Corrected	AD 1108-1408	AD 1295	WSU-3050	Feature 15 Pit in Kiva Profile	Jones 1986b:105
AZ B:6:44	Pinenut Site	Kanab Plateau	Burned Wood	685 ±60	n/a	AD 1227-1397	AD 1308	K-640	Residence Room E Hearth	Westfall 1987b:58
AZ B:6:44	Pinenut Site	Kanab Plateau	Burned Wood	660 ±60	n/a	AD 1256-1405	AD 1334	K-635	Room C, Stratum C	Westfall 1987b:49
AZ A:10:20 BLM		Shivwits Plateau	Charcoal	650 ±40	-21.6	AD 1280-1395	AD 1346	Beta-221392	Test Pit	Allison 2010:19
AZ C:13:384		Colorado River	Charcoal	635 ±120	n/a	AD 1128-1546	AD 1337	W-6371	Isolated Hearth	Hereford et al. 1993:11
GC-671		Mt. Trumbull	Charcoal	630 ±100	n/a	AD 1197-1455	AD 1342	RL-78	Structure 3 Pithouse	Thompson and Thompson 1974:19
AZ B:15:7	Tuna Creek Site	Tuna Creek	Charcoal	620 ±150	Corrected	AD 1066-1618	AD 1345	WSU-3044	Top Level III Roasting Pits	Jones 1986b:105
AZ B:6:44	Pinenut Site	Kanab Plateau	Charcoal	590 ±85	n/a	AD 1270-1456	AD 1356	K-636	Room D	Westfall 1987b:53
AZ C:13:0010	Furnace Flats Site	Colorado River	Charcoal	590 ±140	Corrected	AD 1132-1627	AD 1363	Beta-3051	Feature 14 Hearth 166-185cm bpgs	Jones 1986b:105
AZ C:13:371		Colorado River	Charcoal	350 ±50	n/a	AD 1453-1642	AD 1551	Beta-94283	Feature 4 FCR	Grand Canyon-NPS Files
AZ A:15:063	Bart Site	Shivwits Plateau	Zea Mays	180 ±30	-22.6 AMS	AD 1665-1947	AD 1772	Beta-469417	Feature 1 Pithouse	UNLV Anthropology Files
AZ A:10:27 BLM		Shivwits Plateau	Charcoal	170 ±60	-23.3	AD 1644-1944	AD 1782	Beta-221398	FS133 Test Pit	Allison 2010:19

Table 6.12: Pueblo III-Late Prehistoric radiocarbon dates in the Arizona Strip region. The 95 percent probability ranges were obtained using the Behron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

ranged from AD 1200 to 1250/1275 when some earlier structures fell into disuse, others were reoccupied, and new structures were added. Final abandonment occurred about AD 1275. Westfall (1987b) suggested the Pinenut Site was used by a small family group during the summer months, based on the rarity of faunal remains and interior hearths.

Westfall (1987b:185-186) argued the temporal sequence was consistent with environmental data from elsewhere on the Colorado Plateau that the period from AD 1050 to 1150 was characterized by high spatial variability in climatic conditions, prompting the settlement of micro-environments by a growing population. The period from AD 1150 to 1200 was a time of deteriorating hydrologic conditions exacerbated by drought, resulting in widespread population dislocation and the collapse of regional alliances and interaction spheres. The interval from AD 1200 to 1275 was marked by a gradual return to a high water table and aggraded floodplains, but generally featured low precipitation. The presence of cattail, willow, and maize indicated there was sufficient water to permit agriculture.

The Furnace Flats Site is actually a large complex of constructed features on a terrace above the Colorado River. These features included slab-lined storage structures, a deep masonry kiva, and several masonry rooms (Jones 1986b). The fill inside one room yielded more than 50 ground stone tools, pendants of green and white-banded travertine in various stages of manufacture, and fragments of unfired pottery vessels. More than two dozen potsherds and five pieces of bone had been shaped and ground into disks and rectangular pieces.

This site has been periodically investigated by the National Park Service over the past three decades (Jones 1986b; Miller 2005), and at least 16 radiocarbon dates have now been reported from various features ranging from 1290 $\pm$70 BP (AD 738 median probability) to 590 $\pm$140 BP (AD 1363 median probability). These dates suggest rather continuous occupations from Pueblo I through Pueblo III times, and perhaps a Late Prehistoric reoccupation of the site after its abandonment. The site appears to have grown by accretion over time in the typical Virgin Branch pattern, with newer features added to older ones and older features being remodeled.

Jones (1986b:324-325) believed this site was occupied later than other ones in the region, perhaps by remnant populations following a general abandonment of the region beginning about AD 1150. She suggested local exchange networks might have deteriorated to the point that local production of exotic items became necessary at individual sites, and "evidence for the local production of ceramics, pendants, and gaming pieces in the late component of Furnace Flats supports this."

A similar pattern was observed at the complex of sites in the Unkar Delta, also along the Colorado River, where construction started in Pueblo I times and continued intermittently through Pueblo III times as the size of the pueblos grew more complex (Schwartz et al. 1980). Relevant to this discussion are UN-1, a large U-shaped pueblo, and UN-2, a kiva adjacent to the pueblo. The kiva was constructed by excavating a pit almost 2 meters into river gravels and then lining the pit with wet-laid masonry walls. The foundation consisted of vertically laid limestone slabs of various sizes. Above the foundation were horizontally laid cobbles and slabs covered with large amounts of adobe mortar and plaster. The structure featured a square, slab-lined fire pit, a floor-level ventilator shaft, and a slab-lined niche built into one wall (Schwartz et al. 1980).

Human remains were recovered on the kiva floor that had been covered with burned beams and roof fall, leading Schwartz et al. 1980:246-247 to conclude, "It did not appear to have been interred and presumably represents an individual who was in the kiva at the time it burned." A second human skeleton was located directly above the roof fall, but the fragmentary nature made it impossible to determine whether it had been intentionally interred after the kiva had collapsed.

Charred roof material on the kiva floor returned radiocarbon dates of 855 $\pm$90 BP (AD 1165 median probability) and 925 $\pm$100 BP (AD 1110 median probability). If these dates are representative of the final use of the kiva (e.g., burning of the kiva with someone inside), they might not represent the abandonment of the Unkar Delta complex, or at the very least the site was later reoccupied. A maize sample from a storage bin at UN-19 returned a date of 785 $\pm$85 BP (AD 1224 median probability) and a corn stalk from a surface room at UN-4 returned a date of 755 $\pm$95 BP (AD 1248 median probability).

Schwartz et al. (1980) believed the most intense occupations in this area occurred after about AD 1050 when small groups of farmers occupied certain environments suitable for dry farming, built surface masonry pueblos of masonry and jacal, terraced garden plots, and constructed formal kivas. These represented relatively short occupations, and all yielded late Formative ceramic assemblages with narrow temporal ranges that suggested single-generation occupations. They were disinclined to see evidence that residential sites increased in size through gradual accretion, as was the case with Virgin Branch sites farther north, but they acknowledged some sites yielded evidence of episodic abandonment and reoccupation, and there was evidence of superimposition of walls and detritus inside some rooms.

Both the Furnace Flats Site (Jones 1986b) and the Unkar Delta sites (Schwartz et al. 1980) were described as "small" pueblos, although they are only small by Kayenta standards. Both are fairly typical of moderately sized Virgin Branch pueblos in the Paria Plateau, Little Creek Mountain, and Vermilion Cliffs regions at this same time, both had an abundance of Virgin Branch ceramics (and some identified as Kayenta types), and both exhibited evidence of periodic occupations, abandonments, and reoccupations in the typical Virgin pattern.

Although the sample size is admittedly small, the radiocarbon database suggests possible population shifts from north to south over time. In Basketmaker II, Basketmaker III, and Pueblo I times, the northern Grand Staircase appears to have been much more intensively utilized than the southern Grand Staircase. By early Pueblo II times and continuing through Pueblo III times, the preponderance of evidence is found at sites on the southern Grand Staircase.

Considered collectively, the Pueblo III radiocarbon database for the northern and southern Grand Staircase suggests continuity from late Pueblo II to Pueblo III times, and the idea of widespread abandonment by AD 1150 seems increasing untenable. This conclusion is consistent with Allison's (1996) observations for the lowland Virgin Branch that there is no evidence of population declines in the lower Virgin River region until the late AD 1200s. Allison's conclusions are supported by roughly 40 radiocarbon dates from the St. George Basin, almost all of which are associated with small

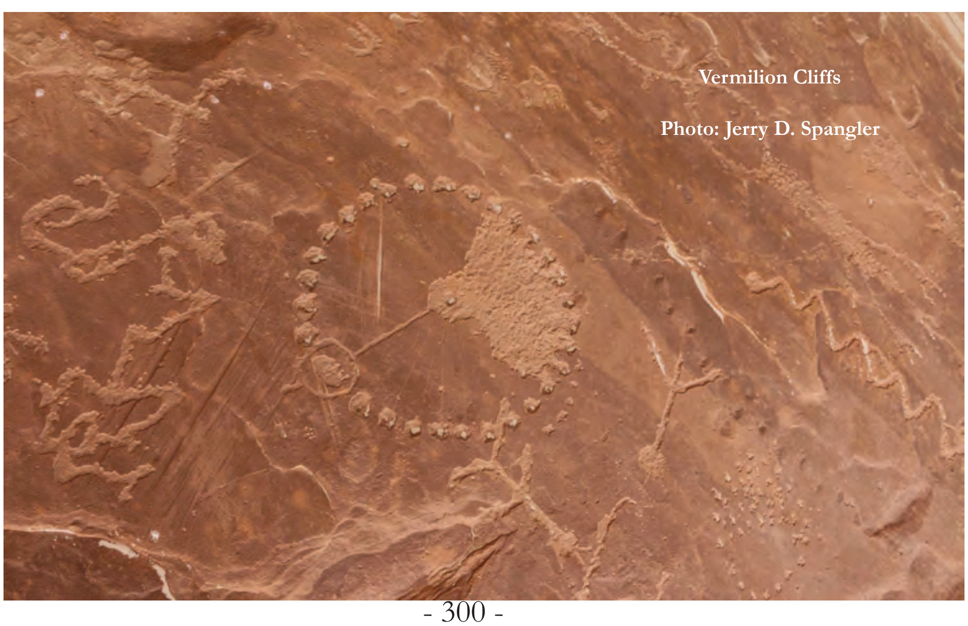

Vermilion Cliffs

Photo: Jerry D. Spangler

pueblos and roomblocks situated on terraces and benches above the Virgin River and Santa Clara River in the same pattern as earlier times.

There is also growing evidence of continued occupations of the lower Virgin River and Muddy River well into the late AD 1200s (Roberts and Ahlstrom 2012). This evidence from lowland sites is at odds with conclusions by Larson and Michaelson (1990) that down-cutting and erosion along the lower Virgin River and its tributaries from AD 1120 to 1150 precipitated region-wide famine and abandonment. Instead, this period seems to have been characterized by small-scale aggregations into clusters of three to five households oriented around a courtyard, as evidenced by sites like Mesa House and Three Mile Ruin (Lyneis 1995), although the older pattern of one or two residences persisted (Walling et al. 1986).

General Summary

As discussed throughout this chapter, the Formative was a period of time characterized by unprecedented dependence on agricultural products that mandated increased sedentism, the development of ceramic technologies to facilitate the cooking and storage of foods, and increased economic specialization and exchange networks to ameliorate the effects of resource shortfalls. In turn, predictable food resources might have precipitated population growth, resulting in decreased mobility, population aggregations, and social stratification.

There is an assumption that all groups at this time were sedentary farmers to a greater or lesser degree, but this is probably biased by the fact most investigated sites are residences and storage locales. Janetski et al. (2013) raised the possibility that some groups might have produced and traded other more-specialized products, for example rabbit skins and yucca sandals, for cultivated foods.

The Formative is that period of time when most groups relied on domesticated resources for a majority of their subsistence, and when sedentism exceeded mobility. Research in the other regions, however, suggests preceramic Basketmaker II farmers were almost entirely dependent on cultivated resources as early as AD 100, and therefore might have been predominantly sedentary by that time (Matson 1991; Smiley 1993). In other words, sedentism is meaningless as a defining trait of the Formative, and the appearance of ceramics at about AD 500 stands as the only significant addition to local lifeways that demarcates the beginning of the Formative as traditionally defined.

Reed et al. (2000:219) have observed the adoption of pottery on the Colorado Plateau was part of a larger "suite of cultural changes" associated with increased populations, increased sedentism, greater reliance on agriculture, and changing social roles." And Crown and Wills (1995) hypothesized that ceramics precipitated changes in labor allocation and gender roles. They argued the adoption of ceramics in the Southwest occurred only when the perceived benefits outweighed the scheduling difficulties.

Rice (1975:97) has argued "sedentary settlement systems are those in which at least part of the population remains at the same location throughout the entire year." As such, Formative groups in the Grand Staircase region would have rarely moved their primary residence, but instead they would have dispatched task-specific groups on trips to procure food and lithic materials, and to trade with other groups for critical resources.

An abundance of early Formative sites has been documented in the Kitchen Corral Wash, Park Wash, and Deer Spring Wash areas, but few of the sites, even if occupied contemporaneously, would likely be of a size considered to be a village. Most early Formative sites are loosely clustered individual pithouse occupations, predominantly one or two pithouses oriented toward dry farming of the mesa tops or floodwater farming of the valley bottoms. Convincing evidence of long-term abandonments in response to soil depletion, drought, or diminished wild resources remains elusive.

Throughout the region, there is considerable evidence of superimposition of occupations, suggesting episodic occupations, abandonments, and reoccupations by groups that subsequently remodeled, repaired, and added to earlier structures.

While architectural patterns and site layouts changed subtly over time, the overriding social structure of one or two families engaged in agricultural activities remained the same. Generally, the Pueblo I and early Pueblo II periods can be summarized as a time when:

- Some late Formative groups aggregated into small pueblos suggesting even greater dependence on domestic foods, a greater need to store sufficient quantities of food to ameliorate crop failures over multiple years, and greater inter-group cooperation that facilitated resource redistribution.

- Population aggregations into small hamlets of three to five residences might have resulted in changes to the social structure, including the presence of unrelated households in close proximity to one another, increased economic specialization, reliance on regional exchange networks, and the emergence of formalized ceremonial practices.

- Population growth might have mandated, as climatic conditions allowed, the expansion of agriculture into upland mesas where seasonal field houses proliferated, but this practice further restricted hunting and gathering in areas previously utilized for procurement of wild game, pinyon nuts, and plants.

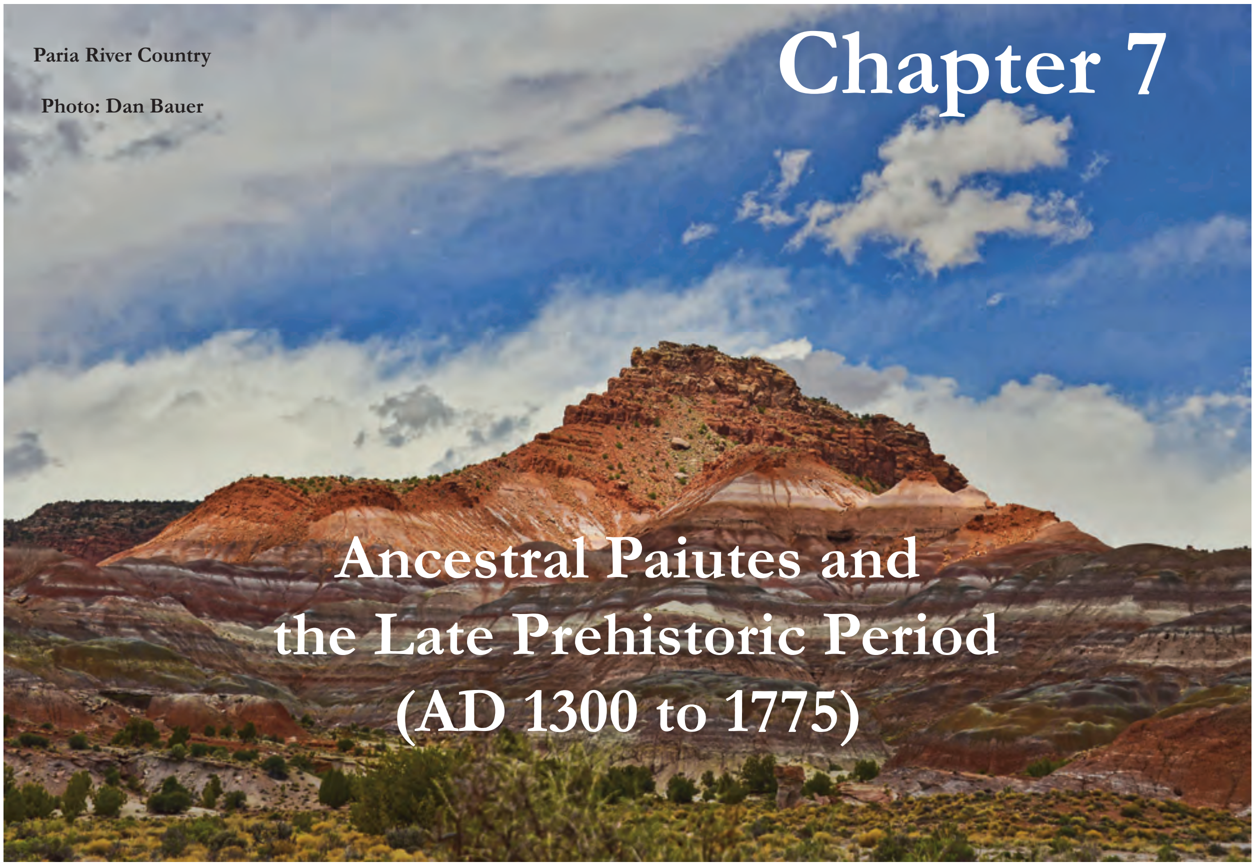
Settlement patterns in the Grand Staircase region became more complex after about AD 1050 with the proliferation of small- and medium-sized pueblos like the Arroyo Site, Pottery Knoll, Cottonwood Cliff Dwelling, and the Pinenut Site. At the same time, there appears to have been an increase in the number of small pueblo sites and field houses at higher elevations on the Kaiparowits Plateau, Paria Plateau, Kaibab Plateau, and Shivwits Plateau, suggesting population growth. In most instances, farming these marginal environments would have been extremely risky.

Throughout the Southwest, village formation appears to have had two important prerequisites. First, populations had to be relatively dense, resulting in a depletion of wild resources and agricultural intensification (Orcutt et al. 1990). And second, local agricultural production had to be generally high, but variable within years and between years, creating a situation where households participated in socioeconomic exchange with other groups (Van West and Kohler 1992).

Throughout the Grand Staircase, small pueblos exhibit a rectilinear configuration of contiguous surface rooms arranged in linear, L-shaped and U-shaped patterns, some arranged around a courtyard or plaza that also featured subterranean structures invariably labeled deep pithouses or kivas. The larger populations, as well as the proliferation of field houses in upland mesas previously used for hunting and gathering, might have significantly reduced group mobility as an adaptive strategy to reduce risk during years of resource shortfalls.

The impetus behind this transition to pueblos might have been the arrival of immigrants from the Kayenta heartland about AD 1050, although their presence here was brief. As summarized by McFadden (2016:159), the Virgin Puebloans accepted the stylistic innovations of the Kayenta immigrants, but within a generation or two they had developed their own whitewares and redwares in the Kayenta tradition and "continued on their original adaptive path established hundreds of years before." After about AD 1150, there is very little evidence for any socioeconomic interaction between the Virgin Puebloans and those south and east of the Colorado River. Sometime between about AD 1250 and 1300, agricultural lifeways that had prevailed for roughly two thousand years had disappeared.

That abandonment of agriculture in the high plateaus of the Grand Staircase in the late AD 1200s coincided with a horrific 20-year drought (AD 1276 to 1297) that impacted much of the western United States (Benson et al. 2007). This event did not result in a complete depopulation of the region. In fact, foraging lifeways continued unabated throughout this drought cycle and others that followed, and some groups might have practiced limited agriculture in radically different environments on the northern Grand Staircase, Arizona Strip, and In fact, the end of the Formative is demarcated by the abandonment of agriculture as a predominant subsistence strategy. The coexistence of predominantly farmers and mostly foragers in the AD 1200s is addressed in greater detail in Chapter 7.



Chapter 7

Ancestral Paiutes and the Late Prehistoric Period (AD 1300 to 1775)

The disappearance of sedentary, agricultural lifeways and the subsequent dominance of a highly mobile hunting-and-gathering subsistence strategy sometime between about AD 1250 to 1300 remains a perplexing problem. Various hypotheses over the years have created a convenient and probably misleading sequential framework based on cause-and-effect relationships, such as migrations resulting from environmental stress and increased competition from different ethnic groups resulting in the displacement of farmers by more-efficient foragers. These remain largely unsubstantiated by archaeological data.

Traditionally, most scholars have subscribed to the idea that Numic-speaking peoples arrived in their historic territories relatively recently, and that historic distribution of these peoples was the result of widespread migration from homelands in the southwestern Great Basin. Much of this consensus was the result of estimates postulated six decades ago by Sydney Lamb (1958) that were subsequently embraced by researchers who modified Lamb's hypothesis to a greater or lesser extent (see Madsen and Rhode 1994 for an overview of the historical debate).

There is little consensus today as to how and when Numic-speaking populations arrived in their historic territories, something referred to in the archaeological literature as the "Numic spread." Relevant hypotheses include: (1) A traditionalist model that Numic-speaking groups migrated into the eastern Great Basin and northern Colorado Plateau between about AD 1000 to 1200, and they probably co-existed with and eventually out-competed late Formative agriculturalists; (2) A continuity model wherein Numic-speaking foragers have been present in the region for at least the past 5,000 years, co-existing alongside agriculturalists, eventually replacing farmers when agriculture became unsustainable in the late AD 1200s; and (3) Formative agriculturalists were themselves Numic-speakers who resumed a foraging lifeway once their agricultural lifeways were no longer tenable.

For the purposes of this chapter, we prefer the term Ancestral Paiute when discussing Late Prehistoric peoples of the GSENM region, as opposed to Shoshonean or Numic, because it more accurately reflects the probability that Late Prehistoric groups were, in fact, ancestral to Southern Paiute groups who were encountered in this same region, first by Spanish explorers in 1776 and later by Mormon colonists in the mid-1800s. We retain the term Numic-speakers when discussing broader regional data that would also apply to ancestral Northern Utes, Southern Utes, Northern Paiutes, Goshutes, Shoshones, and others with a shared language root. There is only minimal evidence of an Ancestral Puebloan presence in GSENM in Pueblo IV times (coequal with the Late Prehistoric). And there is, as yet, no documented evidence of Athapaskan-speaking groups (e.g., Navajo and Apache) in prehistoric contexts.

The Late Prehistoric, as used here, denotes a period of time characterized by the abandonment of agriculture as a primary subsistence strategy and the appearance of foraging lifeways reminiscent of Archaic times. These foragers might have arrived in the southeastern Great Basin by about AD 1000, although most evidence from southern Utah and northwestern Arizona points to an arrival about AD 1250. Radiocarbon data from a handful of sites in and near GSENM suggest Ancestral Paiute peoples were probably present here by the middle AD 1200s (Firor 1994; Westfall 1985), and it is possible their arrival coincided with the last vestiges of Puebloan farming in the region.

Archaeological sites on the northern Colorado Plateau producing radiocarbon dates after AD 1300 are often associated with a different artifact assemblage, in particular a brownware ceramic tradition that lacked the technological refinement of Formative wares, and small, side-notched arrow points that are commonly labeled Desert Side-notched. Because these same artifacts have been observed at historic Southern Paiute sites, it is reasonable, as Reed suggested (1994:195-196), "to regard these artifact types as Numic when found … in earlier contexts, especially when these artifacts are found in combination."

The beginning of the Late Prehistoric is placed at about 1300 AD, although we recognize that Ancestral Paiute groups were probably present in the GSENM region prior to AD 1300, and that some of these groups might have co-existed alongside remnant populations of Ancestral Puebloans. The end of the Late Prehistoric is placed at 1775, the year before Euro-American explorers offered the first written accounts of the Southern Paiutes they encountered on the Arizona Strip and St. George Basin. Its defining characteristic is the abandonment of agriculture as the primary subsistence strategy.

We also emphasize that abandonment of agriculture as a predominant lifeway did not result in a landscape devoid of humans. Relatively mobile hunter-gatherers continued to exploit faunal and floral resources, they inhabited insubstantial brush structures, and they manufactured small amounts of brownware ceramics that were in decided contrast to ceramic traditions of earlier Ancestral Puebloan peoples. In effect, the Late Prehistoric reflects a time when groups were primarily engaged in hunting and gathering of wild food resources, although some Ancestral Paiute groups might have cultivated maize and beans.

The collapse of agricultural lifeways and the re-emergence of foraging adaptations is discussed here within the following broad contexts:

- Relevant hypotheses related to the origins of the Ancestral Paiute, where they came from, and when they arrived in the region.

- A chronometric database that suggests a potential coexistence of Ancestral Paiute foragers with Ancestral Puebloan agriculturalists in the middle and late AD 1200s.

- An empirical database consisting of 85 sites within GSENM that feature brownware ceramics or Desert Side-notched points, or that have produced relevant chronometric data.

- A comparison of Ancestral Paiute foraging site structure and relative complexity to those Archaic foraging sites to identify similarities and differences in land-use patterns.

- A brief overview of Southern Paiute ethnographic data offered by Kelly (1964) that can provide insights to Late Prehistoric subsistence, land-use patterns, mobility, and material culture that might be observable in the archaeological record.

Theoretical Context

Various hypotheses have been proposed related to the end of Formative lifeways, among them: (1) Fremont and Ancestral Puebloan populations abandoned the region due to climatic stress beginning about AD 1200 (Lindsay 1986) and were replaced by Numic-speaking populations who occupied a cultural void (Aikens 1994); (2) Historic Numic-speaking peoples are remnants of sedentary populations who reverted to hunting and gathering in the wake of climatic stress (Grady 1980; Gunnerson 1962, 1969; Simms 1986, 1990); (3) Numic-speaking peoples displaced sedentary farmers who subsequently migrated to the south and east (Aikens 1966a, 1966b; Ambler and Sutton 1986, 1989), and (4) Formative and Numic-speaking peoples temporarily coexisted, followed by a displacement or assimilation of the sedentary populations into a hunting-and-gathering lifeway (Keyser 1975; Madsen 1975; Shimkin 1940).

Various models of Numic expansion based on linguistic, ethnographic, and archaeological studies, have enjoyed a long history of scholarly debate. One model originally proposed by Julian Steward (1940), argued that Numic-speaking peoples spread northward from the southwestern Great Basin about AD 1000. This position, subsequently adopted by Lamb (1958), was recently defended by Adovasio and Pedler (1994), Bettinger (1994), Fowler (1994), and Sutton (1994).

A second hypothesis maintains that proto-Numic or Numic-speaking populations have occupied part of or the entire Intermountain West for thousands of years. Aikens (1994), Grayson (1994), Holmer (1994), Jennings (1957a), Jennings and Norbeck (1955), and Rudy (1953) have advocated this position.

A third hypothesis, summarized by Rhode and Madsen (1994:213), is advocated by "those who do not particularly care which of the first two models is the more valid as long as an expansion across much of the Colorado Plateaus in the last thousand

years is included .... They are unconcerned with point-of-origin squabbles within the small circle, but see evidence of population expansion within the larger circle in the last thousand years." This position is supported by Janetski (1994), Madsen (1994), Reed (1994) and, to some extent, Simms (1994b) and Lyneis (1994).

With a few exceptions, sedentary Fremont and Ancestral Puebloan agriculturalists had apparently abandoned their farming settlements north of the Colorado River sometime before AD 1300 (see Chapter 6). Numerous publications have addressed the causes and effects that led to the disintegration of agricultural lifeways, and regardless of the preferred hypothesis, the demise of the sedentary lifeways north and west of the Colorado coincides with an abandonment of Ancestral Puebloan population centers the Four Corners region generally. Lindsay (1986:231) has argued that Fremont and Ancestral Puebloan abandonments are probably related and "a similar causal mechanism is involved …. Drought, absorption by the [Ancestral Puebloan], Numic expansion, and a reversion to foraging may all be legitimate explanations when considering the fate of the Fremont."

There is growing evidence that farming persisted in isolated environmental niches in the eastern Great Basin and northern Colorado Plateau well into the AD 1500s.

The "fate" of the Fremont, as well as that of Ancestral Puebloans of the Virgin Branch, might not have been nearly as abrupt as suggested by traditionalist explanations. There is growing evidence from across the northern Colorado Plateau and eastern Great Basin that some farming communities persisted in isolated environmental niches for hundreds of years after their supposed "demise." A Fremont-like agricultural subsistence persisted well after AD 1300 in eastern Utah, northeastern Utah, and northwestern Colorado. Possible Fremont architectural sites in northwestern Colorado have been dated to between AD 1300 and 1600 (Creasman 1981; Creasman and Scott 1987; LaPoint et al. 1981) that bear a striking resemblance to the defensive structures described elsewhere in the Southwest. A late Fremont manifestation is also suggested at a site in Dinosaur National Monument (Liestman 1985) and at Allen Creek Village in the Flaming Gorge area where radiocarbon dates suggest Fremont occupations from AD 550 to AD 1420 (Johnson and Loosle 2002). And two radiocarbon dates from sites in the Rock Creek area along the Green River in eastern Utah support the idea that some groups were growing maize into the AD 1500s and were storing foods in Fremont-like granaries at that time (Spangler and Jones 2009).

Collectively, these data suggest Formative-like farming strategies might have coexisted alongside hunting and gathering typically associated with Numic-speaking groups. Evidence of this in the GSENM region remains tenuous. A late Fremont presence might be evident at two sites in the Escalante River country. And a late Ancestral Puebloan presence may be evident on the Arizona Strip and Grand Canyon areas where radiocarbon dates suggest sedentary farming occupations might have continued into the early AD 1300s that were contemporaneous with foraging sites that had Ancestral Paiute artifacts.

Language Indicators

The question of Numic origins and migrations has centered on linguistic studies of historic populations and the spatial distribution of such populations (see Figure 7.3). The origin of the "traditionalist" concept of Numic migrations can be found in Julian H. Steward's pioneering research in the Great Basin, which led him to initially suggest that Southwestern cultures were "eliminated from the Northern Periphery by hostile, nomadic tribes" (1933b:20), although he later maintained that contact with Puebloan groups was gradual and passive,

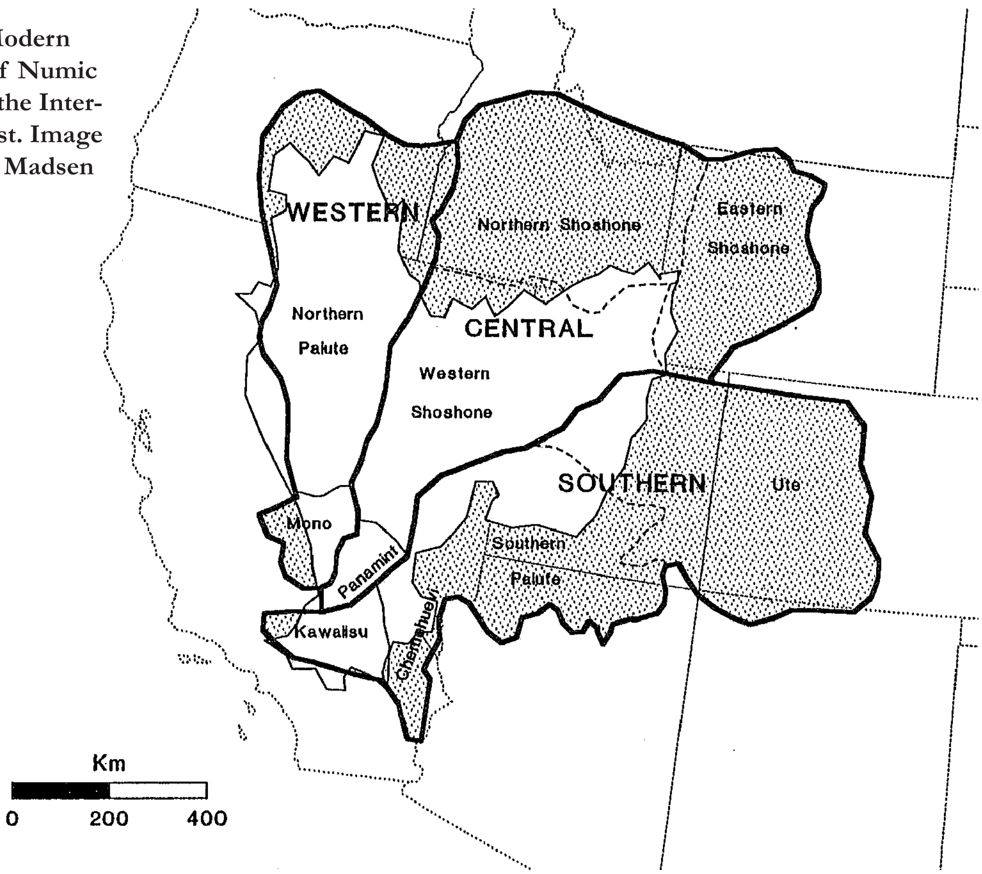


Figure 7.3: Modern distribution of Numic languages in the Intermountain West. Image adapted from Madsen (1994:25).

rather than violent, and that Numic-speakers occupied the Fremont and Ancestral Puebloan homelands following the abandonment of the region by Puebloan peoples (1936:63).

Sidney Lamb (1958), building on Steward's earlier work, proposed that Numic-speaking populations spread across the Great Basin from a homeland in the Death Valley area beginning about AD 1000 (Figure 7.4). Using statistical estimates based on the divergences of various languages, Lamb (1958:98) placed the "separation of Numic from Tubatulabalic somewhere in the neighborhood of three thousand years ago, followed in about a millennium by the split up of the Numic." Three Numic languages then spread north and east across the West. Because areas occupied by peoples speaking these languages were so large and the language dialects so slight, Lamb interpreted this expansion as occurring relatively recently.

Lamb later acknowledged that language divergence was probably very gradual and that it may have occurred much earlier than he originally postulated, perhaps 2,000 to 3,000 years ago. As Thomas noted (1994:57), "While archaeologists have been moving in one direction (increasingly oversimplifying Lamb's original hypothesis), Dr. Lamb has been shifting in the other – emphasizing the largely intuitive nature of his original estimate and allowing even greater time ranges for the start of the Numic spread."

Other researchers, while agreeing with an origin in the southern Great Basin, have taken issue with the timing of the migrations, arguing for a much greater time depth than the traditionalist model (Figure 7.5). Goss (1977) rejected Lamb's hypothesis altogether, arguing that the distribution of Numic languages was the result of a long-term local development. He regarded the Intermountain West as the original homeland of Uto-Aztecan populations with an ancestry dating to 10,000 years ago. Swanson (1962:155) argued for a long, continuous occupation of the Great Basin by Numic-speaking peoples, observing "we appear to be dealing with

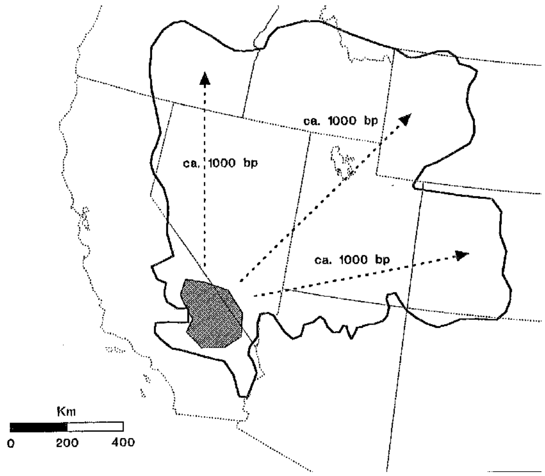


Figure 7.4: The traditional model holds that Numic-speaking groups migrated from the southern Great Basin about a thousand years ago. Image adapted from Rhode and Madsen (1994:214).

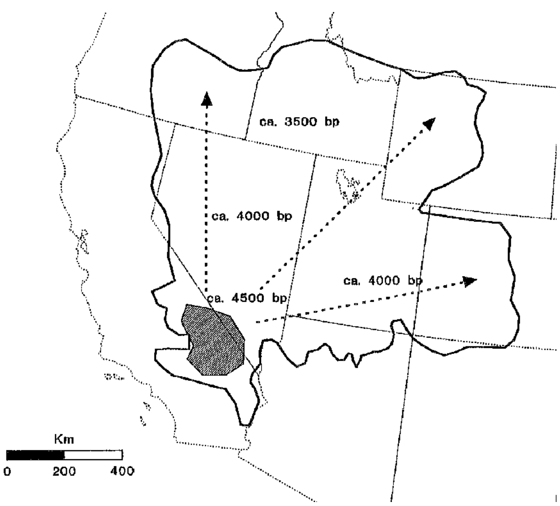


Figure 7.5: Others agree with the traditionalists that the origin of the migration was the southern Great Basin, but they place the migration at 4,000 to 5,000 years ago. Image adapted from Rhode and Madsen (1994:216).

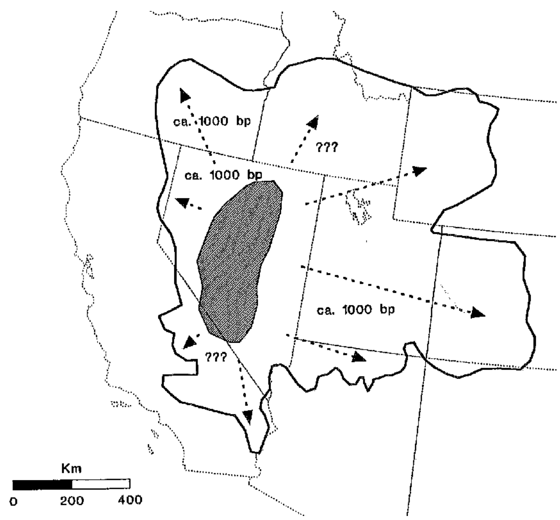


Figure 7.6: Yet others argue the origins of the migration are to be found in the northern Great Basin but they agreed with the traditionalists that it occurred about a thousand years ago. Image adapted from Rhode and Madsen (1994:215).

the ethnographic present even at a time depth of several thousand years."

Other researchers agreed with the AD 1000 date in the traditionalist model, but they have argued the origin of the migration can instead be found in the northern Great Basin (Figure 7.6). Hopkins (1965) hypothesized that Uto-Aztecan people north of the Great Basin migrated south along the west margins of the basin to the southern Sierra Nevada Mountains where sedentary Fremont and Ancestral Puebloans temporally impeded this expansion. Euler (1964) agreed, arguing that Western and Central Numic-speaking peoples expanded a few centuries prior to Southern Numic peoples, and that eastward expansion occurred sometime after agricultural communities disintegrated under the combined effects of deteriorating environmental conditions and Numic-speaking raiders. Aikens (1994:39) also argued that the origin of Numic migrations can be found in the central Great Basin.

The timing of the migration bears directly on a fundamental and largely unresolved issue: If the migration occurred about 1,000 years ago, then immigrants would have encountered existing and comparatively large populations of sedentary farmers. But if it occurred 2,000 or 3,000 years ago, then the immigrants themselves might have incorporated agricultural into their lifeways. Madsen (1975:84), who compared the distribution of Fremont and Paiute-Shoshoni pottery in western Utah, argued that Numic expansionists coexisted with late Fremont peoples, and that archaeological evidence "seems to corroborate the linguistic evidence of a northeastward spread of Numic-speaking groups out of the southwestern Great Basin beginning about AD 1000."

Others have argued that Fremont and Virgin Branch groups were themselves Numic-speakers. Gunnerson (1962:44) argued that a group of "proto-Plateau Shoshoneans" arrived in the northern drainages of the Colorado River in what is now southwestern Utah, northwestern Arizona and southwestern Nevada by about 500 BC. At about AD 950, as part of the widespread Pueblo II expansion, Virgin Branch traits were carried into northeastern Utah. When farming became untenable about AD 1200, the people returned to hunting and gathering, with Sevier groups expanding north and west to become the Shoshone and Comanche, Fremont groups expanding east to become the Utes and southwest to become the Southern Paiute, and Virgin Branch groups expanding northwest to become the Northern Paiute. Although many aspects of Gunnerson's "Plateau-Shoshonean" hypothesis have been rejected, some researchers (Grayson 1994; Holmer 1994; Roberts 2018) maintain that Formative peoples might have been ancestral Numic-speakers, an idea consistent with Southern Paiute oral traditions that they have always been here.

Traditional models suggest ancient Numic-speaking groups arrived in the region about a thousand years ago. Southern Paiutes say they have always been here.

Displacement and Assimilation

Lindsay (1986) suggested that a return to a foraging lifestyle, beginning about AD 1150, might have placed the farming communities in direct competition with recently arrived Numic-speaking foragers. Failure of the Formative groups to efficiently compete for limited wild resources resulted in their subsequent demise. A large number of sites with both Fremont and Numic pottery suggests some interaction between two distinct groups (Berry 1974; Lindsay 1986; Madsen and Lindsay 1977).

A fundamental premise of Lindsay's hypothesis (1986) is that the Fremont, and by extension Ancestral Puebloan groups, were cohesive entities because of their agricultural focus. Settlement stability was afforded only to the extent climatic conditions permitted maximum crop yields and reduced risk of crop loss. Optimal stability was reached between about AD 900 and 1150, after which abrupt changes in climatic conditions resulted in a variety of adaptations over much of the region. He suggested that reduced summer rainfall and possibly a shorter growing season triggered an abandonment of northeastern Utah and southwestern Utah by about AD 1000, or some 150 to 200 years before deteriorating climates forced the abandonment of other agricultural regions. Lindsay's hypothesis now stands at odds with a cumulative radiocarbon database in both regions that demonstrate continuous farming occupations well into the late AD 1200s.

Grady (1980:247-249) maintained that climatic deterioration might have led to changing subsistence strategies, but not necessarily an abandonment of agriculturalist territories. The Fremont culture was primarily a lowland phenomenon found in or adjacent to valleys, whereas upland sites were deemed to be Archaic or Numic. He observed the different subsistence strategies observed in the archaeological record "are in reality nothing more than differing sets of economic activities employed by the same people but at different times of the year," and that the change from a Fremont farming lifeway to "some sort of prehistoric Ute culture" may be nothing more than the dropping of an unprofitable economic strategy (farming) due to deteriorating climatic conditions and a redirection of energies into more profitable hunting and gathering subsistence strategies.

A similar hypothesis was offered by Simms (1979), who argued that some hunter-gatherers remained at higher elevations in closer proximity to faunal resources, whereas horticultural groups occupied valley locations and made seasonal forays into higher elevations. An abandonment of agriculture, as postulated by both Grady (1980) and Simms (1979), would not have mandated an abandonment of geographic areas but simply a return to hunting strategies and perhaps a more economically efficient settlement pattern closer to wild food resources.

Another model proposed by Mark Sutton also embraced the Lamb model in both timing and direction of Numic expansion. He argued (1987:165-166) that a drying trend in the southern Sierra Nevada about AD 1000 might have provided the impetus for a Numic immigration from the Owens Valley and Sierra Nevada Mountains, and that warfare was the mechanism by which these Numic groups exerted control over critical resource patches. Ambler and Sutton (1986:12, see also Ambler and Sutton 1989) suggested that Numic-speaking Southern Paiute and Ute groups began exerting military pressure on Ancestral Puebloan populations about AD 1100, and that "This military pressure would have taken the form of hit-and-run raids against small, dispersed targets, never allowing the attacked to concentrate a larger force than the attackers. A sedentary group faced with this kind of warfare would be at a disadvantage since their settlements and fields are stationary, easy targets for an attacker, and can be attacked in strength and destroyed before help can arrive."

If smaller Numic groups appropriated and defended critical resource patches, they could have denied Fremont and Ancestral Puebloan farmers access to contingency resources that were critical to ameliorate poor crop yields. The advantage of larger population densities and easily defensible residential sites would have been negated if critical patches of wild floral and faunal resources were dispersed and not in close proximity to defensible residences. One historical example of this occurred in New Mexico, when Apache and Navajo part-time farmers abandoned semi-sedentary, horticultural lifeways once the Utes denied them access to traditional hunting territories (Tyler 1951).

Archaeological evidence of violence and warfare is actually quite rare in the GSENM region during late Pueblo II or Pueblo III times. Coombs Village and the Gnatmare Site were both burned (Lister and Lister 1961; Metcalfe 1982), and at least one individual was killed in a kiva along the Colorado River that had been burned (Schwartz et al. 1980). But there is no evidence these events were initiated by Ancestral Paiute groups, and it is just as likely they represent intentional burning of structures upon abandonment, accidental fires, or conflict with other Ancestral Puebloan groups.

If Ancestral Paiute groups were in competition with sedentary farmers, then it is also possible this relationship was passive. Janetski (1994:177) suggested that hunter-gatherers would be disadvantaged during periods of increasing population densities. But if farming populations were decreasing, then hunter-gatherer strategies might have had an advantage. Roberts (2013, 2017) and Roberts and Ahlstrom (2012) have argued that Ancestral Puebloan and Ancestral Paiute groups co-occupied the lower Virgin River country since at least the AD 800s, and there is considerable cultural continuity between Formative and post-Formative times.

Competition over critical resources could have become acute if full-time Numic foragers over-exploited existing resources (cf. Sutton 1987). A coexistence might have occurred for a considerable period of time, perhaps involving some level of socioeconomic intercourse. But diminishing resources over time might have disrupted long-practiced farmer-forager contingency strategies, precipitating conflict if Numic groups defended critical resource patches against trespass by Fremont and Ancestral Puebloan farmer-foragers.

There is ethnohistoric evidence to support this idea. Pedro Castenada, in his account of the 1540 Coronado Expedition into New Mexico, indicated that mobile hunter-gatherer groups spent the winters in close proximity to the pueblos, but "The inhabitants do not dare to let them come inside, because they cannot trust them. Although they are received as friends, and trade with them, they do not stay in the villages overnight, but outside under the wings. The villages are guarded by sentinels with trumpets, who call to one another just as in the fortresses of Spain" (in Winship 1904:105). Tyler (1951) believed these hunter-gatherers were Utes. Later historical accounts of Utes trading with and raiding of the New Mexico pueblos suggest the above pattern persisted throughout the first two centuries of Spanish occupation of the region.

The possibility of a forced displacement also has some support in the oral legends of various Puebloan groups, who described armed confrontations with militaristic Numic-speaking raiders. These oral histories suggest a brief period of peaceful coexistence with the hunter-gatherer immigrants, followed by violent conflict. In the 1870s, renowned scholar William Henry Jackson, a participant in the historic Hayden Expedition, interviewed Puebloan informants who told him (1876:380) their ancestors:

… were an eminently peaceful and prosperous people, living by agriculture rather than by chase. About a thousand years ago, however, they were visited by savage strangers from the North, whom they treated hospitably. Soon these visits became more frequent and annoying. Then their troublesome neighbors — ancestors of the present Utes — began to forage among them, and, at last, to massacre them and devastate their farms so, to save their lives at least, they built houses high on cliffs, where they could store food and hide away till the raiders left. But one summer the invaders did not go back to their mountains as the people expected, but brought their families with them and settled down.


The Gulch

Photo: Dan Bauer

Environmental Perspectives

As we discussed in Chapter 7, greater effective moisture and somewhat warmer temperatures by AD 1050, perhaps beginning as early as AD 900 in some areas, corresponded with an unprecedented population expansion throughout the Southwest into higher elevation areas that had previously been unsuitable for agriculture. In the GSENM region, these areas included the Kaiparowits Plateau, Paria Plateau, and Kaibab Plateau, among others. This climatic event was evident across the entire Northern Hemisphere and is commonly referred to as the Medieval Warm Period or the Medieval Climatic Anomaly (MCA), which featured wetter, warmer conditions at all northern latitudes.

Denton and Karlen (1973) and others have argued that worldwide climatic conditions between AD 800 and 1250 were moister and warmer than the present and were characterized by only minor climatic fluctuations. But this is clearly an over-simplification, at least as it applies to the American Southwest, inasmuch as tree-ring records and other evidence suggest periodic droughts of 20 years or more during this period. In particular, three droughts, one in the late AD 900s to early AD 1000s, another in the mid AD 1100s, and yet another in the late AD 1200s, appear to have had far-reaching impacts that resulted in population shifts and defensive responses among agricultural populations.

The presence of highly efficient Ancestral Paiute foragers might have inhibited the ability of farmers to revert to hunting and gathering as they had done during earlier episodes of climatic stress.

As argued by Benson et al. (2007) and Benson and Berry (2009), the first drought coincided with dramatic population declines (or population shifts to new localities) among Formative groups in northern Utah, based on a dramatic decline in the radiocarbon frequency curves after AD 1000 (Berry and Berry 2003), and the appearance of defensive strategies on the northern Colorado Plateau (Spangler 2002). The second drought at about 1150 AD resulted in the abandonment of most of the great houses in the central San Juan Basin, and in population declines throughout the Southwest, including GSENM. The third drought resulted in the abandonment of remaining population centers beginning about AD 1280.

The drought sequence proposed by Benson et al. (2007) is supported by recent research by the Tree-Ring Laboratory at the University of Arizona (Knight et al. 2009) that identified prolonged dry conditions prior to AD 830 and again in the mid-to-late AD 900s, while wetter conditions were evident in the AD 1000s. Extended dry spells returned to the northern Colorado Plateau by the AD 1100s and continued through AD 1300 – a two-century-long period when there is decreasing evidence of agriculture in the region. In general, researchers found that local climates were extremely unpredictable from year-to-year and decade-to-decade, and that unusually dry episodes lasting 20 to 30 years or more could have had devastating effects on farmers who had become accustomed to atypically wet conditions.

Postulated wetter, warmer conditions at about AD 1050, or just after the first of the three major droughts described by Benson et al. (2007) and Knight et al. (2009), coincided with an expansion of dryland farming in areas of the Colorado Plateau where permanent water for supplemental irrigation would have been rare and where soils were often shallow and nutrient-poor. Remnant agricultural populations persisted in a few locations well into the late AD 1200s, but, as summarized by Madsen (1978:8), when effective summer moisture dwindled and average temperatures decreased, Formative lifeways "would have become increasingly precarious, eventually creating a situation where horticulture was no longer a viable adaptive strategy." The presence of highly efficient Ancestral Paiute foragers might have inhibited the ability of farmers to revert to hunting and gathering as they had done during earlier episodes of climatic stress.

Traditional environmental explanations point to a series of extended droughts as factors that triggered abandonment of agricultural lifeways in the region. But the three droughts that occurred between about AD 1000 and 1300 were hardly unique, and agricultural populations had survived earlier droughts of similar severity by implementing a variety of responses. The unresolved question is why did these droughts result in abandonment? The relationship between deteriorating climate and the subsequent abandonment of agriculture by about AD 1280 is probably not coincidental, but human factors probably contributed, as well. This pattern of decreased effective moisture and extended droughts appears to have been a pan-regional trend that enveloped the entire Colorado Plateau.

The earliest Ancestral Paiute radiocarbon dates are attributed to occupations in the middle AD 1200s when remnant populations of Fremont or Ancestral Puebloan farming groups would have been present in the region.

Droughts were commonplace throughout the late Holocene, and Ancestral Puebloan agricultural populations responded by changing their land use practices, either shifting to higher elevations with greater effective moisture during periods of drought, concentrating in those areas where permanent water could be exploited for irrigation purposes, and/or intensifying water and soil conservation practices through the use of check dams, trincheras, and terracing. For reasons not entirely understood, such responses were not viable within the context of larger human populations.

Kulp (1995:96) has argued that Ancestral Puebloans of the Grand Staircase region were intensifying their land use practices as their population increased, but "the abandonment of the Paria River Basin by the [Ancestral Puebloans] was not associated with a long-term change in regional climate, but was the result of high variability of yearly to decadal rainfall occurring in conjunction with times of high population pressure and intensive land use." Larson et al. (1996) also argued that society is never more vulnerable to climate-related crises than after a period of exponential population growth during a favorable climatic period. Hence, the most successful adaptations that permitted the greatest population growth were ultimately the most prone to catastrophic collapse once the climate deteriorated. In other words, traditional adaptive responses to droughts (shifting settlements to more optimal farming areas or temporarily reverting to hunting and gathering) proved to be ineffective once populations had exceeded the carrying capacity of local environments.

Summary

The hypothesized expansion of Numic-speaking groups into the eastern Great Basin and northern Colorado Plateau remains a popular explanation for abandonment of farming lifeways. It is widely accepted that the period from about AD 1000 to 1500 was characterized by widespread cultural migrations that precipitated tremendous social interaction across the West. As described by Lindsay (1986) and Gumerman (1988), among others, it was also a time of significant climatic change that disrupted agricultural lifeways throughout the Southwest. The predominance of a hunter-gatherer lifeway in GSENM after AD 1300, therefore, is likely dynamic, reflecting human adaptation to changing environments through population migration and shifting subsistence strategies in which agriculture was no longer viable.

The relationship of prehistoric farmers to historic Numic-speakers is wholly unresolved. While acknowledging a Numic expansion at different points in time, Grayson (1994), Gunnerson (1962, 1969) and Holmer (1994) see the Fremont as ancestors of the Utah's Numic-speakers. Others see the disappearance of agriculture and sedentism as evidence for a displacement of non-Numic peoples by Numic immigrants (Bettinger and Baumhoff 1982; Sutton 1987). None of the proposed regional models (e.g., Aikens and Witherspoon 1986; Bettinger and Baumhoff 1982; Sutton 1987) specifically addressed archaeological resources in GSENM, although each model appears to have some merit to a discussion of post-AD 1300 adaptations there.

Janetski's observations offer an intriguing perspective related to the Ancestral Puebloan-Ancestral Paiute interface in the GSENM area. Population expansion beginning about AD 1050 would have favored sedentary Fremont and Ancestral Puebloan farming adaptations that could have blunted expansion of Numic-speaking foragers into the region. But populations began to decline after AD 1150 in the wake of climatic deterioration, and by AD 1250 only a few remnant farming communities were left. At some point, farming populations might have declined to a point where they could no longer deter migration into the region by Numic-speaking foragers, and sedentary groups would have been at a competitive disadvantage with the Ancestral Paiute foragers.

The archaeological evidence from the GSENM region, although somewhat limited, seems to support several of the theoretical concepts discussed above:

- The earliest Ancestral Paiute radiocarbon dates are consistent with occupations in the middle AD 1200s when remnant populations of Fremont/Ancestral Puebloan farming groups would have been present in the region.

- Fremont and Ancestral Puebloan populations had been declining for nearly a century, which would have made the remnant populations of sedentary farmers vulnerable to hit-and-run raids and/or over exploitation of critical resource patches by Ancestral Paiute foragers.

Photo: Dan Bauer

- Ancestral Paiute hunter-gatherers might have denied the farmers access to contingency plant and animal resources necessary in the event of crop failures, disrupting the dynamic farming-foraging strategy that had been successful for more than 1,000 years.

- Ancestral Paiutes and Ancestral Puebloan peoples might have co-existed, engaging in social and economic exchange, as evidenced by sites with both Ancestral Paiute and Ancestral Puebloan artifacts.

- The timing of this co-existence remains unresolved, but it might have been earlier than radiocarbon data suggest. Desert Side-notched points considered diagnostic of Late Prehistoric times appeared in this region between about AD 1000 and 1200. Brownware ceramics, however, have not yet been documented prior to about AD 1250.

- Climates at the beginning of the Late Prehistoric were not appreciably different from earlier Formative times in that periods of greater moisture were followed by prolonged droughts, and warmer temperatures were followed by colder periods. The nature of these changes influenced the viability of agriculture, but would have had minimal impact on foraging.

- Drought conditions at about AD 1150 at the same time populations were at their maximum would have inhibited traditional responses, which included relocation to better agricultural niches (these areas were already occupied) or a resumption of hunting and gathering (wild resources were insufficient to accommodate such large populations). Some farming groups probably left at this time.

- Ancestral Paiute foragers probably arrived in the region about AD 1250 and might have coexisted with remnant farming groups or were in competition with farming groups that were relying to a greater extent on wild resources. Paiute groups might have incorporated limited maize and bean farming into their mobile lifeway during this coexistence.

- The last Ancestral Puebloan farming communities were abandoned in the wake of another prolonged drought beginning about AD 1270 or 1280. Ancestral Paiute foraging lifeways continued unabated, reflecting a pattern of high mobility that emphasized exploitation of lower elevation resources in the spring and upper elevations in the summer and fall. This pattern is similar to Archaic foraging strategies discussed in Chapter 3.

Coexistence or Replacement? The Demise of Farming

A growing number of radiocarbon dates after about AD 1250 have now been reported from the St. George Basin, Arizona Strip, and GSENM regions, many of them in direct association with artifacts that are considered to be Ancestral Paiute, and yet others that are associated with Ancestral Puebloan artifacts. Only rarely do Ancestral Paiute and Ancestral Puebloan artifacts co-occur at sites that have produced these late radiocarbon dates, leading some to suggest Ancestral Paiute reoccupations after regional abandonment by Ancestral Puebloan farmers (Jones 1986b; Lyneis 1994).

Many of the reported dates, however, have 95 percent probability ranges that overlap the end of the Formative and beginning of the Late Prehistoric, suggesting that either Ancestral Paiute groups could have occupied the region at the same time, but had little socioeconomic interaction with farming groups already there, or Ancestral Paiute occupation of the region occurred immediately after abandonment. In this section, we examine the radio-

A prolonged drought beginning about AD 1270 or 1280 was a death knell for farming as a primary subsistence strategy. But these farmers had survived previous droughts. Why was this one so different?

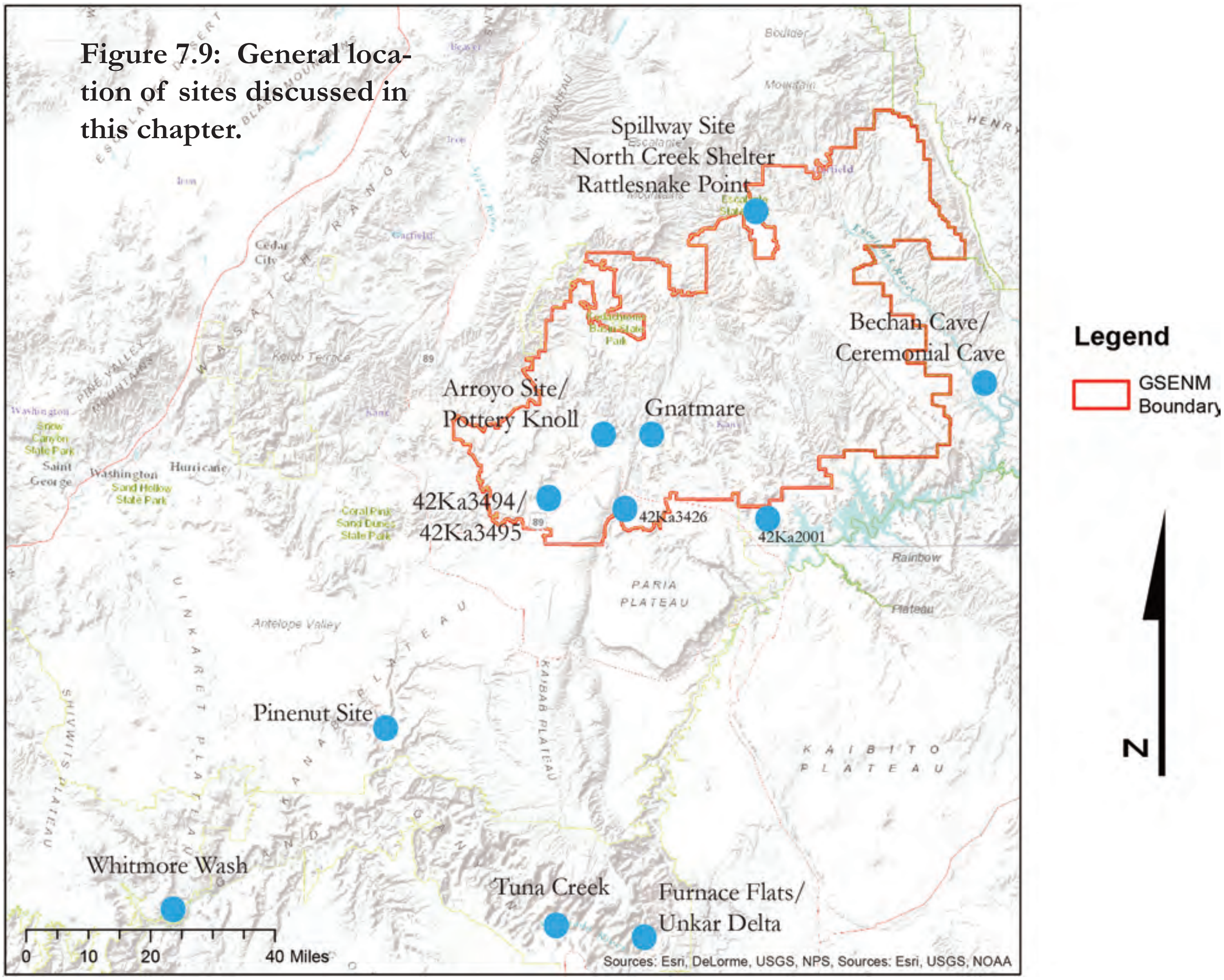


Figure 7.9: General location of sites discussed in this chapter.

carbon database relevant to the end of the Formative and beginning of the Late Prehistoric to assess the evidence that Ancestral Paiute foragers might have coexisted with Ancestral Puebloan farmers.

The current radiocarbon database suggests at least three possibilities: (1) Remnant populations of Ancestral Puebloan farmers persisted in the region throughout the late AD 1200s and perhaps into the early AD 1300s, practicing agriculture in much the same way as earlier generations; (2) Ancestral Paiute groups later camped at abandoned pueblos, resulting in Late Prehistoric dates that are not representative of the residence itself, or (3) The dated samples were contaminated and the reported dates are not valid.

The number of GSENM sites yielding late Formative and early Late Prehistoric radiocarbon dates is rather meager, especially compared to the abundance of Late Prehistoric dates on the Arizona Strip and St. George Basin. The small sample size of GSENM dates requires us to consider proxy data from a broader geographic context. Only nine radiocarbon dates have been reported from the Escalante River Basin with median probabilities after AD 1300, and only five dates have been reported from the Kaiparowits Plateau. Fourteen dates have been reported from the northern Grand Staircase section, but only six sites are represented. By comparison, at least 37 dates have been reported from the southern Grand Staircase and 87 dates from the St. George Basin. The general location of major sites discussed in this chapter is indicated in Figure 7.9 above.

As discussed throughout this overview, the use of material culture to assign temporal affinity is problematic. This is especially true for brownware potsherds and Desert Side-notched points that are traditionally seen as evidence of Ancestral Paiute peoples after about AD 1300. Both artifact types exhibit temporal ranges one to three centuries earlier than the AD 1300 beginning of the Late Prehistoric as used here. There is no dispute that these artifact types were utilized by Numic-speaking populations at the time of Euro-American contact, but it would be speculative to conclude that all brownware ceramics and Desert Side-notched points recovered in prehistoric contexts can be attributed to Late Prehistoric occupations.

Escalante River Basin

The radiocarbon database is quite meager in Escalante River Basin and contiguous areas of the Waterpocket Fold and Circle Cliffs, both in terms of terminal Formative sites and potential Ancestral Paiute foraging sites. In fact, Ancestral Paiute artifacts at radiocarbon-dated sites are extremely rare, consisting of a Desert Side-notched point at one site that also had Formative grayware ceramics, and another Desert Side-notched point at another site that was dominated by both Ancestral Puebloan and Fremont ceramics.

Based on the limited radiocarbon data, Fremont groups appear to have occupied the upper and lower Escalante River country through the late AD 1200s, perhaps longer. Coexistent groups of hunters and gatherers resided in the nearby Waterpocket Fold area, but the relationship of these foragers to sedentary groups has not been adequately addressed and there is minimal support at this time for the idea of coexistent Formative and Ancestral Paiute populations here. Only nine Late Prehistoric radiocarbon dates have been reported (Table 7.1), four of which were considered erroneous or artifact associations were unknown, and three of which were from sites with no temporally diagnostic artifacts (Figure 7.10).

Two sites in the region, one in the upper Escalante River drainage and the other in Bowns Canyon near the Colorado River, offer some evidence that Fremont groups might have remained in the area into Late Prehistoric times. The wide probability ranges, however, also suggest it was just as likely the sites represent terminal Fremont occupations in the late AD 1200s just before or during the horrific drought of the AD 1280s. In fact, the best Late Prehistoric radiocarbon dates are from Rattlesnake Point, Ceremonial Cave, and Bechan Cave, all sites with abundant evidence of Formative occupations.

One late radiocarbon date was reported from the Rattlesnake Point just outside of Escalante where three pithouses were associated with abundant Emery Gray ceramics, numerous Ancestral Puebloan ceramic types, Parowan Basal-notched points, Rose Spring points, and a single Desert Side-notched point. A corncob returned a radiocarbon date of 660 ±80 BP (AD 1331 median probability), or long after the abandonment of Coombs Village (Baer and Sauer 2003; Janetski et al. 2012). Aside from the Desert Side-notched point, there was nothing at this site to suggest coexistence with Ancestral Paiute groups.

A late Fremont presence was also identified in the lower Escalante River drainage where organic pigments from pictographs at Ceremonial Cave returned an AMS radiocarbon date of 675 ±55 BP (AD 1318 median probability), or roughly the same as Rattlesnake Point. The site consisted of 26 polychrome anthropomorphs in four separate panels described as exhibiting typical Fremont motifs (Geib and Fairley 1992:159-160). No Ancestral Paiute artifacts were observed.

At Bechan Cave, also in the lower Escalante River country, one date of 570 ±130 BP (AD 1373 median probability) was reported from juniper twigs that were part of a small brush structure, and another date of 610 ±50 BP (AD 1350 median probability) was obtained from the grass floor (Geib and Fairley 1992:166). Both dates were described as statistically equivalent to the Ceremonial Cave radiocarbon date. There was no convincing evidence the structure, described as a wickiup, was associated with sedentary activities such as agriculture or the manufacture of ceramics. It is possible the structure was utilized during hunting and gathering forays into the Glen Canyon region, either by terminal Fremont and/or coexistent Ancestral Paiute peoples.

Table 7.1

Site No	Site Name	General Location	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations	Comments
42Ka2739	Ceremonial Cave	Bowns Canyon	Paint Pigment	675 ±55	-25.4	AD 1249-1397	AD 1318	AA-5223	Rock Art	Geib and Fairley 1992:164	Fremont
42Ga0043	Rattlesnake Point	Alvey Wash	Zea Mays	660 ±80	-11.1	AD 1218-1417	AD 1331	Beta-171922	Pithouse Structure 1 Vent Shaft	Bauer and Sauer 2003:28	Fremont
42Ka2548	Bechan Cave	Bowns Canyon	Grass	610 ±50	n/a	AD 1288-1414	AD 1350	Beta-38341	Wickiup Structure Floor	Geib and Fairley 1992:166; Agenbroad et al. 1989:345	Unknown Affiliation
42Ka2548	Bechan Cave	Bowns Canyon	Juniper	570 ±130	n/a	AD 1191-1623	AD 1373	GX-10503	Wickiup Surface Structure	Agenbroad et al. 1989:345	Unknown Affiliation
42Ka2807	Five Shields	Cow Canyon	Charcoal	320 ±50	n/a	AD 1463-1657	AD 1562	Beta-67501	Hearth next to alignment	Geib and Fairley 1996:194	Date Rejected
42Ga3102	Aprylls Bench	Boulder Creek	Charcoal	310 ±70	n/a	AD 1457-1837	AD 1571	Beta-22455	Hearth Test Pit 5	Jacklin 1988:23	Date Rejected
42Ga3954		Halls Creek	Charcoal	300 ±70	-25.4	AD 1459-1913	AD 1579	Beta-101266	Deflated Hearth	Janetski et al. 2005:63	Unknown Affiliation
42Ga6264	Spillway Site	Wide Hollow	Charred Material	200 ±30	-21.9	AD 1654-1948	AD 1772	Beta-379132	Oval Pit, Nonstructure 6, Feature 36	Bond et al. 2014:99	Date Rejected
42Ga5863	North Creek Shelter	North Creek	Collagen	196 ±38	AMS	AD 1652-1948	AD 1772	AA-89634	Stratum VIIc, F174 in F54 in F30	Joel Janetski, personal communication 2019	Unknown Associations

Table 7.1: Late Prehistoric radiocarbon dates from sites in the Escalante River Basin and Waterpocket Fold areas. Note that none of them are associated with Ancestral Paiute diagnostics. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

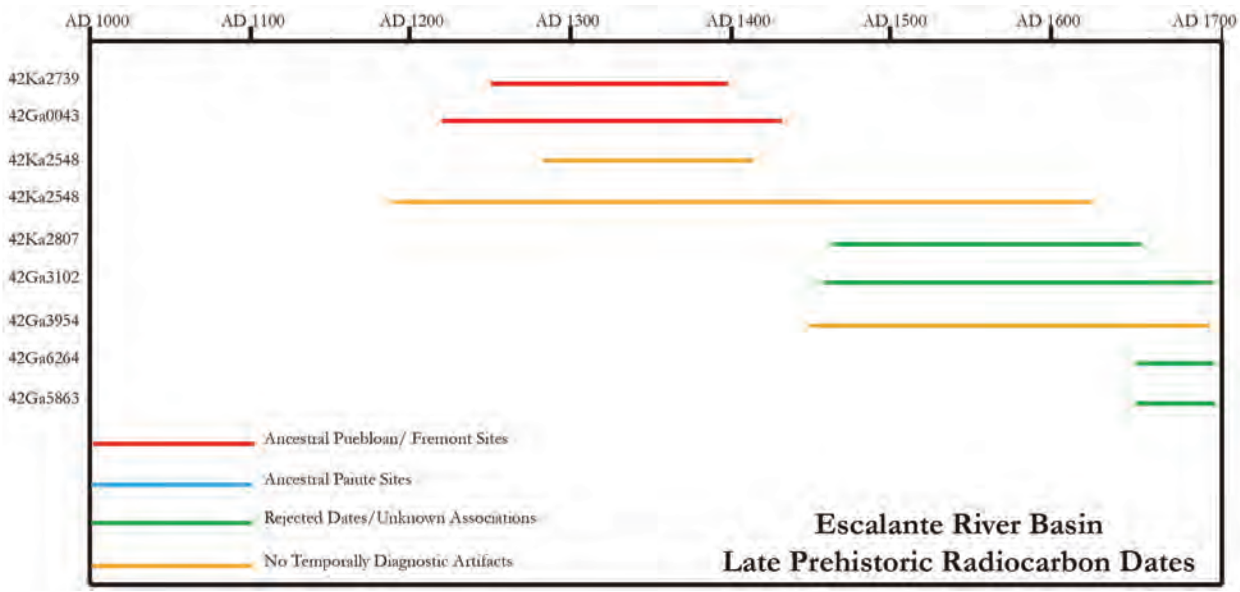


Figure 7.10: Graphic representation of 95 percent probability ranges for Late Prehistoric radiocarbon dates from sites in the eastern portion of the Monument.

Janetski and Talbot (1998:69-70) have argued at least three different models might be applicable to a discussion of the relationship between sedentary farmers and mobile foragers in the region at this time: (1) Farmers lived in the lowlands and made logistical use of the highlands; (2) Farmers lived in the uplands but made logistical use of the lowlands; and/or (3) the lowlands were exploited by small family groups unrelated to the larger village sites in a pattern of diffuse settlement. Empirical evidence from sites in that area suggested that groups of foragers were engaged in hunting and gathering wild food resources at the same time other groups were cultivating maize, beans, and squash. But the limited radiocarbon data suggest that hunting and gathering was not a significant part of terminal Formative and Late Prehistoric lifeways, or that it was so widely dispersed that it has gone largely unrecognized.

Collectively, the limited radiocarbon data from the eastern portion of GSENM does not support a coexistence of Formative and Ancestral Paiute populations in the latter part of the AD 1200s. Instead, a general abandonment of the area by Ancestral Puebloans at about AD 1250 was followed by a brief reoccupation by Fremont farmers, who persisted a generation or two before they also abandoned the region. There is minimal evidence that hunter-gatherers exploited the region to any significant degree after AD 1300. Radiocarbon-dated sites associated with foraging sites include of a brush wickiup in the lower Escalante River country and one eroded hearth in the Waterpocket Fold area. Neither of the sites were associated with evidence of maize agriculture, nor were they associated with Ancestral Paiute artifacts. The eastern portion of GSENM might have been largely abandoned by about AD 1300, or the level of human occupation had become so dispersed as to be archaeologically unrecognizable.

Kaiparowits Plateau

As we discussed in Chapters 5 and 6, there was a robust late Pueblo II farming expression on the Kaiparowits Plateau, which was limited to optimal environments on Fiftymile Mountain and Collet Top. Only one agricultural site has produced a radiocarbon date with a 95 percent probability range extending into the AD 1300s, whereas most of the tree-ring or radiocarbon dates suggest abandonment by the late AD 1100s. Based on the very limited radiocarbon database (see Table 7.2), there is no evidence the region was immediately reoccupied by Ancestral Paiute foragers upon the abandonment,

Table 7.2

Site No	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations
42Ka4575	Tommy Canyon	5720	Bark	400 $\pm$40	-21.9	AD 1439-1625	AD 1489	Beta-144225	F1 Hearth	Geib et al. 2001:114
42Ka2001	Wahweap Creek	3780	Charcoal	240 $\pm$50	n/a	AD 1509-1946	AD 1670	Beta-6875	Charcoal Layer 3cm bpgs	Liestman 1986:43
42Ka5363	Last Chance Creek	5460	Wood Twig/Basket	140 $\pm$40	-23.1	AD 1674-1940	AD 1808	Beta-191066	FS1 Surface	McFadden 2016:297
42Ka2001	Wahweap Creek	3780	Charcoal	120 $\pm$50	n/a	AD 1677-1938	AD 1822	Beta-6876	Charcoal Layer 3cm bpgs	Liestman 1986:43
42Ka4662	Cockscomb	6100	Bone Collagen	80 $\pm$40	-20	AD 1690-1925	AD 1841	Beta-144224	F2 Hearth in Test Pit	Geib et al. 2001:120

Table 7.2: Late Prehistoric radiocarbon dates from sites in the Kaiparowits Plateau region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

although Desert Side-notched points are rather common at Ancestral Puebloan sites and could reflect subsequent reoccupations.

The only potential evidence for a late Formative or early Late Prehistoric presence on the plateau comes from a site in Collet Canyon where a wooden wall peg from an Ancestral Puebloan structure returned a radiocarbon date of 780 ±70 BP (AD 1234 median probability) (McFadden 2016). The artifact assemblage, architectural characteristics, and the 95 percent probability range of AD 1061 to 1372 offer minimal support for the idea that Formative farming persisted here into Late Prehistoric times. Instead, this site probably dates to the late AD 1100s.

The remaining radiocarbon data are all derived from four foraging sites occupied many centuries after the abandonment of agriculture in this region. One site in the Tommy Canyon area is an artifact scatter associated with a hearth and obsidian detritus. A sample of bark returned a radiocarbon date of 400 ±40 BP (AD 1489 median probability) (Geib et al. 2001). No diagnostic artifacts were observed. Another site in the Smoky Mountain area consists of a rockshelter with a small lithic scatter, bifaces, a Rose Spring point, and a portion of an S-twined winnowing tray with red pigment on the exterior. The Rose Spring point suggested an occupation during Formative times, whereas the basketry is characteristic of Paiute weaving techniques in this region. A fragment of the basket returned a radiocarbon date of 140 ±40 BP (AD 1808 median probability) (see state site form; date reported in McFadden 2016). This is the only dated site in this region with a diagnostic Ancestral Paiute artifact.

Another site in the Wahweap area at the southern edge of the Kaiparowits Plateau consisted of a sparse lithic and ground stone scatter associated with a hearth. Charcoal from a hearth returned radiocarbon dates of 240 ±50 BP (AD 1670 median probability) and 120 ±50 BP (AD 1822 median probability). Both of these dates might be indicative of Ancestral Paiute foraging, although no diagnostic artifacts were observed (Liestman 1986). And one site in the Cockscomb area is a small lithic scatter associated with two hearth features. Bone collagen returned a radiocarbon date of 80 ±40 BP (AD 1841 median probability), which probably is indicative of a hunting camp at the end of the Late Prehistoric or sometime after historic contact (Geib et al. 2001).

In summary, the very limited chronometric data do not allow any temporal or spatial comparisons. The rarity of dated sites might be a sampling bias, or it might reflect very sparse utilization of the Kaiparowits Plateau in Late Prehistoric times. Ethnographic evidence suggests the region was indeed exploited by Southern Paiutes (Kelly 1964), but their use of the plateau was not as intense as regions farther to the west and southwest (see also Geib et al. 2001). Evidence that Ancestral Paiute groups immediately reoccupied the area after its abandonment by Ancestral Puebloan farmers has not yet been documented.

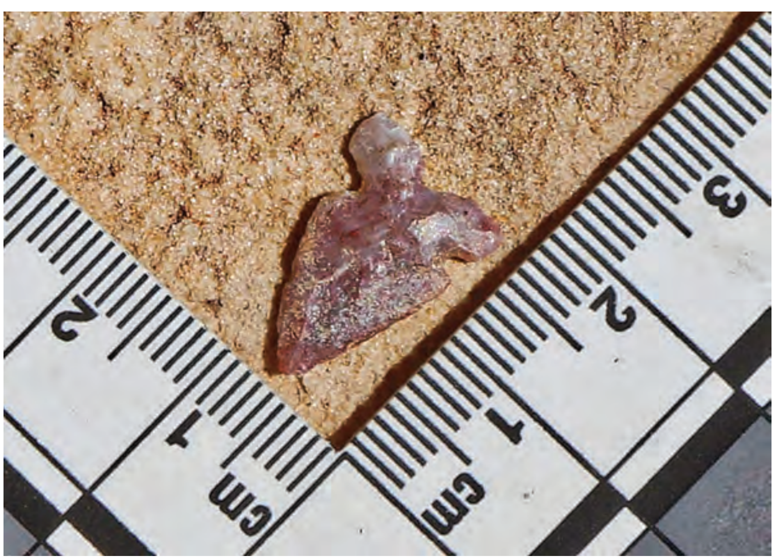


Figure 7.11: Desert Side-notched points are seen as diagnostic of the Late Prehistoric period, but in the Monument they are also found on late Formative sites. Photo: Jerry D. Spangler

Grand Staircase

The Late Prehistoric radiocarbon database from the northern Grand Staircase is only slightly greater than regions to the east, with 10 dates being reported

Table 7.3

Site No	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations	Comments
42Ka3494	Pugh Canyon	5200	Charcoal	730 ±60	n/a	AD 1179-1385	AD 1273	Beta-64997	Feature 5 Hearth	Firor 1994:39	Brownware Ceramics
42Ka3494	Pugh Canyon	5200	Charcoal	710 ±50	n/a	AD 1223-1386	AD 1286	Beta-64999	Feature 1 Hearth	Firor 1994:39	Brownware Ceramics
42Ka3495	Pugh Canyon	5200	Charcoal	700 ±70	n/a	AD 1188-1398	AD 1296	Beta-65004	Hearth	Firor 1994:48	Bownware Ceramics
42Ka3494	Pugh Canyon	5200	Charcoal	700 ±50	n/a	AD 1229-1388	AD 1292	Beta-65001	Feature 9 Hearth	Firor 1994:39	Brownware Ceramics, Desert SN
42Ka2605	Kitchen Corral Wash	5660	Burned Wood	640 ±60	n/a	AD 1270-1411	AD 1346	Beta-8421	Hearth 1A	Westfall 1985:96	Grayware Ceramics
42Ka3494	Pugh Canyon	5200	Charcoal	600 ±80	n/a	AD 1269-1439	AD 1353	Beta-64998	Feature 8 Hearth	Firor 1994:39	Brownware Ceramics, Desert SN
42Ka3426	West Clark Bench	4720	Charcoal	520 ±60	n/a	AD 1306-1489	AD 1406	Beta-33808	F2 Hearth/FCR	Nielson 1993:61	
42Ka3426	West Clark Bench	4720	Charcoal	510 ±70	n/a	AD 1304-1603	AD 1411	Beta-33807	F3a Hearth	Nielson 1993:65	Bean Pods
42Ka3494	Pugh Canyon	5200	Charcoal	510 ±50	n/a	AD 1316-1462	AD 1415	Beta-65002	Feature 6 Hearth	Firor 1994:39	Brownware Ceramics, Desert SN
42Ka5628	Park Wash	5729	Grass	450 ±70	-21.5	AD 1330-1628	AD 1463	Beta-150668	FS-1 Surface	McFadden 2012:17	
42Ka3494	Pugh Canyon	5200	Charcoal	340 ±60	n/a	AD 1452-1659	AD 1556	Beta-65003	Feature 7 Hearth	Firor 1994:39	Brownware Ceramics
42Ka3426	West Clark Bench	4720	Charcoal	140 ±60	n/a	AD 1665-1942	AD 1806	Beta-33809	F4 Hearth	Nielson 1993:69	Bean Pods
42Ka3494	Pugh Canyon	5200	Charcoal	100 ±50	n/a	AD 1681-1934	AD 1830	Beta-65000	Feature 3 Hearth	Firor 1994:39	Brownware Ceramics
42Ka6167	Cloud Blower Hill	4850	Charcoal	90 ±30	20.8	AD 1692-1921	AD 1842	Beta-390948	F5 Hearth	Roberts 2018: Vol. 6: Chapter 3:7	North Creek Gray, Desert Side-Notched

Table 7.3: Late Prehistoric radiocarbon dates from sites in the northern Grand Staircase region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

with conventional ages after AD 1300 (Table 7.3). More interesting are four dates from two sites near Kanab that are clearly Ancestral Paiute foraging sites, but they date a century or so earlier and might support the idea of a coexistence of Ancestral Paiute foragers and remnant populations of Ancestral Puebloan farmers.

Overall, the pattern of dates suggests some Ancestral Puebloan populations remained entrenched at several sites into the middle-to-late AD 1200s, based on the 95 percent probability ranges of some of the calibrated radiocarbon dates. The near-identical dates for some foraging and agricultural sites at this time could support the idea that both groups co-existed for a short time or that Ancestral Paiutes immediately reoccupied the area upon its abandonment, or that farmers were quickly assimilated into a foraging lifeway (see Figure 7.12).

There is very minimal radiocarbon evidence of any interaction between Ancestral Puebloan and Ancestral Paiute groups, although the radiocarbon ages for both adaptations appear to overlap one another. It is also possible this apparent overlap represents immediate reoccupation after Puebloan abandonment. At least 14 dates associated with foraging camps and/or Ancestral Paiute artifacts have been reported from the northern Grand Staircase area, and many of these dates overlap with those reported from Puebloan farming sites such as the Arroyo Site, Gnatmare, and Pottery Knoll. Six radiocarbon dated sites are relevant to Ancestral Paiute occupations of the northern Grand Staircase region:

- Repeated Ancestral Paiute occupations were documented at a series of hearths in the foothills near Kanab. These hearths, which were associated with brownware potsherds and Desert Side-notched points, yielded a series of seven radiocarbon dates between 730 ±60 BP (AD 1273 median probability) to 100 ±50 BP (AD 1830 median probability), suggesting one occupation coequal to terminal Ancestral Puebloan occupations in the same area, and another at or just prior to Euro-American contact (Firor 1994).

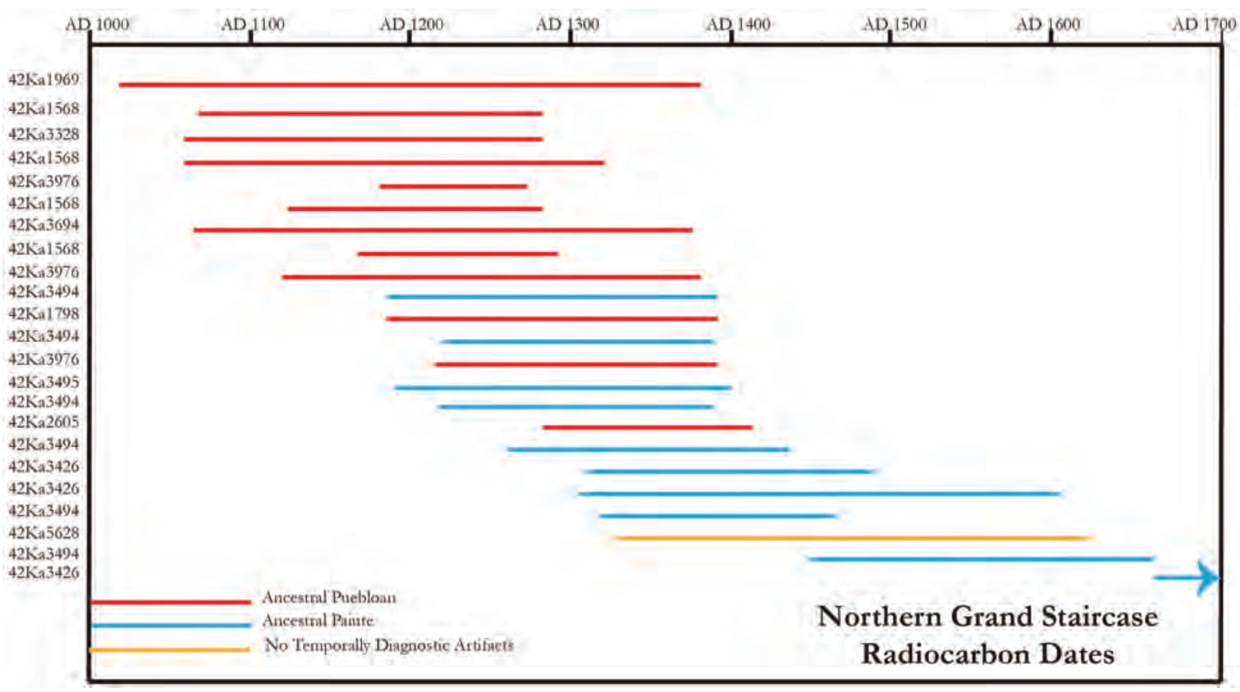


Figure 7.12: Graphic representation of 95 percent probability ranges for Late Prehistoric radiocarbon dates from sites in the western portion of the Monument.

- Another site near Kanab also contained hearth features, one of which that yielded a radiocarbon date of 700 ±70 BP (AD 1296 median probability). The site also yielded Southern Paiute brownware, as well as a few corrugated grayware potsherds that investigators did not believe were part of the overall site (Firor 1994). This is the only radiocarbon-dated site with a mixed late Pueblo II and Ancestral Paiute artifact assemblage.

- One of the more intriguing hunter-gather sites in the region is a sand dune campsite in the West Clark Bench area near the Paria River. Test excavations identified a large number of chert and quartzite reduction flakes, cobbles, and fire-cracked rock in association with discolored soils. One concentration of fire-cracked stone revealed charcoal fragments that produced a radiocarbon date of 520 ±60 BP (AD 1406 median probability). A second concentration of fire-cracked stone revealed oxidized cobbles and the charred remains of bean pods. Charcoal-stained sands returned a radiocarbon date of 510 ±70 BP (AD 1411 median probability). Excavations of a third concentration of fire-cracked stone revealed large fragments of charcoal, economic grasses, and bean pods. A sampling of the charcoal returned a radiocarbon date of 140 ±60 BP (AD 1806 median probability), a date consistent with early historic Southern Paiute occupations (Nielson 1993). Cummings (1993:71-89) believed the site was campsite where groups exploited buffalo berry, sagebrush, cattails, willow, pine, juniper, mustard, phlox, lily, grasses, rose, potato-tomato, wild onion, sego lily, mint, and beans.

- Another site in the Park Wash area consisted of a rockshelter with possible Barrier Canyon and Cave Valley rock art images, as well as a single grayware potsherd. A sample of grass from the shelter floor returned a radiocarbon date of 450 ±70 BP (AD 1463 median probability), suggesting reoccupation in Late Prehistoric times (McFadden 2016)

- Evidence of a hunter-gatherer encampment was identified at a sparse scatter of artifacts associated with a charcoal stain in the Kitchen Corral Canyon area. Excavations revealed a basin-shaped fire hearth with evidence of roasted juniper seeds. Charcoal from the fire hearth returned a radiocarbon date of 640 ±60 BP (AD 1346 median probability), as well as an early Formative date (Westfall 1985). The ceramic evidence was dominated by plain graywares, and this site might be an Ancestral Puebloan foraging camp, or the hearth represents a later reoccupation of the site.

- Late Prehistoric utilization of the Jackson Flat area was inferred by the presence of a few brownware ceramics and ethnographic accounts that this area was preferred by Southern Paiutes for rabbit drives. But chronometric evidence proved elusive. One radiocarbon date of 90 ±30 BP (AD 1842 median probability) was obtained from a hearth at Cloud Blower Hill, a site with grayware ceramics. Several other hearths or roasting pits observed at or near the modern ground surface were suspected to be Ancestral Paiute encampments, but these were not radiocarbon dated (Roberts 2018).

In summary, Ancestral Paiute hunting and gathering has been documented at six radiocarbon-dated sites in the region, some of which have 95 percent probability ranges that overlap the late Ancestral Puebloan occupations discussed in Chapter 6. An Ancestral Paiute occupation was identified based on the presence of brownware ceramics and Desert Side-notched points at two sites (Firor 1994). Four other sites produced Late Prehistoric radiocarbon dates, but these were not associated with any Late Prehistoric artifacts.

Taken collectively, the radiocarbon data, although sparse, could support either the idea of a coexistence of different cultural entities in late Formative times, or the reoccupation of the region by Ancestral Paiutes immediately after it was abandoned by Ancestral Puebloan farmers. Only one of the northern Grand Staircase sites attributed to the Formative-to-Late Prehistoric transition exhibited mixing of traditionally defined Late Pueblo II and Ancestral Paiute artifacts, but investigators did not believe the corrugated grayware and brownware potsherds were in any way related to one another.

Regional Comparisons

The rarity of dated Ancestral Paiute sites in any of the three GSENM subregions stands in stark contrast to the chronometric evidence from the Arizona Strip, the St. George Basin, and the lower Virgin River-Moapa Valley areas where more than 100 radiocarbon dates have now been reported. Although sampling bias may factor into that disparity, the sheer number of dated Late Prehistoric sites south and west of GSENM suggests the possibility that the Escalante River Basin, Kaiparowits Plateau, and northern Grand Staircase were on the extreme eastern fringe of Ancestral Paiute hunting and gathering strategies.

Sites in upland environments to the south and west of GSENM feature a wide variety of foraging sites, many of which are comingled with late Ancestral Puebloan artifacts and architecture, suggesting a coexistence and perhaps socioeconomic exchange, or that the dates are erroneous. Some of the 34 southern Grand Staircase radiocarbon dates with median probability ages after AD 1300 (see Table 7.4) are associated with Ancestral Puebloan occupations, such as those at the Pinenut Site, that might have persisted into the AD 1300s. Others, like the Furnace Flats Site along the Colorado river, might represent re-use of the pueblos after they were abandoned.

The radiocarbon database from the Arizona Strip region suggests that some Ancestral Puebloan populations persisted as recognizable groups of sedentary farmers into late Pueblo III and early Late Prehistoric times, even if their ceramics were indistinguishable from earlier times. Some aggregated into small pueblos, while others occupied small farmsteads or family residences, all situated in favorable environmental niches. Other sites in the Grand Canyon and Shivwits Plateau areas have also produced potential evidence of Ancestral Puebloan occupations much more recently than traditional explanations allow. One site in the Shivwits Plateau even produced a radiocarbon date from maize that suggests maize was being grown at or shortly before historic contact, yet it has all the trappings of an Ancestral Puebloan site (Karen Harry, personal communication 2019).

Although the data are equivocal, there is growing evidence that residential agriculturalists could have coexisted with Ancestral Paiute hunter-gatherers by about AD 1250. Several late Formative residential sites were possibly occupied at the same time Ancestral Paiute foragers moved into the area. The best evidence for potential post-AD 1300 occupations by sedentary farmers comes from the Pinenut Site, a linear roomblock of six contiguous rooms, a slab-lined pithouse, an isolated cist, and trash midden. A range of radiocarbon dates suggests the site was occupied repeated over a 200-year period prior to its abandonment at about AD 1275, a very conservative estimate considering the range of radiocarbon dates (Westfall 1987b:62-65).

Similar evidence was also identified at the Furnace Flat Site in the Grand Canyon, where slab-lined storage structures, a deep masonry kiva, and several masonry rooms were identified (Jones 1986b); site GC-671 in the Mt. Trumbull area (Thompson and Thompson 1974); and possibly sites in the Shivwits Plateau that appear to be late Pueblo II-Pueblo III sites, but where some radiocarbon dates are clearly much later in Late Prehistoric times (Harry 2008). Only the Furnace Flats Site had convincing evidence of later Ancestral Paiute occupations.

Some Ancestral Puebloan sites might have been reoccupied after their abandonment. In effect, Ancestral Puebloan sites were selected because of their proximity to permanent water and predictable resource patches, and those locations were also attractive to subsequent foragers. This might have been the case at the Furnace Flats Site mentioned above (Jones 1986b), another site in the Shivwits Plateau area (Allison 2010), and another site along the Colorado River (Fairley et al. 1994).

Certain locations were repeatedly occupied by foragers during Formative and Late Prehistoric times, suggesting predictable resources during all periods. These sites commonly feature large complexes of roasting pits, perhaps for mescal processing, and they are most commonly located along the Colorado River (Neff et al. 2016; Yeatts 1998; Jones 1986b). Some high elevation hunting camps were repeatedly occupied from Archaic to Late Prehistoric times (Schroedl 1988).

Multiple locations have yielded evidence of single-occupations or temporary use for food processing. These are sites with roasting pits and hearths, but very little other corroborating evidence. Good examples of these are found in the Snake Gulch area (Reid and Betenson 2013), along the Colorado River (Fairley et al. 1994; Hereford et al. 1993); and the Shivwits Plateau (Harry 2015).

In summary, there is an abundance of Late Prehistoric chronometric data from upland sites south of GSENM that reflect a variety of site types in different environmental settings. It is assumed that the same types of sites are abundant to the north, but this remains speculative. The data disparity becomes even more stark when lowland sites are considered. As mentioned above, nearly 90 dates have been reported from the St. George Basin that are attributed to late Formative or Late Prehistoric times, a good share of which are Ancestral Paiute based on the presence of brownware ceramics.

Interestingly, the earliest St. George Basin radiocarbon dates associated with brownware ceramics have conventional ages in the mid to late AD 1200s (Dames and Moore 1994; Reed et al. 2005; Walling et al. 1986) and are statistically the same as those reported in the northern Grand Staircase (Firor 1994) and Arizona Strip (Jones 1986b). In other words, the timing of the appearance of brownware ceramics appears to have been rather uniform between the Kanab region and the St. George Basin.

The post-Formative in southern Nevada is clouded by the fact the region was inhabited by Southern Paiute, Chemehuevi, Shoshone, and Mojave groups during Late Prehistoric times, each with different ethnic identities, tribal boundaries, and artifact traditions. In fact, at least six different ceramic traditions are evident at this time (Roberts and Ahlstrom 2012).

At least 138 radiocarbon dates have been reported from 51 excavated sites attributed to post-Formative occupations in the lower Virgin River-Moapa Valley region. Based on that cumulative radiocarbon database, Roberts and Ahlstrom (2012) suggested Desert Side-notched points were introduced into the area after AD 1200, whereas brownware ceramics might have appeared as early as AD 800 and were used contemporaneously with grayware ceramics over the next five or six centuries, demonstrating cultural continuity (see also Lyneis 1994). Similar evidence is currently lacking in GSENM (see Roberts 2018).

When the regional database is considered collectively, Ancestral Paiute utilization of lowland environments might have been much greater than their use of the uplands. Eighty percent of Late Prehistoric radiocarbon dates have been reported from lowland settings, either in the lower Virgin River country or the St. George Basin. This assessment is probably biased by the fact both of those regions have experienced significant modern development near Las Vegas and St. George that resulted in a multitude of archaeological investigations. Comparatively few investigations have been conducted in upland settings.

Obsidian Markers

Also relevant to this discussion are several Late Prehistoric obsidian hydration dates from sites in GSENM. Obsidian hydration as a mechanism for absolute dating is fraught with problems, mostly related to unknown environmental factors such as temperature and humidity that influence the rate of hydration at a specific location. Yet it remains an effective tool for broad-scale dating where the object can be dated to within a couple hundred years of when the flaked obsidian was exposed to oxygen. Obsidian is an especially sensitive marker to determine the source of the materials due to geologic traits unique to each outcrop, thereby allowing archaeologists to determine logistical patterns of procurement through time.

To date, at least 113 obsidian samples have been collected from sites or isolated contexts in GSENM and contiguous areas of the northern Grand Staircase as part of an ongoing effort to test certain assumptions that Archaic and Late Prehistoric groups utilized obsidian, whereas Formative groups did not. It has become a truism in the region that Formative groups did not import obsidian, although they might utilize a piece left behind by ear-

Table 7.4

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations	Site Type
AZ A:10:20 BLM		Shivwits Plateau	n/a	Charcoal	650 ±40	-21.6	AD 1280-1395	AD 1346	Beta-221392	Test Pit	Allison 2010:19	Residential-Storage
AZ C:13:384		Colorado River	2675	Charcoal	635 ±120	n/a	AD 1128-1546	AD 1337	W-6371	Isolated Hearth	Hereford et al. 1993:11	Foraging Camp
GC-671		Mt. Trumbull	5200	Charcoal	630 ±100	n/a	AD 1197-1455	AD 1342	RL-78	Structure 3 Pithouse	Thompson and Thompson 1974:19	Residential-Storage
AZ B:15:7	Tuna Creek Site	Colorado River	3360	Charcoal	620 ±150	Corrected	AD 1066-1618	AD 1345	WSU-3044	Top Level III Roasting Pit	Jones 1986b:105	Foraging Camp
AZ B:6:44	Pinenut Site	Kanab Plateau	5440	Charcoal	590 ±85	n/a	AD 1270-1456	AD 1356	K-636	Storage Room D	Westfall 1987b:53	Residential-Storage
AZ C:13:0010	Furnace Flats	Colorado River	2650	Charcoal	590 ±140	Corrected	AD 1132-1627	AD 1363	Beta-3051	Feature 14 Hearth 166-185cm bpgs	Jones 1986b:105	Residential-Storage
AR-030703-3012		Snake Gulch	n/a	Charred Material	570 ±30	-20.6	AD 1309-1417	AD 1349	Beta-322439	F3 Hearth Roasting Pit	Reid and Bettenson 2013:45	Foraging Camp
AZ C:13:384		Colorado River	2675	Charcoal	560 ±80	n/a	AD 1286-2495	AD 1369	W-6310	Isolated Hearth	Hereford et al. 1993	Foraging Camp
AZ B:15:7	Tuna Creek Site	Colorado River	3360	Charcoal	550 ±75	Corrected	AD 1289-1486	AD 1377	WSU-3046	Level 1 Midden	Jones 1986b:105	Foraging Camp
AZ C:13:384		Colorado River	2675	Mesquite	550 ±80	n/a	AD 1288-1542	AD 1378	W-6372	Isolated Hearth	Hereford et al. 1993:11	Foraging Camp
AZ G:03:020		Colorado River	1425	Charcoal	540 ±50	-24.8	AD 1305-1441	AD 1394	Beta-158807	Feature 9 Ash Stain	Neff et al. 2016:A.3	Foraging Camp
AZ A:14:50	Lava Ridge	Shivwits Plateau	6280	Charcoal	540 ±40	-20.7	AD 1312-1436	AD 1400	Beta-250680	Feature 5	Harry 2008: Appendix B	Residential-Storage
AZ G:03:020		Colorado River	1425	Charred Material	520 ±30	-24.8	AD 1328-1438	AD 1417	Beta-300492	FS 26 Roasting Pit	Neff et al. 2016:A.3	Foraging Camp
G:03:0007		Colorado River	n/a	Charcoal	500 ±120	n/a	AD 1283-1654	AD 1432	GX-5003	Roasting Pit	Grand Canyon-NPS Files	Foraging Camp
AZ A:16:0001	Whitmore Wash Site	Colorado River	1600	Vegetal Material	445 ±120	n/a	AD 1302-1796	AD 1489	GX-4995	Feature 2 Upper Midden	Grand Canyon-NPS Files	Foraging Camp
AZ B:12:3		Kaibab Plateau-	8705	Charcoal	370 ±80	n/a	AD 1425-1784	AD 1543	Beta-24070	Hearth 1, Locus B, Strata IIC-IIII	Schroedl 1988:57	Foraging Camp

Table 7.4 (continued)

Site No	Site Name	General Location	Elevation	Sample Material	Conventional Age BP	$\delta^{13}C$ ‰	95 Percent Probability	Median Probability	Lab No.	Provenience	Citations	Site Type
AZ C:13:371		Colorado River	2715	Charcoal	350 ±50	n/a	AD 1453-1642	AD 1551	Beta-94283	Feature 4 FCR	Grand Canyon-NPS Files	Residential-Storage
AZ C:13:010	Furnace Flats Site	Colorado River	3000	Mesquite	300 ±50	n/a	AD 1468-1788	AD 1569	W-6261	Roasting Pit	Grand Canyon-NPS Files	Multi-Component
AZ A:15:048		Colorado River	1525	Charred Material	280 ±70	n/a	AD 1466-1937	AD 1598	Beta-147221	Feature 1 Roaster	Grand Canyon-NPS Files	Foraging Camp
AZ:A14:56	Corn Cob	Shivwits Plateau	6000	Charcoal	270 ±40	-21.7	AD 1497-1798	AD 1608	Beta-250686	Feature 10	UNLV Anthro Files	Residential-Storage
B:09:0027		Tuckup Canyon	n/a	Charcoal	255 ±130	n/a	AD 1444-1939	AD 1663	GX-4996	Mescal Pit 1	Grand Canyon-NPS Files	Foraging Camp
AZ C:13:010	Furnace Flats Site	Colorado River	3000	Mesquite	250 ±100	n/a	AD 1463-1942	AD 1667	W-6259	Roasting Pit	Grand Canyon-NPS Files	Multi-Component
AZ C:13:384		Colorado River	2675	Charcoal	240 ±90	n/a	AD 1471-1941	AD 1677	AA-9925	Isolated Hearth	Hereford et al. 1993:11	Foraging Camp
AZ A:14:083	To'tsa	Shivwits Plateau	6200	Juniper Seeds	220 ±30	-19.9	AD 1646-1948	AD 1769	Beta-469419	Feature 6	Harry 2015:Appendix C	Residential-Storage
AZ A:15:63	Bart Site	Shivwits Plateau	6126	Zea Mays	180 ±30	-22.6	AD 1665-1947	AD 1772	Beta-469417	Feature 1	UNLV Anthro Files	Residential
AZ A:10:27 BLM		Shivwits Plateau	n/a	Charcoal	170 ±60	-23.3	AD 1644-1944	AD 1782	Beta-221398	FS133 Test Pit	Allison 2010:19	Residential-Storage
AZ C:13:371		Colorado River	2715	Charcoal	120 ±50	n/a	AD 1676-1938	AD 1821	Beta-94284	Feature 2 FCR	Grand Canyon-NPS Files	Residential-Storage
LAKE 12-038	Roasting Pit	Shivwits Plateau	6050	Unknown	120 ±30	-23.5	AD 1684-1932	AD 1832	Beta-376471	Unknown	Harry 2015:Appendix C	Foraging Camp
AR-030703-1500		Kanab Creek	n/a	Basket	110 ±160	-24.7	AD 1473-1942	AD 1764	AA-66727	n/a	Kaibab NF Files	n/a
AZ G:3:020		Colorado River	1425	Charred Material	110 ±30	-25.9	AD 1687-1928	AD 1836	Beta-300494	Feature 10 Hearth Profile	Neff et al. 2016:A.3	Foraging Camp
AZ:A:16:180		Colorado River	1675	Charcoal	100 ±50	-25	AD 1680-1934	AD 1831	Beta-158801	Hearth	Yeatts 1998:53-62	Foraging Camp
AZ G:3:020		Colorado River	1425	Charred Material	70 ±30	-12.4	Modern	Modern	Beta-300493	Feature 2 Roaster	Neff et al. 2016:A.3	Foraging Camp
AZ:A:16:180		Colorado River	1675	Creosote	50 ±50	-25	Modern	Modern	Beta-106109	Roasting Pit Fill	Yeatts 1998:53-62	Foraging Camp

Table 7.4: Late Prehistoric radiocarbon dates from sites in the southern Grand Staircase (Arizona Strip) region. The 95 percent probability ranges were obtained using the Bchron library (Parnell 2016) in the R environment (R Core Team 2017) following the IntCal13 calibration curve (Reimer et al. 2013).

lier peoples if the opportunity presented itself. The presence of obsidian at Formative sites is generally seen as indicative of an underlying Archaic component or a subsequent Late Prehistoric reoccupation (Zweifel 2008).

The obsidian analyses found that utilization of obsidian was about the same among Late Prehistoric groups as it was among Archaic groups, and the preferred sources were the Wild Horse and Modena outcrops in southwestern Utah. The Wild Horse source was exploited to a greater degree in Archaic times and the Modena source exploited more during Late Prehistoric times. Seven sites within GSENM and another 13 sites immediately adjacent to the Monument have produced obsidian hydration dates consistent with the Late Prehistoric. About two-thirds of these sites are lithic scatters or lithic and ground stone scatters without other temporally diagnostic artifacts.

> **Current evidence suggests brownware ceramics appeared in both the St. George Basin and Kanab region in the middle AD 1200s when remnant farming populations were still present here.**

Summary

The number of Late Prehistoric radiocarbon dates from the western portion of GSENM is somewhat greater than those that have been reported from the eastern portion, which might support observations by Kelly (1964) that the western portion of GSENM sustained greater Southern Paiute populations than did the eastern regions. Corroborative radiocarbon data is entirely lacking from sites in the upper Paria River and Skutumpah Terrace areas that, according to ethnographic accounts, were intensively exploited by Southern Paiute peoples in historic times, suggesting a sampling bias in the chronometric database.

The database suggest populations aggregated into pueblos by about AD 1050, followed by gradual dispersal from the mid-AD 1100s through the mid-AD 1200s. Remnant populations might have been present when Ancestral Paiute immigrants arrived in the mid-AD 1200s, or existing populations became more recognizable in the archaeological record. Evidence of both Ancestral Puebloans and Ancestral Paiutes at the same site is quite limited, and these could be indicative of multiple but not overlapping occupations. Convincing evidence has not been reported that any relationship between the two groups was a hostile one, although several Puebloan sites had been burned at the time of abandonment.

The chronometric database offers some insights related to Ancestral Paiute lifeways and subsistence. The brownware ceramic tradition commonly attributed to Ancestral Paiute peoples appears in this region by the middle-to-late AD 1200s, based on radiocarbon dates from two sites near Kanab (Firor 1994) and from the Whitmore Wash Site in the Grand Canyon (Jones 1986b). The 95 percent probability ranges of these dates overlap Ancestral Puebloan occupations in the same areas. A Desert Side-notched arrow point was also observed at one site, but it was not directly associated with a dated feature.

Based on the plant evidence, Ancestral Paiute groups were primarily engaged in foraging activities focused on economic plants that included goosefoot, pigweed, buffalo berry, sagebrush, cattails, willow, pine, juniper, mustard, phlox, grasses, rose, wild onion, sego lily, wild potato, and mint. Evidence of Southern Paiute maize farming is well-documented in the St. George Basin (Allison et al. 2008), and beans might have been part of the horticultural mix. The presence of bean pods at one GSENM site was considered problematic given that the ethnohistoric record does not mention bean cultivation among the Southern Paiutes (Cummings 1993). Possible corroborative evidence has since been reported from a site in the Sand Hollow near St. George area where beans and maize starches were associated with a thermal feature that returned a radiocarbon date of 640 ±40 BP (AD 1348 median probability), or early in the Late Prehistoric period (Winslow 2011:252). And in Johnson Canyon, bean pollen was identified in a packrat midden that dated to Late Prehistoric times (D'Andrea 2015:109).

GSENM Site Database

The identification of certain artifacts with specific ethnic groups is fraught with theoretical problems. As observed by Aikens (1994:40), "no archaeologist can pick up a pottery sherd or arrow point and say what language its user spoke," although it is also true that archaeologists commonly distinguish between "a 1,200-year-old pithouse village and those of a 500-year-old hunter-gatherer camp." Fowler (1994:103) and Adovasio and Pedler (1994) have maintained that some items do pattern along ethnic lines, although they also recognized material culture could change rapidly.

Among the artifacts considered characteristic of Numic-speaking peoples are basketry, certain projectile points, and brownware ceramics. Rock art styles may also be distinctive, although this has not been convincingly demonstrated in the GSENM region. As cautioned by Buckles (1988), most artifacts considered to be diagnostic of Numic-speaking groups have not been proven to be unique to such groups. Desert Side-notched arrow points, for example, are found in non-Numic Plains contexts (Frison 1991), at Navajo sites in northwestern New Mexico (Reed and Horn 1990), in the Dismal River Apache Phase in the central Plains (Gunnerson 1987), and at sites attributed to ancestral Hopi and Pai peoples (Geib and Warburton 1991). This point type has also been recovered in possible Fremont contexts throughout the northern Colorado Plateau (Spangler 2002), although Justice (2002a, 2002b) has suggested that Desert Side-notched points are often confused with Pueblo Side-notched points.

Unequivocal evidence of an Ancestral Paiute presence in the region – those sites that have produced radiocarbon dates associated with brownware ceramics and/or Desert Side-notched points – is actually quite limited. For the purposes of organizing the data, we accept at face value state site

Long Canyon

Photo: Dan Bauer

forms that indicate the presence of certain Ancestral Paiute material culture markers. Site forms on file with GSENM and the Utah SHPO were subsequently examined for any references to these specific artifacts, and relevant sites were then organized and tabulated according to site size, complexity, and material culture traits. This dataset was augmented by sites that have produced Late Prehistoric radiocarbon and obsidian hydration dates even if the site did not contain diagnostic artifacts.

Because these sites are overwhelmingly indicative of foraging activities, we examine the dataset to address specific questions:

- It is a truism throughout the northern Colorado Plateau and eastern Great Basin that the demise of agricultural lifeways led to a resumption of hunting and gathering in the Archaic pattern. But are Late Prehistoric hunting and gathering sites in GSENM identical in site structure, complexity, and settings as Archaic sites? Are later foraging sites located in the same ecological settings as Archaic ones, or are there different environmental variables?

- Ethnographic evidence suggests that Southern Paiute groups were heavily reliant on wild plant resources, engaging in seasonal movement between resource patches. Is this supported by the prevalence of ground stone tools at Late Prehistoric foraging sites? How does this pattern compare to Archaic foraging sites?

- As we discussed above, there is evidence that Ancestral Paiute groups occupied GSENM at the same time Ancestral Puebloan farmers, but there is minimal evidence of social or economic interaction at farming sites. Is there greater evidence of mixed Ancestral Paiute and Ancestral Puebloan assemblages at foraging sites that might suggest socioeconomic interaction, such as Ancestral Puebloan ceramics at foraging sites with other Ancestral Paiute indicators?

Basketry

As discussed in numerous publications related to the evolution of basketry technologies, Adovasio (1980, 1986) has argued that no other class of artifact possesses a greater number of culturally bounded attributes than does basketry. Adovasio maintained the basic affinities of Fremont basketry, both coiled and twined, "are duplicated in earlier Archaic assemblages from Utah," and that "their persistence in toto constitutes a powerful body of evidence that Fremont basketry is derived part and parcel out of local Archaic industries." The disappearance of Fremont basketry after AD 1300 and the dominance of new twined types attributed to Numic-speakers signaled the end of the Fremont as a cultural entity and "the extinction of a technological tradition thousands of years old" (1980:39).

At least 14 different twined forms of basketry were produced by Numic-speaking groups in the Great Basin and contiguous areas. Basketry forms include open-twined burden baskets, twined cradles, open-twined winnowing or parching trays, paddle-shaped twined seed-beaters, closed-twined water bottles, conical baskets, and closed-twined hats (see Figure 7.14 above).

Adovasio and Pedler (1994:121-123) have argued that basketry of Numic groups can be distinguished from that of all other contemporaneous populations and from preexisting industries, and that "no relationship whatsoever exists." There is also no discernible relationship between archaeological or ethnographic Numic basketry and any of the major Southwestern basketry traditions. The new basketry technology, identified as an "ethnic fingerprint" of Numic-speakers, appeared about AD 1000, supporting the idea that Numic-speakers were late arrivals in the Great Basin and contiguous areas.

A detailed discussion of Numic basketry techniques is beyond the scope of this chapter. It should be noted, however, that large collections of Southern Paiute basketry from the northern Colorado Plateau are curated at the Natural History Museum of Utah in Salt Lake City, and additional basketry specimens are curated at the Smithsonian Institution and were discussed at length by Fowler and Matley (1978, 1979). For a more detailed discussion of dissimilarities of Fremont (and by inference Ancestral Puebloan) bas-

Figure 7.14: Southern Paiute conical basket photographed in the late 1800s. Photo: J.K. Hillers Collection, Smithsonian Institution.

ketry to Numic basketry, see Adovasio et al. (1982) and Adovasio (1986).

It should also be noted that basketry items attributable to Numic-speaking populations are rare in prehistoric archaeological contexts in the GSENM area. One fragment of an S-twined parching tray was recovered from a rockshelter in the Smoky Mountain area. It returned a radiocarbon date of 140 $\pm$40 BP (AD 1808 median probability) (McFadden 2016) that places its construction near the end of the Late Prehistoric or early in historic times.

Brownware Ceramics

The appearance of coarse sand-tempered pottery sometime after AD 1000 is seen by some as direct evidence of expansion of Numic-speaking populations into the eastern Great Basin, northwestern Plains, northern Colorado Plateau, and Rocky Mountains at that time. These ceramics have been assigned a variety of names depending on the region, such as Shoshone Brownware found in northern and western Utah, western Wyoming and southern Idaho; Promontory Wares found primarily in wetlands areas along the Wasatch Front; and Uncompahgre Brownware found in western Colorado and eastern Utah. In the GSENM region, Ancestral Paiute ceramics are commonly referred to as Southern Paiute Brownware, a term synonymous with Intermountain Tradition ceramics (Mulloy 1958), Southern Paiute Utility Ware (Baldwin 1950), and Southern Paiute Ware (Colton 1965).

Brownware vessels come in only a handful of forms (Figure 7.15), unlike the variety evident in Ancestral Puebloan forms. As summarized by Coale (1963:1-2):

Normally, vessels of this ware are generalized truncated cones, flat-bottomed with straight walls which are flared out of the vertical plane at angles of from approximately five to 25 degrees .... Ranking next most important as a diagnostic feature is tempering material. The temper consists of grit, sand or crushed rock. .... [Q]uartz may also be natively present in imperfectly decomposed residual clays. The temper is ordinarily quite coarse compared with Puebloan wares, but still there is a great deal of variability of temper-particle diameter within Shoshonean pottery as a unit .... As to methods of construction, both coiling and modeling techniques appear to have been used to fashion the vessels. In most, if not all, cases, construction has been completed by paddle-and-anvil treatment.

Brownware ceramics attributed to Ancestral Paiute peoples are not commonplace in the GSENM region, but potsherds have been documented in all sub-regions of the Monument. This stands in contrast to statements by Euler (1964) that "for reasons not ascertainable, however, not all Southern Paiute made pottery. Its manufacture apparently was restricted primarily to bands west of the Kaibab Plateau. Only a few Paiute sites to the east, all in the Glen Canyon drainage, are marked by ceramics" (1964:379; see also Stewart 1942:273).

Madsen (1975) observed a south-to-north distribution of radiocarbon dates associated with brownware ceramics, beginning about AD 1000 in the south and extending to AD 1300 in the north. Rhode (1994:129) summarized a number of sites in the southeastern Great Basin that have yielded evidence that brownware pottery might have been present by AD 800 and was contemporaneous with Ancestral Puebloan and Fremont traditions in cultural contact zones, and that "… it would appear that Numic foragers coexisted with Fremont and Anasazi horticulturalists for several centuries before the demise of the latter." A similar position was offered by Roberts and Ahlstrom (2012) for the lower Virgin River-Moapa Valley region, although no evidence for an early brownware tradition has yet been reported from upland areas to the east, including GSENM.

In his synthesis of chronometric data associated with Late Prehistoric ceramics from the northern Colorado Plateau, Reed (1994:194) maintained that none of the calibrated ranges with a high confidence rating occur prior to AD 1000, and, at the time of his analysis, only two dates had been reported from the AD 1100s, suggesting this type might not have appeared until sometime after AD 1200. This assessment is consistent with radiocarbon dates from two sites near Kanab (Firor 1994) and from the Whitmore Wash Site in the Grand Canyon (Jones 1986b).

Euler (1964) cautioned that not all Paiute groups manufactured pottery, and that more-mobile lifeways militated against the manufacture and transport of ceramics in some areas. Geib et al. (2001:392) echoed this theme, suggesting the Kaiparowits band might have been one of a handful of Paiute groups that did not manufacture pottery, and even if they did the ceramic vessels were "seldom part of the traveling tool kit of Southern Paiutes on the Kaiparowits Plateau."

If this assessment is valid for GSENM, then a greater number of sites in the western portion of GSENM would have brownware potsherds, and the frequency of such sites would diminish from west to east. This does not appear to be the case. At least 28 sites in GSENM have yielded brownware ceramics and they have been documented in all three sub-regions of the Monument. Instead of decreased frequency from west to east, we found that brownware ceramics were part of the Ancestral Paiute tool kit in all three sub-regions in almost equal proportions. Nine such sites have been documented in the Escalante River area, nine sites in the Kaiparowits Plateau, and 10 sites in the Grand Staircase. Hence, there is little support in the state database, as yet, for the idea that because the Kaiparowits and Escalante bands were more mobile they rarely carried ceramic vessels on their hunting and gathering forays.

The presence of ground stone tools can be considered evidence of plant foraging and somewhat longer occupations of individual sites by bi-gender groups. The co-occurrence of ceramics and ground stone tools therefore might suggest longer occupations in that plant foods were being collected, processed, and cooked at the same location. This is particularly evident in the Escalante River area where seven of the nine sites had both ground stone tools and brownware ceramics. But this is not evident in the Kaiparowits Plateau where only one out of nine sites had both ground stone tools and brownware ceramics, and only three out of 10 sites in the Grand Staircase featured both artifact types. Although the sample size is small, 61 percent of all sites with brownware ceramics do not have ground stone tools, suggesting that groups either engaged in hunting activities also found ceramics a useful tool, or procured plants were being consumed and/or transported elsewhere without on-site processing.

It should also be noted that brownware ceramics very rarely occur with other Late Prehistoric diagnostics. Two of these sites also featured Desert Side-notched points, one in the Kaiparowits Plateau and the other in the Grand Staircase, and brownware ceramics co-occurred with a Cottonwood Triangular point at one Kaiparowits Plateau site. The relationship between Late Prehistoric diagnostics and the prevalence of obsidian artifacts is likewise tenuous, with obsidian noted at only nine of 28 sites (32 percent) with brownware ceramics.

Projectile Points

The temporal distinction between corner- and basal-notched arrow points characteristic of late Formative peoples and the side-notched points utilized by later groups has been the subject of numerous reports over the past 75 years, although few discussions have addressed the functional advantages of one particular style over another. The trend toward side-notched arrow points appears to have begun about AD 800 with the appearance of Bear River Side-notched points in northern Utah, about AD 875 with the appearance of Uinta Side-notched points in northeastern Utah, and about AD 950 with the appearance of Nawthis Side-notched points in southern Utah (Holmer 1986:106). Nawthis and Uinta types have been documented in the GSENM region, whereas the Parowan Basal-notched points are commonplace in late Formative contexts but might actually be a late Basketmaker III or Pueblo I temporal indicator (Roberts 2018).

Originally, all side-notched arrow points in the Intermountain West were classified as Desert Side-notched points (Baumhoff 1957). Later studies (Holmer and Weder 1980; Justice 2002a, 2002b) demonstrated morphological variability with both chronological and spatial meaning. Holmer

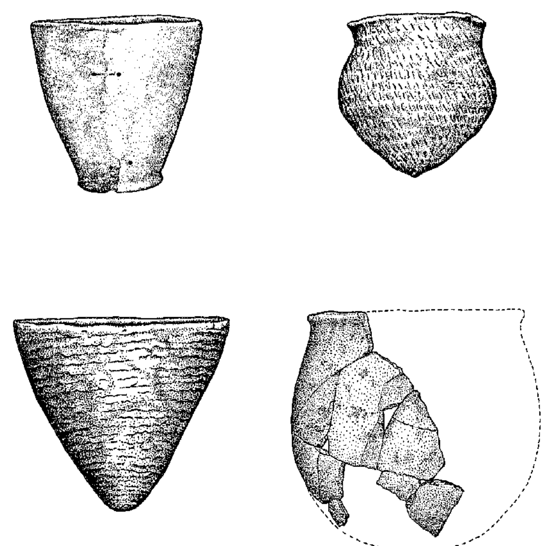


Figure 7.15: Representative examples of brown ware vessel forms. Image adapted from Janetski (1994:165).

(1986:107) suggested an early period from about AD 800 to 1200 that was characterized by a series of small side-notched points called Bear River, Uinta, and Nawthis; these point types were common at sites yielding Fremont ceramics. A later period from AD 1200 to 1700 was characterized by Desert Side-notched points, often found in association with brownware ceramics. Relevant to this discussion, Holmer and Weder (1980:55) believed Desert Side-notched points were introduced into the region by AD 1150, replacing Fremont points by AD 1250 in the southern area, and by AD 1350 in the north (see Figure 7.16 above).

Researchers have long held that not all Paiute groups made pottery, that high mobility deterred its use in some areas. But this assumption is at odds with the state's database that found brownware ceramics in all three of the Monument's sub-regions in almost equal proportions.

Desert Side-notched points are recognizable by high side notches and sometimes a pronounced basal notch. Many sites yielding Desert Side-notched points have also yielded brownware ceramics, leading Holmer and Weder to conclude they reflect occupations by Numic-speakers sometime after AD 1150 (1980:60). Broad conclusions postulated by Holmer and Weder (1980) and Holmer (1986) do not account for what appears to be a complex and confusing projectile sequence during late Formative and early Late Prehistoric times. Desert Side-notched points have been recovered from sites in virtually all sub-regions of the Monument, both in Ancestral Puebloan and Ancestral Paiute contexts.

In many cases, it is likely these mixed artifact assemblages represent repeated occupations of favorable campsites over several thousand years, given the co-occurrence of Archaic dart points at some sites and Formative artifacts at others. In other instances, the argument for mixing of cultural deposits is less convincing. Conclusive statements about the temporal range of this point type in GSENM would be speculative given the absence of direct radiocarbon dates associated with Desert Side-notched points. If the temporal range offered by Holmer and Weder (1980) is accurate, however, Desert Side-notched points could be expected at sites dating as early as AD 1150. Formative graywares and/or corrugated types co-occur at eight of 35 sites with Desert Side-notched points (23 percent).

The spatial patterning of sites yielding Desert Side-notched points does not appear to support Kelly's observations (1964) that the western portion of the study area was exploited to a greater degree than was the eastern portion. Instead, sites with this point type are considerably more common in the Kaiparowits Plateau sub-region (60 percent) compared to the Escalante River Basin (17 percent) or northern Grand Staircase (23 percent). This might indicate that Ancestral Paiute hunters were simply exploiting the Kaiparowits Plateau for its faunal resources in much the same way as Archaic peoples had done, and because those resources are more common in this region, evidence of their procurement is more common.

Other Indicators

Two other artifact types are commonly attributed to Ancestral Paiute peoples, but in both instances the evidence is questionable. In the case of Pueblo IV ceramics (Jeddito Yellow Ware), the artifacts themselves are unquestionably of post-Formative origin. But how they arrived at sites in GSENM remains unresolved. Geib et al. (2001:393) have argued that Jeddito Yellow Ware was traded widely to forager populations throughout the Southwest, and therefore examples found in

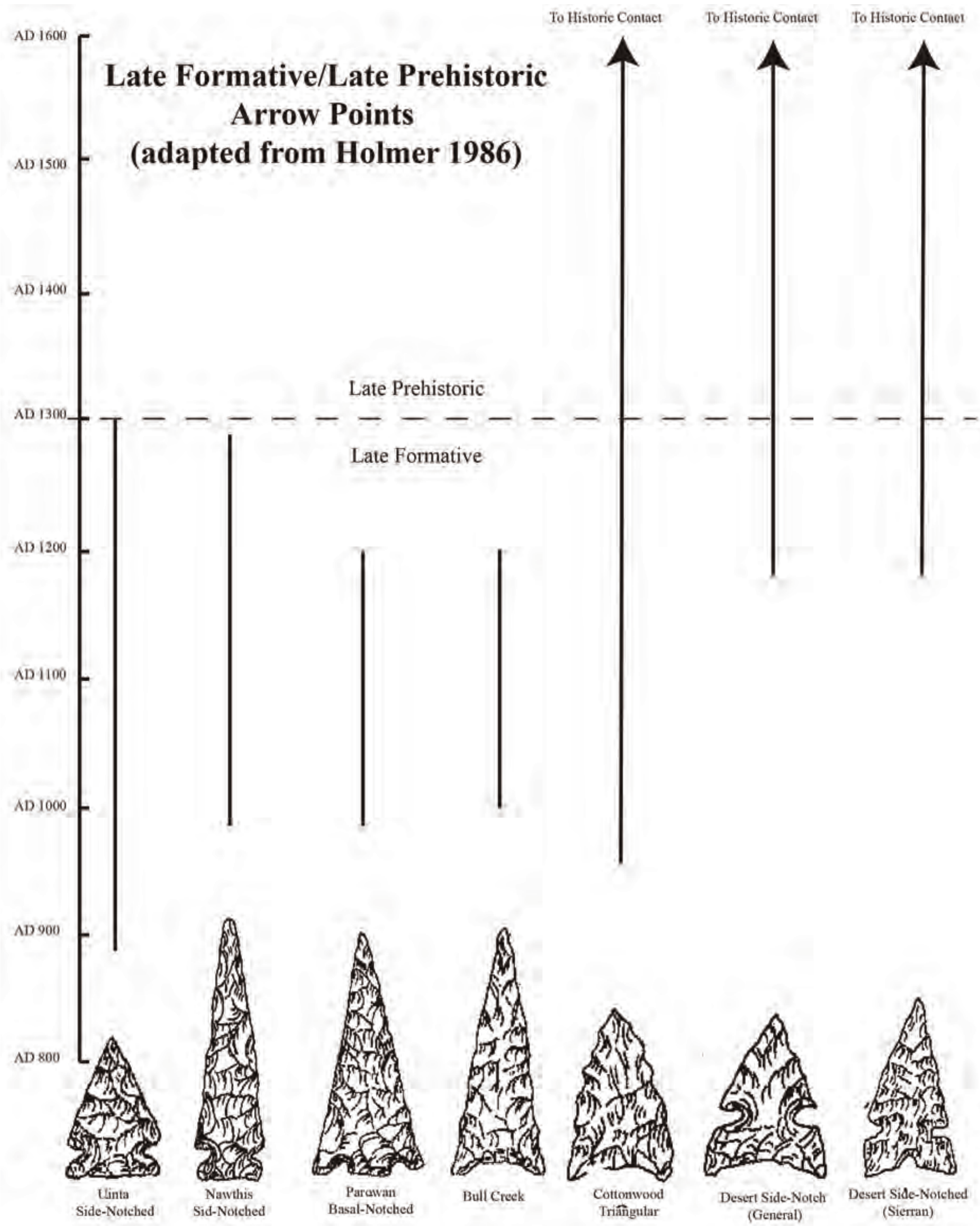


Figure 7.16: Comparison chart depicting the temporal ranges of late Formative and Late Prehistoric arrow points common on the northern Colorado Plateau.

GSENM are actually evidence of Ancestral Paiute trade with Puebloan groups in Arizona. Of course, this precludes the possibility Puebloan individuals to the south visited selected locations north of the Colorado River as part ceremonial pilgrimages to ancestral homelands. The presence of Jeddito Yellow Ware in the San Juan River area to the east is commonly viewed as evidence of such pilgrimages, which continue into modern times (William Davis, personal communication 2008).

Yellow ware potsherds have been identified at four sites in GSENM. Fragments of a Jeddito Yellow Ware bowl were identified at one site and an Awatovi Black-on-yellow dipper at another, both foraging sites in the Kaiparowits Plateau (Geib et al. 2001); two Jeddito Black-on-yellow potsherds were identified at another site with Pueblo II architectural site on Fiftymile Mountain (Fowler et al. 1959b); and unspecified yellow ware sherds were observed by a private individual at a foraging site along the Escalante River.

Possible support for the idea of pilgrimages into GSENM was found at a site in Meadow Canyon, a tributary to Johnson Canyon, where a panel was identified by experts Steven J. Manning and Owen Severance as a late Pueblo III or early Pueblo IV expression (Figure 7.17). Another panel in Johnson Canyon exhibits the same stylistic elements and was identified by a Hopi tribal elder as symbolic of the Greasewood Clan (Spangler and Zweifel 2016b).

Another Late Prehistoric artifact type that warrants a brief mention is the Cottonwood Triangular point (Lanning 1963). It is also abundant in the GSENM region, and is commonly assumed to be a Late Prehistoric temporal marker. Supporting this hypothesis, Cottonwood points have been recovered at sites with Desert Side-notched points and brownware ceramics. Cottonwood points, however, appear much earlier in the archaeological record than do Desert Side-notched points, by about AD 950 at Nawthis Village (Holmer 1986:106). Consequently, Cottonwood points might also be diagnostic of Formative occupations, and are poor temporal markers when found without other corroborative artifacts.

As noted by Holmer (1986:108), any analysis of the temporal or spatial range of Cottonwood points is complicated by the inconsistencies in field identifications, in particular the classification of preforms and bifaces as Cottonwood points in many reports. In the GSENM region, test excavations at the Steep Creek Quarry Site, located in the Circle Cliffs area, produced a Cottonwood Triangular point near the rim of a fire hearth that yielded a late Formative radiocarbon date of 770 ±70 BP (AD 1239 median probability) (Tipps 1992).

Also noteworthy, two GSENM sites were identified as Ancestral Paiute rock art localities. Cole (1988, 2009) has argued there might be very little Ancestral Paiute rock art whatsoever, and Bettinger and Baumhoff (1982:493-495) reached essentially the same conclusion, attributing most rock images to pre-Paiute populations. They cited the absence of ethnographic evidence, oral history, and ritual tradition for rock art among Numic-speaking groups. In recent years, Southern Paiutes have identified a number of panels in the St. George Basin and elsewhere as traditional rock imagery locations (Figure 7.18), suggesting the tradition is far more widespread than traditionally thought. Complicating these identifications, however, is the common Paiute practice of imitating older styles.

Late Prehistoric Foraging Patterns

The existing GSENM site database contains 85 sites that might be attributed Late Prehistoric times based on the presence of certain ceramics, Desert Side-notched points, radiocarbon dates, and/or obsidian hydration dates. These sites might also be attributed to terminal Formative times, given the temporal range of diagnostic artifacts and the 95 percent probability ranges of the radiocarbon dates. The vast majority of these sites are indicative of hunting and gathering activities, and about half are associated with artifacts indicative of Formative and/or Archaic times.

The material culture record associated with hunting and gathering after AD 1300 is distinguished from that of earlier Fremont and/or Ancestral Puebloan peoples primarily on the basis of Desert Side-notched projectile points and brownware potsherds, and in one instance basketry. Numic-speaking populations throughout the Intermountain West utilized the same types of projectile points, ceramics, and basketry, and it is therefore not unreasonable to postulate that these same artifact types, when recovered in prehistoric contexts in GSENM were manufactured by Ancestral Paiute peoples (cf. Reed 1994).

The GSENM database was organized to address three related issues:

- It has commonly assumed that Late Prehistoric foragers were engaged in a generalized Archaic hunting and gathering strategy, although the nuances of this adaptation have not been articulated beyond "they hunted and gathered." In Chapter 3, we discussed the spatial nature of foraging sites and how site structure and organizational responses might have changed through time and in response to changing Archaic environments. We apply those same criteria here to ascertain whether Late Prehistoric adaptations were similar to or distinct from those in Archaic times. For example, were Late Prehistoric groups more logistically oriented, utilizing residential base camps for task-specific activities? Or were Late Prehistoric foraging activities more indicative of higher mobility by small, bi-gender groups who moved constantly between resource patches? Can site size and artifact types be used to infer group size and social structure, and how are those different from Archaic times?

- Simms (1990:12) has observed that distinctions between brownware and grayware pottery types have been overstated, and that projectile points also suggest a higher degree of continuity than has traditionally been accepted. He suggested that shifting subsistence strategies after about AD 1300 might simply be a product of increased mobility compared to earlier times that marked "a time of social, technological, demographic, and perhaps ideological adjustment." If Simms' reasoning is applicable to GSENM, then the appearance of a brownware ceramic tradition in GSENM by the middle-AD 1200s might reflect higher mobility as farming groups became increasingly mobile to better exploit wild plants and animals during periods of crop failures. Is there any evidence in GSENM to support the idea that brownware ceramics are associated with higher mobility by groups that were previously sedentary? Or are brownware ceramics actually evidence that some groups simply did not have access to more durable grayware ceramics?

- The prevalence of co-occurring Formative and Late Prehistoric artifacts at GSENM sites is not unique to this region. A similar pattern has been observed throughout the eastern Great Basin, southern Great Basin, and northern Colorado Plateau (Janetski 1994; Madsen 1975; Reed 1994). Collectively, these data suggest either a coexistence of Formative agriculturalists and Numic-speaking peoples across broad geographic areas, or reoccupation of Formative sites in Late Prehistoric times by groups with different tool kits. As we discussed above, the radiocarbon evidence is equivocal, suggesting either a co-existence or immediate reoccupation. But is there surface evidence of mixed Ancestral Puebloan and Ancestral Paiute artifact assemblages that suggest socioeconomic interaction?

To better understand the nature and complexity of Late Prehistoric sites, as well as to compare them to land-use patterns evident in Archaic times, the sites were organized by suspected site

Figure 7.17: Possible Pueblo IV petroglyph panel in Johnson Canyon.

Figure 7.18: This panel in Kitchen Corral Wash has been identified as an Ancestral Paiute rock imagery location within GSENM. There are probably many others that have not yet been identified as such due to the absence of unique representational elements in the Paiute "style." Photo: Nina Bowen

function and site complexity using a series of yes-no questions to arrive at seven basic site subtypes ranging from simple, single-event sites to complex base camps and preferential camps occupied repeatedly throughout prehistory.

The nature of these sites suggests that about half of the sites are associated with predominantly hunting activities and might represent task-specific activities originating from a residential base elsewhere, and the other half were associated with both hunting and plant procurement and processing, which might have been associated with the seasonal movement of small groups to specific resource patches. By inference, these latter sites would have been bi-gender groups engaged in multiple activities. And given the annual cycle of when seed plants mature, these camps could represent occupations in the spring at lower elevations and early summer at higher elevations.

To better determine whether these sites were suggestive of increased plant procurement, rather than the result of multiple occupations where the ground stone tools could have been left by earlier groups, we organized the site data to exclude all sites with multiple Archaic and/or Formative temporal indicators. The resulting data set (n=43 sites) are considered more likely to be indicative of exclusively Late Prehistoric activities and would therefore be a more valid comparison to foraging sites with exclusively Archaic diagnostics.

We also compared relative site complexity to patterns observed during Archaic times to determine whether site function, group size, and land-use patterns were different. Minor differences were noted, but the only significant difference appears to be a greater prevalence of small sites instead of base camps occupied for extended periods of time (Table 7.5). Some 70 percent of sites with exclusively Late Prehistoric artifacts appear to represent small, single-event activities, compared to only 38 percent of Archaic sites. The higher ratio of single-event sites might be due to better preservation of the small sites that are only a few hundred years old, as opposed to foraging sites that are several thousand years old. Ground stone tools occur at about the same frequency at Late Prehistoric sites as they do at Archaic sites (ca. 40 percent). The spatial distribution of Late Prehistoric sites is also virtually identical to the distribution of Archaic sites, although there are a lot more Archaic sites in the sample.

We also examined what appears to be preferred foraging locations that were occupied repeatedly through prehistory to determine whether optimal foraging sites in Archaic times remained so during Late Prehistoric times. At least 20 Late Prehistoric sites, or 48 percent of all sites with mixed temporal indicators, also had Archaic diagnostics. All Archaic periods are represented in the sample, although later Archaic indicators (e.g., Gypsum points) are certainly more common.

The sample was also examined to identify the co-occurrence of Late Prehistoric and Formative artifacts, the latter consisting of grayware ceramics and Rose Spring points, which might indicate these foraging sites were used repeatedly during Formative and Late Prehistoric times. The database was further organized to identify those sites with late Pueblo II indicators such as corrugated and painted ceramics, and Bull Creek and Parowan Basal-notched points. These sites might be evidence that Ancestral Puebloan and Ancestral Paiute peoples occupied the region at the same time. Of the Late Prehistoric sites with mixed temporal indicators, 81 percent also had Formative artifacts, while 50 percent of them had late Pueblo II diagnostics.

This suggests that either (1) Late Prehistoric foragers utilized Formative foraging sites with much greater frequency than they did Archaic foraging sites, (2) Groups with access to both artifact traditions occupied the sites in late Formative times, or (3) the database is biased by the fact that Ancestral Puebloan ceramics are better preserved in the archaeological record, creating a perception that Ancestral Puebloan foraging was more common than it actually was.

Assessing relative mobility required us to make certain assumptions. If brownware ceramics are characteristic of high group mobility (cf. Simms 1990), then they should occur at smaller and larger foraging sites with the about same frequency (e.g., the presence brownware is a function of group mobility). And conversely, grayware ceramics considered less indicative of group mobility would not be as prevalent at forager sites (e.g., grayware types are a function of greater sedentism and would be expected at residential sites). The 28 sites with brownware potsherds neither support nor discredit those assumptions.

Sixteen sites featured mixed brownware and grayware assemblages, of which 12 sites were moderate or large in size. This suggests that larger, more complex residential base camps are more likely to have grayware and corrugated ceramic types associated with the Formative. Of the 12 sites with only brownware ceramic indicators, eight were small, single-event sites. In general, it appears that brownware potsherds will be found at larger base camps, but these will more often co-occur with grayware types that could represent (1) multiple occupations of the same site, or (2) socioeconomic interaction where foragers had access to both ceramic types. Mixed assemblages are much less common at small foraging sites.

In summary, the Late Prehistoric database of 85 sites suggests that (1) Hunting appears to be the primary or exclusive activity at most Late Prehistoric sites with (ca.) 60 percent of sites exhibiting no evidence of plant procurement and processing. This ratio is virtually the same as that observed at sites with exclusively Archaic indicators. And (2) The spatial patterning for Late Prehistoric foraging is virtually identical to that observed during Archaic times. In other words, the distribution of preferred plant and animal resources did not change appreciably through time, and areas that were good for hunting at 1500 BC were also good for hunting at AD 1500.

Small, single-event hunting and butchering sites and hunting sites with a very minimal amount of plant processing seem to be more prevalent in Late Prehistoric times. These small sites might reflect logistical activities by individuals engaged in task-specific activities from base camps located elsewhere, although there is currently minimal evidence as to where those base camps were located.

Late Prehistoric groups might not have utilized longer-term base camps as frequently as Archaic groups. About 24 percent of Archaic sites were base camps for hunting/game processing or hunting and plant processing, compared to only 9 percent of Late Prehistoric sites. This supports the idea of high mobility foraging by small family groups rather than larger social aggregations engaged in task-oriented activities.

Late Prehistoric groups frequently reoccupied foraging sites utilized during earlier periods (especially the Formative), and what appear to be larger, more complex foraging base camps might actually be shorter-term camps that were repeatedly occupied. Only four Late Prehistoric longer-term camps did not have artifacts indicative of earlier occupa-

Table 7.5

Site Subtype	Criteria	Total Archaic Sites	Total Late Prehistoric Sites	Archaic Percentage	Late Prehistoric Percentage
Single Episode Tool Maintenance	<100 flakes, no tools	8	5	6	12
Single-Episode Hunting Camp	<100 flakes, fauna processing tools	35	16	27	37
Single-Episode Foraging Camp	<100 flakes, minimal ground stone	7	9	5	21
Short-Term Hunting Camp	100-500 flakes, no ground stone	26	5	20	12
Short-Term Foraging Camp	100-500 flakes, ground stone	21	4	16	9
Longer-Term Hunting Camp	500+ flakes, no ground stone	16	0	12	0
Longer-Term Foraging Camp	500+ flakes, ground stone	16	4	12	9

Table 7.5: Comparison of Archaic and Late Prehistoric hunter-gatherer site complexity.

tions. The co-occurrence of Ancestral Paiute artifacts and late Formative artifacts is striking. This suggests either immediate reoccupation of these sites by Ancestral Paiute foragers, or utilization of the sites by groups with access to both artifact traditions. These data support the idea that both groups occupied the region during late Formative times.

Historic Southern Paiute: Kelly's Ethnographic Observations

Data related to the Late Prehistoric allow for intriguing archaeological questions that, unlike earlier periods of culture history, allow direct comparisons between the ethnographically observed behavior and the archaeological record. Any discussion of Late Prehistoric adaptations in the GSENM region inevitably must incorporate the classic ethnographic observations of Isabel Kelly (1934, 1964, 1976, 2016), who was the first to describe Southern Paiute lifeways within the context of human behavior and local environments.

Kelly's research, conducted between 1932 and 1934, focused on the Kaibab, Panguitch, and Kaiparowits bands, as well as the San Juan and Las Vegas bands that are not considered here. The Kaibab band occupied the western and southwestern portion of GSENM, the Panguitch band occupied the northwestern portion, and the Kaiparowits band the central and eastern portions. Kelly's interest, as she stated (1964:2), was "primarily in subsistence and in relationship to habitat." She observed that "in a low-pressure culture such as that of the Paiute, domestic economy rests on direct exploitation of the habitat." In addition to informants from the Kaibab, Kaiparowits, and Panguitch bands, Kelly liberally incorporated unpublished manuscripts, field notes, and photographs of Edward Sapir and Frederick Dellenbaugh.

The Kaibab Band

Kelly divided the Kaibab band into 10 local units, of which the seven more populous ones had a headman who directed seasonal movements and activities (in Park et al. 1938:633-634). These 10 local units may be similar to those listed by William Palmer (1933:99-100), who identified those around Pipe Springs and Moccasin Springs as Pa-spika-vats and Unka-kanig-its; those in Johnson Canyon as Pa-epas; those on the north slope of the Kaibab Mountains as Kaibab-its; those of Glendale and Orderville area as Paria-ru-e-i-at; and those on the western slopes of the Kaibab Plateau as Timpe-sha-wa-gots-its (additional Southern Paiute groups were identified west of GSENM).

Generally speaking, the Kaibab Paiute occupied territories bordered on the north by the Pink Cliffs near the headwaters of Kanab Creek and the Virgin River, on the east by Johnson Canyon, on the west by Zion Canyon, and on the south by the north rim of the Grand Canyon. Kelly observed (1964:5) that the higher plateaus were well watered, but were generally unsuitable for permanent habitation because of deep winter snows. The lower elevations were likewise unsuitable because of the absence of reliable water. Permanent streams were of minimal importance because of the absence of any horticultural tradition facilitated by irrigation. Consequently, the determining factor in human settlement was the location of springs, which occur "in a long, almost continuous line" along the base of the Vermilion Cliffs and House Rock Valley.

Although human populations were concentrated around springs, Kelly observed (1964:7) that camps in these areas "were semi-permanent in the sense that the occupants returned to them following hunting and foraging trips. The sites were strategically situated. Drinking water was at hand; the juniper-dotted slopes of the backing scarps provided fuel; the desert flats were nearby for rabbit hunting and seed collecting; and the higher plateaus could be visited periodically for deer, pine nuts, and yucca fruit."

The Kaibab clusters varied greatly in size and the extent to which the local environment was being exploited. One cluster included six springs, but only one camp. Another included three springs but 14 or 15 households. Her utilization of "economic clusters" to delineate various social units was not acknowledged by her Southern Paiute informants, who recognized no distinctions between the groups. Even Kelly admitted her economic clusters in the Kaibab area was somewhat arbitrary given (1) all groups shared the same annual cycle of hunting and gathering, (2) the considerable amount of intergroup contact and shifting of camps to various springs without apparent consideration of spring ownership, and (3) the Kaibab Plateau, Paunsaugunt Plateau, and the rim of the Grand Canyon were viewed as communal lands for all Paiute groups (1964:22-23).

Subsistence activities were highly seasonal and dependent on high group mobility to exploit a variety of plants, small game, and large animals. As observed by Kelly (1964:22):

Fall was one time of plenty; then most households made trips to the plateaus, to collect yucca fruit, harvest pine nuts, and hunt deer. Stores were cached for winter use but ordinarily ran short; late winter and especially spring were seasons of near famine. At the time, many traveled to the rim of the Colorado and several tributary canyons to gather mescal, the standby when all else failed; cacti and juniper berries also were starvation foods. With the approach of summer, the people returned to what they considered home base, at the foot of the plateaus, to resume residence at their privately owned springs. On the adjacent flats, they harvested valley seeds, and late in summer some returned to the higher elevations to gather `plateau' seeds and berries. A large number of plant foods supplemented those just enumerated, and small game, available throughout the year, must have been the principal source of meat.

Although the location of permanent or semi-permanent water resources appears to have been a determining factor in the location of winter base camps, actual ownership of food resources might have been fluid. Kelly noted (1964:23) that "even the flats adjacent to privately owned springs were available to anyone who wanted to harvest seeds there," and that "people from practically all parts of Kaibab territory gathered at the communal grounds, at least intermittently, during much of the fall and winter." The Kaibab Paiutes sometimes visited the Panguitch band to fish at Panguitch Lake, and the Panguitch band hunted deer with the Kaibab Paiutes on the Kaibab Plateau. Reciprocal visits also occurred between the Kaibab Paiutes and the Cedar City Paiutes (1964:32).

The aggregation of Southern Paiute populations to engage in socioeconomic activities was apparently rare. Kelly noted no evidence of large-scale communal hunting and gathering activities among the Kaibab Paiutes. She placed the number of individuals needed for an antelope hunt at 10, the number for a deer hunt at 15 or 20, and the number for a rabbit drive at 25, "numbers that could have been recruited from comparatively few households" (1964:24).

Figure 7.19: Kaibab Paiute settlement and subsistence was focused toward the seasonal availability of food resources and the location of springs along the base of the Vermilion Cliffs and in House Rock Valley.

Wild seeds collected in the summer and fall were the mainstay of the Kaibab diet, with yucca and pine nuts becoming critical in the fall because they could be stored for winter and spring consumption when other food resources were depleted. Berries, acorns, and roots were deemed minor food resources (Kelly 1964:36-37). Her description identified "valley" seeds harvested in the Kanab Plateau, House Rock Valley, and Vermilion Cliffs areas, and the "plateau" seeds harvested in the higher elevations of the Vermilion Cliffs, the Kaibab Plateau, and the Paria Plateau. Her account also included detailed descriptions of the collection and processing of berries, nuts, yucca, mescal, cacti, roots, tobacco, and herbs (1964:41-47).

Collectively, the Kaibab Paiute occupied the region richest in game resources. Deer were abundant on the Kaibab Plateau and were hunted in the late summer and fall. Antelope, although of lesser importance, were found on the Kanab Plateau and House Rock Valley areas. Mountain sheep were found in the Zion Canyon area and along the north rim of the Grand Canyon, but they were not common. Smaller game animals were reasonably abundant throughout the entire region. Rabbit drives were held only in the winter. Birds, eggs, locusts, and insects were welcome, but were not part of the basic diet (Kelly 1964:6, 36).

Kelly offered detailed accounts of hunting strategies, distribution of meat among the family unit, butchering and hide tanning practices, the processing of the meat for consumption, and some material culture items associated with hunting activities (1964:47-51). She also described a priority list of preferred faunal resources (1964:51-55) that included deer, antelope, mountain sheep, rabbit, marmot, porcupine, wildcat, cougar, coyote, wolf, fox, quail, mourning dove, sage grouse, and ducks; species not exploited included prairie dogs, raccoons, skunk, crow, woodpecker, and meadow lark.

Storage of surplus foods appear to have been focused around a variety of caching strategies which might have been insufficient given the repeated references to starvation foods. Food resources were typically dried and wrapped in cliffrose bark or deposited in hide sacks and then placed within subsurface, bark-lined pits in caves and rockshelters. The cache was covered with layers of bark, earth, and stone. Each family had one or more such caches, often in widely separated localities. For example, those living near Alton cached foods at their winter base camp near Kanab and at their home camps in the Alton area for spring consumption. Those at Moccasin Springs cached food resources in caves and Rockshelters along the western slopes of the Kaibab Plateau, journeying there from their winter base camps at Moccasin to retrieve foodstuffs as the need arose (1964:39).

Settlement patterns were also varied. They preferred semi-permanent camps situated at the base of an escarpment or on its lower slopes adjacent to water and stands of juniper. During the winter, there was no such dependence upon springs because snow could be melted. There was no set arrangement of residential structures. Usually they were scattered about a spring, or in the case of Kanab Creek, they were located on both sides of the stream. The type of shelter varied with the season. Caves were utilized in the winter months, as were house structures covered with earth. As Kelly observed (1964:56), "The winter house was owned by the man and the woman and was the product of joint labor. The man set up the frame; the woman collected the bark. The structure took about half a day to build and was left standing when camp was broken. Sometimes it was reoccupied but generally was built anew; the bark covering lasted barely one winter."

Occupations within the caves typically featured a floor covered with cliffrose bark and branches of green juniper were arranged across the mouth of the cave to a height of 3 or 4 feet. Storage pits were located in the floor of the cave within the dwelling area. Open winter structures were circular with the overhanging limb of a tree functioning as a ridgepole. The size varied according to the number of occupants, some housing up to 10 people. The floor area was smoothed but not excavated. Poles were arranged in a three-quarter circular pattern (postholes were not used), and the pole frame was covered with layers of juniper bark. Cliffrose bark was spread on the floor and sometimes substituted for juniper thatching. A fire was built at the doorway, but fire pits were not used. Cooking was done outside the structure (Kelly 1964:56; see also Figure 7.20 above).

Another type of winter residence utilized by those along the base of the Kaibab Plateau was somewhat conical structure where only half of the structure was enclosed. The structure consisted of three forked poles of cottonwood, two interlocking poles framing the doorway and a bracing pole in the rear. The frame was overlaid with lighter poles that were then covered with grass or brush and sometimes earth. Sapir and Dellenbaugh (cited in Kelly 1964:57) also described this type of winter structure. Ramadas and circular windbreaks were used in the summer and fall.

Kelly's descriptions of the Kaibab Paiute material culture are valuable because of her emphasis on the function of those items within environmental contexts. For example, she noted that older Kaibab Paiute women wore aprons of cliffrose bark (1964:59), but cliffrose was not found in the Panguitch Paiute area to the north. Consequently, the Panguitch women utilized ryegrass and animal hides for clothing (1964:184). She also observed that Kaibab Paiute men were usually naked, but sometimes they wore a belt with a fringe of cliffrose and knee-length leggings, also of cliffrose (1964:60).

The traditional Kaibab Paiutes wore yucca "shoes," which wore out quickly but were preferable for winter conditions. Hide moccasins and yucca sandals were used in the summer (Kelly 1964:62). Headgear was not common, although the men sometimes wore caps of wildcat skin and women wore basketry caps to protect their heads from tumplines used to carry burden baskets (1964:66). The Kaibab Paiutes did not practice tattooing, but the men practiced face decoration. Red paint was obtained from the Escalante and Grand Canyon areas, and black paint from the Paria River. Yellow and white paints were obtained through trade with the Utes (1964:67-68).

Kelly also offered descriptions of rabbit-skin blankets and robes (1964:68), the introduction and distribution of ceramic technology (1964:69-70, 77-78), basketry techniques and function (1964:70, 78-84), methods of tanning hides

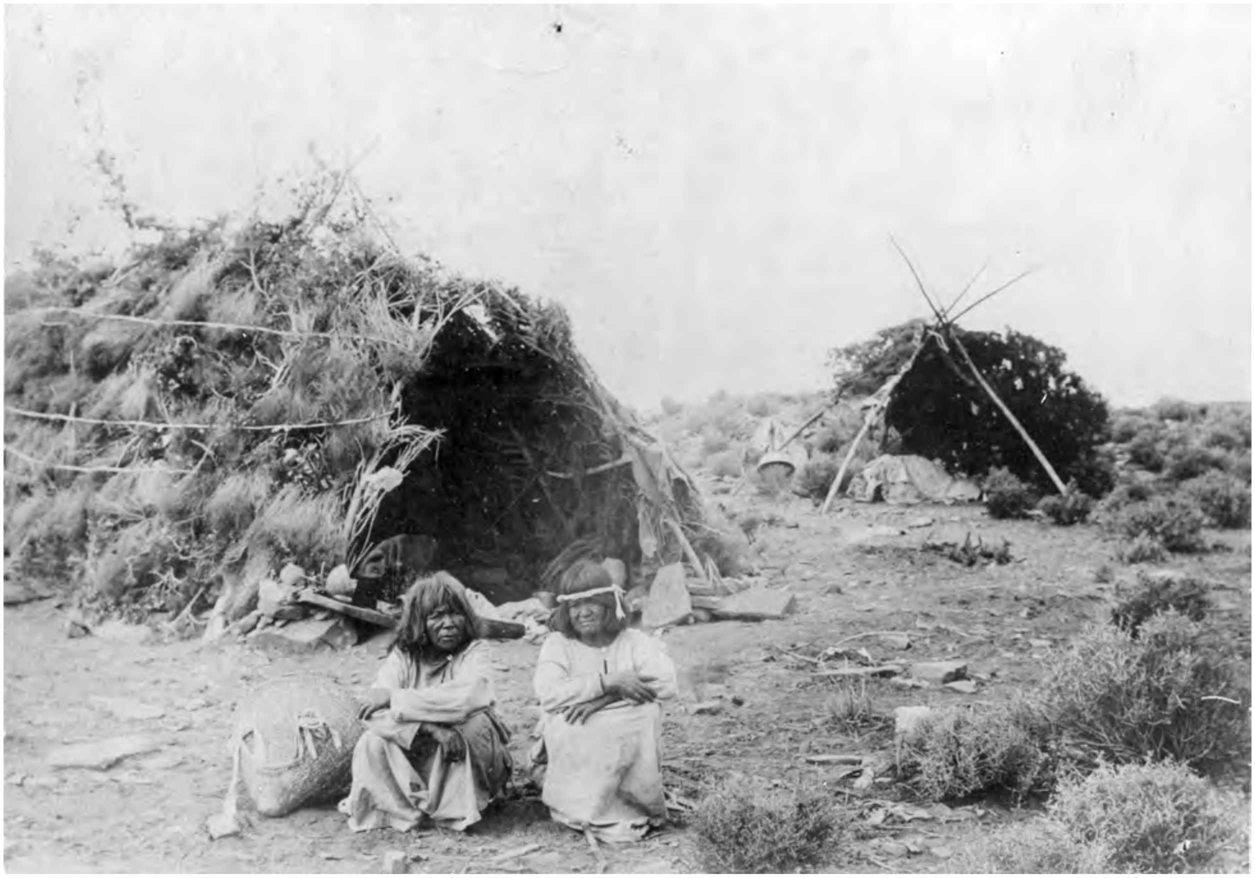


Figure 7.20: Typical Southern Paiute brush residential structures as photographed in 1873. Photo: J.K. Hillers Collection, Smithsonian Institution.

(1964:71-72), and the construction of wooden bows, sinew-backed bows, and horn bows, the latter acquired through trade from the Kaiparowits Paiute (1964:73-74). She also provided detailed descriptions of arrows made of serviceberry or cane, sinew bowstrings, methods for attaching points to arrows, and quivers made of wildcat, fox, coyote, mountain lion, and fawn skins (1964:75-76).

The Kaibab Paiutes appear to have had minimal contact with peoples living south of the Colorado River, although one Paiute was credited with introducing the ceramic technology he learned from his visits to the Hopi, and another was said to have introduced the Kaibab Paiute to the sweat lodge after spending time among the San Juan Paiutes. To the north, there was frequent contact with the Panguitch Paiutes. Domesticated dogs were first introduced among the Kaibab through trade with the Panguitch Paiute and the Utes in Grass Valley (Kelly 1964:86). Forays to the north rim of the Grand Canyon also afforded opportunity to acquire stones used for tobacco pipes (1964:47), as well as salt (1964:55).

The importance of deer hunting is illustrated in her observation (1964:87) that "in all trade, the chief Kaibab commodity was buckskin," and that "to a considerable extent, the Kaibab operated as intermediaries and passed along to their neighbors Navajo rugs and horses they themselves had received in trade." Given the references to trade with Panguitch Paiutes for buckskins, these items might have been acquired as supplemental trade items to be exchanged with groups living south of the Colorado River.

Kelly also mentioned that the Kaibab Paiute bartered children, but she did not elaborate. Some Kaibab groups traded buckskins and stone pipes with Southern Paiutes in the St. George area for agricultural products (1964:90). In historic times, they also traded with Utes for horses, bison robes, knives, guns, white and yellow paint, and Navajo blankets (1964:90-91).

The Kaiparowits Band

The Kaiparowits Paiute exploited territories in the Kaiparowits Plateau and Escalante River areas in the southern and eastern portions of GSENM. Geographically, the region is bounded on the west by the Paria River, on the east and south by the Colorado River and on the north by the Aquarius Plateau. Kelly's descriptions of the Kaiparowits Paiute and their aboriginal homelands are meager compared to the descriptions of the Kaibab Paiutes. This could have been due to a paucity of informants from this region, as well as a confusing linguistic oddity. Both the Kaiparowits Plateau and the Kaibab Plateau have the same name in the Paiute tongue (Kaivavic), making geographic distinctions difficult for Kelly's informants, who sometimes referred to those of the Kaiparowits region as those who lived on the other side of the Paria River. Generally, Kelly was content to designate the entire Kaiparowits region as barren and sparsely populated, perhaps by socially independent groups with some cultural affinity to the Kaibab Paiutes and less so with the Panguitch Paiutes (1964:142-143).

There might have been a minor dialectic difference between the Kaiparowits Paiutes and the Kaibab Paiute (Kelly 1964:143), but not enough to suggest significant isolation from other Southern Paiute groups. Some informants referred to peoples of the Kaiparowits region as "almost Ute" or "half Ute," while others considered them to be Paiute. There was also disagreement as to where the Kaiparowits Paiute lived, although Kelly's informants indicated there were occupations along the Escalante River and its Aquarius Plateau tributaries (1964:144). It should be noted there were few Kaiparowits Paiutes remaining at the time of her interviews, and that some groups had become extinct (1964:144).

Kelly defined three environmental zones for the Kaiparowits band adaptations in the region: (1) a cottonwood, cactus, and yucca zone found along the Colorado River and its tributaries to an elevation of about 5,000 feet; (2) a pinyon, juniper, and sage zone found at an elevation of 5,000 to 8,000 feet on the top and flanks of the Kaiparowits Plateau, on the slopes of the Paunsaugunt Plateau, Table Cliffs, Aquarius Plateau, and on the sides of the Waterpocket Fold; and (3) a yellow pine, spruce, and fir zone found at elevations of 8,000 to 11,000 feet on the upper slopes and tops of the Aquarius Plateau, Table Cliffs Plateau, Paunsaugunt Plateau, and Canaan Peak (1964:148). Campsites were determined by the availability of water and fuel, and "land utilization followed pretty much the same pattern as among the Kaibab: The valleys provided seeds, cacti and small game, and the plateaus, visited chiefly in the fall, provided berries, pine nuts, and larger game" (1964:149).

Southern Paiute exploitation of this region was sparse, and vast areas, including the lower Escalante River and the Paria River south of Cottonwood Wash, were deemed uninhabitable. No permanent camps were located on the Kaiparowits Plateau, although several springs were mentioned in that area by name. There was little information about ownership of springs, and one informant indicated "we went all around, camping anywhere, and nobody owning springs" (in Kelly 1964:149).

Although the absence of first-hand knowledge of the Kaiparowits region hampered Kelly's interpretations of subsistence and settlement patterns, she nonetheless concluded there were three population clusters, all of which were defined within the context of imposing geographical boundaries and all of which were associated with perennial streams. One economic cluster (Avua) was located in the upper Paria Valley, extending south along the east bank of the river; another (Kwaguiuavi) was located between the Kaiparowits Plateau and the Paria River below Cottonwood Wash; and the third (Sanwawitimpaya) was located in the valley around the community of the Escalante (1964:149).

In the Avua territory, water was obtained from one spring, as well as Henrieville Creek, Paria River, and two other small streams. Dry sage was the primary fuel, but in winter the occupants would obtain juniper from the cliffs west of the valley, either camping on top of the bluffs or throwing wood over the cliffs for use in camps at the base of the cliffs. During the spring and summer, the groups would camp at the foot of the cliffs at the north end of the Paria Valley, above Cannonville on the east bank of the Paria River, on the west bank of the Paria at the Henrieville Creek confluence, and on a low red knoll southwest of Henrieville. In the fall, they hunted deer on the Table Cliffs and Kaiparowits Plateaus, and occasionally would join with other Paiute groups to hunt deer on the Paunsaugunt Plateau. Winter and spring camps were sometimes located in Escalante Valley, but more often they were located in the upper Paria River valley in areas with access to fuel wood (Kelly 1964:149-150).

The Kwaguiuavi group obtained water from large potholes and from a perennial stream (probably Wahweap Creek). Juniper resources were rare, but localities with juniper were favored winter camps. Most of the area was a treeless desert with rabbit brush and greasewood. Spring was spent in the area between the Kaiparowits Plateau and the Paria River, although there were forays to the Kaiparowits Plateau for roots. While there, they would consume seeds they had collected and cached the previous fall. In the summer, seeds were gathered in an area around the base camps. Deer hunting trips occurred during the late summer and fall in the same area popular for the harvesting of seeds, berries, roots, and pine nuts. Part of this harvest was cached in caves for consumption the following spring. The winter season marked the return to a base camp with easy access to juniper fuel wood (Kelly 1964:150).

Kaiparowits Plateau

Photo: Jerry D. Spangler

The Sanwawitimpaya group relied on water from the upper Escalante River and its tributaries. Winter camps were located on valley slopes with adequate supplies of juniper fuel wood. The spring and summer marked a seasonal movement along the fringes of the Escalante Valley and west of Escalante Town and south of the river. The camps dispersed during the summer in order to harvest seeds at higher elevations. In the fall, they aggregated for deer hunting trips, sometimes to the Kaiparowits Plateau and other times to the Aquarius Plateau. They usually returned to lower elevations before winter, but occasionally they remained on the Kaiparowits Plateau where they subsisted on cactus, cached seeds, and pine nuts (Kelly 1964:151).

Kelly believed the Kaiparowits Paiute had more difficulty subsisting on available resources than did the Kaibab Paiutes, even referring to a comment by one informant that starvation prompted the Kaiparowits Paiutes to resort to cannibalism. Seeds were regarded as a primary food staple, and roots and berries were more important than they were among the Kaibab Paiutes. The winter and spring were times of considerable scarcity, and the Kaiparowits Paiute might have relied to a greater extent upon stored foods and starvation foods like cacti. Foods were stored in bark-lined pits and covered with stones; where possible, the storage facilities were located in rockshelters or caves (1964:152).

Kelly described the specific plant species exploited in the three different environmental zones, the tools used to harvest and process the resources, and the season during which each was harvested. For example, pine nuts were harvested on the Kaiparowits Plateau during the fall, and cacti in the winter and spring. Roots were harvested during the summer at higher elevations with a crooked serviceberry digging stick. Wild raspberries were found on the Table Cliffs Plateau, while elderberries, serviceberries, chokecherries, and strawberries were important summer foods found at most higher elevations. Some were eaten fresh and others were processed for later consumption. Mescal was found in small quantities along the Paria River (1964:152-154).

Faunal resources were apparently scarce, at least more so than in the Kaibab Plateau area, and "hunting was a year-round pursuit but reached a peak in late summer and fall with trips to neighboring plateaus." These resources included deer and bear on the plateaus, mountain sheep in the upper Paria Valley and the rugged country to the east, and antelope southwest of the Table Cliffs. Elk were apparently not common enough to be hunted (Kelly 1964:152). She offered good descriptions of hunting techniques, group hunting practices, and the location of preferred game species. Rabbits were hunted throughout the year, but the sparse human populations limited their ability to conduct communal rabbit drives. Beaver, marmot, rats, porcupine, and sage hen were common small game resources, and wild turkeys, flickers, quail, owls, eagles, and mourning doves were of lesser significance, although all were consumed. The only insects mentioned were yellow caterpillars that were cleaned, braided into a rope and roasted (1964:154-158).

The Kaiparowits Paiute settlement patterns were similar to those of the Kaibab Paiute. In the winter, they lived in caves wherever possible, with green juniper boughs at either side of an opening and a fire at the central opening. If no caves were available, they leaned juniper poles against a horizontal limb of a tree and covered the temporary superstructure with juniper bark. The remainder of the year they used a dome- or rectangular-shaped shade structure or a circular brush enclosure. Sweat lodges were much more common among the Kaiparowits Paiute, although they attributed that to influence from the Navajo (Kelly 1964:158).

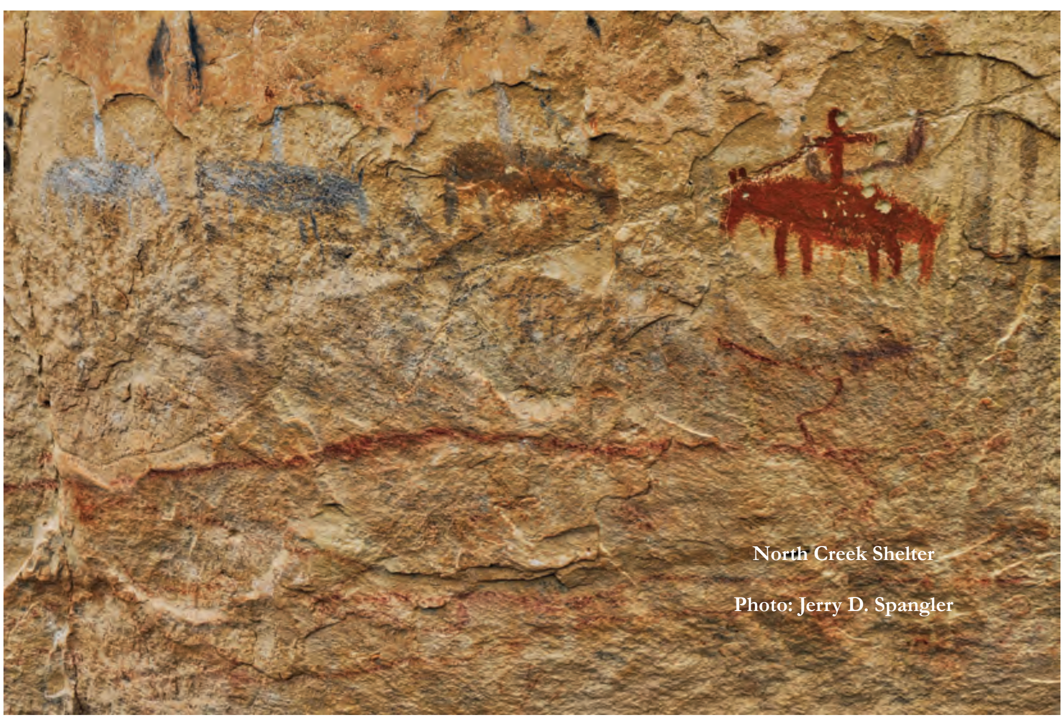


Figure 7.22: Early historic Ute rock art panel at North Creek Shelter near Escalante. Horses were acquired by Numic-speaking groups by the early 1600s but they are rarely mentioned as commonplace among Southern Paiute groups.

Traditional Kaiparowits Paiute clothing consisted of juniper bark garments, although Plains-style buckskin clothing and moccasins were apparently introduced to local groups through their association with neighboring Utes. Traditional skirts worn by women were of cliffrose bark or the soft inner bark of cottonwood trees, and sandals were constructed of yucca. In the winter, the feet were wrapped with cliffrose bark. Women sometimes had garments of mountain sheep hide, whereas the men wore buckskin pants, shirts, and moccasins. No hats were worn, and both genders painted their faces daily, usually with a red paint. Tattooing was not practiced (1964:159).

Among their material culture items were mescal fiber hairbrushes obtained in trade from the Kaibab Paiute; blankets of bear, wildcat, mountain lion, fox, coyote, and wool (the latter obtained in trade from the Navajo); rabbit-skin blankets, ropes, and robes; a two-holed flute made of willow; wooden tobacco pipes; sinew-backed bows, horn bows, and mountain sheep bows; arrows of serviceberry, currant, and cane; quivers of wildcat, fawn and coyote pup; spoons and ladles made of horn; and baskets and nets (Kelly 1964:159-164). She also offered good descriptions of hide tanning (1964:160-161), the weaving of rabbit-skin robes (1964:160), fire-making processes (1964:161-162), and the types and method of construction of basketry items (1964:162-164).

The Kaiparowits Paiute apparently had considerable contact with neighboring groups, and intermarriage and trade were common. There were numerous references to associations between the Kaiparowits Paiute of the Escalante River area and the Koosharem Utes of Grass Valley on the northwestern flanks of the Aquarius Plateau, although the two groups might have been one and the same (1964:144-145). The Kaibab Paiute traded mescal hairbrushes to the Kaiparowits Paiute for red paint, and deer hides for bows and arrows (1964:165).

The Panguitch Band

The Panguitch Paiute, whose name implies reliance upon fish resources, occupied the upper Sevier River area around Panguitch Lake north of the Kaibab Paiutes and northwest of the Kaiparowits Paiute. Their southern boundary appears to have been the upper Kanab Creek-upper Virgin River area; the western boundary was the mountain areas above Parowan and Cedar City; the northern boundary was Circle Valley near the town of Circleville; and the eastern boundary was somewhere in the Bryce Canyon area. It should be mentioned that only one survivor of this band was alive at the time of Kelly's interviews (1964:175), and "it is not possible to estimate the numbers of the Panguitch people or to locate their campsites" (1964:177).

This band was centered on the Panguitch Valley at an elevation of about 7,000 feet. The valley is well watered with springs, creeks, and small rivers. Because of the abundance of water, ownership of water resources was poorly defined. Despite the higher elevations in this region, three main vegetation zones were defined. Sage dominated the valleys between the two plateaus, while sage and juniper were located on the slopes of the plateau and around Panguitch Lake. The higher elevations featured forests of pine, spruce, and aspen. Despite the different floral and faunal resources available to indigenous inhabitants, the same basic Paiute pattern of seasonal exploitation of higher and lower elevations remained intact.

Kelly's informant indicated that campsites were once clustered along the lower slopes of the Markagunt Plateau with easy access of water and fuel resources, and in the Circle Valley. The informant remembered six different camps, although some individuals appear to have moved freely among Kaibab Paiute camps in the Orderville and Glendale areas. The Panguitch Paiute moved together as a larger body, shifting seasonally within their territory. During the winter, the groups camped on the northwest shores of Panguitch Lake near the mouths of small streams with access to fuel resources and where heavy snows were absent. They subsisted on stores of seeds, berries, roots, pine nuts, roots, deer, rabbits, porcupine, beaver, and sage hen. Fish were eaten fresh, as well as dried for future consumption (1964:177).

In the spring, the groups moved together to the Markagunt or Paunsaugunt plateaus to hunt, fish, and gather roots and cacti. During the summer, the groups dispersed to hunt deer and groundhogs and gather roots. In the late summer, the groups again aggregated in the valleys near Panguitch to harvest seeds and buffalo berries, and to conduct communal rabbit drives. In the fall, they returned to the high plateaus as a group to hunt and collect seeds and yucca fruit. They returned to Panguitch Lake for the winter when rabbit drives were also held (Kelly 1964:177-178).

Kelly observed the familiar Southern Paiute land-use pattern was retained without fundamental change. "There were, to be sure, substitutions, such as aspen instead of juniper for house posts, and a few distinctively local food staples, such as fish and sage hen. Nevertheless, as elsewhere, the valley provided seeds and small game, while the higher lands provided roots, berries, and larger game" (1964:178).

There was no indication that the Panguitch Paiute ever cultivated plants, although plots were burned to encourage the growth of tobacco (Kelly 1964:180). As with the Kaibab and Kaiparowits Paiutes, wild plant resources were of primary importance, in particular roots and berries. Cacti were eaten sparingly, and pine nuts were an insignificant resource due to the limited distribution of pinyon trees in the region. The local supply of pine nuts was apparently supplemented through trade. Fish, sage hen, deer, and rabbits were primary food resources. Mountain sheep and antelope were not found in the Panguitch Paiute territory. Elk were found in the region, but there was no indication they were important food resources. As with the Kaibab and Kaiparowits Paiutes, food for winter consumption was stored in rockshelters and caves; subsurface cavities were lined with bark and covered with earth and stones (1964:179).

In the fall, different Paiute groups living in the Escalante River Basin and Kaiparowits Plateau came together to hunt deer, sometimes on the Kaiparowits Plateau and other times on the Aquarius Plateau.

Kelly's description of subsistence activities included a good catalog of plant species exploited at different times of year, methods of gathering and processing the resources, and the abundant nature of fruits and berries. Bears were more abundant in this region than in either the Kaibab or Kaiparowits territories, but there was no indication these animals were important food resources. Communal rabbit drives were held throughout year in the Panguitch area, especially in the summer and fall. Beavers were hunted in the winter along the Sevier River, marmots around Panguitch Lake during the summer, and gophers and groundhogs were hunted all year. Porcupines, badger, fox, wildcats, ducks, sage hens, flickers, mourning doves, and lizards were also food resources. Fish constituted a substantial part of the diet. In the spring, an individual standing in a stream speared fish, and in the winter, the fish were speared through the ice on Panguitch Lake (1964:179-183).

Settlement patterns and associated architecture were similar to those observed in the Kaibab and Kaiparowits areas. Houses were constructed with aspen poles covered with rye grass and pine bark. Winter structures were conical in shape, consisting of a frame of four posts leaned together and lashed with willow withes. The framework was then covered with grass and bark slabs from pine trees, and the bark was then lashed into place with willows (Kelly 1964:183-184).

Panguitch Paiute material culture items reflected adaptations to higher-elevation local environments. Buckskin clothing was more common, consisting of shirts, leggings, and breechcloths. Women wore buckskin dresses or double-aprons,

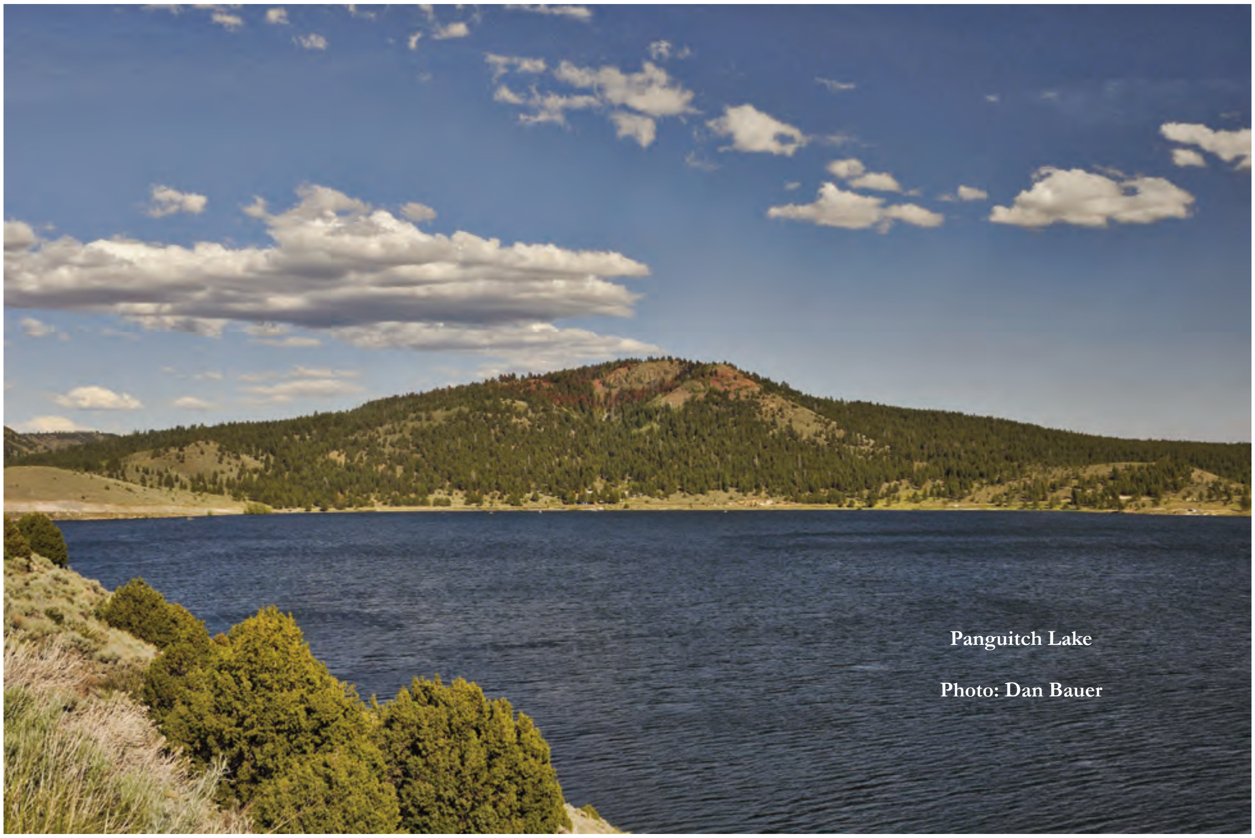

Panguitch Lake

Photo: Dan Bauer

and might have used skirts of ryegrass in earlier times. The men wore buckskin moccasins with badger-skin soles, but most women wore yucca "shoes." The men wore badger-skin caps, while the women wore a close-twined basket hat. Designs were painted on clothing with crushed buffalo berries. Both genders tattooed their chins, cheeks, and foreheads, and red paint was also used for body decorations (Kelly 1964:184).

Kelly also mentioned robes and blankets of bear, wolf, and mountain lion skins, and rectangular rabbit-skin blankets, sometimes with strips of wild-cat skin woven inside (1964:185). Roots were dug with a crooked digging stick similar to that described for the Kaiparowits Paiutes. Tobacco mixed with manzanita was smoked in clay pipes with cane stems (1964:180). Her account offered good descriptions of rabbit hunts, the processing of rabbits, different techniques for catching and processing fish (1964:182-185), and the methods of constructing pottery and basketry items (1964:186-187).

The Panguitch Paiutes were on good terms with all of their neighbors. The Kaibab Paiutes visited the Panguitch Lake area to fish, and the Panguitch Paiute visited the Kaibab Paiutes to hunt deer on the Kaibab Plateau. The Kaiparowits Paiute visited the Panguitch Paiutes to hunt deer on the Paunsaugunt Plateau. The Panguitch Paiutes visited the Cedar City Paiutes to obtain net fibers, and the Cedar City Paiutes visited the Panguitch area to fish.

There was apparently considerable contact with the Utes in the Antimony-Koosharem area, but no mention was made of economic exchange (1964:175-176). Those living in the Panguitch Lake area traded pottery to those living in the Circle Valley area for rabbit-skin blankets. The Panguitch Paiutes also traded rabbit-skin blankets, buckskins, and serviceberry canes to the Kaibab Paiutes for nets, and also traded buckskins to groups in the Cedar City area for moccasins with badger-skin soles, and sage seeds to groups near Beaver for pine nuts (1964:188).

In summary, Kelly's observations of seasonal mobility within varied environmental niches offer important ethnographic comparisons to prehistoric hunter-gatherer lifeways in the GSENM region, particularly during the Late Prehistoric when Ancestral Paiute peoples are assumed to have occupied all sub-sections of the Monument. Kelly's research was inherently biased toward the Kaibab Paiutes, who were more numerous than survivors of other eastern bands. Only a handful of individuals remained who claimed heritage to the Kaiparowits and Panguitch bands. However, it appears that Southern Paiute peoples employed basically the same adaptive strategies, and human behavior was modified according to local environmental resources rather than to any ethnic, linguistic, or band identities.

Basically, subsistence activities were focused around permanent or semi-permanent water sources, mostly springs. These water sources provided a stable base for seed collecting during the spring and early summer. During the summer months, larger groups dispersed into smaller units to collect seeds, berries, and roots in the higher elevations of the Kaibab, Paunsaugunt, Kaiparowits, and Aquarius plateaus. Populations again aggregated during the fall to hunt deer and collect pinyon nuts, also in the high plateaus. Some of the collected foods were cached in rockshelters for consumption in the late winter or early spring. Before the winter snows, the groups returned to lower elevations, usually on the slopes above valley floors that offered easy access to juniper fuel wood and water (either springs or snow that could be melted).

The Kaibab Paiutes visited the Panguitch Lake area to fish, and the Panguitch Paiute visited the Kaibab Paiutes to hunt deer on the Kaibab Plateau.

As food resources diminished during the winter months, forays were made to certain locations to retrieve foods cached the previous fall. Some "starvation' foods were collected and consumed during the winter and early spring, including mescal and juniper berries. Juniper berries were abundant near winter base camps, while mescal required considerable travel to the north rim of the Grand Canyon, although small amounts of mescal were available in the Paria River area. Some small groups, probably no larger than a single family, might have remained in or near the higher plateaus throughout the winter.

Human populations aggregated and dispersed at various times of the year, engaging in cooperative deer hunts, rabbit drives, and, in the Panguitch area, fishing activities. These endeavors rarely involved populations larger than several families. The highly mobile nature of seasonal subsistence brought family groups into regular contact with other camps. Trade with distant groups occurred, but does not appear to have been widespread. Generally, they traded items common to their specific local environments that could be collected during the course of their seasonal foraging.

For example, the Kaiparowits Paiute, who apparently had greater access to bighorn sheep, were noted for their horn bows. The Kaibab Paiute traded salt, stones for pipes, and mescal products. The Panguitch Paiute apparently traded domesticated dogs, buckskin clothing, and access to fish resources. All of the bands in the region traded buckskins, both among themselves and to groups south of the Colorado River and in central Utah north of Southern Paiute territory.

General Summary

The ethnographic descriptions offered by Isabel Kelly offer important clues as to Late Prehistoric settlement patterns, subsistence, and storage strategies, seasonal mobility, and the relationship of small family groups to the distribution of environmental resources. Given the likelihood that Late Prehistoric occupants of the study area were Ancestral Paiutes engaged in similar adaptive strategies, much of the human behavior described by Kelly for the Southern Paiute might be evident in the archaeological record of GSENM.

Based on Kelly's observations, Ancestral Paiutes might have exploited the northern Grand Staircase region more than any other GSENM sub-region. There are somewhat greater numbers of Late Prehistoric radiocarbon dates from the northern Grand Staircase than regions to the east, but this number pales in comparison to dated sites in the southern Grand Staircase (Arizona Strip), St. George Basin, and the lower Virgin River-Moapa Valley regions. The evidence at hand, although limited, suggests that GSENM was on the eastern fringes of Ancestral Paiute adaptations to upland environments, and that populations here were sparse and dispersed compared to areas to the west.

A west-to-east spatial patterning of Ancestral Paiute sites is not obvious in the state site database, however. Brownware ceramics are evenly distributed among all three sub-regions, and Desert Side-notched points are much more common in the Kaiparowits Plateau region. The spatial distribution of sites with Late Prehistoric diagnostic artifacts is essentially the same as observed for sites with Archaic diagnostics, reflecting the importance of Kaiparowits Plateau faunal resources.

Kelly's descriptions also offer important clues as to hunter-gather mobility and settlement patterns in the Kaiparowits Plateau and Escalante Valley areas, two areas she claimed featured very sparse populations. Based on the spatial distribution of sites with brownware ceramics and Desert Side-notched points, there is no convincing evidence these regions were less sparsely populated than the Grand Staircase region to the west.

Ancestral Paiute groups probably arrived in the northern Grand Staircase area in the middle AD 1200s, based on a number of radiocarbon dates that overlap Ancestral Puebloan occupations at the same time. A co-existence of the two groups with different lifeways cannot be demonstrated with certainty, but it is considered possible given (1) the number of radiocarbon dates with 95 percent probability ranges that overlap terminal Formative and Late Prehistoric times, and (2) the significant number of foraging sites with evidence of both Ancestral Paiutes and Ancestral Puebloan groups. An Ancestral Paiute presence in the Kaiparowits Plateau and Escalante River Basin in terminal Formative times cannot yet be demonstrated.

It should be noted that there is, as yet, no good archaeological evidence that Late Prehistoric peoples cultivated maize in the GSENM area. If Late Prehistoric hunter-gatherers coexisted with terminal Formative farmers, then they were at least familiar with domesticated plants. There is some archaeological evidence that Late Prehistoric peoples had access to beans, although the ethnographic record is silent on the cultivation of beans. If the radiocarbon dates associated with beans are an accurate indicator of Late Prehistoric cultivation of food resources, it is likely that maize and squash horticulture was also practiced at this time.

Archaeologists have occasionally applied Kelly's observations to their research into Late Prehistoric behavior. For example, Zier (1974:25) argued that most of the lithic scatters and campsites in the southwestern portion of the Kaiparowits Plateau could be attributed to Southern Paiute peoples, and that "Very likely, the area was visited regularly at more than one time during the year, the exact scheduling dependent on the availability of specific plant and animal foods," and that "if the notion of seasonal occupation of the lower canyon by Southern Paiutes is valid, it then follows that other areas, perhaps nearby, may show a similar type of site patterning, resulting from exploitation at other times of the year of different wild foods occurring in those areas."

In the Skutumpah Terrace and Alton Amphitheater areas, Halbirt and Gualtieri (1981:2-3) offered a succinct comparison of hunter-gatherer archaeological evidence in the area to Kelly's hunter-gatherer model for Southern Paiute hunting strategies in the same general region. They suggested that the relationship of site types and location "can be related to hunting strategies and success probabilities for procuring game, especially mule deer, and in the exploitation of multiple resources. That is, the presence, type and density of sites in an area is a product of the hunting strategies used in procuring (capturing) game and the number of exploitable plant and animal resources."

This chapter has focused predominantly on Ancestral Paiute evidence from GSENM and contiguous areas, and there is sound reasoning behind the assumption that Late Prehistoric groups were ancestral to Southern Paiutes encountered here in 1776. There is, as yet, no archaeological evidence of other ethnolinguistic groups in this region, although various researchers over the years have suggested that possibility. One of the most controversial hypotheses was offered by Aikens (1966a, 1966b, 1967), in which he suggested that proto-Fremont peoples were Athapaskans of northwestern Plains origins who migrated into Utah about AD 500, possibly under pressure from Plains Woodland expansion.

The relationship between Fremont peoples and late prehistoric migrations of Athapaskan speakers (e.g., Apache and Navajo) is rarely addressed in archaeological studies today. As traditionally described, the Navajo are believed to have migrated to the Southwest by about AD 1500 (Hester 1962), and the Apache by AD 1525 (Gunnerson 1960, 1962). Both Athapaskan-speaking peoples might have occupied the Rocky Mountains and upper Green River Basin by about AD 1400, moving south through the Great Plains toward the Southwest. These migrations are believed to have been precipitated by the movements of Shoshone and Crow groups into Wyoming during the AD 1400s. By AD 1700, Athapaskan peoples were distributed in an arc from the Southwest to the Black Hills, where they continued to be pressured by Numic-speaking groups (Reed and Horn 1990; Wright 1978).

The only evidence of Athapaskan-speaking groups in the GSENM region are historic in nature, consisting of hogans, sweat lodges, and

Figure 7.24: Remnants of a Navajo hogan on the mesa top above Johnson Canyon. These are believed to represent occupations during the first half of the twentieth century. No evidence has yet been reported that Navajos or other Athapaskan-speakers were present in the Monument in prehistoric times

other ephemeral structures dated to the mid-1900s (Figure 7.24). Given the numerous historical accounts of Navajo raiding parties in the mid-1800s, it is likely that Navajo encampments would be located north of the Colorado River that date to early historic times.

In summary, Ancestral Paiute hunter-gatherers probably arrived in the GSENM region in the middle AD 1200s. They might have encountered remnant populations of Ancestral Puebloan farmers who occupied environments favorable to maize farming, or they found recently abandoned pueblos. A co-existence of two distinct lifeways cannot be demonstrated by available archaeological data, but it is considered probable in light of overlapping radiocarbon dates and numerous sites with mixed artifact assemblages. Remnant Fremont populations at sites like Rattlesnake Point and Ancestral Puebloan farmers at sites like the Pinenut Site might have ultimately abandoned their homes under the weight of increased competition with Ancestral Paiute immigrants.

Evidence of a militaristic displacement is generally lacking. Coombs Village was burned perhaps a century before the Ancestral Paiutes arrived in the region, and the burning of Gnatmare Site and Pottery Knoll might have been accidental or intentional acts upon abandonment. The only evidence of violence is the remains of an individual inside a burned kiva along the Colorado River, although this site was subsequently reoccupied by Puebloan groups and displacement did not occur at that time. And no evidence has been found that the violence was precipitated by Ancestral Paiute groups.

There is little archaeological evidence in GSENM or contiguous areas that Ancestral Paiute practiced horticulture, although the presence of beans three sites in the region certainly raises that possibility. Given that contemporaneous groups to the west in the St. George Basin were cultivating maize, it is probable that groups in GSENM were at least aware of farming practices.

Most archaeological data point toward a highly mobile hunting and gathering strategy similar to earlier Archaic patterns, although group sizes might have been smaller, and use of longer-term base camps might have been less frequent, suggesting small family-sized units moving frequently between resource patches. This pattern probably involved exploitation of lower elevation resources in the spring and upland resources in the summer, followed by mule deer hunts and rabbit drives in the fall. Winters would have been spent in the foothills with access to fuel wood and water, either snow that could be melted or springs.

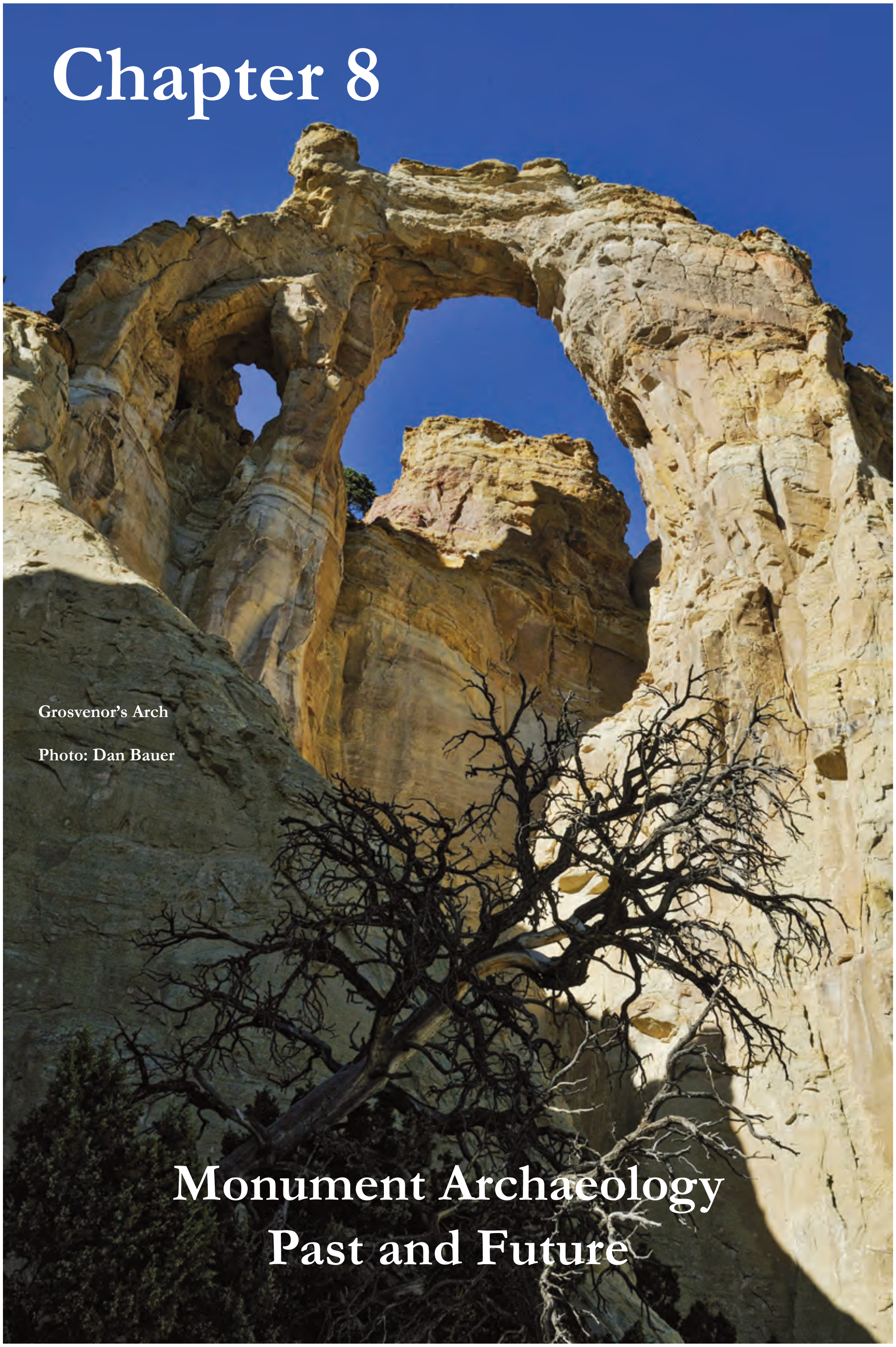
The ephemeral nature of Southern Paiute residential structures is such that it would be difficult to identify them in archaeological contexts, and habitations are probably underrepresented in the state site database. One temporary structure was identified in Bowns Canyon in the lower Escalante River country, but no corroborative artifacts were noted and the ethnographic record indicates this area was not occupied by Southern Paiute foragers.

The comparative abundance of Late Prehistoric sites found in regions to the south and west of GSENM probably reflects the greater amount of research conducted in those regions, much of it spurred by modern development. The rarity of similar sites in GSENM is probably biased by the comparative rarity of large scale developments and the fact most research projects have focused on Formative sites. Only rarely have Late Prehistoric lifeways been addressed.

The Grand Staircase

Photo: Dan Bauer

Chapter 8



Grosvenor's Arch

Photo: Dan Bauer

Monument Archaeology Past and Future

On September 18, 1996, President William Jefferson Clinton stood on the South Rim of the Grand Canyon and, with flowery speech and the stroke of a pen, issued a proclamation creating the 1.7-million-acre Grand Staircase-Escalante National Monument that encompassed the lion's share of federal land in Kane and Garfield Counties (it was later expanded to 1.9 million acres through a subsequent land trade with the state of Utah).

GSENM is the largest national monument to have been created as an outdoor scientific laboratory. And the rich archaeological resources of the region were specifically highlighted as a justification for the Monument. As Clinton stated at the time (see Proclamation 6920), "The cultural resources discovered so far in the monument are outstanding in their variety of cultural affiliation, type, and distribution. Hundreds of recorded sites include rock art panels, occupation sites, campsites, and granaries. Many more undocumented sites that exist within the monument are of significant scientific and historic value worthy of preservation for future study."

Truth told, in 1996 archaeologists knew there was a lot of undocumented archaeology in the new monument, but they had little grasp of what it all meant and how the prehistoric resources of the region related to better known manifestations to the east and west. In fact, the data gaps were massive. Now, some 25 years later, it is appropriate to look back on what has happened since the outdoor archaeological laboratory was created and ask the question: Has the Monument fulfilled the intent of the original proclamation? The answer, at least from our perspective, each of us having worked in the monument for more than two decades, is "beyond a shadow of a doubt."

Research initiated after the Monument was designated has resulted in systematic inventories of more than 36,000 acres and 33 miles of river corridors, the documentation of at least 1,587 archaeological sites, excavations at more than two dozen sites, and a cumulative regional radiocarbon database that now includes more than 400 dates that allow us, for the first time, to organize and understand the culture history of the region. These investigations seamlessly dovetailed with important excavations on private and state lands immediately adjacent to the Monument, all of which have entirely rewritten our understanding of regional prehistory.

In other words, 25 years ago archaeologists used a lot of qualifiers such as "maybe" and "might" and "perhaps." Now we express a lot more confidence in the cumulative data that has allowed probability to replace uncertainty. We know that groups were hunting deer at the end of the last Ice Age, we know that groups returned to favored alcoves and shelters time and again over many millennia, we know far more about the origins of agriculture and the emergence of a sedentary lifeway, and we know that farming families lived here for more than two thousand years. We also know that for each answer teased from the growing database another dozen questions arise.

Although the quantitative nature of these investigations is impressive, more important are the contributions these efforts made toward an understanding of prehistoric lifeways. And these insights have raised scores of new questions and avenues for future research. In the following sections, we review what archaeologists knew at the time the Monument was created in 1996, what we have learned since then, and what avenues of future research lie ahead.

The Paleo-Archaic

As we discussed in Chapter 2, very little was known about the first humans in the region at the end of the last Ice Age. Archaeologists knew they were here because distinctive Paleo-Indian and Paleo-Archaic points had been found in every subregion of the monument. And they might have been hunting now-extinct Pleistocene mammals, which were present at deep alcove sites in the lower Escalante River area. Remains of a mastodon were even found in the Skutumpah Terrace area. But convincing evidence that humans were preying on these Ice Age beasts was elusive, not just in the Monument but throughout the northern Colorado Plateau. In other words, the evidence 25 years ago for early human use of the region was circumstantial, at best.

Today, we know that the Ice Age hunters were indeed present here, and they returned time and again to a favored deer hunting camp in the foothills below the Aquarius Plateau just outside of what is today the town of Escalante. Scholars at Brigham Young University (BYU) named it North Creek Shelter, although it really wasn't much of a shelter. Their excavations there convincingly demonstrated the earliest evidence of deer hunting anywhere in southern Utah at 10,000 to 12,000 years ago. The first residents of the area left behind unique stemmed points used to hunt mule deer, perhaps a now-extinct mule deer much, much larger than modern ones. They also hunted small animals and birds that thrived in the wet meadow below, an environment fed by the continued melting of massive glaciers on the plateau above. Water plants were abundant, but there are, as yet, no manos or metates to suggest the first deer hunters here were also processing plant foots.

The North Creek Shelter investigations offer an intriguing view into the Paleo-Archaic lifeway, but it is nonetheless an incomplete view of a single aspect of their lives, one focused on deer hunting in the fall. Where did they spend their winters? How did they survive the spring months when animals are stressed from the harsh winters? Where did these hunters come from? What happened to them? Did the later Archaic hunting and gathering strategy evolve out of this Paleo-Archaic hunting lifeway? Were now-extinct Pleistocene mammals such as camels, horses, sloths, mammoths, and mastodons tethered to river systems as the climate was warming?

The BYU researchers clearly demonstrated for the first time that humans were present here at the end of the last Ice Age, and in doing so they have raised many more questions ripe for future research. One potential avenue for future research is climatic computer modeling that could re-create the late Pleistocene and early Holocene environmental landscape in the Monument. Such modeling is commonly applied today to predict future reductions in polar ice sheets, but these same approaches can be used to retrodict the location and spatial extent of late Pleistocene glaciers, their vertical and horizontal characteristics, and the estimated discharge of glacial systems at specific points in time and the extent to which specific drainages would have been affected. Such three-dimensional mapping could help identify those drainages that, although dry today, would have been wet riverine environments in late Pleistocene and early Holocene times, and how ice sheets at different elevations through time might have constrained human and animal movement into higher elevations.

At about 8000 BC, the environment around North Creek Shelter was very wet in nature, reflecting significant runoff, probably from glacial melting on the Aquarius Plateau. By 7000 BC, it had assumed more modern conditions, suggesting that deglaciation had been completed by that time and that warmer Holocene conditions had prompted a migration of certain water-adapted plants and animals to higher elevations, and, by inference, the human hunters and gatherers exploiting those resources. Thomas (2014:136) observed that mountains must have been viewed by Paleo-Archaic peoples as obstacles, not destinations. But at what point in time were the high plateaus first accessible to humans? Did glaciation prior to 7000 BC inhibit human utilization of high elevations before Holocene conditions, or was glaciation always spatially restricted and there were never limits as to the movement of large fauna and the humans who exploited them during late Pleistocene times? If there were elevation boundaries above which hunting was not productive, how did these boundaries change through time?

Beck and Jones (2009, 2010, 2012) have made convincing arguments that the early stemmed point tradition of the Intermountain West is a different cultural expression than the Plains complexes, and that it resulted from a separate migration from the Pacific Northwest sometime prior to the arrival of Clovis hunters on the Plains. They also argue that a major portion of fluted points in this region identified as Clovis are not really Clovis points, but might represent a local fluted point tradition that resulted from contact between the two groups. Would a careful re-examination of the various fluted and non-fluted points of suspected Paleo-Archaic age recovered from the Monument and contiguous areas support the idea of a local projectile point tradition? Or would it demonstrate the Monument region was being exploited by two different groups at the same time, Paleo-Indians from the Plains and Paleo-Archaic peoples of the Great Basin? If so, were these groups in competition with one another, and how might that competition be recognized?

If the Clovis, Folsom, and Plano points are indeed representative of Paleo-Indian groups from the Plains extending into the plateau country, are there differences in how Paleo-Indian and Paleo-Archaic peoples utilized the Monument landscape? Are there substantive differences between Paleo-Archaic adaptations suggested by Beck and Jones (2010, 2012) and Janetski et al. (2012) and the Paleo-Indian foothills/mountain adaptations suggested by Frison (1991)? Are there differences in site settings, elevation, topography, and resource availability?

One of the most intriguing questions is whether Paleo-Archaic peoples simply left the region, as Geib (1996a) suggested, or whether they adapted to drier desert conditions by becoming the hunters and gatherers evident in the abundant Archaic archaeological record (Madsen 2007). North Creek Shelter offered convincing evidence that Paleo-Archaic tool kits were distinct from those in the overlying Archaic deposits (stemmed points versus Pinto Series), suggesting "adaptive discontinuity" between Paleo-Archaic and Archaic groups, even if reliance of deer was the primarily focus of both occupations (Janetski et al. 2012:125).

If the Archaic deposits represent the arrival of new groups with new tool kits, then where did these new arrivals come from and what was the source of their new technologies? In light of the fact that Archaic peoples rapidly spread through much of the northern Colorado Plateau, could this represent a large-scale migration into the region by groups that easily displaced the dispersed Paleo-Archaic peoples already there? Or was it a minor migration wherein small groups of new arrivals assimilated existing Paleo-Archaic groups into their own hunter-gatherer lifeways? Or had Paleo-Archaic peoples already abandoned the region, leaving the entire northern Colorado Plateau free for the taking?

The earliest deer bones at North Creek Shelter were much larger than modern comparative specimens. They might actually represent an extinct species of American mountain deer.

One defining characteristic of Paleo-Indian lifeways on the Great Plains is the hunting of large, now-extinct Pleistocene fauna. Hunting of Ice Age mammals on the northern Colorado Plateau has not been conclusively demonstrated, although there are tantalizing hints here and there. The faunal evidence at North Creek Shelter might actually support the idea that the first hunters preyed upon now-extinct animals. Bradley Newbold, who examined the faunal assemblage, noted that deer bones in the Paleo-Archaic deposits were significantly larger than modern comparative specimens, and the North Creek Shelter specimens might represent a species of extinct American mountain deer (*Navahoceros fricki*) known to have been in this region (Newbold 2009). Would a more detailed analysis of the North Creek Shelter deer bones demonstrate that Paleo-Archaic peoples also were big game hunters who followed herds of now-extinct mammals in the traditional Paleo-Indian pattern? If so, what, if any, distinctions can be made between Paleo-Indian and Paleo-Archaic lifeways as they relate to the northern Colorado Plateau?

The Archaic

As we discussed in Chapter 3, a subsistence strategy focused on hunting big game and gathering of plant foods defined the next 7,000 years of

Cottonwood Canyon Road

Photo: Dan Bauer

human history in the Monument. Archaic sites characterized by distinctive atlatl dart points and ground stone tools are found across the entire Monument, especially on the Kaiparowits Plateau. The nature and complexity of hunting and gathering camps changed little over time, although ground stone tools were more prevalent in later, drier Holocene times that could indicate plants assumed even greater importance in the Archaic diets. Most of what was known about the Archaic 25 years ago came from regional alcove and rockshelter sites in the San Rafael Desert, Wasatch Plateau, and Navajo Mountain areas, and to a lesser extent the Kaibab Plateau. In fact, excavated Archaic sites within and near the Monument were limited to a handful of sites along the Colorado River corridor and lower Escalante River country. And all of the evidence pointed to a highly mobile lifeway where groups moved constantly between resource patches.

Research over the past 25 years has demonstrated that Archaic mobility was much more complicated than traditional definitions allowed. Groups returned time and again to preferred base camps, and they were staying long enough to construct houses, both temporary brush structures and substantial pithouses. These Archaic houses, which were constructed in middle and late Holocene times, might have been focused on communal rabbit hunts in the Kanab area (Roberts 2018) and on mule deer migration routes in the Kitchen Corral Wash area (McFadden 2012).

Formal and semiformal Archaic residences are well-documented throughout the West, especially in the Wyoming Basin, in the Flaming Gorge and Yampa River Basin where they were used throughout the entire Archaic period, and in the Rocky Mountains, where they functioned as early Archaic winter residences. Middle Archaic residential structures have also been identified in New Mexico and in the St. George Basin. Recent research has demonstrated that houses were also constructed by Archaic foragers in the Monument and adjacent areas, but the houses are deeply buried with no surface evidence of the Archaic residences. There are probably a lot more Archaic house sites in the region, but archaeologists now know they have to dig deeper if they are going to find them.

The Archaic presence in the Monument is reflected in the high number of sites (>525) with distinctive atlatl dart points, rock art, and in few instances radiocarbon dates, although the current database is dominated by inventory data (e.g., descriptions of surface materials). Approximately 60 percent of the Archaic hunter-gatherer sites considered here are lithic scatters of varying complexity that are associated with bifaces, points, scrapers, and other expedient tools that are commonly attributed to hunting tool kits, and by inference to males engaged in the hunting of high-return resources. The other roughly 40 percent are campsites where the hunting tool kit is also associated with ground stone tools used to process plants and seeds, and by inference they are localities occupied by both men and women, and where women were involved in the collection and processing of low-return plant resources.

Some researchers have suggested that traditional Archaic hunting and gathering might have appeared in this region as early as 8000 BC, based on evidence from regional alcove and rockshelter sites. If this is the case, groups practicing Paleo-Archaic, Paleo-Indian, and Early Archaic lifeways might have co-existed in the region. If full-fledged hunter-gatherers were indeed present by 8000 BC, how did their procurement strategies and differ, if at all, from contemporaneous Paleo-Archaic groups in the same region? How can Early Archaic and Paleo-Archaic adaptations be distinguished if no ground stone tools are evident?

Parental provisioning falls primarily on the mother, and females will choose resources that are consistent and reliable even if the procurement costs are higher. This increases the potential that children will survive to reproductive age.

Current hunter-gatherer theory emphasizes that parental provisioning falls primarily on the mother, and therefore females will choose resources that are consistent and reliable even if the procurement costs are higher. This increases the potential that children will survive to reproductive age. If women chose reliable resources to ensure survival of their offspring, then survival might be enhanced if men also participated in the procurement of those same reliable resources. What are the implications for male choices to procure resources that are less reliable and less certain? Can it be assumed that all men were hunters, or is this a gender stereotype?

Archaic residential structures are rare anywhere on the northern Colorado Plateau, something that might be due to the abundance of rockshelters and alcoves that could have functioned as winter residences without the energy expenditure associated with constructing houses. But the locations with the best shelters (e.g., Glen Canyon, San Rafael Desert, Escalante River) are not optimally situated to exploit animal resources during winter months. This raises several questions.

If south-facing rockshelters and alcoves were preferred winter residences because they were warm, but locally available food resources were minimal during winter months, then food storage strategies to ameliorate winter shortfalls would be expected. This pattern might have been similar to Southern Paiute storage strategies where food resources were cached for retrieval during the winter months (Kelly 1964). A few small subterranean storage pits were noted at North Creek Shelter (Janetski et al. 2012), Cowboy Cave (Jennings 1980), and Sand Dune Cave (Lindsay et al. 1968), but there is a general lack of understanding as to Archaic storage strategies. A more thorough examination of storage features in sheltered settings might better demonstrate that storage strategies of Formative times are rooted in Archaic subsistence practices, whereas the volume of the storage facilities could contribute insights into expected caloric returns and Archaic group size.

A basic premise of modern hunter-gatherer theory holds that if the procurement and transport costs of higher-ranked resources exceed the anticipated return (calories), then the base camp will be moved closer to those resources. If rockshelters and alcoves are not ideally situated for procurement of high-return big game animals, it would be expected that hunter-gatherer groups would move their camps to locations in closer proximity to those resources. During the winter months, mule deer aggregate into large herds, and human procurement of higher-return resources would have been directed toward these aggregated herds at or just below the snow line. Winter residences, perhaps subterranean or semi-subterranean pithouses, would also be expected at locations in close proximity to the deer winter ranges, as is the case in the Wyoming Basin, Yampa Basin, and Rocky Mountains mentioned above. Jackson Flat near Kanab is also located near mule deer winter range in the Kaibab Plateau foothills, although there is very little evidence that mule deer were processed there. Given that so little is known about Archaic residential base camps, thorough excavations should be considered a high priority if and when such sites are discovered.

Residential mobility is typically discussed within the framework of two basic strategies. One involves mobile groups who move their primary residence several times a year, often within a preplanned seasonal round. The other involves logistically mobile groups who rarely move their primary residence, but instead dispatch task-specific groups on trips to procure food and lithic materials and to trade with other groups for critical resources (cf. Binford 1980). But the Monument sites do not fit neatly into either of those two broad categories. About 60 percent of Archaic sites do not have ground stone tools, and most of those are small sites indicative of short-term hunting forays, perhaps by task-specific groups. Yet there is minimal evidence (yet) of longer-term Archaic base camps anywhere in the region. About 40 percent of Archaic sites have ground stone, but these are mostly small sites that suggest short-term foraging episodes, not larger base camps.

Could the small size and ephemeral nature of foraging camps represent task-specific activities (plant gathering) by female-centric groups associated with a primary residence or base camp elsewhere? Were the task-specific activities structured to include short-term male and female activities at the same time, hunting for men and gathering for women? Both possibilities would assume the individuals in the task-specific group were part of a larger social unit and that procured plant and animal resources were transported to the primary residence for processing and consumption. As mentioned, evidence for primary residences or base camps is quite limited at Archaic sites in the region.

Another possibility is that Monument sites reflect much higher residential mobility than is represented by either of the mobility models mentioned above. Instead of groups who moved their primary residences several times a year, the seasonal round might have involved a single nuclear family moving their camp every few days as the sparse plant resources in one area were quickly depleted. If this were the case, the small numbers of artifacts and lack of artifact diversity might simply be a function of small group size and group decisions as to how much and what types of materials could be efficiently transported.

A large percentage of GSENM sites (ca. 40 percent) have evidence of mixed hunting and gathering, and most of these are located within mule deer habitat. And while this is not unusual on the northern Colorado Plateau, it presents an interesting dilemma in that the optimal season for procuring grass seeds is not the optimal season for procuring deer. As summarized by Newbold (2009), most resources are present, abundant, or in prime condition at specific times of the year, and they are most likely to be procured during optimal periods rather than at other times. Some resources, like grass seeds, mature in the early spring in lower elevations and in the late spring and early summer at higher elevations, and opportunities for human exploitation are limited to a very brief time before the seeds drop, often only a few days. Migratory birds, spawning fish, and hibernating mammals are also examples of season-sensitive fauna.

Mule deer are also a season-sensitive species, one that might be present most times of the year, but one that would be abundant or concentrated at certain times of the year. As any modern deer hunter will attest, the optimal time to hunt mule deer is the late fall and early winter when dispersed herds begin to aggregate for their annual migration to winter ranges. If the Archaic hunting camps were oriented toward mule deer procurement, then these would most likely represent fall camps. But the presence of ground stone suggests a spring occupation. It is certainly possible that foragers returned to the exact same location at two different times of the year, once to gather seeds and later to hunt deer. But this seems unlikely.

Deer migration routes do not change over time or in response to external factors, meaning the availability of those resources to humans would have been highly predictable regardless of time period.

There is another possibility. Mule deer migration patterns reflect two periods of concentration, one in the fall when deer are in optimal condition, and the other in the spring when deer return to higher elevations, but are nutritionally stressed. Therefore, sites without ground stone might represent fall hunts, whereas those with ground stone tools could represent hunts during the spring when deer herds were returning to their upland summer ranges.

Wildlife biologists across the West have recently been investigating the migration patterns of mule deer. Of particular relevance to this discussion is the Paunsaugunt Plateau herd, recognized as one of the premier mule deer herds in the nation with a summer range located on the northwestern periphery of the Monument. Mule deer begin migrating from upland elevations to their winter ranges in early October and the migration lasts about six weeks, ending in the middle of November. In the spring, the deer begin migrating to higher Paunsaugunt Plateau elevations in the middle of March and the migration lasts six to seven weeks until early May. Studies elsewhere in the West have demonstrated that mule deer never abandon one home range for another, something referred to as range fidelity. And they consistently use the same migration routes regardless of environmental factors, such as drought or water availability, or human influences, such as highway mortality and urban sprawl.

Herd migration is an adaptive strategy that enhances the survival and productivity of the deer herds, but biologists have also determined that migrating herds are more susceptible to predation at this time, especially human predators, because the animals are in unfamiliar terrain during the actual period of the migration. This presents an intriguing avenue for future research. The spatial distribution of Archaic sites appears to reflect a linear pattern in a T-shape, with one line extending slightly southwest-to-northeast across the middle of the Monument and another north-to-south along the top of the Kaiparowits Plateau. In effect, sites are distributed between mule deer winter range on the Arizona-Utah border at elevations of 4,000 to 5,000 feet and the high plateau above 7,000 feet elevation on Fiftymile Mountain, which is summer range.

This spatial patterning might be coincidental, but it might not. If the migration pattern of the modern Kaiparowits deer herd were to be mapped,

the deer migration routes could then be plotted against prehistoric hunter-gatherer site locations. Because deer migration routes apparently do not change over time or in response to external factors, it might be that deer migration routes were similar or identical to those in prehistoric times, and the availability of those resources to humans would have been highly predictable. A correlation between deer migration routes and hunter-gather camps might demonstrate that prehistoric groups were intensively exploiting migrating deer herds during two specific times of the year, one from early October to middle November, and the other from the middle of March to the beginning of May. The spring migration would have corresponded nicely to the annual ripening of seed plants at lower and mid-range elevations, allowing for both hunting and gathering to occur at the same time.

This idea does not preclude the possibility of winter base camps oriented toward the exploitation of winter mule deer aggregations, nor does it infer that humans did not opportunistically hunt deer on the high plateaus during the summer after the herds had dispersed. But it does suggest that intense procurement of a high-return resource might have been optimal during two brief periods, and that subsistence strategies at these times were intensively focused on the pursuit of migrating deer herds as they moved to and from their winter-summer ranges. It would also suggest that plant gathering during the spring hunt was ancillary to the procurement of higher-return resources.

In Archaic times, the mule deer might have been tethered to established migration corridors that made them especially vulnerable to hunters. Researchers have noted that larger game animals are much less common in Early Agricultural and Formative contexts than they are in Archaic ones (see Fisher et al. 2013; Janetski 2017; Janetski et al. 2013). In light of the apparent population increases that occurred during late Holocene times, it is certainly plausible that increased human predation resulted in decreased mule deer survival rates and lowered herd productivity. In effect, the herds survived hunting by small, dispersed human populations in early and middle Holocene times, but they did not recover from intensive hunting by larger populations in late Holocene times.

The Transitional Period

The transition from predominantly foraging lifeways to one that incorporated agriculture to greater or lesser degrees has benefitted greatly from research over the past two decades, as we discussed in Chapter 4. In 1996, archaeologists knew that Ancestral Fremont groups were farming maize by the AD 200s, which coincided neatly with most of the early maize dates from the Grand Staircase reported at that time. In fact, most evidence of early maize farming suggested a rather sudden appearance of this technology across southern Utah. In the Grand Staircase, the evidence pointed toward a rapid appearance of Basketmaker II groups with many shared characteristics of Basketmaker II groups in northeastern Arizona and southeastern Utah.

Basketmaker II lifeways evident at 100 BC might reflect a hybrid of San Pedro farmers who first arrived about 1000 BC and intermarried with local foragers.

Investigations over the past 25 have completely redefined what we know of the first farmers in the Monument. Yes, maize agriculture was firmly entrenched among the Ancestral Fremont of the Escalante River Basin by AD 200. But investigations at Jackson Flat south of Kanab and in the upper Short Creek area clearly show that Ancestral Puebloans of the Grand Staircase were growing maize two or three centuries before that. And we know that settlement and land-use patterns were quite different between the two regions. Ancestral Puebloan farmers had developed a pithouse tradition oriented toward maize fields by 100 BC (a similar pithouse tradition has not yet been documented among the Ancestral Fremont). The Ancestral Fremont, meanwhile, incorporated the bow-and-arrow into their hunting strategies by AD 200, perhaps a century or two earlier; their Ancestral Puebloan neighbors to the west continued to use the atlatl, a much less efficient hunting technology. The nuances of these differences have prompted some to suggest the emergence of hard boundaries between two different groups with separate cultural identities, something that persisted for at least 500 years. In fact, the only common denominator in Early Agricultural times was that both groups grew maize.

Research has only begun to unravel how farming emerged as the dominant subsistence strategy in the region. Recent research at Jackson Flat suggests that some individuals, perhaps immigrants from the San Pedro culture area of southern Arizona, were farming as early as 1000 BC – a full millennium earlier than traditionally thought (Roberts 2018). And this raises new questions about the events leading up to the emergence of agriculture as the predominant subsistence strategy throughout the region some 900 years later. Did the San Pedro farmers simply leave, taking their farming know-how with them? In this scenario, the Basketmaker II farmers could represent a second migration into the area at about 100 BC. Or did the San Pedro farmers remain in the area, farming as-yet-undiscovered niches along Kanab Creek and Johnson Wash? In this scenario, the Basketmaker II lifeways could reflect a hybrid of San Pedro descendants who intermarried with local foragers, and Basketmaker II farming represents the culmination of centuries of mixed farming and foraging.

It appears that early farming in the Escalante River Basin was a local development wherein Archaic foragers adopted maize agriculture to a greater or lesser degree (Geib 1996c; Keller 2000;

McFadden 2016). There is less consensus for the local development of agriculture in the Grand Staircase region. Talbot (1998) has argued the Archaic-to-Formative transition was a local development, although he did not rule out the possibility of immigration, in effect micro-migrations by small groups that shared new technologies with existing populations and were quickly assimilated into these groups. In other words, the debate over local development versus migration is not a question of "either-or." Rather it is how to recognize the impetus for change arising from multiple sources at different times and in different locations. But how can this be recognized in the archaeological record? If the transition to agriculture resulted from small but frequent micro-migrations, what factors stimulated these migrations? What was the source of these migrations? And does the timing of these events coincide with environmental and social events occurring elsewhere in the Southwest?

Once agricultural technologies crossed the Colorado River, farming became commonplace everywhere maize could be grown, and, as Geib observed, "the changes it wrought appeared even more revolutionary, more in line with agriculturalist colonization of the plateau" (1996c:55). Farming rapidly became the dominant lifeway among Ancestral Fremont groups as far north as the Uinta Basin (Talbot and Richens 1996) and among Basketmaker II groups as far west as the St. George Basin (Landon and Roberts 2018; Winslow 2011; see also Lyneis 1995). In effect, there is minimal evidence to suggest that agriculture was added to foraging lifeways through a long, slow process of accretion.

If agriculture was being practiced as early as 1000 BC (Roberts 2018), there is only minimal evidence of agriculture in the subsequent centuries, could this be evidence that agriculture was slow to take root among foraging populations and that the transition to full-time farming occurred slowly over many generations? If so, does it alter current perceptions that once foragers began farming they became fully committed to agriculture? Or does this period represent different levels of commitment to farming with some groups retaining their Archaic foraging lifeways, others who were both farming and foraging, and a few who were fully committed to maize farming? Does the prevalence of farming sites after AD 200 indicate that farming eventually emerged as the most predictable subsistence strategy and therefore became the dominant strategy? Or does it represent a decrease in available wild resources that could be exploited by larger populations, requiring greater reliance on cultigens?

Farming strategies in the Grand Staircase region clearly involved greater sedentism, as evidenced by the emergence of pithouses and clusters of pithouses situated near arable lands (Berg et al. 2003; Naylor 1996; Nielson 1998; Roberts 2018) in a pattern similar to that observed throughout the Southwest at this time. Yet this same strategy has not been identified in the Escalante River Basin. Instead, farmers seasonally occupied rockshelters and light brush structures along the Escalante River during the growing season, and then returned to a winter residence elsewhere, presumably in areas with abundant fuel wood and perhaps access to migrating mule deer. But where were these winter residences? Why is there no evidence of formal pithouses in this region until some 500 years after the advent of agriculture in this area? It stands to reason that Ancestral Fremont groups interacted with and learned farming technologies from other Fremont groups to the north and northwest and Ancestral Puebloan groups to the south and west, all of whom used pithouses. Furthermore, pithouses had been used throughout the region since Archaic times. Is the absence of evidence for permanent residential architecture merely an anomaly and these sites do exist, but they have not yet been discovered? If so, can evidence from other comparable regions be used to predict where these sites would be expected?

The appearance of the bow-and-arrow by AD 200 is seen by some as evidence of a cultural boundary wherein bow-and-arrow-using Ancestral Fremont groups maintained a competitive advantage over more numerous atlatl-using Basketmaker II peoples to the west (Geib and Bungart 1989). But it defies logic that Ancestral Fremont groups could have prevented the spread of this technology to their neighbors for at least 300 years. Is this dichotomy simply the result of sampling errors? There is evidence to suggest some Basketmaker II

The Cockscomb

Photo: Dan Bauer

groups had the bow-and-arrow much earlier than traditionally thought (Geib 2011; Nash 2013; Naylor 1996). If the bow-and-arrow and maize agriculture were both shared technologies, then what insight does this offer regarding current assumptions about hard cultural boundaries at this time?

Are artifact traditions an accurate indicator of cultural boundedness? If agricultural lifeways in both regions evolved from an Archaic substrate, was there a shared cultural and ethnic identity across the entire region? Or were groups in both regions culturally and ethnically distinct, resulting in competition that had its origins in Archaic times? Or if hard boundaries actually emerged in Early Agricultural times, is this further evidence that groups with different cultural and ethnic identities had moved into the region, thereby warranting mechanisms to maintain identities of local populations? How might this be recognized archaeologically?

Elsewhere in the Southwest, Basketmaker II groups were dry farming on the mesa tops by AD 200. There is minimal evidence of this in the Grand Staircase region. Dry farming in high plateau settings requires a suite of water-control and soil-conservation measures, such as check dams, terracing, field borders, and trincheras, none of which have yet been documented in the Monument. Is the absence of features to capture water and retain soils an indication that dry farming was a contingency strategy that did not warrant investment in permanent field features? How would intensive dry farming have been successful if such measures were not employed? Were water-retention qualities of soils different and/or better than elsewhere in the Southwest where water-control and soil-retention measures were mandatory? Did farmers have access to better maize varieties that matured quicker and required less moisture?

A defining signature of the Basketmaker II sites in southeastern Utah is the presence of limestone, even though limestone was not found in proximity to any of those sites. The logical assumption was that limestone was brought to the residences for a specific purpose, probably as cooking stones (Matson et al. 1990). Limestone is a high-alkaline substance used by a variety of prehistoric groups to make maize easier to process. It is not known if limestone is a signature of Basketmaker II sites in the Monument region because no one has looked for it. A more thorough examination of the stone detritus at suspected Basketmaker II sites might also identify limestone, which could then serve as a diagnostic marker of Basketmaker II occupations. It would also suggest that local Basketmaker II populations learned food processing techniques from contemporaneous groups living to the south and east. Then again, if limestone is not found at early farming sites on the Monument, it might be inferred that farming strategies emerged independently here.

The Fremont Complex

Very little was known about Fremont adaptations in the Escalante River Basin at the time the Monument was designated. A handful of Fremont radiocarbon dates had been reported and a few Fremont sites had been excavated, but virtually nothing was known about Fremont social structure, how Fremont lifeways changed over time, or how Fremont social and economic activities were related to other Fremont groups to the north and northwest and Ancestral Puebloan groups to the south and west.

Ancestral Puebloans of the Grand Staircase had been constructing formal pithouses since about 100 BC. But the absence of pithouses in the Fremont world until AD 750 is as yet unexplained.

As discussed in Chapter 5, that changed substantially due to multi-year investigations by Brigham Young University in the 1990s and 2000s that resulted in a wealth of radiocarbon dates, refined perspectives regarding settlement and land-use patterns, and contributed to an understanding of the changing nature of cultural boundaries between Fremont and Ancestral Puebloan groups. The beginning of the Fremont Complex is demarcated by the appearance of grayware ceramics about AD 500, but Fremont lifeways were certainly rooted in earlier aceramic farming practices (Geib 1996c; McFadden 2016). In fact, the only significant difference between the earliest farmers and the first Fremont farmers was the addition of ceramics, which might reflect increased sedentism and the need for more durable containers for cooking and storage. Several questions remain.

The defining trait of Fremont ceramics in this region is the use of basalt as a tempering agent. Most of the basalt was derived from local sources on the flanks of the Aquarius Plateau, suggesting local manufacture. The presence of small amounts of Snake Valley Gray and Snake Valley Black-on-gray, and to a lesser extent Ivie Creek Black-on-white, suggest interaction with and a logistical orientation toward Fremont groups in the Parowan Valley. Geib and Lyneis (1996) consider these to be actual trade wares. Would a closer examination of ceramic properties from specific Fremont sites reveal spatial patterning in the raw materials used? Could this patterning be used to calculate transport costs? For example, is proximity to a residential base a determining factor in tempering sources? Or were greater distances involved to acquire preferred materials? Were local graywares traded to other Fremont groups to the north and northwest?

There was very little trade ware from Ancestral Puebloan groups early in Formative times, but this began to change after AD 750. Although the chronometric data are currently limited, does the appearance of small amounts of Ancestral Puebloan trade wares after AD 750 represent an expansion of Fremont trade networks to include Ancestral Puebloan groups, or does it reflect diminished relationships with their traditional Fremont partners in the Parowan area? Fremont ceramics are extremely rare in upland Virgin Branch contexts. If Ancestral Puebloan trade wares on Fremont sites are evidence of an increasingly permeable boundary, what was being traded back to the Ancestral Puebloans? How might this be recognized in the archaeological record?

The absence of a Fremont pithouse tradition prior to about AD 750 is perplexing. And when pithouses do appear, they are accompanied by numerous Ancestral Puebloan accoutrements, such as tunnel-vent entryways, interior benches, wall and floor niches, subfloor storage, wing walls, and antechambers. Does this pattern also reflect increasingly permeable boundaries between Ancestral Fremont and Ancestral Puebloan groups, and if so, what are the implications in terms of exchange and intermarriage? Were Fremont groups slowly absorbing the architectural and material culture traits of their neighbors, in effect losing their own separate identity? Is a rigid preference for basalt-tempered pottery during these changes evidence of persistent conservatism or merely a function of economic necessity in that basalt tempering sources were close by?

Pithouse construction is generally seen as a male activity and ceramic production as a female activity. If architecture reflects influences from Ancestral Puebloan groups, then it might indicate Ancestral Puebloan males were assimilated or acculturated into the Fremont social units. But Fremont ceramics did not change and they do not appear at Ancestral Puebloan sites. This suggests Fremont females were entrenched in their traditional ways and did not leave their Escalante River homelands. What social dynamics are involved when males from one group assimilate into another, but there is no reciprocal exchange of females? Or were Fremont females integrated into Ancestral Puebloan social units in the Grand Staircase, but in the absence of readily available basalt they simply adapted their pottery making to include tempering agents that were locally available, such as sand and quartzite? And if this was the case, then basalt tempering would not have been a rigid marker of ethnic identity.

Elsewhere in the Monument, McFadden (2016) has reported a number of intriguing Fremont-age radiocarbon dates from granaries on the Kaiparowits Plateau. He has suggested that Fremont farmers were exploiting limited areas around a number of springs and seeps. The size of dated granaries suggests agriculture was extremely successful at elevations above 7,000 feet. Recent inventories in the Lake Pasture area, however, demonstrate that the settings of Fremont residential sites, although few in number, are indistinguishable from those of later Ancestral Puebloan dry farming sites (Spangler and Zweifel 2016a). In other words, Fremont sites on the plateau are not clustered around springs and seeps, but were oriented toward sage flats that would have required dry farming.

Dry farming was not a new agricultural practice in early Formative times. Basketmaker II groups in southeastern Utah were predominantly dry farmers (Matson et al. 1990), and there is some evidence of this in the Grand Staircase region in Basketmaker III times and later (McFadden 2016). Would a broader examination of Fremont residential sites on the Kaiparowits Plateau demonstrate that Fremont groups were actually dry farming prior to AD 1050? Could Fremont dry farming be construed as further evidence of increasingly permeable boundaries wherein Fremont farmers accustomed to planting along permanent water sources learned dry farming techniques from their Ancestral Puebloan neighbors?

And if they were dry farming on Fiftymile Mountain, are there other Fremont areas that could have accommodated this strategy? For example, the complex of Ancestral Puebloan sites in the Lampstand area also produced radiocarbon dates consistent with an earlier Fremont presence in that region. Could the expansion of Ancestral Puebloan farmers into the Circle Cliffs area in late Pueblo II times be simply a continuation of Fremont dry farming in the same area? Is there evidence elsewhere on the northern Colorado Plateau for Fremont dry farming?

McFadden (2016) has proposed a bi-seasonal mobility model for the Fremont farming wherein populations dispersed in the spring to farm areas along permanent water sources, and then, in the fall, they returned to their winter homes on the well-forested flats near Escalante to exploit mule deer winter ranges. Indeed, a large number of Fremont pithouses have been identified in the Big Flat area southeast of Escalante. Excavations at three of those sites, however, failed to identify convincing evidence of winter occupations. Deer bone was present, but not in significant quantities. There was minimal evidence of cold-weather features and on-site storage was minimal to non-existent. And food-processing pits suggested plant processing.

In other words, the excavated sites had all the trappings of spring or fall foraging bases, not winter residences focused on deer hunting (Jordan and Talbot 2002; Schaub 2003). Does this assessment reflect a sampling bias in that the sites selected for excavation were not winter residences, but other sites in the same area were? Or were winter residences located elsewhere, perhaps in the Wide Hollow area where pithouse sites exhibit voluminous on-site storage? Could renewed investigations at the Arrowhead Complex at Wide Hollow shed light on Fremont residential strategies, population aggregations, and seasonal use?

Ancestral Puebloan Farmers

The Formative in the Grand Staircase region is also demarcated by the appearance of gray-


Photo: Dan Bauer

ware ceramics at about AD 500, but unlike contemporaneous Fremont graywares these were tempered with sand and quartzite. These graywares, referred to as North Creek Gray and Shinarump Gray, were used throughout the entire Formative period until farming was abandoned at about AD 1280. Also appearing at this time were various painted wares that have analogs to types in the Kayenta area, all of which serve as sensitive temporal markers that are, for the most part, not present among the Fremont.

As we discussed in Chapter 6, the Formative is the most thoroughly researched period in this region, resulting in more than a dozen major excavations, scores of radiocarbon and tree-ring dates, and greater temporal and spatial precision that allows placement of local agricultural lifeways into broader Southwestern contexts (see McFadden 2016). In some respects, Virgin Branch adaptations during the Formative mirror contemporaneous events occurring elsewhere in the Southwest. On the other hand, Virgin Branch farmers seem to have been unaffected by developments elsewhere, such as aggregations into large pueblos and participation in the Chacoan sociopolitical climate.

Perhaps the most perplexing issue surrounding the beginning of the Formative is the suite of radiocarbon dates from the Little Jug Site near Mt. Trumbull that suggest grayware ceramics appeared by about AD 300 (Thompson and Thompson 1974, 1978), or two centuries before they appeared elsewhere in the region. These early dates have not been replicated anywhere else in the Southwest. The early dates should not be casually rejected. Recent research has demonstrated that maize agriculture appeared centuries earlier than traditionally thought, bow-and-arrow technology was widely available much earlier than traditionally thought, and formal architecture oriented toward critical resources was present during the Archaic. It is just as likely that ceramics also appeared much earlier. Re-investigation of the Little Jug site could validate or lay to rest what appears to be anomalous data.

Researchers have repeatedly commented on the nature of Virgin Branch sites where earlier occupations were obscured by later ones and earlier architecture was remodeled and modified by subsequent groups. In some instances, the culture history of individual sites extends hundreds of years. But how to recognize earlier versus later use of the same site has bedeviled generations of researchers. This problem is accentuated by the fact that later occupations are not decidedly different from earlier ones, and changes to site layout and architectural patterns was a slow process of accretion rather than replacement. Issues related to site patterning and architectural changes over time can only be resolved through fine-scale excavations at sites with multiple, sequential occupations.

Researchers elsewhere in the Southwest have noted that periods of occupation were followed by long periods of abandonment and then reoccupations. These abandonments reflect population shifts to nearby areas in response to environmental factors such as extended drought and nutrient depletion of the soils (Matson et al. 1990). Similar abandonments and reoccupations were likely in the Grand Staircase region. For example, McFadden (1998) identified a robust Basketmaker III occupation on the Glendale Bench, followed by abandonment, and then a reoccupation in Pueblo II times, but with no evidence of intervening occupations. Can more careful chronometric control identify abandonments and reoccupations elsewhere in the region? How do these population shifts correspond to local and regional climatic histories?

Higher-elevation Basketmaker III sites have been documented above Parunuweap Canyon and the Shinarump Cliffs, which might be evidence of dry farming by about AD 500, even though field features usually associated with dry farming have not been identified. An alternative explanation is that these sites represent winter occupations located in proximity to abundant fuel resources. Would more thorough inventories in these upland settings identify evidence of dry farming, such as check dams, terraces, and trincheras? Would detailed excavation of residential sites identify evidence of winter occupations, such as abundant fire hearths and more substantial pithouse construction to improve thermal retention? Or was dry farming limited to only those areas with unique soil qualities that allowed exceptional water retention? Determining how dry farming might have been practiced without water control and soil conservation features remains a major data gap in the entire Virgin Branch region.

Certain painted ceramics serve as sensitive temporal markers and these have been conveniently organized within the context of the Pecos Classification. Grand Staircase painted wares all have analogs in the Kayenta region, and it is assumed the temporal ranges established for the Kayenta region, all based on Arizona tree-ring dates, are applicable to similar types found in the Monument. But this has not yet been demonstrated by tree-ring dates specific to the Monument. Various temporal assumptions related to ceramic types warrant verification.

The expansion of agricultural practices into the Kaiparowits Plateau sometime after AD 1050 is indisputable. This area, with the exception of a few springs, is largely devoid of water, which would have required dry farming. Under modern climatic regimes, dry farming in this environment would have been successful only once every two or three years, an exceptionally high failure rate (Spangler and Zweifel 2016a).

Dryland farming of the mesa tops might have begun by about AD 500. But this risky strategy only works with water control and soil retention measures — none of which have yet been documented in the Monument.

But are modern climates the appropriate comparison to prehistoric conditions? Fine-scale paleoenvironmental studies specific to the upland plateaus could identify climatic anomalies that made farming of the high plateaus possible at this time, such as warmer and wetter conditions that extended growing seasons and allowed for adequate precipitation at critical points in the growing season. Paleoenvironmental reconstructions are critical to understanding late Formative population dynamics in the region and should be considered a priority.

Researchers elsewhere in the Southwest have noted that extended droughts prompted Ancestral Puebloan groups to shift to higher elevations with greater precipitation. This was especially conspicuous in Pueblo I times (Hurst 1992). In the Grand Staircase, the most recent tree-ring cutting dates are at about AD 1150, or during an extended drought that enveloped the entire Southwest (Benson and Berry 2007). Yet on the Kaiparowits Plateau, the cutting dates begin in earnest at about AD 1150 and continue for the next 50 years. This might indicate a vertical population shift from lower elevations in the Grand Staircase into upland plateau settings on the Kaiparowits Plateau at about AD 1150. Such a response to drought conditions is entirely speculative because the sample of tree-ring dates is so small. A focused effort to augment the tree-ring data base could contribute important insights into how farming groups responded to persistent drought conditions, the timing and duration of the droughts, and population shifts in response to droughts.

The Late Prehistoric

The demise of agriculture as a primary subsistence strategy was apparently a long process occurring over a century or more. The first wave of depopulation occurred in the wake of the extended drought in the middle AD 1100s, but some farming groups remained behind. Another abandonment might have occurred about AD 1280 during another extended drought, as we discussed in Chapters 6 and 7. The timing of this second abandonment coincides generally with the arrival Ancestral Paiute foragers in the Grand Staircase region. Based on the current dataset, there is no convincing evidence the two groups coexisted, although the overlapping 95 percent probability ranges of the radiocarbon dates suggests it was certainly possible. There is no doubt that Ancestral Paiute groups were still foraging in the area at the time of historic contact in 1776.

Many of the questions raised above for the Archaic period are also applicable to the Late Prehistoric. Very little problem-oriented research has been conducted into Ancestral Paiute hunting and gathering, although there are exceptions (cf. Geib et al. 2001). What little is known about Ancestral Paiute adaptations in the Monument is inferential and was derived from ethnographic observations (Kelly 1964, 1976) that have not been verified by archaeological investigations. In fact, the entire Late Prehistoric period must be viewed as a major data gap, at least as it applies to the Monument. Ancestral Paiute residences and storage structures have yet to be excavated, and archaeologists have only broad-scale understandings of land-use patterns and how these were similar to or different from Archaic patterns. Almost nothing is known about Late Prehistoric adaptations in the Escalante River Basin, and only slightly more is known about those in the Kaiparowits Plateau.

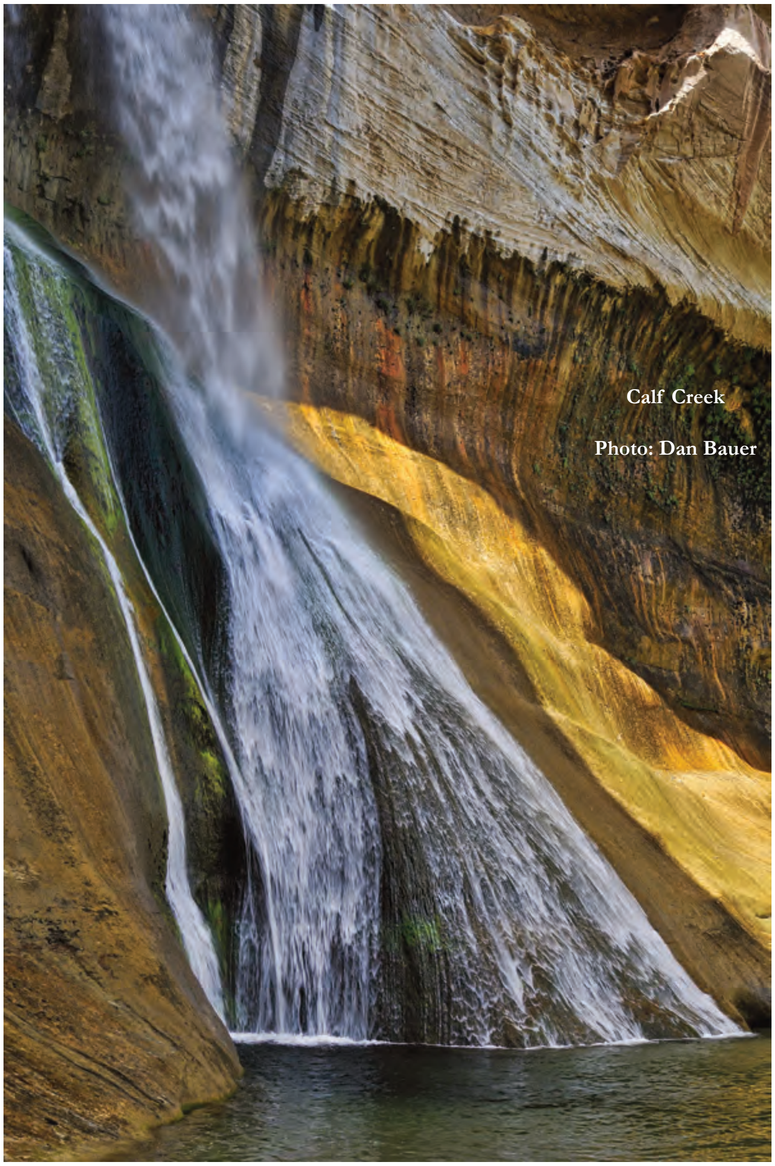
Kelly's detailed observations (1964, 1976) are specific to areas within and immediately adjacent to the Monument, and these offer unique opportunities to examine the archaeological record within the contest of ethnographic analogy. The ethnohistoric record suggests Numic-speaking groups maintained longstanding trading relationships with Puebloan groups in New Mexico (see Tyler 1951), but there was general mistrust and occasionally the relationship turned hostile. If this socioeconomic relationship existed in prehistoric times, it is also possible that Virgin Branch populations traded with co-existing Ancestral Paiute foragers.

As observed by Kelly (1964), the common Southern Paiute trade currency was buckskins. The Ancestral Puebloan currency might have been domesticated foods, although drought conditions would have made food resources a precious commodity in late Formative times. Another currency might have been ceramics. If the ethnohistoric pattern is evident in the Monument, then comprehensive inventories focused around terminal Formative pueblos, such as the Arroyo Site and Pottery Knoll, might identify Ancestral Paiute encampments in close proximity, and these sites should reflect a mix of Ancestral Paiute artifacts and Puebloan ceramics. The absence of Ancestral Paiute artifacts at the pueblos might simply be that items traded to the Ancestral Puebloans were perishable, such as buckskins.

The current radiocarbon database suggests that areas to the south and west of the Monument were exploited to a much greater extent, and that the northern Grand Staircase, Kaiparowits Plateau, and Escalante River Basin were on the extreme eastern and northern fringes of Ancestral Paiute foraging territories. As we suggested in Chapter 8, the database is probably biased by the fact more archaeological research has been conducted in the Las Vegas and St. George areas. But the disparity is nonetheless quite remarkable. Eighty percent of all Ancestral Paiute radiocarbon dates are from lowland settings. Is the diminishing number of sites from west to east an accurate indication of Late Prehistoric land use patterns? Is Ancestral Paiute foraging primarily a lowland phenomenon with only occasional use of the uplands? Would future research directed at Late Prehistoric sites demonstrate a robust Ancestral Paiute presence in the uplands that is currently not documented? The rarity of relevant chronometric data is a major data gap.

If the spatial patterning of dated Ancestral Paiute sites accurately reflects infrequent use of the uplands in Late Prehistoric times, then it would have implications related to the questions above regarding co-existence of two different cultural entities. If Ancestral Paiutes were few in number, it would have been difficult for them to displace remnant Puebloan populations, either through force (Sutton 1986) or by appropriation of critical wild resources (Janetski 1994). In effect, the population balance would have favored sedentary farmers even if their numbers were dramatically fewer than in earlier generations. This seems to support the idea that Ancestral Paiutes reoccupied the region immediately upon abandonment of the pueblos.

Ancestral Paiute base camps of longer duration are underrepresented in the archaeological record, although they are probably present. Kelly's ethnographic research (1964) contains detailed information about the location of specific springs that were used as seasonal base camps. This information could be used to identify and investigate



Calf Creek

Photo: Dan Bauer

specific Ancestral Paiute base camps. Such investigations could demonstrate generational continuity from prehistoric times into the ethnographically observed present, as well as changes in subsistence and settlement resulting from Euro-American contact.

Most of the site data relevant to the Late Prehistoric are suggestive of very small social units, perhaps one or two families, engaged in highly mobile hunting and foraging activities throughout the region. In fact, relative site complexity seems to be much less in Late Prehistoric times compared to Archaic sites. This would appear to be consistent with Kelly's observations (1964) that economic clusters were small, and only rarely did multiple families gather for rabbit drives and deer and antelope hunts. But is this observation biased by the fact small sites a few hundred years old are better preserved than those several thousand years old? Could Archaic hunting and gathering also have reflected a predominance of single-event activities, but evidence of this has simply eroded away? Are surface artifacts observed during inventories an accurate indication of temporal affinity, or, as Geib et al. (2001) cautioned, do simple sites with the outward appearance of a single occupation actually mask multiple occupations?

Brown ware ceramics are typically seen as a good indication of Ancestral Paiute occupations, and indeed this artifact types seems to have appeared in the Grand Staircase and St. George Basin by about AD 1250. Yet this artifact type has not received the same scrutiny as Ancestral Puebloan ceramics (see Betenson 2005). For example, were there regional differences in the materials used to make brown ware, or were brown wares made in southern Nevada indistinguishable from those made in Escalante? Were brown ware ceramics found on the Kaiparowits Plateau made with local materials, or were vessels transported long distances from a source in the Kanab area or even further afield? Brown ware vessels were large, heavy, and fragile, and they would seem unsuitable to high mobility. Does their presence at any given site suggest local production? What were the economic advantages of transporting these vessels long distances? Or do brown ware vessels represent items manufactured and then cached for subsequent use during return visits to the same site?

Roberts (2013, 2017) has suggested a gradual phasing out of complex architecture and an increase in settlement mobility in southern Nevada at about AD 1250, and that a co-residential pattern by sedentary and mobile groups best explains the archaeological evidence in that region. But there is little evidence for co-resident groups in the northern Grand Staircase at any point in the Formative. Is this merely a sampling error? Were Formative farmers always engaged socially and economically with mobile groups? Does the Ancestral Paiute occupation merely reflect the fact farmers left and foragers remained behind? And by inference, were Ancestral Paiutes present in the region centuries before the appearance of cultural markers like brown ware ceramics? Could brown ware ceramics simply reflect Ancestral Paiute attempts after about AD 1250 to replace Puebloan wares that were no longer available to them through trade?

Allison et al. (2008) has suggested that Ancestral Paiute agriculture was more diverse and more intensive than traditional explanations have allowed. There is certainly good evidence for this in the St. George Basin. But there is minimal evidence for Ancestral Paiute agriculture near the Grand Staircase, with the exception of bean pods at one site (Nielson 1993) and bean pollen at another (D'Andrea 2015). Is this also a sampling error? Or did the higher elevations of the Grand Staircase prevent or discourage agriculture? Most evidence of Ancestral Paiute farming has been identified along major rivers (Allison et al. 2008). Would evidence of farming also be found along Kanab Creek and the Paria River, or were these water sources, neither of which can be considered major rivers, inadequate to sustain agriculture in the Ancestral Paiute pattern?

According to Kelly's consultants (1964, 1976), the Kanab area was of major importance to Southern Paiutes, who had so many winter camps they could not be counted. Why is there so little archaeological to support this? Have all traces of this been erased by modern developments? Or would more focused inventories identify these winter camps? And would excavations of such sites demonstrate the origin of the Southern Paiute pattern articulated by Kelly appeared centuries prior to Euro-American contact? More fundamentally, are Kelly's observations (1964, 1976) made 70 years after Euro-Americans first settled along Kanab Creek even reliable? Could researchers using her ethnographic data demonstrate the validity of her observations archaeologically?

Historical Perspective

In the previous chapters, we have outlined the culture history of Monument and surrounding areas based on the archaeological research that has been done to date. The vast majority of this discussion was focused on research conducted over the past 25 years. Not only was this research of much better quality than that of earlier generations, but the research has resulted in new interpretations of the cumulative dataset. And because of this research, old ideas are being discarded (reluctantly by some, enthusiastically by others).

The examples discussed above are but a tiny sample of the research conducted over the past 25 years. In fact, this research has contributed new insights into every phase of prehistoric human occupancy of the region from Paleo-Archaic times through the Late Prehistoric. Research has addressed a variety of salient archaeological questions. Most important, we now have a valid database from which we can explore a multitude of questions related to prehistoric human behavior.

There remain more questions than answers, however. The vast majority of this research has focused on Formative lifeways, either on the Fremont of the Escalante River Basin or the Ancestral Puebloans of the Kaiparowits Plateau and Grand Staircase. This preoccupation with more highly visible residential and storage sites has inevitably resulted in a comparative lack of research into foraging and hunting during Archaic and Late Prehistoric times.

The very nature of archaeological research is that it rarely provides definitive answers. Instead, it raises more and more questions as researchers propose new ideas and then modify their hypotheses through on-the-ground testing. It is likely, if not expected, that researchers two decades from now will chuckle in disbelief at the concepts and conclusions offered in this overview. Archaeological research is simply a spectrum of possibilities and probabilities, and certainty will always remain elusive. It will be exciting to see what future research reveals if and when the nation's largest outdoor laboratory realizes its full potential.

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